112th Congress, 2d Session – – – – – – – – – – – – House Document 112–142

OHIO RIVER SHORELINE, PADUCAH, KENTUCKY RECONSTRUCTION PROJECT

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY, CIVIL WORKS, THE DEPARTMENT OF DEFENSE

TRANSMITTING

RECONSTRUCTION PROPOSAL FOR THE OHIO RIVER SHORELINE, PADUCAH, KENTUCKY

PART 2 OF 2

SEPTEMBER 19, 2012.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE

78–661 WASHINGTON : 2012

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

Ohio River Shoreline, Paducah, Kentucky

Volume 4 (Continued)

Slip Surface Limits

Left Coordinate: (0, 339.3218) ft
Right Coordinate: (224.5, 330.75) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	0	302
	225	302

Piezometric Line 2

Coordinates

	X (ft)	Y (ft)
	132.5	350.2
	225	350.2

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)

Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Foundation Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37048224
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37005407)
Data Point: (0.020691381, 0.37005407)
Data Point: (0.042813324, 0.37005407)
Data Point: (0.088586679, 0.37005407)
Data Point: (0.18329807, 0.37005407)
Data Point: (0.37926902, 0.37005407)
Data Point: (0.78475997, 0.37005407)
Data Point: (1.6237767, 0.37005407)
Data Point: (3.3598183, 0.37005407)
Data Point: (6.951928, 0.37005407)
Data Point: (14.384499, 0.37005407)
Data Point: (29.763514, 0.37005407)
Data Point: (61.584821, 0.37005407)
Data Point: (127.4275, 0.37005407)
Data Point: (263.66509, 0.37005407)
Data Point: (526.83766, 0.36911026)
Data Point: (1128.8379, 0.34318275)
Data Point: (2335.7215, 0.2703264)
Data Point: (4832.9302, 0.21728994)
Data Point: (10000, 0.18487617)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay

Slope Stability RDD

Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 35 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.011
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Foundation Clay	29,4,21,19,3,24,26,25,23,2,20,22,9,10,11,12,13,14,15,27,28,1	9822.254
Region 2	Embankment Fill	21,5,3,19	4.7054975
Region 3	Embankment Fill	8,2,20,22	4.8603244
Region 4	I wall	3,5,6,7,8,2,23,25,26,24	42.081158

Points

	X (ft)	Y (ft)
Point 1	0	339.3218
Point 2	134.73896	336.10876
Point 3	132.34	336.06
Point 4	103.5	340.15
Point 5	132.25	340.35
Point 6	132.5	350.25
Point 7	134.5	350.25
Point 8	134.75	341.05
Point 9	145.5	340.15
Point 10	160.5	334.75
Point 11	163.5	334.85
Point 12	191.5	333.75
Point 13	206.5	332.75
Point 14	208.5	333.05
Point 15	224.5	330.75
Point 16	259.5	324.15
Point 17	302.5	316.85
Point 18	363.5	307.85
Point 19	131.19568	336.11061
Point 20	135.75695	336.14638
Point 21	131.18517	340.34259
Point 22	135.72336	340.96851
Point 23	134.08446	336.13791
Point 24	133.23483	336.06672
Point 25	134.08	325.1
Point 26	133.24	325.1
Point 27	224.5	294
Point 28	0	294
Point 29	1.07396	339.2504

Critical Slip Surfaces

Slope Stability Steady state

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File Information

Title: Paducah 156+25 A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 37
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:22:46 AM
File Name: Paducah 156+25 A F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 11:22:56 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady state

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Left to Right
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Clay

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: Embankment Clay

Clay and Silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: Clay and Silt

Clayey Gravel and Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 31 °
Vol. WC. Function: Clayey Gravel and Sand

Slip Surface Limits

Left Coordinate: (0, 339.2011) ft
Right Coordinate: (428.1404, 328.001) ft

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure

Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Clay and Silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.30136034
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25001108)
Data Point: (0.023357215, 0.25001108)
Data Point: (0.054555948, 0.25001108)
Data Point: (0.1274275, 0.25001108)

Data Point: (0.29763514, 0.25001108)
Data Point: (0.6951928, 0.25001108)
Data Point: (1.6237767, 0.25001108)
Data Point: (3.7926902, 0.25001108)
Data Point: (8.8586679, 0.25001108)
Data Point: (20.691381, 0.25001108)
Data Point: (48.329302, 0.25001108)
Data Point: (112.88379, 0.25001108)
Data Point: (263.66509, 0.25001108)
Data Point: (615.84821, 0.25001108)
Data Point: (1438.4499, 0.25001108)
Data Point: (3359.8183, 0.25001108)
Data Point: (7847.5997, 0.25001108)
Data Point: (22386.337, 0.24999713)
Data Point: (41676.621, 0.24961794)
Data Point: (100000, 0.24671383)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 0.4 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.01
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Clayey Gravel and Sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2015675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.19079819)
Data Point: (0.023357215, 0.19079819)
Data Point: (0.054555948, 0.19079819)
Data Point: (0.1274275, 0.19079819)
Data Point: (0.29763514, 0.19079819)
Data Point: (0.6951928, 0.19079819)
Data Point: (1.6237767, 0.19079819)
Data Point: (3.7926902, 0.19079819)
Data Point: (8.8586679, 0.19079819)
Data Point: (20.691381, 0.19079819)
Data Point: (48.329302, 0.19079819)
Data Point: (112.88379, 0.19079819)
Data Point: (263.66509, 0.19079819)

Slope Stability Steady state

Data Point: (615.84821, 0.19079819)
Data Point: (1438.4499, 0.19079819)
Data Point: (3359.8183, 0.19079819)
Data Point: (7053.0967, 0.19063688)
Data Point: (21364.961, 0.18949932)
Data Point: (42813.324, 0.18069069)
Data Point: (100000, 0.14428002)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 0.31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Embankment Clay	6,7,8,9,23,10,18,11,20,22,21,19	1550.1716
Region 2	Clay and Silt	1,14,15,13,12,11,20,22,21,19,6,5,4,3,2	4858.5978
Region 3	Clayey Gravel and Sand	14,16,17,15	2996

Points

	X (ft)	Y (ft)
Point 1	0	339.2011
Point 2	29.1296	338.3419
Point 3	91.6863	326.041
Point 4	115.903	325.7188
Point 5	135.0478	329.2969
Point 6	177.4173	329.7749
Point 7	257.0184	348.8609
Point 8	260.4708	349.0436
Point 9	265.9396	348.834
Point 10	314.396	332.8219
Point 11	338.5169	328.774
Point 12	379.0807	328.269
Point 13	428.1404	328.001
Point 14	0	318.6
Point 15	428	318.6
Point 16	0	311.6
Point 17	428	311.6
Point 18	333	329.69983
Point 19	258	330
Point 20	266	330

Slope Stability Steady state

Point 21	259	324
Point 22	265	324
Point 23	282	343.52695

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.713	(303.545, 375.482)	28.63375	(261.924, 348.988)	(317.188, 332.353)
2	715	3.927	(303.545, 375.482)	45.74	(266.503, 348.648)	(318.26, 332.173)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	262.7439	348.05495	72.601023	76.722513	2.0101853	200
2	Optimized	264.38445	346.1891	176.80551	279.66165	50.166294	200
3	Optimized	265.57215	344.8691	254.62562	430.63752	85.846741	200
4	Optimized	267.0705	343.29065	350.2604	587.74469	115.82883	200
5	Optimized	269.16215	341.38815	468.48478	802.36384	162.8437	200
6	Optimized	271.08365	339.9658	559.00273	932.4102	182.12299	200
7	Optimized	273.0052	338.5434	649.9808	1062.4984	201.19827	200
8	Optimized	275.01835	337.17885	737.99829	1203.2484	226.91766	200
9	Optimized	277.12305	335.87215	822.80573	1317.8051	241.42731	200
10	Optimized	279.11235	334.76	895.31466	1435.542	263.48648	200
11	Optimized	280.9863	333.84235	955.41447	1509.4446	270.21857	200
12	Optimized	281.96165	333.3689	986.32104	1568.8123	284.09998	200
13	Optimized	282.9883	332.9775	1012.1476	1596.2443	284.88302	200
14	Optimized	284.96495	332.2239	1061.5471	1649.0475	286.54307	200
15	Optimized	286.73885	331.6267	1100.6433	1708.2033	296.32681	200
16	Optimized	288.30995	331.18595	1129.6302	1731.2457	293.42751	200
17	Optimized	289.88105	330.7452	1158.3106	1754.2268	290.64776	200
18	Optimized	291.8156	330.29465	1187.7129	1788.823	293.18096	200
19	Optimized	294.32245	329.86465	1215.8619	1803.8285	286.77045	200
20	Optimized	296.92915	329.56335	1235.6596	1803.5698	276.98831	200
21	Optimized	299.2514	329.44645	1243.5793	1785.884	264.49968	200
22	Optimized	301.39815	329.4156	1245.9547	1745.9203	243.84948	200
23	Optimized	303.54485	329.38475	1248.1905	1705.9565	223.26744	200
24	Optimized	305.58675	329.4074	1246.9939	1672.1501	207.36249	200
25	Optimized	307.52385	329.4836	1242.403	1622.6293	185.44879	200
26	Optimized	309.4139	329.7452	1226.167	1589.05	176.98987	200
27	Optimized	311.2656	330.22695	1196.2197	1493.4619	144.97469	200
28	Optimized	313.126	330.74345	1164.056	1386.2496	108.37104	200
29	Optimized	314.2261	331.07505	1143.3864	1344.299	97.991644	200
30	Optimized	315.09395	331.44965	1120.0519	1273.1061	74.649543	200
31	Optimized	316.48985	332.05215	1082.4954	1177.3403	46.258978	200

Slices of Slip Surface: **715**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)

Slope Stability Steady state

1	715	267.3636	347.5334	111.20914	101.46746	-4.7513308	200
2	715	269.08555	345.4315	234.56104	314.24684	38.865357	200
3	715	270.80745	343.5612	347.09966	504.06949	76.5593	200
4	715	272.5294	341.88345	450.02238	674.00944	109.24579	200
5	715	274.25135	340.3704	544.21065	826.39395	137.62999	200
6	715	275.97325	339.0014	630.37231	963.02505	162.24558	200
7	715	277.69515	337.7607	709.1903	1085.3428	183.46185	200
8	715	279.4171	336.63595	781.08967	1194.5004	201.63386	200
9	715	281.13905	335.6173	846.51804	1291.4197	216.99304	200
10	715	282.85255	334.7008	905.55341	1376.5311	229.71119	200
11	715	284.5576	333.87915	958.52441	1450.5652	239.98431	200
12	715	286.26265	333.1421	1006.1245	1514.481	247.94203	200
13	715	287.9677	332.48525	1048.5813	1568.7914	253.72343	200
14	715	289.67275	331.905	1086.0308	1613.7055	257.36415	200
15	715	291.3778	331.3983	1118.7239	1649.6485	258.94924	200
16	715	293.08285	330.96265	1146.8462	1676.8494	258.49981	200
17	715	294.7879	330.596	1170.5063	1695.3748	255.99548	200
18	715	296.49295	330.29665	1189.7836	1705.5187	251.54083	200
19	715	298.198	330.06325	1204.8396	1707.2784	245.05578	200
20	715	299.90305	329.8948	1215.7962	1700.7467	236.52614	200
21	715	301.6081	329.79055	1222.6185	1686.0006	226.00655	200
22	715	303.31315	329.7501	1225.3427	1662.9777	213.44883	200
23	715	305.0182	329.7733	1224.1359	1631.5951	198.73109	200
24	715	306.72325	329.86015	1218.8258	1591.8104	181.91673	200
25	715	308.4283	330.0111	1209.5455	1543.5088	162.88479	200
26	715	310.13335	330.2268	1196.1493	1486.4521	141.5901	200
27	715	311.8384	330.50815	1178.6806	1420.5189	117.95243	200
28	715	313.54345	330.8564	1157.0238	1345.3685	91.861857	200
29	715	315.3621	331.30585	1129.0407	1256.834	62.328953	200
30	715	317.29425	331.86885	1093.9271	1168.5108	36.376898	200

Slope Stability Steady State

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File Information

Title: 175+12A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 45
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:42:41 AM
File Name: Paducah 175+12B F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 11:50:08 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady State

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Clay

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: embankment clay

Debris

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 27 °
Vol. WC. Function: Debris

Clay and Silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: clay and silt

Clayey Gravel and Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 31 °
Vol. WC. Function: clayey gravel and sand

Slip Surface Limits

Left Coordinate: (0, 335.125) ft
Right Coordinate: (574.1246, 337.6329) ft

Vol. Water Content Functions

Debris

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19999934
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.1, 0.19999929)
Data Point: (0.14384499, 0.19999859)
Data Point: (0.20691381, 0.19999718)
Data Point: (0.29763514, 0.19999432)
Data Point: (0.42813324, 0.19998852)
Data Point: (0.61584821, 0.19997673)
Data Point: (0.88586679, 0.19995275)
Data Point: (1.274275, 0.19990397)
Data Point: (1.8329807, 0.19980471)
Data Point: (2.6366509, 0.19960286)
Data Point: (3.7926902, 0.19919303)
Data Point: (5.4555948, 0.19836402)
Data Point: (7.8475997, 0.19670002)
Data Point: (11.288379, 0.19341173)
Data Point: (16.237767, 0.18711026)
Data Point: (23.357215, 0.17571597)
Data Point: (33.598183, 0.15711748)
Data Point: (48.329302, 0.13126)
Data Point: (69.51928, 0.10214438)
Data Point: (100, 0.075804198)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Sand
Saturated Water Content: 0.2 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 100
Minimum: 0.1
Num. Points: 20

embankment clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %

Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

clayey gravel and sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19342789
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.18997613)
Data Point: (0.023357215, 0.18997613)
Data Point: (0.054555948, 0.18997613)
Data Point: (0.1274275, 0.18997613)
Data Point: (0.29763514, 0.18997613)
Data Point: (0.6951928, 0.18997613)

Data Point: (1.6237767, 0.18997613)
Data Point: (3.7926902, 0.18997613)
Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (4769.8134, 0.18949932)
Data Point: (11131.953, 0.18790673)
Data Point: (21364.961, 0.18267395)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2513675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.01610262, 0.24989967)
Data Point: (0.025929438, 0.24989967)
Data Point: (0.041753189, 0.24989967)
Data Point: (0.067233575, 0.24989967)
Data Point: (0.10826367, 0.24989967)
Data Point: (0.17433288, 0.24989967)
Data Point: (0.28072162, 0.24989967)
Data Point: (0.45203537, 0.24989967)
Data Point: (0.72789538, 0.24989967)
Data Point: (1.1721023, 0.24989967)
Data Point: (1.8873918, 0.24989967)
Data Point: (3.0391954, 0.24989967)
Data Point: (4.8939009, 0.24989967)
Data Point: (7.8804628, 0.24989967)

Data Point: (12.68961, 0.24989967)
Data Point: (20.433597, 0.24989967)
Data Point: (32.903446, 0.24989967)
Data Point: (52.983169, 0.24989967)
Data Point: (85.316785, 0.24989967)
Data Point: (137.38238, 0.24989967)
Data Point: (221.22163, 0.24989967)
Data Point: (356.22479, 0.24989967)
Data Point: (573.61525, 0.24989967)
Data Point: (923.67086, 0.24989967)
Data Point: (1812.7854, 0.2498454)
Data Point: (3414.0428, 0.24965581)
Data Point: (5730.6727, 0.24887847)
Data Point: (7641.3555, 0.24785682)
Data Point: (10000, 0.24514068)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 30

Regions

	Material	Points	Area (ft^2)
Region 1	Clayey Gravel and Sand	34,32,33,35	6601
Region 2	Clay and Silt	33,28,29,11,12,13,14,15,30,26,27,31,32	10195.515
Region 3	Debris	25,27,31,21,22,20,19	1640.9231
Region 4	Debris	26,24,23,30	314.47259
Region 5	Debris	29,28,1,2,3,4,5,6,7,8,9,10,36	364.52734
Region 6	Embankment Clay	23,16,17,37,18,19,25,27,26,24	664.18275

Points

	X (ft)	Y (ft)
Point 1	0	335.125
Point 2	47.1877	334.6991
Point 3	52.7608	335.8419
Point 4	59.8609	335.6637
Point 5	62.8973	334.23
Point 6	65.4775	334.2425
Point 7	68.3984	335.378
Point 8	87.6283	335.665
Point 9	92.7868	334.9249

Slope Stability Steady State

Point 10	105.1336	334.3675
Point 11	124.5526	327.4429
Point 12	136.5964	327.0624
Point 13	157.062	325.7087
Point 14	177.9576	326.025
Point 15	194.9604	325.3005
Point 16	280.1259	350.082
Point 17	288.2718	350.0541
Point 18	323.9674	339.1601
Point 19	334.8666	337.8629
Point 20	349.0074	337.4019
Point 21	574.1246	337.6329
Point 22	353.70395	337.06029
Point 23	236.89948	337.50396
Point 24	280.2	337.6
Point 25	288.2	337.7
Point 26	281.2	331.7
Point 27	287.2	331.7
Point 28	0	331.7
Point 29	113	331.7
Point 30	216.79302	331.70992
Point 31	574	331.7
Point 32	574	313.1
Point 33	0	313.1
Point 34	574	301.6
Point 35	0	301.6
Point 36	106.63124	333.83346
Point 37	304.85751	344.99228

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.979	(229.028, 404.635)	55.29042	(301.82, 345.919)	(180.201, 325.929)
2	725	1.997	(229.028, 404.635)	93.496	(301.794, 345.927)	(178.443, 326.004)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	182.64705	324.53135	102.0838	323.99022	117.98973	225
2	Optimized	187.54015	321.73525	321.52378	724.04955	214.02675	225
3	Optimized	192.47355	319.07705	554.40765	1055.012	266.17603	225
4	Optimized	197.52015	316.5198	796.76305	1544.4254	397.5391	225
5	Optimized	201.8034	314.71045	970.14834	1834.931	459.8131	225
6	Optimized	205.2504	313.68595	1070.7866	2129.6156	562.98938	225
7	Optimized	207.19065	313.13685	1123.4003	2171.3143	557.18579	225
8	Optimized	209.0571	312.81945	1155.5029	2261.6148	664.6191	0
9	Optimized	212.3565	312.2583	1211.9454	2475.8513	759.43131	0
10	Optimized	215.3996	311.874	1255.8296	2561.3628	784.44349	0

11	Optimized	219.804	311.54625	1305.3537	2772.6658	881.65	0
12	Optimized	224.7214	311.36885	1349.2304	2874.6527	916.56614	0
13	Optimized	228.53425	311.4622	1369.1045	2999.193	979.456	0
14	Optimized	232.34715	311.5556	1389.2669	3123.7333	1042.1726	0
15	Optimized	235.57655	311.76215	1398.6237	3105.5637	1025.633	0
16	Optimized	239.16425	312.1957	1396.5337	3179.2206	1071.1463	0
17	Optimized	243.69375	312.74305	1394.4734	3275.0027	1129.936	0
18	Optimized	246.12775	313.05835	1392.3525	3186.1173	1077.8026	0
19	Optimized	248.2767	313.5868	1371.3054	3193.7935	969.03414	225
20	Optimized	252.4098	314.75445	1318.3215	3120.9071	958.45178	225
21	Optimized	256.7166	316.1161	1250.7981	3106.2955	986.58545	225
22	Optimized	260.9278	317.62855	1169.9571	2979.9733	962.40264	225
23	Optimized	265.04335	319.2919	1076.8048	2923.4286	981.86726	225
24	Optimized	268.84585	321.04365	976.30456	2730.8137	932.88906	225
25	Optimized	272.33535	322.8838	870.70194	2635.5027	938.36119	225
26	Optimized	275.82485	324.724	775.16275	2540.9521	938.88683	225
27	Optimized	278.84775	326.5131	694.88612	2315.8342	861.87336	225
28	Optimized	280.16295	327.4073	660.85863	2260.1508	850.35874	225
29	Optimized	280.7	327.77245	652.62533	2234.4632	841.0781	225
30	Optimized	282.73685	329.1573	657.25628	2108.1221	771.43906	225
31	Optimized	285.20225	330.9511	824.11503	1873.3507	557.88849	225
32	Optimized	286.74845	332.19815	1019.2064	1793.5513	377.67322	200
33	Optimized	287.78305	333.0326	1055.5437	1754.1682	355.96696	0
34	Optimized	288.2359	333.3979	1032.8775	1712.6453	346.35897	0
35	Optimized	288.8985	333.93235	999.70502	1651.6434	332.17917	0
36	Optimized	291.2752	336.0773	866.50581	1364.2077	253.59176	0
37	Optimized	294.02355	338.65215	699.16652	1014.4676	153.78261	200
38	Optimized	296.72135	341.1705	543.29691	721.10199	86.721335	200
39	Optimized	300.12025	344.33645	359.87284	352.101	-3.7905802	200

Slices of Slip Surface: **725**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	725	180.50795	324.7503	89.957918	313.33447	118.77142	225
2	725	184.6372	322.38205	270.1905	626.75755	189.59007	225
3	725	188.76645	320.28235	442.61665	883.37558	234.35568	225
4	725	192.89575	318.4315	610.22908	1092.1229	256.22748	225
5	725	196.83755	316.87755	762.94129	1354.1589	314.35598	225
6	725	200.5918	315.58955	893.39136	1671.0014	413.46259	225
7	725	204.34605	314.47625	1005.9333	1953.882	504.03323	225
8	725	208.10035	313.5312	1100.8441	2205.6602	587.44111	225
9	725	211.68135	312.77825	1174.884	2389.9929	730.11107	0
10	725	215.0891	312.19955	1233.3814	2574.8499	806.03556	0
11	725	218.80365	311.72135	1287.7562	2745.2291	875.73808	0
12	725	222.82495	311.3664	1336.6913	2897.889	938.06223	0
13	725	226.84625	311.18575	1375.0044	3023.3292	990.41342	0
14	725	230.86755	311.1784	1402.7599	3122.2721	1033.1871	0
15	725	234.88885	311.3443	1420.0512	3195.9031	1067.0395	0

16	725	238.76255	311.6657	1426.9733	3247.3313	1093.7814	0
17	725	242.48865	312.1319	1424.203	3278.5936	1114.2303	0
18	725	246.2147	312.7515	1412.2929	3289.3531	1127.8515	0
19	725	250.08075	313.56305	1386.2504	3276.0435	1004.8208	225
20	725	254.0868	314.5835	1342.829	3239.8354	1008.6562	225
21	725	258.0928	315.7962	1284.2084	3179.6193	1007.8078	225
22	725	262.0988	317.2092	1209.9296	3094.9842	1002.3013	225
23	725	266.1048	318.83245	1120.2685	2985.3051	991.65756	225
24	725	270.11085	320.67815	1017.124	2849.8218	974.46268	225
25	725	274.1169	322.7614	905.04931	2688.406	948.22757	225
26	725	278.1229	325.1009	794.78991	2500.539	906.96288	225
27	725	280.16295	326.3615	753.57686	2399.0182	874.89666	225
28	725	280.7	326.7173	746.43745	2366.5882	861.44946	225
29	725	284.2	329.24435	783.27451	2082.2941	690.70095	225
30	725	287.36295	331.5699	1127.5186	1856.7184	387.72243	225
31	725	287.86295	331.97295	1121.6608	1860.0967	376.2519	0
32	725	288.2359	332.27525	1102.906	1823.4814	367.15147	0
33	725	291.29985	335.013	932.95738	1482.684	280.09969	0
34	725	296.19445	339.6506	638.82642	861.89507	108.79785	200
35	725	299.9275	343.7535	394.62612	386.33675	-4.0429934	200

Slope Stability Steady state

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File Information

Title: Paducah 177+05 C
Comments: earthen levee
Created By: Minges, George C LRL
Revision Number: 83
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 12:12:40 PM
File Name: Paducah 177+05c F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 12:13:10 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady state

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Clay

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: embankment clay

Clay and Silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: clay and silt

Silty Mud

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 27 °
Vol. WC. Function: Silty Mud

Slip Surface Limits

Left Coordinate: (0, 329.44) ft
Right Coordinate: (261.8367, 327.54) ft

Vol. Water Content Functions

embankment clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure

Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.020691381, 0.21999998)
Data Point: (0.042813324, 0.21999995)
Data Point: (0.088586679, 0.21999988)
Data Point: (0.18329807, 0.21999969)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.78475997, 0.21999752)
Data Point: (1.6237767, 0.21999264)
Data Point: (3.3598183, 0.2199777)
Data Point: (6.951928, 0.2199314)
Data Point: (14.384499, 0.21978687)
Data Point: (29.763514, 0.2193343)
Data Point: (61.584821, 0.2179235)
Data Point: (127.4275, 0.21362613)
Data Point: (263.66509, 0.2014734)
Data Point: (545.55948, 0.17327571)
Data Point: (1128.8379, 0.12923352)
Data Point: (2335.7215, 0.087755139)
Data Point: (4832.9302, 0.060407646)
Data Point: (10000, 0.044010658)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 10000
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2601826
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25998123)
Data Point: (0.020691381, 0.25998123)
Data Point: (0.042813324, 0.25998123)
Data Point: (0.088586679, 0.25998123)

Data Point: (0.18329807, 0.25998123)
Data Point: (0.37926902, 0.25998123)
Data Point: (0.78475997, 0.25998123)
Data Point: (1.6237767, 0.25998123)
Data Point: (3.3598183, 0.25998123)
Data Point: (6.951928, 0.25998123)
Data Point: (14.384499, 0.25998123)
Data Point: (29.763514, 0.25998123)
Data Point: (61.584821, 0.25998123)
Data Point: (127.4275, 0.25998123)
Data Point: (263.66509, 0.25998123)
Data Point: (545.55948, 0.25998123)
Data Point: (1151.9502, 0.2583442)
Data Point: (2335.7215, 0.24584199)
Data Point: (4832.9302, 0.21435066)
Data Point: (10000, 0.18619499)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 30 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Silty Mud

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37999999
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37999999)
Data Point: (0.020691381, 0.37999997)
Data Point: (0.042813324, 0.37999992)
Data Point: (0.088586679, 0.3799998)
Data Point: (0.18329807, 0.37999947)
Data Point: (0.37926902, 0.37999851)
Data Point: (0.78475997, 0.37999571)
Data Point: (1.6237767, 0.37998729)
Data Point: (3.3598183, 0.37996148)
Data Point: (6.951928, 0.37988152)
Data Point: (14.384499, 0.37963187)
Data Point: (29.763514, 0.37885015)
Data Point: (61.584821, 0.37641332)

Slope Stability Steady state

Data Point: (127.4275, 0.36899059)
Data Point: (263.66509, 0.34799952)
Data Point: (545.55948, 0.2992944)
Data Point: (1128.8379, 0.22322153)
Data Point: (2335.7215, 0.15157706)
Data Point: (4832.9302, 0.10434048)
Data Point: (10000, 0.07601841)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.38 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Embankment Clay	5,27,6,7,8,25,26,9,13,16,15,14	1333.2343
Region 2	Silty Mud	21,19,17,18,20,22	2610
Region 3	Silty Mud	23,21,22,24	4489.2
Region 4	Clay and Silt	1,17,18,12,11,10,9,13,16,15,14,5,28,29,30,4,3,2	3534.0409
Region 5	Clay and Silt	30,29,28,5	16.401447

Points

	X (ft)	Y (ft)
Point 1	0	329.44
Point 2	2.6572	327.7818
Point 3	12.6443	327.7989
Point 4	14.7324	329.5039
Point 5	30.5158	330.8228
Point 6	93.2703	350.5922
Point 7	97.5013	350.874
Point 8	101.7313	350.6552
Point 9	162.9985	333.8041
Point 10	181.8955	332.5079
Point 11	214.0501	328.1119
Point 12	261.8367	327.54
Point 13	101.53514	332.42097
Point 14	93.47597	332.23961
Point 15	94.48622	326.23738
Point 16	100.52539	326.23738
Point 17	0	317.2
Point 18	261	317.2

Point 19	0	313.2
Point 20	261	313.2
Point 21	0	307.2
Point 22	261	307.2
Point 23	0	290
Point 24	261	290
Point 25	122.17126	345.03334
Point 26	129.49354	343.0194
Point 27	67	342.31633
Point 28	30.5	326
Point 29	27	326
Point 30	27	330.52901

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.802	(45.108, 383.834)	49.97264	(106.113, 349.45)	(2.65736, 327.782)
2	166	1.829	(45.108, 383.834)	68.153	(104.249, 349.963)	(6.33089, 327.788)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	5.1264835	326.25265	126.21822	398.04834	144.53464	225
2	Optimized	10.119955	323.31275	374.2842	833.3257	244.07669	225
3	Optimized	13.11381	321.63965	538.92199	1157.2897	328.79194	225
4	Optimized	14.15786	321.16505	592.16144	1235.6221	342.1341	225
5	Optimized	17.16842	320.05295	707.88125	1499.7471	421.04254	225
6	Optimized	21.18223	318.66485	837.99618	1698.5763	457.57855	225
7	Optimized	24.33781	317.6883	933.115	1874.8276	500.71749	225
8	Optimized	26.4578	317.0322	996.53082	1943.288	482.39685	100
9	Optimized	27.444045	316.727	1023.9712	2032.6032	513.92367	100
10	Optimized	29.201945	316.3716	1061.4458	2021.7891	489.31932	100
11	Optimized	31.908245	315.9226	1114.0812	2084.6248	494.51668	100
12	Optimized	34.69313	315.46055	1170.0155	2267.3058	559.09733	100
13	Optimized	38.170145	315.1368	1226.0152	2352.732	574.09086	100
14	Optimized	42.3393	314.9514	1282.4697	2549.5558	645.61261	100
15	Optimized	45.964935	314.9706	1321.2932	2588.4481	645.64766	100
16	Optimized	49.04705	315.1944	1341.6153	2683.9426	683.94991	100
17	Optimized	52.129165	315.4182	1362.0022	2779.4371	722.21918	100
18	Optimized	55.79935	315.9476	1369.7235	2745.116	700.7975	100
19	Optimized	60.161605	316.80295	1364.5808	2811.5118	737.2482	100
20	Optimized	64.697365	318.2451	1325.2345	2589.8429	672.40422	225
21	Optimized	68.385995	319.8539	1266.6917	2537.616	675.76243	225
22	Optimized	71.157985	321.0629	1222.8782	2498.3326	678.17116	225
23	Optimized	74.31247	322.647	1160.6016	2339.9007	627.04443	225
24	Optimized	77.849455	324.60615	1080.5439	2245.1521	619.23317	225
25	Optimized	80.99156	326.48875	1002.3305	2076.5037	571.14801	225
26	Optimized	83.738785	328.29485	926.13828	1974.4274	557.38522	225

Slope Stability Steady state

27	Optimized	86.985	330.6668	825.60003	1757.336	495.41282	225
28	Optimized	89.527435	332.6611	741.9628	1649.374	442.574	200
29	Optimized	91.733785	334.5801	658.99478	1466.1067	393.65479	200
30	Optimized	94.62713	337.20435	545.23231	1260.79	349.00081	200
31	Optimized	96.74263	339.2266	459.52596	1030.1371	278.30564	200
32	Optimized	99.14745	341.7358	359.42692	789.38575	209.70493	200
33	Optimized	101.26245	343.9819	281.52966	552.28079	132.05415	200
34	Optimized	103.92235	346.98015	169.46511	227.24075	28.179062	200

Slices of Slip Surface: **166**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	166	7.9092445	326.7594	85.204692	330.54803	130.45136	225
2	166	11.065948	324.8202	251.90018	608.43611	189.57352	225
3	166	13.68835	323.3672	411.43986	946.12598	284.29765	225
4	166	16.26585	322.1082	547.85667	1263.946	380.75147	225
5	166	19.33275	320.765	670.78381	1457.6207	418.3686	225
6	166	22.39965	319.5962	778.1076	1620.9269	448.13495	225
7	166	25.46655	318.59245	875.86961	1756.3288	468.14848	225
8	166	28.7579	317.6962	969.61517	1950.3027	521.44079	225
9	166	30.657735	317.2308	1020.0253	1937.4593	487.80833	225
10	166	32.389525	316.8979	1057.2492	2001.0153	480.87285	100
11	166	35.56924	316.371	1121.6183	2170.0274	534.19109	100
12	166	38.748955	315.99715	1178.1799	2313.8379	578.64668	100
13	166	41.928665	315.77385	1226.4772	2434.0738	615.30124	100
14	166	45.10838	315.6996	1266.1835	2532.0839	645.00848	100
15	166	48.288095	315.77385	1296.9727	2608.7732	668.39578	100
16	166	51.467805	315.99715	1318.4893	2664.8464	686.00319	100
17	166	54.64752	316.371	1330.5341	2700.8023	698.18655	100
18	166	57.827235	316.8979	1332.8773	2716.9193	705.20462	100
19	166	61.312815	317.66425	1323.8413	2703.735	733.70251	225
20	166	65.10427	318.71055	1301.034	2662.0254	723.65195	225
21	166	68.609625	319.88415	1267.2954	2598.3273	707.72221	225
22	166	71.82887	321.16195	1224.1594	2516.4689	687.13316	225
23	166	75.048115	322.63565	1169.4709	2412.3825	660.86781	225
24	166	78.26736	324.31995	1102.7371	2285.1986	628.72593	225
25	166	81.486605	326.23335	1023.6075	2133.8333	590.31749	225
26	166	84.705855	328.39965	931.85733	1956.86	545.00356	225
27	166	87.9251	330.85015	827.52012	1752.5519	491.84811	225
28	166	91.40251	333.8819	696.27139	1514.2558	398.95764	200
29	166	95.3858	337.92995	513.7516	1125.5587	298.39826	200
30	166	99.6163	343.0754	292.44676	595.38405	147.75239	200
31	166	102.99005	347.9333	110.69282	108.89016	-0.87921493	200

Slope Stability steady state

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File Information

Created By: Ghack, Mabior T LRL
Revision Number: 47
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:24:34 AM
File Name: Paducah 67+17A F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 11:25:14 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability steady state

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution
    FOS Calculation Option: Constant
Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

embankment fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: embankment fill

gravels

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 35 °
Vol. WC. Function: gravels

clay and silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: clay and silt

clayey gravel

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 31 °
Vol. WC. Function: clayey gravel

Slip Surface Limits

Left Coordinate: (0, 334.8625) ft
Right Coordinate: (374.9917, 321.3737) ft

Vol. Water Content Functions

embankment fill

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

gravels

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.12977884

Slope Stability steady state

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.13)
Data Point: (0.018329807, 0.12999999)
Data Point: (0.033598183, 0.12999999)
Data Point: (0.061584821, 0.12999998)
Data Point: (0.11288379, 0.12999996)
Data Point: (0.20691381, 0.12999993)
Data Point: (0.37926902, 0.12999986)
Data Point: (0.6951928, 0.12999975)
Data Point: (1.274275, 0.12999945)
Data Point: (2.3357215, 0.12999692)
Data Point: (4.2813324, 0.12994609)
Data Point: (7.8475997, 0.12879092)
Data Point: (14.384499, 0.1086857)
Data Point: (26.366509, 0.048675218)
Data Point: (48.329302, 0.025073057)
Data Point: (88.586679, 0.016822363)
Data Point: (162.37767, 0.012726241)
Data Point: (297.63514, 0.010268092)
Data Point: (545.55948, 0.0086222321)
Data Point: (1000, 0.0074377998)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Gravel
Saturated Water Content: 0.13 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

clayey gravel

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19532101
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.18997613)
Data Point: (0.023357215, 0.18997613)
Data Point: (0.054555948, 0.18997613)
Data Point: (0.1274275, 0.18997613)
Data Point: (0.29763514, 0.18997613)
Data Point: (0.6951928, 0.18997613)
Data Point: (1.6237767, 0.18997613)
Data Point: (3.7926902, 0.18997613)

Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (3359.8183, 0.18997613)
Data Point: (10429.375, 0.18959155)
Data Point: (22804.218, 0.18312897)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.25114936
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.020691381, 0.24989967)
Data Point: (0.042813324, 0.24989967)
Data Point: (0.088586679, 0.24989967)
Data Point: (0.18329807, 0.24989967)
Data Point: (0.37926902, 0.24989967)
Data Point: (0.78475997, 0.24989967)
Data Point: (1.6237767, 0.24989967)
Data Point: (3.3598183, 0.24989967)
Data Point: (6.951928, 0.24989967)
Data Point: (14.384499, 0.24989967)
Data Point: (29.763514, 0.24989967)
Data Point: (61.584821, 0.24989967)
Data Point: (127.4275, 0.24989967)
Data Point: (263.66509, 0.24989967)
Data Point: (545.55948, 0.24989967)
Data Point: (1128.8379, 0.24989967)

Slope Stability steady state

Data Point: (2282.0137, 0.2498454)
Data Point: (5107.633, 0.24853936)
Data Point: (10000, 0.24514068)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	embankment fill	14,26,13,12,11,10,9,8,7,16,18,19,17	2264.308
Region 2	gravels	1,2,3,4,5,6,7,16,18,24	2011.0898
Region 3	clayey gravel	20,22,23,21	4124.9087
Region 4	gravels	19,17,14,15,25	869.8555
Region 5	clay and silt	25,21,20,24,18,19	1124.9751

Points

	X (ft)	Y (ft)
Point 1	0	334.8625
Point 2	12.9496	334.8222
Point 3	51.8256	333.6227
Point 4	75.5322	325.9003
Point 5	92.5865	326.3688
Point 6	109.279	326.1716
Point 7	124.9974	326.2999
Point 8	141.2426	332.3327
Point 9	148.057	334.1276
Point 10	164.1967	335.7904
Point 11	205.5546	349.3855
Point 12	211.0685	349.9124
Point 13	216.8613	349.5456
Point 14	302.4014	324.8389
Point 15	374.9917	321.3737
Point 16	207	325.8
Point 17	215	325.8
Point 18	208	318.9
Point 19	214	318.9
Point 20	0	315.9
Point 21	374.9917	315.9
Point 22	0	304.9

Slope Stability steady state

Point 23	374.9917	304.9
Point 24	0	318.9
Point 25	374.9917	318.9
Point 26	239.52363	343

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.485	(153.66, 404.46)	55.3083	(224.653, 347.295)	(103.772, 326.237)
2	635	2.529	(153.66, 404.46)	91.826	(225.359, 347.091)	(105.6, 326.215)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	106.5253	324.95505	59.280099	199.4166	98.124634	0
2	Optimized	111.6646	322.56305	208.58202	569.97597	253.05077	0
3	Optimized	117.0323	320.1401	359.81518	943.26608	408.53672	0
4	Optimized	122.5059	317.6936	517.37598	1365.0506	450.71661	225
5	Optimized	125.7222	316.22985	616.31433	1629.6752	538.81354	225
6	Optimized	126.875	315.70525	651.4039	1726.5782	646.02987	0
7	Optimized	128.81795	315.1161	689.76751	1780.888	655.61132	0
8	Optimized	131.8479	314.32735	741.76517	2058.1237	790.94798	0
9	Optimized	135.95355	313.6102	790.79763	2258.7652	882.04388	0
10	Optimized	139.8934	313.25685	817.61708	2413.5042	958.90575	0
11	Optimized	143.6382	313.172	828.24008	2573.8396	1048.862	0
12	Optimized	147.0454	313.16645	834.20183	2623.6109	1075.1855	0
13	Optimized	150.07445	313.31245	830.74851	2665.8514	1102.6411	0
14	Optimized	154.10935	313.50695	827.45612	2694.3195	1121.7247	0
15	Optimized	158.1443	313.70145	825.8718	2722.54	1139.6333	0
16	Optimized	162.17925	313.89595	826.3669	2751.0081	1156.4411	0
17	Optimized	165.68715	314.06505	828.78158	2818.675	1195.6486	0
18	Optimized	169.66835	314.54285	815.69963	2806.9023	1196.4353	0
19	Optimized	174.64985	315.35475	789.68521	2907.7503	1272.6619	0
20	Optimized	177.3579	315.83035	775.5036	2801.9269	1217.598	0
21	Optimized	179.40245	316.4858	717.44072	2798.0527	1106.281	225
22	Optimized	183.0569	317.65735	593.82401	2798.3132	1172.1477	225
23	Optimized	185.48495	318.57155	481.43548	2570.051	1110.5366	225
24	Optimized	188.975	320.47935	339.20501	2463.9361	1487.7527	0
25	Optimized	194.7897	323.95765	122.21225	2198.1003	1453.5524	0
26	Optimized	198.2124	326.1793	-2.3854112	2112.6048	1030.3862	200
27	Optimized	200.42085	327.59125	-3.2743261	2050.8413	1000.2621	200
28	Optimized	203.84335	329.76975	82.991991	1948.1057	909.67675	200
29	Optimized	205.56915	330.86825	163.80959	1898.6618	846.14398	200
30	Optimized	208.3261	333.06505	286.87147	1621.1438	650.7681	200
31	Optimized	212.14395	336.11045	375.34506	1348.7634	474.76786	200
32	Optimized	215.04035	338.65685	371.61249	1038.1673	325.10053	200

Slope Stability steady state

33	Optimized	218.0922	341.4868	322.48994	729.48196	198.50327	200
34	Optimized	221.98805	344.96165	222.32131	339.57993	57.190847	200

Slices of Slip Surface: 635

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	635	107.4394	325.1431	47.551907	178.41182	91.6291	0
2	635	111.11925	323.1088	174.52172	495.89555	225.02838	0
3	635	114.7997	321.2867	288.25666	770.09575	337.38736	0
4	635	118.48015	319.66345	389.57252	1001.8009	428.68694	0
5	635	122.6589	318.0609	492.99787	1244.8413	399.76222	225
6	635	127.19235	316.5609	594.88754	1546.2975	505.87367	225
7	635	131.36315	315.4053	673.62978	1867.7627	717.50742	0
8	635	135.3149	314.50765	733.70033	2167.6777	861.62054	0
9	635	139.2667	313.79105	783.22887	2432.5356	991.00345	0
10	635	142.9462	313.2772	820.57647	2625.1976	1084.3258	0
11	635	146.3534	312.941	847.21068	2753.186	1145.2255	0
12	635	150.07445	312.72615	867.80477	2826.1481	1176.6914	0
13	635	154.10935	312.6572	881.29462	2843.3895	1178.9456	0
14	635	158.1443	312.7658	885.35225	2837.8008	1173.1494	0
15	635	162.17925	313.0525	880.21631	2809.9308	1159.4894	0
16	635	166.4859	313.56355	864.2979	2819.3548	1174.7167	0
17	635	171.0643	314.32865	836.52568	2858.9032	1215.167	0
18	635	175.6427	315.33535	796.99076	2866.0113	1243.1929	0
19	635	180.1986	316.58455	710.56231	2836.9702	1130.6311	225
20	635	184.73205	318.08455	544.28617	2774.6701	1185.9162	225
21	635	188.76105	319.6292	392.26317	2679.4076	1601.4758	0
22	635	192.2855	321.1757	295.79897	2582.707	1601.3102	0
23	635	195.80995	322.90375	187.98428	2464.6912	1594.1673	0
24	635	199.33445	324.82525	68.109184	2324.6908	1580.0754	0
25	635	203.32565	327.2702	36.070376	2185.8033	1048.4948	200
26	635	208.31155	330.7485	336.19657	1891.7158	758.67741	200
27	635	213.9649	335.31885	493.69973	1400.3489	442.20233	200
28	635	218.98575	339.99805	413.52247	849.60974	212.69397	200
29	635	223.23465	344.6211	250.53572	324.43032	36.040808	200

Slope Stability Steady State

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File Information

Title: Paducah 7+60 B
Comments: T-Wall
Created By: Minges, George C LRL
Revision Number: 43
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:29:22 AM
File Name: Paducah 7+60B F.gsz
Directory: S:\proj\112546\Others\GEOTECH SEEP AND SLOPE\FEASIBILITY\
Last Solved Date: 11/8/2009
Last Solved Time: 11:30:32 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady State

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Left to Right
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution
    FOS Calculation Option: Constant

Advanced
- Number of Slices: 30
- Optimization Tolerance: 0.01
- Minimum Slip Surface Depth: 2 ft
- Optimization Maximum Iterations: 2000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1
- Driving Side Maximum Convex Angle: 5 °
- Resisting Side Maximum Convex Angle: 1 °

Materials

T-wall
Model: Bedrock (Impenetrable)

Foundation Clay
Model: Mohr-Coulomb
Unit Weight: 127 pcf
Cohesion: 285 psf
Phi: 27 °
Vol. WC. Function: Foundation Clay

Debris
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 27 °
Vol. WC. Function: Debris

Embankment Clay
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: Embankment Clay

existing retaining wall
Model: Bedrock (Impenetrable)

Slip Surface Limits
Left Coordinate: (0, 334.9629) ft
Right Coordinate: (359.2597, 312.6319) ft

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Foundation Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.3704873

Slope Stability Steady State

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.36966087)
Data Point: (0.023357215, 0.36966087)
Data Point: (0.054555948, 0.36966087)
Data Point: (0.1274275, 0.36966087)
Data Point: (0.29763514, 0.36966087)
Data Point: (0.6951928, 0.36966087)
Data Point: (1.6237767, 0.36966087)
Data Point: (3.7926902, 0.36966087)
Data Point: (8.8586679, 0.36966087)
Data Point: (20.691381, 0.36966087)
Data Point: (48.329302, 0.36966087)
Data Point: (112.88379, 0.36966087)
Data Point: (263.66509, 0.36966087)
Data Point: (602.85683, 0.36114733)
Data Point: (1438.4499, 0.2901812)
Data Point: (3359.8183, 0.21242878)
Data Point: (7847.5997, 0.17220763)
Data Point: (18329.807, 0.14645868)
Data Point: (42813.324, 0.12590906)
Data Point: (100000, 0.10784644)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.0006
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Debris

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.25999999
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25999998)
Data Point: (0.018329807, 0.25999996)
Data Point: (0.033598183, 0.25999988)
Data Point: (0.061584821, 0.25999963)
Data Point: (0.11288379, 0.25999885)
Data Point: (0.20691381, 0.25999634)
Data Point: (0.37926902, 0.2599882)
Data Point: (0.6951928, 0.2599617)

Slope Stability Steady State

Data Point: (1.274275, 0.25987516)
Data Point: (2.3357215, 0.25959248)
Data Point: (4.2813324, 0.2586718)
Data Point: (7.8475997, 0.25571003)
Data Point: (14.384499, 0.24656017)
Data Point: (26.366509, 0.22150596)
Data Point: (48.329302, 0.17063801)
Data Point: (88.586679, 0.10916815)
Data Point: (162.37767, 0.065559185)
Data Point: (297.63514, 0.041878631)
Data Point: (545.55948, 0.029155966)
Data Point: (1000, 0.021736063)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Sand
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Debris	12,27,7,30,29	43.292528
Region 2	Embankment Clay	6,14,12,27	32.306024
Region 3	T-wall	12,29,10,13,11,15,16,17,5,18,21,20,19,6,14	96.178322
Region 4	Debris	23,24,25,15	2.2524075
Region 5	Embankment Clay	23,28,26,5,17,16,15	31.157314
Region 6	Debris	26,28,22,1,2,3,4	636.27261
Region 7	Foundation Clay	29,10,13,11,15,25,24,23,28,22,31,32,9,8,36,35,30	14900.163

Points

	X (ft)	Y (ft)
Point 1	0	334.9629
Point 2	74.1988	335.4209
Point 3	133.6199	335.1982
Point 4	156.1492	333.8638
Point 5	189.94866	335.00041
Point 6	192.10634	335.14426
Point 7	217.58	333.7031
Point 8	305.4474	317.9361
Point 9	359.2597	312.6319
Point 10	203.30208	322.916
Point 11	200.21849	329.66493

Point 12	203.30208	331.92348
Point 13	201.84227	322.89996
Point 14	192.1851	331.93952
Point 15	182.20486	329.69835
Point 16	182.20486	331.21898
Point 17	189.89112	332.34859
Point 18	190.25176	349.20939
Point 19	191.76033	349.22332
Point 20	191.76033	350.21665
Point 21	190.29354	350.25378
Point 22	0	331.5
Point 23	180.7	329.7
Point 24	180.7	328.2
Point 25	182.2	328.2
Point 26	180.7	334.65
Point 27	203.30926	334.51046
Point 28	180.7	331.5
Point 29	203.3	331.5
Point 30	223.13081	331.50496
Point 31	0	285
Point 32	359	285
Point 33	189.75	334.8
Point 34	192.25	335.2
Point 35	243	323.9
Point 36	243	319.6

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.509	(238.796, 355.884)	22.43748	(206.591, 334.325)	(247.427, 319.482)
2	925	3.852	(238.796, 355.884)	37.706	(207.914, 334.25)	(248.518, 319.453)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.1976	333.9672	1012.9213	1017.8222	2.4971274	0
2	Optimized	208.41035	333.252	1057.5265	1095.8102	19.506546	0
3	Optimized	209.62305	332.5368	1102.2027	1173.8693	36.515964	0
4	Optimized	210.7119	331.8406	1145.6287	1245.4662	50.869736	0
5	Optimized	211.8417	331.04775	1192.5416	1285.1705	47.196777	285
6	Optimized	213.1584	330.0625	1249.6218	1387.4348	70.219245	285
7	Optimized	214.45085	329.03775	1310.1645	1504.8244	99.184144	285
8	Optimized	215.69695	328.05025	1369.5373	1618.0353	126.61601	285
9	Optimized	216.95	327.07105	1429.0797	1733.479	155.09917	285
10	Optimized	218.155	326.1425	1486.1493	1837.8329	179.19177	285
11	Optimized	219.30505	325.2563	1540.975	1919.9338	193.08914	285
12	Optimized	220.82995	324.16505	1609.0978	2034.0047	216.50087	285
13	Optimized	222.4553	323.11655	1675.2032	2142.6352	238.16847	285

14	Optimized	223.61705	322.42805	1718.9873	2200.5727	245.38	285
15	Optimized	225.06295	321.65585	1768.3117	2278.3551	259.88009	285
16	Optimized	226.7003	320.8829	1818.0276	2350.7854	271.45367	285
17	Optimized	228.05575	320.3051	1855.2867	2390.4199	272.66397	285
18	Optimized	229.55875	319.73925	1891.886	2443.978	281.30495	285
19	Optimized	231.2093	319.18535	1927.7272	2473.9031	278.29055	285
20	Optimized	232.75145	318.7255	1957.5324	2511.778	282.40223	285
21	Optimized	234.1852	318.35975	1981.3215	2523.4698	276.23834	285
22	Optimized	235.16595	318.1144	1997.1795	2534.6902	273.87537	285
23	Optimized	236.1915	317.909	2010.6455	2546.5338	273.0487	285
24	Optimized	237.71485	317.6232	2029.2267	2545.9531	263.28522	285
25	Optimized	239.2382	317.3374	2047.7435	2545.3724	253.55462	285
26	Optimized	240.74995	317.02305	2068.0611	2540.2018	240.56774	285
27	Optimized	242.25	316.68015	2090.0921	2667.7091	294.31054	285
28	Optimized	243.0058	316.50735	2101.2088	2269.2117	85.601754	285
29	Optimized	243.74745	317.002	2070.7145	2364.9452	149.91801	285
30	Optimized	245.21915	317.994	2009.2991	2226.2815	110.55808	285
31	Optimized	246.69085	318.98605	1947.6583	2087.6742	71.341682	285

Slices of Slip Surface: **925**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	925	208.4436	333.53025	1040.1704	1044.3096	2.109029	0
2	925	209.5038	332.1561	1125.927	1194.1452	34.758914	0
3	925	210.66275	330.7965	1206.1811	1278.7859	36.993978	285
4	925	211.92045	329.4519	1283.22	1442.0614	80.933736	285
5	925	213.1781	328.23	1355.1672	1592.2179	120.78338	285
6	925	214.43575	327.115	1422.1584	1730.5951	157.15635	285
7	925	215.69345	326.09485	1484.4396	1858.4084	190.54658	285
8	925	216.95115	325.1601	1542.3417	1976.4472	221.18784	285
9	925	218.27385	324.2627	1598.5352	2086.6491	248.70645	285
10	925	219.66155	323.40365	1652.8074	2172.3676	264.72914	285
11	925	221.04925	322.62465	1702.4734	2248.1575	278.03995	285
12	925	222.43695	321.9202	1747.7342	2314.8389	288.95427	285
13	925	223.7931	321.2987	1787.9738	2370.0211	296.56789	285
14	925	225.1177	320.75355	1823.4632	2415.3148	301.56349	285
15	925	226.4423	320.266	1855.3957	2453.3191	304.6572	285
16	925	227.76695	319.8337	1883.8272	2484.2407	305.92596	285
17	925	229.0916	319.45465	1908.8082	2508.3838	305.49902	285
18	925	230.4162	319.1272	1930.521	2525.9146	303.36821	285
19	925	231.7408	318.85005	1948.9289	2536.8706	299.57126	285
20	925	233.0654	318.62205	1964.2079	2541.5167	294.15352	285
21	925	234.39	318.44225	1976.3809	2539.9044	287.12955	285
22	925	235.7146	318.31	1985.4664	2532.0189	278.48242	285
23	925	237.0392	318.22485	1991.5509	2517.9254	268.20122	285
24	925	238.36385	318.1864	1994.6403	2497.6221	256.28203	285
25	925	239.6885	318.1945	1994.8165	2471.1997	242.72932	285
26	925	241.0131	318.2492	1991.9964	2438.4472	227.47803	285

Slope Stability Steady State

27	925	242.3377	318.3507	1986.3991	2549.7971	287.06565	285
28	925	243.6897	318.5035	1977.4679	2069.261	46.77089	285
29	925	245.0691	318.7102	1964.7496	2045.4555	41.121722	285
30	925	246.4485	318.9696	1948.7028	2014.8616	33.709586	285
31	925	247.8279	319.2828	1929.2193	1977.0802	24.386381	285

Slope Steady State

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File Information

Title: Paducah 87+43 B
Comments: I-Wall
Created By: Minges, George C LRL
Revision Number: 44
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:37:26 AM
File Name: Paducah 87+43 B F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 11:38:34 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Steady State

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

Slope Steady State

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

I wall
Model: Bedrock (Impenetrable)

Embankment Fill
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: Embankment Clay

Foundation Clay
Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: Foundation Clay

Slip Surface Limits
Left Coordinate: (0, 339.3218) ft
Right Coordinate: (224.5, 330.75) ft

Vol. Water Content Functions

Embankment Clay
Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22

Slope Steady State

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.21999999)
- Data Point: (0.018329807, 0.21999998)
- Data Point: (0.033598183, 0.21999997)
- Data Point: (0.061584821, 0.21999993)
- Data Point: (0.11288379, 0.21999984)
- Data Point: (0.20691381, 0.21999963)
- Data Point: (0.37926902, 0.21999914)
- Data Point: (0.6951928, 0.21999792)
- Data Point: (1.274275, 0.21999489)
- Data Point: (2.3357215, 0.21998722)
- Data Point: (4.2813324, 0.21996761)
- Data Point: (7.8475997, 0.21991719)
- Data Point: (14.384499, 0.21978687)
- Data Point: (26.366509, 0.21944947)
- Data Point: (48.329302, 0.21857772)
- Data Point: (88.586679, 0.21634893)
- Data Point: (162.37767, 0.21082014)
- Data Point: (297.63514, 0.19810028)
- Data Point: (545.55948, 0.17327571)
- Data Point: (1000, 0.13699113)

Estimation Properties
- Vol. WC Estimation Method: Sample functions
- Sample Material: Silty Clay
- Saturated Water Content: 0.22 ft^3/ft^3
- Liquid Limit: 0 %
- Diameter at 10% passing: 0
- Diameter at 60% passing: 0
- Maximum: 1000
- Minimum: 0.01
- Num. Points: 20

Foundation Clay

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.37048224

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.37005407)
- Data Point: (0.020691381, 0.37005407)
- Data Point: (0.042813324, 0.37005407)
- Data Point: (0.088586679, 0.37005407)
- Data Point: (0.18329807, 0.37005407)
- Data Point: (0.37926902, 0.37005407)
- Data Point: (0.78475997, 0.37005407)
- Data Point: (1.6237767, 0.37005407)

Slope Steady State

Data Point: (3.3598183, 0.37005407)
Data Point: (6.951928, 0.37005407)
Data Point: (14.384499, 0.37005407)
Data Point: (29.763514, 0.37005407)
Data Point: (61.584821, 0.37005407)
Data Point: (127.4275, 0.37005407)
Data Point: (263.66509, 0.37005407)
Data Point: (526.83766, 0.36911026)
Data Point: (1128.8379, 0.34318275)
Data Point: (2335.7215, 0.2703264)
Data Point: (4832.9302, 0.21728994)
Data Point: (10000, 0.18487617)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 35 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.011
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Foundation Clay	29,4,21,19,3,24,26,25,23,2,20,22,9,10,11,12,13,14,15,27,28,1	9822.254
Region 2	Embankment Fill	21,5,3,19	4.7054975
Region 3	Embankment Fill	8,2,20,22	4.8603244
Region 4	I wall	3,5,6,7,8,2,23,25,26,24	42.081158

Points

	X (ft)	Y (ft)
Point 1	0	339.3218
Point 2	134.73896	336.10876
Point 3	132.34	336.06
Point 4	103.5	340.15
Point 5	132.25	340.35
Point 6	132.5	350.25
Point 7	134.5	350.25
Point 8	134.75	341.05
Point 9	145.5	340.15
Point 10	160.5	334.75
Point 11	163.5	334.85
Point 12	191.5	333.75
Point 13	206.5	332.75
Point 14	208.5	333.05

Slope Steady State

Point 15	224.5	330.75
Point 16	259.5	324.15
Point 17	302.5	316.85
Point 18	363.5	307.85
Point 19	131.19568	336.11061
Point 20	135.75695	336.14638
Point 21	131.18517	340.34259
Point 22	135.72336	340.96851
Point 23	134.08446	336.13791
Point 24	133.23483	336.06672
Point 25	134.08	325.1
Point 26	133.24	325.1
Point 27	224.5	294
Point 28	0	294
Point 29	1.07396	339.2504

Critical Slip Surfaces

Transient Seepage

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File Information

Title: Paducah 156+25 A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 23
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 1:47:34 PM
File Name: Paducah 156+25 A F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/2/2009
Last Solved Time: 1:49:10 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
- Initial PWP: Parent Analysis
- Include Air Flow: No
- Exclude cumulative values: Yes

Control
- Apply Runoff: Yes

Convergence
- Maximum Number of Iterations: 500
- Tolerance: 0.001
- Maximum Change in K: 0.1

Transient Seepage

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

Embankment Clay

Model: Saturated / Unsaturated
Hydraulic
K-Function: Embankment Clay
Vol. WC. Function: Embankment Clay
K-Ratio: 1
K-Direction: 0 °

Clay and Silt

Model: Saturated / Unsaturated
Hydraulic
K-Function: Clay and Silt
Vol. WC. Function: Clay and Silt
K-Ratio: 1
K-Direction: 0 °

Clayey Gravel and Sand

Model: Saturated / Unsaturated
Hydraulic
K-Function: Clayey Gravel and Sand
Vol. WC. Function: Clayey Gravel and Sand
K-Ratio: 1
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Transient

Function: Paducah Feasibilty

Transient Seepage

Type: H (Q=0)

K Functions

Embankment Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.020691381, 1.59992e-008)
Data Point: (0.042813324, 1.5997795e-008)
Data Point: (0.088586679, 1.5995421e-008)
Data Point: (0.18329807, 1.5991072e-008)
Data Point: (0.37926902, 1.5982644e-008)
Data Point: (0.78475997, 1.5965385e-008)
Data Point: (1.6237767, 1.5929179e-008)
Data Point: (3.3598183, 1.5851103e-008)
Data Point: (6.951928, 1.5682796e-008)
Data Point: (14.384499, 1.5320437e-008)
Data Point: (29.763514, 1.4560234e-008)
Data Point: (61.584821, 1.3033595e-008)
Data Point: (127.4275, 1.0227837e-008)
Data Point: (263.66509, 5.9616669e-009)
Data Point: (545.55948, 1.7364398e-009)
Data Point: (1128.8379, 6.7715324e-011)
Data Point: (2335.7215, 1.176744e-011)
Data Point: (4832.9302, 2.699492e-012)
Data Point: (10000, 6.3101416e-013)
Estimation Properties
Volume Water Content Function: Embankment Clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

Clay and Silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.2e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)

Transient Seepage

Data Point: (0.01, 1.2e-010)
Data Point: (0.023357215, 1.2e-010)
Data Point: (0.054555948, 1.2e-010)
Data Point: (0.1274275, 1.2e-010)
Data Point: (0.29763514, 1.1999998e-010)
Data Point: (0.6951928, 1.1999995e-010)
Data Point: (1.6237767, 1.1999984e-010)
Data Point: (3.7926902, 1.1999949e-010)
Data Point: (8.8586679, 1.1999836e-010)
Data Point: (20.691381, 1.1999473e-010)
Data Point: (48.329302, 1.1998306e-010)
Data Point: (112.88379, 1.1994554e-010)
Data Point: (263.66509, 1.1982494e-010)
Data Point: (615.84821, 1.1943727e-010)
Data Point: (1438.4499, 1.181921e-010)
Data Point: (3359.8183, 1.1421266e-010)
Data Point: (7847.5997, 1.0181826e-010)
Data Point: (18329.807, 6.7994015e-011)
Data Point: (42813.324, 1.7015298e-011)
Data Point: (100000, 6.7786075e-013)

Estimation Properties
Volume Water Content Function: Clay and Silt
Hydraulic K Sat: 1.2e-010 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.23 ft^3/ft^3

Clayey Gravel and Sand

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-009)
Data Point: (0.023357215, 1.6e-009)
Data Point: (0.054555948, 1.6e-009)
Data Point: (0.1274275, 1.6e-009)
Data Point: (0.29763514, 1.6e-009)
Data Point: (0.6951928, 1.6e-009)
Data Point: (1.6237767, 1.6e-009)
Data Point: (3.7926902, 1.6e-009)
Data Point: (8.8586679, 1.6e-009)
Data Point: (20.691381, 1.5999998e-009)
Data Point: (48.329302, 1.5999987e-009)
Data Point: (112.88379, 1.5999921e-009)

Data Point: (263.66509, 1.5999499e-009)
Data Point: (615.84821, 1.5996825e-009)
Data Point: (1438.4499, 1.5979845e-009)
Data Point: (3359.8183, 1.5871732e-009)
Data Point: (7847.5997, 1.5185885e-009)
Data Point: (18329.807, 1.1256886e-009)
Data Point: (42813.324, 1.78848e-010)
Data Point: (100000, 1.1840808e-012)

Estimation Properties
Volume Water Content Function: Clayey Gravel and Sand
Hydraulic K Sat: 1.6e-009 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.15 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibilty

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)
Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)

Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)

Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Clay and Silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.30136034
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25001108)
Data Point: (0.023357215, 0.25001108)
Data Point: (0.054555948, 0.25001108)
Data Point: (0.1274275, 0.25001108)
Data Point: (0.29763514, 0.25001108)
Data Point: (0.6951928, 0.25001108)
Data Point: (1.6237767, 0.25001108)
Data Point: (3.7926902, 0.25001108)
Data Point: (8.8586679, 0.25001108)
Data Point: (20.691381, 0.25001108)
Data Point: (48.329302, 0.25001108)
Data Point: (112.88379, 0.25001108)
Data Point: (263.66509, 0.25001108)
Data Point: (615.84821, 0.25001108)
Data Point: (1438.4499, 0.25001108)
Data Point: (3359.8183, 0.25001108)

Data Point: (7847.5997, 0.25001108)
Data Point: (22386.337, 0.24999713)
Data Point: (41676.621, 0.24961794)
Data Point: (100000, 0.24671383)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 0.4 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.01
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Clayey Gravel and Sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2015675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.19079819)
Data Point: (0.023357215, 0.19079819)
Data Point: (0.054555948, 0.19079819)
Data Point: (0.1274275, 0.19079819)
Data Point: (0.29763514, 0.19079819)
Data Point: (0.6951928, 0.19079819)
Data Point: (1.6237767, 0.19079819)
Data Point: (3.7926902, 0.19079819)
Data Point: (8.8586679, 0.19079819)
Data Point: (20.691381, 0.19079819)
Data Point: (48.329302, 0.19079819)
Data Point: (112.88379, 0.19079819)
Data Point: (263.66509, 0.19079819)
Data Point: (615.84821, 0.19079819)
Data Point: (1438.4499, 0.19079819)
Data Point: (3359.8183, 0.19079819)
Data Point: (7053.0967, 0.19063688)
Data Point: (21364.961, 0.18949932)
Data Point: (42813.324, 0.18069069)
Data Point: (100000, 0.14428002)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 0.31 %

Transient Seepage

Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft²)
Region 1	Embankment Clay	6,7,8,9,23,10,18,11,20,22,21,19	1550.1716
Region 2	Clay and Silt	1,14,15,13,12,11,20,22,21,19,6,5,4,3,2	4858.5978
Region 3	Clayey Gravel and Sand	14,16,17,15	2996

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	1	2	Potential Seepage Face
Line 2	2	3	Potential Seepage Face
Line 3	3	4	Potential Seepage Face
Line 4	4	5	Potential Seepage Face
Line 5	5	6	Potential Seepage Face
Line 6	6	7	Potential Seepage Face
Line 7	7	8	
Line 8	8	9	
Line 9	11	12	Transient
Line 10	12	13	Transient
Line 11	16	17	
Line 12	14	15	
Line 13	10	18	Transient
Line 14	18	11	Transient
Line 15	6	19	
Line 16	19	21	
Line 17	21	22	
Line 18	22	20	
Line 19	20	11	
Line 20	1	14	
Line 21	15	13	
Line 22	14	16	
Line 23	17	15	
Line 24	9	23	Transient
Line 25	23	10	Transient

Points

	X (ft)	Y (ft)
Point 1	0	339.2011
Point 2	29.1296	338.3419

Transient Seepage

Point 3	91.6863	326.041
Point 4	115.903	325.7188
Point 5	135.0478	329.2969
Point 6	177.4173	329.7749
Point 7	257.0184	348.8609
Point 8	260.4708	349.0436
Point 9	265.9396	348.834
Point 10	314.396	332.8219
Point 11	338.5169	328.774
Point 12	379.0807	328.269
Point 13	428.1404	328.001
Point 14	0	318.6
Point 15	428	318.6
Point 16	0	311.6
Point 17	428	311.6
Point 18	333	329.69983
Point 19	258	330
Point 20	266	330
Point 21	259	324
Point 22	265	324
Point 23	282	343.52695

Transient Seepage

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File Information

Title: 175+12A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 38
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 10:02:55 AM
File Name: Paducah 175+12B F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/2/2009
Last Solved Time: 10:06:50 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
- Initial PWP: Parent Analysis
- Include Air Flow: No
- Exclude cumulative values: Yes

Control
- Apply Runoff: Yes

Convergence
- Maximum Number of Iterations: 500
- Tolerance: 0.001
- Maximum Change in K: 0.1

Transient Seepage

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

Embankment Clay

Model: Saturated / Unsaturated
Hydraulic
K-Function: embankment clay
Vol. WC. Function: embankment clay
K-Ratio: 1
K-Direction: 0 °

Debris

Model: Saturated / Unsaturated
Hydraulic
K-Function: Debris
Vol. WC. Function: Debris
K-Ratio: 1
K-Direction: 0 °

Clay and Silt

Model: Saturated / Unsaturated
Hydraulic
K-Function: clay and silt
Vol. WC. Function: clay and silt
K-Ratio: 1
K-Direction: 0 °

Clayey Gravel and Sand

Model: Saturated / Unsaturated
Hydraulic
K-Function: clayey gravel and sand
Vol. WC. Function: clayey gravel and sand
K-Ratio: 1
K-Direction: 0 °

Transient Seepage

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Paducah Transient

Function: Paducah Feasibility
Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5
Coordinates
Coordinate: (0, 325) ft
Coordinate: (575, 325) ft

K Functions

embankment clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.014873521, 1.6e-008)
Data Point: (0.022122163, 1.6e-008)
Data Point: (0.032903446, 1.6e-008)
Data Point: (0.048939009, 1.6e-008)
Data Point: (0.072789538, 1.5999999e-008)
Data Point: (0.10826367, 1.5999998e-008)
Data Point: (0.1610262, 1.5999996e-008)
Data Point: (0.23950266, 1.599999e-008)
Data Point: (0.35622479, 1.5999976e-008)
Data Point: (0.52983169, 1.5999944e-008)
Data Point: (0.78804628, 1.5999866e-008)
Data Point: (1.1721023, 1.5999682e-008)
Data Point: (1.7433288, 1.5999247e-008)
Data Point: (2.5929438, 1.5998213e-008)
Data Point: (3.8566204, 1.599576e-008)
Data Point: (5.7361525, 1.5989932e-008)
Data Point: (8.5316785, 1.5976086e-008)

Transient Seepage

Data Point: (12.68961, 1.5943115e-008)
Data Point: (18.873918, 1.586466e-008)
Data Point: (28.072162, 1.5677721e-008)
Data Point: (41.753189, 1.523511e-008)
Data Point: (62.101694, 1.4206105e-008)
Data Point: (92.367086, 1.1952872e-008)
Data Point: (137.38238, 7.8380216e-009)
Data Point: (204.33597, 2.9823935e-009)
Data Point: (303.91954, 5.0927599e-010)
Data Point: (452.03537, 4.4029597e-011)
Data Point: (672.33575, 2.707796e-012)
Data Point: (1000, 1.4845445e-013)

Estimation Properties
Volume Water Content Function: embankment clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1000
Minimum: 0.01
Num. Points: 30
Residual Water Content: 0.18 ft^3/ft^3

clayey gravel and sand

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-009)
Data Point: (0.026366509, 1.5095915e-009)
Data Point: (0.06951928, 1.419343e-009)
Data Point: (0.18329807, 1.3289936e-009)
Data Point: (0.48329302, 1.2387287e-009)
Data Point: (1.274275, 1.148433e-009)
Data Point: (3.3598183, 1.0580587e-009)
Data Point: (8.8586679, 9.6769824e-010)
Data Point: (23.357215, 8.7731688e-010)
Data Point: (61.584821, 7.8689671e-010)
Data Point: (162.37767, 6.9637844e-010)
Data Point: (428.13324, 6.055879e-010)
Data Point: (1128.8379, 5.140835e-010)
Data Point: (2976.3514, 4.2070495e-010)
Data Point: (8975.4623, 3.1570716e-010)
Data Point: (20041.075, 1.9531317e-010)
Data Point: (54555.948, 3.3990655e-011)
Data Point: (143844.99, 4.9019873e-012)
Data Point: (379269.02, 7.0441961e-013)
Data Point: (1000000, 1.0036437e-013)

Transient Seepage

Estimation Properties
Volume Water Content Function: clayey gravel and sand
Hydraulic K Sat: 1.6e-009 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1e+006
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.15 ft^3/ft^3

clay and silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.2e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.2e-010)
Data Point: (0.017433288, 1.1756382e-010)
Data Point: (0.030391954, 1.1512398e-010)
Data Point: (0.052983169, 1.1267788e-010)
Data Point: (0.092367086, 1.102229e-010)
Data Point: (0.1610262, 1.0777589e-010)
Data Point: (0.28072162, 1.0532911e-010)
Data Point: (0.48939009, 1.0288472e-010)
Data Point: (0.85316785, 1.0043686e-010)
Data Point: (1.4873521, 9.7990163e-011)
Data Point: (2.5929438, 9.5544187e-011)
Data Point: (4.5203537, 9.3097567e-011)
Data Point: (7.8804628, 9.0650388e-011)
Data Point: (13.738238, 8.8201874e-011)
Data Point: (23.950266, 8.5748855e-011)
Data Point: (41.753189, 8.3290469e-011)
Data Point: (72.789538, 8.0822601e-011)
Data Point: (126.8961, 7.8338225e-011)
Data Point: (221.22163, 7.5824956e-011)
Data Point: (385.66204, 7.3261299e-011)
Data Point: (672.33575, 7.0611702e-011)
Data Point: (1172.1023, 6.7796699e-011)
Data Point: (2043.3597, 6.4745683e-011)
Data Point: (3562.2479, 6.134204e-011)
Data Point: (6150.5143, 5.4797104e-011)
Data Point: (9377.0263, 4.4437815e-011)
Data Point: (18873.918, 2.0133151e-011)
Data Point: (32903.446, 6.646356e-012)
Data Point: (57361.525, 2.1767318e-012)
Data Point: (100000, 7.1688982e-013)
Estimation Properties
Volume Water Content Function: clay and silt

Transient Seepage

Hydraulic K Sat: 1.2e-010 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 30
Residual Water Content: 0.23 ft^3/ft^3

Debris

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 9e-006
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.1, 9e-006)
Data Point: (0.1268961, 8.9999911e-006)
Data Point: (0.1610262, 8.9999753e-006)
Data Point: (0.20433597, 8.999944e-006)
Data Point: (0.25929438, 8.999885e-006)
Data Point: (0.32903446, 8.9997719e-006)
Data Point: (0.41753189, 8.999557e-006)
Data Point: (0.52983169, 8.999148e-006)
Data Point: (0.67233575, 8.9983623e-006)
Data Point: (0.85316785, 8.9968758e-006)
Data Point: (1.0826367, 8.9940211e-006)
Data Point: (1.3738238, 8.9885789e-006)
Data Point: (1.7433288, 8.9782123e-006)
Data Point: (2.2122163, 8.9582365e-006)
Data Point: (2.8072162, 8.9203954e-006)
Data Point: (3.5622479, 8.8476358e-006)
Data Point: (4.5203537, 8.7087936e-006)
Data Point: (5.7361525, 8.4481832e-006)
Data Point: (7.2789538, 7.9578401e-006)
Data Point: (9.2367086, 7.0886025e-006)
Data Point: (11.721023, 5.6609867e-006)
Data Point: (14.873521, 3.7049725e-006)
Data Point: (18.873918, 1.7409597e-006)
Data Point: (23.950266, 5.4767929e-007)
Data Point: (30.391954, 1.1601479e-007)
Data Point: (38.566204, 1.8774804e-008)
Data Point: (48.939009, 2.6261967e-009)
Data Point: (62.101694, 3.4297071e-010)
Data Point: (78.804628, 4.3482228e-011)
Data Point: (100, 5.4441855e-012)
Estimation Properties
Volume Water Content Function: Debris
Hydraulic K Sat: 9e-006 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function

Maximum: 100
Minimum: 0.1
Num. Points: 30
Residual Water Content: 0.15 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibility

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)
Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)
Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)

Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

Debris

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19999934
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.1, 0.19999929)
Data Point: (0.14384499, 0.19999859)
Data Point: (0.20691381, 0.19999718)
Data Point: (0.29763514, 0.19999432)
Data Point: (0.42813324, 0.19998852)
Data Point: (0.61584821, 0.19997673)
Data Point: (0.88586679, 0.19995275)
Data Point: (1.274275, 0.19990397)
Data Point: (1.8329807, 0.19980471)
Data Point: (2.6366509, 0.19960286)
Data Point: (3.7926902, 0.19919303)
Data Point: (5.4555948, 0.19836402)
Data Point: (7.8475997, 0.19670002)
Data Point: (11.288379, 0.19341173)
Data Point: (16.237767, 0.18711026)
Data Point: (23.357215, 0.17571597)
Data Point: (33.598183, 0.15711748)
Data Point: (48.329302, 0.13126)
Data Point: (69.51928, 0.10214438)

Data Point: (100, 0.075804198)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Sand
Saturated Water Content: 0.2 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 100
Minimum: 0.1
Num. Points: 20

embankment clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000

Minimum: 0.01
Num. Points: 20

clayey gravel and sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19342789
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.18997613)
Data Point: (0.023357215, 0.18997613)
Data Point: (0.054555948, 0.18997613)
Data Point: (0.1274275, 0.18997613)
Data Point: (0.29763514, 0.18997613)
Data Point: (0.6951928, 0.18997613)
Data Point: (1.6237767, 0.18997613)
Data Point: (3.7926902, 0.18997613)
Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (4769.8134, 0.18949932)
Data Point: (11131.953, 0.18790673)
Data Point: (21364.961, 0.18267395)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf

Transient Seepage

Porosity: 0.2513675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.01610262, 0.24989967)
Data Point: (0.025929438, 0.24989967)
Data Point: (0.041753189, 0.24989967)
Data Point: (0.067233575, 0.24989967)
Data Point: (0.10826367, 0.24989967)
Data Point: (0.17433288, 0.24989967)
Data Point: (0.28072162, 0.24989967)
Data Point: (0.45203537, 0.24989967)
Data Point: (0.72789538, 0.24989967)
Data Point: (1.1721023, 0.24989967)
Data Point: (1.8873918, 0.24989967)
Data Point: (3.0391954, 0.24989967)
Data Point: (4.8939009, 0.24989967)
Data Point: (7.8804628, 0.24989967)
Data Point: (12.68961, 0.24989967)
Data Point: (20.433597, 0.24989967)
Data Point: (32.903446, 0.24989967)
Data Point: (52.983169, 0.24989967)
Data Point: (85.316785, 0.24989967)
Data Point: (137.38238, 0.24989967)
Data Point: (221.22163, 0.24989967)
Data Point: (356.22479, 0.24989967)
Data Point: (573.61525, 0.24989967)
Data Point: (923.67086, 0.24989967)
Data Point: (1812.7854, 0.2498454)
Data Point: (3414.0428, 0.24965581)
Data Point: (5730.6727, 0.24887847)
Data Point: (7641.3555, 0.24785682)
Data Point: (10000, 0.24514068)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 30

Regions

	Material	Points	Area (ft^2)
Region 1	Clayey Gravel and Sand	34,32,33,35	6601
Region 2	Clay and Silt	33,28,29,11,12,13,14,15,30,26,27,31,32	10195.515

Transient Seepage

Region 3	Debris	25,27,31,21,22,20,19	1640.9231
Region 4	Debris	26,24,23,30	314.47259
Region 5	Debris	29,28,1,2,3,4,5,6,7,8,9,10,36	364.52734
Region 6	Embankment Clay	23,16,17,37,18,19,25,27,26,24	664.18275

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	1	2	Potential Seepage Face
Line 2	2	3	Potential Seepage Face
Line 3	3	4	Potential Seepage Face
Line 4	4	5	Potential Seepage Face
Line 5	5	6	Potential Seepage Face
Line 6	6	7	Potential Seepage Face
Line 7	7	8	Potential Seepage Face
Line 8	8	9	Potential Seepage Face
Line 9	9	10	Potential Seepage Face
Line 10	16	17	
Line 11	18	19	Paducah Transient
Line 12	19	20	Paducah Transient
Line 13	22	21	Paducah Transient
Line 14	20	22	Paducah Transient
Line 15	23	16	Potential Seepage Face
Line 16	23	24	
Line 17	24	26	
Line 18	26	27	
Line 19	27	25	
Line 20	25	19	
Line 21	35	34	
Line 22	32	33	
Line 23	30	26	
Line 24	27	31	
Line 25	34	32	
Line 26	33	35	
Line 27	33	28	
Line 28	28	29	
Line 29	29	11	Potential Seepage Face
Line 30	11	12	Potential Seepage Face
Line 31	12	13	Potential Seepage Face
Line 32	13	14	Potential Seepage Face
Line 33	14	15	Potential Seepage Face
Line 34	15	30	Potential Seepage Face
Line 35	31	32	
Line 36	31	21	
Line 37	23	30	Potential Seepage Face
Line 38	10	36	Potential Seepage Face
Line 39	36	11	
Line 40	28	1	

Transient Seepage

Line 41	36	29	Potential Seepage Face
Line 42	17	37	Paducah Transient
Line 43	37	18	Paducah Transient

Points

	X (ft)	Y (ft)
Point 1	0	335.125
Point 2	47.1877	334.6991
Point 3	52.7608	335.8419
Point 4	59.8609	335.6637
Point 5	62.8973	334.23
Point 6	65.4775	334.2425
Point 7	68.3984	335.378
Point 8	87.6283	335.665
Point 9	92.7868	334.9249
Point 10	105.1336	334.3675
Point 11	124.5526	327.4429
Point 12	136.5964	327.0624
Point 13	157.062	325.7087
Point 14	177.9576	326.025
Point 15	194.9604	325.3005
Point 16	280.1259	350.082
Point 17	288.2718	350.0541
Point 18	323.9674	339.1601
Point 19	334.8666	337.8629
Point 20	349.0074	337.4019
Point 21	574.1246	337.6329
Point 22	353.70395	337.06029
Point 23	236.89948	337.50396
Point 24	280.2	337.6
Point 25	288.2	337.7
Point 26	281.2	331.7
Point 27	287.2	331.7
Point 28	0	331.7
Point 29	113	331.7
Point 30	216.79302	331.70992
Point 31	574	331.7
Point 32	574	313.1
Point 33	0	313.1
Point 34	574	301.6
Point 35	0	301.6
Point 36	106.63124	333.83346
Point 37	304.85751	344.99228

Transient Seepage

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File Information

Created By: Ghack, Mabior T LRL
Revision Number: 42
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 11:40:49 AM
File Name: Paducah 67+17A F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/2/2009
Last Solved Time: 11:42:30 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial state for Transient
Method: Transient
Settings
- Initial PWP: Parent Analysis
- Include Air Flow: No
- Exclude cumulative values: Yes

Control
- Apply Runoff: Yes

Convergence
- Maximum Number of Iterations: 50
- Tolerance: 0.1
- Maximum Change in K: 1
- Rate of Change in K: 1.1
- Minimum Change in K: 0.0001

Transient Seepage

Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10
Time
Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

embankment fill

Model: Saturated / Unsaturated
Hydraulic
K-Function: embankment fill
Vol. WC. Function: embankment fill
K-Ratio: 1
K-Direction: 0 °

gravels

Model: Saturated / Unsaturated
Hydraulic
K-Function: gravels
Vol. WC. Function: gravels
K-Ratio: 1
K-Direction: 0 °

clay and silt

Model: Saturated / Unsaturated
Hydraulic
K-Function: clay and silt
Vol. WC. Function: clay and silt
K-Ratio: 1
K-Direction: 0 °

clayey gravel

Model: Saturated / Unsaturated
Hydraulic
K-Function: clayey gravel
Vol. WC. Function: clayey gravel
K-Ratio: 1
K-Direction: 0 °

Boundary Conditions

Transient Seepage

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

transient

Function: Paducah Transient
Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5

K Functions

embankment fill

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.020691381, 1.59992e-008)
Data Point: (0.042813324, 1.5997795e-008)
Data Point: (0.088586679, 1.5995421e-008)
Data Point: (0.18329807, 1.5991072e-008)
Data Point: (0.37926902, 1.5982644e-008)
Data Point: (0.78475997, 1.5965385e-008)
Data Point: (1.6237767, 1.5929179e-008)
Data Point: (3.3598183, 1.5851103e-008)
Data Point: (6.951928, 1.5682796e-008)
Data Point: (14.384499, 1.5320437e-008)
Data Point: (29.763514, 1.4560234e-008)
Data Point: (61.584821, 1.3033595e-008)
Data Point: (127.4275, 1.0227837e-008)
Data Point: (263.66509, 5.9616669e-009)
Data Point: (545.55948, 1.7364398e-009)
Data Point: (1128.8379, 6.7715324e-011)
Data Point: (2335.7215, 1.176744e-011)
Data Point: (4832.9302, 2.699492e-012)
Data Point: (10000, 6.3101416e-013)
Estimation Properties
Volume Water Content Function: embankment fill
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function

Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

gravels

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 0.0008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 0.0008)
Data Point: (0.016237767, 0.00079999993)
Data Point: (0.026366509, 0.00079999983)
Data Point: (0.042813324, 0.00079999966)
Data Point: (0.06951928, 0.0007999994)
Data Point: (0.11288379, 0.00079999896)
Data Point: (0.18329807, 0.00079999835)
Data Point: (0.29763514, 0.00079999698)
Data Point: (0.48329302, 0.00079999593)
Data Point: (0.78475997, 0.00079999182)
Data Point: (1.274275, 0.00079998255)
Data Point: (2.0691381, 0.00080003501)
Data Point: (3.3598183, 0.00079962424)
Data Point: (5.4555948, 0.00080170144)
Data Point: (8.8586679, 0.00078543995)
Data Point: (14.384499, 0.00061725171)
Data Point: (23.357215, 0.00011475968)
Data Point: (37.926902, 5.5237849e-006)
Data Point: (61.584821, 6.1737905e-007)
Data Point: (100, 8.0741569e-008)
Estimation Properties
Volume Water Content Function: gravels
Hydraulic K Sat: 0.0008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 100
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.11 ft^3/ft^3

clayey gravel

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)

Transient Seepage

Data Point: (0.01, 1.6e-009)
Data Point: (0.018329807, 1.5999999e-009)
Data Point: (0.033598183, 1.5999997e-009)
Data Point: (0.061584821, 1.599999e-009)
Data Point: (0.11288379, 1.5999963e-009)
Data Point: (0.20691381, 1.5999869e-009)
Data Point: (0.37926902, 1.5999539e-009)
Data Point: (0.6951928, 1.5998379e-009)
Data Point: (1.274275, 1.5994303e-009)
Data Point: (2.3357215, 1.5979996e-009)
Data Point: (4.2813324, 1.5929479e-009)
Data Point: (7.8475997, 1.5751865e-009)
Data Point: (14.384499, 1.512945e-009)
Data Point: (26.366509, 1.304117e-009)
Data Point: (48.329302, 7.5127229e-010)
Data Point: (88.586679, 1.2970246e-010)
Data Point: (162.37767, 4.3854942e-012)
Data Point: (297.63514, 6.8944157e-014)
Data Point: (545.55948, 9.1880554e-016)
Data Point: (1000, 1.1915923e-017)

Estimation Properties
Volume Water Content Function: clayey gravel
Hydraulic K Sat: 1.6e-009 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.15 ft^3/ft^3

clay and silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.2e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.2e-010)
Data Point: (0.020691381, 1.2e-010)
Data Point: (0.042813324, 1.2e-010)
Data Point: (0.088586679, 1.2e-010)
Data Point: (0.18329807, 1.2e-010)
Data Point: (0.37926902, 1.2e-010)
Data Point: (0.78475997, 1.2e-010)
Data Point: (1.6237767, 1.2e-010)
Data Point: (3.3598183, 1.2e-010)
Data Point: (6.951928, 1.2e-010)
Data Point: (14.384499, 1.2e-010)
Data Point: (29.763514, 1.2e-010)

Data Point: (61.584821, 1.2e-010)
Data Point: (127.4275, 1.1999997e-010)
Data Point: (263.66509, 1.1999977e-010)
Data Point: (545.55948, 1.2000082e-010)
Data Point: (1128.8379, 1.200232e-010)
Data Point: (2335.7215, 1.2009837e-010)
Data Point: (4659.8728, 1.0483992e-010)
Data Point: (10000, 3.2744769e-011)

Estimation Properties
Volume Water Content Function: clay and silt
Hydraulic K Sat: 1.2e-010 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.23 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Transient

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)
Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)

Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

embankment fill

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)

Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

gravels

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.12977884
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.13)
Data Point: (0.018329807, 0.12999999)
Data Point: (0.033598183, 0.12999999)
Data Point: (0.061584821, 0.12999998)
Data Point: (0.11288379, 0.12999996)
Data Point: (0.20691381, 0.12999993)
Data Point: (0.37926902, 0.12999986)
Data Point: (0.6951928, 0.12999975)
Data Point: (1.274275, 0.12999945)
Data Point: (2.3357215, 0.12999692)
Data Point: (4.2813324, 0.12994609)
Data Point: (7.8475997, 0.12879092)
Data Point: (14.384499, 0.1086857)
Data Point: (26.366509, 0.048675218)
Data Point: (48.329302, 0.025073057)
Data Point: (88.586679, 0.016822363)

Data Point: (162.37767, 0.012726241)
Data Point: (297.63514, 0.010268092)
Data Point: (545.55948, 0.0086222321)
Data Point: (1000, 0.0074377998)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Gravel
Saturated Water Content: 0.13 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

clayey gravel

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19532101
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.18997613)
Data Point: (0.023357215, 0.18997613)
Data Point: (0.054555948, 0.18997613)
Data Point: (0.1274275, 0.18997613)
Data Point: (0.29763514, 0.18997613)
Data Point: (0.6951928, 0.18997613)
Data Point: (1.6237767, 0.18997613)
Data Point: (3.7926902, 0.18997613)
Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (3359.8183, 0.18997613)
Data Point: (10429.375, 0.18959155)
Data Point: (22804.218, 0.18312897)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 31 %

Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.25114936
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.020691381, 0.24989967)
Data Point: (0.042813324, 0.24989967)
Data Point: (0.088586679, 0.24989967)
Data Point: (0.18329807, 0.24989967)
Data Point: (0.37926902, 0.24989967)
Data Point: (0.78475997, 0.24989967)
Data Point: (1.6237767, 0.24989967)
Data Point: (3.3598183, 0.24989967)
Data Point: (6.951928, 0.24989967)
Data Point: (14.384499, 0.24989967)
Data Point: (29.763514, 0.24989967)
Data Point: (61.584821, 0.24989967)
Data Point: (127.4275, 0.24989967)
Data Point: (263.66509, 0.24989967)
Data Point: (545.55948, 0.24989967)
Data Point: (1128.8379, 0.24989967)
Data Point: (2282.0137, 0.2498454)
Data Point: (5107.633, 0.24853936)
Data Point: (10000, 0.24514068)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)

Transient Seepage

Region 1	embankment fill	14,26,13,12,11,10,9,8,7,16,18,19,17	2264.308
Region 2	gravels	1,2,3,4,5,6,7,16,18,24	2011.0898
Region 3	clayey gravel	20,22,23,21	4124.9087
Region 4	gravels	19,17,14,15,25	869.8555
Region 5	clay and silt	25,21,20,24,18,19	1124.9751

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	13	12	
Line 2	12	11	
Line 3	11	10	Potential Seepage Face
Line 4	10	9	Potential Seepage Face
Line 5	9	8	Potential Seepage Face
Line 6	8	7	Potential Seepage Face
Line 7	7	16	
Line 8	16	18	
Line 9	18	19	
Line 10	19	17	
Line 11	17	14	
Line 12	1	2	Potential Seepage Face
Line 13	2	3	Potential Seepage Face
Line 14	3	4	Potential Seepage Face
Line 15	4	5	Potential Seepage Face
Line 16	5	6	Potential Seepage Face
Line 17	6	7	Potential Seepage Face
Line 18	24	1	
Line 19	20	21	
Line 20	20	22	
Line 21	22	23	
Line 22	23	21	
Line 23	18	24	
Line 24	14	15	transient
Line 25	15	25	
Line 26	25	19	
Line 27	25	21	
Line 28	20	24	
Line 29	14	26	transient
Line 30	26	13	transient

Points

	X (ft)	Y (ft)
Point 1	0	334.8625
Point 2	12.9496	334.8222
Point 3	51.8256	333.6227
Point 4	75.5322	325.9003
Point 5	92.5865	326.3688

Transient Seepage

Point 6	109.279	326.1716
Point 7	124.9974	326.2999
Point 8	141.2426	332.3327
Point 9	148.057	334.1276
Point 10	164.1967	335.7904
Point 11	205.5546	349.3855
Point 12	211.0685	349.9124
Point 13	216.8613	349.5456
Point 14	302.4014	324.8389
Point 15	374.9917	321.3737
Point 16	207	325.8
Point 17	215	325.8
Point 18	208	318.9
Point 19	214	318.9
Point 20	0	315.9
Point 21	374.9917	315.9
Point 22	0	304.9
Point 23	374.9917	304.9
Point 24	0	318.9
Point 25	374.9917	318.9
Point 26	239.52363	343

Transient Seepage

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File Information

Title: Paducah 7+60 B
Comments: T-Wall
Created By: Minges, George C LRL
Revision Number: 35
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 11:22:52 AM
File Name: Paducah 7+60B F.gsz
Directory: S:\proj\112546\Others\GEOTECH SEEP AND SLOPE\FEASIBILITY\
Last Solved Date: 11/2/2009
Last Solved Time: 11:25:08 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: initial state for transient
Method: Transient
Settings
- Initial PWP: Parent Analysis
- Include Air Flow: No
- Exclude cumulative values: Yes

Control
- Apply Runoff: Yes

Convergence
- Maximum Number of Iterations: 500
- Tolerance: 0.001
- Maximum Change in K: 0.1
- Rate of Change in K: 1.02

Transient Seepage

Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10
Time
Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

T-wall

Model: (none)

Foundation Clay

Model: Saturated / Unsaturated
Hydraulic
K-Function: Clay and Silt
Vol. WC. Function: Foundation Clay
K-Ratio: 8
K-Direction: 0 °

Debris

Model: Saturated / Unsaturated
Hydraulic
K-Function: Debris
Vol. WC. Function: Debris
K-Ratio: 1
K-Direction: 0 °

Embankment Clay

Model: Saturated / Unsaturated
Hydraulic
K-Function: Embankment Clay
Vol. WC. Function: Embankment Clay
K-Ratio: 8
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Transient Seepage

transient

Function: Paducah Transient Feasibility
Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5

K Functions

Embankment Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.018329807, 1.5999372e-008)
Data Point: (0.033598183, 1.5998342e-008)
Data Point: (0.061584821, 1.5996774e-008)
Data Point: (0.11288379, 1.5994263e-008)
Data Point: (0.20691381, 1.5990033e-008)
Data Point: (0.37926902, 1.5982644e-008)
Data Point: (0.6951928, 1.5969208e-008)
Data Point: (1.274275, 1.5944374e-008)
Data Point: (2.3357215, 1.5897609e-008)
Data Point: (4.2813324, 1.5808533e-008)
Data Point: (7.8475997, 1.5639994e-008)
Data Point: (14.384499, 1.5320437e-008)
Data Point: (26.366509, 1.4727229e-008)
Data Point: (48.329302, 1.3658753e-008)
Data Point: (88.586679, 1.1823309e-008)
Data Point: (162.37767, 8.9682229e-009)
Data Point: (297.63514, 5.1544584e-009)
Data Point: (545.55948, 1.7364398e-009)
Data Point: (1000, 1.1616636e-010)
Estimation Properties
Volume Water Content Function: Embankment Clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

Transient Seepage

Clay and Silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 6.5e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 6.5e-009)
Data Point: (0.020691381, 6.5e-009)
Data Point: (0.042813324, 6.5e-009)
Data Point: (0.088586679, 6.5e-009)
Data Point: (0.18329807, 6.5e-009)
Data Point: (0.37926902, 6.5e-009)
Data Point: (0.78475997, 6.5e-009)
Data Point: (1.6237767, 6.5e-009)
Data Point: (3.3598183, 6.5e-009)
Data Point: (6.951928, 6.5e-009)
Data Point: (14.384499, 6.4999998e-009)
Data Point: (29.763514, 6.4999983e-009)
Data Point: (61.584821, 6.5000048e-009)
Data Point: (127.4275, 6.5001689e-009)
Data Point: (263.66509, 6.501123e-009)
Data Point: (545.55948, 6.4937109e-009)
Data Point: (1396.6185, 5.2476121e-009)
Data Point: (2335.7215, 1.3806548e-009)
Data Point: (4832.9302, 6.7639102e-014)
Data Point: (10000, 3.9871948e-019)
Estimation Properties
Volume Water Content Function: Foundation Clay
Hydraulic K Sat: 6.5e-009 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.25 ft^3/ft^3

Debris

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 0.0009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 0.0009)
Data Point: (0.016237767, 0.00089999839)
Data Point: (0.026366509, 0.0008999939)
Data Point: (0.042813324, 0.00089998384)

Transient Seepage

Data Point: (0.06951928, 0.00089996132)
Data Point: (0.11288379, 0.00089990944)
Data Point: (0.18329807, 0.00089978997)
Data Point: (0.29763514, 0.00089951612)
Data Point: (0.48329302, 0.00089888542)
Data Point: (0.78475997, 0.00089743687)
Data Point: (1.274275, 0.00089419165)
Data Point: (2.0691381, 0.00088700001)
Data Point: (3.3598183, 0.00087122954)
Data Point: (5.4555948, 0.00083827851)
Data Point: (8.8586679, 0.00077289797)
Data Point: (14.384499, 0.00065139674)
Data Point: (23.357215, 0.00046382735)
Data Point: (37.926902, 0.00023682493)
Data Point: (61.584821, 7.6191529e-005)
Data Point: (100, 1.4636508e-005)

Estimation Properties

Volume Water Content Function: Debris
Hydraulic K Sat: 0.0009 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 100
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.2 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Transient Feasibility

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)

Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)
Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22

Transient Seepage

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.21999999)
- Data Point: (0.018329807, 0.21999998)
- Data Point: (0.033598183, 0.21999997)
- Data Point: (0.061584821, 0.21999993)
- Data Point: (0.11288379, 0.21999984)
- Data Point: (0.20691381, 0.21999963)
- Data Point: (0.37926902, 0.21999914)
- Data Point: (0.6951928, 0.21999792)
- Data Point: (1.274275, 0.21999489)
- Data Point: (2.3357215, 0.21998722)
- Data Point: (4.2813324, 0.21996761)
- Data Point: (7.8475997, 0.21991719)
- Data Point: (14.384499, 0.21978687)
- Data Point: (26.366509, 0.21944947)
- Data Point: (48.329302, 0.21857772)
- Data Point: (88.586679, 0.21634893)
- Data Point: (162.37767, 0.21082014)
- Data Point: (297.63514, 0.19810028)
- Data Point: (545.55948, 0.17327571)
- Data Point: (1000, 0.13699113)

Estimation Properties
- Vol. WC Estimation Method: Sample functions
- Sample Material: Silty Clay
- Saturated Water Content: 0.22 ft^3/ft^3
- Liquid Limit: 0 %
- Diameter at 10% passing: 0
- Diameter at 60% passing: 0
- Maximum: 1000
- Minimum: 0.01
- Num. Points: 20

Foundation Clay

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.3704873

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.36966087)
- Data Point: (0.023357215, 0.36966087)
- Data Point: (0.054555948, 0.36966087)
- Data Point: (0.1274275, 0.36966087)
- Data Point: (0.29763514, 0.36966087)
- Data Point: (0.6951928, 0.36966087)
- Data Point: (1.6237767, 0.36966087)
- Data Point: (3.7926902, 0.36966087)

Data Point: (8.8586679, 0.36966087)
Data Point: (20.691381, 0.36966087)
Data Point: (48.329302, 0.36966087)
Data Point: (112.88379, 0.36966087)
Data Point: (263.66509, 0.36966087)
Data Point: (602.85683, 0.36114733)
Data Point: (1438.4499, 0.2901812)
Data Point: (3359.8183, 0.21242878)
Data Point: (7847.5997, 0.17220763)
Data Point: (18329.807, 0.14645868)
Data Point: (42813.324, 0.12590906)
Data Point: (100000, 0.10784644)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.0006
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Debris

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.25999999
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25999998)
Data Point: (0.018329807, 0.25999996)
Data Point: (0.033598183, 0.25999988)
Data Point: (0.061584821, 0.25999963)
Data Point: (0.11288379, 0.25999885)
Data Point: (0.20691381, 0.25999634)
Data Point: (0.37926902, 0.2599882)
Data Point: (0.6951928, 0.2599617)
Data Point: (1.274275, 0.25987516)
Data Point: (2.3357215, 0.25959248)
Data Point: (4.2813324, 0.2586718)
Data Point: (7.8475997, 0.25571003)
Data Point: (14.384499, 0.24656017)
Data Point: (26.366509, 0.22150596)
Data Point: (48.329302, 0.17063801)
Data Point: (88.586679, 0.10916815)
Data Point: (162.37767, 0.065559185)

Transient Seepage

Data Point: (297.63514, 0.041878631)
Data Point: (545.55948, 0.029155966)
Data Point: (1000, 0.021736063)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Sand
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Debris	12,27,7,30,29	43.292528
Region 2	Embankment Clay	6,14,12,27	32.306024
Region 3	T-wall	12,29,10,13,11,15,16,17,5,18,21,20,19,6,14	96.178322
Region 4	Foundation Clay	23,24,25,15	2.2524075
Region 5	Embankment Clay	23,28,26,5,17,16,15	31.157314
Region 6	Debris	26,28,22,1,2,3,4	636.27261
Region 7	Foundation Clay	29,10,13,11,15,25,24,23,28,22,31,32,9,8,36,35,30	14900.163

Lines

	Start Point	End Point	Hydraulic Boundary	Right Side Material
Line 1	1	2	Potential Seepage Face	
Line 2	2	3	Potential Seepage Face	
Line 3	3	4	Potential Seepage Face	
Line 4	4	5	Potential Seepage Face	
Line 5	13	10		
Line 6	10	12		
Line 7	12	14		
Line 8	19	20	transient	
Line 9	20	21		
Line 10	21	18		
Line 11	18	17		
Line 12	17	16		
Line 13	16	15		
Line 14	15	11		
Line 15	11	13		
Line 16	23	15		
Line 17	15	25		
Line 18	25	24		
Line 19	24	23		
Line 20	6	27	transient	

Transient Seepage

Line 21	27	7	transient	
Line 22	12	27		
Line 23	7	30	transient	
Line 24	30	29		
Line 25	28	22		
Line 26	29	10		
Line 27	23	28		
Line 28	29	12		
Line 29	6	14		
Line 30	17	5		
Line 31	5	18		
Line 32	19	6	transient	
Line 33	28	26		
Line 34	26	5		
Line 35	22	1		
Line 36	4	26		
Line 37	30	35	transient	
Line 38	35	36	transient	T-wall
Line 39	36	8	transient	
Line 40	22	31		
Line 41	31	32		
Line 42	32	9		
Line 43	9	8	transient	

Points

	X (ft)	Y (ft)
Point 1	0	334.9629
Point 2	74.1988	335.4209
Point 3	133.6199	335.1982
Point 4	156.1492	333.8638
Point 5	189.94866	335.00041
Point 6	192.10634	335.14426
Point 7	217.58	333.7031
Point 8	305.4474	317.9361
Point 9	359.2597	312.6319
Point 10	203.30208	322.916
Point 11	200.21849	329.66493
Point 12	203.30208	331.92348
Point 13	201.84227	322.89996
Point 14	192.1851	331.93952
Point 15	182.20486	329.69835
Point 16	182.20486	331.21898
Point 17	189.89112	332.34859
Point 18	190.25176	349.20939
Point 19	191.76033	349.22332
Point 20	191.76033	350.21665
Point 21	190.29354	350.25378

Transient Seepage

Point 22	0	331.5
Point 23	180.7	329.7
Point 24	180.7	328.2
Point 25	182.2	328.2
Point 26	180.7	334.65
Point 27	203.30926	334.51046
Point 28	180.7	331.5
Point 29	203.3	331.5
Point 30	223.13081	331.50496
Point 31	0	285
Point 32	359	285
Point 33	189.75	334.8
Point 34	192.25	335.2
Point 35	243	323.9
Point 36	243	319.6

Transient Seepage

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File Information

Title: Paducah 87+43 B
Comments: I-Wall
Created By: Minges, George C LRL
Revision Number: 41
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 12:01:38 PM
File Name: Paducah 87+43 B F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/2/2009
Last Solved Time: 12:02:44 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
- Initial PWP: Parent Analysis
- Include Air Flow: No
- Exclude cumulative values: No

Control
- Apply Runoff: Yes

Convergence
- Maximum Number of Iterations: 500
- Tolerance: 0.001
- Maximum Change in K: 0.1

Transient Seepage

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10
Time
Starting Time: 0 sec
Duration: 2937600 sec
# of Steps: 34
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

I wall

Model: (none)

Embankment Fill

Model: Saturated / Unsaturated
Hydraulic
K-Function: Embankment Clay
Vol. WC. Function: Embankment Clay
K-Ratio: 8
K-Direction: 0 °

Foundation Clay

Model: Saturated / Unsaturated
Hydraulic
K-Function: Foundation Clay
Vol. WC. Function: Foundation Clay
K-Ratio: 8
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Transient certification

Function: Paducah Feasibilty
Type: H (Q=0)

Initial Water Tables

Transient Seepage

Initial Water Table 1

Max. negative head: 5
Coordinates
Coordinate: (0, 335) ft
Coordinate: (160, 335) ft

K Functions

Embankment Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.018329807, 1.5999372e-008)
Data Point: (0.033598183, 1.5998342e-008)
Data Point: (0.061584821, 1.5996774e-008)
Data Point: (0.11288379, 1.5994262e-008)
Data Point: (0.20691381, 1.5990032e-008)
Data Point: (0.37926902, 1.5982642e-008)
Data Point: (0.6951928, 1.5969207e-008)
Data Point: (1.274275, 1.5944375e-008)
Data Point: (2.3357215, 1.5897611e-008)
Data Point: (4.2813324, 1.5808536e-008)
Data Point: (7.8475997, 1.5639998e-008)
Data Point: (14.384499, 1.5320442e-008)
Data Point: (26.366509, 1.4727233e-008)
Data Point: (48.329302, 1.3658756e-008)
Data Point: (88.586679, 1.182331e-008)
Data Point: (162.37767, 8.9682235e-009)
Data Point: (297.63514, 5.1544587e-009)
Data Point: (545.55948, 1.73644e-009)
Data Point: (1000, 1.161664e-010)
Estimation Properties
Volume Water Content Function: Embankment Clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

Foundation Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure

Transient Seepage

Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 8.1e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 8.1e-010)
Data Point: (0.023357215, 8.0994448e-010)
Data Point: (0.054555948, 8.098889e-010)
Data Point: (0.1274275, 8.0983285e-010)
Data Point: (0.29763514, 8.0977596e-010)
Data Point: (0.6951928, 8.0971714e-010)
Data Point: (1.6237767, 8.0965382e-010)
Data Point: (3.7926902, 8.0958e-010)
Data Point: (8.8586679, 8.0948154e-010)
Data Point: (20.691381, 8.0932544e-010)
Data Point: (48.329302, 8.0903319e-010)
Data Point: (112.88379, 8.0840618e-010)
Data Point: (263.66509, 8.068192e-010)
Data Point: (615.84821, 7.8897265e-010)
Data Point: (1438.4499, 3.7419198e-010)
Data Point: (3359.8183, 2.606661e-011)
Data Point: (7847.5997, 1.7973317e-012)
Data Point: (18329.807, 1.7906888e-013)
Data Point: (42813.324, 3.2981673e-014)
Data Point: (100000, 6.0490098e-015)
Estimation Properties
Volume Water Content Function: Foundation Clay
Hydraulic K Sat: 8.1e-010 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.26 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibilty

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 334
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 334)
Data Point: (86400, 334)
Data Point: (172800, 334.9)
Data Point: (259200, 336.1)
Data Point: (345600, 338.5)

Data Point: (432000, 341.1)
Data Point: (518400, 343)
Data Point: (604800, 344.3)
Data Point: (691200, 346.2)
Data Point: (777600, 347.2)
Data Point: (864000, 347.7)
Data Point: (950400, 348.1)
Data Point: (1036800, 348.5)
Data Point: (1123200, 348.8)
Data Point: (1209600, 349.1)
Data Point: (1296000, 349.3)
Data Point: (1382400, 349.4)
Data Point: (1468800, 349.4)
Data Point: (1555200, 349.2)
Data Point: (1641600, 349)
Data Point: (1728000, 348.5)
Data Point: (1814400, 348)
Data Point: (1900800, 347.5)
Data Point: (1987200, 346.8)
Data Point: (2073600, 345.8)
Data Point: (2160000, 344.6)
Data Point: (2246400, 343.3)
Data Point: (2332800, 342.2)
Data Point: (2419200, 341.1)
Data Point: (2505600, 339.8)
Data Point: (2592000, 338.4)
Data Point: (2678400, 337.3)
Data Point: (2764800, 336.2)
Data Point: (2851200, 334.9)
Data Point: (2937600, 334)

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)

Transient Seepage

Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Foundation Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37048224
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37005407)
Data Point: (0.020691381, 0.37005407)
Data Point: (0.042813324, 0.37005407)
Data Point: (0.088586679, 0.37005407)
Data Point: (0.18329807, 0.37005407)
Data Point: (0.37926902, 0.37005407)
Data Point: (0.78475997, 0.37005407)
Data Point: (1.6237767, 0.37005407)
Data Point: (3.3598183, 0.37005407)
Data Point: (6.951928, 0.37005407)
Data Point: (14.384499, 0.37005407)
Data Point: (29.763514, 0.37005407)
Data Point: (61.584821, 0.37005407)
Data Point: (127.4275, 0.37005407)
Data Point: (263.66509, 0.37005407)

Transient Seepage

Data Point: (526.83766, 0.36911026)
Data Point: (1128.8379, 0.34318275)
Data Point: (2335.7215, 0.2703264)
Data Point: (4832.9302, 0.21728994)
Data Point: (10000, 0.18487617)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 35 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.011
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Foundation Clay	29,4,21,19,3,24,26,25,23,2,20,22,9,10,11,12,13,14,15,27,28,1	9822.254
Region 2	Embankment Fill	21,5,3,19	4.7054975
Region 3	Embankment Fill	8,2,20,22	4.8603244
Region 4	I wall	3,5,6,7,8,2,23,25,26,24	42.081158

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	29	4	Potential Seepage Face
Line 2	4	21	Potential Seepage Face
Line 3	21	19	
Line 4	19	3	
Line 5	3	24	
Line 6	24	26	
Line 7	26	25	
Line 8	25	23	
Line 9	23	2	
Line 10	2	20	
Line 11	20	22	
Line 12	22	9	Transient certification
Line 13	9	10	Transient certification
Line 14	10	11	Transient certification
Line 15	11	12	Transient certification
Line 16	12	13	Transient certification
Line 17	13	14	Transient certification
Line 18	14	15	Transient certification
Line 19	15	27	
Line 20	27	28	
Line 21	28	1	

Transient Seepage

Line 22	1	29	Potential Seepage Face
Line 23	21	5	Potential Seepage Face
Line 24	5	3	
Line 25	8	2	
Line 26	22	8	Transient certification
Line 27	5	6	
Line 28	6	7	
Line 29	7	8	

Points

	X (ft)	Y (ft)
Point 1	0	339.3218
Point 2	134.73896	336.10876
Point 3	132.34	336.06
Point 4	103.5	340.15
Point 5	132.25	340.35
Point 6	132.5	350.25
Point 7	134.5	350.25
Point 8	134.75	341.05
Point 9	145.5	340.15
Point 10	160.5	334.75
Point 11	163.5	334.85
Point 12	191.5	333.75
Point 13	206.5	332.75
Point 14	208.5	333.05
Point 15	224.5	330.75
Point 16	259.5	324.15
Point 17	302.5	316.85
Point 18	363.5	307.85
Point 19	131.19568	336.11061
Point 20	135.75695	336.14638
Point 21	131.18517	340.34259
Point 22	135.72336	340.96851
Point 23	134.08446	336.13791
Point 24	133.23483	336.06672
Point 25	134.08	325.1
Point 26	133.24	325.1
Point 27	224.5	294
Point 28	0	294
Point 29	1.07396	339.2504

Transient Seepage w/o toe drain

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File Information

Title: Paducah 177+05 C
Comments: earthen levee
Created By: Minges, George C LRL
Revision Number: 74
Last Edited By: Minges, George C LRL
Date: 11/5/2009
Time: 2:30:21 PM
File Name: Paducah 177+05c F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/5/2009
Last Solved Time: 2:32:26 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage w/o toe drain

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
- Initial PWP: Parent Analysis
- Include Air Flow: No
- Exclude cumulative values: No

Control
- Apply Runoff: Yes

Convergence
- Maximum Number of Iterations: 500
- Tolerance: 0.001
- Maximum Change in K: 0.1

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

Embankment Clay

Model: Saturated / Unsaturated

Hydraulic

K-Function: embankment clay
Vol. WC. Function: embankment clay
K-Ratio: 8
K-Direction: 0 °

Clay and Silt

Model: Saturated / Unsaturated

Hydraulic

K-Function: clay and silt
Vol. WC. Function: clay and silt
K-Ratio: 10
K-Direction: 0 °

Silty Mud

Model: Saturated / Unsaturated

Hydraulic

K-Function: Silty Mud
Vol. WC. Function: Silty Mud
K-Ratio: 10
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

New Boundary Condition

Function: Paducah Feasibility

Transient Seepage w/o toe drain

Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5
Coordinates
Coordinate: (0, 325) ft
Coordinate: (320, 325) ft

K Functions

embankment clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.020691381, 1.5999304e-008)
Data Point: (0.042813324, 1.5998111e-008)
Data Point: (0.088586679, 1.5996064e-008)
Data Point: (0.18329807, 1.5992334e-008)
Data Point: (0.37926902, 1.5985098e-008)
Data Point: (0.78475997, 1.5970267e-008)
Data Point: (1.6237767, 1.5939037e-008)
Data Point: (3.3598183, 1.5872196e-008)
Data Point: (6.951928, 1.5726386e-008)
Data Point: (14.384499, 1.5413972e-008)
Data Point: (29.763514, 1.4755734e-008)
Data Point: (61.584821, 1.3421874e-008)
Data Point: (127.4275, 1.0951722e-008)
Data Point: (263.66509, 7.1227362e-009)
Data Point: (545.55948, 2.945564e-009)
Data Point: (1128.8379, 6.0232013e-010)
Data Point: (2335.7215, 6.5262204e-011)
Data Point: (4832.9302, 4.9979777e-012)
Data Point: (10000, 2.0104652e-013)
Estimation Properties
Volume Water Content Function: embankment clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Residual Water Content: 0.18 ft^3/ft^3

clay and silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 5.5e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 5.5e-009)
Data Point: (0.020691381, 5.4942437e-009)
Data Point: (0.042813324, 5.4884677e-009)
Data Point: (0.088586679, 5.4826814e-009)
Data Point: (0.18329807, 5.4769073e-009)
Data Point: (0.37926902, 5.4711211e-009)
Data Point: (0.78475997, 5.4653099e-009)
Data Point: (1.6237767, 5.4594492e-009)
Data Point: (3.3598183, 5.4534852e-009)
Data Point: (6.951928, 5.4473076e-009)
Data Point: (14.384499, 5.4406881e-009)
Data Point: (29.763514, 5.4331511e-009)
Data Point: (61.584821, 5.4237205e-009)
Data Point: (127.4275, 5.4104318e-009)
Data Point: (263.66509, 5.3893615e-009)
Data Point: (545.55948, 5.3488586e-009)
Data Point: (1128.8379, 5.1693186e-009)
Data Point: (2335.7215, 3.3469211e-009)
Data Point: (4832.9302, 7.1749718e-010)
Data Point: (10000, 8.922774e-011)
Estimation Properties
Volume Water Content Function: clay and silt
Hydraulic K Sat: 5.5e-009 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.23 ft^3/ft^3

Silty Mud

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1e-007
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1e-007)
Data Point: (0.020691381, 9.9995926e-008)
Data Point: (0.042813324, 9.9988463e-008)

Data Point: (0.088586679, 9.9975661e-008)
Data Point: (0.18329807, 9.995235e-008)
Data Point: (0.37926902, 9.9907134e-008)
Data Point: (0.78475997, 9.9814436e-008)
Data Point: (1.6237767, 9.961925e-008)
Data Point: (3.3598183, 9.9201491e-008)
Data Point: (6.951928, 9.8290169e-008)
Data Point: (14.384499, 9.6337563e-008)
Data Point: (29.763514, 9.2223569e-008)
Data Point: (61.584821, 8.3886926e-008)
Data Point: (127.4275, 6.8448433e-008)
Data Point: (263.66509, 4.4517209e-008)
Data Point: (545.55948, 1.8409823e-008)
Data Point: (1128.8379, 3.764511e-009)
Data Point: (2335.7215, 4.0788978e-010)
Data Point: (4832.9302, 3.1237397e-011)
Data Point: (10000, 1.2565461e-012)

Estimation Properties
Volume Water Content Function: Silty Mud
Hydraulic K Sat: 1e-007 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.3 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibility

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)

Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)
Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

embankment clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22

Transient Seepage w/o toe drain

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.21999999)
- Data Point: (0.020691381, 0.21999998)
- Data Point: (0.042813324, 0.21999995)
- Data Point: (0.088586679, 0.21999988)
- Data Point: (0.18329807, 0.21999969)
- Data Point: (0.37926902, 0.21999914)
- Data Point: (0.78475997, 0.21999752)
- Data Point: (1.6237767, 0.21999264)
- Data Point: (3.3598183, 0.2199777)
- Data Point: (6.951928, 0.2199314)
- Data Point: (14.384499, 0.21978687)
- Data Point: (29.763514, 0.2193343)
- Data Point: (61.584821, 0.2179235)
- Data Point: (127.4275, 0.21362613)
- Data Point: (263.66509, 0.2014734)
- Data Point: (545.55948, 0.17327571)
- Data Point: (1128.8379, 0.12923352)
- Data Point: (2335.7215, 0.087755139)
- Data Point: (4832.9302, 0.060407646)
- Data Point: (10000, 0.044010658)

Estimation Properties
- Vol. WC Estimation Method: Sample functions
- Sample Material: Silty Clay
- Saturated Water Content: 0.22 ft^3/ft^3
- Liquid Limit: 0 %
- Diameter at 10% passing: 0
- Diameter at 60% passing: 0
- Maximum: 10000
- Minimum: 0.01
- Num. Points: 20

clay and silt

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.2601826

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.25998123)
- Data Point: (0.020691381, 0.25998123)
- Data Point: (0.042813324, 0.25998123)
- Data Point: (0.088586679, 0.25998123)
- Data Point: (0.18329807, 0.25998123)
- Data Point: (0.37926902, 0.25998123)
- Data Point: (0.78475997, 0.25998123)
- Data Point: (1.6237767, 0.25998123)

Transient Seepage w/o toe drain

Data Point: (3.3598183, 0.25998123)
Data Point: (6.951928, 0.25998123)
Data Point: (14.384499, 0.25998123)
Data Point: (29.763514, 0.25998123)
Data Point: (61.584821, 0.25998123)
Data Point: (127.4275, 0.25998123)
Data Point: (263.66509, 0.25998123)
Data Point: (545.55948, 0.25998123)
Data Point: (1151.9502, 0.2583442)
Data Point: (2335.7215, 0.24584199)
Data Point: (4832.9302, 0.21435066)
Data Point: (10000, 0.18619499)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 30 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Silty Mud

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37999999
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37999999)
Data Point: (0.020691381, 0.37999997)
Data Point: (0.042813324, 0.37999992)
Data Point: (0.088586679, 0.3799998)
Data Point: (0.18329807, 0.37999947)
Data Point: (0.37926902, 0.37999851)
Data Point: (0.78475997, 0.37999571)
Data Point: (1.6237767, 0.37998729)
Data Point: (3.3598183, 0.37996148)
Data Point: (6.951928, 0.37988152)
Data Point: (14.384499, 0.37963187)
Data Point: (29.763514, 0.37885015)
Data Point: (61.584821, 0.37641332)
Data Point: (127.4275, 0.36899059)
Data Point: (263.66509, 0.34799952)
Data Point: (545.55948, 0.2992944)
Data Point: (1128.8379, 0.22322153)

Transient Seepage w/o toe drain

Data Point: (2335.7215, 0.15157706)
Data Point: (4832.9302, 0.10434048)
Data Point: (10000, 0.07601841)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.38 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Embankment Clay	5,27,6,7,8,25,26,9,13,16,15,14	1333.2343
Region 2	Silty Mud	21,19,17,18,20,22	2610
Region 3	Silty Mud	23,21,22,24	4489.2
Region 4	Clay and Silt	1,17,18,12,11,10,9,13,16,15,14,5,28,29,30,4,3,2	3534.0409
Region 5	Clay and Silt	30,29,28,5	16.401447

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	6	7	
Line 2	7	8	
Line 3	13	9	
Line 4	5	14	
Line 5	14	15	
Line 6	15	16	
Line 7	16	13	
Line 8	17	18	
Line 9	21	19	
Line 10	19	17	
Line 11	18	20	
Line 12	20	22	
Line 13	22	21	
Line 14	23	21	
Line 15	22	24	
Line 16	24	23	
Line 17	8	25	New Boundary Condition
Line 18	25	26	New Boundary Condition
Line 19	26	9	New Boundary Condition
Line 20	5	27	Potential Seepage Face
Line 21	27	6	
Line 22	5	28	

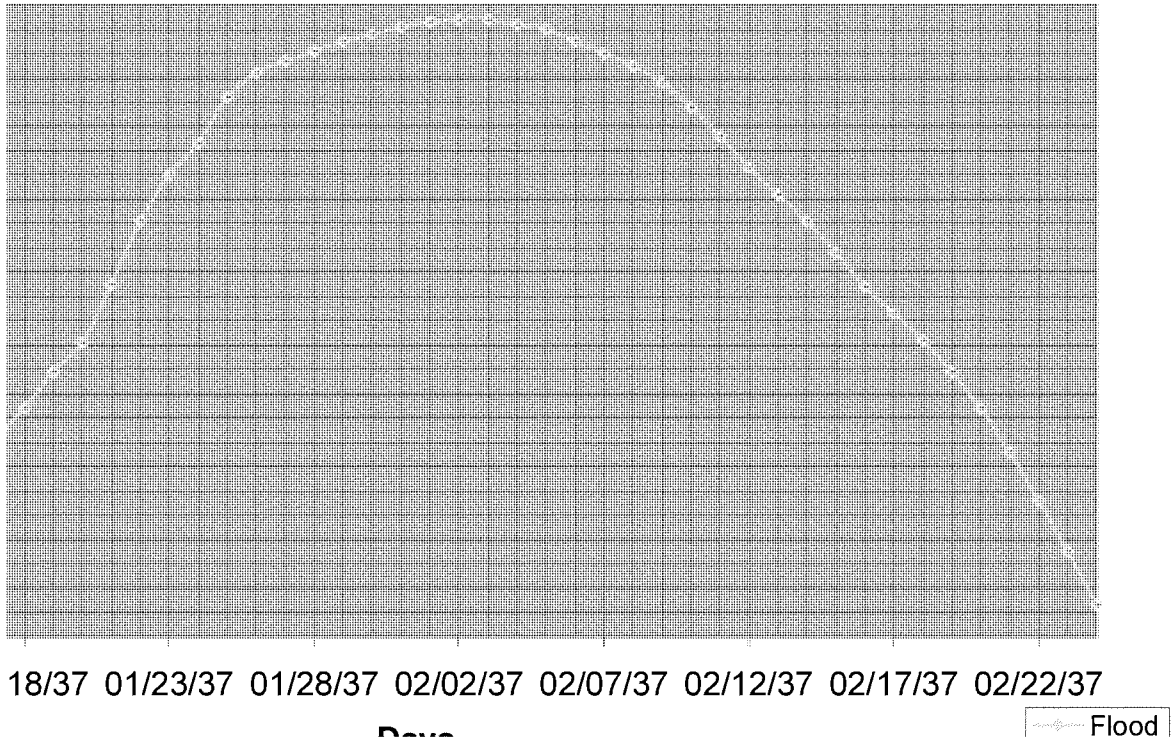
Transient Seepage w/o toe drain

Line 23	28	29	
Line 24	29	30	
Line 25	1	17	
Line 26	18	12	
Line 27	12	11	New Boundary Condition
Line 28	11	10	New Boundary Condition
Line 29	10	9	New Boundary Condition
Line 30	30	4	Potential Seepage Face
Line 31	4	3	Potential Seepage Face
Line 32	3	2	Potential Seepage Face
Line 33	2	1	Potential Seepage Face
Line 34	5	30	Potential Seepage Face

Points

	X (ft)	Y (ft)
Point 1	0	329.44
Point 2	2.6572	327.7818
Point 3	12.6443	327.7989
Point 4	14.7324	329.5039
Point 5	30.5158	330.8228
Point 6	93.2703	350.5922
Point 7	97.5013	350.874
Point 8	101.7313	350.6552
Point 9	162.9985	333.8041
Point 10	181.8955	332.5079
Point 11	214.0501	328.1119
Point 12	261.8367	327.54
Point 13	101.53514	332.42097
Point 14	93.47597	332.23961
Point 15	94.48622	326.23738
Point 16	100.52539	326.23738
Point 17	0	317.2
Point 18	261	317.2
Point 19	0	313.2
Point 20	261	313.2
Point 21	0	307.2
Point 22	261	307.2
Point 23	0	290
Point 24	261	290
Point 25	122.17126	345.03334
Point 26	129.49354	343.0194
Point 27	67	342.31633
Point 28	30.5	326
Point 29	27	326
Point 30	27	330.52901

hio River Design Flood at Paducah, KY.



US Army Corps of Engineers
Louisville District

Project:	Paducah LFPP Feasibility Study	Prepared By:	S. Alsip	Date:	03 Nov 2009
Subject:	Strip Footings for Pump Station 14	Checked By:	C. Neutz	Date:	23 Nov 2009
	Borings AD-1 and AD-2				
		Status:	Final		

Settlement of Cohesionless Soils - Schmertmann Method

Ref: Schmertmann, J. H. "Static Cone to Compute Static Settlement over Sand." *Journal of Soil Mechanics and Foundation Division*, ASCE, May 1970, Vol. 96, No. SM3, pp. 1011-1043.
Schmertmann, J. H., et al. "Improved Strain Influence Factor Diagrams." *Journal of the Geotechnical Engineering Division*, ASCE, Aug. 1978, Vol. 104, No. GT8, pp. 1131-1135.

Contact Pressure, p	2,000 psf	Contact Pressure, p	1.00 tsf	Zone of Influence	8.0 feet
Overburden Pressure, p_o	165 psf	Overburden Pressure, p_o	0.08 tsf	Depth of Peak Influence Factor, I_{zp}	2.0 feet
Width of Footing, B	2.0 feet	Net Pressure, $\Delta p = p - p_o$	0.92 tsf	Initial Effective Vertical Pressure at I_{zp}, σ'_{vp}	0.21 tsf
Length of Footing, L	40.0 feet	Footing Aspect Ratio, L/B	20.0	Peak Influence Factor, $I_{zp}=0.5+0.1\cdot(\Delta p/\sigma'_{vp})^{0.5}$	0.710
Embedment Depth, D	2.00 feet	Cut Depth, z_c	0.0 feet	Time Since Application of Load, t	1.0 years

Soil	q_c/N	Soil Type and Description
1	2.0	Silt, sandy silt, slightly cohesive silt-sand mixture
2	3.5	Clean fine to medium sand and slightly silty sand
3	5.0	Coarse sand and sand with little gravel
4	6.0	Sandy gravel and gravel

Depth Factor, $C_1 = 1 - 0.5\cdot(p_o/\Delta p) \geq 0.5$	0.96
Secondary Creep Factor, $C_2 = 1 + 0.2\cdot\log(t/0.1)$	1.20
Shape Factor, $C_3 = 1.03 - 0.03\cdot(L/B) \geq 0.73$	0.73

Layer No.	Remarks	Soil Type	z_{top} (feet)	z_{bot} (feet)	z_{mid} (feet)	Δz (feet)	γ' (pcf)	$(N_1)_{60}$ (bpf)	E_s (tsf)	I_z	$H\cdot(I_z/E_s)$	ρ (in)
1	GC	6	0.0	2.0	1.0	2.0	125	8	168.0	0.455	0.0054	0.05
2		6	2.0	4.0	3.0	2.0	125	23	483.0	0.592	0.0025	0.02
3		6	4.0	6.0	5.0	2.0	125	25	525.0	0.355	0.0014	0.01
4		6	6.0	8.0	7.0	2.0	125	25	525.0	0.118	0.0005	0.00
5		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
6		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
7		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
8		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
9		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
10		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00

Total Settlement, $\rho = C_1\cdot C_2\cdot C_3\cdot\Delta p\cdot\Sigma[(I_z/E_s)\cdot\Delta z]$ 0.09 inches

Notes: Overburden pressure is due to footing embedment or cut, and σ'_{vp} is initial vertical stress from original ground surface.
Stratigraphy and layer numbers must start at the bottom of the footing, where $z_{top} = 0$.
A stratum break is required where I_{zp} occurs and at the bottom of the Zone of Influence; reference cells in a formula if necessary.
If all 10 layers are not required, enter the depth for Zone of Influence for z_{bot} for each of the remaining layers,

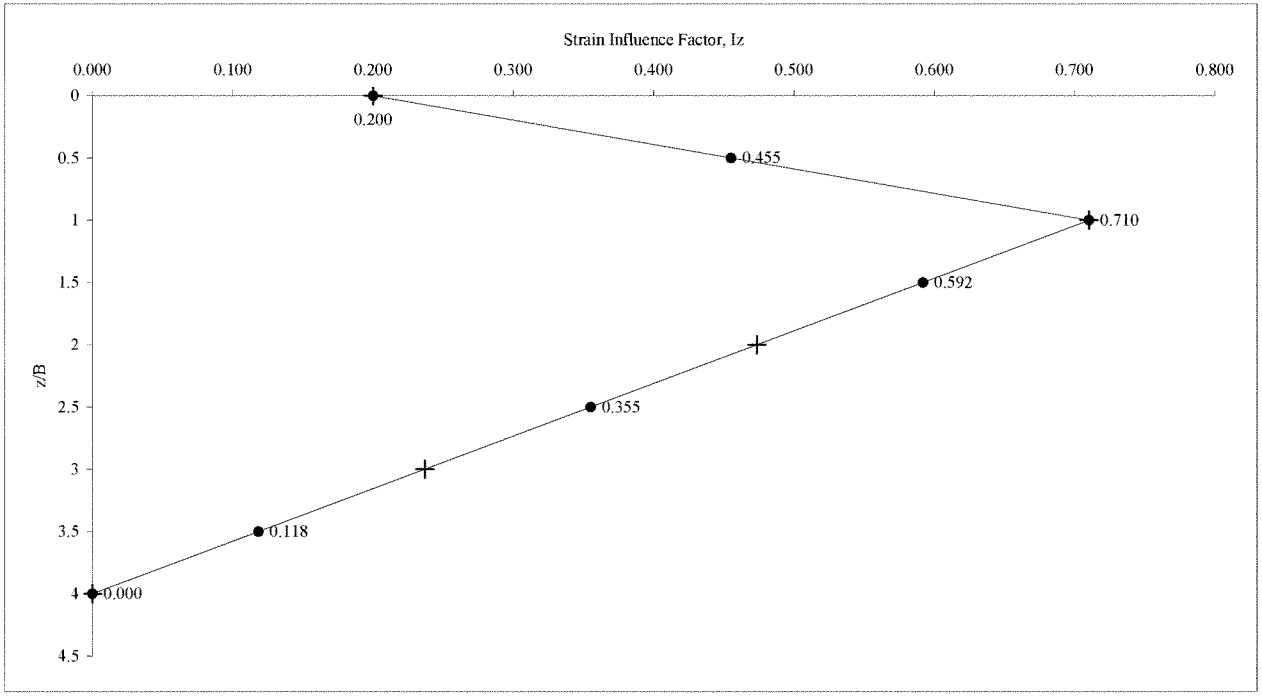
$z/B = 2$ and $I_z = 0.1$ (L/B = 1)
$z/B = 4$ and $I_z = 0.2$ (L/B ≥ 10)
$E_s = 2.5\cdot q_c$ (L/B = 1)
$E_s = 3.5\cdot q_c$ (L/B ≥ 10)

US Army Corps of Engineers
Louisville District

Project:	Paducah LFPP Feasibility Study	Prepared By:	S. Alsip	Date:	03 Nov 2009
Subject:	Strip Footings for Pump Station 14	Checked By:	C. Neutz	Date:	23 Nov 2009
	Borings AD-1 and AD-2				
		Status:	Final		

Settlement of Cohesionless Soils - Schmertmann Method

Ref: Schmertmann, J. H. "Static Cone to Compute Static Settlement over Sand." *Journal of Soil Mechanics and Foundation Division* , ASCE, May 1970, Vol. 96, No. SM3, pp. 1011-1043.
Schmertmann, J. H., et al. "Improved Strain Influence Factor Diagrams." *Journal of the Geotechnical Engineering Division* , ASCE, Aug. 1978, Vol. 104, No. GT8, pp. 1131-1135.



US Army Corps of Engineers
Louisville District

Project:	Paducah Feasibility Report	Prepared By:	S. Alsip	Date:	03 Nov 2009
Subject:	Bearing Capacity Check for Strip Footings	Checked By:	C. Neutz	Date:	23 Nov 2009
	Pump Station 14 at STA 111+67A				
	Using Borings AD-1 and AD-2	Status:	Final		

Bearing Capacity of Soil-Supported Shallow Foundations: Comparison of Bearing Capacity Models

Ref: EM 1110-1-1905, *Bearing Capacity of Soils*, 30 October 1992.

Foundation Dimensions

Foundation Width, B		2.0 feet
Foundation Length, L		40.0 feet
Reduction Factor, $r_\gamma = 1-0.25\cdot\log(B/6)$	(for $B \geq 6$)	1.00

Soil Parameters for Overburden

Embedment Depth, D	2.00 feet
Wet Unit Weight, $\gamma_{wet,D}$	110.0 pcf
Saturated Unit Weight, $\gamma_{sat,D}$	120.0 pcf
Slope of Ground away from Base, β (Downward = Positive)	0.0 deg

Layer-Weighted Soil Parameters within Effective Shear Depth of Interest

USCS Soil Classification	GC									
Layer Thickness, h (feet)	20.0									
Angle of Internal Friction, ϕ (deg)	31									
Cohesion Interept, c (psf)	0									
Wet Unit Weight, $\gamma_{wet,H}$ (pcf)	115.0									
Saturated Unit Weight, $\gamma_{sat,H}$ (pcf)	125.0									

Σh (Must Equal H)	20.0 feet
Angle of Internal Friction, ϕ	31 deg
Cohesion Interept, c	0 psf
Wet Unit Weight, $\gamma_{wet,H}$	115.0 pcf
Saturated Unit Weight, $\gamma_{sat,H}$	125.0 pcf

Effective Shear Depth of Interest

Effective Shear Depth of Interest, $H = 0.5\cdot B\cdot\tan(45 + \phi/2)$	1.8 feet
$K_{p\gamma} = (0.435-0.00716\cdot\phi)^{(-1/0.383)}$	56.43
$N_\phi = \tan^2(45 + \phi/2)$	3.12
$k = D/B$ for $D/B \leq 1$, else $k = \tan^{-1}(D/B)$	1.00

Effect of Water Table on Bearing Capacity

Depth to Water Table from Ground Surface, D_{GWT}		2.0 feet
$\gamma_{eff,D} = \gamma_{wet,D} - \gamma_w\cdot(D - D_{GWT})/D$	(for $0 < D_{GWT} \leq D$)	110.0 pcf
$\gamma_{eff,H} = \gamma'_H + \gamma_w\cdot(D - D_{GWT})/H$	(for $D < D_{GWT} \leq D + H$)	62.6 pcf

Bearing Capacity Summary

Factor of Safety, FS 3.0

Method of Analysis	B. C. Factors			Shape Factors			Depth Factors			Ground Factors			Bearing Capacity (psf)			
	N_q	N_c	N_γ	s_c	s_q	s_γ	d_c	d_q	d_γ	s_c	s_q	s_γ	Gross q_{ult}	Gross q_a	Net q_{ult}	Net q_a
Terzaghi	25.28	40.41	22.77	1.00	NA	1.00	NA	NA	NA	NA	NA	NA	6,988	2,329	6,768	2,256
Meyerhof	20.63	32.67	18.56	1.03	1.02	1.02	1.35	1.18	1.18	NA	NA	NA	6,813	2,271	6,593	2,198
Hansen	20.63	32.67	17.69	1.03	1.03	0.98	1.40	1.28	1.00	1.00	1.00	1.00	7,082	2,361	6,862	2,287
Vesić	20.63	32.67	25.99	1.03	1.03	0.98	1.40	1.28	1.00	1.00	1.00	1.00	7,591	2,530	7,371	2,457

Recommended Maximum Net Allowable Bearing Pressure (based on settlement considerations) 2,000 psf

Toe Drain Location

PADUCAH_KY TOE DRAIN STATIONING

As-Builts are illegible in areas due to low quality copies
This color denotes station numbers estimated by scaling

Levee Section: A

Start	to	Stop
53+00		62+10
70+33		79+52
131+00		134+47.19=133+87.02
133+87.02		138+00
144+71		147+25
148+25		151+25
152+01		152+84.84=149+54.27
149+54.27		157+63
172+20		191+80

Levee Section: B

Start	to	Stop		
3+91		11+25		
11+25		16+82		
19+11		22+55		
22+25		23+23.16=22+94.62	Drawing Number 933-12.3/4	
22+94.62		23+50.1		
23+50.1		26+86.8	mh1 @	26+86.8
26+86.8		28+49	mh2 @	28+49
28+49		31+75		
31+75		35+00		
35+00		96+91.96=46+15.75		
54+47.31		55+05		
55+05		60+00	mh4 @	57+97.9
62+50		66+28		
66+28		72+12.12	mh5 @	69+86.0
74+00		77+45	mh6 @	74+40
77+45		77+64.94=77+21		
77+21		80+00		

Levee Section: C

Start	to	Stop
171+00		181+37.75=109+32.87
109+32.87		150+05
150+05		181+37.75=169+32.87
169+32.87		171+00
171+00		174+80.5
218+85		229+00
229+00		244+65

ELSEVIER

Engineering Geology 46 (1997) 369–383

ENGINEERING GEOLOGY

Seismic investigation of near-surface geological structure in the Paducah, Kentucky, area: application to earthquake hazard evaluation

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Received 26 April 1996; accepted 19 December 1996

Abstract

Seismic methods were used to evaluate shallow geological conditions at 33 sites in the vicinity of Paducah, Kentucky. A combined set of P- and S-wave seismic refraction and reflection soundings were used, in addition to local borehole information, to produce structure maps of (1) a shallow (<30 m deep) horizon believed to represent an unconformity surface at the top of the Eocene, and (2) the Paleozoic bedrock surface (<85 to >160 m deep). Shear-wave velocity contrasts across the shallow unconformity were generally 2-to-1 while the contrast at the top of the Paleozoic bedrock exceeds 5-to-1. These seismic boundaries have been determined to be very important in modelling and interpreting earthquake ground motion amplification in the Paducah area. The quality and accuracy of the data, and the cost-effective nature of the methods, suggest that other communities in areas at risk to damage from seismic activity, with foundation conditions comparable to Paducah, might benefit from similar characterization in order (1) to identify seismically hazardous, near-surface, geological conditions, and (2) to develop geological models that could be used in computer simulations of site response.

Keywords: Seismic reflection; Seismic refraction; Shear wave; Earthquake hazards

1. Introduction

Damage as a result of earthquakes has been recognized to be greater in populated areas built on sedimentary basins. Recent studies have demonstrated that damage patterns at the surface are strongly influenced by the three-dimensional geometry of a basin and are most often a result of resonant amplification in unconsolidated basin sediments and/or amplification due to impedance contrasts at basin boundaries. For example, the shape of the lake bed that underlies part of Mexico City was instrumental in trapping and amplifying seismic waves from the 19 September 1985 Michoacán earthquake that killed more than 10 000 people (Sánchez-Sesma et al., 1988). Likewise, damage in the Marina district of San Francisco from the 18 October 1989 Loma Prieta earthquake was believed to be in part due to focusing of seismic energy caused by the shape of the basin underlying the area (Boatwright et al.,

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PII S0013-7952(97)00012-4

1991; Bonilla, 1991). More recently, studies of the Northridge earthquake (17 January 1994) have further stressed the importance of local geological structure in interpreting observed variations in site response (Gao et al., 1996; Hartzell et al., 1996; Spudich et al., 1996). In the previous investigations, as well as in studies based on computer simulations to predict ground motion patterns (Frankel and Vidale, 1992; Rial et al., 1992; Frankel, 1993; Graves, 1993), most authors have stressed the need for knowledge of the subsurface geological structure of the area and for accurate estimates of key geophysical parameters (e.g., seismic velocities and velocity contrasts). P-wave (compressional wave) seismic investigations targeting shallow geological deformation (Sexton and Jones, 1986; Treadway et al., 1988), depth to structure of the bedrock surface (Miller et al., 1989; Pullan and Hunter, 1990), and the geometry of near-surface sedimentary deposits (Jongerius and Helbig, 1988; Knapp, 1988) have successfully been performed in areas where geological conditions are favorable (e.g., shallow water table, fine-grained surface material) for the collection of high-quality data. Nevertheless, there are situations where S-wave (shear wave) methods (or the combined use of S- and P-wave methods) are more suitable for solving particular problems. Unconsolidated, water-saturated sediment sequences are ideal for the use of S-waves. In such environments, P-waves travel with the velocity of the fluid and are often insensitive to lithological changes. Because S-waves travel with the velocity of the sediment framework, they are not affected by the degree of saturation and therefore indicate the lithology more accurately than P-waves. For example, S-wave seismic techniques have been used successfully in bedrock mapping below the water table (Pullan et al., 1990; Hasbrouck, 1991; Goforth and Hayward, 1992), imaging geological structure within the saturated zone (Suyama et al., 1987; Zhang, 1990; Woolery et al., 1993), and determining engineering properties of sediments (Sirles and Viksne, 1990; Liu et al., 1994; Wang et al., 1994).

The purpose of this investigation was to examine near-surface geological conditions in the vicinity of Paducah, Kentucky, using standard shallow seismic methods which are known to be fast, accurate, and cost effective. Shallow seismic refraction and reflection methods were used to determine the geometry of near-surface impedance boundaries that have the potential to amplify earthquake waves from seismic activity in the nearby New Madrid Seismic Zone (NMSZ). Using results from P- and S-wave seismic soundings, integrated with local borehole data, we produced structure maps of the Paleozoic bedrock surface and a shallower unconformity that, in part of the study area, is believed to be associated with the base of a Pleistocene-age lake deposit. Ground motion modelling (Harris et al., 1994) and observations (Street et al., 1997, this volume) have emphasized the importance of these two surfaces for earthquake hazard analysis in the Paducah area.

2. Geological setting

Stauder et al. (1976) first recognized the three linear trends of seismicity that make up the NMSZ (Fig. 1). The southern segment trends northeast from near Marked Tree, Arkansas, to Ridgely, Tennessee; the central zone of seismicity extends northwest from Ridgely to New Madrid, Missouri; and the northern trend stretches northeast from New Madrid toward Charleston, Missouri, and, although the pattern of seismicity becomes more diffuse, possibly as far northeast as southern Illinois. The study area for our investigation is located in the vicinity of Paducah, Kentucky, near the northeastern extent of the NMSZ (Fig. 1).

The Paducah area is situated on a thick sequence of unconsolidated to poorly consolidated sands, clays, and gravels of Late Cretaceous to Holocene age that unconformably overlie Mississippian-age limestone bedrock at depths ranging from less than 85 m to more than 160 m below the ground surface (Pree et al., 1957). Following is a brief geological description of the Paducah area based on work by Pree et al. (1957), Finch (1966, 1967), and Olive (1966a,b):

The western and central parts of the study area are capped by a layer of Holocene alluvium or Pleistocene loess. The alluvium is found adjacent to the Ohio River or in tributary stream valleys,

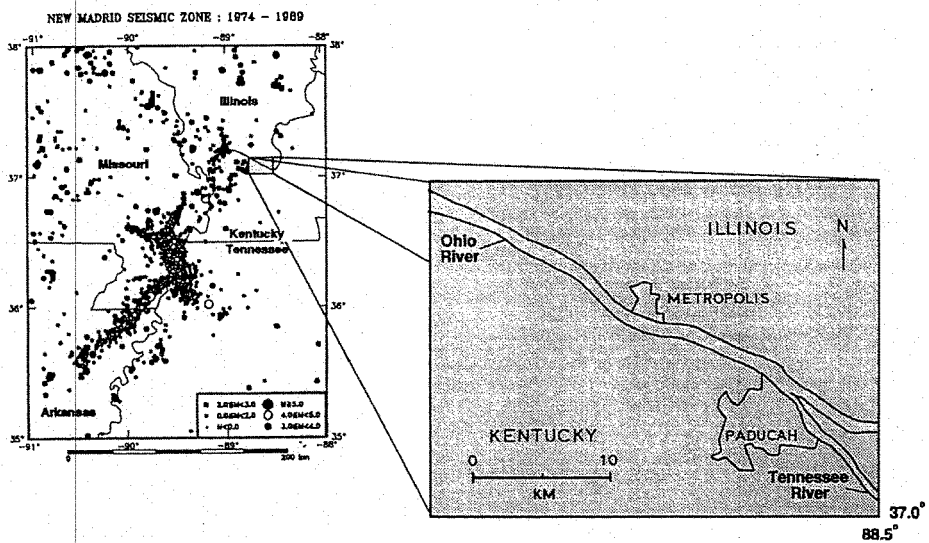


Fig. 1. Map of the study area and its relationship to contemporary seismicity in the New Madrid Seismic Zone (seismicity data from Center for Earthquake Research and Information, University of Memphis).

and the loess usually covers terraces adjacent to the river. An upland region, covered by Pliocene and Pleistocene silts, sands, clays, and gravels called "continental deposits", is present in the south-central part of the study area. The continental deposits occur in the subsurface to the west and, at their base, contain a regional gravel aquifer. The surficial deposits in the eastern part of the study area are composed of thick (up to 50 m) alluvial and lacustrine material. An erosional surface of Eocene age or later underlies the loess, continental deposits, alluvium, and lacustrine deposits. In the southern part of the study area, Eocene sands (Claiborne and Wilcox Formations) and a Paleocene clay (Porters Creek Clay) are the sub-erosional strata, while to the north the surface is cut on sands and clays of the McNairy Formation (Late Cretaceous). The McNairy Formation makes up the majority of the soil column and lies unconformably over the Paleozoic bedrock. A borehole log (Finch, 1967) from the western part of the study area has identified bedrock as the Warsaw Limestone (Mississippian).

3. Methods

Shallow seismic data were collected at 33 sites. The approach was a seismic sounding technique in which P- and SH-wave (horizontally polarized shear waves) seismic refraction and reflection data were used to investigate the shallow geological setting of the study area. The method chosen to collect the data was similar to a walkaway noise test (Sheriff and Geldart, 1982: section 5.3.4). Each site was sampled by a variety of source-receiver offsets to identify first-arrivals from near-surface sediments, and bedrock reflections from within the "optimum window" (Hunter et al., 1984; Pullan and Hunter, 1990). The main advantage of this setup was its adaptability to a variety of unforeseen site conditions, particularly those that occur in a

congested, urban setting (in which most of this study was conducted).

3.1. Field procedure

To collect the P-wave data at each site, an inline spread of 12 40-Hz vertical geophones, on 8-cm spikes, were deployed at 3-m spacings, and the energy source (a 5-kg sledgehammer vertically impacted on an aluminum plate) was activated at offsets of 6, 30, 60 and, when possible, 91 m. The SH-wave data were recorded using a 12-element inline spread of 4.5-Hz horizontal geophones (at 3-m spacings) that were coupled to the ground with 8-cm spikes. The shear-wave energy source was a section of railroad tie standing 18 cm high and measuring 23 × 79 cm at its base. The source was mounted on plywood and coupled to the ground using 25-cm spikes. For SH-wave generation, the source was oriented perpendicular to the spread and impacted horizontally with the sledgehammer [the choice of SH as the preferred shear-wave phase was based on our greater ability to identify these arrivals because pure SH energy reflects and refracts only as an SH-wave and, unlike P- and SV-waves (shear waves polarized in a vertical plane), does not experience mode conversion]. Source offsets of 6, 30, 61, 91 and, when possible, 122 and 152 m, were used. To ensure accurate identification of SH events, data from each offset were recorded for impacts on both sides of the source. Therefore, on the field record, a pure SH event appeared 180° out-of-phase with the same signal recorded from an impact on the opposite side of the energy source. An SH-wave field record from site J-3, located in the western part of the study area, is shown in Fig. 2.

The seismic data were recorded with an EG&G 2415F 24-channel signal enhancement seismograph and a DMT-911 tape recorder. An 8-bit digital word was recorded on tape in SEG-D format following analog-to-digital conversion of the fixed-gain data. The analog low-cut filters, with a slope of 12 db/octave, were generally set at 50 Hz for the P-wave data and at 10 Hz for the SH-wave data. Two thousand and forty-eight samples were recorded for each seismic trace, with sampling intervals of 1/8 ms (1/4-s record length) for the P-wave data and 1 ms (2-s record length) for the SH-wave data.

3.2. Seismic data reduction

For both the P- and SH-wave data, individual "offset panels" were displayed and combined to form composite sections that present the data over the entire range of source-receiver offsets used at each site. The SH-wave offset panels were made by subtracting the records created by an impact on one side of the SH-wave source from the comparable records created by an impact on the opposite side of the source. Through this process, SH-wave signals interfered constructively (stacked), while unwanted P-wave energy was canceled. A suite of SH-wave offset panels from site J-3 is shown in Fig. 3 and the corresponding composite section on which several seismic events have been identified is presented in Fig. 4.

First-arrival data from the offset panels and composite sections were utilized to calculate velocities and layer thicknesses for the near-surface material using the intercept time method (Lankston, 1990), whose details are presented in many introductory textbooks (e.g., Dobrin and Savit, 1988: section 11-2). When they could be confidently identified, reflected arrivals from the bedrock were picked from the composite sections, measured, and plotted on X^2 (offset^2) vs. T^2 (time^2) plots, as is customary for most manual velocity-depth analyses of seismic reflection data. Stacking velocities and intercept times were determined from the plots and used to calculate depths to bedrock (i.e., Dobrin and Savit, 1988: section 7-6).

4. Seismic data quality

Figs. 5 and 6 display, respectively, examples of SH- and P-wave composite seismic sections showing variations in data quality that were encountered in the study. Variability in the quality of the P-wave data was appreciably greater than for the SH-wave data, probably due to the effects that differences in the degree of water saturation in the very near surface have on transmission of P-wave

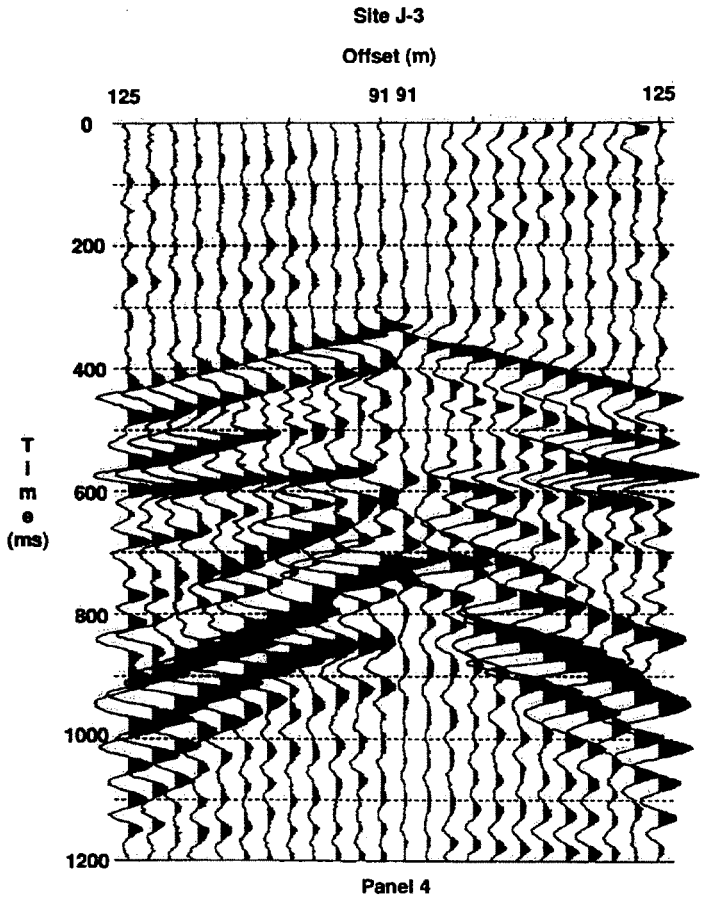


Fig. 2. SH-wave field record showing the phase reversal produced by impacts on opposite sides of the energy source.

seismic energy. The SH-wave first-arrival data were consistent and, in spite of occasional noise, were almost always interpretable. The P-wave data were very good at sites with a shallow water table. However, at sites with thick unsaturated zones, rapid attenuation hindered the recognition of first breaks.

Although it was only identified at approximately half of the sites, the bedrock reflection was frequently a very strong arrival on both the SH- and P-wave data. An explanation for the inconsistent recognition of the bedrock reflection is that, throughout much of the study area, a rubble zone (locally called the Little Bear soil), primarily composed of weathered bedrock, is encountered at the base of the sediment column. The zone is variable

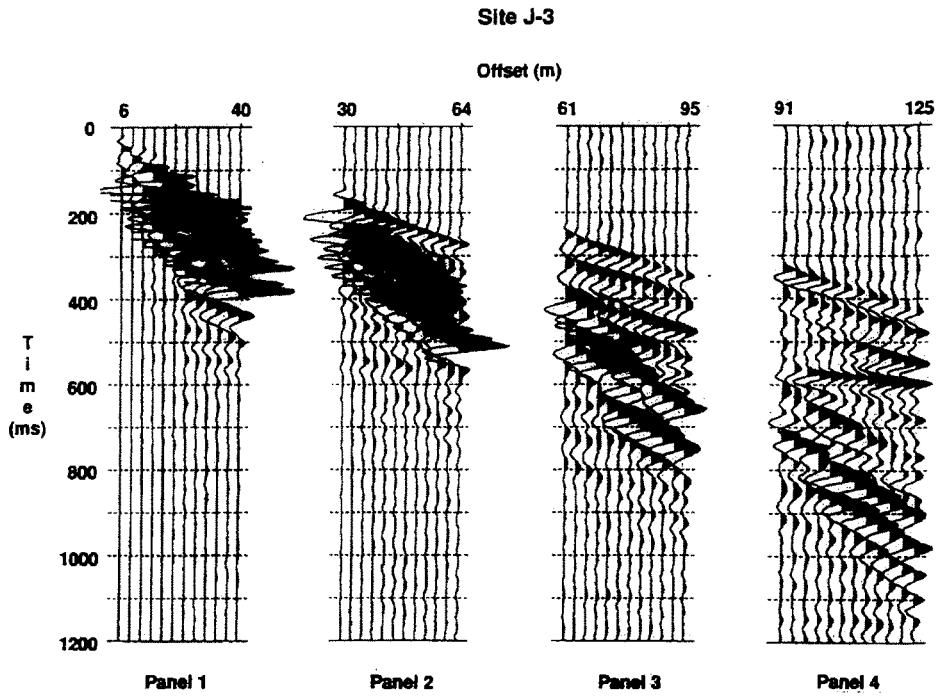


Fig. 3. SH-wave offset panels.

in thickness, but can be as thick as 20 m (A. Burgess (Burgess Drilling), pers. commun., 1992) in the Paducah area. Scattering and attenuation of seismic energy due to the irregularity of the rubble zone could likely lead to incoherent, indistinguishable bedrock reflections at some sites.

Reflections from within the sediment column were rare and difficult to identify because shear-wave velocity variations in the Tertiary and Cretaceous sediments were not generally large enough to produce strong reflections. Shallower reflections on the SH-wave sections were almost impossible to identify because of interference with "ringing" (multiple) refractions and high-amplitude surface (Love) waves. The uniform nature of the P-wave velocity in water-saturated, near-surface sediments did not generally provide adequate impedance boundaries to generate strong reflections from within the sediment column.

5. Results

Interpretations of the direct and refracted arrivals on the SH-wave sections, following comparison with local borehole data (Pree et al., 1957; Finch, 1966, 1967; Olive, 1966a,b), correlate moderately well with the shallow geology of the area. At most of the sites, the P-wave first arrivals were characterized by a direct wave travelling, with velocities ranging from 350 to 610 m s^{-1}, in the unsaturated surface material and a sharp refraction (typical velocities were in the 1500–1650 m s^{-1} range) from the top of a shallow (<5 m deep) water table,

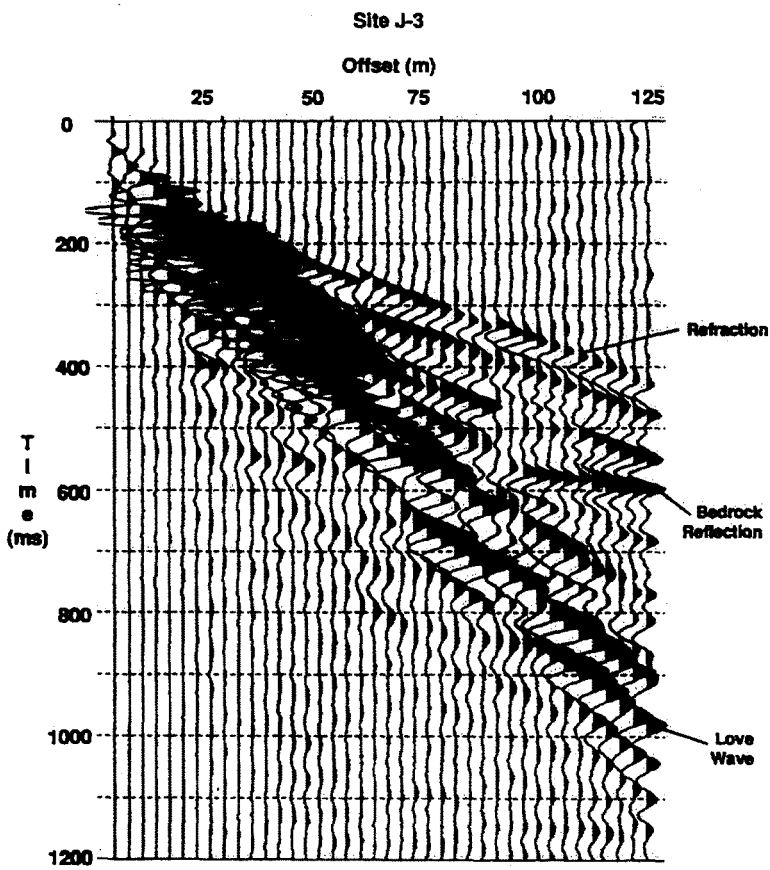


Fig. 4. Composite SH-wave seismic section with various events identified.

except in the western part of the study area, where a thick (10–25 m) unsaturated zone severely attenuated first-arrival information (e.g., sites J-4 and H-7 in Fig. 6). As was typical for most sites where SH-wave reflection data were collected, reflections from the bedrock are identifiable at the longer offsets on the SH-wave sections (Fig. 5). Characteristic of the P-wave reflection data gathered throughout most of the study area, bedrock reflections can be seen in the vicinity of 150 ms for the sites in the central and eastern part of the study area (Fig. 6). However, as was the case with the P-wave refraction data, little P-wave reflection information was identified for sites in the western part of the study area.

Fig. 7 shows a direct comparison between SH- and P-wave data collected in the central (site PW-11) and western (site H-3) parts of the study area. The SH-wave sections (Figs. 7(a) and (c)) show similar direct arrivals, refracted arrivals from

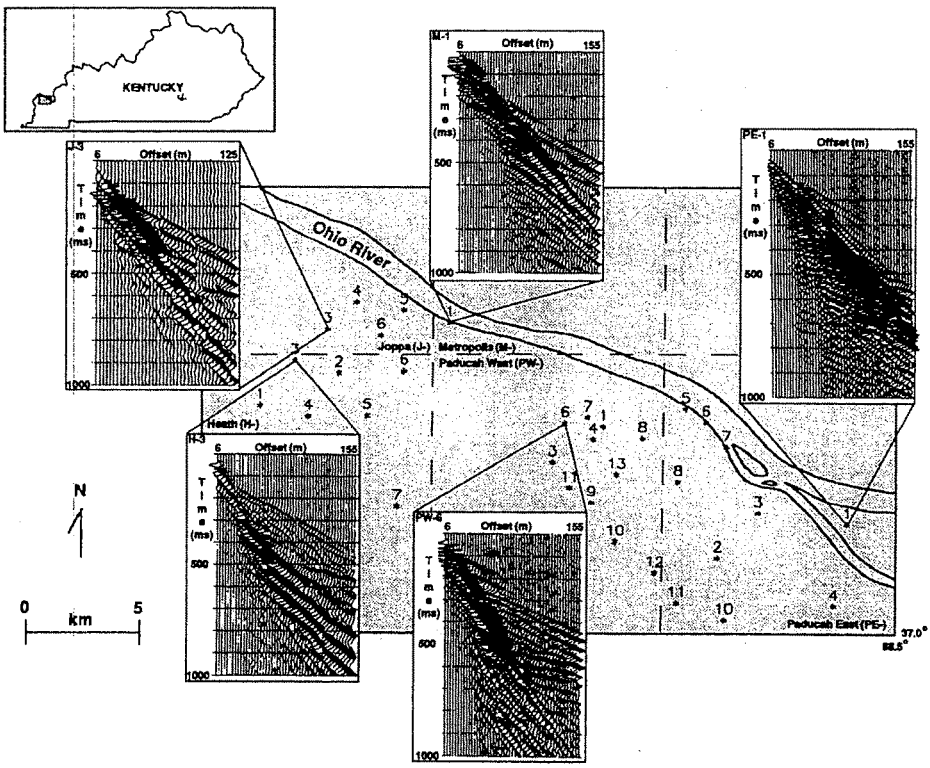


Fig. 5. Map showing the distribution of investigated sites in the study area, the site numbers, and geological quadrangle names. An example SH-wave composite section from each of the five quadrangles investigated in the study shows the consistent quality of the shear-wave data.

a shallow horizon, and reflections from the top of bedrock ($\approx$650 ms at site PW-11 and $\approx$550 ms at site H-3). The P-wave data (Figs. 7(b) and (d)), however, are quite different from each other. The section from site PW-11 shows a strong refraction from the top of a shallow water table (calculated to be $\approx$2 m deep) and an easily identifiable bedrock reflection ($\approx$160 ms), while the section at site H-3 exhibits little, if any, useable information. From a boring log at site H-3 (Staub et al., 1991), water was first encountered at a depth of 15 m and the near-surface, unsaturated material consisted of a heterogeneous deposit of silt, clay, and pebbly sand. These shallow conditions (thick, attenuative unsaturated zone) were prevalent throughout the western portion of the study area and, as noted above, impeded the collection of high-quality P-wave data in that area.

5.1. Shallow structure

Because the P-wave refraction data were highly influenced (both in quality and geological significance) by the degree of water saturation in the

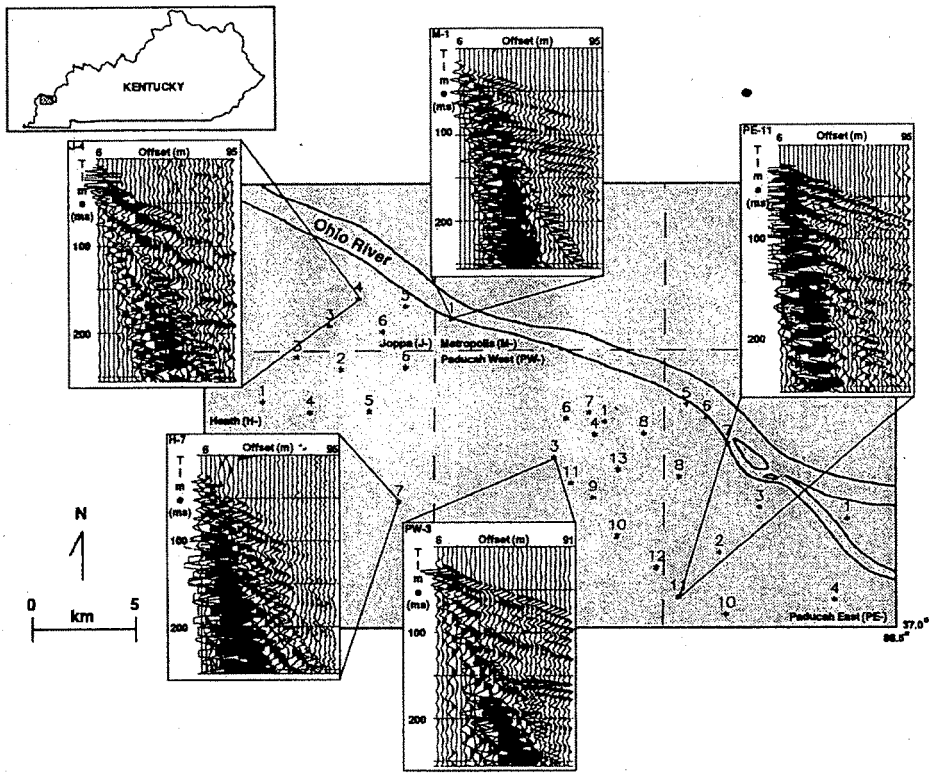


Fig. 6. Map of the Paducah area showing representative examples of P-wave data collected in the study.

near-surface material and showed no correlation with lithology, SH-wave refraction data were used exclusively to develop a shallow map (< 30 m deep) for the study area. The map (Fig. 8) shows the interpreted geological structure of the first major refractor picked from the SH-wave first-arrival data. Logs from water wells, oil and gas wells, and engineering boreholes (Pree et al., 1957; Finch, 1966, 1967; Olive, 1966a,b) were used as control points in an attempt to correlate the SH-wave data to stratigraphy. The main features that are evident on the map include a relatively uniform northeast-dipping surface in the western part of the study area, a prominent high in the south-central part of the study area, and an elongated depression, with a north–south-trending axis, in the eastern part of the study area. The sediments above the refracting surface generally had shear-wave velocities in the range of 175–260 m s^{-1}, while the strata below the surface had velocities that ranged from 350 to 610 m s^{-1}, with an average value of approximately 470 m s^{-1}. Correlation of the SH-wave refraction data with the borehole information indicated that, throughout most of the study area, the refractor is the unconformity at the top of the Eocene strata. However, in the western part of the

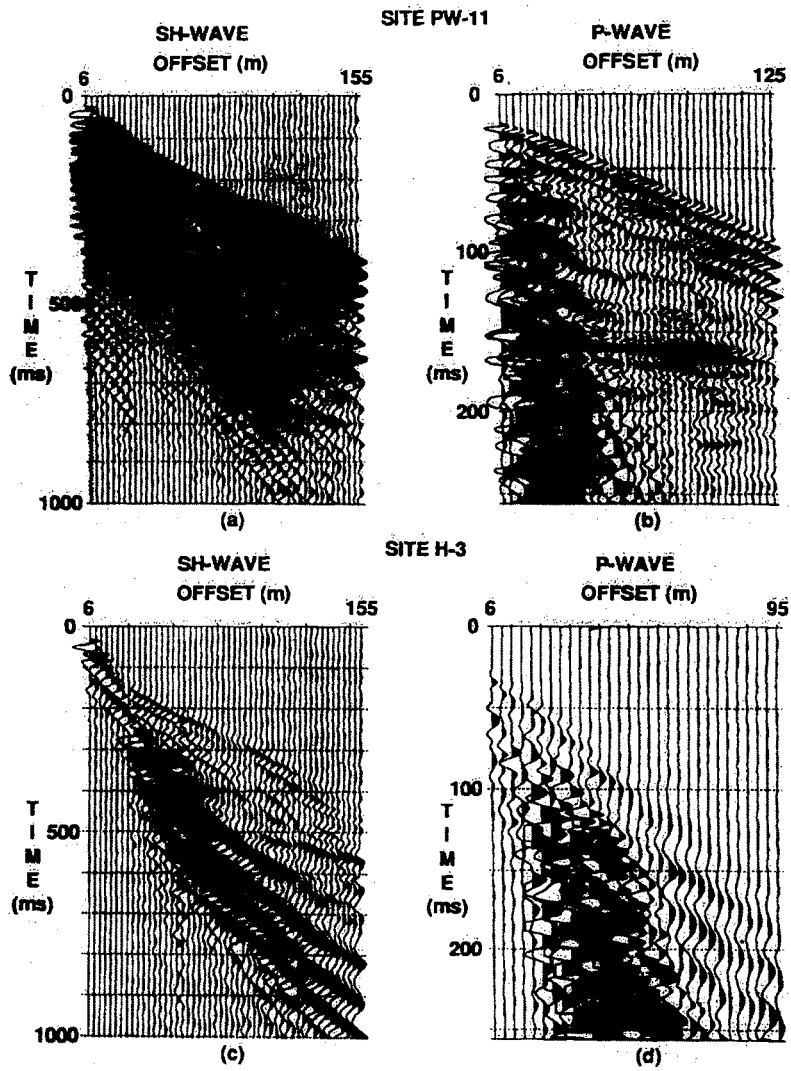


Fig. 7. Example seismic sections from the study area showing the effects that near-surface saturation conditions had on the quality of the SH- and P-wave data. Site locations are presented in Fig. 5. Notice the decrease in P-wave data quality (as opposed to the relative consistency in SH-wave data quality) between site PW-11 (water table ≈2 m deep) and site H-3 (water table ≈15 m deep).

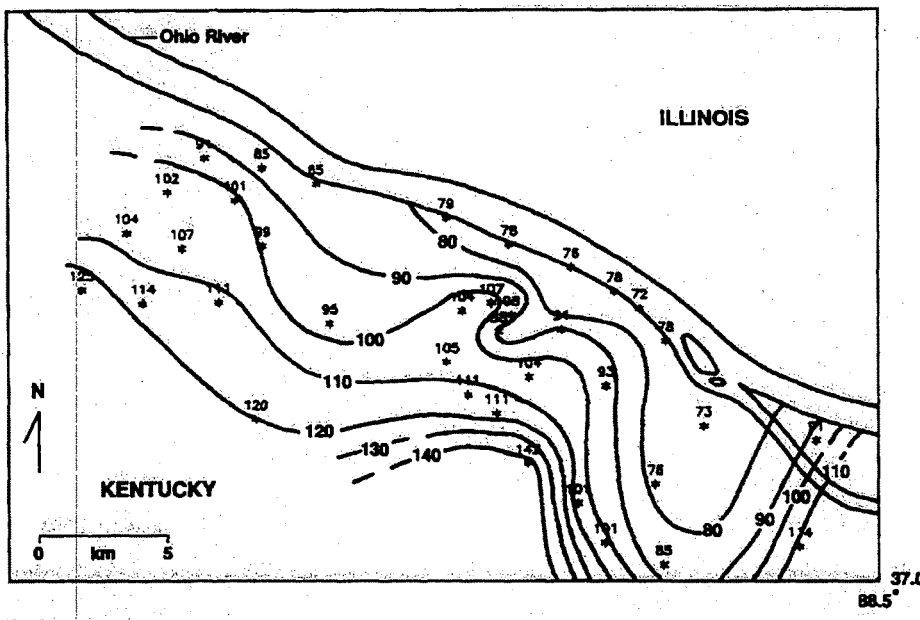


Fig. 8. Structure map of the shallow acoustic impedance boundary (interpreted to represent an unconformity surface of Eocene or later age) based on SH-wave refraction data. Elevations (m) are relative to sea level, and the contour interval is 10 m.

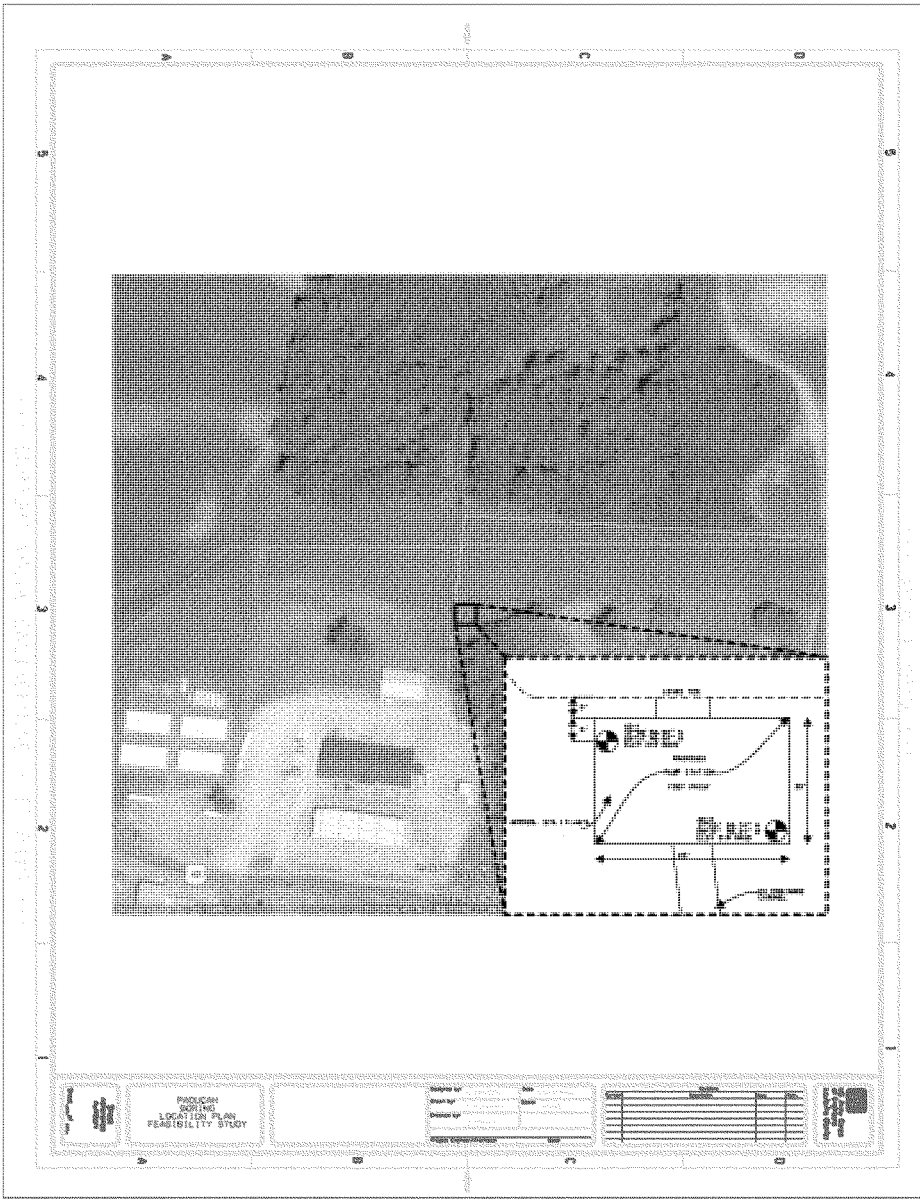
study area, the refractor may not be completely associated with a geological horizon (e.g., the unconformity), but could be a compaction boundary related to age, depth of burial, and lithology.

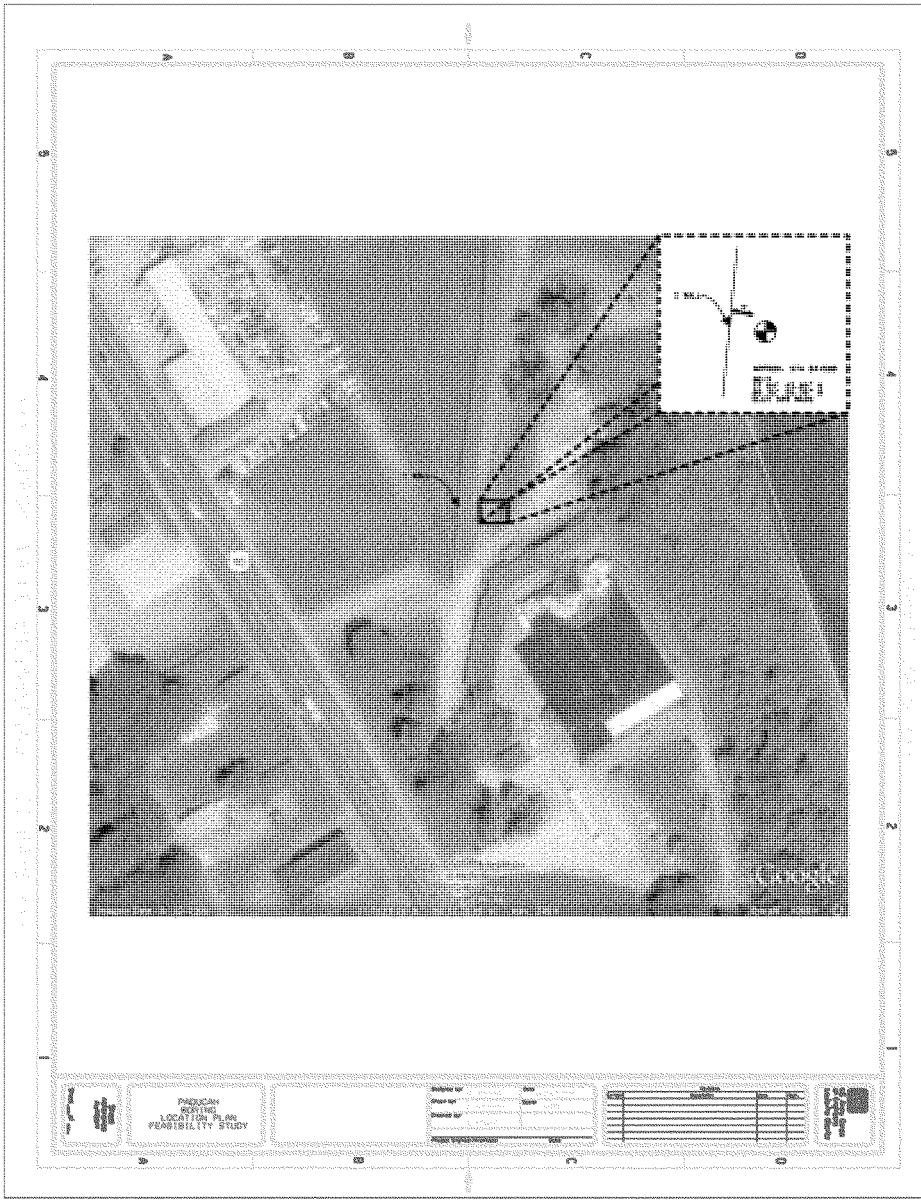
5.2. Bedrock structure

Bedrock depths were calculated from reflection events at 19 sites in the study area (seven sites using SH-wave data, eight sites using P-wave data, and four sites using a combination of both SH- and P-wave data). Twenty additional depths were available from borings that penetrated the bedrock (Finch, 1966, 1967; Olive, 1966a,b; Staub et al., 1991). Fig. 9 presents the bedrock structure map (top of Mississippian limestone) constructed for the study area. The general trend of the bedrock surface shows a gentle dip (<1°) to the southwest toward the axis of the Mississippi Embayment; however, there are several localized lobes that probably result from the erosional nature of the bedrock surface. The depth to the bedrock surface in the study area varied from less than 85 to more than 160 m, calculated P-wave stacking velocities ranged from 1340 to 1910 m s^{-1}, and calculated SH-wave stacking velocities ranged from 415 to 540 m s^{-1}.

6. Implications for seismic hazard

One of the primary mechanisms for damage in communities located on thick deposits of unconsolidated material is ground motion amplification due to resonance. Resonance is a frequency-dependent phenomenon that, at sites underlain by unconsolidated sediments with low material damping (stiffness), can greatly increase earthquake amplitudes


PADUCAH
BORING
LOCATION PLAN
FEASIBILITY STUDY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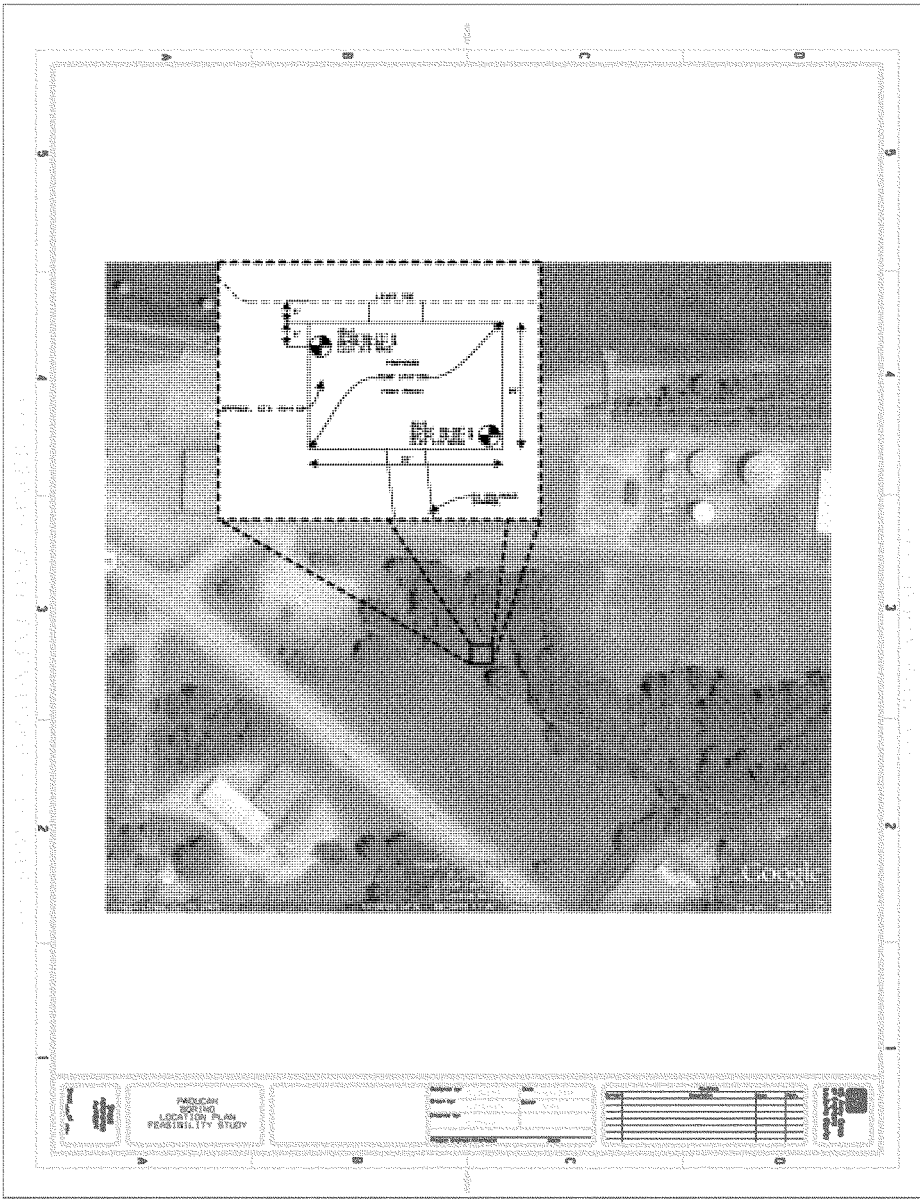
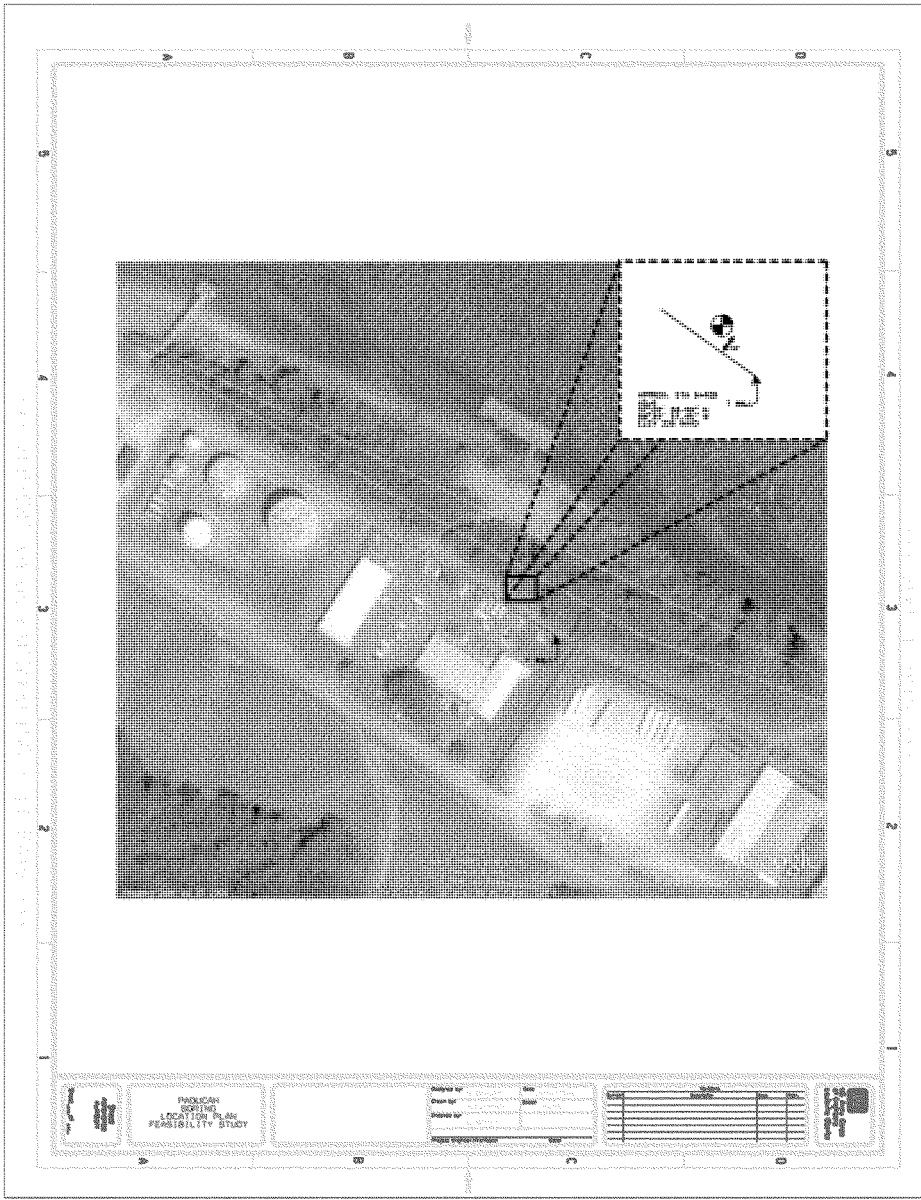
MERING
LOCATION PLAN
FEASIBILITY STUDY


PADUCAH
BORING
LOCATION PLAN
FEASIBILITY STUDY


PADUCAH
BORING
LOCATION PLAN
FEASIBILITY STUDY

BORING N0. AD-1 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1932251.31 E 800550.79	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 318
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 318 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/9/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___"___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
318.0	Brown, gray & tan, lean CLAY.		CL			2						V
				1	D	2 2 3	26.9	1.5				1
				2	D	1 2 5	19.6	1.5				2
												3
												4
				3	D	3 4 4	25.0	1.5				5
												6
312.0	Beige, gray & tan, lean CLAY.		CL									
				4	U		23.1	2.0	60			7
												8
310.0	Brown, clayey GRAVEL with sand.		GC									
												9
				5	D	5 8 13	26.7	1.5			Poor recovery, rock in end of spoon.	10
												11
306.0	Tan, well-graded GRAVEL with clay and sand (and/or silty clay and sand).		GW-GC									12
												13
				6	D	12 28 36	13.6	1.5				14
												15
												16
												17
300.7	Tan, well-graded SAND with clay and gravel (and/or silty clay and gravel).		SW-SC									18
												19
						5						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-1

BORING NO. AD-1 SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1932251.31 E 800550.79	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 318
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 318 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/9/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Tan, well-graded SAND with clay and gravel (and/or silty clay and gravel). *(continued)*			7	D	16 32	17.0	1.5				
												21
												22
												23
												24
				8	D	5 27 26	20.0	1.5				25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 292.5).											26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

BORING N0. AD-2 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1932248.84 E 800631.77	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 318
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 318 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/9/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___"___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
318.0	Brown, lean CLAY with sand.		CL									V
				1	D	2 3 3	31.1	1.5				1
				2	D	3 3 3	23.9	1.5				2
												3
314.2	Brown & tan, clayey GRAVEL with sand.		GC									4
				3	D	1 3 5	18.3	1.5				5
												6
												7
												8
												9
				4	D	12 8 17	15.2	1.5				10
												11
												12
												13
				5	D	30 29 22	14.6	1.5				14
												15
												16
												17
												18
												19
						7						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-2

BORING N0. AD-2 SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1932248.84 E 800631.77	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 318
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 318 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/9/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Brown & tan, clayey GRAVEL with sand. *(continued)*			6	D	15 16	15.1	1.5				21 22
295.5	Gray & tan, silty SAND.		SM	7	D	2 7 14	32.2	1.5				23 24 25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 292.5).											26 27 28 29 30 31 32 33 34 35 36 37 38 39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-2

BORING N0. AD-3 SHEET 1 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1924318.89 E 811901.93	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 339
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 334 24 hr
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/10/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
339.0	Black topsoil, silt & sand.			1	D	2 2 2	18.4	1.5				1
337.5	Tan, brown, black & gray, gravelly lean CLAY with sand.		CL	2	D	1 2 1	23.9	1.5				2
				3	D	1 1 1	35.0	1.5				3 4
				4	D	0 1 1	27.8	1.5				V 5
333.0	Gray & tan, lean CLAY.		CL	5	D	0 1 1	31.0	1.5				6 7
				6	D	0 0 1	26.3	1.5				8 9
				7	D	3 3 6	20.4	1.5				10
328.5	Tan & brown, lean CLAY.		CL	8	D	1 1 2	38.1	1.5				11
				9	D	3 4 5	24.5	1.5				12 13
325.5	Tan, lean CLAY.		CL	10	D	3 6 8	27.5	1.5				14
				11	D	3 6 7	20.0	1.5				15 16
				12	D	4 6 7	22.7	1.5				17 18
				13	D	3 5 5	22.8	1.5				19
						4						

BORING N0. AD-3 SHEET 2 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1924318.89 E 811901.93	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 339
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 334 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 51	STARTED 6/9/09 COMPLETED 6/10/09
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ---- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Tan, lean CLAY. *(continued)*			14	D	6 7	24.9	1.5				21
				15	D	2 4 5	22.7	1.5				22
				16	D	1 5 8	21.7	1.5				23
				17	D	4 8 12	21.9	1.5				24 25
313.5	Tan, lean CLAY.		CL	18	D	3 6 9	23.7	1.5				26
				19	D	7 11 13	23.0	1.5				27 28
				20	D	6 9 10	21.7	1.5				29
				21	D	6 9 11	25.0	1.5				30 31
				22	D	4 6 7	27.7	1.5				32
				23	D	3 7 9	21.7	1.5				33 34
				24	D	3 8 13	28.3	1.5				35
				25	D	5 7 10	22.2	1.5				36 37
301.5	Brown, tan & gray, lean CLAY.		CL	26	D	4 7 10	22.2	1.5				38
				27	D	4 5	21.5	1.5				39

BORING N0. AD-3 SHEET 3 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1924318.89 E 811901.93	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 339
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 334 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/10/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Brown, tan & gray, lean CLAY. *(continued)*					9						
				28	D	5 8 9	22.8	1.5				41
												42
				29	D	3 4 5	25.8	1.5				43
				30	D	3 5 5	22.4	1.5				44
												45
294.0	Gray & tan, lean CLAY.		CL	31	D	2 3 4	27.5	1.5				46
				32	D	0 3 4	30.6	1.5				47
												48
				33	D	1 2 2	33.7	1.5				49
				34	D	1 3 4	30.2	1.5				50
												51
	No Auger Refusal & Boring Terminated @ 51.0' (Elev. 288.0).											52
												53
												54
												55
												56
												57
												58
												59

BORING NO. AD-3A

SHEET 1 OF 1

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1924318.89 E 811901.93	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 339
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 17	15. ELEVATION GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 17	STARTED 6/10/09 COMPLETED 6/10/09
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS.	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
339.0	Gray, tan & brown, gravelly lean CLAY with sand.		CL									1
												2
												3
												4
												5
				1	U		24.8	2.0	80			6
												7
												8
												9
												10
328.4	Tan & gray, lean CLAY.		CL									11
												12
												13
												14
												15
				2	U		24.1	2.0	80			16
												17
	No Auger Refusal & Boring Terminated @ 17.0' (Elev. 322.0).											18
												19

BORING N0. AD-4 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919929.48 E 809823.94	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 317 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ---- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
319.0	Black topsoil, silt & sand.			1	D	1 1 1	29.9	1.5				1
317.5	Brown & tan, lean CLAY with sand.		CL	2	D	1 1 1	37.9	1.5				V 2 3
315.2	Tan, lean CLAY.		CL	3	D	2 3 6	24.1	1.5				4 5 6 7 8 9
				4	D	4 6 7	27.6	1.5				10
308.5	Light brown, lean CLAY.		CL	5	U		23.3	2.0	98			11 12
306.3	Gray, lean CLAY.		CL	6	D	4 4 6	20.2	1.5				13 14 15 16 17 18 19
						2						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-4

BORING NO. AD-4 SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919929.48 E 809823.94	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 317 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Gray, lean CLAY. *(continued)*			7	D	3 4	27.1	1.5				21 22
296.5	Tan & gray, lean CLAY.		CL	8	D	3 4 5	29.7	1.5				23 24 25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 293.5).											26 27 28 29 30 31 32 33 34 35 36 37 38 39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-4

BORING N0. AD-5 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919780.95 E 814765.5	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 316 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
319.0	Brown & tan, lean CLAY with sand.		CL	1	D	2 1 3	30.0	1.5				1
				2	D	1 2 2	30.6	1.5				2 V 3
315.2	Gray, lean CLAY with sand.		CL	3	D	2 2 3	28.6	1.5				4 5 6 7
311.5	Tan, lean CLAY.		CL	4	D	3 6 8	28.6	1.5				8 9 10 11
307.0	Brown, lean CLAY.		CL	5	D	3 5 6	20.8	1.5				12 13 14 15 16 17
301.7	Gray, lean CLAY.		CL			3						18 19

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-5

BORING N0. AD-5 SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919780.95 E 814765.5	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 316 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Gray, lean CLAY. *(continued)*			6	D	4 3	26.9	1.5				21
												22
												23
												24
				7	D	3 4 5	31.5	1.5				25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 293.5).											26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

BORING N0. AD-6 SHEET 1 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 317 Immediate
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/11/09 COMPLETED 6/11/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
336.0	Brown & gray, lean CLAY with sand.		CL	1	D	4 6 10	15.5	1.5				1
				2	D	6 6 10	21.5	1.5				2
				3	D	4 6 10	19.8	1.5				3 4
				4	D	3 4 8	20.5	1.5				5
330.0	Brown & gray, lean CLAY with sand.		CL	5	D	4 6 6	21.6	1.5				6 7
328.5	Brown & gray, lean CLAY.		CL	6	D	2 4 6	25.6	1.5				8
				7	D	1 2 4	23.3	1.5				9 10
				8	D	0 2 4	23.2	1.5				11
				9	D	2 3 5	24.5	1.5				12 13
322.5	Brown & gray lean CLAY.		CL	10	D	3 3 5	28.5	1.5				14
				11	D	1 2 3	28.1	1.5				15 16
				12	D	0 3 3	26.5	1.5				17 18
				13	D	1 3 3	27.0	1.5				V 19
316.5	Brown, lean CLAY.		CL			2						

BORING N0. AD-6 SHEET 2 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 317 Immediate
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/11/09 COMPLETED 6/11/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Brown, lean CLAY. *(continued)*			14	D	2 3	26.5	1.5				
				15	D	0 0 1	31.0	1.5				21 22
				16	D	2 2 3	29.6	1.5				23
				17	D	0 2 3	27.6	1.5				24 25
				18	D	0 2 3	31.0	1.5				26
				19	D	2 2 3	28.4	1.5				27 28
				20	D	1 2 3	32.4	1.5				29
306.0	Gray, lean CLAY.		CL	21	D	0 1 3	26.5	1.5				30 31
				22	D	3 5 8	24.9	1.5				32
				23	D	4 5 7	27.9	1.5				33 34
				24	D	3 5 6	24.5	1.5				35
				25	D	4 5 5	24.0	1.5				36 37
				26	D	2 3 3	39.4	1.5				38
				27	D	0 2	39.2	1.5				39

BORING N0. AD-6 SHEET 3 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 317 Immediate
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/11/09 COMPLETED 6/11/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____"__ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Gray, lean CLAY. *(continued)*					2						
				28	D	0 1 2	32.9	1.5				41
												42
294.0	Gray & brown, sandy, silty CLAY.		CL-ML	29	D	0 0 2	37.1	1.5				43
				30	D	3 4 4	31.1	1.5				44
												45
				31	D	0 2 2	31.6	1.5				46
				32	D	1 3 5	26.6	1.5				47
												48
				33	D	6 9 11	22.2	1.5				49
				34	D	3 5 6	23.3	1.5				50
												51
	No Auger Refusal & Boring Terminated @ 51.0' (Elev. 285.0).											52
												53
												54
												55
												56
												57
												58
												59

BORING N0. AD-6A

SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 23	15. ELEVATION GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 23	STARTED 6/12/09 COMPLETED 6/12/09
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ --- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
336.0	Tan, beige & brown, lean CLAY.		CL									
												1
												2
												3
												4
												5
												6
												7
												8
				1	U		25.3	2.0				9
												10
												11
												12
												13
												14
												15
320.5	Tan, beige & brown, lean CLAY.		CL									
												16
												17
												18
												19

BORING N0. AD-6A SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 23	15. ELEVATION GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 23	STARTED 6/12/09 COMPLETED 6/12/09
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Tan, beige & brown, lean CLAY. *(continued)*											
												21
				2	U		27.6	1.5				22
313.5	Dark orange & beige, lean CLAY.		CL	2	U		27.4	0.5				23
	No Auger Refusal & Boring Terminated @ 23.0' (Elev. 313.0).											24
												25
												26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

Moisture Data

(AASHTO T255-T265)

Project Name : Paducah LFPP Feasibility Drilling
Location : McCracken County, Kentucky
Job Number : 09124

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
1	AD-1		SS-1	0.0	1.5	Brown Lean Clay		26.9
1			SS-2	1.5	3.0	Gray & Tan Lean Clay		19.6
1			SS-3	4.5	6.0	Brown Lean Clay		25.0
2			ST-1	6.0	6.9	Beige, Gray & Tan Lean Clay		23.1
3			SS-4	9.0	10.5	Brown Clayey Gravel with Sand		26.7
4			SS-5	13.5	15.0	Tan Well-Graded Gravel with Clay and Sand (and(or Silty Clay and Sand)		13.6
5			SS-6	19.5	21.0	Tan Well-Graded Sand with Clay and Gravel (and/or Silty Clay and Gravel)		17.0
5			SS-7	24.0	25.5	Tan Well-Graded Sand with Clay and Gravel (and/or Silty Clay and Gravel)		20.0
6	AD-2		SS-1	0.0	1.5	Brown Lean Clay with Sand		31.1
6			SS-2	1.5	3.0	Brown Lean Clay with Sand		23.9
7			SS-3	4.5	6.0	Brown & Tan Clayey Gravel with Sand		18.3
7			SS-4	9.0	10.5	Tan Clayey Gravel with Sand		15.2
7			SS-5	13.5	15.0	Tan Clayey Gravel with Sand		14.6
7			SS-6	19.5	21.0	Tan Clayey Gravel with Sand		15.1
8			SS-7	24.0	25.5	Gray & Tan Silty Sand		32.2
	AD-3		SS-1	0.0	1.5	Black Topsoil, Silt & Sand		18.4
14			SS-2	1.5	3.0	Tan & Brown Gravelly Lean Clay with Sand		23.9
14			SS-3	3.0	4.5	Black Gravelly Lean Clay with Sand		35.0
14			SS-4	4.5	6.0	Tan & Gray Gravelly Lean Clay with Sand		27.6
9			SS-5	6.0	7.5	Gray Lean Clay		31.0
9			SS-6	7.5	9.0	Gray Lean Clay		26.3
9			SS-7	9.0	10.5	Tan Lean Clay		26.4
10			SS-8	10.5	12.0	Tan Lean Clay		38.1
10			SS-9	12.0	13.5	Brown Lean Clay		24.5
15			SS-10	13.5	15.0	Tan Lean Clay		27.5
15			SS-11	15.0	16.5	Tan Lean Clay		20.0
15			SS-12	16.5	18.0	Tan Lean Clay		22.7
15			SS-13	18.0	19.5	Tan Lean Clay		22.8
15			SS-14	19.5	21.0	Tan Lean Clay		24.9
15			SS-15	21.0	22.5	Tan Lean Clay		22.7
15			SS-16	22.5	24.0	Tan Lean Clay		21.7
15			SS-17	24.0	25.5	Tan Lean Clay		21.9
11			SS-18	25.5	27.0	Tan Lean Clay		23.7
11			SS-19	27.0	28.5	Tan Lean Clay		23.0
11			SS-20	28.5	30.0	Tan Lean Clay		21.7
11			SS-21	30.0	31.5	Tan Lean Clay		25.0
11			SS-22	31.5	33.0	Tan Lean Clay		27.7
11			SS-23	33.0	34.5	Tan Lean Clay		21.7
11			SS-24	34.5	36.0	Tan Lean Clay		28.3
11			SS-25	36.0	37.5	Tan Lean Clay		22.2
12			SS-26	37.5	39.0	Brown Lean Clay		22.2
12			SS-27	39.0	40.5	Brown Lean Clay		21.5
12			SS-28	40.5	42.0	Tan Lean Clay		22.8
12			SS-29	42.0	43.5	Tan & Gray Lean Clay		25.8
12			SS-30	43.5	45.0	Gray & Tan Lean Clay		22.4
13			SS-31	45.0	46.5	Gray Lean Clay		27.5
13			SS-32	46.5	48.0	Gray Lean Clay		30.6
13			SS-33	48.0	49.5	Gray & Tan Lean Clay		33.7
13			SS-34	49.5	51.0	Gray Lean Clay		30.2
14	AD-3A		ST-1	5.0	6.1	Gray, Tan & Brown Gravelly Lean Clay with Sand		24.8
15			ST-2	15.0	16.2	Tan & Gray Lean Clay		24.1
	AD-4		SS-1	0.0	1.5	Black Topsoil, Silt & Sand		29.9
16			SS-2	1.5	3.0	Brown & Tan Lean Clay with Sand		37.9
17			SS-3	4.5	6.0	Tan Lean Clay		24.1
17			SS-4	9.0	10.5	Tan Lean Clay		27.6

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Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

Moisture Data

(AASHTO T255-T265)

Project Name : Paducah LFPP Feasibility Drilling
Location : McCracken County, Kentucky
Job Number : 09124

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
18			ST-1	10.5	11.9	Light Brown Lean Clay		23.3
19			SS-5	13.5	15.0	Gray Lean Clay		20.2
19			SS-6	19.5	21.0	Gray Lean Clay		27.1
20			SS-7	24.0	25.5	Tan & Gray Lean Clay		29.7
16	AD-5		SS-1	0.0	1.5	Brown Lean Clay with Sand		30.0
16			SS-2	1.5	3.0	Brown & Tan Lean Clay with Sand		30.6
21			SS-3	4.5	6.0	Gray Lean Clay with Sand		28.6
22			SS-4	9.0	10.5	Tan Lean Clay		28.6
23			SS-5	13.5	15.0	Brown Lean Clay		20.8
24			SS-6	19.5	21.0	Gray Lean Clay		26.9
24			SS-7	24.0	25.5	Gray Lean Clay		31.5
16	AD-6		SS-1	0.0	1.5	Brown Lean Clay with Sand		15.5
16			SS-2	1.5	3.0	Brown Lean Clay with Sand		21.5
16			SS-3	3.0	4.5	Brown Lean Clay with Sand		19.8
16			SS-4	4.5	6.0	Brown & Gray Lean Clay with Sand		20.5
21			SS-5	6.0	7.5	Brown & Gray Lean Clay with Sand		21.6
29			SS-6	7.5	9.0	Brown & Gray Lean Clay		25.6
29			SS-7	9.0	10.5	Brown Lean Clay		23.3
29			SS-8	10.5	12.0	Brown Lean Clay		23.2
29			SS-9	12.0	13.5	Brown & Gray Lean Clay		24.5
25			SS-10	13.5	15.0	Brown Lean Clay		28.5
25			SS-11	15.0	16.5	Brown & Gray Lean Clay		28.1
25			SS-12	16.5	18.0	Brown Lean Clay		26.5
25			SS-13	18.0	19.5	Brown Lean Clay		27.0
26			SS-14	19.5	21.0	Brown Lean Clay		26.5
26			SS-15	21.0	22.5	Brown Lean Clay		31.0
26			SS-16	22.5	24.0	Brown Lean Clay		29.6
26			SS-17	24.0	25.5	Brown Lean Clay		27.8
26			SS-18	25.5	27.0	Brown Lean Clay		31.0
26			SS-19	27.0	28.5	Brown Lean Clay		28.4
26			SS-20	28.5	30.0	Brown Lean Clay		32.4
27			SS-21	30.0	31.5	Gray Lean Clay		26.5
27			SS-22	31.5	33.0	Gray Lean Clay		24.9
27			SS-23	33.0	34.5	Gray Lean Clay		27.9
27			SS-24	34.5	36.0	Gray Lean Clay		24.5
27			SS-25	36.0	37.5	Gray Lean Clay		24.0
27			SS-26	37.5	39.0	Gray Lean Clay		39.4
27			SS-27	39.0	40.5	Gray Lean Clay		39.2
27			SS-28	40.5	42.0	Gray Lean Clay		32.9
28			SS-29	42.0	43.5	Gray Sandy Silty Clay		37.1
28			SS-30	43.5	45.0	Gray Sandy Silty Clay		31.1
28			SS-31	45.0	46.5	Gray Sandy Silty Clay		31.6
28			SS-32	46.5	48.0	Gray & Brown Sandy Silty Clay		26.6
28			SS-33	48.0	49.5	Gray & Brown Sandy Silty Clay		22.2
28			SS-34	49.5	51.0	Gray & Brown Sandy Silty Clay		23.3
29	AD-6A		ST-1	8.0	10.0	Tan, Beige & Brown Lean Clay		25.3
30			ST-2	21.0	22.5	Tan, Beige & Brown Lean Clay		27.6
31			ST-2	22.5	23.0	Dark Orange & Beige Lean Clay		27.4

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Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 1.5' to 3.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray & Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	100.0
3/4	in.	19	mm	94.6
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	94.6
1/4		6.3	mm	
No.4		4.75	mm	94.6
No.6		3.35	mm	
No.10		2	mm	93.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	91.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	87.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0263	mm	83.8
Hyd. Rd.	# 2	0.0173	mm	76.1
Hyd. Rd.	# 3	0.0105	mm	65.0
Hyd. Rd.	# 4	0.0076	mm	59.3
Hyd. Rd.	# 5	0.0055	mm	52.8
Hyd. Rd.	# 6	0.0028	mm	44.2
Hyd. Rd.	# 7	0.0012	mm	36.2

D_{50} = 0.0044 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 6.8
Coarse Sand (-No.10 + No.40) : 1.3
Fine Sand (-No.40 + No.200) : 4.8
Silt (-No.200 + 0.002mm) : 46.1
Clay (-0.002mm + 0.001mm) : 7.5
Colloids (-0.001mm) : 33.5

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 5.4
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 1.4
Medium Sand (-No.10 + No.40) : 1.3
Fine Sand (-No.40 + No.200) : 4.8
Silt (-No.200 + 0.005mm) : 35.6
Clay (-0.005mm + 0.001mm) : 18.0
Colloids (-0.001mm) : 33.5

Natural Moisture (%) (AASHTO T265) : 19.6
Liquid Limit (AASHTO T89) : 39
Plastic Limit (AASHTO T90) : 19
Plasticity Index : 20
Liquidity Index : 0.05
Activity : 0.49
Sp. Gr. (AASHTO T100) : 2.692
AASHTO Classification: M145 : A-6 (17)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 1

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 6.0' to 6.9'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Beige, Gray & Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	98.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	96.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0267	mm	81.2
Hyd. Rd.	# 2	0.0175	mm	73.3
Hyd. Rd.	# 3	0.0106	mm	63.6
Hyd. Rd.	# 4	0.0077	mm	54.8
Hyd. Rd.	# 5	0.0056	mm	48.8
Hyd. Rd.	# 6	0.0028	mm	39.3
Hyd. Rd.	# 7	0.0012	mm	34.3

D_{50} = 0.006 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 1.6
Coarse Sand (-No.10 + No.40)	: 2.3
Fine Sand (-No.40 + No.200)	: 6.8
Silt (-No.200 + 0.002mm)	: 52.0
Clay (-0.002mm + 0.001mm)	: 5.5
Colloids (-0.001mm)	: 31.8

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 1.6
Medium Sand (-No.10 + No.40)	: 2.3
Fine Sand (-No.40 + No.200)	: 6.8
Silt (-No.200 + 0.005mm)	: 42.1
Clay (-0.005mm + 0.001mm)	: 15.4
Colloids (-0.001mm)	: 31.8

Natural Moisture (%) (AASHTO T265)	: 23.1
Liquid Limit (AASHTO T89)	: 40
Plastic Limit (AASHTO T90)	: 18
Plasticity Index	: 22
Liquidity Index	: 0.25
Activity	: 0.59
Sp. Gr. (AASHTO T100)	: 2.724
AASHTO Classification: M145	: A-6 (20)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 2

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 4
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Clayey Gravel with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	77.5
3/4	in.	19	mm	77.5
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	71.7
1/4		6.3	mm	
No.4		4.75	mm	65.8
No.6		3.35	mm	
No.10		2	mm	57.7

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	51.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	40.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0338	mm	39.3
Hyd. Rd.	# 2	0.0215	mm	36.6
Hyd. Rd.	# 3	0.0126	mm	31.0
Hyd. Rd.	# 4	0.0089	mm	26.7
Hyd. Rd.	# 5	0.0064	mm	22.6
Hyd. Rd.	# 6	0.0031	mm	18.7
Hyd. Rd.	# 7	0.0013	mm	13.4

D_{50} = 0.3175 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 42.3
Coarse Sand (-No.10 + No.40) : 5.8
Fine Sand (-No.40 + No.200) : 11.3
Silt (-No.200 + 0.002mm) : 24.7
Clay (-0.002mm + 0.001mm) : 4.0
Colloids (-0.001mm) : 11.9

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 22.5
Fine Gravel (-3/4in. + No.4) : 11.7
Coarse Sand (-No.4 + No.10) : 8.1
Medium Sand (-No.10 + No.40) : 5.8
Fine Sand (-No.40 + No.200) : 11.3
Silt (-No.200 + 0.005mm) : 19.3
Clay (-0.005mm + 0.001mm) : 9.3
Colloids (-0.001mm) : 11.9

Natural Moisture (%) (AASHTO T265) : 26.7
Liquid Limit (AASHTO T89) : 35
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 15
Liquidity Index : 0.42
Activity : 0.94
Sp. Gr. (AASHTO T100) : 2.660
AASHTO Classification: M145 : A-6 (2)
ASTM Classification: D2487 : GC

Approved By : _____

Soil No. 3

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 5
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 13.5' to 15.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Well-Graded Gravel with Clay and Sand (and(or Silty Clay and Sand)		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	95.2
3/4	in.	19	mm	84.9
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	69.1
1/4		6.3	mm	
No.4		4.75	mm	53.0
No.6		3.35	mm	
No.10		2	mm	39.3

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	22.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	10.7
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0315	mm	9.2
Hyd. Rd.	# 2	0.0201	mm	8.6
Hyd. Rd.	# 3	0.0118	mm	7.8
Hyd. Rd.	# 4	0.0084	mm	7.6
Hyd. Rd.	# 5	0.0060	mm	7.0
Hyd. Rd.	# 6	0.0030	mm	6.1
Hyd. Rd.	# 7	0.0013	mm	5.2

D_{50} = 3.9304 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 60.7
Coarse Sand (-No.10 + No.40) : 16.6
Fine Sand (-No.40 + No.200) : 12.0
Silt (-No.200 + 0.002mm) : 5.0
Clay (-0.002mm + 0.001mm) : 1.0
Colloids (-0.001mm) : 4.7

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 15.1
Fine Gravel (-3/4in. + No.4) : 31.9
Coarse Sand (-No.4 + No.10) : 13.7
Medium Sand (-No.10 + No.40) : 16.6
Fine Sand (-No.40 + No.200) : 12.0
Silt (-No.200 + 0.005mm) : 3.9
Clay (-0.005mm + 0.001mm) : 2.1
Colloids (-0.001mm) : 4.7

Natural Moisture (%) (AASHTO T265) : 13.6
Liquid Limit (AASHTO T89) : 26
Plastic Limit (AASHTO T90) : 15
Plasticity Index : 11
Liquidity Index : -0.12
Activity : 1.93
Sp. Gr. (AASHTO T100) : 2.680
AASHTO Classification: M145 : A-2-6 (0)
ASTM Classification: D2487 : GW-GC

Approved By : _____

Soil No. 4

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 6
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 19.5' to 21.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Well-Graded Sand with Clay and Gravel (and/or Silty Clay and Gravel)		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	95.5
3/4	in.	19	mm	91.1
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	72.6
1/4		6.3	mm	
No.4		4.75	mm	55.3
No.6		3.35	mm	
No.10		2	mm	38.3

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	15.4
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	7.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0345	mm	6.4
Hyd. Rd.	# 2	0.0219	mm	6.1
Hyd. Rd.	# 3	0.0127	mm	5.7
Hyd. Rd.	# 4	0.0090	mm	4.9
Hyd. Rd.	# 5	0.0064	mm	4.3
Hyd. Rd.	# 6	0.0031	mm	3.8
Hyd. Rd.	# 7	0.0013	mm	3.4

D_{50} = 3.6272 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 61.7
Coarse Sand (-No.10 + No.40) : 22.9
Fine Sand (-No.40 + No.200) : 8.1
Silt (-No.200 + 0.002mm) : 3.7
Clay (-0.002mm + 0.001mm) : 0.6
Colloids (-0.001mm) : 3.0

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 8.9
Fine Gravel (-3/4in. + No.4) : 35.8
Coarse Sand (-No.4 + No.10) : 17.0
Medium Sand (-No.10 + No.40) : 22.9
Fine Sand (-No.40 + No.200) : 8.1
Silt (-No.200 + 0.005mm) : 3.2
Clay (-0.005mm + 0.001mm) : 1.1
Colloids (-0.001mm) : 3.0

Natural Moisture (%) (AASHTO T265) : 17
Liquid Limit (AASHTO T89) : 30
Plastic Limit (AASHTO T90) : 16
Plasticity Index : 14
Liquidity Index : 0.08
Activity : 3.91
Sp. Gr. (AASHTO T100) : 2.701
AASHTO Classification: M145 : A-2-6 (1)
ASTM Classification: D2487 : SW-SC

Approved By : _____

Soil No. 5

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 2
Project County	: McCracken	Saruple Loc.	: Boring No. AD - 2
Project State	: Kentucky	Sample Depth	: 1.5' to 3.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	98.8
No.6		3.35	mm	
No.10		2	mm	96.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	91.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	72.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0293	mm	64.0
Hyd. Rd.	# 2	0.0190	mm	58.1
Hyd. Rd.	# 3	0.0114	mm	48.4
Hyd. Rd.	# 4	0.0082	mm	43.6
Hyd. Rd.	# 5	0.0059	mm	39.8
Hyd. Rd.	# 6	0.0030	mm	30.2
Hyd. Rd.	# 7	0.0013	mm	20.0

D_{50} = 0.0124 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 3.6
Coarse Sand (-No.10 + No.40) : 4.6
Fine Sand (-No.40 + No.200) : 19.2
Silt (-No.200 + 0.002mm) : 47.2
Clay (-0.002mm + 0.001mm) : 7.3
Colloids (-0.001mm) : 18.1

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 1.2
Coarse Sand (-No.4 + No.10) : 2.4
Medium Sand (-No.10 + No.40) : 4.6
Fine Sand (-No.40 + No.200) : 19.2
Silt (-No.200 + 0.005mm) : 35.0
Clay (-0.005mm + 0.001mm) : 19.5
Colloids (-0.001mm) : 18.1

Natural Moisture (%) (AASHTO T265) : 23.9
Liquid Limit (AASHTO T89) : 31
Plastic Limit (AASHTO T90) : 17
Plasticity Index : I4
Liquidity Index : 0.48
Activity : 0.55
Sp. Gr. (AASHTO T100) : 2.677
AASHTO Classification: M145 : A-6 (8)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 6

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 4
Project County	: McCracken	Sample Loc.	: Boring No. AD - 2
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Clayey Gravel with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	100.0
3/4	in.	19	mm	93.1
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	73.3
1/4		6.3	mm	
No.4		4.75	mm	55.0
No.6		3.35	mm	
No.10		2	mm	40.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	29.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	13.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0330	mm	11.3
Hyd. Rd.	# 2	0.0210	mm	10.9
Hyd. Rd.	# 3	0.0122	mm	10.1
Hyd. Rd.	# 4	0.0086	mm	9.7
Hyd. Rd.	# 5	0.0061	mm	9.0
Hyd. Rd.	# 6	0.0030	mm	8.0
Hyd. Rd.	# 7	0.0013	mm	6.3

D_{50} = 3.5463 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 59.8
Coarse Sand (-No.10 + No.40) : 11.1
Fine Sand (-No.40 + No.200) : 15.9
Silt (-No.200 + 0.002mm) : 6.0
Clay (-0.002mm + 0.001mm) : 1.5
Colloids (-0.001mm) : 5.7

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 6.9
Fine Gravel (-3/4in. + No.4) : 38.1
Coarse Sand (-No.4 + No.10) : 14.8
Medium Sand (-No.10 + No.40) : 11.1
Fine Sand (-No.40 + No.200) : 15.9
Silt (-No.200 + 0.005mm) : 4.5
Clay (-0.005mm + 0.001mm) : 3.0
Colloids (-0.001mm) : 5.7

Natural Moisture (%) (AASHTO T265) : 15.2
Liquid Limit (AASHTO T89) : 27
Plastic Limit (AASHTO T90) : 14
Plasticity Index : 13
Liquidity Index : 0.06
Activity : 1.81
Sp. Gr. (AASHTO T100) : 2.720
AASHTO Classification: M145 : A-2-6 (1)
ASTM Classification: D2487 : GC

Approved By : _____

Soil No. 7

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 2
Project State	: Kentucky	Sample Depth	: 24.0' to 25.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray & Tan Silty Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	97.0
1/4		6.3	mm	
No.4		4.75	mm	94.3
No.6		3.35	mm	
No.10		2	mm	90.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	87.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	14.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0334	mm	11.2
Hyd. Rd.	# 2	0.0213	mm	10.3
Hyd. Rd.	# 3	0.0124	mm	8.5
Hyd. Rd.	# 4	0.0089	mm	7.2
Hyd. Rd.	# 5	0.0063	mm	6.3
Hyd. Rd.	# 6	0.0031	mm	5.2
Hyd. Rd.	# 7	0.0013	mm	4.3

D_{50} = 0.1746 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 9.8
Coarse Sand (-No.10 + No.40) : 2.6
Fine Sand (-No.40 + No.200) : 73.3
Silt (-No.200 + 0.002mm) : 9.6
Clay (-0.002mm + 0.001mm) : 0.9
Colloids (-0.001mm) : 3.9

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 5.7
Coarse Sand (-No.4 + No.10) : 4.1
Medium Sand (-No.10 + No.40) : 2.6
Fine Sand (-No.40 + No.200) : 73.3
Silt (-No.200 + 0.005mm) : 8.4
Clay (-0.005mm + 0.001mm) : 2.1
Colloids (-0.001mm) : 3.9

Natural Moistnre (%) (AASHTO T265) : 32.2
Liquid Limit (AASHTO T89) : NP
Plastic Limit (AASHTO T90) : NP
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Sp. Gr. (AASHTO T100) : 2.709
AASHTO Classification: M145 : A-2-4 (0)
ASTM Classification: D2487 : SM

Approved By : _____

Soil No. 8

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	91.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0269	mm	79.6
Hyd. Rd.	# 2	0.0180	mm	66.7
Hyd. Rd.	# 3	0.0108	mm	55.9
Hyd. Rd.	# 4	0.0078	mm	49.9
Hyd. Rd.	# 5	0.0057	mm	42.0
Hyd. Rd.	# 6	0.0029	mm	34.6
Hyd. Rd.	# 7	0.0012	mm	24.7

D_{50} = 0.0079 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 1.1
Fine Sand (-No.40 + No.200) : 7.2
Silt (-No.200 + 0.002mm) : 61.2
Clay (-0.002mm + 0.001mm) : 7.7
Colloids (-0.001mm) : 22.6

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 1.1
Fine Sand (-No.40 + No.200) : 7.2
Silt (-No.200 + 0.005mm) : 51.0
Clay (-0.005mm + 0.001mm) : 18.0
Colloids (-0.001mm) : 22.6

Natural Moisture (%) (AASHTO T265) : 26.4
Liquid Limit (AASHTO T89) : 34
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 14
Liquidity Index : 0.45
Activity : 0.46
Sp. Gr. (AASHTO T100) : 2.756
AASHTO Classification: M145 : A-6 (13)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 9

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 9
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 12.0' to 13.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.7
No.6		3.35	mm	
No.10		2	mm	99.5

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	94.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0265	mm	82.2
Hyd. Rd.	# 2	0.0175	mm	72.4
Hyd. Rd.	# 3	0.0106	mm	61.5
Hyd. Rd.	# 4	0.0078	mm	52.5
Hyd. Rd.	# 5	0.0056	mm	44.7
Hyd. Rd.	# 6	0.0029	mm	35.4
Hyd. Rd.	# 7	0.0012	mm	25.4

D_{50} = 0.007 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.5
Coarse Sand (-No.10 + No.40) : 0.7
Fine Sand (-No.40 + No.200) : 4.3
Silt (-No.200 + 0.002mm) : 63.3
Clay (-0.002mm + 0.001mm) : 7.8
Colloids (-0.001mm) : 23.3

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.3
Coarse Sand (-No.4 + No.10) : 0.2
Medium Sand (-No.10 + No.40) : 0.7
Fine Sand (-No.40 + No.200) : 4.3
Silt (-No.200 + 0.005mm) : 51.5
Clay (-0.005mm + 0.001mm) : 19.7
Colloids (-0.001mm) : 23.3

Natural Moisture (%) (AASHTO T265) : 24.5
Liquid Limit (AASHTO T89) : 39
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 19
Liquidity Index : 0.23
Activity : 0.61
Sp. Gr. (AASHTO T100) : 2.748
AASHTO Classification: M145 : A-6 (19)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 10

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Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 20
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 28.5' to 30.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.0
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0252	mm	90.1
Hyd. Rd.	# 2	0.0164	mm	84.3
Hyd. Rd.	# 3	0.0098	mm	78.3
Hyd. Rd.	# 4	0.0071	mm	71.4
Hyd. Rd.	# 5	0.0052	mm	62.6
Hyd. Rd.	# 6	0.0027	mm	51.4
Hyd. Rd.	# 7	0.0012	mm	33.6

D_{50} = 0.0025 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.0
Coarse Sand (-No.10 + No.40)	: 0.2
Fine Sand (-No.40 + No.200)	: 2.8
Silt (-No.200 + 0.002mm)	: 52.1
Clay (-0.002mm + 0.001mm)	: 13.7
Colloids (-0.001mm)	: 31.2

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.0
Medium Sand (-No.10 + No.40)	: 0.2
Fine Sand (-No.40 + No.200)	: 2.8
Silt (-No.200 + 0.005mm)	: 35.2
Clay (-0.005mm + 0.001mm)	: 30.6
Colloids (-0.001mm)	: 31.2

Natural Moisture (%) (AASHTO T265)	: 21.7
Liquid Limit (AASHTO T89)	: 36
Plastic Limit (AASHTO T90)	: 18
Plasticity Index	: 18
Liquidity Index	: 0.18
Activity	: 0.40
Sp. Gr. (AASHTO T100)	: 2.776
AASHTO Classification: M145	: A-6 (18)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 11

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 29
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 42.0' to 43.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	93.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0282	mm	72.0
Hyd. Rd.	# 2	0.0187	mm	59.1
Hyd. Rd.	# 3	0.0115	mm	44.0
Hyd. Rd.	# 4	0.0083	mm	37.0
Hyd. Rd.	# 5	0.0060	mm	31.0
Hyd. Rd.	# 6	0.0030	mm	23.3
Hyd. Rd.	# 7	0.0013	mm	17.9

D_{50} = 0.0139 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 6.3
Silt (-No.200 + 0.002mm) : 72.8
Clay (-0.002mm + 0.001mm) : 4.5
Colloids (-0.001mm) : 16.2

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 6.3
Silt (-No.200 + 0.005mm) : 64.6
Clay (-0.005mm + 0.001mm) : 12.7
Colloids (-0.001mm) : 16.2

Natural Moisture (%) (AASHTO T265) : 25.8
Liquid Limit (AASHTO T89) : 27
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 9
Liquidity Index : 0.87
Activity : 0.43
Sp. Gr. (AASHTO T100) : 2.709
AASHTO Classification: M145 : A-4 (7)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 12

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 33
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 48.0' to 49.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray & Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	96.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0269	mm	83.4
Hyd. Rd.	# 2	0.0178	mm	73.4
Hyd. Rd.	# 3	0.0109	mm	58.3
Hyd. Rd.	# 4	0.0080	mm	49.4
Hyd. Rd.	# 5	0.0058	mm	41.2
Hyd. Rd.	# 6	0.0030	mm	29.4
Hyd. Rd.	# 7	0.0013	mm	20.2

D_{50} = 0.0082 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.1
Coarse Sand (-No.10 + No.40)	: 0.2
Fine Sand (-No.40 + No.200)	: 3.5
Silt (-No.200 + 0.002mm)	: 71.2
Clay (-0.002mm + 0.001mm)	: 6.8
Colloids (-0.001mm)	: 18.3

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.1
Medium Sand (-No.10 + No.40)	: 0.2
Fine Sand (-No.40 + No.200)	: 3.5
Silt (-No.200 + 0.005mm)	: 57.7
Clay (-0.005mm + 0.001mm)	: 20.2
Colloids (-0.001mm)	: 18.3

Natural Moisture (%) (AASHTO T265)	: 33.7
Liquid Limit (AASHTO T89)	: 35
Plastic Limit (AASHTO T90)	: 20
Plasticity Index	: 15
Liquidity Index	: 0.90
Activity	: 0.60
Sp. Gr. (AASHTO T100)	: 2.694
AASHTO Classification: M145	: A-6 (15)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 13

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3A
Project State	: Kentucky	Sample Depth	: 5.0' to 6.1'
Laboratory No.	: 09124	Date Tested	: 07/16/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray, Tan & Brown Gravelly Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	81.5
3/4	in.	19	mm	81.5
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	75.2
1/4		6.3	mm	
No.4		4.75	mm	69.9
No.6		3.35	mm	
No.10		2	mm	65.1

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	58.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	50.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0293	mm	43.1
Hyd. Rd.	# 2	0.0191	mm	37.9
Hyd. Rd.	# 3	0.0114	mm	32.6
Hyd. Rd.	# 4	0.0082	mm	29.2
Hyd. Rd.	# 5	0.0059	mm	25.2
Hyd. Rd.	# 6	0.0030	mm	20.5
Hyd. Rd.	# 7	0.0013	mm	15.3

D_{50} = 0.074 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 34.9
Coarse Sand (-No.10 + No.40) : 6.4
Fine Sand (-No.40 + No.200) : 8.6
Silt (-No.200 + 0.002mm) : 32.0
Clay (-0.002mm + 0.001mm) : 4.2
Colloids (-0.001mm) : 13.9

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 18.5
Fine Gravel (-3/4in. + No.4) : 11.6
Coarse Sand (-No.4 + No.10) : 4.8
Medium Sand (-No.10 + No.40) : 6.4
Fine Sand (-No.40 + No.200) : 8.6
Silt (-No.200 + 0.005mm) : 26.0
Clay (-0.005mm + 0.001mm) : 10.2
Colloids (-0.001mm) : 13.9

Natural Moisture (%) (AASHTO T265) : 24.1
Liquid Limit (AASHTO T89) : 34
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 16
Liquidity Index : 0.38
Activity : 0.88
Sp. Gr. (AASHTO T100) : 2.682
AASHTO Classification: M145 : A-6 (5)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 14

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3A
Project State	: Kentucky	Sample Depth	: 15.5' to 16.2'
Laboratory No.	: 09124	Date Tested	: 07/16/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	98.0
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0248	mm	94.9
Hyd. Rd.	# 2	0.0164	mm	86.9
Hyd. Rd.	# 3	0.0099	mm	76.9
Hyd. Rd.	# 4	0.0073	mm	67.0
Hyd. Rd.	# 5	0.0053	mm	61.1
Hyd. Rd.	# 6	0.0027	mm	47.1
Hyd. Rd.	# 7	0.0012	mm	33.2

D_{50} = 0.0031 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 1.7
Silt (-No.200 + 0.002mm) : 56.1
Clay (-0.002mm + 0.001mm) : 11.1
Colloids (-0.001mm) : 30.8

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 1.7
Silt (-No.200 + 0.005mm) : 38.1
Clay (-0.005mm + 0.001mm) : 29.1
Colloids (-0.001mm) : 30.8

Natural Moisture (%) (AASHTO T265) : 24.8
Liquid Limit (AASHTO T89) : 39
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 19
Liquidity Index : 0.27
Activity : 0.45
Sp. Gr. (AASHTO T100) : 2.771
AASHTO Classification: M145 : A-6 (20)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 15

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 1.5' to 3.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown & Tan Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.8

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	96.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	82.4
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0290	mm	65.2
Hyd. Rd.	# 2	0.0191	mm	55.2
Hyd. Rd.	# 3	0.0114	mm	45.1
Hyd. Rd.	# 4	0.0083	mm	39.0
Hyd. Rd.	# 5	0.0060	mm	31.8
Hyd. Rd.	# 6	0.0030	mm	24.2
Hyd. Rd.	# 7	0.0013	mm	18.8

D_{50} = 0.0146 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.2
Coarse Sand (-No.10 + No.40) : 3.1
Fine Sand (-No.40 + No.200) : 14.3
Silt (-No.200 + 0.002mm) : 60.8
Clay (-0.002mm + 0.001mm) : 4.6
Colloids (-0.001mm) : 17.0

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.2
Medium Sand (-No.10 + No.40) : 3.1
Fine Sand (-No.40 + No.200) : 14.3
Silt (-No.200 + 0.005mm) : 52.6
Clay (-0.005mm + 0.001mm) : 12.8
Colloids (-0.001mm) : 17.0

Natural Moisture (%) (AASHTO T265) : 37.9
Liquid Limit (AASHTO T89) : 31
Plastic Limit (AASHTO T90) : 17
Plasticity Index : 14
Liquidity Index : 1.47
Activity : 0.65
Sp. Gr. (AASHTO T100) : 2.710
AASHTO Classification: M145 : A-6 (10)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 16

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Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 3
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 4.5' to 6.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0256	mm	88.3
Hyd. Rd.	# 2	0.0167	mm	82.3
Hyd. Rd.	# 3	0.0101	mm	73.2
Hyd. Rd.	# 4	0.0073	mm	66.2
Hyd. Rd.	# 5	0.0053	mm	59.4
Hyd. Rd.	# 6	0.0028	mm	44.0
Hyd. Rd.	# 7	0.0012	mm	31.6

D_{50} = 0.0036 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 1.0
Fine Sand (-No.40 + No.200) : 3.7
Silt (-No.200 + 0.002mm) : 56.1
Clay (-0.002mm + 0.001mm) : 9.8
Colloids (-0.001mm) : 29.2

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 1.0
Fine Sand (-No.40 + No.200) : 3.7
Silt (-No.200 + 0.005mm) : 37.3
Clay (-0.005mm + 0.001mm) : 28.6
Colloids (-0.001mm) : 29.2

Natural Moisture (%) (AASHTO T265) : 24.1
Liquid Limit (AASHTO T89) : 41
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 21
Liquidity Index : 0.18
Activity : 0.54
Sp. Gr. (AASHTO T100) : 2.766
AASHTO Classification: M145 : A-7-6 (21)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 17

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 10.5' to 11.9'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Light Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0253	mm	91.2
Hyd. Rd.	# 2	0.0166	mm	84.3
Hyd. Rd.	# 3	0.0100	mm	74.3
Hyd. Rd.	# 4	0.0073	mm	69.5
Hyd. Rd.	# 5	0.0053	mm	62.5
Hyd. Rd.	# 6	0.0027	mm	49.7
Hyd. Rd.	# 7	0.0012	mm	34.8

D_{50} = 0.0028 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.002mm) : 51.3
Clay (-0.002mm + 0.001mm) : 11.8
Colloids (-0.001mm) : 32.3

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.005mm) : 34.1
Clay (-0.005mm + 0.001mm) : 29.1
Colloids (-0.001mm) : 32.3

Natural Moisture (%) (AASHTO T265) : 23.3
Liquid Limit (AASHTO T89) : 36
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 18
Liquidity Index : 0.28
Activity : 0.41
Sp. Gr. (AASHTO T100) : 2.748
AASHTO Classification: M145 : A-6 (17)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 18

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 6
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 19.5' to 21.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	93.0
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0280	mm	78.0
Hyd. Rd.	# 2	0.0183	mm	71.4
Hyd. Rd.	# 3	0.0110	mm	62.2
Hyd. Rd.	# 4	0.0079	mm	56.3
Hyd. Rd.	# 5	0.0057	mm	50.3
Hyd. Rd.	# 6	0.0029	mm	40.8
Hyd. Rd.	# 7	0.0012	mm	30.7

D_{50} = 0.0056 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.8
Coarse Sand (-No.10 + No.40)	: 0.3
Fine Sand (-No.40 + No.200)	: 5.9
Silt (-No.200 + 0.002mm)	: 56.6
Clay (-0.002mm + 0.001mm)	: 8.4
Colloids (-0.001mm)	: 28.0

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.8
Medium Sand (-No.10 + No.40)	: 0.3
Fine Sand (-No.40 + No.200)	: 5.9
Silt (-No.200 + 0.005mm)	: 44.6
Clay (-0.005mm + 0.001mm)	: 20.4
Colloids (-0.001mm)	: 28.0

Natural Moisture (%) (AASHTO T265)	: 27.1
Liquid Limit (AASHTO T89)	: 40
Plastic Limit (AASHTO T90)	: 18
Plasticity Index	: 22
Liquidity Index	: 0.42
Activity	: 0.60
Sp. Gr. (AASHTO T100)	: 2.670
AASHTO Classification: M145	: A-6 (21)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 19

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 24.0' to 25.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	96.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0259	mm	88.5
Hyd. Rd.	# 2	0.0170	mm	80.7
Hyd. Rd.	# 3	0.0103	mm	70.7
Hyd. Rd.	# 4	0.0075	mm	63.8
Hyd. Rd.	# 5	0.0054	mm	57.0
Hyd. Rd.	# 6	0.0028	mm	42.6
Hyd. Rd.	# 7	0.0012	mm	32.5

D_{50} = 0.0039 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.9
Fine Sand (-No.40 + No.200) : 2.5
Silt (-No.200 + 0.002mm) : 58.0
Clay (-0.002mm + 0.001mm) : 8.5
Colloids (-0.001mm) : 30.1

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.9
Fine Sand (-No.40 + No.200) : 2.5
Silt (-No.200 + 0.005mm) : 41.4
Clay (-0.005mm + 0.001mm) : 25.1
Colloids (-0.001mm) : 30.1

Natural Moisture (%) (AASHTO T265) : 29.7
Liquid Limit (AASHTO T89) : 41
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 21
Liquidity Index : 0.47
Activity : 0.54
Sp. Gr. (AASHTO T100) : 2.772
AASHTO Classification: M145 : A-7-6 (22)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 20

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 3
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 4.5' to 6.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.4
1/4		6.3	mm	
No.4		4.75	mm	97.5
No.6		3.35	mm	
No.10		2	mm	96.7

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	86.3
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	76.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0282	mm	67.7
Hyd. Rd.	# 2	0.0185	mm	58.2
Hyd. Rd.	# 3	0.0112	mm	46.6
Hyd. Rd.	# 4	0.0081	mm	40.8
Hyd. Rd.	# 5	0.0059	mm	34.0
Hyd. Rd.	# 6	0.0029	mm	25.6
Hyd. Rd.	# 7	0.0013	mm	17.7

D_{50} = 0.013 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 3.3
Coarse Sand (-No.10 + No.40)	: 10.4
Fine Sand (-No.40 + No.200)	: 9.7
Silt (-No.200 + 0.002mm)	: 54.6
Clay (-0.002mm + 0.001mm)	: 6.0
Colloids (-0.001mm)	: 16.1

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 2.5
Coarse Sand (-No.4 + No.10)	: 0.8
Medium Sand (-No.10 + No.40)	: 10.4
Fine Sand (-No.40 + No.200)	: 9.7
Silt (-No.200 + 0.005mm)	: 44.5
Clay (-0.005mm + 0.001mm)	: 16.0
Colloids (-0.001mm)	: 16.1

Natural Moisture (%) (AASHTO T265)	: 28.6
Liquid Limit (AASHTO T89)	: 36
Plastic Limit (AASHTO T90)	: 20
Plasticity Index	: 16
Liquidity Index	: 0.53
Activity	: 0.73
Sp. Gr. (AASHTO T100)	: 2.767
AASHTO Classification: M145	: A-6 (11)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 21

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 4
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0254	mm	89.3
Hyd. Rd.	# 2	0.0167	mm	82.3
Hyd. Rd.	# 3	0.0100	mm	75.4
Hyd. Rd.	# 4	0.0073	mm	68.5
Hyd. Rd.	# 5	0.0053	mm	61.7
Hyd. Rd.	# 6	0.0027	mm	48.3
Hyd. Rd.	# 7	0.0012	mm	30.4

D_{50} = 0.0029 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.4
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.002mm) : 54.0
Clay (-0.002mm + 0.001mm) : 13.5
Colloids (-0.001mm) : 28.1

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.4
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.005mm) : 35.0
Clay (-0.005mm + 0.001mm) : 32.5
Colloids (-0.001mm) : 28.1

Natural Moisture (%) (AASHTO T265) : 28.6
Liquid Limit (AASHTO T89) : 40
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 20
Liquidity Index : 0.42
Activity : 0.48
Sp. Gr. (AASHTO T100) : 2.797
AASHTO Classification: M145 : A-6 (20)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 22

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 5
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 13.5' to 15.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.10		2	mm	99.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	86.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0278	mm	73.5
Hyd. Rd.	# 2	0.0180	mm	68.5
Hyd. Rd.	# 3	0.0107	mm	61.6
Hyd. Rd.	# 4	0.0077	mm	55.6
Hyd. Rd.	# 5	0.0056	mm	49.9
Hyd. Rd.	# 6	0.0028	mm	42.2
Hyd. Rd.	# 7	0.0012	mm	27.3

D_{50} = 0.0056 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.6
Coarse Sand (-No.10 + No.40)	: 1.6
Fine Sand (-No.40 + No.200)	: 11.3
Silt (-No.200 + 0.002mm)	: 50.4
Clay (-0.002mm + 0.001mm)	: 11.1
Colloids (-0.001mm)	: 25.0

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.2
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 1.6
Fine Sand (-No.40 + No.200)	: 11.3
Silt (-No.200 + 0.005mm)	: 37.8
Clay (-0.005mm + 0.001mm)	: 23.7
Colloids (-0.001mm)	: 25.0

Natural Moisture (%) (AASHTO T265)	: 20.8
Liquid Limit (AASHTO T89)	: 32
Plastic Limit (AASHTO T90)	: 18
Plasticity Index	: 14
Liquidity Index	: 0.22
Activity	: 0.39
Sp. Gr. (AASHTO T100)	: 2.752
AASHTO Classification: M145	: A-6 (11)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 23

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Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 24.0' to 25.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0266	mm	82.1
Hyd. Rd.	# 2	0.0173	mm	76.2
Hyd. Rd.	# 3	0.0106	mm	64.1
Hyd. Rd.	# 4	0.0076	mm	59.3
Hyd. Rd.	# 5	0.0055	mm	51.4
Hyd. Rd.	# 6	0.0028	mm	39.4
Hyd. Rd.	# 7	0.0012	mm	30.5

D_{50} = 0.0051 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 2.6
Silt (-No.200 + 0.002mm) : 61.3
Clay (-0.002mm + 0.001mm) : 7.6
Colloids (-0.001mm) : 28.2

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 2.6
Silt (-No.200 + 0.005mm) : 47.5
Clay (-0.005mm + 0.001mm) : 21.4
Colloids (-0.001mm) : 28.2

Natural Moisture (%) (AASHTO T265) : 31.5
Liquid Limit (AASHTO T89) : 40
Plastic Limit (AASHTO T90) : 19
Plasticity Index : 21
Liquidity Index : 0.60
Activity : 0.59
Sp. Gr. (AASHTO T100) : 2.766
AASHTO Classification: M145 : A-6 (21)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 24

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 11
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 15.0' to 16.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.6
1/4		6.3	mm	
No.4		4.75	mm	99.4
No.6		3.35	mm	
No.10		2	mm	99.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0263	mm	84.2
Hyd. Rd.	# 2	0.0174	mm	74.3
Hyd. Rd.	# 3	0.0107	mm	60.4
Hyd. Rd.	# 4	0.0078	mm	52.7
Hyd. Rd.	# 5	0.0056	mm	46.9
Hyd. Rd.	# 6	0.0029	mm	34.0
Hyd. Rd.	# 7	0.0012	mm	24.1

D_{50} = 0.0067 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.6
Coarse Sand (-No.10 + No.40)	: 0.6
Fine Sand (-No.40 + No.200)	: 1.7
Silt (-No.200 + 0.002mm)	: 67.3
Clay (-0.002mm + 0.001mm)	: 7.7
Colloids (-0.001mm)	: 22.1

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.6
Coarse Sand (-No.4 + No.10)	: 0.0
Medium Sand (-No.10 + No.40)	: 0.6
Fine Sand (-No.40 + No.200)	: 1.7
Silt (-No.200 + 0.005mm)	: 52.4
Clay (-0.005mm + 0.001mm)	: 22.6
Colloids (-0.001mm)	: 22.1

Natural Moisture (%) (AASHTO T265)	: 28.1
Liquid Limit (AASHTO T89)	: 38
Plastic Limit (AASHTO T90)	: 20
Plasticity Index	: 18
Liquidity Index	: 0.44
Activity	: 0.60
Sp. Gr. (AASHTO T100)	: 2.767
AASHTO Classification: M145	: A-6 (18)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 25

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 16
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 22.5' to 24.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.10		2	mm	99.5

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0284	mm	71.4
Hyd. Rd.	# 2	0.0188	mm	60.5
Hyd. Rd.	# 3	0.0114	mm	45.5
Hyd. Rd.	# 4	0.0083	mm	38.6
Hyd. Rd.	# 5	0.0060	mm	31.7
Hyd. Rd.	# 6	0.0030	mm	24.5
Hyd. Rd.	# 7	0.0013	mm	16.6

D_{50} = 0.0133 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.5
Coarse Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 7.9
Silt (-No.200 + 0.002mm) : 68.5
Clay (-0.002mm + 0.001mm) : 5.7
Colloids (-0.001mm) : 15.0

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.2
Coarse Sand (-No.4 + No.10) : 0.3
Medium Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 7.9
Silt (-No.200 + 0.005mm) : 59.4
Clay (-0.005mm + 0.001mm) : 14.8
Colloids (-0.001mm) : 15.0

Natural Moisture (%) (AASHTO T265) : 29.6
Liquid Limit (AASHTO T89) : 29
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 9
Liquidity Index : 1.05
Activity : 0.43
Sp. Gr. (AASHTO T100) : 2.714
AASHTO Classification: M145 : A-4 (7)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 26

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 21
Project Connty	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 30.0' to 31.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.9
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.9
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0264	mm	85.6
Hyd. Rd.	# 2	0.0175	mm	75.8
Hyd. Rd.	# 3	0.0106	mm	63.9
Hyd. Rd.	# 4	0.0076	mm	59.8
Hyd. Rd.	# 5	0.0056	mm	50.3
Hyd. Rd.	# 6	0.0029	mm	38.1
Hyd. Rd.	# 7	0.0012	mm	24.3

D_{50} = 0.0055 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.1
Coarse Sand (-No.10 + No.40)	: 0.3
Fine Sand (-No.40 + No.200)	: 3.7
Silt (-No.200 + 0.002mm)	: 63.7
Clay (-0.002mm + 0.001mm)	: 10.0
Colloids (-0.001mm)	: 22.2

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.1
Coarse Sand (-No.4 + No.10)	: 0.0
Medium Sand (-No.10 + No.40)	: 0.3
Fine Sand (-No.40 + No.200)	: 3.7
Silt (-No.200 + 0.005mm)	: 47.6
Clay (-0.005mm + 0.001mm)	: 26.2
Colloids (-0.001mm)	: 22.2

Natural Moisture (%) (AASHTO T265)	: 26.5
Liquid Limit (AASHTO T89)	: 33
Plastic Limit (AASHTO T90)	: 19
Plasticity Index	: 14
Liquidity Index	: 0.55
Activity	: 0.44
Sp. Gr. (AASHTO T100)	: 2.735
AASHTO Classification: M145	: A-6 (13)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 27

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 30
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 43.5' to 45.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Sandy Silty Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.6
No.6		3.35	mm	
No.10		2	mm	99.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	60.9
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0312	mm	48.4
Hyd. Rd.	# 2	0.0202	mm	40.6
Hyd. Rd.	# 3	0.0120	mm	33.6
Hyd. Rd.	# 4	0.0086	mm	29.7
Hyd. Rd.	# 5	0.0061	mm	24.8
Hyd. Rd.	# 6	0.0031	mm	20.5
Hyd. Rd.	# 7	0.0013	mm	14.8

D_{50} = 0.0348 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.8
Coarse Sand (-No.10 + No.40)	: 1.0
Fine Sand (-No.40 + No.200)	: 37.3
Silt (-No.200 + 0.002mm)	: 43.3
Clay (-0.002mm + 0.001mm)	: 4.4
Colloids (-0.001mm)	: 13.3

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.4
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 1.0
Fine Sand (-No.40 + No.200)	: 37.3
Silt (-No.200 + 0.005mm)	: 37.4
Clay (-0.005mm + 0.001mm)	: 10.2
Colloids (-0.001mm)	: 13.3

Natural Moisture (%) (AASHTO T265)	: 31.1
Liquid Limit (AASHTO T89)	: 22
Plastic Limit (AASHTO T90)	: 17
Plasticity Index	: 5
Liquidity Index	: 2.86
Activity	: 0.28
Sp. Gr. (AASHTO T100)	: 2.696
AASHTO Classification: M145	: A-4 (0)
ASTM Classification: D2487	: CL-ML

Approved By : _____

Soil No. 28

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 8.0' to 10.0'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan, Beige & Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.10		2	mm	99.6

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.9
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0283	mm	67.0
Hyd. Rd.	# 2	0.0191	mm	50.3
Hyd. Rd.	# 3	0.0114	mm	40.6
Hyd. Rd.	# 4	0.0082	mm	35.6
Hyd. Rd.	# 5	0.0059	mm	30.7
Hyd. Rd.	# 6	0.0030	mm	23.1
Hyd. Rd.	# 7	0.0013	mm	18.1

D_{50} = 0.0188 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.4
Coarse Sand (-No.10 + No.40)	: 0.7
Fine Sand (-No.40 + No.200)	: 9.0
Silt (-No.200 + 0.002mm)	: 69.1
Clay (-0.002mm + 0.001mm)	: 4.3
Colloids (-0.001mm)	: 16.5

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.2
Coarse Sand (-No.4 + No.10)	: 0.2
Medium Sand (-No.10 + No.40)	: 0.7
Fine Sand (-No.40 + No.200)	: 9.0
Silt (-No.200 + 0.005mm)	: 61.0
Clay (-0.005mm + 0.001mm)	: 12.4
Colloids (-0.001mm)	: 16.5

Natural Moisture (%) (AASHTO T265)	: 25.3
Liquid Limit (AASHTO T89)	: 30
Plastic Limit (AASHTO T90)	: 21
Plasticity Index	: 9
Liquidity Index	: 0.48
Activity	: 0.43
Sp. Gr. (AASHTO T100)	: 2.756
AASHTO Classification: M145	: A-4 (8)
ASTM Classification: D2487	: CL

Approved By : _____

Soil No. 29

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 21.0' to 22.5'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan, Beige & Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	96.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0263	mm	81.0
Hyd. Rd.	# 2	0.0171	mm	75.3
Hyd. Rd.	# 3	0.0104	mm	64.4
Hyd. Rd.	# 4	0.0076	mm	54.6
Hyd. Rd.	# 5	0.0055	mm	47.9
Hyd. Rd.	# 6	0.0028	mm	35.3
Hyd. Rd.	# 7	0.0012	mm	24.5

D_{50} = 0.0061 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.8
Fine Sand (-No.40 + No.200) : 2.9
Silt (-No.200 + 0.002mm) : 65.4
Clay (-0.002mm + 0.001mm) : 8.3
Colloids (-0.001mm) : 22.6

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.8
Fine Sand (-No.40 + No.200) : 2.9
Silt (-No.200 + 0.005mm) : 50.3
Clay (-0.005mm + 0.001mm) : 23.4
Colloids (-0.001mm) : 22.6

Natural Moisture (%) (AASHTO T265) : 27.6
Liquid Limit (AASHTO T89) : 35
Plastic Limit (AASHTO T90) : 19
Plasticity Index : 16
Liquidity Index : 0.53
Activity : 0.52
Sp. Gr. (AASHTO T100) : 2.785
AASHTO Classification: M145 : A-6 (16)
ASTM Classificatiou: D2487 : CL

Approved By : _____

Soil No. 30

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 22.5' to 23.0'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Dark Orange & Beige Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.0
1/4		6.3	mm	
No.4		4.75	mm	97.8
No.6		3.35	mm	
No.10		2	mm	96.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	94.0
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	85.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0279	mm	70.0
Hyd. Rd.	# 2	0.0187	mm	55.7
Hyd. Rd.	# 3	0.0114	mm	43.3
Hyd. Rd.	# 4	0.0083	mm	35.5
Hyd. Rd.	# 5	0.0060	mm	29.8
Hyd. Rd.	# 6	0.0030	mm	20.3
Hyd. Rd.	# 7	0.0013	mm	14.7

D_{50} = 0.0149 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 3.6
Coarse Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 8.8
Silt (-No.200 + 0.002mm) : 67.6
Clay (-0.002mm + 0.001mm) : 4.4
Colloids (-0.001mm) : 13.3

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 2.2
Coarse Sand (-No.4 + No.10) : 1.4
Medium Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 8.8
Silt (-No.200 + 0.005mm) : 57.8
Clay (-0.005mm + 0.001mm) : 14.1
Colloids (-0.001mm) : 13.3

Natural Moisture (%) (AASHTO T265) : 27.4
Liquid Limit (AASHTO T89) : 28
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 8
Liquidity Index : 0.93
Activity : 0.45
Sp. Gr. (AASHTO T100) : 2.733
AASHTO Classification: M145 : A-4 (6)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 31

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UNIT WEIGHT TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT # :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE # :	SS - 3
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Boring No. AD -1
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	4.5' to 6.0'
LABORATORY # :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-20-09
SOIL TYPE :	Gray & Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.77	in
INITIAL DIAMETER	:	1.42	in

RESULTS

MOISTURE	:	26.3	%
WET DENSITY	:	125.3	pcf
DRY DENSITY	:	99.2	pcf

Comments :

APPROVED BY: _____

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UNIT WEIGHT TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT # :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE # :	SS - 6
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Boring No. AD -2
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	19.5' to 21.5'
LABORATORY # :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-20-09
SOIL TYPE :	Brown Sand		

SAMPLE DATA

INITIAL HEIGHT	:	2.68	in
INITIAL DIAMETER	:	1.39	in

RESULTS

MOISTURE	:	14.8	%
WET DENSITY	:	131.1	pcf
DRY DENSITY	:	114.2	pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT # :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE # :	SS - 16
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Boring No. AD -3
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	22.5' to 24.0'
LABORATORY # :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-20-09
SOIL TYPE :	Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.80 in
INITIAL DIAMETER	:	1.37 in

RESULTS

MOISTURE	:	21.2 %
WET DENSITY	:	137.9 pcf
DRY DENSITY	:	113.8 pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT # :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE # :	SS - 17
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Boring No. AD -3
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	24.0' to 25.5'
LABORATORY # :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-20-09
SOIL TYPE :	Light Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.81	in
INITIAL DIAMETER	:	1.39	in

RESULTS

MOISTURE	:	21.6	%
WET DENSITY	:	133.6	pcf
DRY DENSITY	:	109.8	pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT # :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE # :	SS - 4
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Boring No. AD -4
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	9.0' to 10.5'
LABORATORY # :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-20-09
SOIL TYPE :	Dark Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.82	in
INITIAL DIAMETER	:	1.36	in

RESULTS

MOISTURE	:	22.2	%
WET DENSITY	:	131.8	pcf
DRY DENSITY	:	107.9	pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT # :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE # :	SS - 11
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Boring No. AD -6
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	15.0' to 16.5'
LABORATORY # :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-20-09
SOIL TYPE :	Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.81	in
INITIAL DIAMETER	:	1.32	in

RESULTS

MOISTURE	:	28.9	%
WET DENSITY	:	127.8	pcf
DRY DENSITY	:	99.1	pcf

Comments :

APPROVED BY: _____

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UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No. :	ST - 1
Project County	: McCracken	Sample Loc. :	Boring No_AD-1
Project State	: Kentucky	Sample Depth :	6.4' to 6.9'
Laboratory No.	: 09124	Date Tested :	06-25-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported :	07-20-09
Soil Type	: Beige, Gray & Tan Lean Clay		
Wet Density	: 127.3 pcf	Initial Height :	5.71 in
Dry Density	: 103.4 pcf	Initial Diameter :	2.84 in
Moisture	: 23.1 %	Proving Ring :	#22734

RESULTS:

#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	36.0	0.04	0.3	0.82
3	44.0	0.04	0.5	1.00
4	52.0	0.04	0.8	1.17
5	59.0	0.04	1.1	1.33
6	67.0	0.04	1.3	1.50
7	74.0	0.04	1.6	1.66
8	81.0	0.04	1.8	1.81
9	87.0	0.04	2.1	1.94
10	94.0	0.05	2.5	2.08
11	101.0	0.05	2.8	2.23
12	107.7	0.05	3.2	2.37
13	114.4	0.05	3.5	2.51
14	121.6	0.05	3.9	2.66
15	126.9	0.05	4.4	2.76
16	132.6	0.05	4.6	2.88
17	137.4	0.05	4.9	2.97
18	143.2	0.05	5.3	3.08
19	148.0	0.05	5.7	3.17
20	153.6	0.05	6.1	3.28
21	159.3	0.05	6.6	3.38
22	163.5	0.05	7.0	3.46
23	166.8	0.05	7.4	3.51
24	169.6	0.05	7.9	3.55
25	172.0	0.05	8.3	3.58
26	171.5	0.05	8.8	3.56
27	164.9	0.05	9.6	3.39
28	158.8	0.05	10.5	3.23

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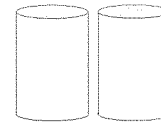
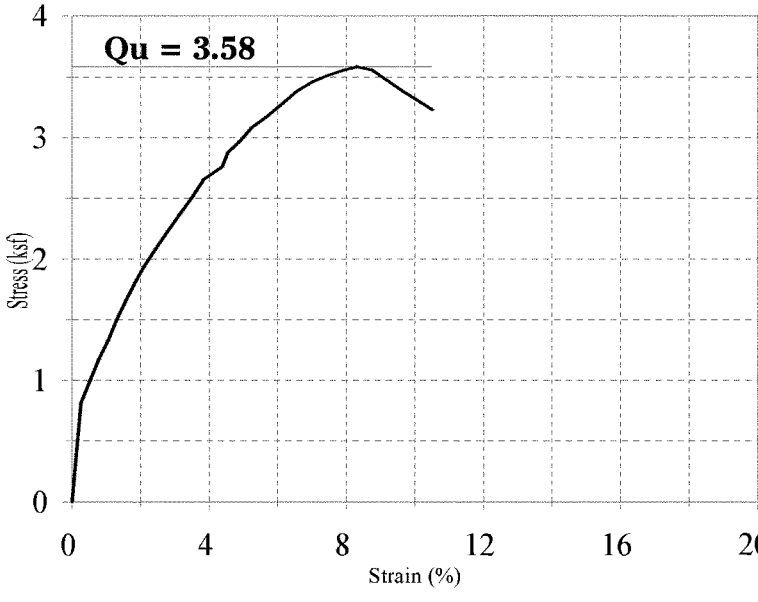
UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No_AD-1
Project State	: Kentucky	Sample Depth	: 6.4' to 6.9'
Laboratory No.	: 09124	Date Tested	: 06-25-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-20-09
Soil Type	: Beige, Gray & Tan Lean Clay		
Wet Density	: 127.3 pcf	Initial Height	: 5.71 in
Dry Density	: 103.4 pcf	Initial Diameter	: 2.84 in
Moisture	: 23.1 %	Proving Ring	: #22734
Deg. of Sat.	: 97.7 %	Specific Gravity	: 2.724
COMMENTS	: AASHTO: T-208		





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UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No. :	ST - 1
Project County	: McCracken	Sample Loc. :	Boring No_AD-4
Project State	: Kentucky	Sample Depth :	10.5' to 11.0'
Laboratory No.	: 09124	Date Tested :	06-26-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported :	07-20-09
Soil Type	: Light Brown Lean Clay		
Wet Density	: 128.8 pcf	Initial Height :	5.73 in
Dry Density	: 104.0 pcf	Initial Diameter :	2.84 in
Moisture	: 23.9 %	Proving Ring :	#22734

RESULTS:

#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	11.0	0.04	0.3	0.25
3	22.0	0.04	0.5	0.50
4	30.0	0.04	0.8	0.68
5	39.0	0.04	1.0	0.88
6	49.0	0.04	1.3	1.10
7	60.0	0.04	1.6	1.34
8	71.0	0.04	1.8	1.58
9	83.0	0.05	2.1	1.84
10	98.0	0.05	2.4	2.17
11	114.4	0.05	2.8	2.52
12	127.8	0.05	3.1	2.81
13	140.3	0.05	3.5	3.07
14	151.8	0.05	3.8	3.31
15	164.0	0.05	4.4	3.56
16	173.4	0.05	4.5	3.76
17	180.9	0.05	4.9	3.90
18	187.5	0.05	5.2	4.03
19	194.1	0.05	5.7	4.15
20	198.7	0.05	6.1	4.23
21	203.3	0.05	6.5	4.31
22	207.9	0.05	7.0	4.39
23	209.7	0.05	7.4	4.41
24	209.7	0.05	7.9	4.38
25	207.0	0.05	8.3	4.31
26	200.5	0.05	8.7	4.15

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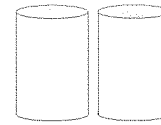
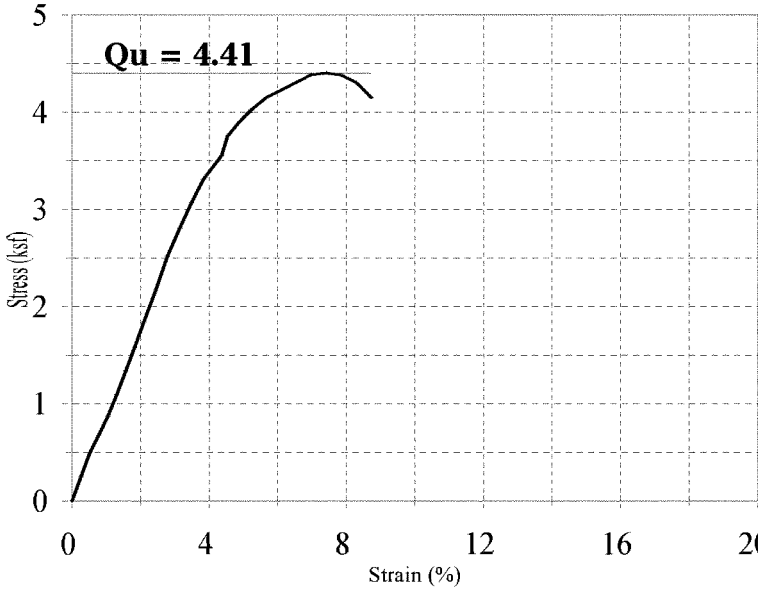
UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No_AD-4
Project State	: Kentucky	Sample Depth	: 10.5' to 11.0'
Laboratory No.	: 09124	Date Tested	: 06-26-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-20-09
Soil Type	: Light Brown Lean Clay		
Wet Density	: 128.8 pcf	Initial Height	: 5.73 in
Dry Density	: 104.0 pcf	Initial Diameter	: 2.84 in
Moisture	: 23.9 %	Proving Ring	: #22734
Deg. of Sat.	: 100.0 %	Specific Gravity	: 2.748
COMMENTS	: AASHTO: T-208		





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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Submitted By : Florence & Hutcheson, Inc.
Soil Type : Light Brown Lean Clay

Point No. : 1
Sample Loc. : Boring No. AD - 4
Sample Depth : 11.0' to 11.5'
Date Tested : 06-29-09
Date Reported : 07-21-09

Wet Density : 129.1 pcf
Dry Density : 104.7 pcf
Moisture : 23.3 %

Delta Height : NA
Delta Volume : NA
Chamber Pressure. : 9.7 psi

Initial Height : 14.60 cm
Initial Diameter : 7.21 cm
Init. Pore Pres. : NA

RESULTS:

	ε a	σ 3 (psi)	σ 1 (psi)	σ1 / σ3
1	0.00	9.72	9.72	1.00
2	0.09	9.72	12.24	1.26
3	0.17	9.72	13.03	1.34
4	0.26	9.72	13.66	1.41
5	0.35	9.72	14.13	1.45
6	0.43	9.72	14.68	1.51
7	0.52	9.72	15.38	1.58
8	1.04	9.72	18.28	1.88
9	1.57	9.72	21.60	2.22
10	2.09	9.72	25.14	2.59
11	2.61	9.72	27.77	2.86
12	3.13	9.72	29.56	3.04
13	3.48	9.72	30.57	3.15
14	4.35	9.72	32.51	3.35
15	5.22	9.72	33.88	3.49
16	6.09	9.72	34.97	3.60
17	6.96	9.72	35.90	3.69
18	7.83	9.72	36.68	3.77
19	8.70	9.72	37.29	3.84
20	9.57	9.72	37.65	3.87
21	10.44	9.72	38.11	3.92
22	11.30	9.72	38.44	3.96
23	12.17	9.72	38.69	3.98
24	13.04	9.72	38.94	4.01
25	13.91	9.72	39.35	4.05
26	14.78	9.72	39.40	4.05
27	15.65	9.72	39.55	4.07
28	16.52	9.72	39.59	4.07
29	17.39	9.72	39.61	4.08
30	18.26	9.72	39.64	4.08
31	19.13	9.72	39.66	4.08
32	20.00	9.72	39.56	4.07

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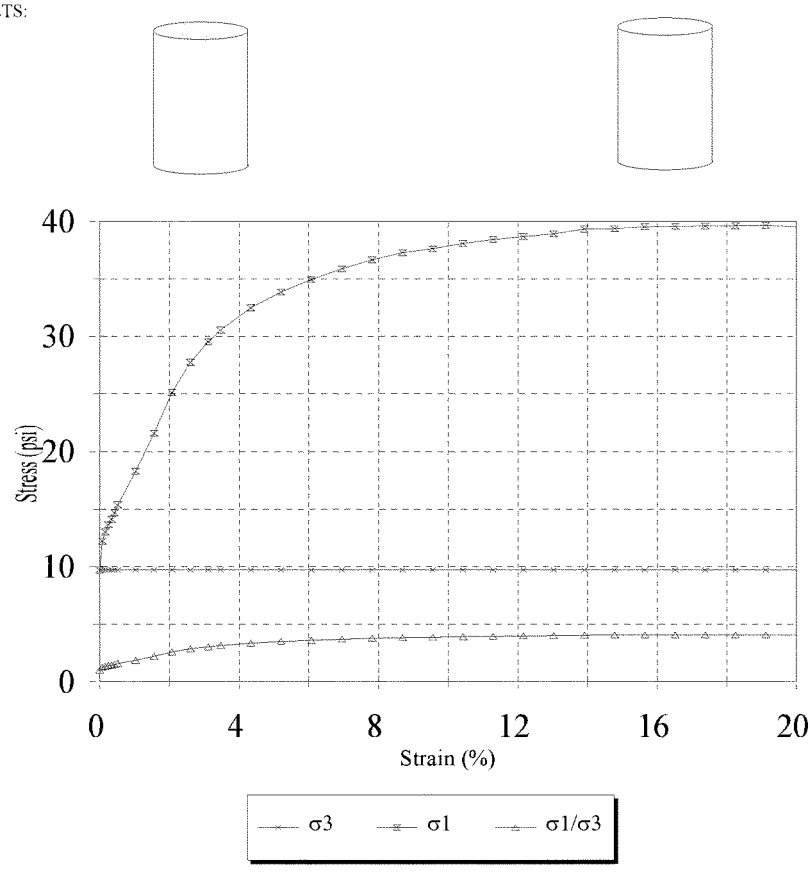
TRIAXIAL COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Point No.	: 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 11.0' to 11.5'
Laboratory No.	: 09124	Date Tested	: 06-29-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-21-09

Final Moisture	: 23.3 %	Eff. Cons. Stress	: 9.72 psi	Init.Void Ratio	: 0.6385
Final Height	: 11.68 cm	Total Back Pressure	: NA	Final Void Ratio	: 0.6385
Final Diameter	: 8.06 cm	Pore Pres. After Sat.	: NA	Specific Gravity	: 2.748
Initial Saturation	: 100 %	Final Saturation	: 100 %	Comments	: AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Submitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 4
Sample Depth : 11.0' to 11.5'
Date Tested : 06-29-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

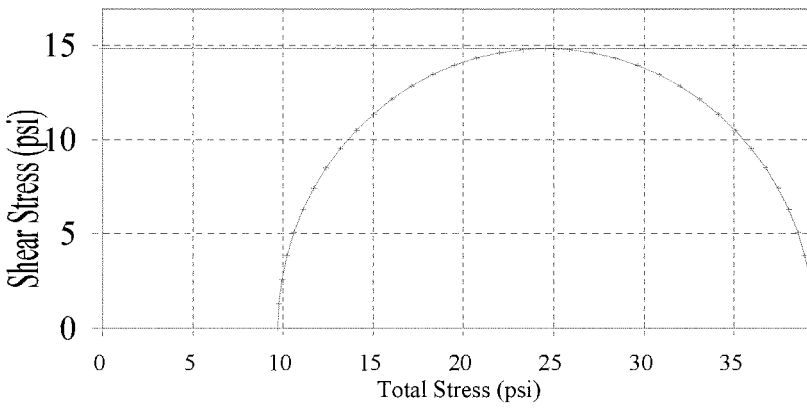
Test	Lateral	Total
1	9.72	39.44

Compressive Strength = 4279 psf
Cohesion = 2140 psf
Phi = 0.0 deg
Tan (Phi) = 0.0000

At Maximum Deviator Stress

Triaxial Mohr's Circles

Unconsolidated Undrained Triaxial Test



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Submitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 1
Sample Loc. : Boring No. AD - 6A
Sample Depth : 8.0' to 9.5'
Date Tested : 06-25-09
Date Reported : 07-21-09

Wet Density : 126.5 pcf
Dry Density : 101.9 pcf
Moisture : 24.2 %

Delta Height : NA
Delta Volume : NA
Chamber Pressure. : 4.0 psi

Initial Height : 14.69 cm
Initial Diameter : 7.18 cm
Init. Pore Pres. : NA

RESULTS:

	ε a	σ 3 (psi)	σ 1 (psi)	σ1 / σ3
1	0.00	4.01	4.01	1.00
2	0.09	4.01	5.76	1.44
3	0.17	4.01	6.40	1.60
4	0.26	4.01	7.03	1.75
5	0.35	4.01	7.51	1.87
6	0.43	4.01	8.14	2.03
7	0.52	4.01	8.93	2.23
8	1.04	4.01	13.97	3.48
9	1.56	4.01	20.20	5.04
10	2.07	4.01	19.84	4.95
11	2.59	4.01	19.48	4.86
12	3.11	4.01	20.08	5.01
13	3.46	4.01	20.56	5.13
14	4.32	4.01	21.36	5.32
15	5.19	4.01	21.73	5.42
16	6.05	4.01	21.83	5.44
17	6.92	4.01	21.80	5.44
18	7.78	4.01	21.89	5.46
19	8.65	4.01	21.92	5.46
20	9.51	4.01	21.81	5.44
21	10.37	4.01	22.02	5.49
22	11.24	4.01	22.28	5.56
23	12.10	4.01	22.41	5.59
24	12.97	4.01	21.80	5.44
25	13.83	4.01	22.05	5.50
26	14.70	4.01	22.23	5.54
27	15.56	4.01	22.40	5.58
28	16.43	4.01	22.68	5.65
29	17.29	4.01	22.72	5.66
30	18.16	4.01	22.92	5.72
31	19.02	4.01	23.01	5.74
32	19.88	4.01	22.97	5.73

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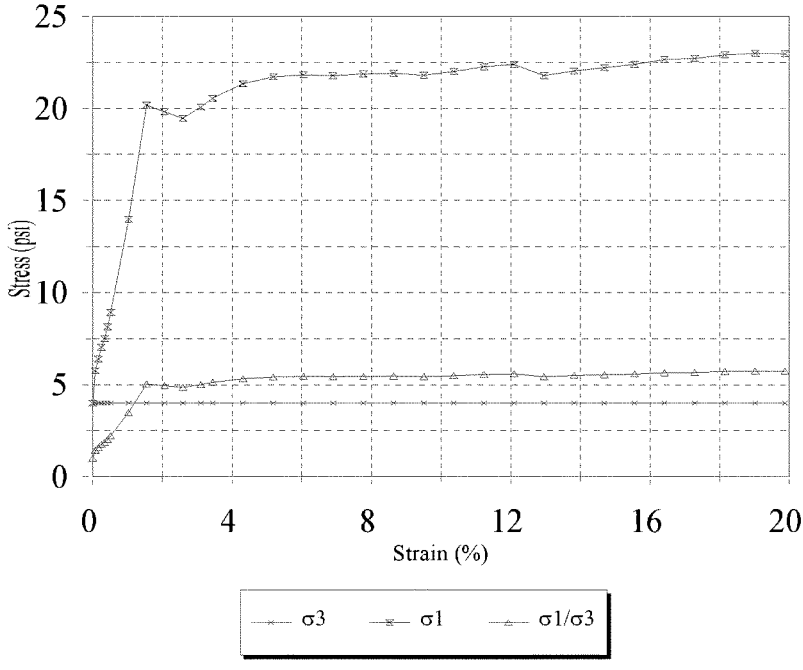
TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039 Point No. : 1
Project County : McCracken Sample Loc. : Boring No. AD - 6A
Project State : Kentucky Sample Depth : 8.0' to 9.5'
Laboratory No. : 09124 Date Tested : 06-25-09
Submitted By : Florence & Hutcheson, Inc. Date Reported : 07-21-09

Final Moisture : 24.2 % Eff. Cons. Stress : 4.01 psi Init.Void Ratio : 0.6880
Final Height : 11.77 cm Total Back Pressure : NA Final Void Ratio : 0.6880
Final Diameter : 8.02 cm Pore Pres. After Sat. : NA Specific Gravity : 2.756
Initial Saturation : 97 % Final Saturation : 97 % Comments : AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

PROJECT NAME : Paducah LFPP Feasibility / Certification Study
PROJECT # : W912QR-06-D-0027, Task Order N **POINT #** : 2
PROJECT COUNTY : McCracken **SAMPLE LOC.** : Boring No. AD - 6A
PROJECT STATE : Kentucky **SAMPLE DEPTH** : 8.0' to 9.5'
LABORATORY # : 09124 **DATE TESTED** : 06-25-09
SUBMITTED BY : Florence & Hutcheson, Inc. **DATE REPORTED** : 07-21-09
SOIL TYPE : Tan, Beige & Brown Lean Clay
WET DENSITY : 126.4 pcf **DELTA HEIGHT** : NA **INITIAL HEIGHT** : 14.58 cm
DRY DENSITY : 100.9 pcf **DELTA VOLUME** : NA **INITIAL DIAMETER** : 7.19 cm
MOISTURE : 25.3 % **CHAMBER PRES.** : 8.02 psi **INIT. PORE PRES.** : NA
RESULTS:

	ε_a	$\sigma 3$ (psi)	$\sigma 1$ (psi)	$\sigma 1 / \sigma 3$
1	0.00	8.02	8.02	1.00
2	0.09	8.02	9.60	1.20
3	0.17	8.02	10.55	1.32
4	0.26	8.02	11.34	1.41
5	0.35	8.02	11.97	1.49
6	0.44	8.02	12.76	1.59
7	0.52	8.02	13.54	1.69
8	1.05	8.02	19.26	2.40
9	1.57	8.02	25.65	3.20
10	2.09	8.02	28.70	3.58
11	2.61	8.02	26.14	3.26
12	3.14	8.02	24.01	3.00
13	3.48	8.02	23.55	2.94
14	4.36	8.02	23.14	2.89
15	5.23	8.02	24.33	3.04
16	6.10	8.02	25.10	3.13
17	6.97	8.02	25.85	3.22
18	7.84	8.02	26.65	3.32
19	8.71	8.02	27.43	3.42
20	9.58	8.02	28.13	3.51
21	10.45	8.02	28.31	3.53
22	11.32	8.02	28.73	3.58
23	12.20	8.02	29.02	3.62
24	13.07	8.02	28.57	3.56
25	13.94	8.02	28.36	3.54
26	14.81	8.02	28.15	3.51
27	15.68	8.02	28.07	3.50
28	16.55	8.02	28.32	3.53
29	17.42	8.02	28.23	3.52
30	18.29	8.02	28.47	3.55
31	19.16	8.02	28.42	3.55
32	20.04	8.02	28.31	3.53

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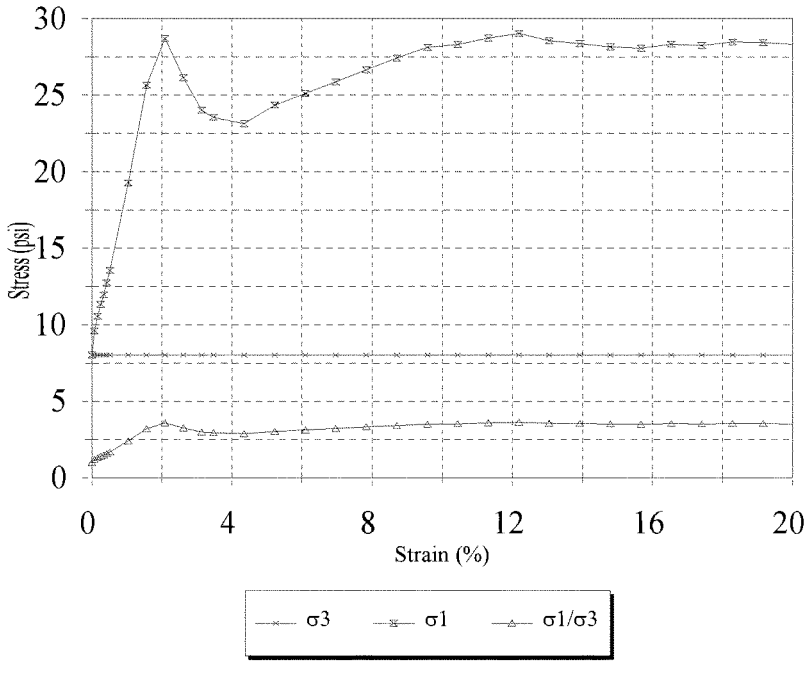
TRIAXIAL COMPRESSION TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order N	**POINT #**	: 2
PROJECT COUNTY	: McCracken	**SAMPLE LOC.**	: Boring No. AD - 6A
PROJECT STATE	: Kentucky	**SAMPLE DEPTH**	: 8.0' to 9.5'
LABORATORY #	: 09124	**DATE TESTED**	: 06-25-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	**DATE REPORTED**	: 07-21-09

FINAL MOISTURE	: 25.3 %	**EFF. CONS. STRESS**	: 8.02 psi	**INIT.VOID RATIO**	: 0.7056
FINAL HEIGHT	: 11.66 cm	**TOTAL BACK PRESSURE**	: NA	**FINAL VOID RATIO**	: 0.7056
FINAL DIAMETER	: 8.04 cm	**PORE PRES. AFTER SAT.**	: NA	**SPECIFIC GRAVITY**	: 2.756
INTIAL SATURATION	: 99 %	**FINAL SATURATION**	: 99 %	**COMMENTS**	: AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

PROJECT NAME : Paducah LFPP Feasibility / Certification Study
PROJECT # : W912QR-06-D-0027, Task Order N **POINT #** : 3
PROJECT COUNTY : McCracken **SAMPLE LOC.** : Boring No. AD - 6A
PROJECT STATE : Kentucky **SAMPLE DEPTH** : 8.0' to 9.5'
LABORATORY # : 09124 **DATE TESTED** : 06-25-09
SUBMITTED BY : Florence & Hutcheson, Inc. **DATE REPORTED** : 07-21-09
SOIL TYPE : Tan, Beige & Brown Lean Clay
WET DENSITY : 124.8 pcf **DELTA HEIGHT** : NA **INITIAL HEIGHT** : 14.67 cm
DRY DENSITY : 98.8 pcf **DELTA VOLUME** : NA **INITIAL DIAMETER** : 7.17 cm
MOISTURE : 26.3 % **CHAMBER PRES.** : 16.02 psi **INIT. PORE PRES.** : NA
RESULTS:

	ε_a	$\sigma 3$ (psi)	$\sigma 1$ (psi)	$\sigma 1 / \sigma 3$
1	0.00	16.02	16.02	1.00
2	0.09	16.02	19.22	1.20
3	0.17	16.02	20.81	1.30
4	0.26	16.02	22.40	1.40
5	0.35	16.02	23.67	1.48
6	0.43	16.02	24.73	1.54
7	0.52	16.02	25.61	1.60
8	1.04	16.02	30.47	1.90
9	1.56	16.02	34.46	2.15
10	2.08	16.02	37.26	2.33
11	2.60	16.02	38.79	2.42
12	3.12	16.02	38.94	2.43
13	3.46	16.02	39.13	2.44
14	4.33	16.02	39.86	2.49
15	5.19	16.02	39.78	2.48
16	6.06	16.02	39.96	2.49
17	6.92	16.02	40.26	2.51
18	7.79	16.02	40.17	2.51
19	8.65	16.02	40.45	2.52
20	9.52	16.02	40.35	2.52
21	10.39	16.02	40.37	2.52
22	11.25	16.02	40.51	2.53
23	12.12	16.02	40.39	2.52
24	12.98	16.02	40.40	2.52
25	13.85	16.02	40.40	2.52
26	14.71	16.02	40.27	2.51
27	15.58	16.02	40.50	2.53
28	16.44	16.02	40.13	2.50
29	17.31	16.02	40.12	2.50
30	18.17	16.02	39.98	2.49
31	19.04	16.02	39.84	2.49
32	19.91	16.02	39.81	2.48

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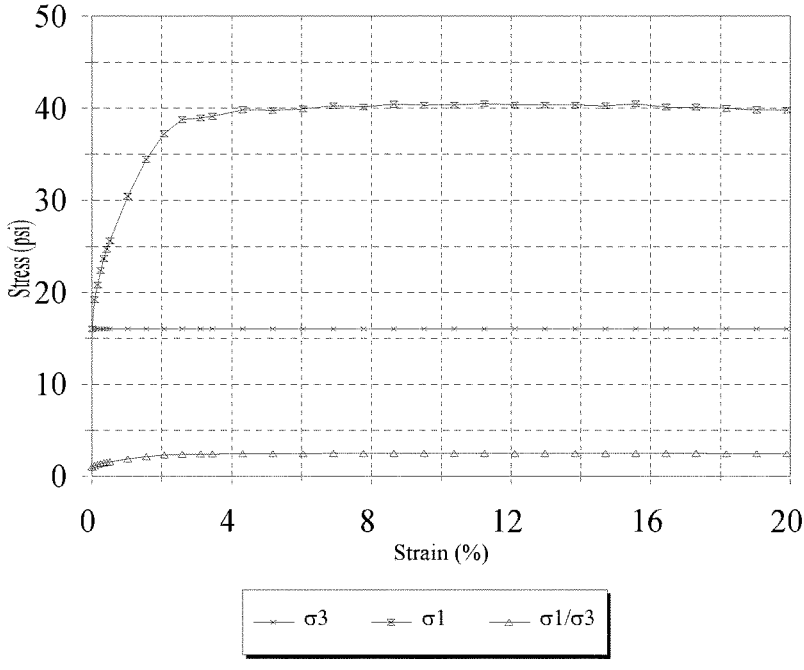
TRIAXIAL COMPRESSION TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order N	**POINT #**	: 3
PROJECT COUNTY	: McCracken	**SAMPLE LOC.**	: Boring No. AD - 6A
PROJECT STATE	: Kentucky	**SAMPLE DEPTH**	: 8.0' to 9.5'
LABORATORY #	: 09124	**DATE TESTED**	: 06-25-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	**DATE REPORTED**	: 07-21-09

FINAL MOISTURE	: 26.3 %	**EFF. CONS. STRESS**	: 16.02 psi	**INIT.VOID RATIO**	: 0.7421
FINAL HEIGHT	: 11.75 cm	**TOTAL BACK PRESSURE**	: NA	**FINAL VOID RATIO**	: 0.7421
FINAL DIAMETER	: 8.01 cm	**PORE PRES. AFTER SAT.**	: NA	**SPECIFIC GRAVITY**	: 2.756
INTIAL SATURATION	: 98 %	**FINAL SATURATION**	: 98 %	**COMMENTS**	: AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Submitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 6A
Sample Depth : 8.0' to 9.5'
Date Tested : 06-25-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

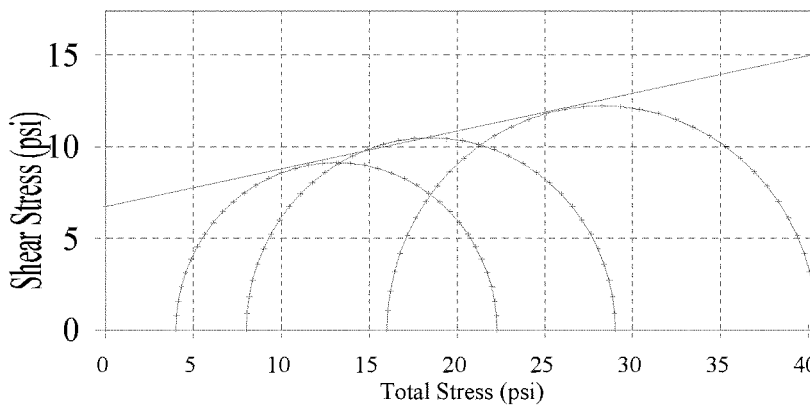
Test	Lateral	Total
1	4.01	22.29
2	8.02	29.02
3	16.02	40.51

Compressive Strength = 2632 psf
Cohesion = 969 psf
Phi = 11.7 deg
Tan (Phi) = 0.2063

At Maximum Deviator Stress

Triaxial Mohr's Circles

Unconsolidated Undrained Triaxial Test



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 1
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Wet Density : 126.8 pcf
Dry Density : 101.6 pcf
Moisture : 24.9 %

Delta Height : 0.14 cm
Delta Volume : 1.70 cc
Chamber Pres. : 49.9 psi

Initial Height : 14.55 cm
Initial Diameter : 7.13 cm
Init. Pore Pres. : 39.97 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	9.93	9.93	1.00	0.00	9.93
2	1.91	0.11	8.03	10.89	1.36	1.43	9.46
3	2.66	0.21	7.27	11.03	1.52	1.88	9.15
4	3.26	0.32	6.67	11.03	1.65	2.18	8.85
5	3.76	0.42	6.17	11.12	1.80	2.47	8.65
6	4.01	0.53	5.92	11.01	1.86	2.55	8.47
7	4.26	0.63	5.67	11.06	1.95	2.69	8.36
8	4.56	0.74	5.37	10.94	2.04	2.78	8.15
9	4.61	0.85	5.32	11.14	2.10	2.91	8.23
10	4.71	0.95	5.22	11.26	2.16	3.02	8.24
11	5.12	1.06	4.82	11.08	2.30	3.13	7.95
12	5.72	2.12	4.22	12.04	2.86	3.91	8.13
13	5.82	3.17	4.12	13.27	3.22	4.58	8.69
14	5.82	4.23	4.12	14.86	3.61	5.37	9.49
15	5.57	5.29	4.37	16.38	3.75	6.01	10.37
16	5.52	6.35	4.42	17.52	3.97	6.55	10.97
17	5.32	7.41	4.62	18.85	4.08	7.12	11.73
18	4.87	8.46	5.07	20.24	3.99	7.59	12.66
19	4.56	9.52	5.37	21.53	4.01	8.08	13.45
20	4.21	10.58	5.72	22.83	3.99	8.56	14.28
21	3.71	11.64	6.22	23.93	3.85	8.85	15.08
22	3.36	12.70	6.57	24.92	3.79	9.18	15.75
23	3.11	13.75	6.82	25.67	3.76	9.42	16.25
24	2.76	14.81	7.17	26.43	3.68	9.63	16.80
25	2.41	15.87	7.53	27.19	3.61	9.83	17.36
26	2.01	16.93	7.93	27.98	3.53	10.03	17.95
27	1.66	17.98	8.28	28.58	3.45	10.15	18.43
28	1.40	19.04	8.53	28.94	3.39	10.21	18.73
29	1.10	20.10	8.83	29.34	3.32	10.26	19.09

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

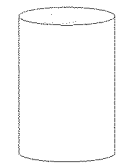
Point No. : 1
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

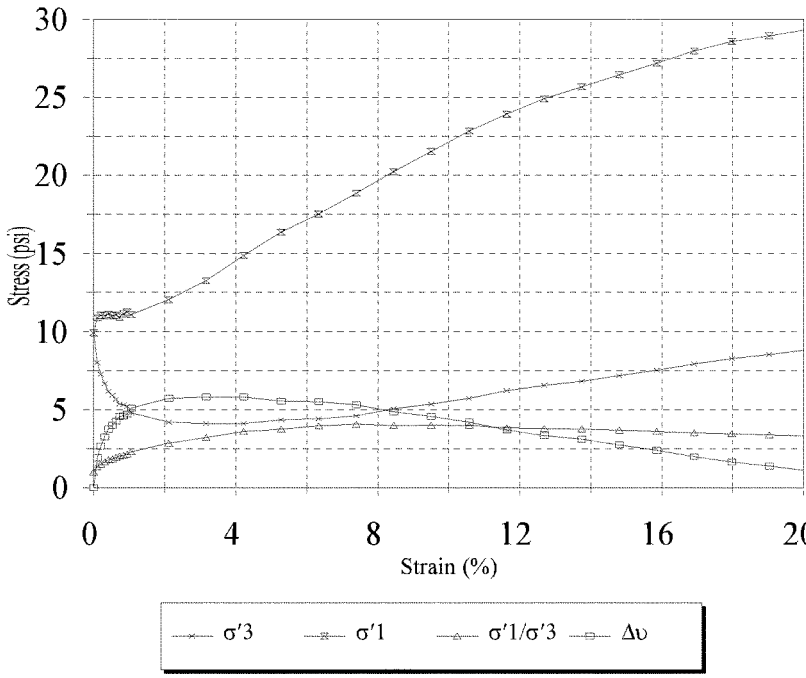
Final Moisture : 24.7 %
Final Height : 13.27 cm
Final Diameter : 7.43 cm
Initial Saturation : 97 %

Eff. Cons. Stress : 9.93 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 40.82 psi
Final Saturation : 99 %

Init. Void Ratio : 0.7118
Final Void Ratio : 0.6947
Specific Gravity : 2.785
COMMENTS : AASHTO T-297

RESULTS:





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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 2
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Wet Density : 126.4 pcf
Dry Density : 99.0 pcf
Moisture : 27.6 %

Delta Height : 0.14 cm
Delta Volume : 23.60 cc
Chamber Pres. : 59.90 psi

Initial Height : 14.51 cm
Initial Diameter : 7.16 cm
Init. Pore Pres. : 40.30 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	19.60	19.60	1.00	0.00	19.60
2	2.80	0.11	16.80	22.55	1.34	2.87	19.67
3	4.60	0.21	15.00	23.03	1.54	4.02	19.02
4	5.60	0.32	14.00	23.49	1.68	4.75	18.74
5	6.50	0.42	13.10	23.37	1.78	5.14	18.23
6	7.10	0.53	12.50	23.55	1.88	5.52	18.02
7	7.60	0.64	12.00	23.67	1.97	5.83	17.83
8	7.90	0.74	11.70	23.98	2.05	6.14	17.84
9	8.26	0.85	11.35	24.09	2.12	6.37	17.72
10	8.61	0.95	11.00	24.12	2.19	6.56	17.56
11	9.01	1.06	10.60	24.18	2.28	6.79	17.39
12	10.06	2.12	9.55	26.30	2.75	8.38	17.92
13	10.01	3.18	9.60	29.10	3.03	9.75	19.35
14	9.91	4.24	9.70	32.49	3.35	11.40	21.09
15	9.36	5.30	10.25	35.19	3.44	12.47	22.72
16	8.76	6.36	10.85	37.89	3.49	13.52	24.37
17	8.16	7.42	11.45	40.39	3.53	14.47	25.92
18	7.15	8.48	12.45	42.39	3.41	14.97	27.42
19	6.35	9.54	13.25	44.19	3.34	15.47	28.72
20	5.60	10.60	14.00	45.90	3.28	15.95	29.95
21	4.90	11.66	14.70	46.96	3.20	16.13	30.83
22	4.20	12.73	15.40	47.81	3.10	16.20	31.60
23	3.65	13.79	15.95	48.55	3.04	16.30	32.25
24	3.10	14.85	16.50	48.83	2.96	16.17	32.67
25	2.50	15.91	17.10	49.16	2.87	16.03	33.13
26	2.20	16.97	17.40	48.99	2.82	15.80	33.20
27	2.00	18.03	17.60	48.73	2.77	15.56	33.16
28	1.75	19.09	17.85	48.20	2.70	15.18	33.03
29	1.75	20.15	17.85	47.68	2.67	14.92	32.77

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

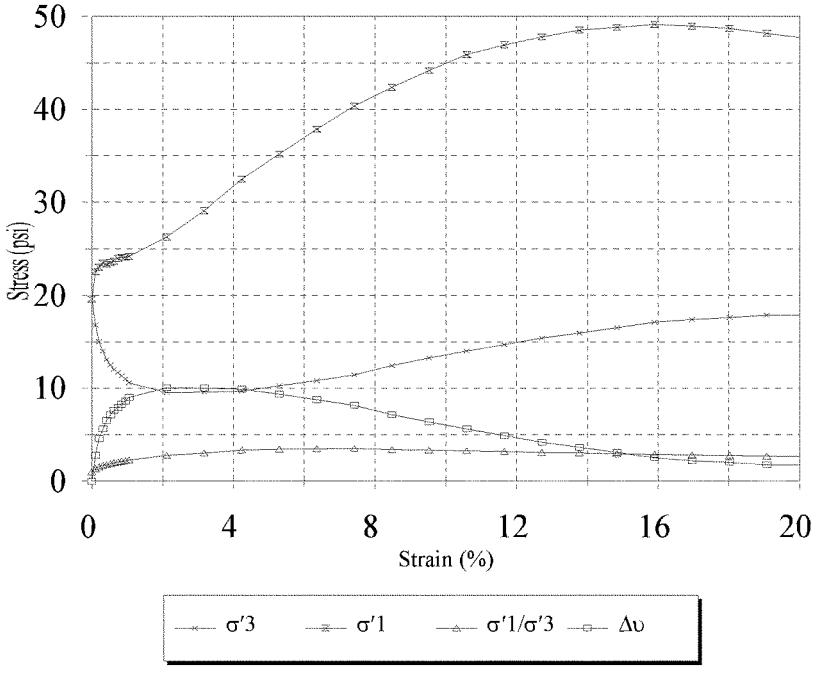
Point No. : 2
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Final Moisture : 25.1 %
Final Height : 13.23 cm
Final Diameter : 7.46 cm
Initial Saturation : 100 %

Eff. Cons. Stress : 19.60 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 40.70 psi
Final Saturation : 95 %

Init. Void Ratio : 0.7553
Final Void Ratio : 0.7381
Specific Gravity : 2.785
COMMENTS : AASHTO T-297

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 3
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Wet Density : 127.9 pcf
Dry Density : 100.7 pcf
Moisture : 27.0 %

Delta Height : 0.29 cm
Delta Volume : 30.70 cc
Chamber Pres. : 79.90 psi

Initial Height : 14.59 cm
Initial Diameter : 7.16 cm
Init. Pore Pres. : 40.73 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	39.17	39.17	1.00	0.00	39.17
2	4.66	0.11	34.51	44.29	1.28	4.89	39.40
3	8.02	0.21	31.16	45.77	1.47	7.31	38.46
4	10.07	0.32	29.10	45.97	1.58	8.44	37.54
5	12.02	0.43	27.15	45.71	1.68	9.28	36.43
6	13.23	0.53	25.95	45.81	1.77	9.93	35.88
7	14.53	0.64	24.64	45.57	1.85	10.46	35.10
8	15.58	0.75	23.59	45.31	1.92	10.86	34.45
9	16.38	0.85	22.79	45.37	1.99	11.29	34.08
10	17.13	0.96	22.04	45.21	2.05	11.59	33.62
11	17.84	1.07	21.34	45.11	2.11	11.89	33.22
12	21.19	2.13	17.98	46.25	2.57	14.14	32.12
13	22.19	3.20	16.98	48.22	2.84	15.62	32.60
14	22.24	4.26	16.93	51.12	3.02	17.10	34.02
15	22.19	5.33	16.98	54.04	3.18	18.53	35.51
16	21.74	6.39	17.43	56.68	3.25	19.63	37.05
17	21.04	7.46	18.13	59.37	3.27	20.62	38.75
18	20.29	8.52	18.88	61.68	3.27	21.40	40.28
19	19.39	9.59	19.78	63.75	3.22	21.99	41.77
20	18.69	10.65	20.48	65.30	3.19	22.41	42.89
21	17.74	11.72	21.44	66.80	3.12	22.68	44.12
22	16.78	12.79	22.39	67.87	3.03	22.74	45.13
23	16.13	13.85	23.04	68.22	2.96	22.59	45.63
24	15.58	14.92	23.59	68.35	2.90	22.38	45.97
25	15.13	15.98	24.04	68.36	2.84	22.16	46.20
26	14.73	17.05	24.44	68.33	2.80	21.94	46.39
27	14.43	18.11	24.74	68.19	2.76	21.72	46.47
28	14.18	19.18	24.99	67.88	2.72	21.44	46.44
29	13.93	20.24	25.24	67.44	2.67	21.10	46.34

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

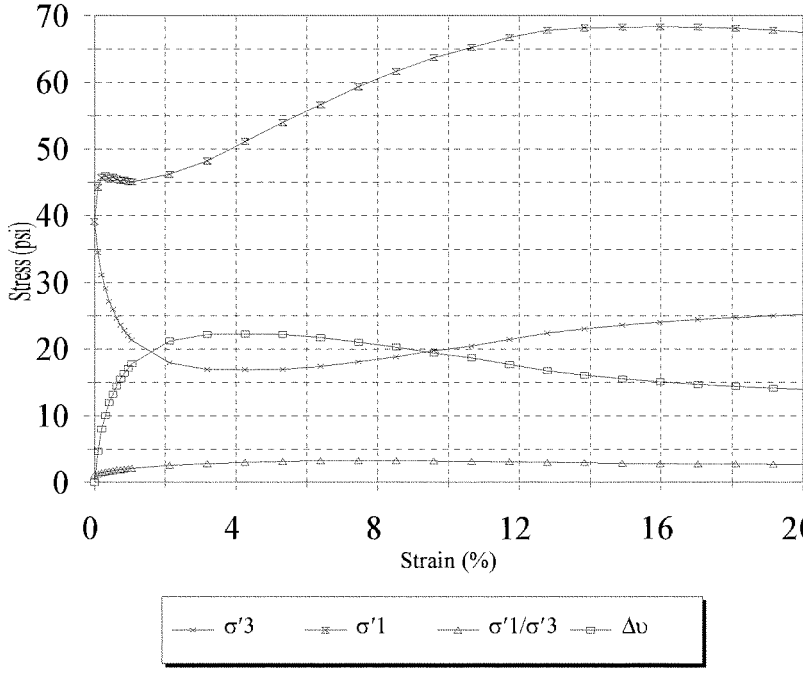
Point No. : 3
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Final Moisture : 23.8 %
Final Height : 13.16 cm
Final Diameter : 7.45 cm
Initial Saturation : 100 %

Eff. Cons. Stress : 39.17 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 40.98 psi
Final Saturation : 96 %

Init. Void Ratio : 0.7266
Final Void Ratio : 0.6926
Specific Gravity : 2.785
COMMENTS : AASHTO T-297

RESULTS:



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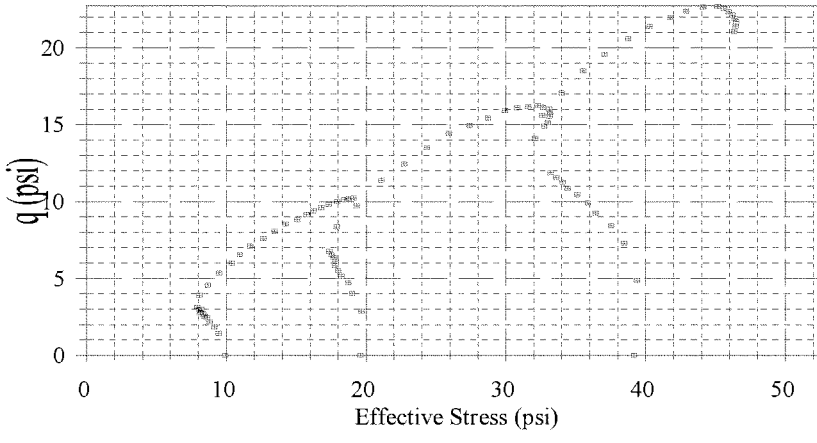
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Triaxial Failure Envelopes

Consolidated Undrained



sin(phi') = tan(alpha)
alpha = _____
phi' = _____

c' = a / cos(phi')
a = _____
c' = _____

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Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

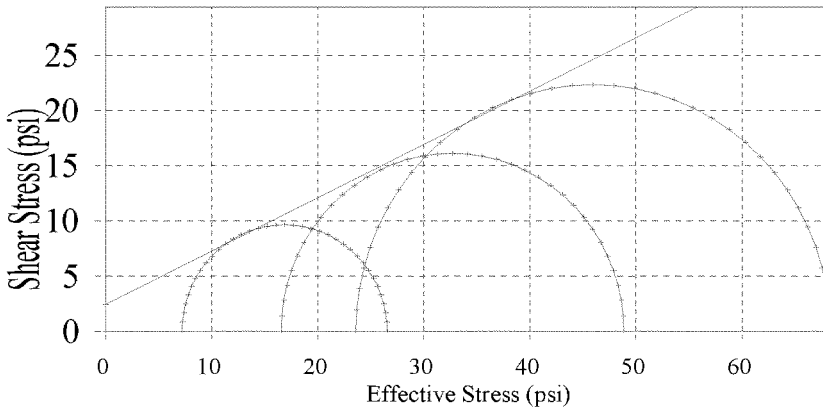
Test	Eff Lateral	Eff Total
1	7.24	26.56
2	16.59	48.88
3	23.63	68.35

Eff Cohesion =	348	psf
Eff Phi =	25.8	deg
Tan (Phi) =	0.4838	

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

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Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

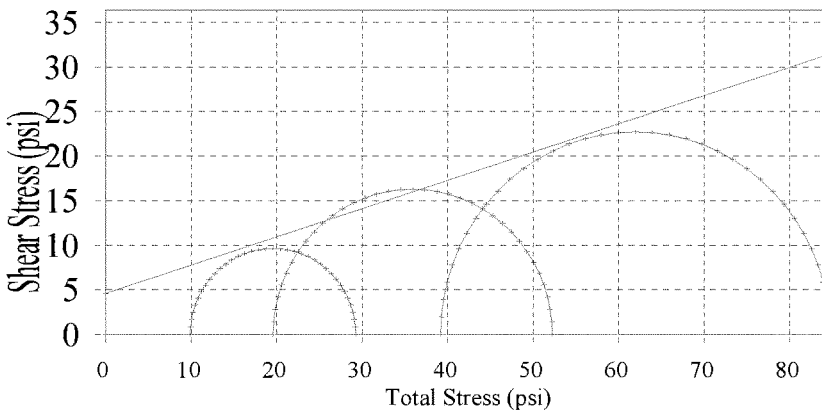
COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

Test	Lateral	Total			
1	9.93	29.26	Cohesion =	663	psf
2	19.60	52.21	Phi =	17.6	deg
3	39.17	84.65	Tan (Phi) =	0.3176	

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



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Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

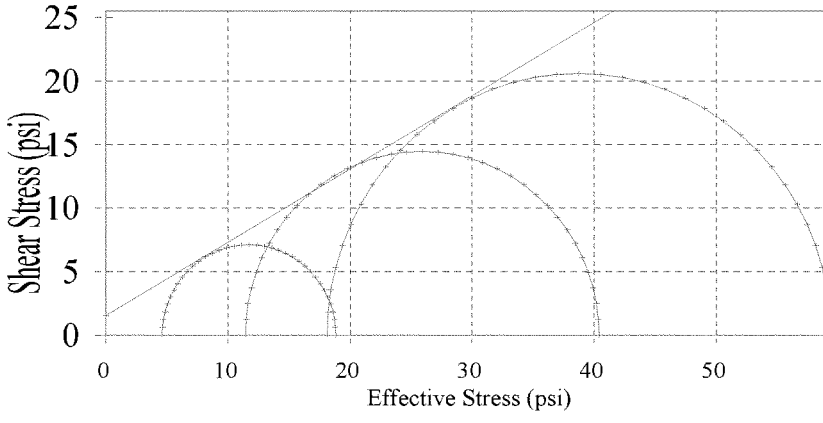
Test	Eff Lateral	Eff Total
1	4.62	18.85
2	11.45	40.39
3	18.13	59.37

Eff Cohesion =	222	psf
Eff Phi =	30.0	deg
Tan (Phi) =	0.5774	

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

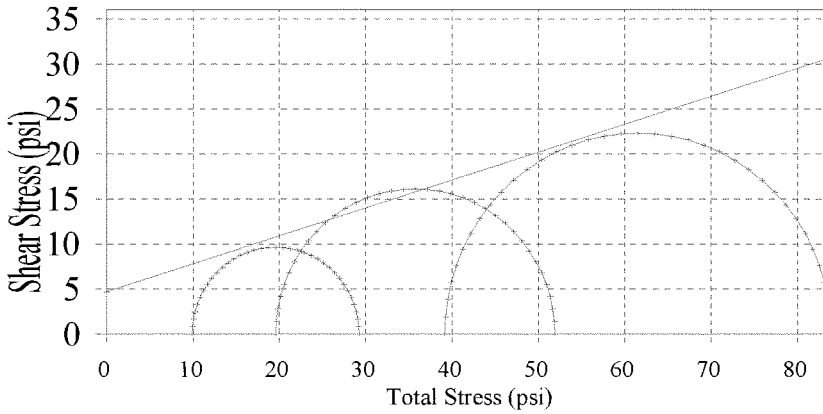
Test	Lateral	Total
1	9.93	29.26
2	19.60	51.90
3	39.17	83.89

Cohesion =	680	psf
Phi =	17.2	deg
Tan (Phi) =	0.3104	

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



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CONSULTING ENGINEERS

PERMEABILITY TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT NO. :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO. :	ST - 1
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Broing No. AD - 6A
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	9.5' to 9.7'
LABORATORY NO. :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-21-09
SOIL TYPE :	Tan, Beige & Brown Lean Clay		

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	40.082 cm^2	Specific Gravity =	2.756
Dry Sample, Ws =	496.9 grams	Wet Weight =	621.7 grams
Height of Specimen, L =	7.489 cm	Diameter of Specimen, D =	7.205 cm

Test 1	Test 2	Test 3	Test 4
Q = 1.10 cm^3	Q = 2.80 cm^3	Q = 5.95 cm^3	Q = 3.25 cm^3
t = 7200 sec.	t = 21600 sec.	t = 50400 sec.	t = 28800 sec.
Rt = 0.8955	Rt = 0.9310	Rt = 0.9599	Rt = 0.9599
h = 162.28 cm	h = 156.99 cm	h = 148.17 cm	h = 137.58 cm
K_{20} = 1.58E-07	K_{20} = 1.44E-07	K_{20} = 1.43E-07	K_{20} = 1.47E-07

Average K_{20} = 1.48E-07 cm/sec.
Dry Density = 103.3 pcf
Moisture = 25.1 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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CONSULTING ENGINEERS

PERMEABILITY TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT NO. :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO. :	ST - 2
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Broing No. AD - 6A
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	22.5' to 23.0'
LABORATORY NO. :	09124	DATE TESTED :	06-24-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-21-09
SOIL TYPE :	Dark Orange & Beige Lean Clay		

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	39.623 cm^2	Specific Gravity =	2.733
Dry Sample, Ws =	933.6 grams	Wet Weight =	1189.5 grams
Height of Specimen, L =	14.368 cm	Diameter of Specimen, D =	7.177 cm

Test 1	Test 2	Test 3	Test 4
Q = 1.30 cm^3	Q = 2.43 cm^3	Q = 9.73 cm^3	Q = 4.30 cm^3
t = 7200 sec.	t = 14400 sec.	t = 61200 sec.	t = 28800 sec.
Rt = 0.9206	Rt = 0.9188	Rt = 0.9488	Rt = 0.9574
h = 305.15 cm	h = 289.28 cm	h = 275.17 cm	h = 262.82 cm
K_{20} = 1.98E-07	K_{20} = 1.94E-07	K_{20} = 1.99E-07	K_{20} = 1.97E-07

Average K_{20} = 1.97E-07 cm/sec.
Dry Density = 102.3 pcf
Moisture = 27.4 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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PERMEABILITY TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT NO. :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO. :	ST - 1
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Broing No. AD - 1
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	6.0' to 6.3'
LABORATORY NO. :	09124	DATE TESTED :	07-10-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-22-09
SOIL TYPE :	Dark Orange & Beige Lean Clay		

K_{20} = (Q x L x Rt)/(h x A x t)

Area of Specimen, A =	40.635 cm^2	Specific Gravity =	2.724
Dry Sample, Ws =	526.6 grams	Wet Weight =	667.9 grams
Height of Specimen, L =	8.229 cm	Diameter of Specimen, D =	7.182 cm

Test 1	Test 2	Test 3	Test 4
Q = 0.20 cm^3	Q = 0.73 cm^3	Q = 0.33 cm^3	Q = 0.15 cm^3
t = 32400 sec.	t = 153000 sec.	t = 66600 sec.	t = 25200 sec.
Rt = 0.9237	Rt = 0.9102	Rt = 0.9090	Rt = 0.9096
h = 276.93 cm	h = 269.88 cm	h = 262.82 cm	h = 264.58 cm
K_{20} = 4.17E-09	K_{20} = 3.24E-09	K_{20} = 3.42E-09	K_{20} = 4.14E-09

Average K_{20} = 3.74E-09 cm/sec.
Dry Density = 98.3 pcf
Moisture = 26.8 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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PERMEABILITY TEST

PROJECT NAME	Paducah LFPP Feasibility / Certification Study		
PROJECT NO.	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO.	ST - 1
PROJECT COUNTY	McCracken	SAMPLE LOC.	Broing No. AD - 3A
PROJECT STATE	Kentucky	SAMPLE DEPTH	5.5' to 6.0'
LABORATORY NO.	09124	DATE TESTED	07-10-09
SUBMITTED BY	Florence & Hutcheson, Inc.	DATE REPORTED	07-22-09
SOIL TYPE	Gray, Tan & Brown Gravelly Lean Clay with Sand		

$$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$$

Area of Specimen, A = 39.625 cm^2 — Specific Gravity = 2.682

Dry Sample, Ws = 753.0 grams — Wet Weight = 934.8 grams

Height of Specimen, L = 11.257 cm — Diameter of Specimen, D = 7.145 cm

Test 1	Test 2	Test 3	Test 4
Q = 1.08 cm^3	Q = 1.50 cm^3	Q = 5.30 cm^3	Q = 1.85 cm^3
t = 39600 sec.	t = 54000 sec.	t = 153000 sec.	t = 66600 sec.
Rt = 0.9421	Rt = 0.9396	Rt = 0.9163	Rt = 0.9188
h = 354.54 cm	h = 351.01 cm	h = 333.38 cm	h = 331.61 cm
K_{20} = 2.05E-08	K_{20} = 2.11E-08	K_{20} = 2.70E-08	K_{20} = 2.19E-08

Average K_{20} = 2.26E-08 cm/sec.
Dry Density = 105.3 pcf
Moisture = 24.1 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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PERMEABILITY TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT NO. :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO. :	ST - 1
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Broing No. AD - 4
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	11.6' to 11.9'
LABORATORY NO. :	09124	DATE TESTED :	07-10-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-22-09
SOIL TYPE :	Gray, Tan & Brown Gravelly Lean Clay with Sand		

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	40.753	cm^2	Specific Gravity =	2.748	
Dry Sample, Ws =	506.1	grams	Wet Weight =	622.4	grams
Height of Specimen, L =	7.467	cm	Diameter of Specimen, D =	7.164	cm

Test 1	Test 2	Test 3	Test 4
Q = 0.88 cm^3	Q = 4.45 cm^3	Q = 1.95 cm^3	Q = 0.78 cm^3
t = 32400 sec.	t = 153000 sec.	t = 66600 sec.	t = 25200 sec.
Rt = 0.9237	Rt = 0.9114	Rt = 0.9127	Rt = 0.9127
h = 215.19 cm	h = 204.61 cm	h = 201.08 cm	h = 201.08 cm
K_{20} = 2.12E-08	K_{20} = 2.37E-08	K_{20} = 2.43E-08	K_{20} = 2.56E-08

Average K_{20} = 2.37E-08 cm/sec.
Dry Density = 103.8 pcf
Moisture = 23.0 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

PERMEABILITY TEST

PROJECT NAME :	Paducah LFPP Feasibility / Certification Study		
PROJECT NO. :	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO. :	ST - 2
PROJECT COUNTY :	McCracken	SAMPLE LOC. :	Broing No. AD - 3A
PROJECT STATE :	Kentucky	SAMPLE DEPTH :	15.5' to 16.0'
LABORATORY NO. :	09124	DATE TESTED :	07-10-09
SUBMITTED BY :	Florence & Hutcheson, Inc.	DATE REPORTED :	07-22-09
SOIL TYPE :	Tan & Gray Lean Clay		

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	39.837 cm^2	Specific Gravity =	2.771
Dry Sample, Ws =	969.2 grams	Wet Weight =	1209.9 grams
Height of Specimen, L =	14.441 cm	Diameter of Specimen, D =	7.145 cm

Test 1	Test 2	Test 3	Test 4
Q = 1.33 cm^3	Q = 0.88 cm^3	Q = 1.25 cm^3	Q = 2.38 cm^3
t = 46800 sec.	t = 36000 sec.	t = 50400 sec.	t = 86400 sec.
Rt = 0.9433	Rt = 0.9445	Rt = 0.9317	Rt = 0.9421
h = 336.90 cm	h = 328.08 cm	h = 322.79 cm	h = 352.78 cm
K_{20} = 2.87E-08	K_{20} = 2.54E-08	K_{20} = 2.59E-08	K_{20} = 2.66E-08

Average K_{20} = 2.67E-08 cm/sec.
Dry Density = 105.1 pcf
Moisture = 24.8 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan & Gray Lean Clay

Point No. : 1
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Wet Density : 130.1 pcf
Dry Density : 104.2 pcf
Moisture : 24.8 %

Delta Height : 0.05 cm
Delta Volume : 12.60 cc
Chamber Pres. : 46.9 psi

Initial Height : 14.49 cm
Initial Diameter : 7.14 cm
Init. Pore Pres. : 43.28 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	3.62	3.62	1.00	0.00	3.62
2	1.35	0.11	2.27	4.73	2.09	1.23	3.50
3	1.55	0.21	2.07	5.38	2.60	1.65	3.72
4	1.65	0.32	1.97	5.73	2.91	1.88	3.85
5	1.65	0.42	1.97	6.27	3.18	2.15	4.12
6	1.70	0.53	1.92	6.59	3.44	2.34	4.26
7	1.75	0.63	1.87	6.85	3.66	2.49	4.36
8	1.85	0.74	1.77	7.05	3.99	2.64	4.41
9	1.85	0.84	1.77	7.35	4.16	2.79	4.56
10	1.95	0.95	1.67	7.62	4.57	2.98	4.64
11	1.90	1.06	1.72	7.82	4.55	3.05	4.77
12	1.70	2.11	1.92	10.00	5.21	4.04	5.96
13	1.30	3.17	2.32	11.92	5.14	4.80	7.12

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

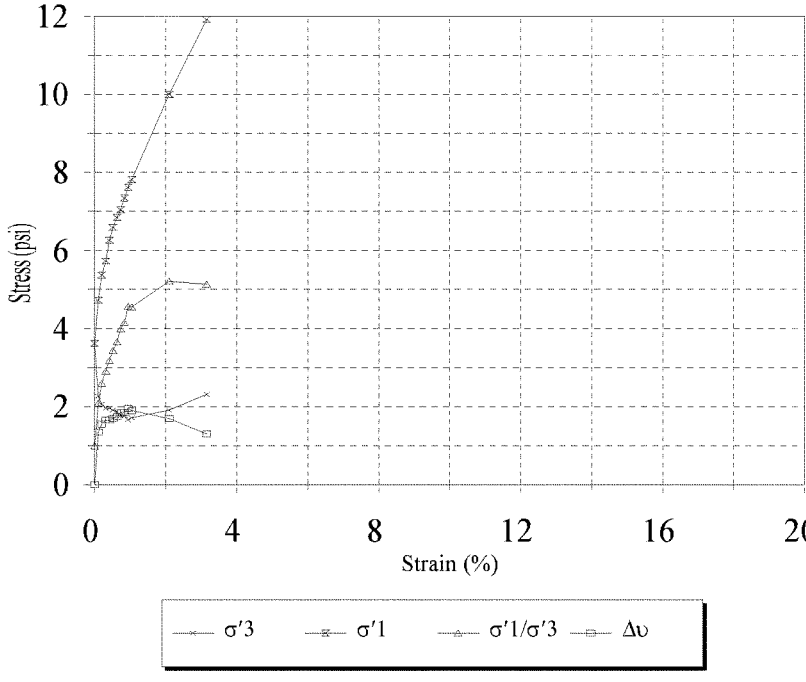
Point No. : 1
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Final Moisture : 23.5 %
Final Height : 14.26 cm
Final Diameter : 7.19 cm
Initial Saturation : 100 %

Eff. Cons. Stress : 3.62 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 41.03 psi
Final Saturation : 100 %

Init. Void Ratio : 0.6605
Final Void Ratio : 0.6552
Specific Gravity : 2.771
COMMENTS : AASHTO T-297

RESULTS:



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CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan & Gray Lean Clay

Point No. : 2
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Wet Density : 130.1 pcf
Dry Density : 104.2 pcf
Moisture : 24.8 %

Delta Height : 0.44 cm
Delta Volume : 23.60 cc
Chamber Pres. : 53.90 psi

Initial Height : 14.49 cm
Initial Diameter : 7.14 cm
Init. Pore Pres. : 40.53 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	3.25	13.38	13.38	1.00	0.00	13.38
2	2.81	3.36	10.57	15.74	1.49	2.59	13.16
3	4.11	3.47	9.27	16.95	1.83	3.84	13.11
4	4.71	3.58	8.67	17.77	2.05	4.55	13.22
5	5.21	3.69	8.17	18.39	2.25	5.11	13.28
6	5.61	3.80	7.76	18.88	2.43	5.56	13.32
7	5.91	3.91	7.46	19.61	2.63	6.07	13.54
8	6.11	4.01	7.26	20.15	2.77	6.44	13.71
9	6.26	4.12	7.11	20.66	2.90	6.77	13.89
10	6.41	4.23	6.96	21.09	3.03	7.06	14.03
11	6.51	4.34	6.86	21.57	3.14	7.35	14.22
12	6.46	5.42	6.91	24.64	3.56	8.86	15.78
13	5.81	6.51	7.56	27.02	3.57	9.73	17.29

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

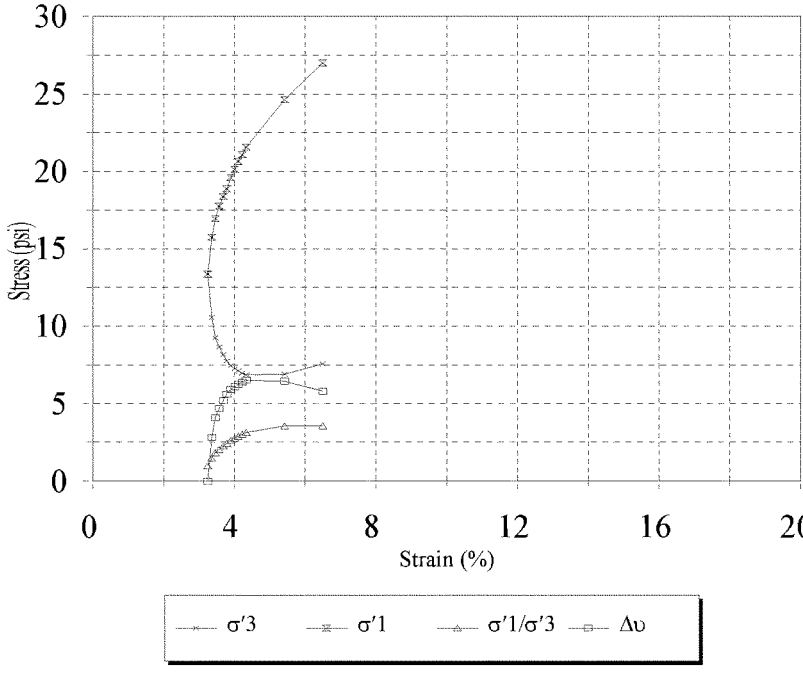
Point No. : 2
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Final Moisture : 22.4 %
Final Height : 13.69 cm
Final Diameter : 7.24 cm
Initial Saturation : 100 %

Eff. Cons. Stress : 13.38 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 41.03 psi
Final Saturation : 100 %

Init. Void Ratio : 0.6605
Final Void Ratio : 0.6104
Specific Gravity : 2.771
COMMENTS : AASHTO T-297

RESULTS:



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CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan & Gray Lean Clay

Point No. : 3
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Wet Density : 130.1 pcf
Dry Density : 104.2 pcf
Moisture : 24.8 %

Delta Height : 0.90 cm
Delta Volume : 33.80 cc
Chamber Pres. : 67.90 psi

Initial Height : 14.49 cm
Initial Diameter : 7.14 cm
Init. Pore Pres. : 40.73 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	6.73	27.17	27.17	1.00	0.00	27.17
2	4.21	6.84	22.97	29.84	1.30	3.44	26.40
3	6.71	6.96	20.46	31.76	1.55	5.65	26.11
4	8.62	7.07	18.56	33.33	1.80	7.39	25.94
5	9.37	7.18	17.80	34.28	1.93	8.24	26.04
6	10.12	7.29	17.05	35.21	2.06	9.08	26.13
7	10.82	7.40	16.35	36.03	2.20	9.84	26.19
8	11.32	7.52	15.85	36.89	2.33	10.52	26.37
9	11.72	7.63	15.45	37.89	2.45	11.22	26.67
10	12.02	7.74	15.15	38.70	2.55	11.77	26.92
11	12.22	7.85	14.95	39.60	2.65	12.33	27.27
12	12.73	8.97	14.45	44.37	3.07	14.96	29.41
13	11.92	10.10	15.25	47.39	3.11	16.07	31.32
14	11.72	11.22	15.45	50.12	3.24	17.33	32.78
15	11.02	12.34	16.15	51.73	3.20	17.79	33.94
16	10.27	13.46	16.90	52.82	3.13	17.96	34.86
17	9.52	14.58	17.65	53.37	3.02	17.86	35.51
18	8.87	15.71	18.31	53.03	2.90	17.36	35.67
19	8.62	16.83	18.56	51.93	2.80	16.69	35.24
20	8.42	17.95	18.76	50.92	2.71	16.08	34.84
21	8.32	19.07	18.86	50.21	2.66	15.68	34.53
22	8.32	20.19	18.86	49.28	2.61	15.21	34.07
23	8.27	21.32	18.91	48.90	2.59	15.00	33.91

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

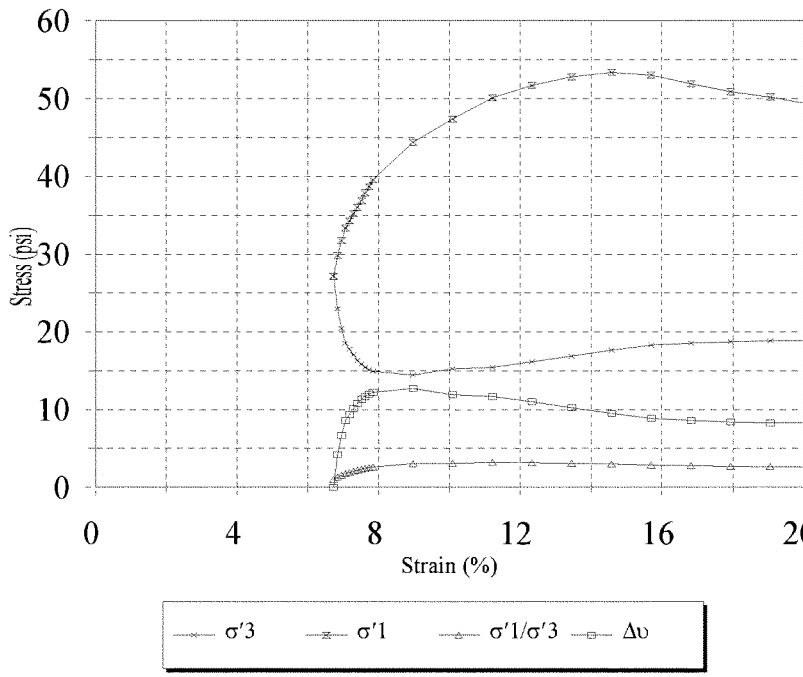
Point No. : 3
Sample Loc. : Boriug No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Final Moisture : 21.3 %
Final Height : 12.44 cm
Final Diameter : 7.44 cm
Initial Saturation : 100 %

Eff. Cons. Stress : 27.17 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 41.03 psi
Final Saturation : 100 %

Init. Void Ratio : 0.6605
Final Void Ratio : 0.5571
Specific Gravity : 2.771
COMMENTS : AASHTO T-297

RESULTS:



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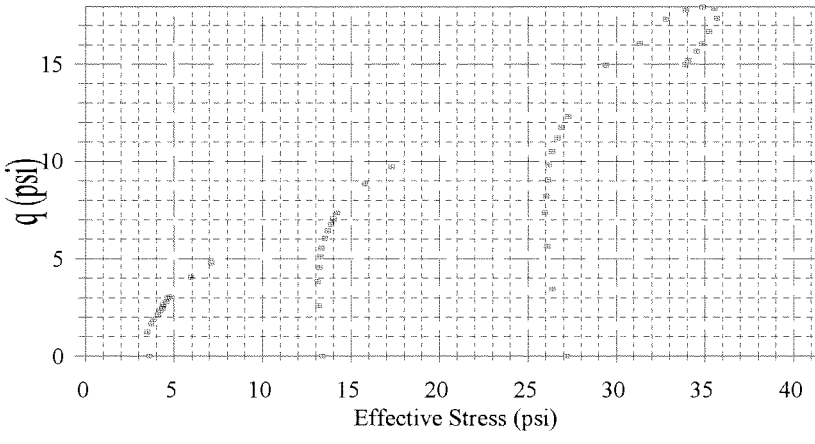
TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Triaxial Failure Envelopes

Consolidated Undrained



sin(phi') = tan(alpha)
alpha = _____
phi' = _____

c' = a / cos(phi')
a = _____
c' = _____

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

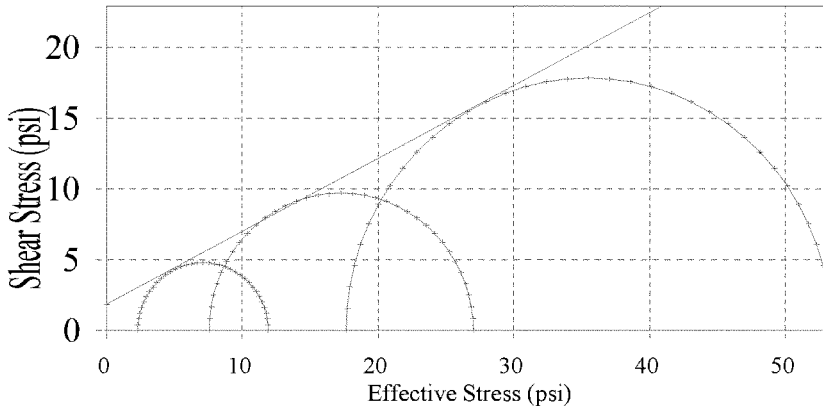
Test	Eff Lateral	Eff Total
1	2.32	11.92
2	7.56	27.02
3	17.65	53.37

Eff Cohesion =	266	psf
Eff Phi =	27.3	deg
Tan (Phi) =	0.5156	

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



APPROVED BY: _____

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

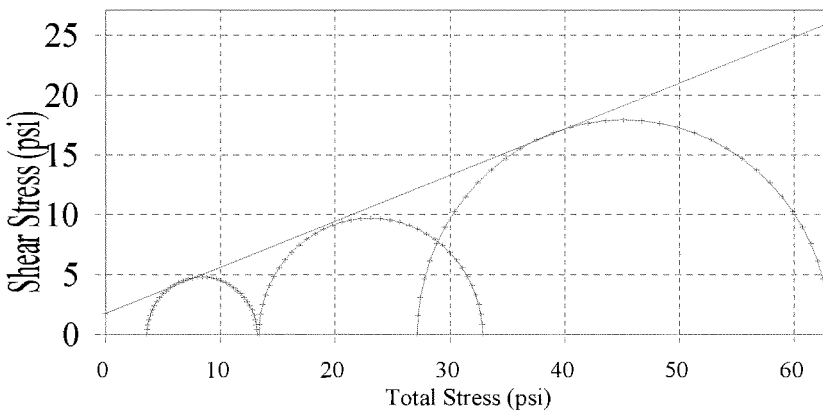
COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

Test	Lateral	Total			
1	3.62	13.22	Cohesion =	253	psf
2	13.38	32.83	Phi =	21.1	deg
3	27.17	63.09	Tan (Phi) =	0.3854	

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

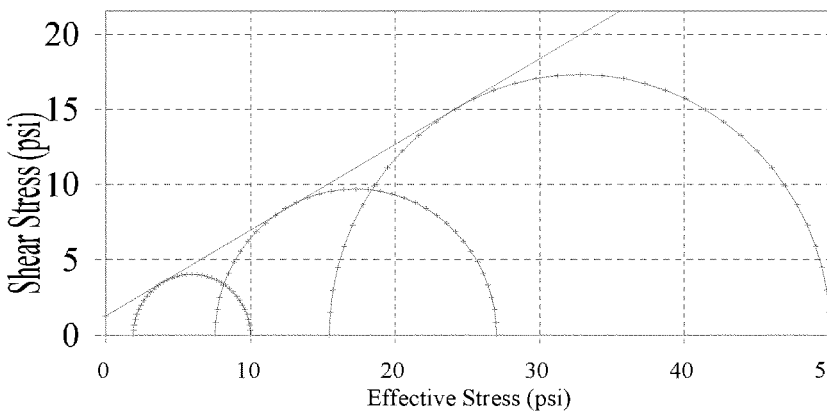
Test	Eff Lateral	Eff Total
1	1.92	10.00
2	7.56	27.02
3	15.45	50.12

Eff Cohesion =	185	psf
Eff Phi =	29.7	deg
Tan (Phi) =	0.5701	

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



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CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

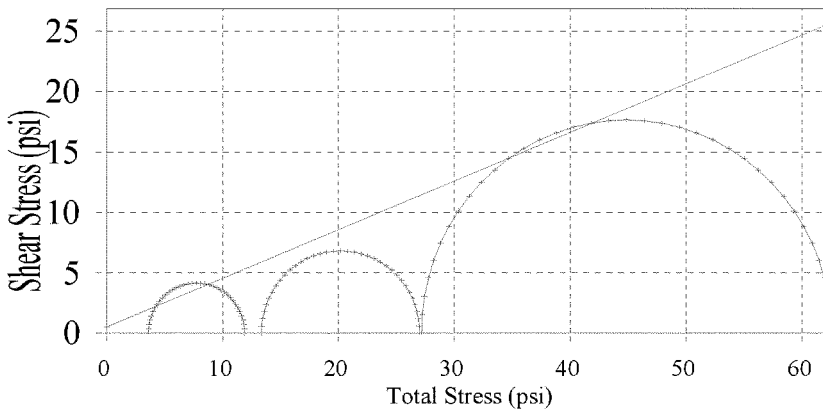
COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

Test	Lateral	Total			
1	3.62	11.92	Cohesion =	73	psf
2	13.38	27.02	Phi =	22.0	deg
3	27.17	62.52	Tan (Phi) =	0.4034	

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



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In Association With
Paducah's Feasibility & Certification
This Is An Adjacent Project's

GEOTECHNICAL EXPLORATION REPORT

OF

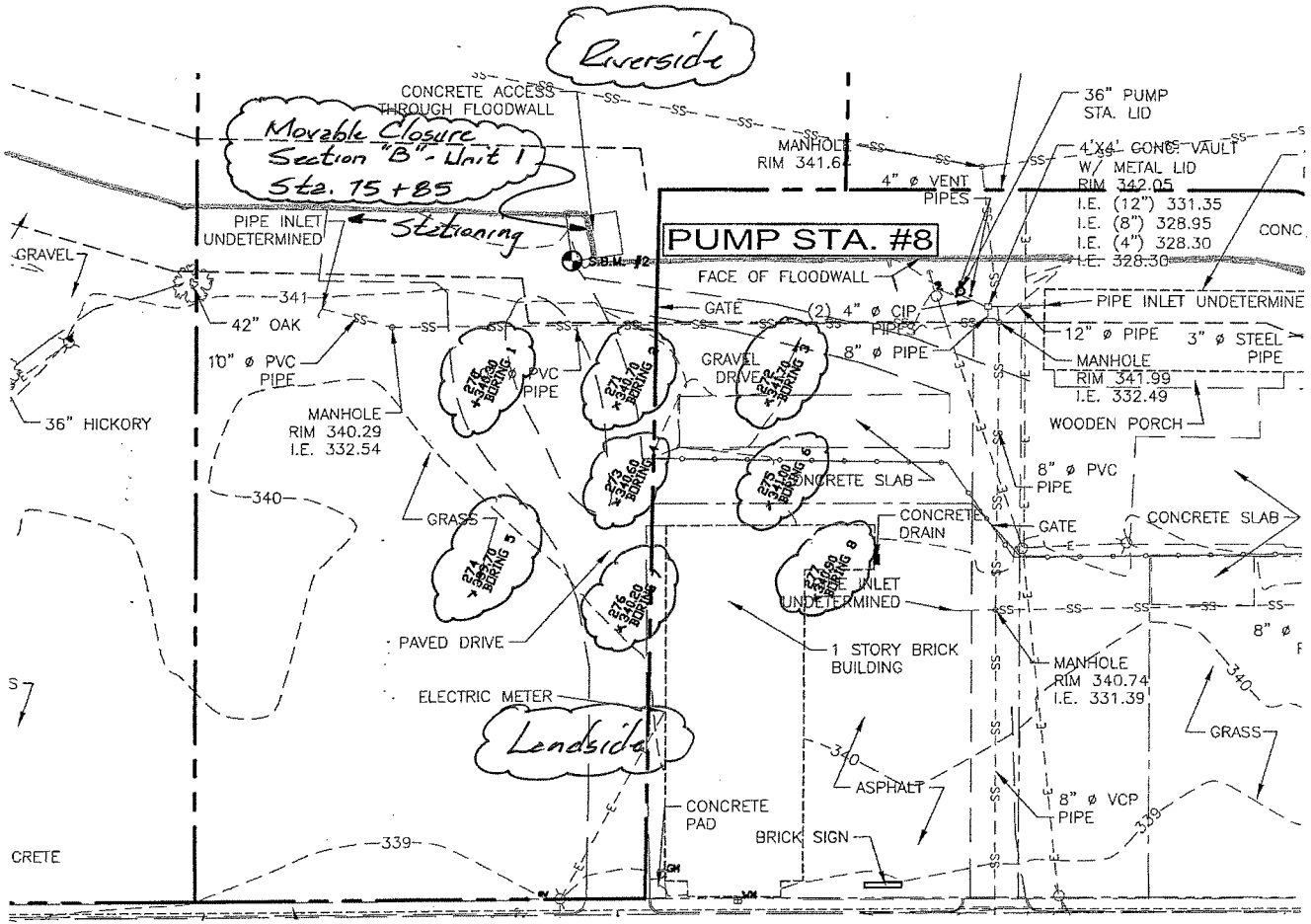
PROPOSED INGRAM OFFICE BUILDING
THIRD STREET
PADUCAH, KENTUCKY

8 Borings, Landside Left
of Movable Closure
Section "B - Unit I"
Sta. 75 +85 +/- (See Appendix B)

Submitted By:

[redacted]

Geotech Engineering & Testing, Inc.


Riverside
Movable Closure
Section "B" - Unit 1
Sta. 75 + 85
Stationing
CONCRETE ACCESS THROUGH FLOODWALL
PIPE INLET UNDETERMINED
GRAVEL
341
42" OAK
10" ø PVC PIPE
36" HICKORY
MANHOLE RIM 340.29 I.E. 332.54
340
GRASS
PAVED DRIVE
ELECTRIC METER
Landside
CRETE
339
S.B.M. #2
PUMP STA. #8
FACE OF FLOODWALL
GATE
(2) 4" ø CIP PIPES
PVC PIPE
GRAVEL DRIVE
CONCRETE SLAB
CONCRETE DRAIN
PIPE INLET UNDETERMINED
1 STORY BRICK BUILDING
CONCRETE PAD
BRICK SIGN
ASPHALT
MANHOLE RIM 341.64
4" ø VENT PIPES
36" PUMP STA. LID
4'X4' CONC. VAULT W/ METAL LID RIM 342.05
I.E. (12") 331.35
I.E. (8") 328.95
I.E. (4") 328.30
I.E. 328.30
PIPE INLET UNDETERMINE
12" ø PIPE
8" ø PIPE
3" ø STEEL PIPE
MANHOLE RIM 341.99 I.E. 332.49
WOODEN PORCH
8" ø PVC PIPE
GATE
CONCRETE SLAB
MANHOLE RIM 340.74 I.E. 331.39
8" ø VCP PIPE
GRASS
340
339
CONC.

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-1**

Project : Proposed Ingram Office Building

Project Location : Paducah, KY

Page 1 of 1

Boring Started : August 24, 2005
Date Completed : August 24, 2005
Surface Elevation : 340

Boring Diameter : 4-1/2 Inch Dia
Drilling Method : Hollow Stem Auger
Sampling Methods : SPT, Hammer

Driller : C. Smith / B. Watkins
Drill Equipment : B-50 Mobile Drill

Sample Type: Split spoon; Shelby Tube; Rock Core
GW @ drilling; GW @ 24 hrs

Depth in Feet	Elev. in Feet	DESCRIPTION	Counts Blows (per 6")	PID Readings (PPM)	Unconfined Strength, (psf)
0	340	ASPHALT: Approximately 2 inches thick.			
		DGA: Approximately 1.0 feet thick.			
		CL: Brown-gray silty CLAY (CL); with dark brown mottling, medium plasticity, stiff in consistency.	6 - 5 - 7		
5	335			107.7	5,351
10	330		3 - 6 - 9		
		Some sand intermixed and interlensing.	3 - 4 - 8		
15	325				
20	320		2 - 5 - 8		
25	315		4 - 8 - 14		
		Sample moist.	2 - 11 - 15		
30	310	Boring terminated @ 30 feet bgs.			
35	305				

Lithology

Standard Penetration Resistance (N-Values) 10 20 30 40

Moisture Content (%) 10 20 30

Qu (tsf) 1 2

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
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SUBSURFACE BORING LOG

Boring No. : **B-2**

Project : Proposed Ingram Office Building

Project Location : Paducah, KY

Boring Started :	August 27, 2005	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith / B. Watkins
Date Completed :	August 27, 2005	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	B-50 Mobile Drill
Surface Elevation :	340	**Sampling Methods :**	SPT, Hammer		

Split spoon; Shelby Tube; Rock Core; GW @ drilling; GW @ 24 hrs

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Counts Blows (per 6")	PID Readings (PPM)	Unconfined Strength, (psf)
0	340		ASPHALT: Approximately 2 inches thick.			
			DGA: Approximately 1.0 feet thick.			
			CL: Brown-gray silty CLAY (CL); with dark brown mottling, medium plasticity, stiff to very stiff in consistency.	5 - 5 - 7		
5	335				101.2	5,576
				4 - 6 - 8		
10	330					
			Brown, with gray silt lineations.	3 - 7 - 9		
15	325					
				3 - 5 - 6		
20	320					
				2 - 6 - 10		
25	315					
			Sample moist.	3 - 5 - 8		
30	310		Boring terminated @ 30 feet bgs.			
35	305					

Lithology

Standard Penetration Resistance (N-Values) 10 20 30 40

Moisture Content (%) 10 20 30

Qu (tsf) 1 2

In Association With The City of Paducah's Feasibility & Certification, This Is An Adjacent Project's

Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

P.O. Box 7267 • Paducah, Kentucky 42002-7267
2550 Irvin Cobb Drive • Paducah, Kentucky 42003

SUBSURFACE INVESTIGATION

FOUR RIVERS CENTER

SITE NO. 2

PADUCAH, KENTUCKY

17 Borings, Landside Left of Movable Closure, Section B-Unit II Sta. 114+98 ±

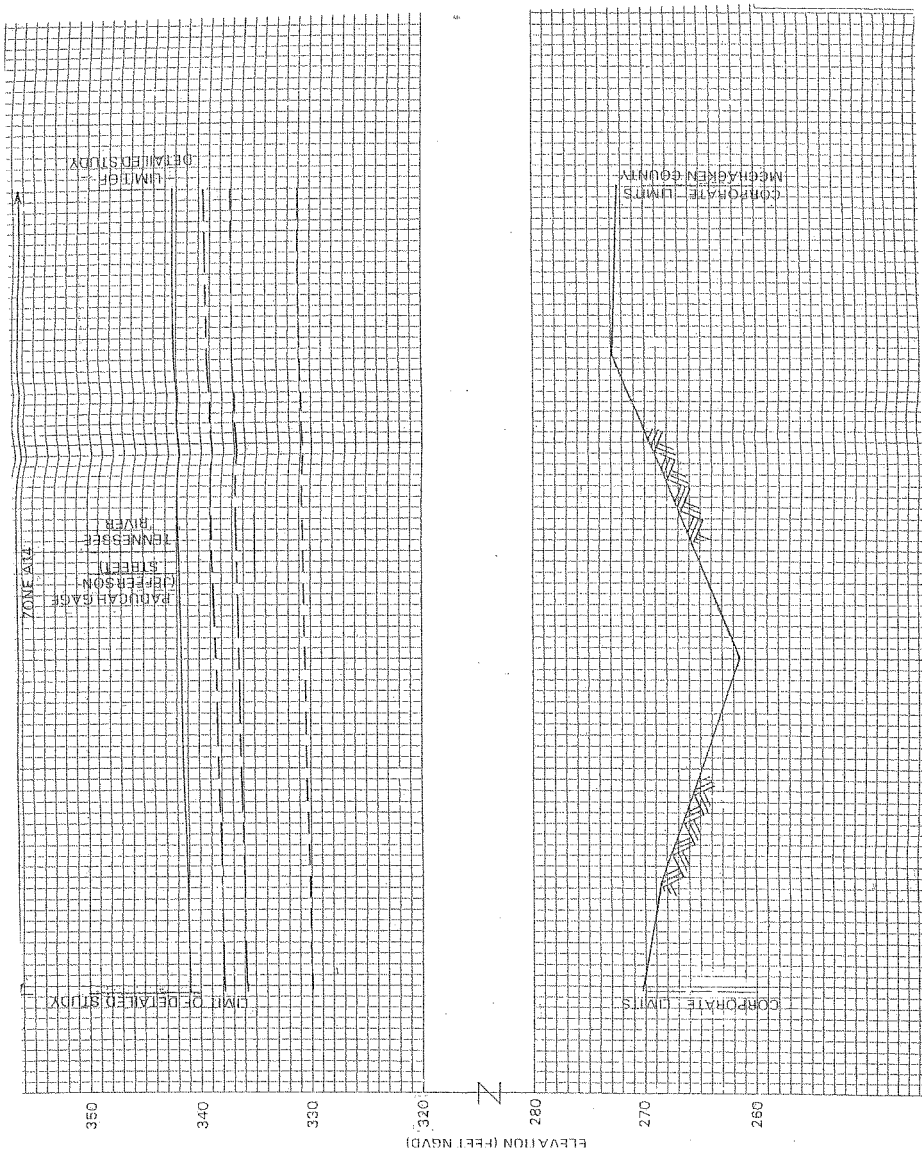
PREPARED BY

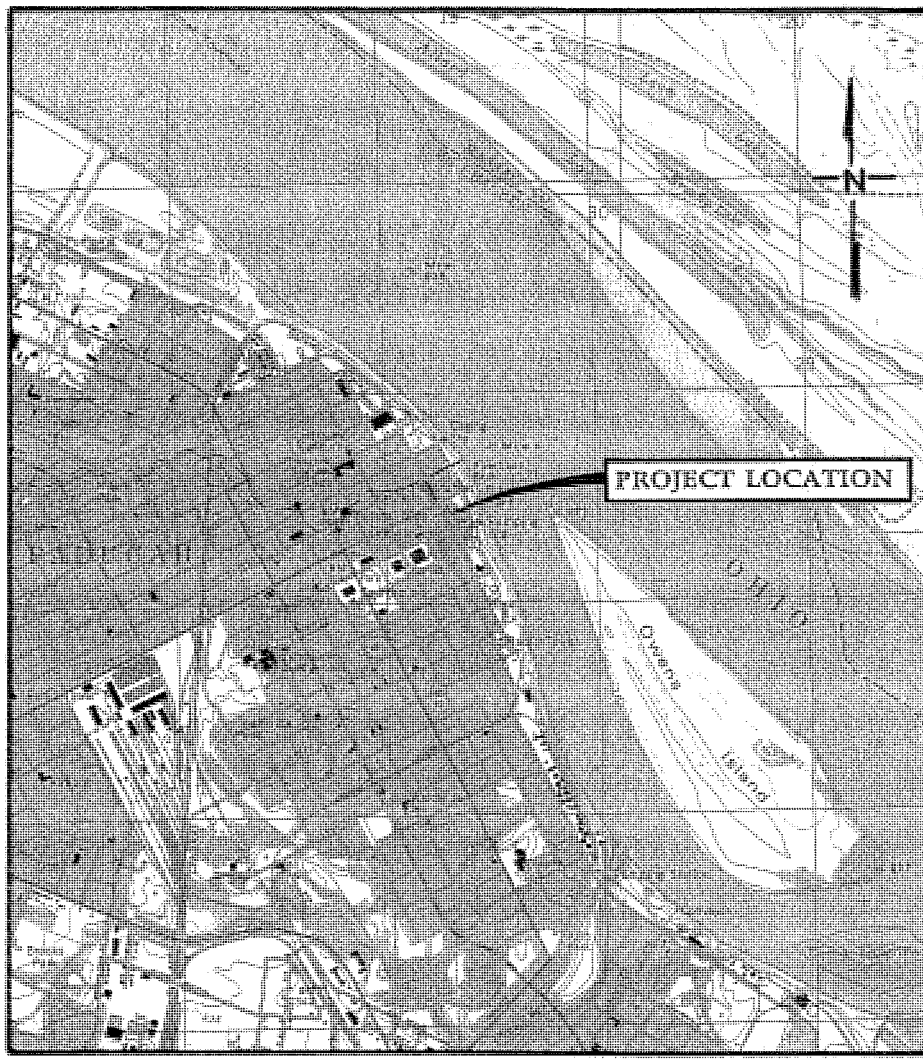
FLORENCE & HUTCHESON, INC.

CONSULTING ENGINEERS

PADUCAH, KENTUCKY

NOVEMBER 1999


CORPORATE LIMITS
CORPORATE LIMITS
MEGHAGEN COUNTY
LIMIT OF DELAYED STUDY
LIMITS OF DELAYED STUDY
PADUCAH GAGE
(JEFFERSON
STREET)
TENNESSEE
RIVER
ZONE A14
A
N
350
340
330
320
280
270
260
ELEVATION (FEET NGVD)



PADUCAH EAST QUADRANGLE
KENTUCKY-ILLINOIS
7.5 MINUTE SERIES (TOPOGRAPHIC) 1-SE
SE/4 PADUCAH 15' QUADRANGLE

FLORENCE
& HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
1	1		SS-1	2.0	3.5	Greenish Gray, Brown & Black Fill, Demolition Debris		25.8
1			SS-2	5.0	6.5	Greenish Gray, Tan & Black Fill, Demolition Debris		25.3
3			ST-1	10.0	11.9	Greenish Gray Lean Clay with Sand		21.3
7			SS-3	15.0	16.5	Light Grayish Tan Lean Clay		19.6
7			SS-4	20.0	21.5	Light Grayish Tan Lean Clay		18.1
9			SS-5	25.0	26.5	Beige & Brown Lean Clay		23.8
9			SS-6	30.0	31.5	Tanish Beige Lean Clay		17.9
11			SS-7	35.0	36.5	Gray, White & Brown Sandy Lean Clay		30.0
12			SS-8	40.0	41.5	Dark Gray & White Lean Clay with Sand		28.4
12			SS-9	45.0	46.5	Dark Brown & Tan Lean Clay with Sand		24.7
13			SS-10	50.0	51.5	White Silty Sand		22.7
13			SS-11	55.0	56.5	White & Tan Silty Sand		22.1
14			SS-12	60.0	61.5	White, Dark Brown & Tan Silt with Sand		20.3
15			SS-13	65.0	66.5	White & Dark Gray Silt with Sand		31.2
15			SS-14	70.0	71.5	White & Dark Gray Silt with Sand		30.2
15			SS-15	75.0	76.5	White & Dark Gray Silt with Sand		23.9
15			SS-16	80.0	81.5	White & Dark Gray Silt with Sand		24.9
15			SS-17	85.0	86.5	White & Dark Gray Silt with Sand		22.2
16			SS-18	90.0	91.5	White & Dark Gray Silty Sand		18.5
16			SS-19	95.0	95.4	White Silty Sand		21.0
17			SS-20	100.0	101.5	White & Dark Gray Silty Sand		26.9
1	2		SS-1	2.0	3.5	Black & Dark Tan Fill, Demolition Debris		29.6
1			SS-2	5.0	6.5	Black & Dark Tan Fill, Demolition Debris		35.6
1			SS-3	10.0	11.5	Black & Brown Fill, Demolition Debris		85.0
3			SS-4	15.0	16.5	Greenish Gray & White Lean Clay with Sand		21.8
9			SS-5	20.0	21.5	Grayish Tan Lean Clay		21.8
9			SS-6	25.0	26.5	Grayish Tan Lean Clay		23.9
1	4		SS-1	2.0	6.5	Black & White Fill, Demolition Debris		23.5
1			ST-1	5.0	5.7	Black, Red, Brown & Etc. Fill, Demolition Debris		25.9
1			ST-1	5.7	6.1	Brown, Tan, Gray & Black Fill, Demolition Debris		24.7
1			SS-2	10.0	11.5	Dark Gray & Greenish Tan Fill, Demolition Debris		28.6
1			SS-3	15.0	16.5	Gray Fill, Demolition Debris		38.4
1			SS-4	20.0	21.5	Beige & Gray Fill, Demolition Debris		26.8
9			SS-5	25.0	26.5	Grayish Tan Lean Clay		25.9
1	5		SS-1	2.0	3.5	Copper & Gray Fill, Demolition Debris		18.2
1			SS-2	5.0	6.5	Dark Brown Roots Fill, Demolition Debris		79.1
1			SS-3	10.0	11.5	Grayish Beige Fill, Demolition Debris		38.5
1			SS-4	15.0	16.5	Copper Fill, Demolition Debris		24.0
1			SS-5	20.0	21.5	Gray & Red Fill, Demolition Debris		25.1
9			SS-6	25.0	26.5	Beige Lean Clay		23.1
9			ST-1	30.0	31.6	Tanish Brown Lean Clay		19.1
11			SS-7	35.0	36.5	Gray, White & Brown Sandy Lean Clay		32.0
12			SS-8	40.0	41.5	White & Dark Gray Lean Clay with Sand		31.9
19			SS-9	45.0	45.8	Brown, Copper & Tan Silty Sand with Gravel		19.7
13			SS-10	50.0	50.4	White Silty Sand		24.3
13			SS-11	55.0	55.5	Yellowish White Silty Sand		21.0
14			SS-12	60.0	61.5	Tan & White Silt with Sand		29.2
15			SS-13	65.0	66.5	White & Dark Gray Silt with Sand		30.6
15			SS-14	70.0	71.5	White & Dark Gray Silt with Sand		27.8
15			SS-15	75.0	76.5	White & Dark Gray Silt with Sand		25.5

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013A

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
20	1A		SS-1	2.0	3.5	Beige & Gray Lean Clay		17.5
20			SS-2	5.0	6.5	Tan & Gray Lean Clay		20.6
21			SS-3	10.0	11.5	Light Tan & Gray Lean Clay		23.7
21			SS-4	15.0	16.5	Light Tan & Copper Lean Clay		21.5
21			SS-5	20.0	21.5	Beige & Copper Lean Clay		19.1
21			SS-6	25.0	26.5	Beige & Copper Lean Clay		20.9
22			SS-7	30.0	31.5	Tan Poorly Graded Gravel with Silt and Sand		15.5
22			SS-8	35.0	36.5	Tan Poorly Graded Gravel with Silt and Sand		17.6
23			SS-9	40.0	41.5	Tan & Copper Sandy Silt		28.0
24			SS-10	45.0	46.5	Tan & Gray Silty Sand		24.6
24			SS-11	50.0	50.5	White & Brown Silty Sand		23.7
24			SS-12	55.0	56.5	White & Tan Silty Sand		18.7
26			SS-13	60.0	61.5	Olive Gray & White Silty Clay with Sand		23.5
26			SS-14	65.0	66.5	Olive Gray & White Silty Clay with Sand		27.2
26			SS-15	70.0	71.5	Olive Gray & White Silty Clay with Sand		26.6
26			SS-16	75.0	76.5	Olive Gray & White Silty Clay with Sand		28.7
26			SS-17	80.0	81.5	Olive Gray & White Silty Clay with Sand		27.1
27			SS-18	85.0	86.5	Olive Gray & White Silty Sand		25.4
27			SS-19	90.0	90.8	Olive Gray & White Silty Sand		20.7
27			SS-20	95.0	95.9	White & Olive Gray Silty Sand		17.8
28			SS-21	100.0	101.4	Olive Gray & White Silt		25.8
20	2A		SS-1	2.0	3.5	Brown & Beige Lean Clay		14.6
20			SS-2	5.0	6.5	Tan & Copper Lean Clay		14.7
21			SS-3	10.0	11.5	Beige Lean Clay		17.5
21			SS-4	15.0	16.5	Beige Lean Clay		20.3
21			ST-1	20.0	21.5	Tanish Beige & Copper Lean Clay		19.5
21			SS-5	25.0	26.5	Tan & Gray Lean Clay		23.3
1	3A		SS-1	2.0	3.5	Tanish Brown & Gray Fill, Demolition Debris		8.6
20			SS-2	5.0	6.5	Gray & Tan Lean Clay		19.2
20			ST-1	10.0	11.6	Tan, Gray & Copper Lean Clay		17.2
21			SS-3	15.0	16.5	Beige & Copper Lean Clay		20.9
21			SS-4	20.0	21.5	Beige & Copper Lean Clay		20.3
21			SS-5	25.0	26.5	Beige & Brown Lean Clay		18.5
1	4A		SS-1	2.0	3.5	Brown & Gray Fill, Demolition Debris		21.1
20			SS-2	5.0	6.5	Beige & Brown Lean Clay		18.9
20			SS-3	10.0	11.5	Tan & Gray Lean Clay		20.5
21			SS-4	15.0	16.5	Beige & Copper Lean Clay		22.5
21			SS-5	20.0	21.5	Tan & Beige Lean Clay		19.3
21			SS-6	25.0	26.5	Beige & Brown Lean Clay		18.9
21			SS-7	30.0	31.5	Tan & Gray Lean Clay		15.6
22			SS-8	35.0	36.5	Tan Poorly Graded Gravel with Silt and Sand		12.9
23			SS-9	40.0	41.5	Gray, Yellow & Copper Sandy Silt		32.3
24			SS-10	45.0	46.3	Tan Silty Sand		22.3
24			SS-11	50.0	51.2	White & Dark Tan Silty Sand		23.2
24			SS-12	55.0	55.8	Tan Silty Sand		19.8
25			SS-13	60.0	61.5	Gray-White & Tan Silt with Sand		29.8
25			SS-14	65.0	66.5	Gray-White & Copper Silt with Sand		28.3
26			SS-15	70.0	71.5	Light Olive Gray, White & Tan Silty Clay with Sand		30.4
26			SS-16	75.0	76.5	Olive Gray & White Silty Clay with Sand		26.7

FLORENCE
& HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013A

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil.	pH	Natural Moisture Content (%)
26			SS-17	80.0	81.5	Olive Gray & White Silty Clay with Sand		25.6
26			SS-18	85.0	86.5	Olive Gray & White Silty Clay with Sand		28.6
27			SS-19	90.0	90.9	White & Olive Gray Silty Sand		23.6
28			SS-20	95.0	96.5	Olive Gray & White Silt		27.6
28			SS-21	100.0	101.5	Olive Gray & White Silt		26.1
20	5A		SS-1	2.5	4.0	Tan, Gray & Copper Lean Clay		21.6
21			SS-2	5.0	6.5	Tan, Gray & Copper Lean Clay		20.5
21			SS-3	10.0	11.5	Tanish Beige & Copper Lean Clay		22.0
21			ST-1	15.0	16.1	Tan, Brown & Copper Lean Clay		22.0
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		21.3
21			SS-5	25.0	26.5	Grayish, Brown & Copper Lean Clay		25.0
20	6A		SS-1	2.0	3.5	Tan, Gray & Copper Lean Clay		19.3
21			SS-2	5.0	6.5	Tan & Copper Lean Clay		19.1
21			SS-3	10.0	11.5	Tanish Beige & Copper Lean Clay		22.2
21			SS-4	15.0	16.5	Beige, Tan & Copper Lean Clay		21.6
21			ST-1	20.0	21.2	Tanish Brown & Copper Lean Clay		18.9
21			SS-5	25.0	26.5	Tanish Beige & Copper Lean Clay		25.5
20	7A		SS-1	2.0	3.5	Tan & Copper Lean Clay		19.9
20			SS-2	5.0	6.5	Tanish Beige & Copper Lean Clay		19.1
21			SS-3	10.0	11.5	Beige Lean Clay		17.6
21			SS-4	15.0	16.5	Beige & Copper Lean Clay		20.6
21			SS-5	20.0	21.5	Beige & Copper Lean Clay		20.3
21			SS-6	25.0	26.5	Beige & Copper Lean Clay		21.1
22			SS-7	30.0	31.5	Tan Poorly Graded Gravel with Silt and Sand		13.4
23			SS-8	35.0	36.5	Olive Gray & White Sandy Silt		33.8
23			SS-9	40.0	41.5	Olive Gray, White, Tan & Brown Sandy Silt		29.3
24			SS-10	45.0	46.5	Yellow, White & Brown Silty Sand		25.7
24			SS-11	50.0	50.8	Yellowish White & Brown Silty Sand		22.4
24			SS-12	55.0	56.4	Yellowish White & Brown Silty Sand		18.4
26			SS-13	60.0	61.5	Olive Gray, White & Tan Silty Clay with Sand		24.5
26			SS-14	65.0	66.5	Olive Gray & White Silty Clay with Sand		26.4
26			SS-15	70.0	71.5	Olive Gray & White Silty Clay with Sand		30.2
26			SS-16	75.0	76.5	Olive Gray & White Silty Clay with Sand		26.3
20	8A		SS-1	2.0	3.5	Beige & Copper Lean Clay		21.7
20			SS-2	5.0	6.5	Greenish Gray & Tan Lean Clay		23.9
21			SS-3	10.0	11.5	Greenish Gray Lean Clay		21.1
21			ST-1	15.0	16.3	Greenish Tan Lean Clay		21.8
21			SS-4	20.0	21.5	Tan & Copper Lean Clay		18.5
21			SS-5	25.0	26.5	Greenish Gray & Brown Lean Clay		26.7
20	9A		SS-1	5.0	6.5	Tan & Copper Lean Clay		19.9
21			SS-2	10.0	11.5	Dark Yellowish Tan Lean Clay		20.4
21			SS-3	15.0	16.5	Dark Yellowish Tan & Copper Lean Clay		21.1
21			SS-4	20.0	21.5	Dark Beige & Copper Lean Clay		16.5
21			SS-5	25.0	26.5	Dark Beige & Copper Lean Clay		22.9
21			SS-6	30.0	31.5	Dark Tan & Copper Lean Clay		22.7
23			SS-7	35.0	36.5	Dark Greenish Gray Sandy Silt		23.0
23			SS-8	40.0	41.5	Olive Gray & White Sandy Silt		31.9
24			SS-9	45.0	46.5	Tan Silty Sand		27.4

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013A

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
24			SS-10	50.0	50.8	Grayish White Silty Sand		26.2
24			SS-11	55.0	56.5	Tanish White Silty Sand		21.6
24			SS-12	60.0	61.5	Tan & White Silty Sand		27.8
26			SS-13	65.0	66.5	Olive Gray & White Silty Clay with Sand		29.2
26			SS-14	70.0	71.5	Olive Gray & White Silty Clay with Sand		26.2
26			SS-15	75.0	76.5	Olive Gray & White Silty Clay with Sand		29.4
20	10A		SS-1	5.0	6.5	Brown & Tan Lean Clay		19.7
21			SS-2	10.0	11.5	Light Tan Lean Clay		21.4
21			SS-3	15.0	16.5	Beige & Brown Lean Clay		22.1
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		19.2
21			SS-5	25.0	26.5	Tanish Beige & Copper Lean Clay		21.8
20	11A		SS-1	5.0	6.5	Tan & Gray Lean Clay		20.7
21			SS-2	10.0	11.5	Tanish Beige & Copper Lean Clay		20.2
21			SS-3	15.0	16.5	Tanish Beige & Copper Lean Clay		22.4
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		20.5
21			SS-5	25.0	26.5	Beige & Brown Lean Clay		21.7
21			SS-6	30.0	31.5	Beige & Copper Lean Clay		22.3
23			SS-7	35.0	36.5	Olive Gray & White Sandy Silt		33.7
23			SS-8	40.0	41.5	Olive Gray & White Sandy Silt		32.2
23			SS-9	45.0	46.5	Olive Gray, White & Tan Sandy Silt		23.7
24			SS-10	50.0	51.0	Dark Yellow Silty Sand		24.6
24			SS-11	55.0	56.5	Yellowish White Silty Sand		19.9
26			SS-12	60.0	61.5	Olive Gray & White Silty Clay with Sand		31.4
26			SS-13	65.0	66.5	Olive Gray & White Silty Clay with Sand		27.2
26			SS-14	70.0	71.5	Olive Gray & White Silty Clay with Sand		31.1
26			SS-15	75.0	76.5	Olive Gray & White Silty Clay with Sand		29.1
20	12A		SS-2	10.0	6.5	Dark Yellowish Tan & Copper Lean Clay		18.0
21			ST-1	15.0	15.5	Tanish Beige & Copper Lean Clay		24.5
21			SS-3	20.0	21.5	Tanish Beige Lean Clay		19.6
21			SS-4	25.0	26.5	Tanish Beige & Copper Lean Clay		21.0
20	13A		SS-1	5.0	6.5	Brown & Gray Lean Clay		20.9
21			SS-2	10.0	11.5	Dark Tan & Copper Lean Clay		21.0
21			SS-3	15.0	16.5	Dark Tan & Copper Lean Clay		20.7
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		19.0
21			SS-5	25.0	26.5	Tanish Beige & Copper Lean Clay		21.3

SOIL CLASSIFICATION

FLORENCE
& HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: ST-1
Project County	: McCracken	Sample Loc.	: Boring No. 1
Project State	: Kentucky	Sample Depth	: 10.0' to 11.9'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Greenish Gray Lean Clay with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	98.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	87.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	83.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 21.3
Maximum Dry Density	: NA	Liquid Limit	: 33
Optimum Moisture	: NA	Plastic Limit	: 19
		Plasticity Index	: 14
AASHTO Composition of Total Sample		Liquidity Index	: 0.16
Gravel (3in. + No.10)	: 1.1	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 11.8	Specific Gravity	: 2.763
Fine Sand (-No.40 + No.200)	: 4.0	AASHTO Classification	: A-6 (11)
Silt + Clay (-No.200)	: 83.1	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 1.1
Medium Sand (-No.10 + No.40)	: 11.8
Fine Sand (-No.40 + No.200)	: 4.0
Silt + Clay (-No.200)	: 83.1

Approved By : SPW

Soil No. 3

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: ST-1
Project County	: McCracken	Sample Loc.	: Boring No. 7
Project State	: Kentucky	Sample Depth	: 15.8' to 17.0'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Tanish Brown Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.7
No.4		4.75	mm	99.4
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.3

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	92.6
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 22.9
Maximum Dry Density	: NA	Liquid Limit	: 33
Optimum Moisture	: NA	Plastic Limit	: 19
		Plasticity Index	: 14
AASHTO Composition of Total Sample		Liquidity Index	: 0.28
Gravel (3in. + No.10)	: 0.7	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 1.7	Specific Gravity	: 2.752
Fine Sand (-No.40 + No.200)	: 5.0	AASHTO Classification	: A-6 (13)
Silt + Clay (-No.200)	: 92.6	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.6
Coarse Sand (-No.4 + No.10)	: 0.1
Medium Sand (-No.10 + No.40)	: 1.7
Fine Sand (-No.40 + No.200)	: 5.0
Silt + Clay (-No.200)	: 92.6

Approved By : SPN

Soil No. 7

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: ST-2
Project County	: McCracken	Sample Loc.	: Boring No. 3
Project State	: Kentucky	Sample Depth	: 25.2' to 26.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Tanish Brown & Gray Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.3
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 21.9
Maximum Dry Density	: NA	Liquid Limit	: 41
Optimum Moisture	: NA	Plastic Limit	: 22
		Plasticity Index	: 19
AASHTO Composition of Total Sample		Liquidity Index	: -0.01
Gravel (3in. + No.10)	: 0.2	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 0.5	Specific Gravity	: 2.722
Fine Sand (-No.40 + No.200)	: 2.2	AASHTO Classification	: A-7-6 (20)
Silt + Clay (-No.200)	: 97.1	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.2
Coarse Sand (-No.4 + No.10)	: 0.0
Medium Sand (-No.10 + No.40)	: 0.5
Fine Sand (-No.40 + No.200)	: 2.2
Silt + Clay (-No.200)	: 97.1

Approved By : SPW

Soil No. 9

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 7 & 8
Project County	: McCracken	Sample Loc.	: Boring No. 13
Project State	: Kentucky	Sample Depth	: 35.0' to 41.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White & Tan Sandy Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	98.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	76.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	62.9
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 30.6
Maximum Dry Density	: NA	Liquid Limit	: 28
Optimum Moisture	: NA	Plastic Limit	: 18
		Plasticity Index	: 10
AASHTO Composition of Total Sample		Liquidity Index	: 1.26
Gravel (3in. + No.10)	: 1.2	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 22.7	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 13.2	AASHTO Classification	: A-4 (4)
Silt + Clay (-No.200)	: 62.9	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 1.2
Medium Sand (-No.10 + No.40)	: 22.7
Fine Sand (-No.40 + No.200)	: 13.2
Silt + Clay (-No.200)	: 62.9

Approved By : SPW

Soil No. 11

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 7 & 8
Project County	: McCracken	Sample Loc.	: Boring No. 3
Project State	: Kentucky	Sample Depth	: 40.0' to 46.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White & Dark Gray Lean Clay with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	95.2
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	90.6

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	86.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	76.8
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 28.7
Maximum Dry Density	: NA	Liquid Limit	: 29
Optimum Moisture	: NA	Plastic Limit	: 21
		Plasticity Index	: 8
AASHTO Composition of Total Sample		Liquidity Index	: 0.96
Gravel (3in. + No.10)	: 9.4	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 4.1	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 9.7	AASHTO Classification	: A-4 (5)
Silt + Clay (-No.200)	: 76.8	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 4.8
Coarse Sand (-No.4 + No.10)	: 4.6
Medium Sand (-No.10 + No.40)	: 4.1
Fine Sand (-No.40 + No.200)	: 9.7
Silt + Clay (-No.200)	: 76.8

Approved By : SPW

Soil No. 12

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 9 thru 12
Project County	: McCracken	Sample Loc.	: Boring No. 13
Project State	: Kentucky	Sample Depth	: 45.0' to 61.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Tan & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.9
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.5

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	96.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	12.6
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.5
Coarse Sand (-No.10 + No.40) : 2.7
Fine Sand (-No.40 + No.200) : 84.2
Silt + Clay (-No.200) : 12.6

Natural Moisture (%) : 23.8
Liquid Limit : NA
Plastic Limit : NA
Plasticity Index : NA
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-2-4 (0) *
ASTM Classification : SM *
* Visual Classsification

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.1
Coarse Sand (-No.4 + No.10) : 0.4
Medium Sand (-No.10 + No.40) : 2.7
Fine Sand (-No.40 + No.200) : 84.2
Silt + Clay (-No.200) : 12.6

Approved By : SPW

Soil No. 13

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 12 & 13
Project County	: McCracken	Sample Loc.	: Boring No. 10
Project State	: Kentucky	Sample Depth	: 60.0' to 66.0'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Gray & Orange Silt with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	71.4
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 28.9
Maximum Dry Density	: NA	Liquid Limit	: 25
Optimum Moisture	: NA	Plastic Limit	: 21
		Plasticity Index	: 4
AASHTO Composition of Total Sample		Liquidity Index	: 1.97
Gravel (3in. + No.10)	: 0.2	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 1.2	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 27.2	AASHTO Classification	: A-4 (1)
Silt + Clay (-No.200)	: 71.4	ASTM Classification	: ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.2
Medium Sand (-No.10 + No.40)	: 1.2
Fine Sand (-No.40 + No.200)	: 27.2
Silt + Clay (-No.200)	: 71.4

Approved By : SPW

Soil No. 14

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 13 thru 17
Project County	: McCracken	Sample Loc.	: Boring No. 1
Project State	: Kentucky	Sample Depth	: 65.0' to 86.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White & Dark Gray Silt with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	74.3
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 26.5
Maximum Dry Density	: NA	Liquid Limit	: 21
Optimum Moisture	: NA	Plastic Limit	: 20
		Plasticity Index	: 1
AASHTO Composition of Total Sample		Liquidity Index	: 6.50
Gravel (3in. + No.10)	: 0.1	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 1.1	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 24.5	AASHTO Classification	: A-4 (0)
Silt + Clay (-No.200)	: 74.3	ASTM Classification	: ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.1
Medium Sand (-No.10 + No.40)	: 1.1
Fine Sand (-No.40 + No.200)	: 24.5
Silt + Clay (-No.200)	: 74.3

Approved By : SPW

Soil No. 15

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 18 & 19
Project County	: McCracken	Sample Loc.	: Boring No. 1
Project State	: Kentucky	Sample Depth	: 90.0' to 95.4'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	98.7
No.4		4.75	mm	97.3
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	96.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	82.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	14.3
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 19.8
Maximum Dry Density	: NA	Liquid Limit	: NA
Optimum Moisture	: NA	Plastic Limit	: NA
		Plasticity Index	: NA
AASHTO Composition of Total Sample		Liquidity Index	: NA
Gravel (3in. + No.10)	: 3.1	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 14.4	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 68.2	AASHTO Classification	: A-2-4 (0) *
Silt + Clay (-No.200)	: 14.3	ASTM Classification	: SM *
		* Visual Classsification	

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 2.7
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 14.4
Fine Sand (-No.40 + No.200)	: 68.2
Silt + Clay (-No.200)	: 14.3

Approved By : SPW

Soil No. 16

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 17 & 18
Project County	: McCracken	Sample Loc.	: Boring No. 13
Project State	: Kentucky	Sample Depth	: 85.0' to 90.8'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Dark Gray & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.6

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	47.8
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 27.2
Maximum Dry Density	: NA	Liquid Limit	: NP
Optimum Moisture	: NA	Plastic Limit	: NP
		Plasticity Index	: NP
AASHTO Composition of Total Sample		Liquidity Index	: NA
Gravel (3in. + No.10)	: 0.4	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 0.5	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 51.3	AASHTO Classification	: A-4 (0)
Silt + Clay (-No.200)	: 47.8	ASTM Classification	: SM

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 0.5
Fine Sand (-No.40 + No.200)	: 51.3
Silt + Clay (-No.200)	: 47.8

Approved By : SPW

Soil No. 17

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 19
Project County	: McCracken	Sample Loc.	: Boring No. 5
Project State	: Kentucky	Sample Depth	: 45.0' to 45.8'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Brown, Copper & Tan Silty Sand with Gravel		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	89.9
3/4	in.	19	mm	84.7
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	81.5
No.4		4.75	mm	77.7
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	73.3

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	69.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	17.5
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 26.7
Coarse Sand (-No.10 + No.40) : 3.8
Fine Sand (-No.40 + No.200) : 52.0
Silt + Clay (-No.200) : 17.5

Natural Moisture (%) : 19.7
Liquid Limit : NA
Plastic Limit : NA
Plasticity Index : NA
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-2-4 (0) *
ASTM Classification : SM *
* Visual Classsification

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 15.3
Fine Gravel (-3/4in. + No.4) : 7.0
Coarse Sand (-No.4 + No.10) : 4.4
Medium Sand (-No.10 + No.40) : 3.8
Fine Sand (-No.40 + No.200) : 52.0
Silt + Clay (-No.200) : 17.5

Approved By : SPW

Soil No. 19

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. 3A
Project State	: Kentucky	Sample Depth	: 10.0' to 11.6'
Laboratory No.	: 99013A	Date Tested	: 10-05-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan, Gray & Copper Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.7

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	87.4
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.3
Coarse Sand (-No.10 + No.40) : 1.9
Fine Sand (-No.40 + No.200) : 10.4
Silt + Clay (-No.200) : 87.4

Natural Moisture (%) : 17.2
Liquid Limit : 24
Plastic Limit : 16
Plasticity Index : 8
Liquidity Index : 0.15
Activity : NA
Specific Gravity : 2.708
AASHTO Classification : A-4 (5)
ASTM Classification : CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.2
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 1.9
Fine Sand (-No.40 + No.200) : 10.4
Silt + Clay (-No.200) : 87.4

Approved By : _____

Soil No. 20

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. 5A
Project State	: Kentucky	Sample Depth	: 15.0' to 16.1'
Laboratory No.	: 99013A	Date Tested	: 10-05-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan, Brown & Copper Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	100.0

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.4
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	92.0
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 1.6
Fine Sand (-No.40 + No.200) : 6.4
Silt + Clay (-No.200) : 92.0

Natural Moisture (%) : 22.0
Liquid Limit : 27
Plastic Limit : 19
Plasticity Index : 8
Liquidity Index : 0.38
Activity : NA

Specific Gravity : 2.736
AASHTO Classification : A-4 (6)
ASTM Classification : CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 1.6
Fine Sand (-No.40 + No.200) : 6.4
Silt + Clay (-No.200) : 92.0

Approved By : _____

Soil No. 21

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 7 & 8
Project County	: McCracken	Sample Loc.	: Boring No. 1A
Project State	: Kentucky	Sample Depth	: 30.0' to 36.5'
Laboratory No.	: 99013A	Date Tested	: 10-05-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan Poorly Graded Gravel with Silt and Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	92.3
3/4	in.	19	mm	88.6
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	66.3
No.4		4.75	mm	41.5
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	28.1

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	18.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	7.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) : 16.6
Liquid Limit : 18
Plastic Limit : 18
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-1-a (0)
ASTM Classification : GP-GM

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 71.9
Coarse Sand (-No.10 + No.40) : 9.9
Fine Sand (-No.40 + No.200) : 11.1
Silt + Clay (-No.200) : 7.1

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 11.4
Fine Gravel (-3/4in. + No.4) : 47.1
Coarse Sand (-No.4 + No.10) : 13.4
Medium Sand (-No.10 + No.40) : 9.9
Fine Sand (-No.40 + No.200) : 11.1
Silt + Clay (-No.200) : 7.1

Approved By : _____

Soil No. 22

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 7, 8 & 9
Project County	: McCracken	Sample Loc.	: Boring No. 11A
Project State	: Kentucky	Sample Depth	: 35.0' to 46.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Sandy Silt		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	98.7
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	95.3

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	88.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	59.3
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 4.7
Coarse Sand (-No.10 + No.40) : 6.8
Fine Sand (-No.40 + No.200) : 29.2
Silt + Clay (-No.200) : 59.3

Natural Moisture (%) : 29.9
Liquid Limit : NP
Plastic Limit : NP
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-4 (0)
ASTM Classification : ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 1.3
Coarse Sand (-No.4 + No.10) : 3.4
Medium Sand (-No.10 + No.40) : 6.8
Fine Sand (-No.40 + No.200) : 29.2
Silt + Clay (-No.200) : 59.3

Approved By : _____

Soil No. 23

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 9 thru 12
Project County	: McCracken	Sample Loc.	: Boring No. 9A
Project State	: Kentucky	Sample Depth	: 45.0' to 61.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	98.5
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	96.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	94.0
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	23.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) : 25.8
Liquid Limit : NP
Plastic Limit : NP
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-2-4 (0)
ASTM Classification : SM

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 3.1
Coarse Sand (-No.10 + No.40) : 2.9
Fine Sand (-No.40 + No.200) : 70.9
Silt + Clay (-No.200) : 23.1

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 1.5
Coarse Sand (-No.4 + No.10) : 1.6
Medium Sand (-No.10 + No.40) : 2.9
Fine Sand (-No.40 + No.200) : 70.9
Silt + Clay (-No.200) : 23.1

Approved By : _____

Soil No. 24

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 13 & 14
Project County	: McCracken	Sample Loc.	: Boring No. 4A
Project State	: Kentucky	Sample Depth	: 60.0' to 66.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Gray - White Silt with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.1

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	95.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	72.2
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.9
Coarse Sand (-No.10 + No.40) : 3.2
Fine Sand (-No.40 + No.200) : 23.7
Silt + Clay (-No.200) : 72.2

Natural Moisture (%) : 29.1
Liquid Limit : 24
Plastic Limit : 23
Plasticity Index : 1
Liquidity Index : 6.10
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-4 (0)
ASTM Classification : ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.9
Medium Sand (-No.10 + No.40) : 3.2
Fine Sand (-No.40 + No.200) : 23.7
Silt + Clay (-No.200) : 72.2

Approved By : _____

Soil No. 25

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 12 thru 15
Project County	: McCracken	Sample Loc.	: Boring No. 11A
Project State	: Kentucky	Sample Depth	: 60.0' to 76.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Silty Clay with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	100.0
3/4	in.	19	mm	94.7
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	94.7
No.4		4.75	mm	94.1
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	92.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	90.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	72.0
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 7.2
Coarse Sand (-No.10 + No.40) : 2.1
Fine Sand (-No.40 + No.200) : 18.7
Silt + Clay (-No.200) : 72.0

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 5.3
Fine Gravel (-3/4in. + No.4) : 0.6
Coarse Sand (-No.4 + No.10) : 1.3
Medium Sand (-No.10 + No.40) : 2.1
Fine Sand (-No.40 + No.200) : 18.7
Silt + Clay (-No.200) : 72.0

Natural Moisture (%) : 29.7
Liquid Limit : 23
Plastic Limit : 18
Plasticity Index : 5
Liquidity Index : 2.34
Activity : NA

Specific Gravity : NA
AASHTO Classification : A-4 (1)
ASTM Classification : CL-ML

Approved By : _____

Soil No. 26

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 18 thru 20
Project County	: McCracken	Sample Loc.	: Boring No. 1A
Project State	: Kentucky	Sample Depth	: 85.0' to 96.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.5
No.4		4.75	mm	99.3
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	98.5

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	87.3
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	30.6
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 1.5
Coarse Sand (-No.10 + No.40) : 11.2
Fine Sand (-No.40 + No.200) : 56.7
Silt + Clay (-No.200) : 30.6

Natural Moisture (%) : 21.3
Liquid Limit : 25
Plastic Limit : 22
Plasticity Index : 3
Liquidity Index : -0.23
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-2-4 (0)
ASTM Classification : SM

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.7
Coarse Sand (-No.4 + No.10) : 0.8
Medium Sand (-No.10 + No.40) : 11.2
Fine Sand (-No.40 + No.200) : 56.7
Silt + Clay (-No.200) : 30.6

Approved By : _____

Soil No. 27

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 20 & 21
Project County	: McCracken	Sample Loc.	: Boring No. 4A
Project State	: Kentucky	Sample Depth	: 95.0' to 101.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Silt.		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.9
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.7

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.8
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.3
Coarse Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 9.4
Silt + Clay (-No.200) : 89.8

Natural Moisture (%) : 26.9
Liquid Limit : 28
Plastic Limit : 23
Plasticity Index : 5
Liquidity Index : 0.78
Activity : NA

Specific Gravity : NA
AASHTO Classification : A-4 (4)
ASTM Classification : ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.1
Coarse Sand (-No.4 + No.10) : 0.2
Medium Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 9.4
Silt + Clay (-No.200) : 89.8

Approved By : _____

Soil No. 28

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 1
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 10.0' to 10.9'
LABORATORY #	: 99013	DATE TESTED	: 03-03-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 03-15-99
SOIL TYPE	: Greenish Gray Lean Clay with Sand		
WET DENSITY	: 130.9 pcf	INITIAL HEIGHT	: 5.82 in
DRY DENSITY	: 107.9 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 21.3 %	PROVING RING	: #22734

RESULTS:

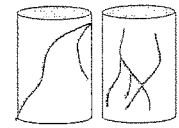
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	26.4	0.04	0.3	0.60
3	38.2	0.04	0.5	0.87
4	48.0	0.04	0.8	1.09
5	59.8	0.04	1.0	1.35
6	71.6	0.04	1.3	1.62
7	83.5	0.04	1.5	1.88
8	94.3	0.04	1.8	2.12
9	103.4	0.04	2.1	2.32
10	110.6	0.04	2.4	2.47
11	115.3	0.04	2.7	2.56
12	116.8	0.05	3.1	2.59
13	115.3	0.05	3.4	2.55
14	110.6	0.05	3.8	2.44
15	105.5	0.05	4.1	2.31
16	98.3	0.05	4.5	2.15

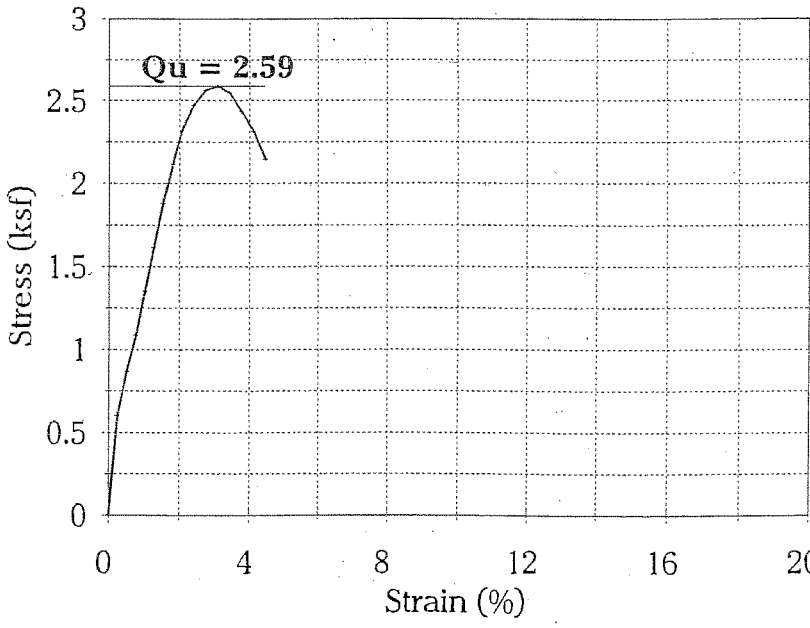
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 1
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 10.0' to 10.9'
LABORATORY #	: 99013	DATE TESTED	: 03-03-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 03-15-99
SOIL TYPE	: Greenish Gray Lean Clay with Sand		
WET DENSITY	: 130.9 pcf	INITIAL HEIGHT	: 5.82 in
DRY DENSITY	: 107.9 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 21.3 %	PROVING RING	: #22734
DEG. OF SAT.	: 98.3 %		
COMMENTS	: AASHTO: T-208		





APPROVED BY: SPW

TRIAXIAL COMPRESSION TEST

FLORENCE HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013	POINT #	: 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 5
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 30.0' to 31.6'
LABORATORY #	: 99013	DATE TESTED	: 03-04-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 03-15-99

SOIL TYPE : Tanish Brown Lean Clay

WET DENSITY	: 134.2 pcf	DELTA HEIGHT	: NA	INITIAL HEIGHT	: 14.73 cm
DRY DENSITY	: 112.6 pcf	DELTA VOLUME	: NA	INITIAL DIAMETER	: 7.18 cm
MOISTURE	: 19.1 %	CHAMBER PRES.	: 15.2 psi	INIT. PORE PRES.	: NA

RESULTS:

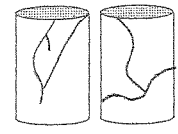
	ε a	σ 3 (psi)	σ 1 (psi)	σ1 / σ3
1	0.00	15.20	15.20	1.00
2	0.09	15.20	17.03	1.12
3	0.17	15.20	17.98	1.18
4	0.26	15.20	18.69	1.23
5	0.34	15.20	19.31	1.27
6	0.43	15.20	19.89	1.31
7	0.52	15.20	20.47	1.35
8	1.03	15.20	23.37	1.54
9	1.55	15.20	26.88	1.77
10	2.07	15.20	29.98	1.97
11	2.59	15.20	32.75	2.15
12	3.10	15.20	35.20	2.32
13	3.45	15.20	36.68	2.41
14	4.31	15.20	39.65	2.61
15	5.17	15.20	41.62	2.74
16	6.03	15.20	43.33	2.85
17	6.90	15.20	44.60	2.93
18	7.76	15.20	45.84	3.02
19	8.62	15.20	46.63	3.07
20	9.48	15.20	47.60	3.13
21	10.34	15.20	48.31	3.18
22	11.21	15.20	48.77	3.21
23	12.07	15.20	49.22	3.24
24	12.93	15.20	49.68	3.27
25	13.79	15.20	49.91	3.28
26	14.66	15.20	50.06	3.29
27	15.52	15.20	50.19	3.30
28	16.38	15.20	50.39	3.32
29	17.24	15.20	50.44	3.32
30	18.10	15.20	50.41	3.32
31	18.97	15.20	50.48	3.32
32	19.83	15.20	50.47	3.32

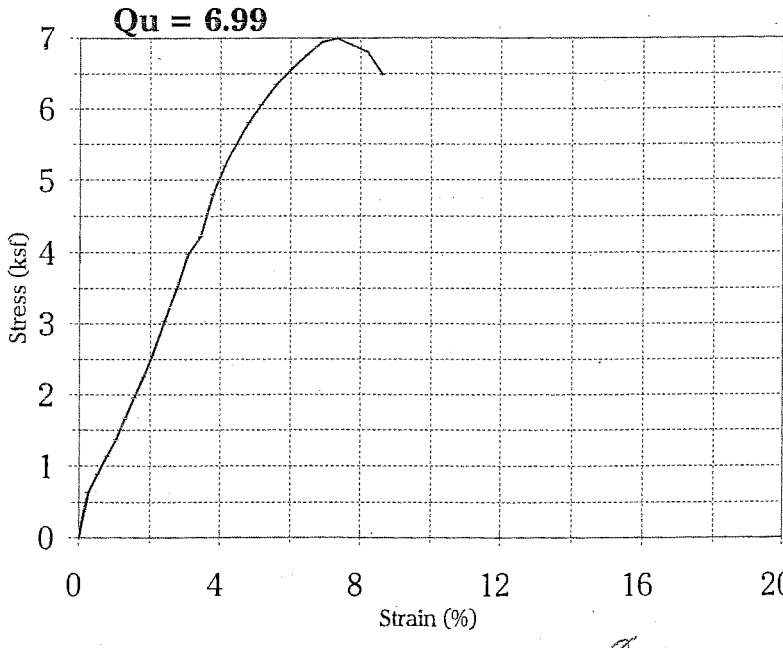
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 3A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 10.0' to 11.6'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Gray & Copper Lean Clay		
WET DENSITY	: 136.2 pcf	INITIAL HEIGHT	: 5.80 in
DRY DENSITY	: 116.2 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 17.2 %	PROVING RING	: #22734
DEG. OF SAT.	: 100.0 %		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 5A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.1'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 129.6 pcf	INITIAL HEIGHT	: 5.83 in
DRY DENSITY	: 106.2 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 22.0 %	PROVING RING	: #22734

RESULTS:

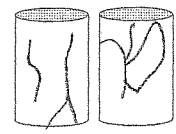
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	19.1	0.04	0.3	0.43
3	26.1	0.04	0.7	0.59
4	34.1	0.04	1.0	0.77
5	43.2	0.04	1.4	0.97
6	53.3	0.04	1.7	1.19
7	63.4	0.04	2.1	1.41
8	75.7	0.05	2.4	1.68
9	86.9	0.05	2.7	1.92
10	98.1	0.05	3.1	2.16
11	107.1	0.05	3.4	2.35
12	118.1	0.05	3.9	2.58
13	127.1	0.05	4.3	2.76
14	135.1	0.05	4.7	2.92
15	141.1	0.05	5.1	3.04
16	143.0	0.05	5.6	3.07
17	144.0	0.05	6.0	3.07
18	140.1	0.05	6.4	2.97
19	132.1	0.05	6.9	2.79
20	126.1	0.05	7.3	2.65

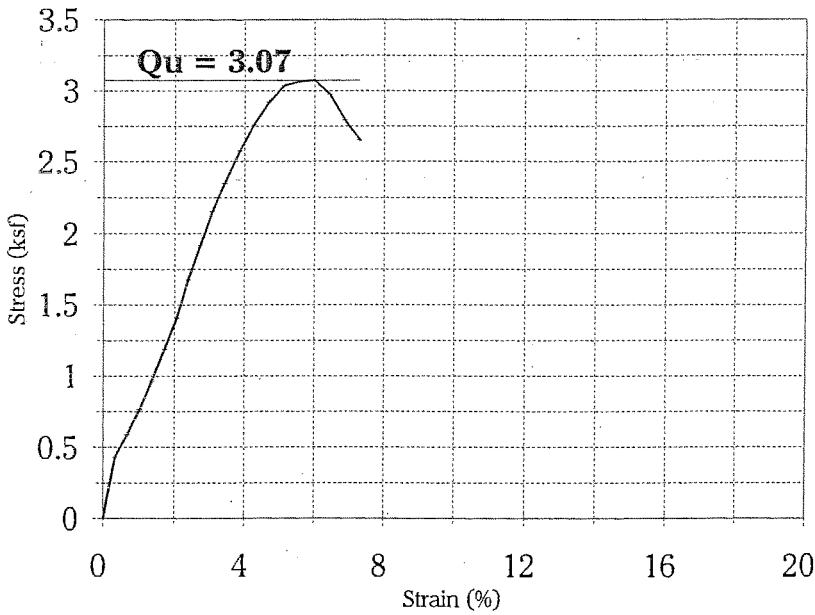
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 5A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.1'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 129.6 pcf	INITIAL HEIGHT	: 5.83 in
DRY DENSITY	: 106.2 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 22.0 %	PROVING RING	: #22734
DEG. OF SAT.	: 98.9 %		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 6A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 20.0' to 21.2'
LABORATORY #	: 99013A	DATE TESTED	: 09-28-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 132.6 pcf	INITIAL HEIGHT	: 5.79 in
DRY DENSITY	: 111.5 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 18.9 %	PROVING RING	: #22734

RESULTS:

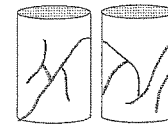
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	22.1	0.04	0.3	0.50
3	30.1	0.04	0.5	0.68
4	37.1	0.04	0.8	0.84
5	44.2	0.04	1.0	0.99
6	51.2	0.04	1.3	1.15
7	58.4	0.04	1.6	1.30
8	66.5	0.04	1.8	1.48
9	74.7	0.05	2.1	1.66
10	87.9	0.05	2.4	1.95
11	95.0	0.05	2.8	2.10
12	106.1	0.05	3.1	2.33
13	116.1	0.05	3.5	2.54
14	124.1	0.05	3.8	2.71
15	134.1	0.05	4.1	2.92
16	143.0	0.05	4.5	3.10
17	151.0	0.05	4.8	3.26
18	157.7	0.05	5.2	3.39
19	167.3	0.05	5.6	3.58
20	176.8	0.05	6.0	3.77
21	184.5	0.05	6.5	3.91
22	192.1	0.05	6.9	4.06
23	199.8	0.05	7.3	4.20
24	206.5	0.05	7.8	4.32
25	212.3	0.05	8.2	4.42
26	220.0	0.05	8.6	4.56
27	230.5	0.05	9.5	4.73
28	239.2	0.05	10.4	4.86
29	243.5	0.05	11.2	4.90
30	244.2	0.05	12.1	4.87
31	242.8	0.05	12.9	4.79
32	239.4	0.05	13.8	4.68

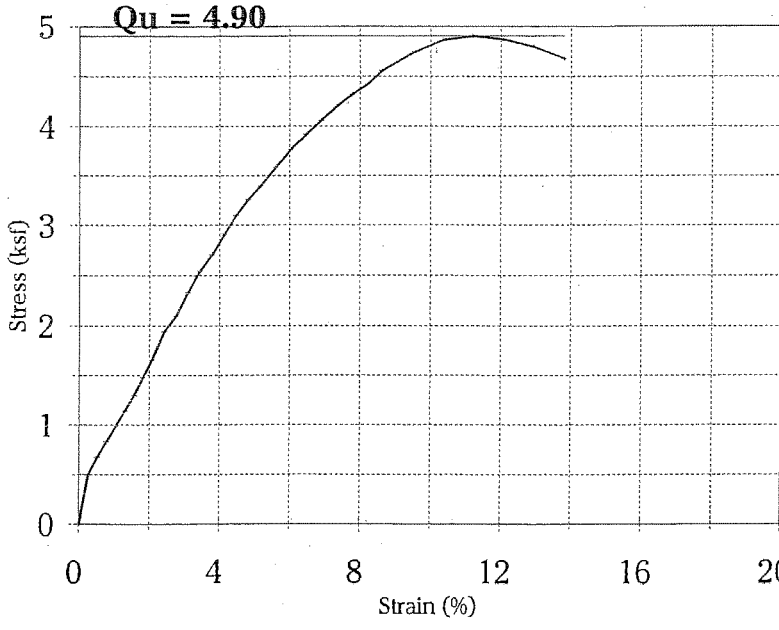
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 6A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 20.0' to 21.2'
LABORATORY #	: 99013A	DATE TESTED	: 09-28-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 132.6 pcf	INITIAL HEIGHT	: 5.79 in
DRY DENSITY	: 111.5 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 18.9 %	PROVING RING	: #22734
DEG. OF SAT.	: NA		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 8A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.3'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Greenish Tan Lean Clay		
WET DENSITY	: 131.0 pcf	INITIAL HEIGHT	: 5.77 in
DRY DENSITY	: 107.6 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 21.8 %	PROVING RING	: #22734

RESULTS:

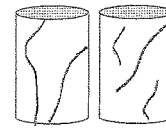
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	23.1	0.04	0.3	0.53
3	32.1	0.04	0.7	0.73
4	41.2	0.04	1.0	0.93
5	50.2	0.04	1.4	1.13
6	61.4	0.04	1.7	1.38
7	71.6	0.04	2.1	1.60
8	83.8	0.04	2.4	1.87
9	95.0	0.05	2.8	2.11
10	105.1	0.05	3.1	2.33
11	115.1	0.05	3.5	2.54
12	126.1	0.05	3.8	2.77
13	135.1	0.05	4.2	2.96
14	144.0	0.05	4.5	3.14
15	152.0	0.05	4.8	3.30
16	159.6	0.05	5.2	3.46
17	168.2	0.05	5.6	3.63
18	176.8	0.05	6.1	3.79
19	184.5	0.05	6.5	3.94
20	191.2	0.05	6.9	4.06
21	197.9	0.05	7.4	4.19
22	202.7	0.05	7.8	4.27
23	208.4	0.05	8.2	4.37
24	213.2	0.05	8.7	4.45
25	220.0	0.05	9.5	4.55
26	220.9	0.05	10.4	4.52
27	216.1	0.05	11.3	4.38
28	206.5	0.05	12.1	4.15

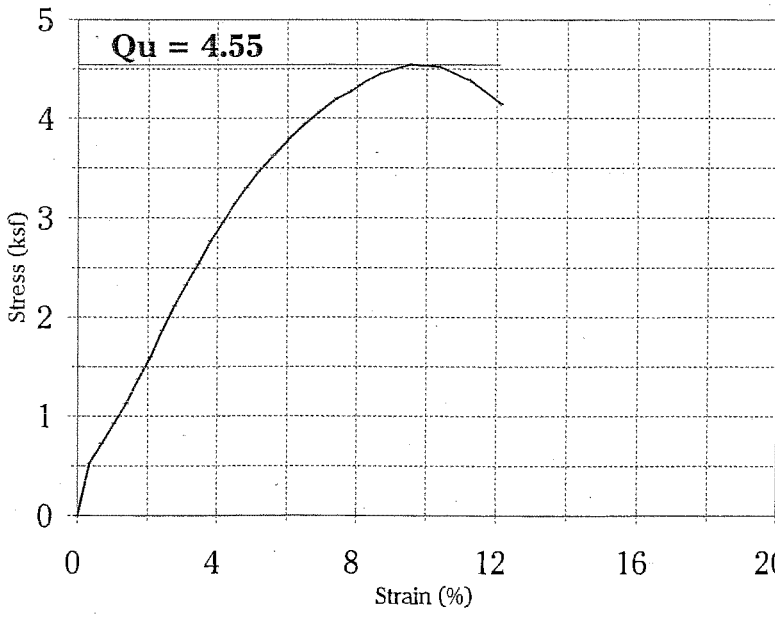
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 8A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.3'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Greenish Tan Lean Clay		
WET DENSITY	: 131.0 pcf	INITIAL HEIGHT	: 5.77 in
DRY DENSITY	: 107.6 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 21.8 %	PROVING RING	: #22734
DEG. OF SAT.	: NA		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 12A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 15.5'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tanish Beige & Copper Lean Clay		
WET DENSITY	: 128.5 pcf	INITIAL HEIGHT	: 5.76 in
DRY DENSITY	: 103.3 pcf	INITIAL DIAMETER	: 2.82 in
MOISTURE	: 24.5 %	PROVING RING	: #22734

RESULTS:

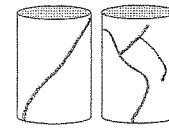
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	20.1	0.04	0.3	0.46
3	28.1	0.04	0.7	0.64
4	37.1	0.04	1.0	0.85
5	45.2	0.04	1.4	1.03
6	55.3	0.04	1.7	1.25
7	63.4	0.04	2.1	1.43
8	74.7	0.04	2.4	1.68
9	84.8	0.04	2.8	1.90
10	94.0	0.04	3.1	2.10
11	104.1	0.05	3.5	2.31
12	117.1	0.05	3.9	2.59
13	129.1	0.05	4.3	2.84
14	142.1	0.05	4.8	3.11
15	151.0	0.05	5.2	3.29
16	160.6	0.05	5.6	3.49
17	170.2	0.05	6.1	3.68
18	178.8	0.05	6.5	3.85
19	186.4	0.05	6.9	3.99
20	192.1	0.05	7.4	4.09
21	197.9	0.05	7.8	4.20
22	201.7	0.05	8.3	4.26
23	205.6	0.05	8.7	4.32
24	208.4	0.05	9.6	4.34
25	207.5	0.05	10.4	4.28
26	197.9	0.05	11.3	4.04
27	172.1	0.05	12.2	3.48

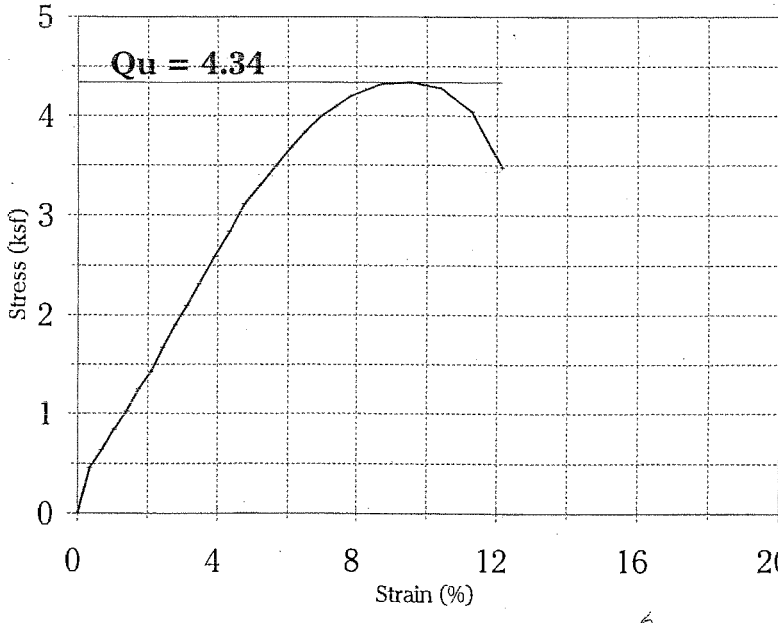
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 12A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 15.5'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tanish Beige & Copper Lean Clay		
WET DENSITY	: 128.5 pcf	INITIAL HEIGHT	: 5.76 in
DRY DENSITY	: 103.3 pcf	INITIAL DIAMETER	: 2.82 in
MOISTURE	: 24.5 %	PROVING RING	: #22734
DEG. OF SAT.	: NA		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

CONSOLIDATION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 3A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 10.25' to 10.50'
LABORATORY #	: 99013A	DATE TESTED	: 09-28-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Gray & Copper Lean Clay		
COMMENTS	: AASHTO: T-216		

SAMPLE DATA

Initial Saturation	: 95.5	Final Saturation	: 100.0
Initial Void Ratio	: 0.4934	Final Void Ratio	: 0.4437
Initial Dial Reading	: 0.1600 in.	Final Dial Reading	: 0.2009 in.
		Dry wt. of Soil	: 143.87 gms.
Intial Sample Vol.	: 79.339 cm^3	Ht. of Solids	: 1.6795 cm
Initial Ht. of Voids	: 0.8287 cm	Spec. Gravity	: 2.708

Computations for Void Ratio and Coeff. of Consolidation

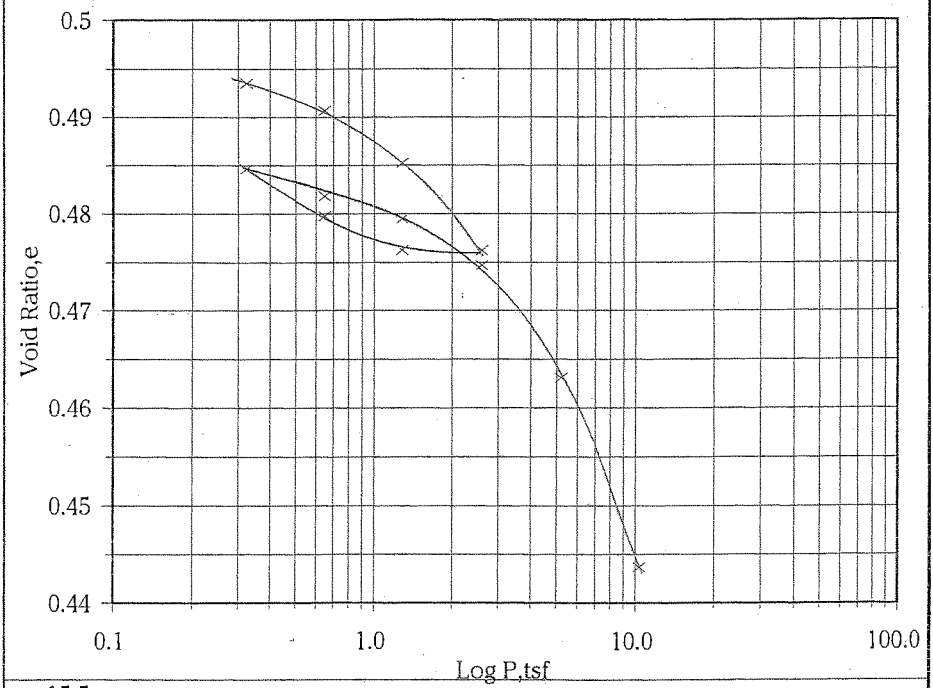
Load, tsf	Corrected Def. Dial Reading at End of Load, in.	Inst. Void Ratio e	Average Ht. for Load, in.	Hc in.	Time for 90% Consol., min.	Coef. of Consol. Cv, ft^2/Day
0.324	0.1599	0.4935	0.9875	0.4938	0.141	14.66
0.649	0.1618	0.4907	0.9866	0.4933	0.147	14.04
1.294	0.1654	0.4853	0.9839	0.4920	0.134	15.32
2.599	0.1714	0.4762	0.9791	0.4896	0.149	13.64
0.649	0.1690	0.4798	0.9773	0.4887		
1.294	0.1713	0.4763	0.9773	0.4887		
2.599	0.1724	0.4747	0.9757	0.4878		
5.217	0.1801	0.4631	0.9713	0.4856	0.147	13.61
10.423	0.1929	0.4437	0.9610	0.4805	0.146	13.41
1.294	0.1692	0.4795	0.9665	0.4832		
0.649	0.1677	0.4818	0.9791	0.4895		
0.324	0.1658	0.4846	0.9808	0.4904		

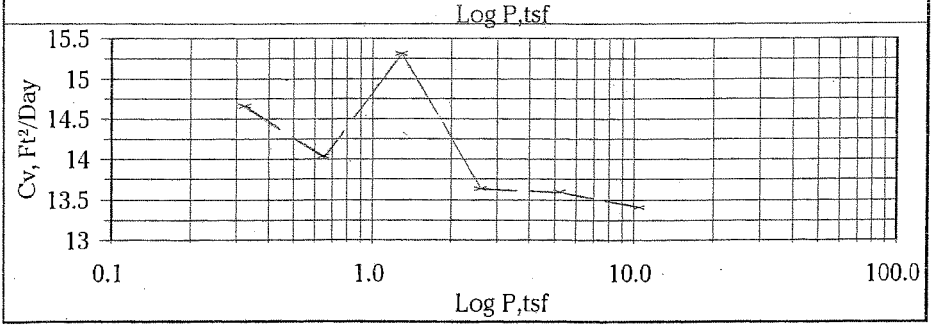
CONSOLIDATION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013A	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 3A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	10.25' to 10.50'
LABORATORY #	:	99013A	DATE TESTED	:	09-28-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	10-08-99
SOIL TYPE	:	Tan, Gray & Copper Lean Clay	APPROVED BY	:	
COMMENTS	:	AASHTO: T-216			





CONSOLIDATION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 5A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.25' to 15.50'
LABORATORY #	: 99013A	DATE TESTED	: 09-28-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
COMMENTS	: AASHTO: T-216		

SAMPLE DATA

Initial Saturation	: 98.1	Final Saturation	: 100.0
Initial Void Ratio	: 0.6092	Final Void Ratio	: 0.5290
Initial Dial Reading	: 0.1600 in.	Final Dial Reading	: 0.2173 in.
		Dry wt. of Soil	: 135.18 gms.
Intial Sample Vol.	: 79.508 cm^3	Ht. of Solids	: 1.5626 cm
Initial Ht. of Voids	: 0.9520 cm	Spec. Gravity	: 2.736

Computations for Void Ratio and Coeff. of Consolidation

Load, tsf	Corrected Def. Dial Reading at End of Load, in.	Inst. Void Ratio e	Average Ht. for Load, in.	Hc in.	Time for 90% Consol., min.	Coef. of Consol. Cv, ft^2/Day
0.324	0.1641	0.6025	0.9880	0.4940	0.134	15.44
0.648	0.1679	0.5964	0.9840	0.4920	0.172	11.93
1.296	0.1730	0.5880	0.9795	0.4898	0.160	12.71
2.603	0.1794	0.5776	0.9738	0.4869	0.169	11.89
0.648	0.1785	0.5791	0.9710	0.4855		
1.296	0.1793	0.5778	0.9711	0.4855		
2.603	0.1804	0.5760	0.9701	0.4851		
5.212	0.1885	0.5630	0.9656	0.4828	0.181	10.92
10.451	0.2094	0.5290	0.9511	0.4756	0.538	3.56
1.296	0.1775	0.5807	0.9566	0.4783		
0.648	0.1772	0.5812	0.9726	0.4863		
0.324	0.1746	0.5855	0.9741	0.4870		

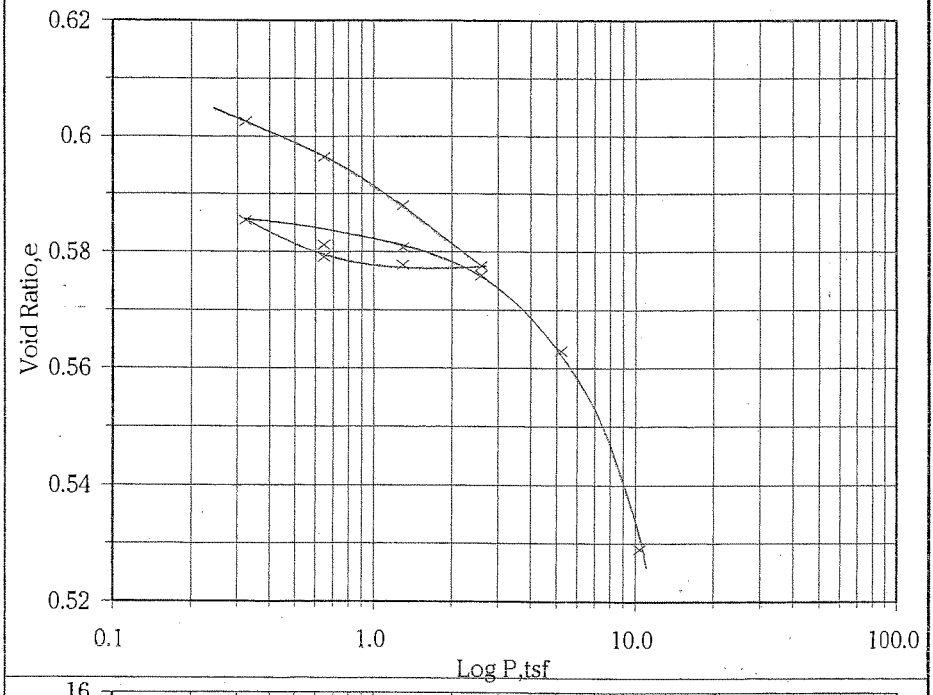
CONSOLIDATION TEST

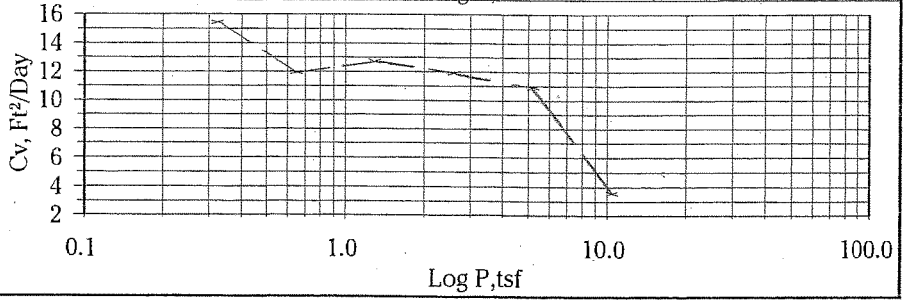
FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Page 2 of 2

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013A	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 5A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	15.25' to 15.50'
LABORATORY #	:	99013A	DATE TESTED	:	09-28-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	10-08-99
SOIL TYPE	:	Tan, Brown & Copper Lean Clay	APPROVED BY	:	
COMMENTS	:	AASHTO: T-216			





In Association With
Paducah's Feasibility & Certification
This Is An Adjacent Project's

GEOTECHNICAL EXPLORATION REPORT

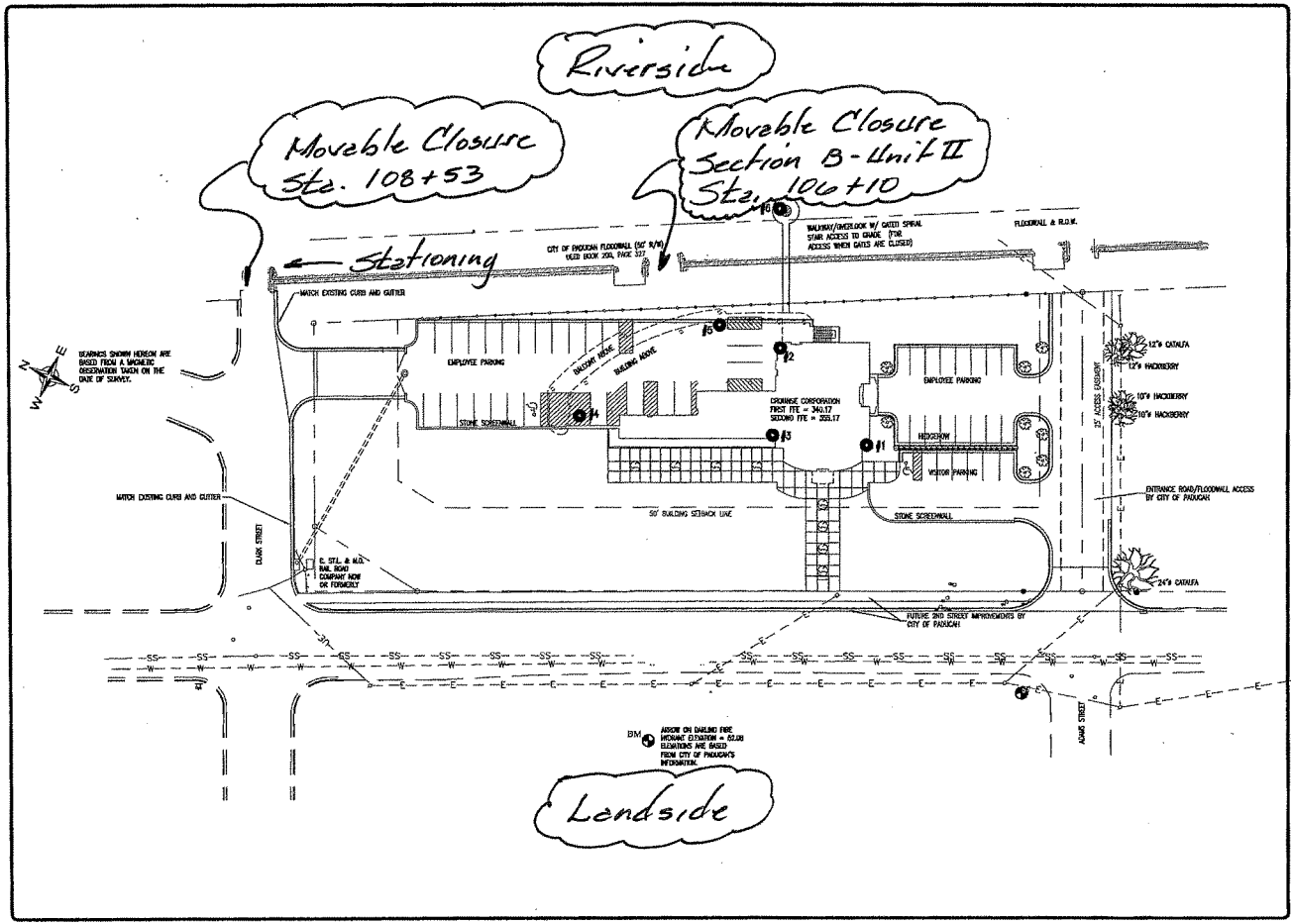
OF

PROPOSED CROUNSE CORPORATION HEADQUARTERS
432 SECOND STREET
PADUCAH, KENTUCKY

Borings #1-#5 Landside Left of
Boring #6 Riverside Right of
Movable Closure
Section "B - Unit II"
Sta. 106+10 +/- (See Appendix B)

Submitted By:

Geotech Engineering & Testing, Inc.



PROJECT NO. 01-119 DATE: JANUARY 2001
DRAWN BY: JLH CHECKED BY: DW

NO.	DESCRIPTION	BY	DATE

GEOTECH ENGINEERING & TESTING, INC.
411 N. MARKET STREET
PADUCAH, KY 42003
PHONE: 270-443-8300
FAX: 270-443-8301
www.geotechengineering.com
200 SOUTH 7TH STREET
MURRAY, KY 42071
PHONE: 270-753-9300
FAX: 270-753-9301
www.geotechengineering.com

BORING LOCATIONS

432 2nd STREET
PADUCAH, KY 42001

CROUNSE CORPORATIONS PROPERTY

SHEET
C-1.0
OF 1

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-1**

Project : Crounse Headquarters

Project Location : Paducah, KY

Boring Started :	December 21, 2006	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith/B. Watkins
Date Completed :	December 21, 2006	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	CME - 45B
Surface Elevation :	339.82	**Sampling Methods :**	SPT, Shelby Tubes		

Sample Type: Split spoon; Shelby Tube; Auger cuttings. GW @ drilling; GW @ 24 hrs.

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0			DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.							
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		0 - 0 - 2					
5	335					99.06	1,991			
10	330				1 - 3 - 5					
15	325				1 - 2 - 4					
20	320				1 - 3 - 5					
			Boring terminated @ approximately 21.0 feet bgs.							
25	315									

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
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SUBSURFACE BORING LOG

Boring No. : **B-2**

Project : Crounse Headquarters

Project Location : Paducah, KY

Page 1 of 1

Boring Started :	December 21, 2006	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith/B. Watkins
Date Completed :	December 21, 2006	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	CME - 45B
Surface Elevation :	340.42	**Sampling Methods :**	SPT, Shelby Tubes		

Split spoon; Shelby Tube; Auger cuttings; GW @ drilling; GW @ 24 hrs

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0	340		DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.							
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		1 - 1 - 1					
5	335					99.42	2,241			
10	330				1 - 2 - 4					
15	325				1 - 3 - 4					
20	320				1 - 2 - 5					
			Boring terminated @ approximately 21.0 feet bgs.							
25										

Standard Penetration Resistance (N-Values): 10 20 30 40
Moisture Content (%): 10 20 30
Qu (tsf): 1 2

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(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-3**

Project : Crounse Headquarters

Project Location : Paducah, KY

Page 1 of 2

Boring Started :	December 18, 2006	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith/B. Watkins
Date Completed :	December 20, 2006	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	CME-45B
Surface Elevation :	339.94	**Sampling Methods :**	SPT, Shelby Tubes		

Sample Type: Split spoon; Shelby Tube; Auger cuttings. GW @ drilling; GW @ 24 hrs

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0			DEBRIS: Consisting primarily of intermixed gravel and soil with some pieces of glass, metal, and brick.		2 - 1 - 3					
5	335		CL: Brownish gray silty CLAY (CL); medium plasticity, soft to very stiff in consistency.			105.5	5,733			
10	330				2 - 3 - 5					
15	325				1 - 4 - 4					
20	320				2 - 3 - 5					
25	315				3 - 5 - 10					
30	310				3 - 5 - 10					
35	305				4 - 8 - 16					
40	300				1 - 2 - 1					
45	295		SM: Dark gray laminated SILT and light gray well-graded SAND (SM); interlensing, micaceous; very loose to firm in consistency.		3 - 5 - 9					
50	290									

Boring Continued on Following Page

GEOTECH Engineering & Testing, Inc.
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www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-3**

Project : Crounse Headquarters

Project Location : Paducah, KY

Page 1 of 1

Boring Started :	December 18, 2006	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith/B. Watkins
Date Completed :	December 20, 2006	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	CME-45B
Surface Elevation :	339.94	**Sampling Methods :**	SPT, Shelby Tubes		

Split spoon; Shelby Tube; Auger cuttings; GW @ drilling; GW @ 24 hrs

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Counts Blows (per 6")
50			SM: Dark gray laminated SILT and light gray well-graded SAND (SM); micaceous, interlensing, very loose to firm in consistency.	4 - 5 - 8
55	285		SW: Reddish to light brown silty SAND (SW); well sorted, with iron staining, very dense in consistency.	45 - 50+
60	280			42 - 50+
65	275			11 - 36 - 50+
70	270		SM: Dark gray laminated SILT and light gray well-graded SAND (SM); micaceous, interlensing, firm to dense in consistency; can be correlated to the Clayton and McNairy formations.	13 - 9 - 13
75	265			5 - 7 - 11
80	260			5 - 12 - 17
85	255			5 - 11 - 13
90	250			3 - 10 - 15
95	245			4 - 12 - 16
100	240		Boring Terminated @ 100 Feet	

Lithology; Dry Density (pcf); Unconfined Strength, (psf); Standard Penetration Resistance (N-Values) 10 20 30 40; Moisture Content (%) 10 20 30; Qu (tsf) 1 2

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-4**

Project : Crounse Headquarters

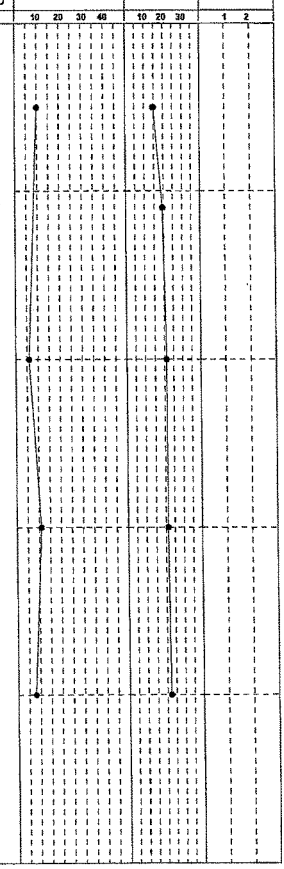
Project Location : Paducah, KY

Page 1 of 1

Boring Started :	December 21, 2006	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith/B. Watkins
Date Completed :	December 21, 2006	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	CME - 45B
Surface Elevation :	339.15	**Sampling Methods :**	SPT, Shelby Tubes		

Split spoon; Shelby Tube; Auger cuttings; GW @ drilling; GW @ 24 hrs

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0			DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.							
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		3 - 3 - 7					
	335									
5										
	330									
10					1 - 2 - 4					
	325									
15					2 - 4 - 7					
	320									
20					3 - 4 - 4					
			Boring terminated @ approximately 21.0 feet bgs.							
	315									
25										



GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-5**

Project : Crounse Headquarters

Project Location : Paducah, KY

Boring Started :	December 21, 2006	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith/B. Watkins
Date Completed :	December 21, 2006	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	CME - 45B
Surface Elevation :	340.55	**Sampling Methods :**	SPT, Shelby Tubes		

Sample Type: Split spoon; Shelby Tube; Auger cuttings. GW @ drilling; GW @ 24 hrs.

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)
0	340		DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.			
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.	2 - 1 - 2		
5	335				102.53	3,124
10	330			1 - 3 - 4		
15	325			1 - 2 - 5		
20	320			1 - 3 - 7		
			Boring terminated @ approximately 21.0 feet bgs.			
25						

Standard Penetration Resistance (N-Values): 10 20 30 40

Moisture Content (%): 10 20 30

Qu (tsf): 1 2

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SUBSURFACE BORING LOG

Boring No. : **B-6**

Project : Crounse Headquarters

Project Location : Paducah, KY

Boring Started :	December 21, 2006	**Boring Diameter :**	4-1/2 Inch Dia	**Driller :**	C. Smith/B. Watkins
Date Completed :	December 21, 2006	**Drilling Method :**	Hollow Stem Auger	**Drill Equipment :**	CME - 45B
Surface Elevation :	337.58	**Sampling Methods :**	SPT, Shelby Tubes		

Sample Type: Split spoon; Shelby Tube; Auger cuttings. GW @ drilling; GW @ 24 hrs.

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)
0			DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.			
	335		CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.	3 - 2 - 5		
5					114.02	8,496
	330					
10				0 - 2 - 4		
	325					
15				2 - 3 - 7		
	320					
20				2 - 4 - 5		
			Boring terminated @ approximately 21.0 feet bgs.			
	315					
25						

Lithology

Standard Penetration Resistance (N-Values) 10 20 30 40

Moisture Content (%) 10 20 30

Qu (tsf) 1 2

Appendix D

Soil Laboratory Datasheets

Geotech Engineering & Testing, Inc.
Soils Reports

Project.	Crounse Headquarters
Location.	Paducah, KY
Job No.	6178

Boring No.	Depth Feet	Moisture Content %	Minus No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Classification	Unconfined Compression	Dry-Unit Wt. lbs/c.f.	Blow Count	Remarks
B-1	2' - 3.5'	22.70					CL			2	
	4.5' - 6.5'	23.70					CL	1,991 psf	99.08		
	9.5' - 11'	21.80					CL			8	
	14.5' - 16'	20.40					CL			6	
	19.5' - 21'	21.90					CL			8	
B-2	2' - 3.5'	23.40					CL			2	
	4.5' - 6.5'	23.90					CL	2,241 psf	99.42		
	9.5' - 11'	20.50					CL			6	
	14.5' - 16'	21.90					CL			7	
	19.5' - 21'	23.60					CL			7	
B-3	2' - 3.5'						CL			4	*No Recovery*
	4.5' - 6.5'	19.80		49	21	29	CL	5,733 psf	105.5		
	9.5' - 11'	22.60					CL			8	
	14.5' - 16'	22.40					CL			8	
	19.5' - 21'	22.00					CL			8	
	24.5' - 26'	21.80					CL			15	
	29.5' - 31'	22.40					CL			15	

Special Notes:

Geotech Engineering & Testing, Inc.
Soils Reports

Project.	Crounse Headquarters
Location.	Paducah, KY
Job No.	6176

Boring No.	Depth Feet	Moisture Content %	Minus No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Classification	Unconfined Compression	Dry-Unit Wt. lbs/c.f.	Blow Count	Remarks
B-3	34.5' - 36'	21.70					CL			24	
	39.5' - 41'	25.20					SM			3	
	44.5' - 46'	31.00					SM			14	
	49.5' - 51'	28.90					SM			13	
	54.5' - 56'	21.00					SW			50+	
	59.5' - 61'	23.70					SW			50+	
	64.5' - 66'	21.30					SW			50+	
	69.5' - 71'	30.90					SW/SM			22	*Material Change @ 70.5'*
	74.5' - 76	28.10					SM			18	
	79.5' - 81'	24.80					SM			29	
	84.5' - 86'	30.20					SM			24	
	89.5' - 91'	24.80					SM			25	
	94.5' - 96'	29.20					SM			28	
	99.5' - 101'	25.40					SM			31	
B-4	2' - 3.5'	14.80					CL			10	
	4.5' - 6.5'	19.50					CL				
	9.5' - 11'	21.10					CL			6	
	14.5' - 16'	21.30					CL			11	

Special Notes:

Geotech Engineering & Testing, Inc.
Soils Reports

Project.	Crounse Headquarters
Location.	Paducah, KY
Job No.	6176

Boring No.	Depth Feet	Moisture Content %	Minus No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Classification	Unconfined Compression	Dry-Unit Wt. lbs/c.f.	Blow Count	Remarks
B-4	19.5' - 21'	22.20					CL			8	
B-5	2' - 3.5'	23.40					CL			3	
	4.5' - 6.5'	22.80					CL	3,124 psf	102.53		
	9.5' - 11'	20.30					CL			7	
	14.5' - 16'	35.30					CL			7	
	19.5' - 21'	23.50					CL			10	
B-6	2' - 3.5'	21.00					CL			7	
	4.5' - 6.5'	16.30		36	18	18	CL	8, 496 psf	114.02		
	9.5' - 11'	19.90					CL			6	
	14.5' - 16'	24.70					CL			10	
	19.5' - 21'	22.20					CL			9	

Special Notes:

SCOPE OF WORK

PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

22 JULY 2009

REVISED 30 JULY 2009

1.0 BACKGROUND

1.1 Problem

Corrugated metal pipe (CMP) culverts and drainage structures located beneath vital transportation and flood management infrastructure in the Louisville Engineer District (CELRL) are significantly deteriorated. CMP design life is generally considered to be 50 years. However, there is ample documentation that actual service life is as long as 65 or 70 years. Most of the CMPs in the CELRL levees were installed in the post-Depression era of the late 1930's to early 1950's. Collapse failures have occurred in a limited number of these structures within CELRL. Conventional repairs of failed or failing CMPs using open-cut excavations with complete pipe replacements are costly.

1.2 Remedy

CMP rehabilitation using trenchless technology eliminates the necessity for open-cut excavation, generally results in no loss of hydraulic capacity or efficiency, and extends the drainage structure design life an additional 50 to 100+ years. Rehabilitation of CMP culverts by sliplining entails inserting (or "slipping") or spiral-winding a new, slightly smaller diameter pipe through the existing CMP. The annular space between the old and new pipe is pressure grouted. Typical wall thickness of the new pipe is about one to two inches and the grout annulus is between one and five inches. The cost savings of this trenchless repair over traditional open cut excavation and replacement is estimated at more than 50%, and the procedure minimizes the disruption of surface roads and activities that occur when conventional "cut and cover" repairs are employed.

A CELRL team developed a sliplining process including pipe condition assessment; hydraulic, geotechnical and structural analysis; and contracting procedures. The process meets current USACE engineering standards and specifications. The team is working with the local sponsor of the Paducah, Kentucky Local Flood Protection Project (LFPP) to rehabilitate 37 CMPs using sliplining technology. Many of these pipes contain significant holes and some voids are present in the surrounding backfill soil due to piping along the outside of the CMP.

1.3 General Scope of Work

Work on this contract is performed in accordance with the requirements of the CELRL Multiple Award Task Order Contract (MATOC). This Scope of Work identifies site and job specific requirements that are added to the MATOC requirements. The requirement is for design/build construction as a Civil project.

CELRL is performing proof tests on three sliplined CMPs at the Paducah LFPP to demonstrate the efficacy of slipliner technology to grout both the annular space between the CMP and liner pipe as well as void spaces outside the CMP.

The Contractor will investigate the integrity of slipliner technology to rehabilitate deteriorated CMP installations at the Paducah Local Flood Protection Project. The project involves four phases:

a) Non-destructive inspection of one CMP using gamma ray logging and thermographic imaging before and after the CMP is sliplined,
b) Hydraulic proof load testing of one CMP before and after the CMP is sliplined,
c) Excavation, inspection, and dissection of three CMPs after sliplining, grouting, and non-destructive testing are completed, and,
d) Replacement of the three demolished sliplined CMPs using conventional construction methods.

Sliplining of the CMPs is not included in this contract and is currently underway by others. The successful Offeror coordinates activities with the sliplining contractor to ensure that both projects proceed efficiently.

The District Office point of contact is Christina Neutz, 502.315.6305, christina.m.neutz@usace.army.mil, and the Construction Division representative is Stephen Casner, 502.315.7250, stephen.w.casner@usace.army.mil. The current Paducah sliplining project is contracted to Larry Smith Contractors, Inc., Cleves, Ohio, represented by Jay Smith, 513.367.0218, jay@techunder.com. The project designer is Florence & Hutcheson, Inc., Paducah, Kentucky, represented by Jason Petersen, 270.444.9691, jpetersen@flohut.com.

2.0 LOCATION

Three CMP locations are selected for this project (Sites A, B, and C, listed in Table 1). The project location is depicted in Figure 1, and the as-built drawings of Site A, B, and C CMPs are shown in Figures 2, 3, and 4, respectively. The plan-view locations of Sites A and C are shown on Figure 5, and the location of Site B is shown on Figure 6.

Table 1. CMP Locations and Descriptions at Paducah LFPP

Site	Location	Description
A	Station 150+05, Paducah LFPP Section C Pre-Slipline CMP Condition: Fair Scope: Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 60 Feet Levee Height of 12 Feet
B	Station 147+25, Paducah LFPP Section A Pre-Slipline CMP Condition: Poor Scope: Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 80 Feet Levee Height of 18 Feet
C	Station 128+80, Paducah LFPP Section C Pre-Slipline CMP Condition: Very Poor Scope: Non-Destructive Inspection, Hydraulic Loading Test, Grout Penetration Inspection and Pipe Replacement	48 Inch Outside Diameter CMP CMP Length of 135 Feet Levee Height of 12 Feet

Approximate latitude/longitude coordinates for the sites are:

Site A: N37.02528, W88.56682
Site B: N37.09346, W88.63747
Site C: N37.02208, W88.57335

All work on this contract occurs within the existing Paducah, Kentucky LFPP Right of Way (ROW). Areas available for site access, staging, and soil stockpiles were discussed during the pre-bid site visit. Drawings showing the City's ROW are provided at ftp://ftp.usace.army.mil/pub/lrl/Paducah%20slipliner%20proof%20test/. The Contractor Limits of Work coincide the City ROW, except at Site B as discussed in Section 3.5.

The CMPs at Sites A and B were installed during the original levee construction circa 1938 to 1939. The Site C CMP was installed under permit in 1980. The permit drawings for the Site C CMP identify it's location as "125+95 Section C". More recent drawings cite the location of the CMP as "128+80 Section C", and that designation is used in this contract. The dimensions provided in this Scope of Work are approximate and the Contractor is responsible to determine the actual quantities for bidding purposes.

A City of Paducah contractor (Florence & Hutcheson, Inc.) performed video-logging of the CMPs in 2007; those digital files are provided to Offerors via the CELRL ftp site. Contact Richard Hockett, 502.315.6329, rick.hockett@us.army.mil for instructions on ftp site access.

3.0 DETAILS OF SCOPE OF WORK

Prior to performing any work at the project site other than planning and reconnaissance, the Contractor submits a Project Work Plan for USACE approval. The Work Plan

describes each part of the work in sufficient detail to ensure that the deliverables are suitable for use.

3.1 Non-Destructive Existing Condition Evaluation Of Site B CMP

Non-destructive testing is performed at Site B, a 24-inch CMP. Work at Site B requires extensive coordination with the slipliner contractor, because the work on this contract has the potential to significantly impact the sliplining contract.

a) Gamma ray logging is used to evaluate the presence of voids in the soil backfill surrounding the CMP. The Contractor provides a device to hold a standard gamma-ray well-logging tool proximal to the wall of the CMPs, and produces longitudinally-oriented gamma logs at six locations separated by 60 degrees around the CMP circumference (12, 2, 4, 6, 8, and 10 o'clock positions with 12 o'clock being the top of the CMP).
b) Thermographic inspection is used to evaluate surface micro-temperature differentials on the interior of the CMP. These data are interpreted to evaluate the presence of voids outside the CMP.
c) A 21-day hydraulic proof test is conducted. A temporary cofferdam is designed and constructed by the Contractor. The cofferdam surrounds the CMP outlet on the riverside of the levee to impound water, and is at least ten ft from either side of the CMP. The flap gate on the riverside of the CMP is temporarily sealed to prevent ingress of water through the riverside end of the CMP. If necessary, additional measures are taken to ensure complete sealing of the CMP at the riverside. The cofferdam and sealed CMP are flooded with water to create a six-foot head measured from the top of the CMP. Sufficient water (supplied by the Contractor) is added to the impoundment to maintain the six-foot head as needed to ensure that the water level inside the cofferdam does not vary more than 0.1 ft. The volume of water added to the cofferdam impoundment to maintain the constant head is metered and documented. The volume of water discharging from the land side of the CMP is monitored using a weir and continuously recorded for the duration of the test. Any other seepage exterior to the pipe is also recorded. Video inspection of the interior of the entire length of the CMP is performed once per day during the proof test. Transient ground water head is documented continuously throughout the test using a minimum of three temporary piezometers installed along the axis of the CMP with 2-ft screens positioned at the pipe diameter elevation. The Contractor provides all monitoring equipment, a primary power source, and a backup power source.

Contractors that expressed capability to perform non-destructive testing to CELRL include:

a) Terracon, Cincinnati, Ohio; contact Jason Sander 513.321.5816
b) Technos Inc., Miami, Florida, Lynn Yuhr, 305.718.9594

Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.

3.2 Sliplining

Upon completion of the pre-existing conditions evaluation, the Site B CMP is rehabilitated by Larry Smith Contractors, Inc. (LSC) under a separate contract using sliplining technology. No significant delay occurs to the project as a result of coordination with LSC. The City directs LCS to slipline and grout the 48" CMP at Site C first. The Contractor destructively tests the Site C CMP as the first task on the contract, concurrent with the Site B non-destructive testing.

Based on the results of the Site C destructive testing, the City of Paducah may direct LSC to modify the grout mixture to enhance performance, if needed. Rapid execution of the Site C destructive testing is a high priority to ensure efficient coordination of activities with LSC for the remainder of the City of Paducah sliplining contract. If grout mixture modification is required, this process may be repeated at a second CMP location.

3.3 Non-destructive post-rehabilitation evaluation of Site B CMP.

After sliplining rehabilitation at Site B, the battery of non-destructive tests described in section 3.1 is repeated on the Site B 24-inch CMP. The hydraulic proof test is conducted no sooner than five days after sliplining and grouting are completed. The five-day waiting period for hydraulic testing at Site B is waived if the three-day grout strength tests indicate the grout has reached the design strength (300 psi).

Gamma logging, thermographic imagery, and hydraulic proof testing are repeated using the same protocols as used in the existing condition evaluation prior to sliplining. Upon completion of the hydraulic proof testing, the temporary cofferdam is removed and a bentonite-water mixture is used to seal any holes resulting from the removal of sheet piling or other below-grade structures used in the cofferdam construction, if any. The post-rehabilitation conditions and the existing conditions are compared, using the existing conditions evaluation as a baseline, and the efficacy of sliplining technology is evaluated. Particular emphasis is directed at evaluating the capability of the pressure grouting process to seal voids on the exterior of the pipe.

3.4 Destructive Post-Rehabilitation Evaluation of Sites A, B, and C CMPs.

After completion of sliplining, the three CMPs (Sites A, B, and C) are excavated for visual inspection and destructive testing. Excavation is performed by open cut trenching with appropriate side slopes for the site conditions as specified in Section 25 of Engineer Manual 385-1-1 (2008 edition). Excavated soil is stockpiled on the riverside of the levee and reserved for installation of the replacement pipe. Top soil is stripped and stockpiled separately. Soil stockpiles are protected using appropriate erosion

control measures. The excavation is performed so that a two-ft thick section of soil remains in place surrounding the CMP, along with any slipliner grout that is extruded from the CMP during rehabilitation.

Contractor carefully removes the existing flap gates to minimize damage and provides the salvaged flap gates to the City Floodwall Shop at 4th & Elizabeth Streets.

It is assumed that the temporary piezometers are removed when the Site B CMP is excavated for destructive testing. All casing, screen, and sand pack material not in the limits of the excavation is removed and the resulting void backfilled with bentonite grout.

No sooner than seven days after grouting is complete, careful excavation of the soil remaining around the CMP is incrementally performed so that the presence of extruded slipliner grout is observed and documented. Observations of the capability of the grouting process to fill voids around the CMP are vital to this process. The Contractor documents the excavation process with video and digital still cameras. The procedure to accomplish this task is described in detail in the Proposal, and is approved by CELRL in the Work Plan.

Florence & Hutcheson, Inc. performs grout strength tests at 3, 7, and 28 days from slipliner grout samples at Sites A, B, and C. The seven-day curing period before destructive testing is waived if the three-day strength tests indicate the grout has reached the design strength (300 psi).

When excavation of all remaining soil and extruded grout is complete, the grouted pipe is carefully removed from the excavation in manageable sections and positioned for dissection. Beginning at the end of the pipe distal from the grout injection, the pipe is transversely sawed into sections so that the annular grout between the slipliner and the CMP is not disturbed. Cuts are spaced at 1-ft intervals and every fourth cut is made on a 30-degree skew from perpendicular to provide oblique sections exposing more pipe area. The pipe cuts are made using a diamond wire rope saw so that smooth cut surfaces are produced for grout inspection. Alternate cutting methodology must be approved by CELRL, and will be evaluated based on capability to achieve the project objectives.

Contractors that expressed capability to perform destructive testing to CELRL include:

a) Ohio Concrete Sawing and Drilling, Inc., Franklin, Ohio, Doug Schuchhardt, 513.723.0099
b) Capital Drilling and Sawing of Kentucky, Elizabethtown, Kentucky, 270.765.7377

Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.

The condition and completeness of the grout fill is documented with video and still photo cameras. Selected 1-ft sections are sawed longitudinally, with video and still photo

documentation of the process, if necessary to define the extent of voids noted in the transverse cuts. Based on the findings of the inspection of the first portion of each CMP, the spacing of cuts may be increased up to a maximum of five ft. CELRL anticipates cuts on 1-ft spacing for the first 10 ft of pipe, followed by five cuts at 3-ft spacing, followed by 5-ft spacing for the remainder of the pipe. At a maximum, each pipe may be cut on 1-ft spacing if deemed necessary by CELRL. Regardless of the spacing of cuts, each fourth cut will be made on a 30 degree skew as noted above. The Offeror is instructed to include the cost for ten perpendicular cuts and three skew cuts per pipe in the base bid. The bid schedule also includes line items for additional perpendicular and skew cuts on a per cut basis as directed by CELRL.

3.5 Replacement of three CMPs with new pipe.

The destructively-tested pipes are replaced with a Glass Fiber Reinforced Thermosetting Resin (GFRTR) sewer pipe of the same type as the slipliner pipe used to rehabilitate the CMPs. The pipe invert is placed at the same grade as the original CMP installation. The riverside 2/3rds of the pipe length is placed so that at least 1.0 ft of flowable fill surrounds the pipe. The landside 1/3 of the pipe length is placed so that at least 1.5 ft of granular fill material completely surrounds the pipe to create a drainage fill meeting the requirements of Section 8-5 of Engineer Manual 1110-2-1913. Seep rings are not included.

The levee embankment is replaced to original condition. The tie-in surfaces of the existing levee are benched at least 24 inches horizontally and scarified to allow new material to make good contact with the existing levee embankment section. The proposed slope for the excavation and the details of the scarified tie-in benching are provided in the Contractor's Work Plan. Using the previously excavated levee material, the levee embankment is replaced in maximum 8-inch lifts.

The toe drain at Site B is replaced to original as-built condition if it is disturbed by the cofferdam installation.

The top elevation of the new levee replacement section is constructed level with the existing levee section with the compacted soil. After the final lift of compacted soil is placed and compacted to meet the surrounding top-of-levee grade, a 6-inch layer of topsoil is placed over the new levee embankment to provide for settlement. The rebuilt levee embankment and all other disturbed areas are shaped, seeded, and covered with a biodegradable erosion control fabric to provide a suitable grass cover. Restoration of the levee includes placement of eight inches of compacted aggregate to match the existing driving surface on top of the levee. Top soil is not placed under the compacted aggregate.

All previously installed drainage features and devices are replaced. New cast-in-place concrete headwalls are installed meeting the requirements of Kentucky Transportation Cabinet 2008 Standard Specifications Section 710, adjusted to original as-built

dimensions. The flap gates, frames, and anchors are replaced with new items of like design and materials meeting the requirements of Section 05 50 05.

The Site A west headwall appears to encroach on private property and is not aligned well with the drainage ditch to the west. Contractor installs new cast-in-place headwall five ft to the east to resolve the encroachment issue. New west headwall includes a 90 degree wing wall tied into the existing hand-placed rip rap to alleviate the ditch alignment issue. Rip-rap is place in a trench at the transition of the wing wall to the surrounding soil. The City coordinates construction activities with the adjacent landowner.

After all other work is completed, the Contractor performs a video inspection of the three pipes to document the post-installation conditions. This is provided to the COR for approval. All defects discovered during the post-installation video inspection are corrected by the Contractor at his expense before the work under the Contract is considered for Substantial Completion. After all defects, if any, are corrected in accordance with manufacturer's recommendations, the affected pipe segment(s) are video inspected a second time as a follow-up inspection.

4.0 SPECIFICATIONS

4.1 Geotechnical Requirements

4.1.1 Placement and Compaction

Compaction layer thickness and densities are as stated in Section 3.5. Each layer is spread uniformly on a soil surface that is moistened or aerated as necessary, and scarified or otherwise broken up so that the fill bonds with the surface on which it is placed (refer to Section 3.5 for tie-in benching description). After spreading, each layer is plowed, disked, or otherwise broken up; moistened or aerated as necessary; thoroughly mixed; and compacted to 95% maximum dry density per ASTM D-698. Compaction is accomplished by sheepsfoot-type rollers or other approved equipment well suited to the soil being compacted. Material is moistened or aerated as necessary to plus or minus three percent of optimum moisture to provide the moisture content that readily facilitates obtaining the specified compaction with the equipment used.

4.1.2 Materials

During excavation and backfill of the levee materials, the suitability of the excavated materials for reuse is verified by the Contractor. Satisfactory materials used in the levee embankment and other clay fill consist of materials classified by ASTM D 2487 as clays, silty clays, sandy clays, and clayey sands. All compacted embankments are constructed from satisfactory materials free of roots and other organic matter, trash, debris, frozen material, and rocks. Soil additives such as lime or cement may be requested by the COR if soil conditions warrant. Materials are within the following limits:

Table 2. Gradation of Levee Embankment Material

Sieve Size	% Passing by Weight
¼ in.	100
No. 200	50-100

If for any reason additional fill material is required, the borrow source meets the requirements of all specifications for fill material. The Contractor submits an "if-needed" borrow source to USACE in the Work Plan for approval.

4.1.3 Field In-place Density Quality Control

Field in-place density is determined in accordance with ASTM D 2922. When ASTM D 2922 is used, the calibration curves are checked and adjusted using only the sand cone method as described in ASTM D 1556. In place density testing is performed at a rate of one test per 400 square feet, or fraction thereof, of each lift of embankment or backfill for the levee.

4.1.4 Optimum Moisture and Laboratory Maximum Density

Tests are made for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum dry density values. One representative test is performed per borrow site, per stockpile of excavated material, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density. Additional laboratory compaction tests are required if soil additives are requested to facilitate fill construction.

4.1.5 Certification

Testing is performed by a Commercial laboratory and is overseen and approved by a professional geotechnical engineer retained by the Contractor. Subsequent to construction, an independent geotechnical engineer certifies in writing that the fill was placed in accordance with the requirements herein and provide the backup data including the soil test results, testing locations, and testing elevations. Sketches and photographs are provided such that all testing locations and elevations can be verified. The Contractor's Work Plan details these testing requirements and outlines his plan to report the testing results.

4.1.6 Frozen Material

Material is not placed on surfaces that are muddy, frozen, or contain frost. This includes previously placed lifts that become frozen or saturated.

4.1.7 Seeding and Covering

All new levee embankments and any disturbed areas are seeded and covered. Prior to seeding, the area is raked to a depth of 2 to 4 inches. Once the seed bed has been prepared, the seed mixture in Table 3 (Section 4.4) is applied. The seeded areas are covered with a non-woven, bio-degradable erosion control fabric to prevent surface rutting from rainfall until grass is established.

4.2 Flowable Fill

Flowable fill meets the specifications contained in Kentucky Transportation Cabinet Standard Specifications for Road and Bridge Construction, 2008 Edition, Subsection 601.03.03 (B)(5)(a).

4.3 Drainage Fill Sand

Drainage fill sand meets the specifications for concrete sand (natural) listed in ASTM C-33 or Kentucky Transportation Cabinet Standard Specifications for Road and Bridge Construction, 2008 Edition, Section 804.03. CELRL verifies that concrete sand is an appropriate filter drain material based on the characteristics of the levee materials prior to placement.

4.4 Seed

Table 3. Seed Mixture

Botanical Name	Common Name	lbs/acre
Festuca rubra	Creeping Red Fescue	20
Lolium multiflorum	Annual Rye	25
Phleum praiense	Timothy	10
Poa pratensis	Kentucky Blue Grass	25
Agrostis alba	Redtop	20
Lolium perfenne	Perennial Rye	10
	Seed Oats	20

4.5 Glass Fiber-Reinforced Plastic Pipe Requirements

4.5.1 Reference Standards

Unless otherwise noted, reference is made to the latest version of the documents listed below. All work complies with the following reference standards unless specifically stated otherwise in this Specification.

a) ASTM D2412 – Standard Test Method for Determination of External Loading Characteristics on Plastic Pipe by Parallel Plate Loading
b) ASTM D3262 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe
c) ASTM D3681 – Standard Test Method for Chemical Resistance of Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Pipe in a Deflected Condition
d) ASTM D4161 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
e) ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

4.5.2 Pipe

Provide Glass Fiber Reinforced Thermosetting Resin sewer pipe in accordance with ASTM D3262, cell classification Type 1, Liner 2, Grade 3. Nominal pipe diameter is selected to match the previous CMP. Minimum pipe stiffness is 36 when tested in accordance with ASTM D2412. The glass is a commercial grade of E-type glass fibers with the amount, location and orientation of the chopped glass-fiber reinforcement specifically designed for each application. Sand is a minimum 98 % silica kiln-dried and graded. The polyester wall resin is an isophthalic, orthophthalic or other approved resin with a minimum tensile elongation of 2 %. Pipe is marked at both ends and inside every 5 feet on the outside to identify the manufacturer's number, diameter, stiffness, ASTM designation and lot number.

All pipes are specifically applicable for installation and use in the environment as required by this specification.

4.5.3 Joints

Joints meet the performance requirements of ASTM D4161. All pipes are provided with joints designed so that neither the outside diameter of the pipe is increased nor the internal diameter of the pipe is decreased at the joint. Joints are water-tight over the range of head pressure as specified as a design requirement in this Specification.

4.5.4 Design Criteria for Replacement Pipe

The Contractor demonstrates that the selected liner pipe is suitable for installation based on a detailed evaluation given the following parameters:

a) Long-term analysis is considered 50 years.
b) Live load need not be considered.
c) Allowable long-term deflection is 5%.
d) All pipes are designed based on information shown on Drawing G003 from the column labeled "Bury Depth from Corps Drawings (ft)" with water table located 5 feet below the ground surface for the life of the pipe.
e) Use a Safety Factor of 2.0 for all parameters and calculations.
f) Modulus of soil reaction is 1500 psi.
g) Saturated unit weight of soil is 120 pcf.

4.5.5 UV End Treatment

All replacement pipes terminating at an open end or headwall receive a coating applied to the interior surface of the pipe to resist deterioration from ultraviolet radiation. The application of both prime and finish coats is performed by the pipe manufacturer in a climate-controlled environment prior to pipe delivery to the job site.

a) Two coats of Induron Perma-Clean II semi-gloss epoxy (or approved equal) are applied at 4.0 to 6.0 mils per coat to each open end of the interior of the liner pipe for a distance of 2 times the ID of the liner pipe.

b) Surface preparation is in accordance with the recommendations of the

coating supplier as well as the pipe manufacturer. In the case of a discrepancy, the more conservative approach governs.

c) Prime coat color is "Almond". Finish color is "Polar White", or similar shade subject to approval by the COR.

Upon completion of installation, the Contractor repairs all damaged areas in the UV coating in accordance with the manufacturer's recommendations.

4.6 Site Preparation and Maintenance

Contractor documents existing site conditions before performing any work with video and still digital photography. That documentation serves as the baseline for site restoration when the project is complete.

4.6.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

4.6.2 Trees, Shrubs, and Existing Facilities.

Trees and vegetation to be left standing are protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

4.6.3 Clearing

Clearing consists of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing also includes the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared are cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas are trimmed of dead branches 1.5 inches or more in diameter and are trimmed of all branches to the heights indicated or directed. Limbs and branches to be trimmed are neatly cut close to the bole of the tree or main branches.

Contractor includes proposed limits of clearing on a scaled drawing in the Work Plan. Those limits are only exceeded with approval of the COR.

4.6.4 Tree Removal

Where indicated or directed, trees and stumps that are designated as trees are removed from areas designated for clearing and grubbing. This work includes the felling of such trees and the removal of their stumps and roots as specified in paragraph 4.6.5. Trees are disposed of as specified in paragraph 4.6.7.

4.6.5 Grubbing

Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, is removed to a depth of not less than 6 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing are filled with material meeting the soil requirements described in Section 4.1.2 and compacted as in Sections 3.5 and 4.1.1 to make the surface conform to the original adjacent surface of the ground.

4.6.7 Disposal of Materials

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, are disposed of in accordance with local practice and regulations with preference given to recycling if locally available. The contractor removes all left over construction/demolition debris to an inert disposal site for construction/demolition materials at no cost to the Contractor. Access to the inert disposal site is provided by the City (location provided in Figure 1). The same area will be used to stage selected cut sections of destructively tested pipes for future inspection. The contractor includes the expense to carefully transport up to ten cut pipe sections to the inert site so they are not damaged during transportation. Those ten pipe sections are selected by CELRL to represent the various grout conditions observed during the destructive testing of the sliplined pipes.

5.0 SUBMITTALS

Submittals are made electronically and with paper copies. Electronic submittal files are compatible with Microsoft Office or Adobe Acrobat software (Portable Document Format) and are provided on CD or DVD media. Hard copies are provided on 8.5 x 11 inch paper with plan sheets provided on 11 x 17 inch paper. Five paper copies are provided to the COR. The COR is provided a five-day review period for all submittals.

5.1 Geotechnical Submittals

The followings geotechnical submittals are made to CELRL:

a) Biodegradable erosion control fabric specifications,
b) Soil test results,
c) Potential borrow source,
d) Seed mix design.

5.2 Pipe Submittals

The followings geotechnical submittals are made to CELRL:

a) Detailed analysis and calculations are submitted demonstrating suitable application based on the following parameters:
   1. Deflection
   2. Confined buckling
   3. Long-term (50 yr) hydrostatic buckling
b) Test results and certification of compliance for materials.
c) Documentation of manufacturer's certification of installers (as applicable).

5.3 Project Reports

The contractor submits for review and approval to the COR the following submittals:

Title of Data Item	Frequency	Remarks
Pollution Prevention Plan	One time	Due 5 days prior to pre-work conference
Accident Prevention Plan & Safety and Health Plan	One time	Due 5 days prior to pre-work conference
Quality Control Plan	One time	Due within 5 days
Activity Hazard Analysis and Risk Analysis	As required	Due 5 days minimum before start of each phase
Work Plan*/Work Schedule	One time	Due prior to pre-work conference
EP Plan	One time	Due with in 5 days
Contingency Plan for Emergency Flood Management	One time	Included in Work Plan
Site Safety & Health Officer Qualifications	One time	Due with in 5 days
Project Report**	Two reports: draft and final	At completion of work
Post-installation videos	One time	At completion of work
Accident Reports	As required	

*Detailed Work Plan outlining the following items in addition to the items contained in the Scope of Work:

a) Proposed construction sequencing and scheduling
b) Areas requiring special construction techniques
c) Proposed methods for control of water (if applicable)
d) Proposed access and staging areas
e) Proposed work hours
f) Detailed description and drawings, as needed, to fully explain how the work is executed and project objectives are achieved.

**The Project Report includes narrative and photo documentation of all work performed, conditions encountered, and final as-built drawings. Copies of all project documentation are included in the Project Report. Still photo and video documentation is provided on DVD as well as in the assembled report. All saw cuts, pipe condition descriptions, and video and photo documentation are referenced to the pipe position established in the video inspection records provided with this Scope of Work on DVD. Photos and videos are annotated with specific reference locations. The results of the destructive post-rehabilitation evaluation of Sites A, B, and C CMPs are presented in the project report with photos and description of each cut location and the approximate percentage of void and grout observed in each cut. An illustrated narrative interpretation of the gamma and thermographic logging is provided.

6.0 MEETINGS

A mandatory scope-validation meeting is attended by the Contractor, potential subcontractors, and COR to facilitate common agreement and understanding of the work to be performed. Prior to the meeting, resumes of subcontractor project superintendant or project managers are supplied to the COR for consideration or elimination.

7.0 SPECIAL CLAUSES

7.1 Commencement, Prosecution, and Completion of Work

The Contractor is required to commence work within ten (10) day after notice to proceed and complete the work within 90 calendar days. If the contractor fails to complete the work within the time specified in this Task Order, the Contractor pays liquidated damages to the Government in the amount of $1,010.00 for each calendar day of delay until the work is completed or accepted. If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination.

7.2 Utilities

Contractor supplies all utilities and is responsible for all connections and payments. Contractor clears all utilities with the Kentucky Underground Protection, Inc. Non-member utilities are cleared individually.

7.3 Government Furnished Equipment

No Government Furnished Equipment is included in this contract.

7.3 Variations in Quantities

No difficult to quantify items are included in this contract, and no items are subject to the Variations Clause.

7.4 Work Hours and Work Days

Normal work hours are 7 days/week, 07:00 to 17:00, or whatever is required to complete the contract within 90 calendar days. During the 21-day hydraulic proof tests, work hours are 24 hours per day. The Contractor may choose to work an alternate schedule with authorization from the Contracting Officers Representative.

7.4 As-built Documents

The Contractor submits as-built drawings of the pipe installations in digital Adobe Acrobat Portable Document Format on CD or DVD.

7.5 Wage Rates

Wage rates are required as per the MATOC contract. The Wage Rate Determination for this contract is provided herein as Attachment 1.

7.6 Kentucky Sales and Use Tax Information

Required as per the MATOC contract.

7.7 Time Extensions for Unusually Severe Weather

The Monthly Anticipated Adverse Weather Delay Work Days based on the nearby Olmstead area. The table below is used in lieu of the sample table in the base MATOC specifications. The contractor works as many days per week as needed to complete the contract within the given period of performance.

MONTHLY ANTICIPATED ADVERSE WEATHER CONDITION DELAY WORK DAYS BASED ON 7-DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
11	10	9	8	7	6	6	5	5	5	8	11

MONTHLY ANTICIPATED ADVERSE WEATHER CONDITION DELAY WORK DAYS BASED ON 6-DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9	9	8	7	6	5	5	4	4	4	7	9

MONTHLY ANTICIPATED ADVERSE WEATHER CONDITION DELAY WORK DAYS BASED ON 5-DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
8	7	6	6	5	4	4	4	4	4	6	8

7.8 Safety and Health Requirements Manual

The Safety and Health Manual is available at
http://www.usace.army.mil/CESO/Documents/EM385-1-1FINAL.pdf

7.9 Activity Environmental Analysis

As required by the MATOC contract.

7.10 Pollution Prevention Plan

The Contractor is responsible for preparing the Pollution Prevention Plan, which is included in the Work Plan.

7.10 City of Paducah

The project occurs entirely on City of Paducah (the City) Right of Way, and the successful Offeror coordinates activities with the City. The City will also be named as an additional ensured on the Contractor's Certificate of Insurance.

7.11 Contingency Plan for Emergency Flood Management

Contractor submits a Contingency Plan for Emergency Flood Management as part of the Work Plan. The submittal describes the measures taken in the event of a flood event during the project while the levee is breached for pipe replacement as well as the plan to handle surface drainage from the landside while the CMP is sealed and/or the temporary cofferdam is in place for hydraulic proof testing.

Hydrographs for the Ohio River are provided at the USACE ftp site ftp://ftp.usace.army.mil/pub/lrl/Paducah%20slipliner%20proof%20test/. These hydrographs may assist Offerors evaluate risk of high water levels during the project period of performance.

7.11.1 Temporary Levee Closure

Provisions for the flood level or flood event that trigger the construction of a temporary emergency closure are determined during the project planning process. USACE Hydrology & Hydraulics (H&H) Design personnel review the base elevations of a proposed closure and then, using this information along with the rate of river rise, provide a trigger elevation that is provided to the Contractor and incorporated into the Work Plan.

The contractor provides the method of temporary closure to the Corps of Engineers for approval once the contract has been awarded. If required as a result of a potential flood event, the emergency closure is in place within 72 hours of notification by the City of Paducah, Kentucky or USACE. Because the crest of a flood often rises, falls and then rises again, the closure system is designed to be flexible and have the capacity to

be raised if necessary to match the top elevation of the rest of the flood protection system. The structural elements (if the temporary closure is structural) have the capacity to resist the full height flood. This does not mean that all structural components providing protection up to the full floodwall height would need to be installed for every flood event. Calculations are provided showing that the temporary closure can withstand a full height flood.

The Contractor provides documentation that the proposed emergency closure system consists of components presently owned, or are obtainable within the 72-hour time frame, and that all components can be installed within the same time frame.

For cost estimation purposes, except for any contractor-caused delays or problems, the Offeror is instructed to assume that the cost of execution of the temporary levee closure plan will be paid as a contract modification and that the base bid is not to include any cost for temporary levee closure except preparation of the plan.

7.11.2 Landside Drainage
The Work Plan includes a description of the plan to manage surface water drainage on the landside of the levee while the CMP is sealed and/or the temporary cofferdam is in place for hydraulic proof testing. The contractor installs a system for use during the CMP closure that will accommodate the flow expected during the closure period. The plan also describes additional equipment needed for severe flooding and the sources used to obtain that equipment within 72 hours of notification from the local sponsor or USACE. The plan includes adequate provisions to ensure that landside flooding does not occur as a result of the CMP closure. For cost estimation purposes, the Offeror is instructed to include the cost of all landside surface water management in the bid item for hydraulic proof testing (items 0004 and 0006).

7.12 Additional Clauses from Basic MATOC Hubzone Contract

Unless otherwise noted below, all provisions of the Hubzone MATOC apply to this Contract.

SECTION 00 80 00.00 06
Section 1.1 Project completion is specified in SOW Section 7.1.
Section 1.2 Liquidated Damages are specified in SOW Section 7.1.
Section 1.5 Utilities are specified in SOW Section 7.2.
Section 1.10 Mobilization and Demobilization are included in the Work Items.
Section 1.1 Variations in Quantities are specified in SOW Section 7.3.
SECTION 00 80 50.00 06
Section 1.1 does not apply. Submittals are specified in SOW Section 5.
Section 1.2 (b) does not apply.
Section 1.3 does not apply.
Section 1.4 does not apply
Section 1.14 does not apply
Section 1.16 applies as modified in SOW Section 7.7

Section 1.17 Wage Rates are provided in SOW Attachment 1.
Section 1.20 does not apply.
Section 1.21 does not apply.
Section 1.23 does not apply.
Section 1.24 does not apply.
Section 1.25 does not apply.
Section 1.31 does not apply.
Section 1.33 does not apply.
Section 1.36 does not apply.
Sections 1.57 c and j do not apply.
Section 1.43 does not apply.
Section 1.45 does not apply.
Section 1.49 does not apply.
Section 1.55 No asbestos or HTRW issues are identified on this project.

SECTION 01 11 00.00 06

Section 1.4 Submittals are specified in SOW Section 5.
Section 3.5 No asbestos or HTRW issues are identified on this project.

SECTION 01 11 00.20 06

This Section does not apply.

SECTION 01 21 00.00 06

This Section does not apply.

SECTION 01 21 00.00 48

This Section does not apply.

SECTION 01 32 01.00 06

This Section does not apply.

SECTION 01 33 00.00 06

This Section does not apply.

SECTION 01 33 00.10 06

Submittals are specified in SOW Section 5.

SECTION 01 41 00.00 06

This Section does not apply.

SECTION 01 46 00.00 06

This Section does not apply.

SECTION 01 57 20.00 10

Section 1.7.2(q) A pesticide treatment plan will not be required for this project.
Section 1.9 No special environmental requirements have been identified in association with this project.
Section 1.12-1.13 HTRW air monitoring and emission control requirements are not required for this project.
Section 3.5.4 There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that work is performed.
Section 3.10 Integrated pest management will not be required for this project.
Section 3.13 Military munitions are not expected to be encountered at this project site.

SECTION 01 78 23.00 06

This Section does not apply.

8.0 BID SCHEDULE

PROJECT: Proof Tests of Sliplining Technology

LOCATION: Paducah, Kentucky

OFFEROR'S NAME: _____

SITE A DESTRUCTIVE TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Levee Excavation and Pipe Removal	1	LS	$ _____
0004	Pipe Assessment & Dissection, base bid	1	LS	$ _____
0005	Additional perpendicular cuts, each _____			
0006	Additional skew cuts, each _____			
0007	Pipe Replacement	1	LS	$ _____
0008	Levee Embankment Replacement	1	LS	$ _____
	SITE A DESTRUCTIVE TESTING SUBTOTAL			$ _____

SITE B DESTRUCTIVE TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Levee Excavation and Pipe Removal	1	LS	$ _____
0004	Pipe Assessment & Dissection, base bid	1	LS	$ _____
0005	Additional perpendicular cuts, each _____			
0006	Additional skew cuts, each _____			
0007	Pipe Replacement	1	LS	$ _____
0008	Levee Embankment Replacement	1	LS	$ _____
	SITE B DESTRUCTIVE TESTING SUBTOTAL			$ _____

SITE B NON-DESTRUCTIVE INSPECTION AND HYDRAULIC PROOF TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Video, Gamma, and Thermographic Inspection Before Sliplining	1	LS	$ _____
0004	Hydraulic Proof Testing Before Sliplining	1	LS	$ _____
0005	Video, Gamma, and Thermographic Inspection After Sliplining	1	LS	$ _____
0006	Hydraulic Proof Testing After Sliplining	1	LS	$ _____

SITE B INSPECTION AND PROOF TESTING BID SUBTOTAL $ _____

SITE C DESTRUCTIVE TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Levee Excavation and Pipe Removal	1	LS	$ _____
0004	Pipe Assessment & Dissection, base bid	1	LS	$ _____
0005	Additional perpendicular cuts, each _____			
0006	Additional skew cuts, each _____			
0007	Pipe Replacement	1	LS	$ _____
0008	Levee Embankment Replacement	1	LS	$ _____

SITE C DESTRUCTIVE TESTING SUBTOTAL $ _____

SITES A, B, AND C BID TOTAL **$ _____**

Notes:

1. Pipe Assessment & Dissection, base bid includes the cost for ten perpendicular cuts and three (3) skew cuts per pipe. The line items for additional perpendicular and skew cuts on a per cut basis are not included in the Subtotals or Total.

2. Pipe Replacement includes all costs associated with installing the new pipe, headwalls, flap gates and pipe backfill to the one foot level above the pipe, including all flowable fill and the granular fill material.
3. Levee Embankment Replacement includes all embankment replacement above the one foot level above the top of the replacement pipe, final grading, seeding, mulching, etc.
4. Hydraulic Proof Testing Before Sliplining includes cofferdam construction, pipe sealing, and all testing procedures. Hydraulic Proof Testing After Sliplining includes all test procedures, cofferdam removal upon completion of testing, and repairs required to cofferdam area, if any.

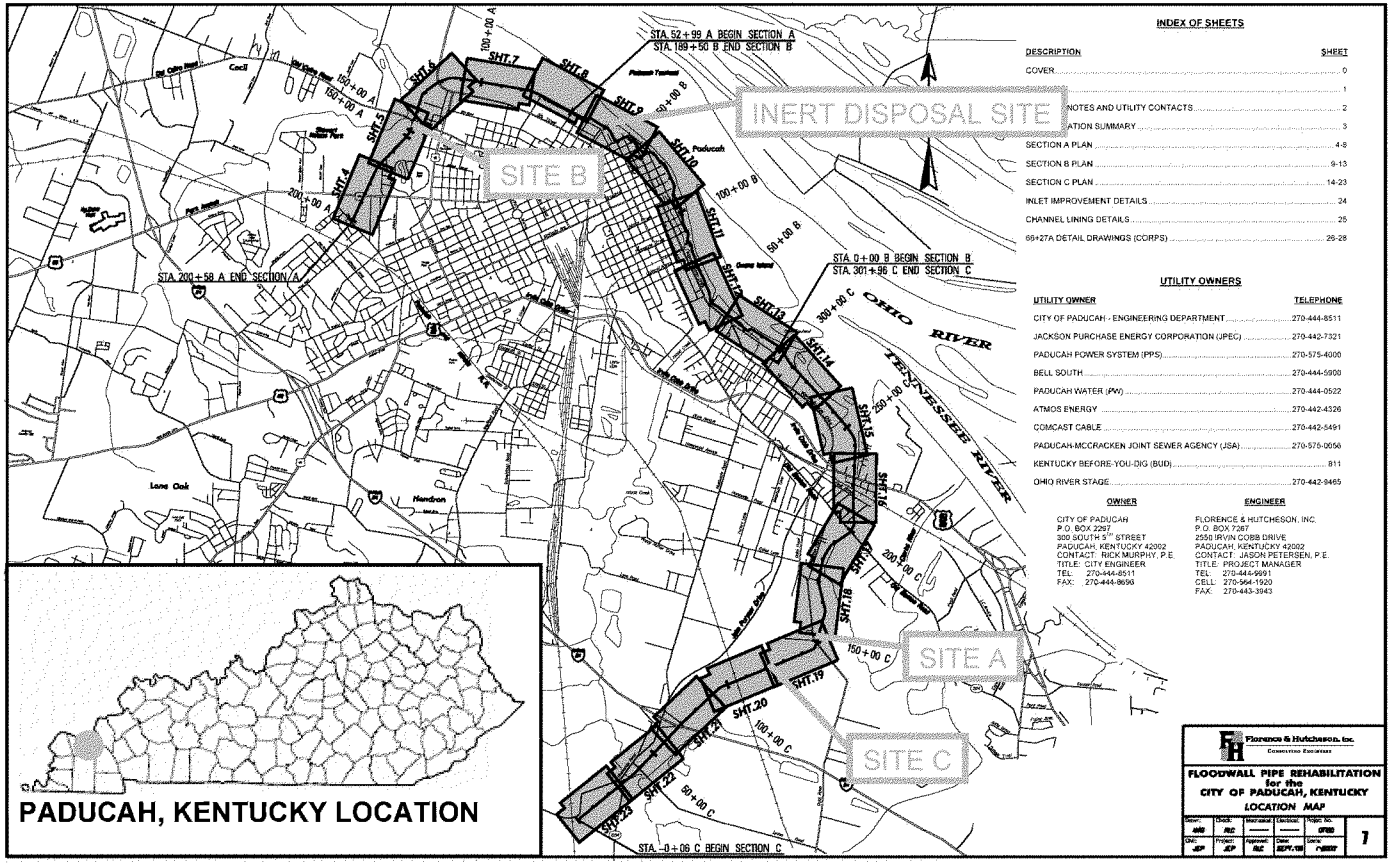

FIGURE 1. PROJECT LOCATION MAP.

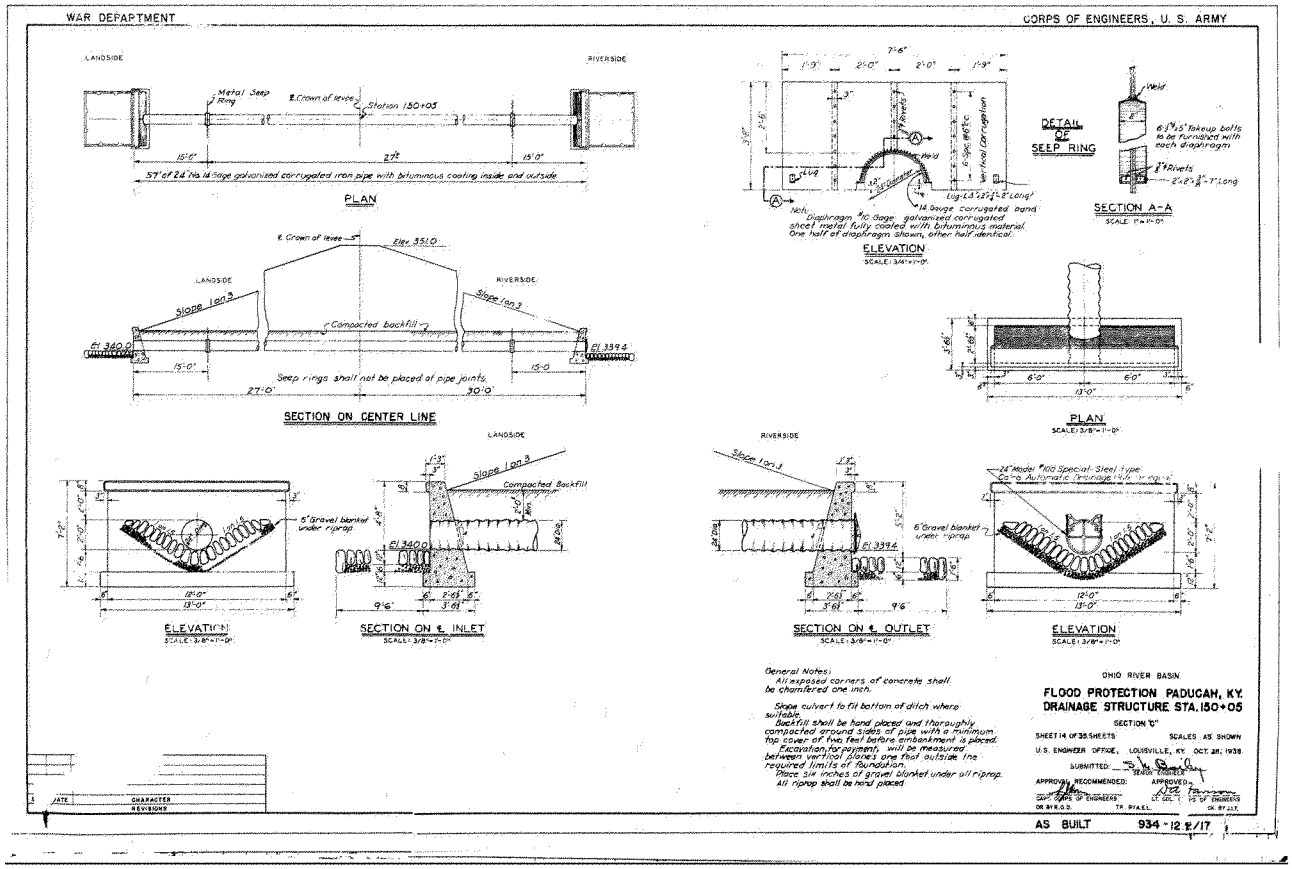

FIGURE 2. SITE A AS-BUILT DRAWING.

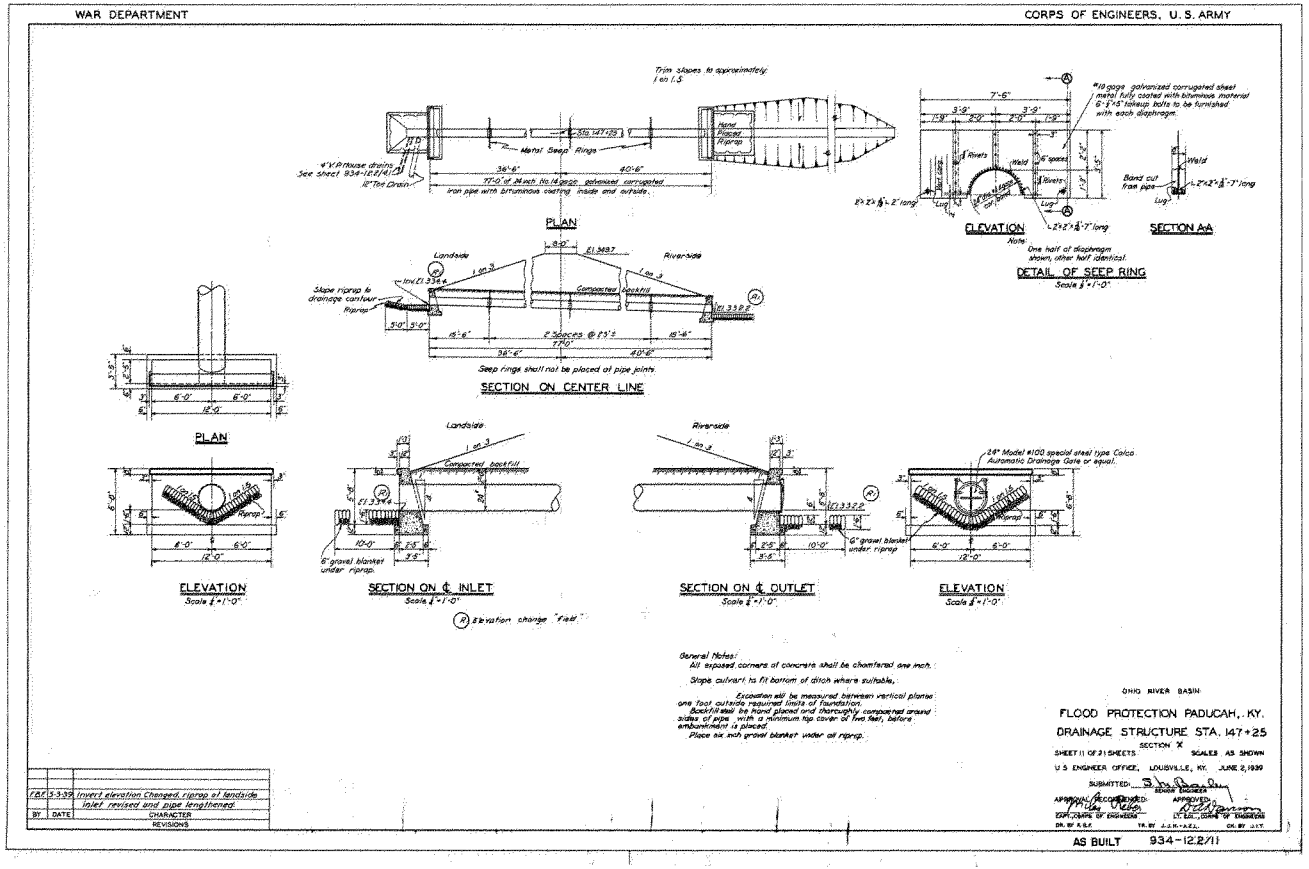

FIGURE 3. SITE B AS-BUILT DRAWING.

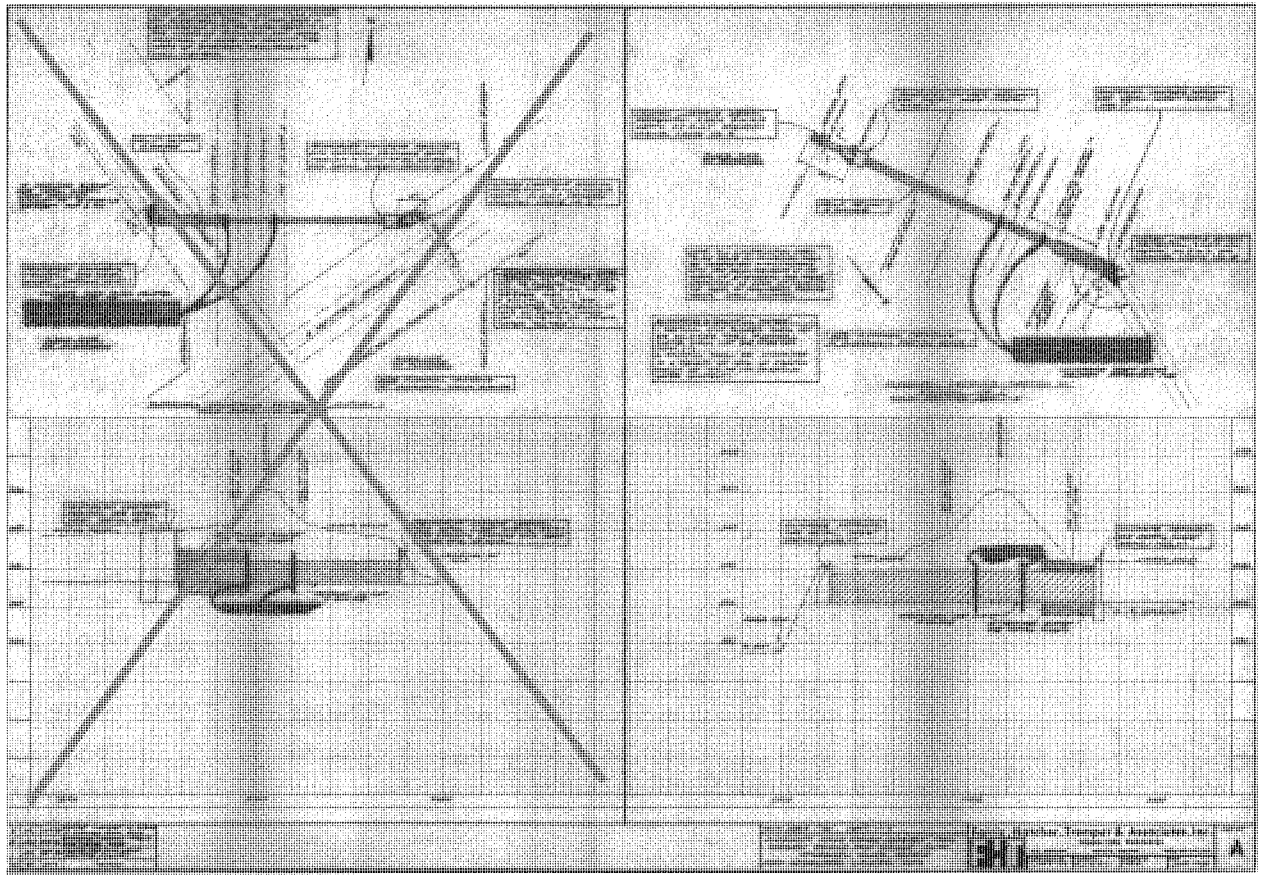

FIGURE 4. SITE C AS-BUILT DRAWING.

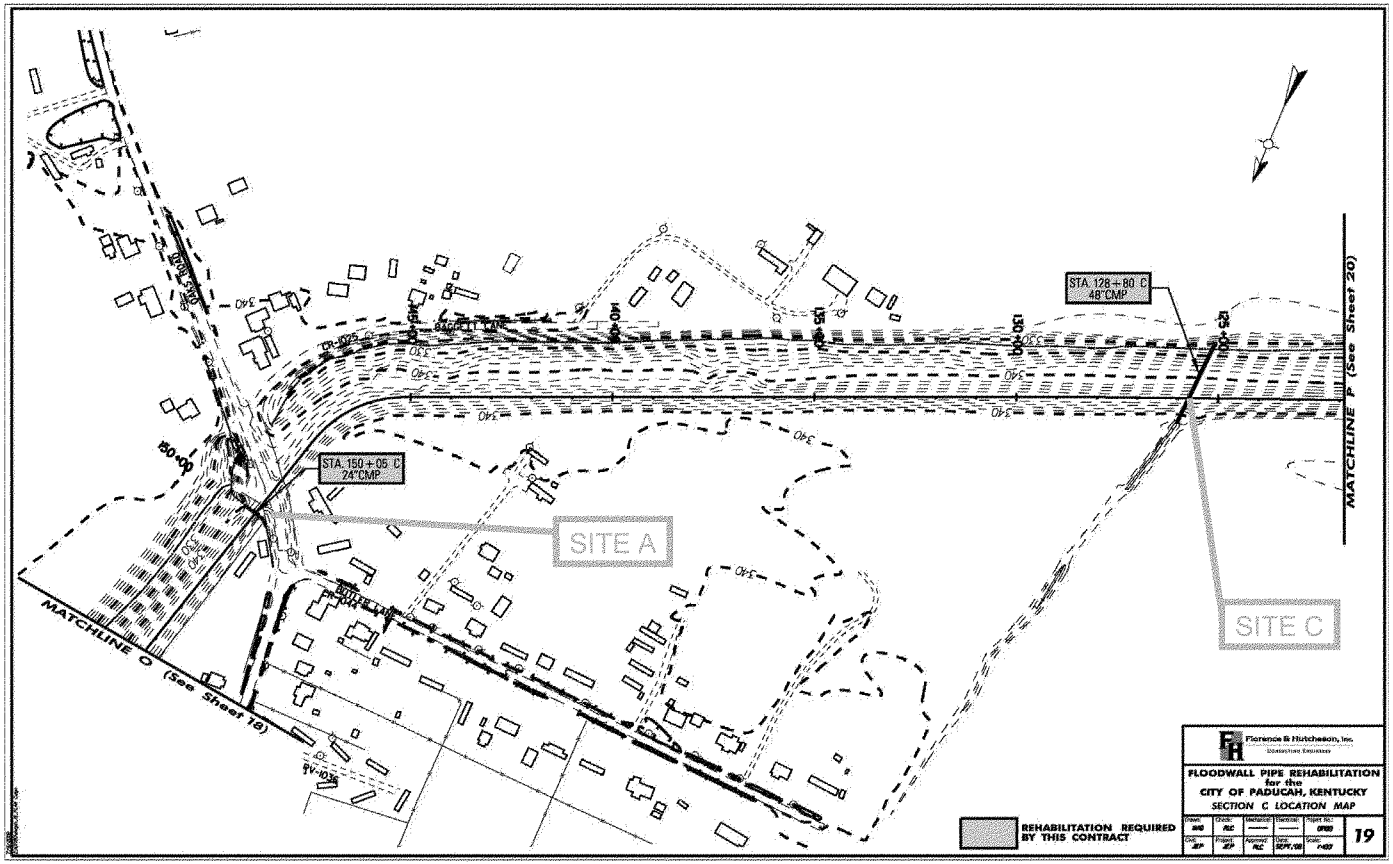

FIGURE 5. SITES A AND C LOCATION.

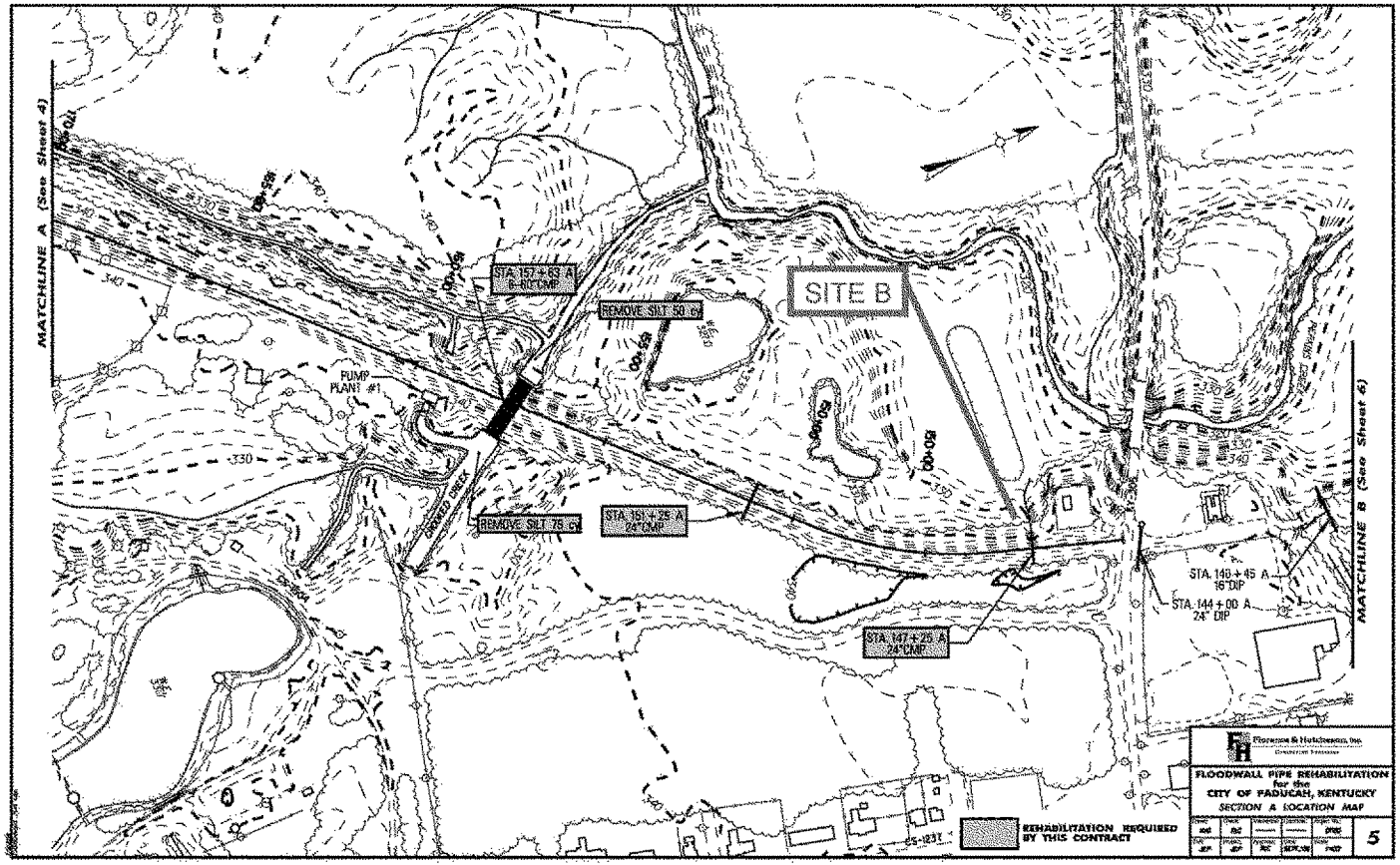

FIGURE 6. SITE B LOCATION.

AMENDMENT #1

SCOPE OF WORK

PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

30 JULY 2009

This amendment to the Scope of Work (SOW) entitled Proof Tests of Sliplining Technology Paducah, Kentucky Local Flood Protection Projects, dated 22 July 2009, is the result of site observations and discussion with Offerors during the pre-bid site visit on 29 July 2009. Offerors are instructed to modify their proposals as described in the following table. Other than these changes, all requirements of the 22 July 09 SOW remain in effect.

SOW Section	Summary of Revision/Clarification
Revision Sections 2.0, 3.1, 3.2, 3.3,	The nondestructive testing described at Site C is changed to Site B. Site C is evaluated using only destructive testing. Site B is evaluated using a combination of non-destructive and destructive testing.
Clarification Table 1	Approximate latitude/longitude coordinates for the sites are: Site A: N37.02528, W88.56682 Site B: N37.09346, W88.63747 Site C: N37.02208, W88.57335
Revision Section 3.2	No significant delay occurs to the project as a result of coordination with Larry Smith Contracting (LSC), who is providing sliplining services to the City of Paducah (the City). The City directs LCS to slipline the 48" CMP at Site C first. The Contractor destructively tests the Site C CMP as the first task on the contract, concurrent with the Site B non-destructive testing. Based on the results of the Site C destructive testing, the City of Paducah may direct LSC to modify the grout mixture to enhance performance, if needed. Rapid execution of the Site C destructive testing is a high priority to ensure efficient coordination of activities with LSC for the remainder of the City of Paducah sliplining contract. If grout mixture modification is required, this process may be repeated at a second and third pipe.
Clarification Section 3.1	Gamma ray and thermographic logging is required only at one site (Site B).
Revision Section 7.11	Hydrographs for the Ohio River are provided at the USACE ftp site ftp://ftp.usace.army.mil/pub/lrl/Paducah%20slipliner%20proof%20test/. These hydrographs may assist Offerors evaluate risk of high water levels during the project period of performance.

Revision Section 4.6.7	The City of Paducah provides access to an inert disposal site for construction/demolition materials at no cost to the Contractor. The same area will be used to stage selected cut sections of destructively tested pipes for future inspection. The site location is shown on Figure 1.
Revision Section 3.5	The Site A west headwall appears to encroach on private property and is not aligned well with the drainage ditch to the west. Contractor installs new cast-in-place headwall five ft to the east to resolve the encroachment issue. New west headwall includes a 90 degree wing wall tied into the existing hand-placed rip rap to alleviate the ditch alignment issue. Rip-rap is place in a trench at the transition of the wing wall to the surrounding soil. The City coordinates construction activities with the adjacent landowner.
Revision Section 3.5	New headwalls are cast-in-place and meet Kentucky Transportation Cabinet 2008 Standard Specifications Section 710, adjusted to original as-built dimensions.
Revision Section 3.5	Restoration of the levee includes eight inches of compacted aggregate to match the existing driving surface on top of the levee.
Revision Sections 3.4,	F&H performs grout strength tests at 3, 7, and 28 days from slipline grout samples at Sites A, B, and C. The seven-day curing period before destructive testing is waived if the three-day strength tests indicate the grout has reached the design strength (300 psi).
Revision Section 3.3	The post-hydraulic proof test is conducted no sooner than five days after sliplining and grouting are completed. The five-day waiting period for hydraulic testing at Site B is waived if the three-day grout strength tests indicate the grout has reached the design strength (300 psi).
Revision Section 3.4	Staging areas and stockpiles are located on the riverside at each site.
Revision Section 3.4	Prescriptive methodology for soil /grout evaluation is deleted. Offeror to propose a suitable method.
Revision Section 4.3	USACE verifies that concrete sand is an appropriate filter drain material based on the characteristics of the levee materials.
Revision Section 3.5	It is assumed that the temporary piezometers are removed when the Site B CMP is excavated for destructive testing. All casing, screen, and sand pack material not in the limits of the excavation is removed and the resulting void backfilled with bentonite grout.
Revision Section 3.6 (new)	Warning signs are installed along Oaks Road while work is performed at Site A. Signs and traffic control measures comply with Kentucky Transportation Cabinet 2008 Standard Specifications Section 112.03
Revision Section 3.4	Contractor carefully removes the existing flap gates to minimize damage and provides the salvaged flap gates to the City Floodwall Shop at 4th & Elizabeth Streets.
Revision Table 1	Levee height at Site C is about 12 ft.

Revision Figure 5	The Site A and Site C labels are switched.
Revision Section 3.1	Contractors that expressed capability to perform non-destructive testing to CELRL include: Terracon, Cincinnati, Ohio; contact Jason Sander 513.321.5816 Technos Inc., Miami, Florida, Lynn Yuhr, 305.718.9594 Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.
Clarification Section 3.5	The toe drain at Site B is replaced to original as-built condition if it is disturbed by the cofferdam installation.
Revision Section 7.4	Work hours are extended to 24 hours per day during hydraulic proof testing.
Revision Section 3.1(c)	Changed the third sentence to read: "The cofferdam surrounds the CMP outlet on the riverside of the levee to impound water, and is at least ten ft from either side of the CMP."
Revision Section 3.4	Contractors that expressed capability to perform destructive testing to CELRL include: a) Ohio Concrete Sawing and Drilling, Inc., Franklin, Ohio, Doug Schuchhardt, 513.723.0099 b) Capital Drilling and Sawing of Kentucky, Elizabethtown, Kentucky, 270.765.7377 Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.

AMENDMENT #2
SCOPE OF WORK
PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

4 August 2009

This amendment to the Scope of Work (SOW) entitled Proof Tests of Sliplining Technology Paducah, Kentucky Local Flood Protection Projects, dated 29 July 2009, is the result of questions from some of the MATOC contractors and their subs which. Offerors are instructed to modify their proposals as described in the following table. Other than these changes, all requirements of the 29 July 09 SOW remain in effect.

SOW Section	Summary of Revision/Clarification
Revision Section 2.0, Table 1	**Site B Scope**: has been revised to state "Non-destructive Inspection, Hydraulic Loading Test, Grout Penetration Inspection and Pipe Replacement". **Site C** scope will only involve Grout Penetration Inspection and Pipe Replacement. Also See Revised Table 1 attached as Enclosure 1 at the end of this amendment.
Revision/Additional Information Section 3.1 paragraph c)	After Sentence beginning with the words "Sufficient water..." Sentence added to state the following "There is an existing fire hydrant located approximately 300 ft from the riverside headwall for the CMP designated as Site B. Contractor shall call Paducah Water Distribution, Point of Contact Barry Bolen at 270-444-0522 to coordinate access to the fire hydrant for water supply for the Hydraulic Loading Test. The contractor will be required to meter this and pay for all costs associated with the use of water supplied from this location.
Revision Section 3.5	Revise the following sentence "The flap gates, frames, and anchors are replaced with new items of like design and materials meeting the requirements of Section 05 50 05." – To state "**The flap gates, frames, and anchors are replaced with new items per added Section 7.13 titled Flap Gates in the subject SOW. Section 7.13 is attached as Enclosure 2 at the end of this amendment."**

ENCLOSURE 1

Table 1. CMP Locations and Descriptions at Paducah LFPP

Site	Location	Description
A	Station 150+05, Paducah LFPP Section C Pre-Slipline CMP Condition: Fair Scope: Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 60 Feet Levee Height of 12 Feet
B	Station 147+25, Paducah LFPP Section A Pre-Slipline CMP Condition: Poor Scope: Non-Destructive Inspection, Hydraulic Loading Test, Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 80 Feet Levee Height of 18 Feet
C	Station 128+80, Paducah LFPP Section C Pre-Slipline CMP Condition: Very Poor Scope: Grout Penetration Inspection and Pipe Replacement	48 Inch Outside Diameter CMP CMP Length of 135 Feet Levee Height of 12 Feet

ENCLOSURE 2

7.13 Flap gates

Flap gates shall be standard products conforming with the requirements hereinafter specified and shall be of the size indicated. The flap gate, size as indicated on the drawings, will be flange framed with resilient or bronze seats. The body will be cast iron, ASTM A126 Class B. The angle of the cover to the vertical, when seated shall be between 2 degrees and 5 degrees from the vertical and be consistent with the proper operation of the gate. Resilient seat, neoprene or Buna-N, will not deteriorate under extremely moist and corrosive conditions; will prevent sticking of the gate flap after the gate has remained closed for long periods of time, and will be bonded in a groove machined in the body to provide a wide seating surface for the seat machined on the cover. Bronze seats, when specified ASTM B21 C464 or ASTM B133 C110, will be pneumatically impacted into dovetailed grooves machined in the cast iron body and cover and machined to a 63 micro-inch finish for maximum water tightness. The cover, or flap, will be cast iron, ASTM A126 Class B, with spherically dished design to withstand maximum operating loads. The hinge arms will be No. 1 manganese bronze, ASTM B584 C865. The hinge pins, designed in double shear, will be silicon bronze, ASTM B98 C655, or Type 304 stainless steel. Each hinge arm will have two pivot points, an adjustable lower pivot with limited rotation and a threaded upper hinge post to adjust flap valve sensitivity. A lubrication fitting will be supplied for each pivot. Type of service is gravity discharge and mounting type is anchor bolts to either an existing concrete headwall or to a new concrete headwall. Anchor bolts shall be stainless steel epoxy type. The anchor size(s), number of anchors and locations for connection to gate shall be based upon the manufacturer's recommendations.

Each gate shall be designed so that it will operate freely and function properly under all conditions of operation from minimum to maximum head and will seat true and be watertight when seated. All flap gates shall have the capability to resist a seating head of 60 feet. The seat rings will be in contact in the entire perimeter, when gate is closed, and the actual bearing of the disc seat ring on the frame seat ring will be not less than 75 percent of the total bearing area at all points on the perimeter. The frames shall be designed so as to fasten securely to the concrete walls, or pipes, and shall be so attached that no leakage will occur between the frame and the wall when the gates are closed. Gates shall be designed to operate with 6-inch head differential.

FABRICATION DRAWINGS

Fabrication drawings shall be provided showing complete details of materials, tolerances, connections, and proposed welding sequences which clearly differentiate shop welds and field welds.

SHOP ASSEMBLY DRAWINGS

Shop assembly drawings shall be provided showing details for connecting the adjoining fabricated components in the shop to assure satisfactory field installation.

DELIVERY DRAWINGS

Delivery drawings shall be provided showing descriptions of methods of delivering components to the site, including details for supporting fabricated components during shipping to prevent distortion or other damages.

FIELD INSTALLATION DRAWINGS

Field installation drawings shall be provided showing a detailed description of the field installation procedures. The description shall include the location and method of support of installation and handling equipment; provisions to be taken to protect concrete and other work during installation; method of maintaining components in correct alignment; and methods for installing appurtenant items.

PAINTING OF CAST-IRON FLAP GATES

Flap gates shall be thoroughly cleaned (surface preparation to be sand blasted in accordance with SSPC SP 6), primed and painted at the factory in accordance with manufacturer's recommendations with exterior epoxy type paint for submergence applications.

ACCEPTANCE TRIAL OPERATION

After completion of installation, the Contracting Officer will examine the flapgate installations for final acceptance. The individual components of the flapgate installations will be examined first to determine whether or not the workmanship conforms to the specification requirements. Required repairs or replacements to correct defects, shall be made at no cost to the Government. The trial operation shall be repeated after defects are corrected.

AMENDMENT #3
SCOPE OF WORK
PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

4 August 2009

This amendment to the Scope of Work (SOW) entitled Proof Tests of Sliplining Technology Paducah, Kentucky Local Flood Protection Projects, dated 29 July 2009, is the result of questions from some of the MATOC contractors and their potential subs contractors. Offerors are instructed to modify their proposals as described in the following table. Other than this change along with the Amendment #2 changes, all requirements of the 29 July 09 SOW remain in effect.

SOW Section	Summary of Revision/Clarification
Revision Section 3.1, paragraph c)	Add a sentence at the end of this paragraph which states "The contractor will be required to construct a temporary elevated cover over the cofferdam to prevent rainwater from entering the cofferdam area during both the pre and post Hydraulic Proof Test which could skew the test results. "

OHIO RIVER SHORELINE, PADUCAH, KENTUCKY LFPP RECONSTRUCTION FEASIBILITY REPORT VOLUME 4 APPENDIX C

SECTION 3 STRUCTURAL CALCULATIONS

April 2011
Final Submittal

US Army Corps of Engineers
Louisville District

Subject:	Paducah Levee Certification	Page	1	of	26
	Near Locust St.	Computed by:	J. Kelly		12-Jun-09
	Station 4+50 B-1	Checked by:			

Geometry:

Dimensions						
From As-Builts			Derived		Flood	
AB	7.354	ft. (width)	BC	7.278 ft	Sill El.	338.20 ft. (NAVD)
AI	2.818		CG	4.580	Flood El.	344.80
IC	3.583		GD	3.965	AH	7.378
CD	4.417		AJ	5.938		
DE	2.271		IJ	4.117		
EF	1.500					
BF	11.708	(height)	Θ_{IAB}	63.4505 °	Θ_{JAB}	25.1183 °
BG	6.615		Θ_{ABC}	51.8796	Θ_{IAJ}	38.3322
W	7.500	supported skinplate	Θ_{ACB}	64.6699	BJ	3.204
		width	Θ_{BCG}	63.0659	CJ	4.075

Nodes					
Truss				Beam y = 0, z = 0	
	x	y	z		x
1-A	0.000	0.000	0.000	1-A	0.000
2-I	1.259	2.521	0.000	Purlin A	0.818
3-C	2.861	5.726	0.000	3-I	2.818
4-D	4.835	9.677	0.000	4-C	6.401
5-E	5.850	11.708	0.000	5-D	10.818
6-F	7.354	11.708	0.000	6-E	13.089
7-G	7.354	6.615	0.000		
8-B	7.354	0.000	0.000	Load dist	1.642
9-J	5.376	2.521	0.000		

Members (from As-Builts)					
		Check			Check
AB	2L2-1/2X2-1/2X1/4		Purlin at A:	W8X15	
AI	2L2-1/2X2-1/2X1/4		Purlin at I :	W8X15	
IC	2L2-1/2X2-1/2X1/4		Purlin at C:	W8X15	
CD	2L2-1/2X2-1/2X1/4		Purlin at D:	W8X15	N/A
DE	2L2-1/2X2-1/2X1/4				
EF	2L2-1/2X2-1/2X1/4			Skin Plate	X
FG	2L3X2-1/2X1/4SLBB				
BG	2L3X2-1/2X1/4SLBB				
AJ	2L2-1/2X2X1/4LLBB				
IJ	2L2-1/2X2X1/4LLBB				
BJ	2L2-1/2X2-1/2X1/4		CG	2L2-1/2X2X1/4LLBB	
CJ	2L2-1/2X2-1/2X1/4		DG	2L2-1/2X2X1/4LLBB	

Hydrostatic Force:

Resultant Hydrostatic Force at Center of Pressure, CP

$R = \gamma h_{CG} A =$ 62.4 lb/ft^3 × (AH/2×sinΘ_{IAB})ft × (AH×W)ft^2 11,394.6 lbs

$R_V = R\cos\Theta_{IAB} =$ 11394.6cos(63.5°)lb = 5,093.1

$R_H = R\sin\Theta_{IAB} =$ 11394.6sin(63.5°)lb = 10,193.0

Check: Sqrt($R_V^2 + R_H^2$) - R = 0 0.0

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
New Levee St
Station 4+50 B-1

Page 2 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

CP *(Neglecting ambient pressure)*

$y_{cp} = -(I_{xx}\sin\Theta_{IAB}) / (h_{cg}A) =$ -1.230 ft

$x_{cp} = 0$ 0.000

Location of Resultant Force, R, (distance fr. A) 2.459 ft

Results (Condition DL=Dead Load)

Forces [Kip] | Moments [Kip*ft] | Forces [Kip]

Support Reactions (Truss)[1]

Node	FX	FY	MX	MY
1-A	-10.194	1.281	0.000	0.000
8-B	0.000	3.810	0.000	0.000
SUM	-10.194	5.091	0.000	0.000
Check	-0.001	-0.002		

Beam

Node	FY
Purlin A	1.451
3-I	10.345
4-C	-0.461
5-D	0.059
SUM	11.395
Check	0.000

Members

	Axial	M_{33}
1-AI	-5.589	-1.562
2-IC	-0.069	0.328
3-CD	0.005	-0.029
4-DE	-0.005	-0.004
5-EF	0.003	0.007
6-FG	0.008	-0.008
7-GB	-0.035	0.043
8-AB	2.998	0.387
9-AJ	9.622	-0.139
10-BJ	-4.754	-0.084
11-CJ	0.406	0.190
12-IJ	-11.989	0.219
13-CG	0.014	-0.026
14-DG	-0.034	-0.011

Notes: 1. Neglecting weight of truss, & assuming pin connection at A, roller at B. Although assuming a roller at B is not completely accurate, effort will be made to ensure that the least conservative method is used in this analysis.
2. Material used is designated as AL 27S-T; closest match to today's standards is 2014-T4. This analysis uses A36 steel.

Member Design Data:

F_y = 42 ksi E = 10,600 ksi G = 4,000 ksi

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Reach Levee 51
Station 4+51 B-1

Page 3 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Member AI

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-5,589.00 lbs	M_r =	-1,562.00 lb-ft	L =	33.813 in
L_b =	33.813 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 44 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 53.41 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*
= 30.22 ksi

$P_n = F_{cr} \cdot A_g =$ 30.22 x 2.37 = 71.62 kips
= 71,624 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 30.22 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 24.51 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 24.51 x 2.37 = 58.09 kips
= 58,092 lbs

$P_n =$ 58,092 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \le 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)/L_b}] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 1.208 *(F9-5)*
= 606.08 kip-in = 50,506 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Longwell St.
Station 4+50 B.1

Page 4 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n$ = 0.9 x 58092 = 52,283 lbs
$M_c = \varphi_b M_n$ = 0.9 x 4329 = 3,896 lb-1b

P_r/P_c = -0.107 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.454 ≤ 1.0 Therefore OK.

Member AI is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member IC
Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-69.00 lbs	M_r =	328.000 lb-ft	L =	43.000 in
L_b =	43.000 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E
K·L/r = 56 Slender Element? No Therefore use Chapter E3.

K·L/r ≤ 4.71√(E/Fy) = 75 F_e = π²E/(K·L/r)² = 33.03 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 24.67 ksi

$P_n = F_{cr} \cdot A_g$ = 24.67 x 2.37 = 58.46 kips
= 58,456 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 24.67 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 21.11 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 21.11 x 2.37 = 50.02 kips
= 50,020 lbs

P_n = 50,020 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
New Locust St
Station 4+50 B-1

Page 5 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} =$ $[\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B =$ $2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.950 *(F9-5)*

= 399.83 kip-in = 33,319 lb-ft

Flange Local Buckling, F9.3

$M_n =$ $F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c =$ $\varphi_cP_n =$ 0.9 x 50020 = 45,018 lbs

$M_c =$ $\varphi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ -0.002 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

0.083 ≤ 1.0 Therefore OK.

Member IC is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Hazel Lagoon St
Station 4+50 B-1

Page 6 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Member CD

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	5.00 lbs	M_r =	-29.000 lb-ft	L =	53.000 in
L_b =	53.000 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 69 Slender Element? No Therefore use Chapter E3.

K·L/r > 4.71√(E/Fy) = 75 F_e = π²E/(K·L/r)² = 21.74 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 18.71 ksi

P_n = $F_{cr} \cdot A_g$ = 18.71 x 2.37 = 44.34 kips
= 44,341 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

F_{crz} = $GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
F_{cry} = $F_{cr,FB}$ = 18.71 ksi *(E3-2)*

F_{cr} = ((F_{cry} + F_{crz}) / 2H) · [1 - √(1 - ($4F_{cry}F_{crz}H$) / (F_{cry} + F_{crz})^2)]
= 16.82 ksi *(E4-2)*

P_n = $F_{cr} \cdot A_g$ = 16.82 x 2.37 = 39.87 kips
= 39,874 lbs

P_n = 39,874 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p$ = $F_y Z_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_y Z_x$ = 58.38 kip-in $1.6M_y$ = 51.95 kip-in

Therefore: $M_{n,Y}$ = 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr}$ = [π√(EI_yGJ)/L_b] · [B+√(1+B²)] (B positive for tension) *(F9-4)*
B = 2.3(d/L_b)√(I_y/J) = 0.771 *(F9-5)*
= 283.17 kip-in = 23,597 lb-ft

Flange Local Buckling, F9.3

M_n = $F_{cr} S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n$ = 0.9 x 39874 = 35,887 lbs
$M_c = \varphi_b M_n$ = 0.9 x 4329 = 3,896 lb-ft

P_r/P_c = 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.007 ≤ 1.0 Therefore OK.

Member CD is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member DE

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-5.00 lbs	M_r =	-4.000 lb-ft	L =	27.250 in
L_b =	27.250 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 36 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2 E/(K \cdot L/r)^2 =$ 82.24 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 33.92 ksi

$P_n = F_{cr} \cdot A_g$ = 33.92 x 2.37 = 80.38 kips
= 80,382 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 33.92 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 26.46 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 26.46 x 2.37 = 62.70 kips
= 62,704 lbs

P_n = 62,704 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Lock Certification
Near Lock 51
Station 11+50 Bt

Page 8 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 1.499 *(F9-5)*

= 894.15 kip-in = 74,512 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_cP_n =$ 0.9 x 62704 = 56,434 lbs

$M_c = \varphi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.001 ≤ 1.0 Therefore OK.

Member DE is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Lonsdale St
Station 4+50 B-1

Page 9 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Member EF

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	3.00 lbs	M_r =	7.000 lb-ft	L =	18.000 in
L_b =	18.000 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 24 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 188.47 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*
= 38.26 ksi

$P_n = F_{cr} \cdot A_g =$ 38.26 x 2.37 = 90.68 kips
= 90,676 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 38.26 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 28.43 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 28.43 x 2.37 = 67.39 kips
= 67,389 lbs

$P_n =$ 67,389 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \le 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_yJ)} =$ 2.270 *(F9-5)*
= 1947.56 kip-in = 162,297 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Longue St
Station 4+50 B.1

Page 10 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

P_c = $\varphi_c P_n$ = 0.9 x 67389 = 60,650 lbs
M_c = $\varphi_b M_n$ = 0.9 x 4329 = 3,896 lb-ft

P_r/P_c = 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
0.002 ≤ 1.0 Therefore OK.

Member EF is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member FG
Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	8.00 lbs	M_r =	-8.000 lb-ft	L =	61.125 in
L_b =	61.125 in	K =	1.000	A_g =	2.640 in²
d =	2.500 in	b_f =	6.000 in	t_f =	0.250 in
r =	0.746 in	r_o =	1.590 in	H =	0.890
S_x =	0.794 in^3	Z_x =	1.410 in^3	I_y =	4.462 in^4
J =	0.056 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E
K·L/r = 82 Slender Element? No Therefore use Chapter E3.

K·L/r > 4.71√(E/Fy) = 75 F_e = $\pi^2E/(K \cdot L/r)^2$ = 15.58 ksi

Therefore, F_{cr} = 0.877Fe *(E3-3)*
= 13.67 ksi

P_n = $F_{cr} \cdot A_g$ = 13.67 x 2.64 = 36.08 kips
= 36,079 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

F_{crz} = $GJ/A_g r_o^2$ = 33.56 ksi *(E4-3)*
F_{cry} = $F_{cr,FB}$ = 13.67 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 12.80 ksi *(E4-2)*

P_n = $F_{cr} \cdot A_g$ = 12.8 x 2.64 = 33.79 kips
= 33,787 lbs

P_n = 33,787 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 59.22 kip-in $1.6M_y =$ 53.36 kip-in

Therefore: $M_{n,Y} =$ 53.36 kip-in = 4,446 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} =$ $[\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B =$ $2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.840 *(F9-5)*

= 358.88 kip-in = 29,907 lb-ft

Flange Local Buckling, F9.3

$M_n =$ $F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,446 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c =$ $\varphi_cP_n =$ 0.9 x 33787 = 30,408 lbs

$M_c =$ $\varphi_bM_n =$ 0.9 x 4446 = 4,002 lb-ft

$P_r/P_c =$ 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.002 ≤ 1.0 Therefore OK.

Member FG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Inner Levee S1
Station 4+50 B-1

Page 12 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Member BG

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-35.00 lbs	M_r =	43.000 lb-ft	L =	79.375 in
L_b =	79.375 in	K =	1.000	A_g =	2.640 in²
d =	2.500 in	b_f =	6.000 in	t_f =	0.250 in
r =	0.746 in	r_o =	1.590 in	H =	0.890
S_x =	0.794 in^3	Z_x =	1.410 in^3	I_y =	4.462 in^4
J =	0.056 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 106 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 9.24 ksi

Therefore, $F_{cr} =$ 0.877Fe *(E3-3)*
= 8.10 ksi

$P_n = F_{cr} \cdot A_g =$ 8.1 x 2.64 = 21.40 kips
= 21,395 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 33.56 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 8.10 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 7.84 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 7.84 x 2.64 = 20.70 kips
= 20,701 lbs

$P_n =$ 20,701 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 59.22 kip-in $1.6M_y =$ 53.36 kip-in

Therefore: $M_{n,Y} =$ 53.36 kip-in = 4,446 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)/L_b}] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.647 *(F9-5)*
= 236.69 kip-in = 19,724 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

M_n = 4,446 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n$ = 0.9 x 20701 = 18,631 lbs
$M_c = \varphi_b M_n$ = 0.9 x 4446 = 4,002 lb-ft

P_r/P_c = -0.002 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
0.010 ≤ 1.0 Therefore OK.

Member BG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member AB

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	2,998 lbs	M_r =	387.000 lb-ft	L =	88.250 in
L_b =	88.250 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 116 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2 E/(K \cdot L/r)^2 =$ 7.84 ksi

Therefore, F_{cr} = 0.877Fe *(E3-3)*
= 6.88 ksi

$P_n = F_{cr} \cdot A_g$ = 6.88 x 2.37 = 16.30 kips
= 16,297 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 6.88 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 6.66 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 6.66 x 2.37 = 15.79 kips
= 15,795 lbs

P_n = 15,795 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Locust St
Station 1+50 Rt

Page 14 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} =$ $[\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B =$ $2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.463 *(F9-5)*

= 130.88 kip-in = 10,906 lb-ft

Flange Local Buckling, F9.3

$M_n =$ $F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c =$ $\varphi_cP_n =$ 0.9 x 15795 = 14,215 lbs

$M_c =$ $\varphi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ 0.211 $\geq$ 0.2, Therefore use Equation (H1-1a)

$Pr/Pc + (8/9)\cdot(Mr/Mc) \leq 1.0$

$0.299 \leq 1.0$ Therefore OK.

Member AB is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Floor Levee St
Station 4+50 B-1

Page 15 of 26
Computed by: J. Kelly 12-Jun-09
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Member AJ

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	9,622.00 lbs	M_r =	-139.000 lb-ft	L =	71.254 in
L_b =	71.254 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in^3	Z_x =	1.380 in^3	I_y =	1.349 in^4
J =	0.046 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 91 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 12.60 ksi

Therefore, $F_{cr} =$ 0.877Fe *(E3-3)*
= 11.05 ksi

$P_n = F_{cr} \cdot A_g =$ 11.05 x 2.14 = 23.65 kips
= 23,649 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 51.19 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 11.05 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 10.38 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 10.38 x 2.14 = 22.20 kips
= 22,204 lbs

$P_n =$ 22,204 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 57.96 kip-in $1.6M_y =$ 51.21 kip-in

Therefore: $M_{n,Y} =$ 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)/L_b}] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_yJ)} =$ 0.439 *(F9-5)*
= 109.00 kip-in = 9,084 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

M_n = 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n =$ 0.9 x 22204 = 19,983 lbs
$M_c = \varphi_b M_n =$ 0.9 x 4267 = 3,840 lb-ft

$P_r/P_c =$ 0.482 ≥ 0.2, Therefore use Equation (H1-1a)

Pr/Pc + (8/9)·(Mr/Mc) ≤ 1.0
0.449 ≤ 1.0 Therefore OK.

Member AJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member IJ
Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-11,989 lbs	M_r =	219.000 lb-ft	L =	49.403 in
L_b =	49.403 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in³	Z_x =	1.380 in³	I_y =	1.349 in⁴
J =	0.046 in⁴				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E
K·L/r = 63 Slender Element? No Therefore use Chapter E3.

K·L/r ≤ 4.71√(E/Fy) = 75 F_e = π²E/(K·L/r)² = 26.21 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 21.48 ksi

P_n = $F_{cr} \cdot A_g$ = 21.48 x 2.14 = 45.96 kips
= 45,963 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

F_{crz} = $GJ/A_g r_o^2$ = 51.19 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 21.48 ksi *(E3-2)*

F_{cr} = ((F_{cry} + F_{crz}) / 2H) · [1 - √(1 - (4$F_{cry}F_{crz}$H) / (F_{cry} + F_{crz})²)]
= 18.72 ksi *(E4-2)*

P_n = $F_{cr} \cdot A_g$ = 18.72 x 2.14 = 40.05 kips
= 40,053 lbs

P_n = 40,053 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Floor Locust St
Station 11+50 R-1

Page 17 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 57.96 kip-in $1.6M_y =$ 51.21 kip-in

Therefore: $M_{n,Y} =$ 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} =$ $[\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B =$ $2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.633 *(F9-5)*

= 186.55 kip-in = 15,546 lb-ft

Flange Local Buckling, F9.3

$M_n =$ $F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c =$ $\varphi_cP_n =$ 0.9 x 40053 = 36,048 lbs

$M_c =$ $\varphi_bM_n =$ 0.9 x 4267 = 3,840 lb-ft

$P_r/P_c =$ -0.333 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.109 ≤ 1.0 Therefore OK.

Member IJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Levee St
Station 4+50 B-1

Page 18 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Member BJ

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-4,754.00 lbs	M_r =	-84.000 lb-ft	L =	38.447 in
L_b =	38.447 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 50 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 41.31 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 27.44 ksi

$P_n = F_{cr} \cdot A_g =$ 27.44 x 2.37 = 65.04 kips
= 65,042 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 27.44 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 22.88 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 22.88 x 2.37 = 54.23 kips
= 54,229 lbs

P_n = 54,229 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \le 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
F_yZ_x = 58.38 kip-in $1.6M_y$ = 51.95 kip-in

Therefore: $M_{n,Y}$ = 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)/L_b}] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 1.063 *(F9-5)*
= 484.09 kip-in = 40,341 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n$ = 0.9 x 54229 = 48,806 lbs
$M_c = \varphi_b M_n$ = 0.9 x 4329 = 3,896 lb-ft

P_r/P_c = -0.097 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.070 ≤ 1.0 Therefore OK.

Member BJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member CJ

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	406.00 lbs	M_r =	190.000 lb-ft	L =	48.894 in
L_b =	48.894 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 64 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2 E/(K \cdot L/r)^2 =$ 25.54 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 21.10 ksi

$P_n = F_{cr} \cdot A_g$ = 21.1 x 2.37 = 50.02 kips
= 50,017 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 21.10 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 18.62 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 18.62 x 2.37 = 44.13 kips
= 44,133 lbs

P_n = 44,133 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Locust St.
Station 1+50 B.1

Page 20 of 26
Computed by: J. Kelly 12-Jun-09
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Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} =$ $[\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B =$ $2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.836 *(F9-5)*

= 322.83 kip-in = 26,903 lb-ft

Flange Local Buckling, F9.3

$M_n =$ $F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c =$ $\varphi_cP_n =$ 0.9 x 44133 = 39,719 lbs

$M_c =$ $\varphi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ 0.010 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

0.054 ≤ 1.0 Therefore OK.

Member CJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Pattison Lateral Certification
Tower Lateral St
Station 4+50 B-1

Page 21 of 26
Computed by: J. Kelly 12-Jun-09
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Member CG

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	14.00 lbs	M_r =	-26.000 lb-ft	L =	54.961 in
L_b =	54.961 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in^3	Z_x =	1.380 in^3	I_y =	1.349 in^4
J =	0.046 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 70 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 21.18 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*
= 18.31 ksi

$P_n = F_{cr} \cdot A_g =$ 18.31 x 2.14 = 39.19 kips
= 39,191 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 51.19 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 18.31 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 16.35 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 16.35 x 2.14 = 34.99 kips
= 34,988 lbs

$P_n =$ 34,988 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 57.96 kip-in $1.6M_y =$ 51.21 kip-in

Therefore: $M_{n,Y} =$ 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)/L_b}] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.569 *(F9-5)*
= 158.73 kip-in = 13,227 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

M_n = 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

P_c = $\varphi_c P_n$ = 0.9 x 34988 = 31,489 lbs
M_c = $\varphi_b M_n$ = 0.9 x 4267 = 3,840 lb-ft

P_r/P_c = 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.007 ≤ 1.0 Therefore OK.

Member CG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member DG
Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-34.00 lbs	M_r =	-11.000 lb-ft	L =	47.583 in
L_b =	47.583 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in^3	Z_x =	1.380 in^3	I_y =	1.349 in^4
J =	0.046 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E
K·L/r = 61 Slender Element? No Therefore use Chapter E3.

K·L/r ≤ 4.71√(E/Fy) = 75 F_e = π²E/(K·L/r)² = 28.26 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 22.55 ksi

P_n = $F_{cr} \cdot A_g$ = 22.55 x 2.14 = 48.25 kips
= 48,247 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

F_{crz} = $GJ/A_g r_o^2$ = 51.19 ksi *(E4-3)*
F_{cry} = $F_{cr,FB}$ = 22.55 ksi *(E3-2)*

F_{cr} = ((F_{cry} + F_{crz}) / 2H) · [1 - √(1 - (4$F_{cry}F_{crz}$H) / (F_{cry} + F_{crz})^2)]
= 19.48 ksi *(E4-2)*

P_n = $F_{cr} \cdot A_g$ = 19.48 x 2.14 = 41.69 kips
= 41,690 lbs

P_n = 41,690 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 57.96 kip-in $1.6M_y =$ 51.21 kip-in

Therefore: $M_{n,Y} =$ 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} =$ $[\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B =$ $2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.657 *(F9-5)*

= 197.67 kip-in = 16,472 lb-ft

Flange Local Buckling, F9.3

$M_n =$ $F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c =$ $\varphi_cP_n =$ 0.9 x 41690 = 37,521 lbs

$M_c =$ $\varphi_bM_n =$ 0.9 x 4267 = 3,840 lb-ft

$P_r/P_c =$ -0.001 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.003 ≤ 1.0 Therefore OK.

Member DG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Ground St
Station 4+50 B.1

Page 24 of 26
Computed by: J. Kelly 12-Jun-09
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Purlin Design
Data

A =	W8X15	L =	8.167 ft		
I =	W8X15	L_b =	8.167 ft		
C =	W8X15	F_y =	60 ksi		
		E =	29,000 ksi		
		G =	11,200 ksi		

Note: Structure is designed for design flood loads, where Purlin D should not experience load. An analysis of Purlin D should be performed if this is not the case.

$M_{max} = (wL^2/8)$

w_A =	177.7 lb/ft	w_I =	1,266.7 lb/ft	w_C =	-56.4 lb/ft
M_A =	1,481.5 lb-ft	M_I =	10,560.3 lb-ft	M_C =	-470.2 lb-ft

Purlin A, Steel Design
Steel Design, Steel Construction Manual, AISC 13th Edition

M_r =	1,481 lb-ft	L =	98 in	L_b =	98 in
d =	8.11 in	$b_f/2t_f$ =	6.37	S_x =	11.8 in^3
Z_x =	13.6 in^3	I_y =	3.41 in^4	J =	0.137 in^4
r_y =	0.876 in	C_w =	51.8 in^6	h_o =	7.795 in
r^2_{ts} =	$\sqrt{(I_y*C_w)/S_x}$ =	1.126 in^2	*(F2-7)*		

Nominal Flexural Strength

Yielding, F2.1

Mn = Mp = FyZx = 816.00 kip-in
Mn,y = 816.00 kip-in = 68,000 lb-ft

Lateral-Torsional Buckling, F2.2

$L_p = 1.76 r_y \sqrt{(E/F_y)}$ = 33.90 in *(F2-5)*

$L_r = 1.95 r_{ts} \cdot (E/0.7F_y) \sqrt{(Jc/S_x h_o)} \sqrt{(1+\sqrt{(1+6.76 \cdot ((0.7F_y/E) \cdot (S_x h_o/Jc))^2)})}$

= 106.35 in *(F2-6)*

Lp < Lb ≤ Lr

Mn = Cb [Mp - (Mp - 0.7FySx) x (Lb - Lp) / (Lr - Lp)] ≤ Mp

M_n = 532.51 kip-in

$F_{cr} = C_b \pi^2 E/(L_b/r_{ts})^2 \cdot \sqrt{(1 + 0.078 \cdot (Jc/S_x h_o)*(L_b/r_{ts})^2)}$

= 47.36 ksi

$M_{n,LTB}$ = 532.51 kip-in = 44,375.81 lb-ft

Compression Flange Local Buckling Does not Apply

M_n = 44,376 lb-ft *Lowest value obtained through limit states.

φM_n = 0.9 x 44376 = 39,938 lb-ft > Mr = 1481 lb-ft, Therefore OK.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Steel Levee St
Stoplog 4+50 B-1

Page 25 of 26
Computed by: J. Kelly 12-Jun-09
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Purlin I, Steel Design

Steel Design, Steel Construction Manual, AISC 13th Edition

M_r =	10,560 lb-ft	L =	98 in	L_b =	98 in
d =	8.11 in	$b_f/2t_f$ =	6.37	S_x =	11.8 in^3
Z_x =	13.6 in^3	I_y =	3.41 in^4	J =	0.137 in^4
r_y =	0.876 in	C_w =	51.8 in^6	h_o =	7.795 in

r^2_{ts} = $\sqrt{(I_y{*}C_w)}/S_x$ = 1.126 in^2 *(F2-7)*

Nominal Flexural Strength

Yielding, F2.1

Mn = Mp = FyZx = 816.00 kip-in

Mn,y = 816.00 kip-in = 68,000 lb-ft

Lateral-Torsional Buckling, F2.2

L_p = $1.76 r_y \sqrt{(E/F_y)}$ = 33.895 in *(F2-5)*

L_r = $1.95 r_{ts} \cdot (E/0.7F_y) \sqrt{(Jc/S_x h_o)} \sqrt{(1+\sqrt{(1+6.76 \cdot ((0.7F_y/E) \cdot (S_x h_o/Jc))^2)})}$

= 106.35 in *(F2-6)*

Lp < Lb ≤ Lr

Mn = Cb [Mp - (Mp - 0.7FySx) x (Lb - Lp) / (Lr - Lp)] ≤ Mp

M_n = 532.51 kip-in

$F_{cr} = C_b \pi^2 E/(L_b/r_{ts})^2 \cdot \sqrt{(1 + 0.078 \cdot (Jc/S_x h_o)*(L_b/r_{ts})^2)}$

= 47.36 ksi

$M_{n,LTB}$ = 532.51 kip-in = 44,376 lb-ft

Compression Flange Local Buckling Does not Apply

M_n = 44,376 lb-ft *Lowest value obtained through limit states.

φM_n = 0.9 x 44376 = 39,938 lb-ft > Mr = 10560 lb-ft, Therefore OK.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Locust St
Station 4+50 E-1

Page 26 of 26
Computed by: J. Kelly 12-Jun-09
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Purlin C, Steel Design

Steel Design, Steel Construction Manual, AISC 13th Edition

M_r =	(470) lb-ft	L =	98 in	L_b =	98 in
d =	8.11 in	$b_f/2t_f$ =	6.37	S_x =	11.8 in^3
Z_x =	13.6 in^3	I_y =	3.41 in^4	J =	0.137 in^4
r_y =	0.876 in	C_w =	51.8 in^6	h_o =	7.795 in
r^2_{ts} =	$\sqrt{(I_y*C_w)/S_x}$ =	1.126 in^2	*(F2-7)*		

Nominal Flexural Strength

Yielding, F2.1

Mn = Mp = FyZx = 816.00 kip-in

Mn,y = 816.00 kip-in = 68,000 lb-ft

Lateral-Torsional Buckling, F2.2

$L_p = 1.76 r_y \sqrt{(E/F_y)}$ = 33.895 in *(F2-5)*

$L_r = 1.95 r_{ts} \cdot (E/0.7F_y) \sqrt{(Jc/S_x h_o)} \sqrt{(1+\sqrt{(1+6.76 \cdot ((0.7F_y/E) \cdot (S_x h_o/Jc))^2)})}$

= 106.35 in *(F2-6)*

Lp < Lb ≤ Lr

Mn = Cb [Mp - (Mp - 0.7FySx) x (Lb - Lp) / (Lr - Lp)] ≤ Mp

M_n = 532.51 kip-in

$F_{cr} = C_b \pi^2 E/(L_b/r_{ts})^2 \cdot \sqrt{(1 + 0.078 \cdot (Jc/S_x h_o)*(L_b/r_{ts})^2)}$

= 47.36 ksi

$M_{n,LTB}$ = 532.51 kip-in = 44,376 lb-ft

Compression Flange Local Buckling Does not Apply

M_n = 44,376 lb-ft *Lowest value obtained through limit states.

φM_n = 0.9 x 44376 = 39,938 lb-ft > Mr = -470 lb-ft, Therefore OK.

Skin Plate *EM 1110-2-2705*

t = 0.1345 in L = 1.000 ft* F_y = 30 ksi

E = 10000 ksi *Spacing of extrusions

Notes: *Material used is designated as 10 gage corr. sheet, closest match to today's standards is A570*

p = 62.4 x flood height = 62.4 pcf x 6.6 ft = 411.84 psf

p = 0.00286 ksi L = 12.00 in

$M = pL^2/12$ = 0.0343 k-in

F_b = (5/6) x 0.75 x F_y = 18.75 ksi *Case I1, Design Flood Loading*

$t_{min\ for\ stress}$ = $\sqrt{(6M / F_b)}$ = $\sqrt{(6 \cdot 0.0343 / 18.8)}$ = 0.1048 in

$t_{min\ for\ defl}$ = $(pL^4 / 12.8E)^{0.25}$ = (0.00286 · 12^4 / 12.8 · 10000)^0.25

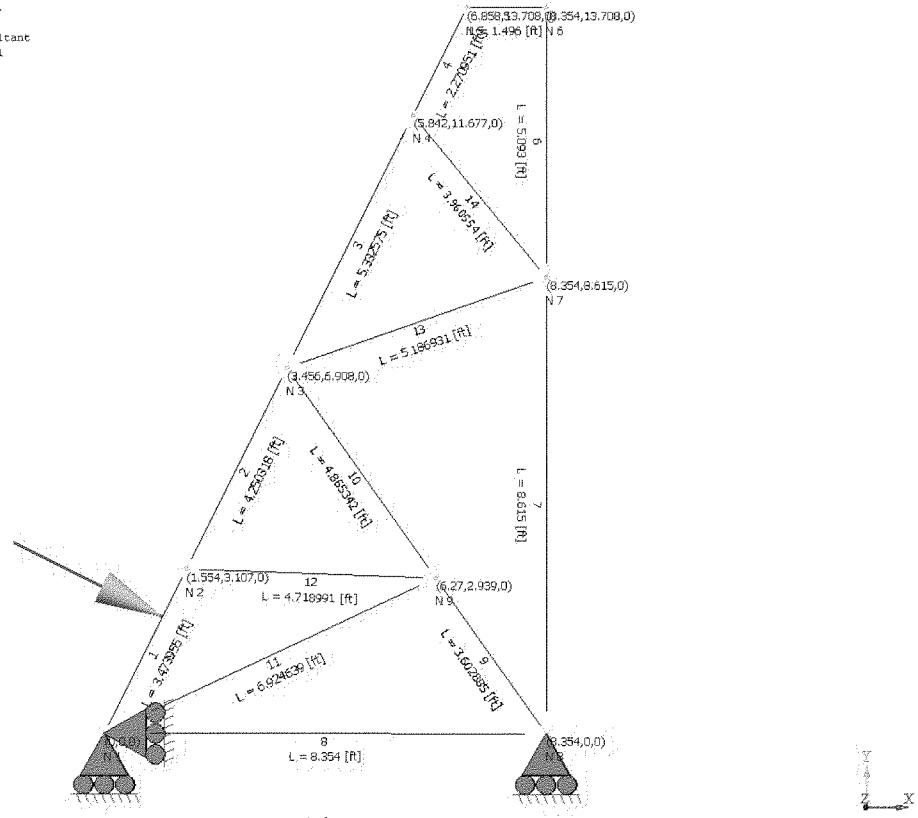
= 0.1467 in

t_{min} = 0.1467 **in > t = 0.1345 in, therefore skin plate is NOT GOOD.**

Stations 93+57, 94+64, 114+99, 119 +63, 123+80, 128+20, 132+41, 135+23, 138+23, 145+74, 149+87, 161+53.

Magnitude and position of resultant hydrostatic load vary with sill elevation.

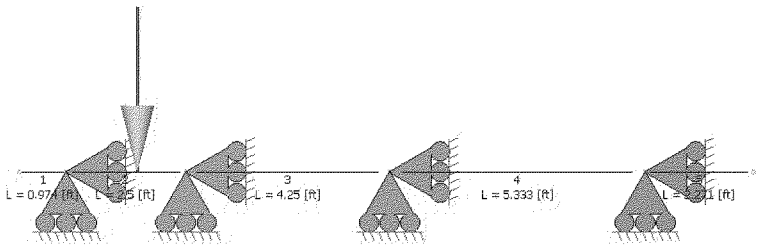
See 935-12.2/102.



Stations 93+57, 94+64, 114+99, 119+63, 123+80, 128+20, 132+41, 135+23, 138+23, 145+74, 149+87, 161+53.

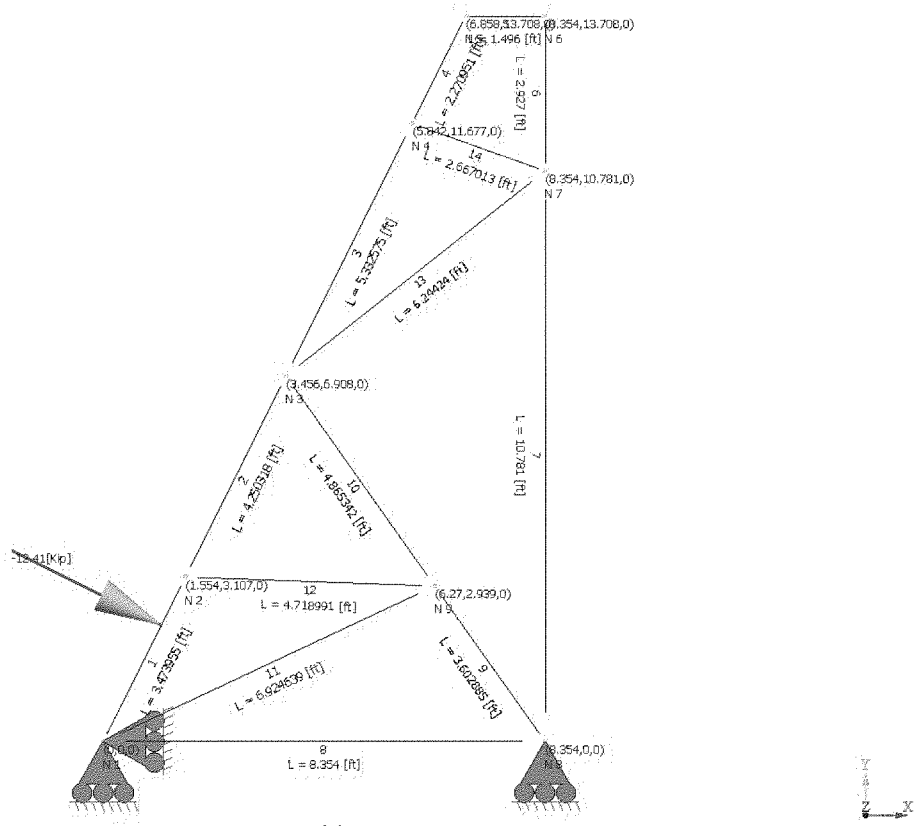
Magnitude and position of resultant hydrostatic load vary with sill elevation; nodes 2 - 5 represent purlins.

See 935-12.2/102.



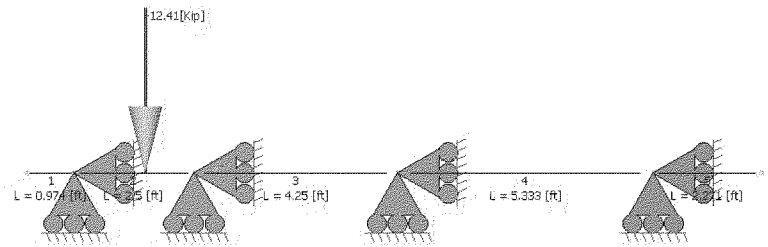
Stations 98+89 & 108+53.

See 935-12.2/102.



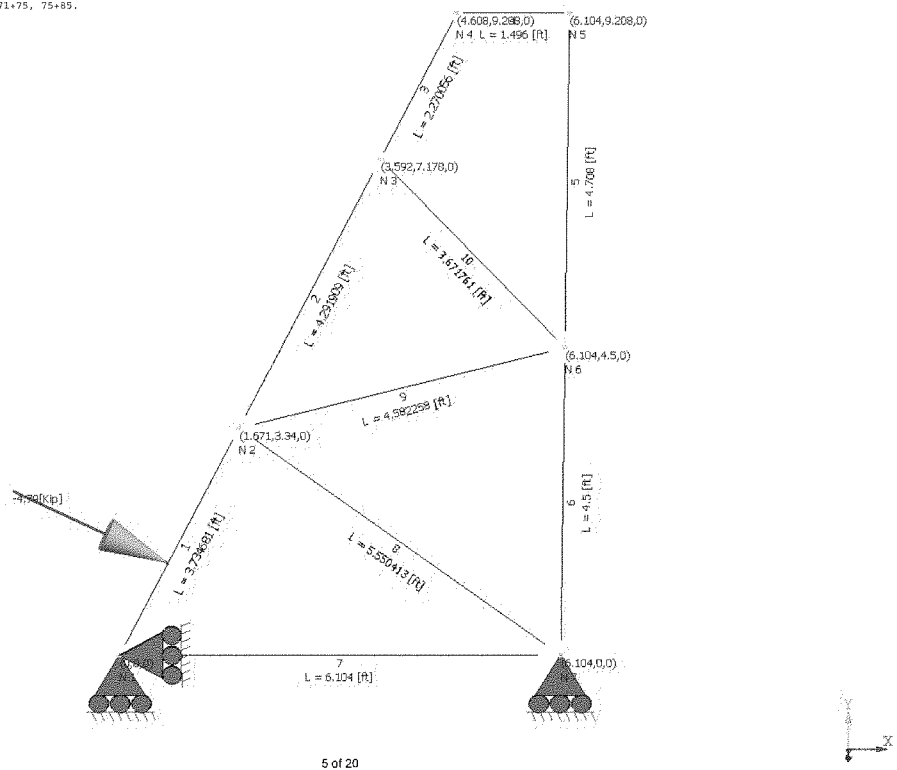
Stations 98+89 & 108+53.
Nodes 2 - 5 represent
purlins.

See 935-12.2/102.



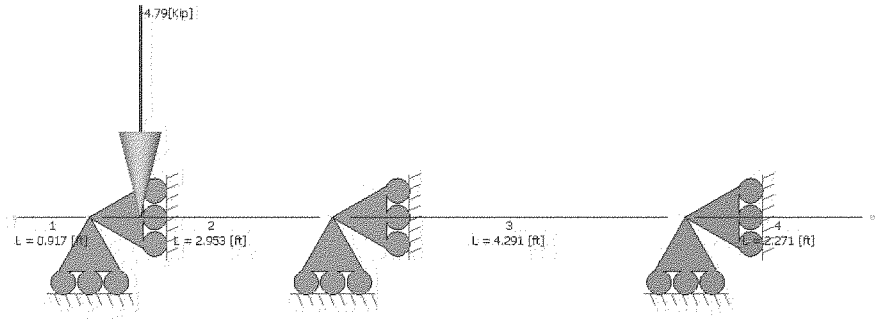
Stations 31+51, 62+84, 71+75, 75+85.

See 935-12.2/103.



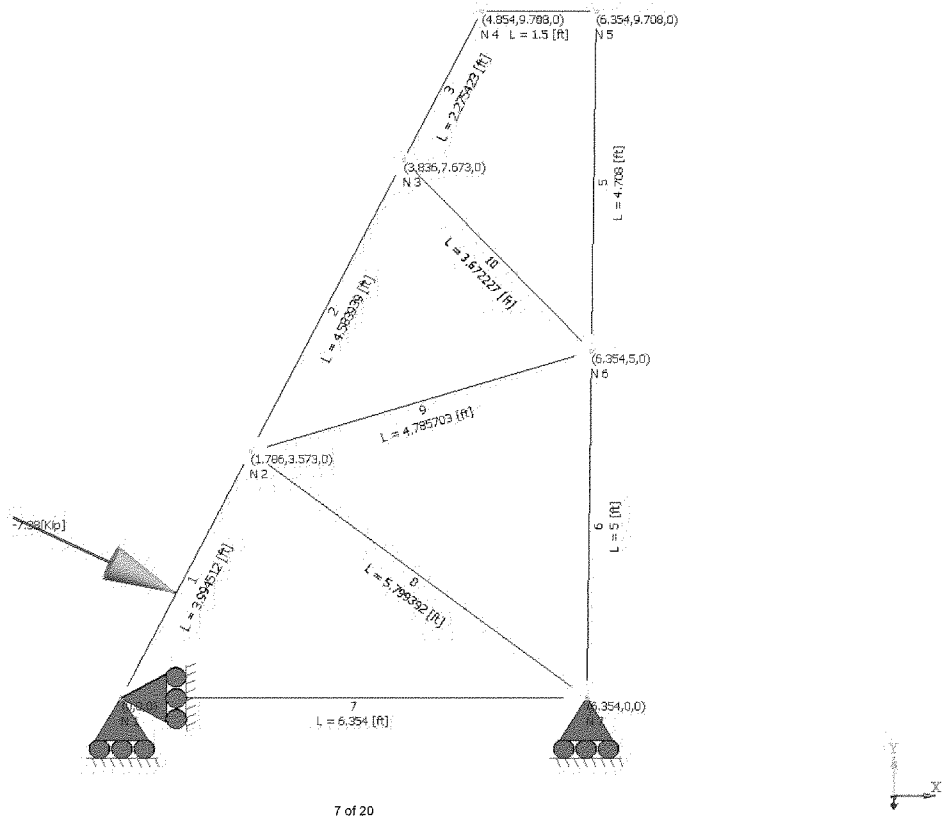
Stations 31+51, 62+84, 71+75, 75+85. Nodes 2 - 4 represent purlins.

See 935-12.2/103.



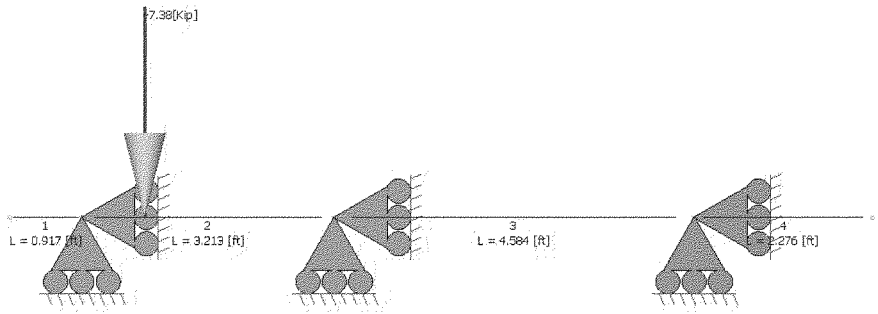
Station 26+90.

See 935-12.2/103.



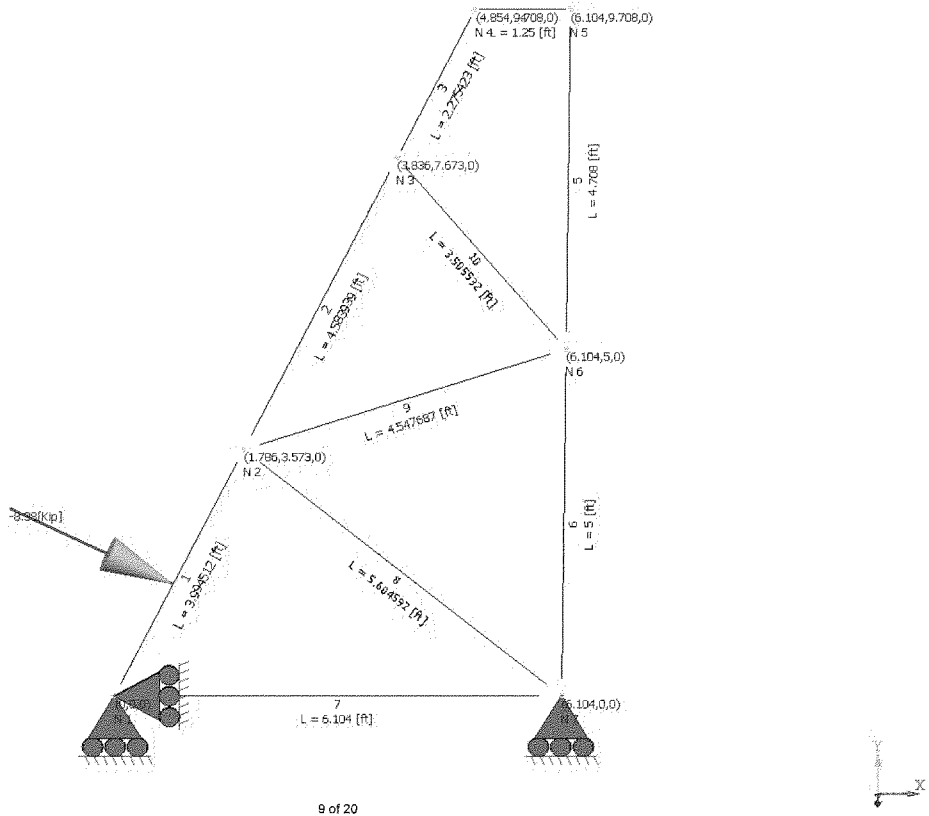
Station 26+90. Nodes 2 - 4
represent purlins.

See 935-12.2/103.



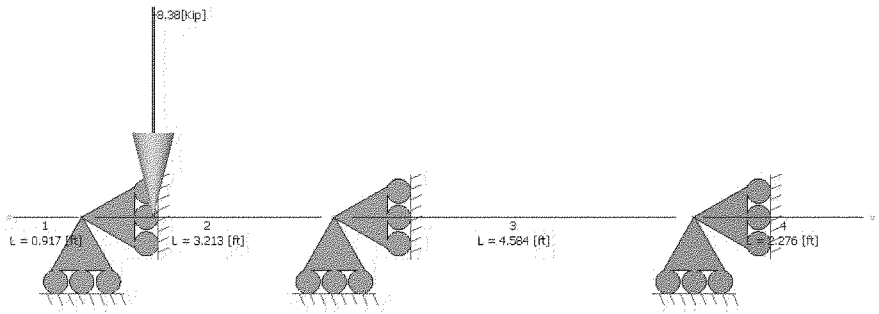
Station 106+10.

See 935-12.2/103.



Station 106+10. Nodes 2 - 4
represent purlins.

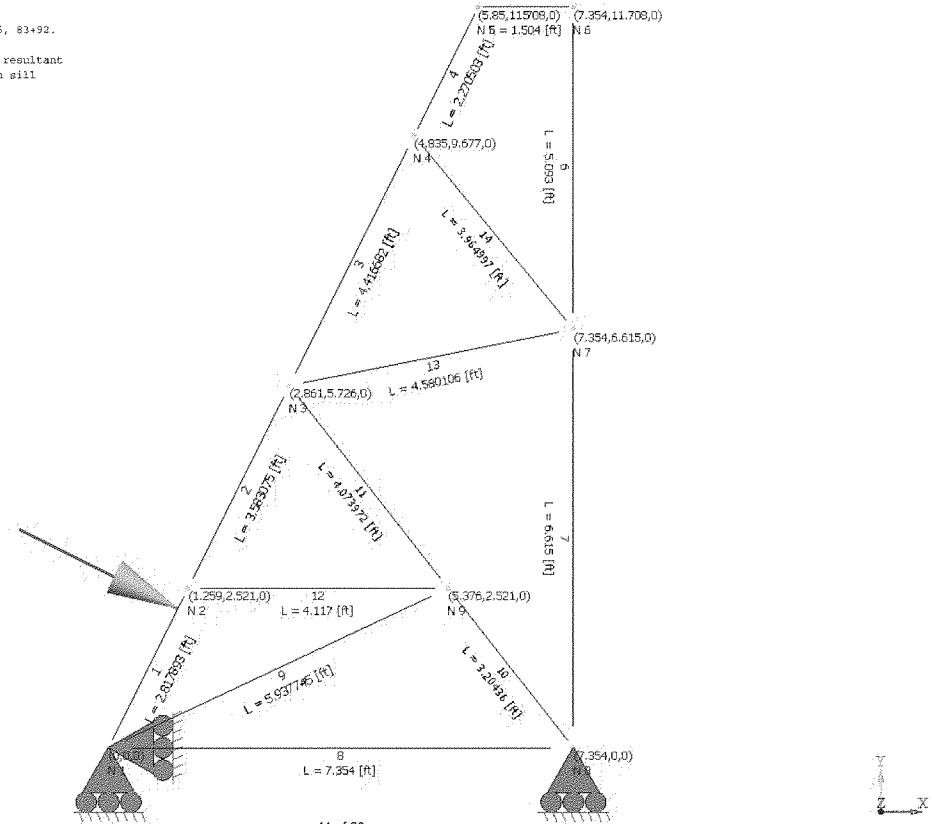
See 935-12.2/103.



Stations 4+50, 5+35, 25+15, 83+92.

Magnitude and position of resultant hydrostatic load vary with sill elevation.

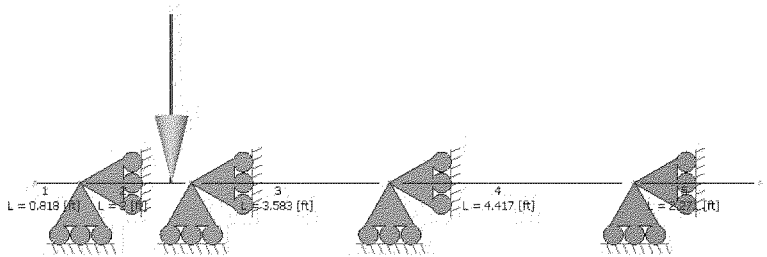
See 935-12.2/104.



Stations 4+50, 5+35, 25+15, 83+92.

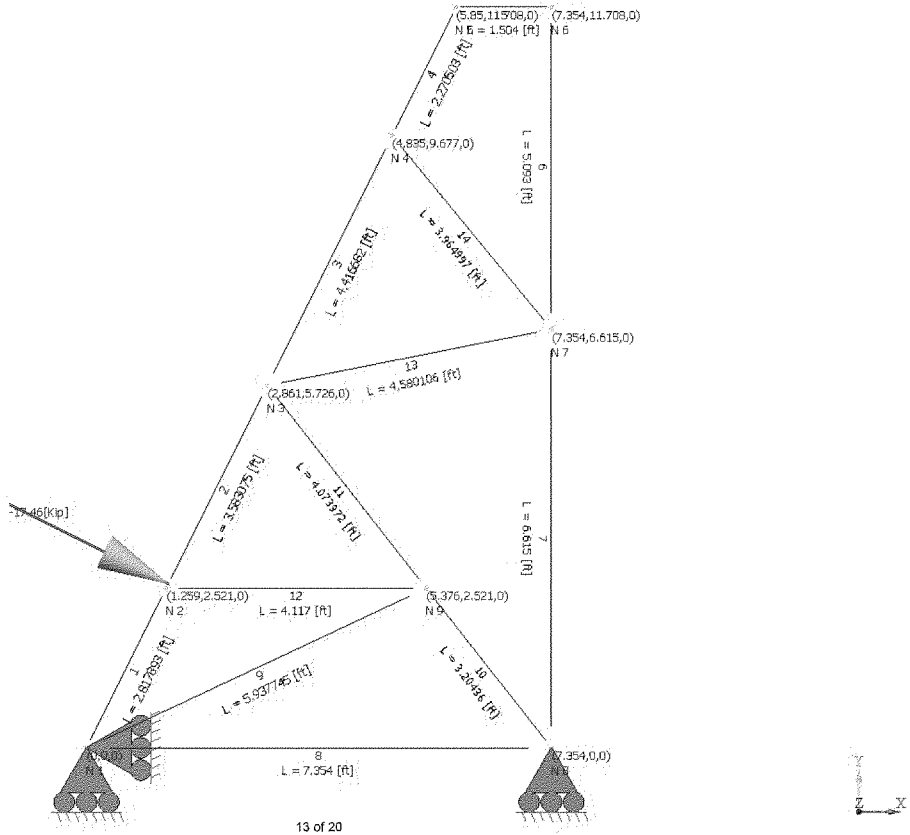
Magnitude and position of resultant hydrostatic load vary with sill elevation; nodes 2 - 5 represent purlins.

See 935-12.2/104.



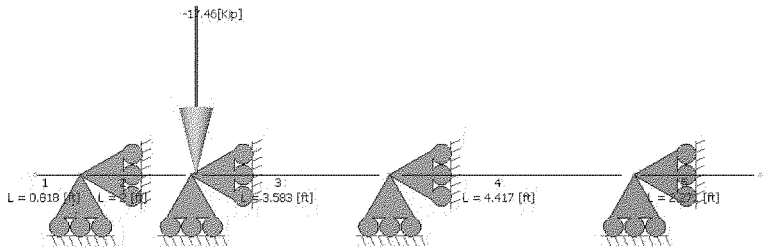
Station 157+26.

See 935-12.2/104.



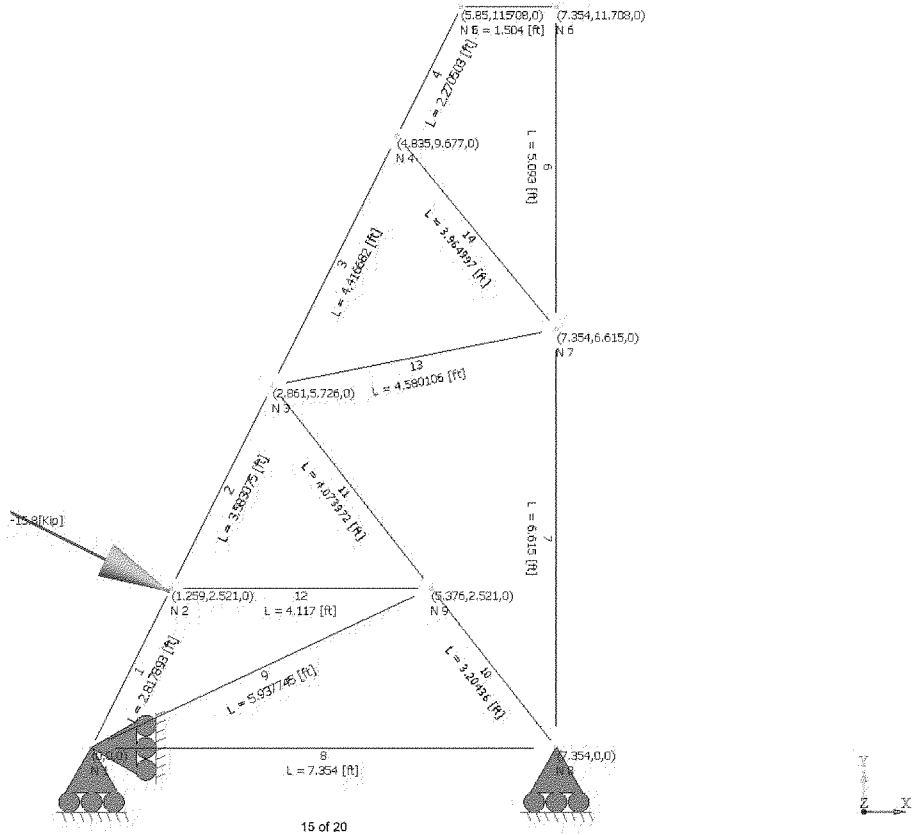
Station 157+26. Nodes 2 - 5
represent purlins.

See 935-12.2/104.



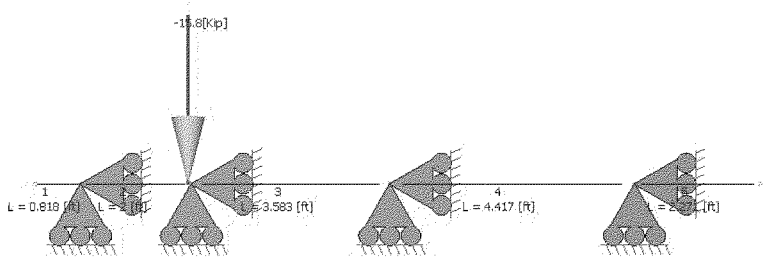
Station 170+04.

See 935-12.2/104.



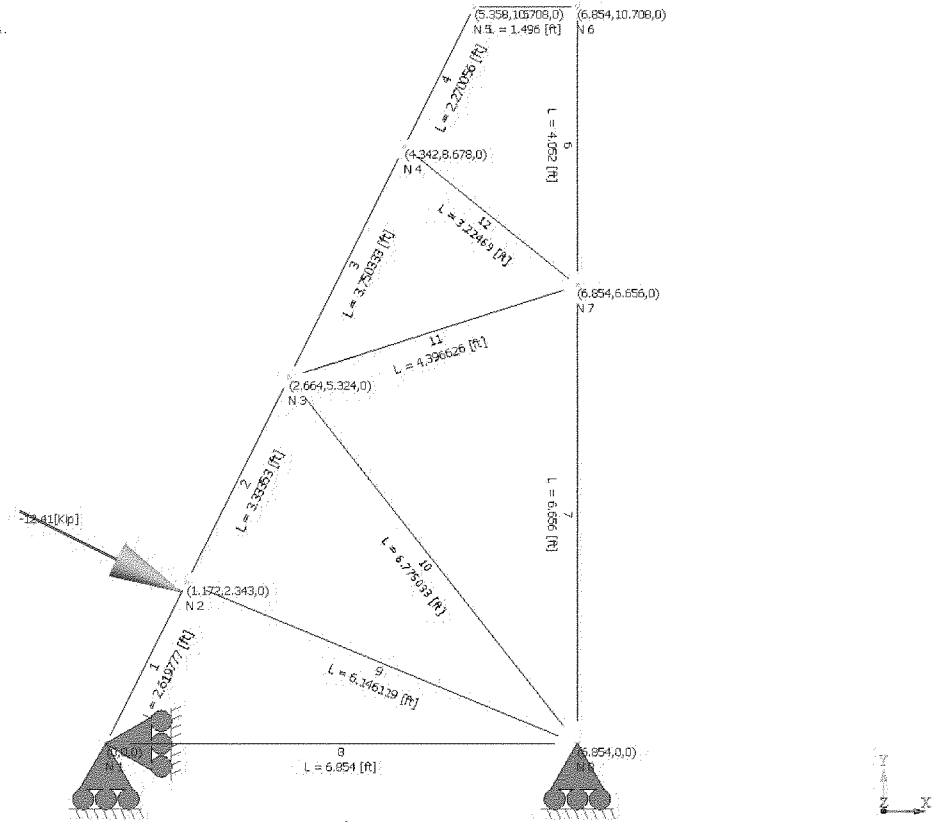
Station 170+04. Nodes 2 - 5
represent purlins.

See 935-12.2/104.



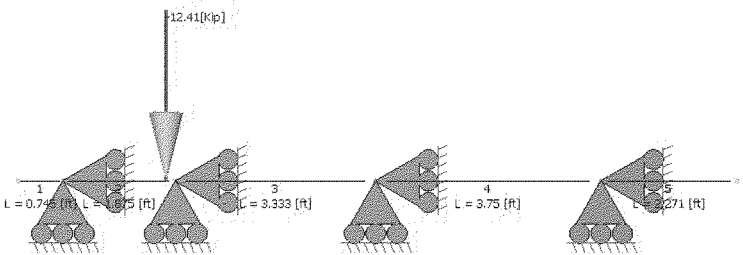
Stations 90+41 & 103+64.

See 935-12.2/105.



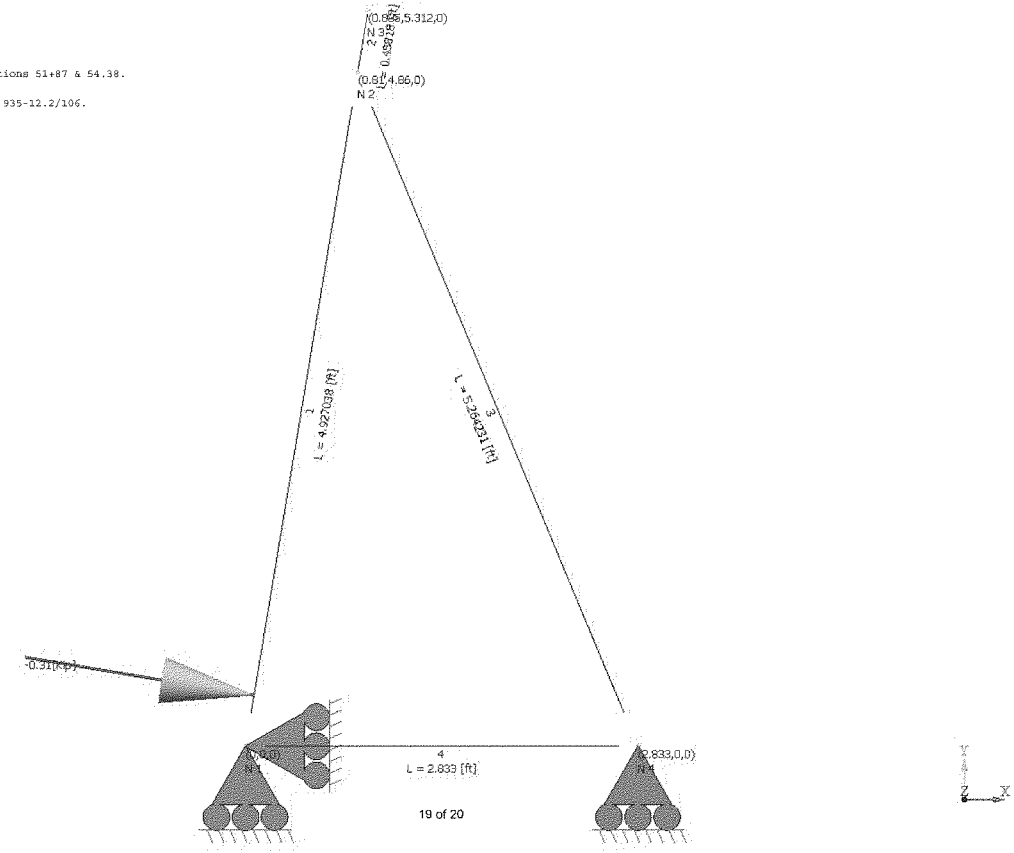
Stations 90+41 & 103+64. Nodes 2 -
5 represent purlins.

See 935-12.2/105.



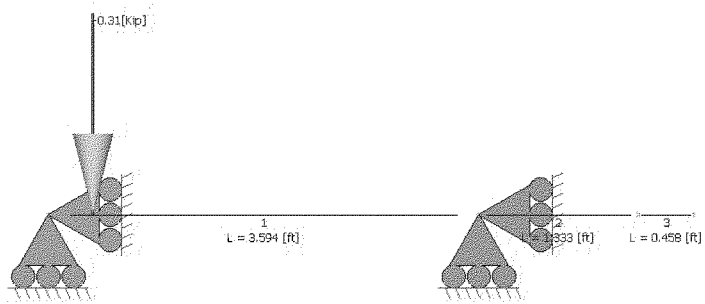
Stations 51+87 & 54.38.

See 935-12.2/106.



Stations 51+87 & 54.38.
Nodes 1 & 2 represent
purlins.

See 935-12.2/106.



Lwall0+7.7

********** Echoprint of Input Data **********

Date: 2009/11/16 Time: 11.17.29

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	11.00 ft
Thickness top of stem (TTS)	=	1.25 ft
Thickness bottom of stem (TBS)	=	1.25 ft
Dist. of batter at bot. of stem (TBSR)	=	0.00 ft
Depth of heel (THEEL)	=	6.00 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	0.00 ft
Distance of batter for toe (BTRT)	=	0.00 ft
Width of base (BWIDTH)	=	15.00 ft
Depth of key (HK)	=	4.50 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.50 ft

Structure coordinates:

x (ft)	y (ft)
0.00	334.00
0.00	340.00
13.75	340.00
13.75	351.00
15.00	351.00
15.00	338.50
3.00	338.50
1.50	334.00

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
26.00	0.000	0.125	0.125	17.33	342.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

Driving side soil profile:

Lwall0+7.7

Soil point	x (ft)	y (ft)
1	-1486.25	342.00
2	13.75	342.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
30.00	0.000	0.120	0.125	342.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	15.00	342.00
2	515.00	342.00

Foundation property data:
phi for soil-structure interface = 30.00 (deg)
c for soil-structure interface = 0.000 (ksf)
phi for soil-soil interface = 30.00 (deg)
c for soil-soil interface = 0.000 (ksf)

Water data:
Driving side elevation = 351.00 ft
Resisting side elevation = 342.00 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.50
Overturning = 100.00% base in compression

Crack options:
o Crack depth is to be calculated
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Not Satisfied ***
* Overturning *     Required base in comp. = 100.00 %
***************     Actual base in comp.   =  89.05 %
                    Overturning ratio      =   1.77
```

To increase stability try one or a combination

```
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add/remove key

Xr (measured from toe) =   4.45 ft
Resultant ratio        = 0.2968
Stem ratio             = 0.0000
Base pressure at x=  13.36 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.6928 ksf

***********     *** Satisfied ***
* Sliding *     Min. Required =   1.50
***********     Actual FS     =   3.53


********************** Output Results **********************

Date: 2009/11/16                                  Time: 11.17.29

***************************
**  Overturning Results  **
***************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -32.2855
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.3730
  Driving side at rest Kc   =   0.8510
  Resisting side at rest K  =   0.5000
  Resisting side at rest Kc =   0.7071
  At-rest K's for resisting side calculated.

Depth of cracking =     0.00 ft

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       342.00     0.5616
       334.00     0.8954

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       342.00     0.0000
       334.00     0.2485

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
```

342.00	0.0000
338.50	0.2908
338.50	0.5038
334.00	0.8688

Earth pressures:

Elevation (ft)	Pressure (ksf)
342.00	0.0000
338.50	0.0734

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
338.50	1.2497
334.00	1.2497

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	0.8954
1.50	0.8688
3.00	0.5038
15.00	0.2908

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	6.956		-6.84	-47.61
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	3.438		-8.12	-27.93
Water above structure.....	0.000		0.00	0.00
Water above soil.....	7.722		-8.12	-62.74
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.994	-1.83	-1.82
Shear (due to delta).....	0.310		-15.00	-4.65
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		8.355	1.40	11.73
Resisting side:				
Effective earth loads.....		-0.128	1.17	-0.15
Balancing earth load.....		-5.624	-2.25	12.65
Water loads.....		-3.597	-1.94	6.97
Foundation:				
Vertical force on base.....	-11.306		-4.45	50.34

```
                                        Lwall0+7.7
  Uplift.....................   -7.120                  -8.88     63.21
=========================================================================
** Statics Check **   SUMS =     0.000      0.000                   0.00

Angle of base        =    16.70 degrees
Normal force on base =   12.445 kips
Shear force on base  =    2.138 kips
Max. available shear force =    8.818 kips

Base pressure at x=  13.36 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.6928 ksf

Xr (measured from toe) =     4.45 ft
Resultant ratio        =   0.2968
Stem ratio             =   0.0000
Base in compression    =    89.05 %
Overturning ratio      =     1.77

Volume of concrete =     1.72 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



************************
**  Sliding Results  **
************************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ==================================
     1       0.000      11.251
     2       2.527       7.722
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
   number   (ksf)    (ksf)     (ft)       (ksf)
  ================================================
      1    0.5616    0.8954
      2                          0.0000     0.8954
      2                         15.0000     0.2908
      3    0.0000    0.2908

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   334.00 ft
  Point 2 (right), x =    15.00 ft,   y =   338.50 ft

Depth of cracking =     0.00 ft

          Failure   Total    Weight    Submerged   Uplift
```

Wedge number	angle (deg)	length (ft)	of wedge (kips)	Lwall0+7.7 length (ft)	force (kips)
1	-21.768	21.572	10.017	21.572	15.715
2	16.699	15.660	13.347	15.660	9.288
3	40.387	5.402	0.900	5.402	0.785

Wedge number	Net force (kips)
1	-6.943
2	6.078
3	0.865
SUM =	0.000

```
+-----------------------------+
| Factor of safety =     3.526 |
+-----------------------------+
```

```
************************
**  Bearing Results   **
************************

            Base width =     15.660 (ft)
                    Xr =      4.453 (ft)
  Effective base width =      9.298 (ft)
   (measured along slope)
            Base slope =    16.6992 (deg)

                   Phi =     30.000 (deg)
                     C =      0.000 (ksf)
       Effective Gamma =     0.0626 (kcf)

           Normal load =     12.445 (kips)
      Load inclination =      9.747 (deg)
     Load eccentricity =      3.181 (ft)

             Surcharge =     0.2191 (kips)
             Embedment =      3.500 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	30.1396	18.4011	15.6680
Embedment	1.1304	1.0652	1.0652
Inclination	0.7951	0.7951	0.4558
Base Tilt	0.6741	0.6918	0.6918
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.7652 (ksf)

```
+------------------------------+
| Factor of safety =      2.813 |
+------------------------------+
```

Lwall27+01.8

********** Echoprint of Input Data **********

Date: 2009/11/16 Time: 11.19.07

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	12.00 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.95 ft
Dist. of batter at bot. of stem (TBSR)	=	0.00 ft
Depth of heel (THEEL)	=	6.67 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	2.00 ft
Width of toe (TWIDTH)	=	0.00 ft
Distance of batter for toe (BTRT)	=	0.00 ft
Width of base (BWIDTH)	=	17.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.33
0.00	339.00
15.05	339.00
15.50	351.00
17.00	351.00
17.00	337.00
2.67	337.00
1.50	332.33

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.127	18.00	339.91

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

Driving side soil profile:

Lwall27+01.8

Soil point	x (ft)	y (ft)
1	-1484.92	339.91
2	15.08	339.91

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.127	339.91	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	17.00	339.91
2	517.00	339.91

Foundation property data:
phi for soil-structure interface = 27.00 (deg)
c for soil-structure interface = 0.000 (ksf)
phi for soil-soil interface = 27.00 (deg)
c for soil-soil interface = 0.285 (ksf)

Water data:
Driving side elevation = 351.00 ft
Resisting side elevation = 339.91 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.50
Overturning = 100.00% base in compression

Crack options:
o Crack *is* down to bottom of heel
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Not Satisfied ***
* Overturning *     Required base in comp. = 100.00 %
***************     Actual base in comp.   =  69.95 %
                    Overturning ratio      =   1.56
```

To increase stability try one or a combination

```
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add/remove key

Xr (measured from toe) =   3.96 ft
Resultant ratio        = 0.2332
Stem ratio             = 0.0000
Base pressure at x=  11.89 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.2066 ksf

***********     *** Satisfied ***
* Sliding *    Min. Required =   1.50
***********    Actual FS     =   4.62


********************** Output Results **********************


Date: 2009/11/16                                  Time: 11.19.07


***************************
**  Overturning Results  **
***************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -48.5902
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4263
  Driving side at rest Kc   =   0.6134
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.31 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       335.60     0.9607
       332.33     1.0699

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       339.91     0.0000
       335.60     0.0000
       332.33     0.0695

** Resisting side pressures **

  Water pressures:
```

Lwall27+01.8

Elevation (ft)	Pressure (ksf)
339.91	0.0000
337.00	0.2661
337.00	0.6218
332.33	1.0699

Earth pressures:

Elevation (ft)	Pressure (ksf)
339.91	0.0000
337.00	0.0565

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	1.3735
332.33	1.3735

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0699
1.50	1.0326
2.67	0.6218
17.00	0.2661

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.666		-7.17	-69.31
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.741		-9.47	-16.48
Water above structure.....	0.000		0.00	0.00
Water above soil.....	10.582		-9.35	-98.98
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.114	-3.58	-0.41
Shear (due to delta).....	0.037		-17.00	-0.63
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		10.720	1.63	17.46
Resisting side:				
Effective earth loads.....		-0.082	0.97	-0.08
Balancing earth load.....		-6.414	-2.34	14.98
Water loads.....		-4.337	-2.23	9.67

Lwall27+01.8

```
Foundation:
  Vertical force on base.....  -13.120                  -3.96      52.00
  Uplift....................    -8.907                 -10.30      91.78
==========================================================================
** Statics Check **   SUMS =     0.000      0.000                   0.00

Angle of base        =    15.36 degrees
Normal force on base =   14.350 kips
Shear force on base  =    2.710 kips
Max. available shear force =   14.206 kips

Base pressure at x=  11.89 ft from toe =   0.0000 ksf
Base pressure at toe                   =   2.2066 ksf

Xr (measured from toe) =     3.96 ft
Resultant ratio        =   0.2332
Stem ratio             =   0.0000
Base in compression    =    69.95 %
Overturning ratio      =     1.56

Volume of concrete =     2.39 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



***********************
**  Sliding Results  **
***********************

Solution converged.  Summation of forces = 0.

           Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ==================================
     1       0.000       0.000
     2      10.875      10.582
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ==================================================
      1    0.0000    0.0000
      2                         0.0000     1.1650
      2                        17.0000     0.2796
      3    0.0000    0.2796

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   332.33 ft
  Point 2 (right), x =    17.00 ft,   y =   337.00 ft

Depth of cracking =     7.58 ft
```

Lwall27+01.8

Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	0.000	0.000	0.000	0.000	0.000
2	15.361	17.630	15.212	17.630	12.734
3	42.015	4.348	0.597	4.348	0.608

Wedge number	Net force (kips)
1	0.000
2	-0.971
3	0.971
SUM =	0.000

```
+----------------------------+
| Factor of safety =    4.616 |
+----------------------------+
```

```
************************
**  Bearing Results  **
************************

            Base width =     17.630 (ft)
                    Xr =      3.964 (ft)
  Effective base width =      8.221 (ft)
   (measured along slope)
            Base slope =    15.3606 (deg)

                   Phi =     27.000 (deg)
                     C =      0.000 (ksf)
       Effective Gamma =     0.0646 (kcf)

           Normal load =     14.350 (kips)
      Load inclination =     10.693 (deg)
     Load eccentricity =      4.704 (ft)

              Surcharge =     0.1880 (kips)
              Embedment =      2.910 (ft)
           Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1155	1.0578	1.0578
Inclination	0.7765	0.7765	0.3648
Base Tilt	0.7246	0.7455	0.7455
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 2.1269 (ksf)

```
+-----------------------------+
| Factor of safety =      1.219 |
```

Lwall82+18.87

********** Echoprint of Input Data **********

Date: 2009/11/16 Time: 11.19.40

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	12.00 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.97 ft
Dist. of batter at bot. of stem (TBSR)	=	0.00 ft
Depth of heel (THEEL)	=	6.67 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	2.00 ft
Width of toe (TWIDTH)	=	0.00 ft
Distance of batter for toe (BTRT)	=	0.00 ft
Width of base (BWIDTH)	=	17.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.33
0.00	339.00
15.03	339.00
15.50	351.00
17.00	351.00
17.00	337.00
2.67	337.00
1.50	332.33

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.130	18.67	340.64

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

Driving side soil profile:

Lwall82+18.87

Soil point	x (ft)	y (ft)
1	-1484.91	340.64
2	15.09	340.64

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.130	340.64	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	17.00	340.64
2	517.00	340.64

Foundation property data:
phi for soil-structure interface = 28.00 (deg)
c for soil-structure interface = 0.000 (ksf)
phi for soil-soil interface = 28.00 (deg)
c for soil-soil interface = 0.225 (ksf)

Water data:
Driving side elevation = 351.00 ft
Resisting side elevation = 340.64 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.50
Overturning = 100.00% base in compression

Crack options:
o Crack depth is to be calculated
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Not Satisfied ***
* Overturning *     Required base in comp. = 100.00 %
***************     Actual base in comp.   =  78.99 %
                    Overturning ratio      =   1.64
```

To increase stability try one or a combination

```
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add/remove key

Xr (measured from toe) =   4.48 ft
Resultant ratio        = 0.2633
Stem ratio             = 0.0000
Base pressure at x=  13.43 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.0430 ksf

***********    *** Not Satisfied ***
* Sliding *    Min. Required =   1.50
***********    Actual FS     = -11.20

  To increase stability try one or a combination
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add a key


********************** Output Results **********************


Date: 2009/11/16                                  Time: 11.19.40


****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -51.9984
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4093
  Driving side at rest Kc   =   0.5835
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.29 ft

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       337.35     0.8517
       332.33     1.0416

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       340.64     0.0000
```

337.35	0.0000
332.33	0.1386

** Resisting side pressures **

Water pressures:

Elevation (ft)	Pressure (ksf)
340.64	0.0000
337.00	0.3166
337.00	0.6176
332.33	1.0416

Earth pressures:

Elevation (ft)	Pressure (ksf)
340.64	0.0000
337.00	0.0831

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	1.3516
332.33	1.3516

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0416
1.50	1.0101
2.67	0.6176
17.00	0.3166

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.684		-7.16	-69.34
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	3.211		-9.47	-30.41
Water above structure.....	0.000		0.00	0.00
Water above soil.....	9.889		-9.35	-92.47
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.348	-3.00	-1.04
Shear (due to delta).....	0.118		-17.00	-2.00

```
                                        Lwall82+18.87
  Horiz. surcharge effects...                  0.000       0.00       0.00
  Water loads................                  10.565       1.69      17.82
Resisting side:
  Effective earth loads......                  -0.151       1.21      -0.18
  Balancing earth load.......                  -6.312      -2.33      14.74
  Water loads................                  -4.450      -2.05       9.12
Foundation:
  Vertical force on base.....  -13.717                    -4.48      61.40
  Uplift....................    -9.184                   -10.06      92.36
=====================================================================
** Statics Check **   SUMS =     0.000      0.000                    0.00

Angle of base        =    15.36 degrees
Normal force on base =   14.899 kips
Shear force on base  =    2.453 kips
Max. available shear force =   13.885 kips

Base pressure at x=  13.43 ft from toe =   0.0000 ksf
Base pressure at toe                   =   2.0430 ksf

Xr (measured from toe) =     4.48 ft
Resultant ratio        =   0.2633
Stem ratio             =   0.0000
Base in compression    =    78.99 %
Overturning ratio      =     1.64

Volume of concrete =     2.39 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



************************
**  Sliding Results  **
************************

Factor of safety < 0.2.  Last iteration printed.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ================================
     1      -0.479      35.052
     2       3.349       9.889
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
   Wedge    press.   press.   x-coord.    press.
   number   (ksf)    (ksf)     (ft)       (ksf)
  ==================================================
     1    0.6002    1.1650
     2                         0.0000     1.1650
     2                        17.0000     0.3378
     3    0.0000    0.3378
```

Lwall82+18.87

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 332.33 ft
Point 2 (right), x = 17.00 ft, y = 337.00 ft

Depth of cracking = -0.74 ft

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	-9.477	54.971	26.676	54.971	48.518
2	15.361	17.630	16.789	17.630	13.247
3	81.359	3.682	0.131	3.682	0.622

Wedge number	Net force (kips)
1	-10.844
2	2.917
3	0.426
SUM =	-7.502

Factor of safety = -11.198

****
** Bearing Results **
****

Base width = 17.630 (ft)
Xr = 4.476 (ft)
Effective base width = 9.284 (ft)
(measured along slope)
Base slope = 15.3606 (deg)

Phi = 28.000 (deg)
C = 0.000 (ksf)
Effective Gamma = 0.0676 (kcf)

Normal load = 14.899 (kips)
Load inclination = 9.349 (deg)
Load eccentricity = 4.173 (ft)

Surcharge = 0.2461 (kips)
Embedment = 3.640 (ft)
Ground slope = 0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1305	1.0653	1.0653
Inclination	0.8030	0.8030	0.4437
Base Tilt	0.7159	0.7352	0.7352
Ground Slope	1.0000	1.0000	1.0000

Lwall82+18.87

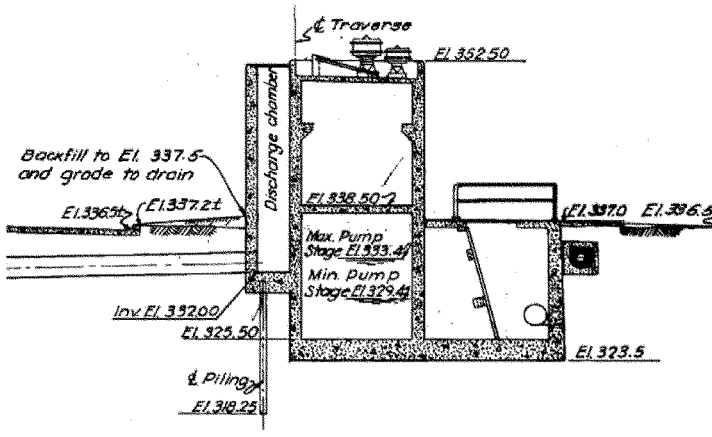
Net ultimate bearing pressure = 3.3435 (ksf)

```
+-------------------------------+
| Factor of safety =      2.083 |
+-------------------------------+
```

US Army Corps of Engineers
Louisville District

Subject:	Paducah, KY LSE	Page	1	of	4
	Pump Station #3	Computed by:	N. Cash		10-Nov-09
	Global Stability (Unusual Condition)	Checked by:			

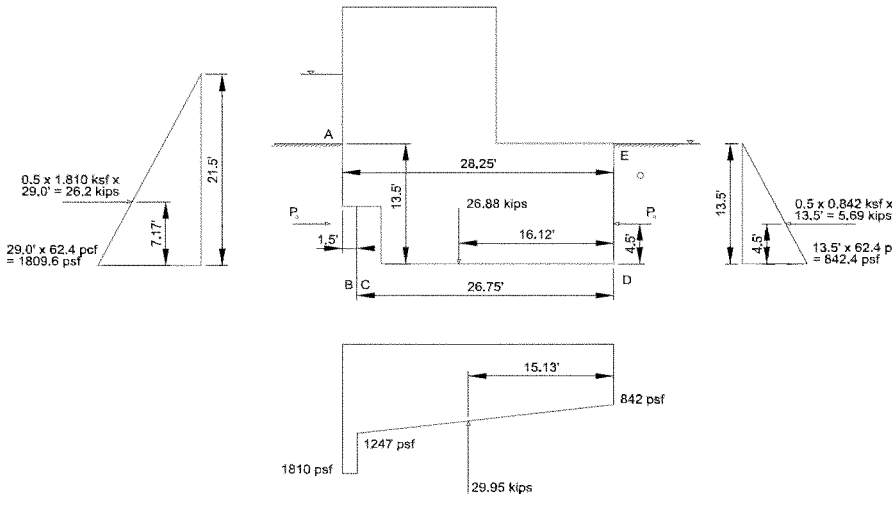
Elevation



Data

Weight =	396000 lbs	φ =	28 °	Min_{Stage} =	2129 lbs/ft
γ_s =	125 pcf	c =	200 psf	Cutoff =	19%
Weight =	24750 lbs/ft				

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #3
Global Stability (Unusual Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Full-head pressure on headwater side of sheet pile at point B
= (21.5 ft) x (62.4 pcf) = 1341.6 psf
= 1.342 ksf

Pressure at Point D
= (13.5 ft) x (62.4 pcf) = 842.4 psf
= 0.842 ksf

Pressure on tailwater side of sheet pile at point C
= full-head pressure at C - 19% (full-head pressure at C - pressure at D)
= 1.34 - 19% x (1.34 - 0.84) =
1.247 ksf

Uplift = 29.95 kips $\bar{x}$ = 13.12 ft

Horizontal Soil Forces

Resisting $P_P = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.00 *EM 1110-2-2502, 3-10d, N-64
= 11390.63 lb/ft $\bar{x}$ = 4.50 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_A = 6043.05 lb/ft $\bar{x}$ = 4.50 ft

Overturning Stability (about point D)

*Weight	26.88 kips x 16.12 ft =	433.30 kip-ft	
*Vert. Fric.	6.04 kips x 28.25 ft =	170.72 kip-ft	
*Uplift	-29.95 kips x 15.13 ft =	-453.18 kip-ft	
ΣV =	14.36 kips		
	5.69 kips x 4.5 ft =	25.59 kip-ft	
	-14.42 kips x 7.17 ft =	-103.36 kip-ft	
	-6.04 kips x 4.5 ft =	-27.19 kip-ft	
ΣH =	-3.39 kips	45.86 kip-ft / 14.36 kips =	3.19 ft = x_R

a = $3x_R$ = 9.58 ft > b = 28.25 ft *(Inside middle third, Therefore a = b)*

Percent of base in compression (a/b)*100 = 100.00% > 75%

Therefore criteria is satisfied. Suitable in Overturning.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #3
Global Stability (Unusual Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 14.36 kips
T = ΣH = 3.39 kips

$$FS_s = \frac{N' \tan\phi + cL}{T}$$

Eq. 3-1, EM 1110-2-2100
**Over 1 foot section*

$$FS_s = \frac{14.36 \text{ kips} \times \tan(28°) + 0.2 \text{ ksf} \times 28.25 \text{ ft}}{3.39 \text{ kips}}$$

FS_s = 3.92

FSs > 1.5, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$$FS_f = \frac{W_S + W_C + S}{U - W_G}$$

$$FS_f = \frac{24.75 \text{ kips} + 2.13 \text{ kips} + 17.43 \text{ kips}}{29.95 \text{ kips} - 0 \text{ kips}}$$

FS_f = 1.48

FSf > 1.2, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right) = \tan^{-1}(3.39 / 14.36) = 13.28°$$

e = B/2 - x_R = ½ x 28.25 ft - 3.19 ft = 10.93 ft

$\bar{B}$ = B - 2e = 28.25 ft - 2 x 10.93 ft = 6.39 ft

γ' = γ_s - γ_w = 125 pcf - 62.4 pcf = 62.60 pcf

q_o = γ' D = 62.6 pcf x 13.5 ft = 845.10 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #3
Global Stability (Unusual Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\overline{B}$) x tan(45° + φ/2) = 1 + 0.2*(13.5 / 6.39) x tan(45° + 28°/2)
= 1.70

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(13.5 / 6.39) x tan(45° + 28°/2)
1.35

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 13.28° / 90°)² = 0.73

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 13.28° / 28°)² = 0.28

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right] =$$

= 6.39 ft x [(1.7 x 0.73 x 1 x 1 x 200 x 25.8) +
(1.35 x 0.73 x 1 x 1 x 845.1 x 14.72) +
½ x (1.35 x 0.28 x 1 x 1 x 6.39 ft x 125 pcf x 11.19)] =

= 129539.37 lbs

FS = 1.15Q / N' = 148.97 kips / 14.36 kips = 10.38 > 3

Therefore criteria is satisfied. Suitable in bearing.

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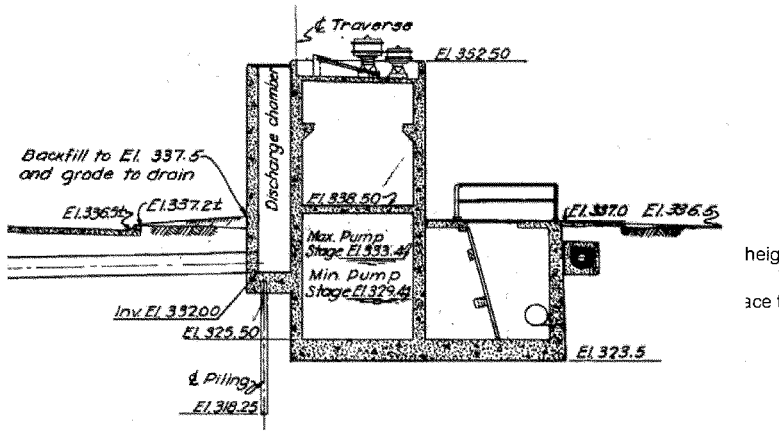
Louisville District

Subject:	Paducah, KY Feasability	Page	1	of	4
	Pump Station #3	Computed by:	N. Cash		10-Nov-09
	Global Stability (Extreme Condition)	Checked by:			

Elevation

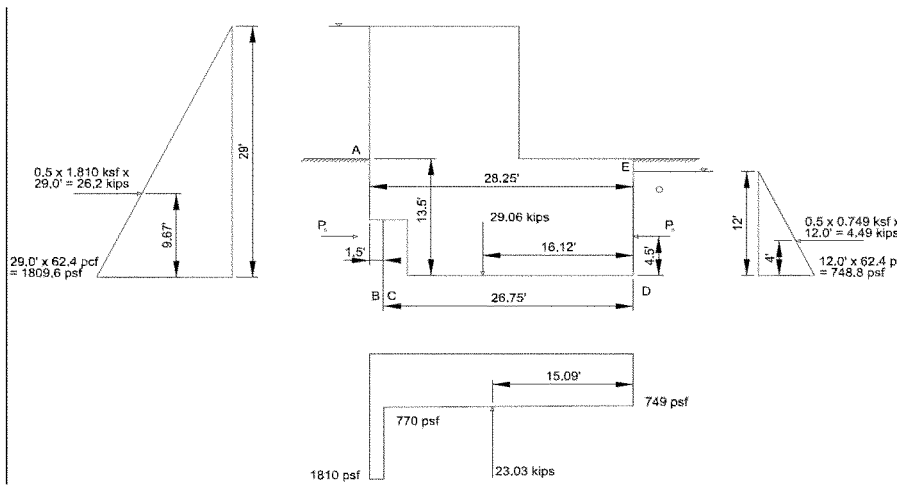


Data

Weight =	396000 lbs	φ =	28 °	Max_{Stage} =	4313 lbs/ft
γ_s =	125 pcf	c =	200 psf	Cutoff =	95%
Weight =	24750 lbs/ft				

*Lowered water 1.5 ft below TOG on LS. Toe drain is 4 ft below TOG. Need to determine if a lower Cutoff is more desirable.

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #3
Global Stability (Extreme Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Full-head pressure on headwater side of sheet pile at point B
= (29 ft) x (62.4 pcf) = 1809.6 psf
= 1.810 ksf

Pressure at Point D
= (9.6 ft) x (62.4 pcf) = 599.04 psf
= 0.599 ksf

Pressure on tailwater side of sheet pile at point C
= full-head pressure at C - 95% (full-head pressure at C - pressure at D)
= 1.81 - 95% x (1.81 - 0.6) =
0.660 ksf

Uplift = 19.55 kips $\bar{x}$ = 12.73 ft

Horizontal Soil Forces

Resisting P_P = $0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.00 *EM 1110-2-2502, 3-10d, N-64
= 11390.63 lb/ft $\bar{x}$ = 4.50 ft

Driving P_D = $0.5 \times K_D \times \gamma \times h^2$
K_D = $(1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_A = 6043.05 lb/ft $\bar{x}$ = 4.50 ft

Overturning Stability (about point D)

*Weight	29.06 kips x 16.12 ft =	468.50 kip-ft
*Vert. Fric.	6.04 kips x 28.25 ft =	170.72 kip-ft
*Uplift	-19.55 kips x 15.52 ft =	-303.41 kip-ft
ΣV =	26.95 kips	

	2.88 kips x 3.2 ft =	9.20 kip-ft
	11.39 kips x 4.5 ft =	51.26 kip-ft
	-26.24 kips x 9.67 ft =	-253.65 kip-ft
	-6.04 kips x 4.5 ft =	-27.19 kip-ft
ΣH =	-18.02 kips	115.43 kip-ft / 26.95 kips = 4.28 ft = x_R

a = $3x_R$ = 12.85 ft > b = 28.25 ft *(Inside middle third, Therefore a = b)*

Percent of base in compression (a/b)*100 = 100.00% > 75%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #3
Global Stability (Extreme Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 26.95 kips
T = ΣH = 18.02 kips

$$FS_s = \frac{N' \tan\phi + cL}{T}$$

Eq. 3-1, EM 1110-2-2100
**Over 1 foot section*

$$FS_s = \frac{26.95 \text{ kips} \times \tan(28°) + 0.2 \text{ ksf} \times 28.25 \text{ ft}}{18.02 \text{ kips}}$$

FS_s = 1.11

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$$FS_f = \frac{W_S + W_C + S}{U - W_G}$$

$$FS_f = \frac{24.75 \text{ kips} + 4.31 \text{ kips} + 0 \text{ kips}}{19.55 \text{ kips} - 0 \text{ kips}}$$

FS_f = 1.49

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right) = \tan^{-1}(18.02 / 26.95) = 33.76\ °$$

e = B/2 - x_R = ½ x 28.25 ft - 4.28 ft = 9.84 ft

$\bar{B}$ = B - 2e = 28.25 ft - 2 x 9.84 ft = 8.57 ft

γ' = $\gamma_s - \gamma_w$ = 125 pcf - 62.4 pcf = 62.60 pcf

q_o = γ' D = 62.6 pcf x 13.5 ft = 845.10 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #3
Global Stability (Extreme Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\overline{B}$) x tan(45° + φ/2) = 1 + 0.2*(13.5 / 8.57) x tan(45° + 28°/2)
= 1.52

$\xi_{qd} = \xi_{yd}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(13.5 / 8.57) x tan(45° + 28°/2)
1.26

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 33.76° / 90°)^2 = 0.39

ξ_{yi} = 0

$\xi_{yg} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))^2 = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{yt}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))^2 = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

Q = $$\overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right]=$$

= 8.57 ft x [(1.52 x 0.39 x 1 x 1 x 200 x 25.8) +
(1.26 x 0.39 x 1 x 1 x 845.1 x 14.72) +
½ x (1.26 x 0 x 1 x 1 x 8.57 ft x 125 pcf x 11.19)] =

= 78833.25 lbs

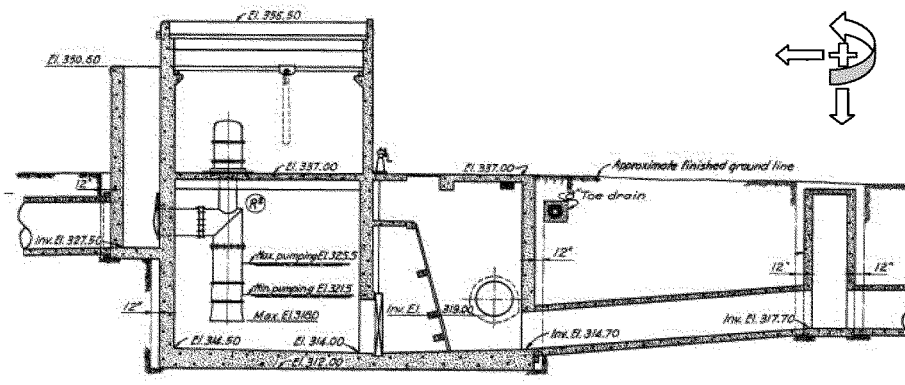
FS = 1.5Q / N' = 118.25 kips / 26.95 kips = 4.39 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject:	Paducah, KY LSE	Page	1	of 4
	Pump Station #6	Computed by:	N. Cash	10-Nov-09
	Global Stability (Unusual Condition)	Checked by:		

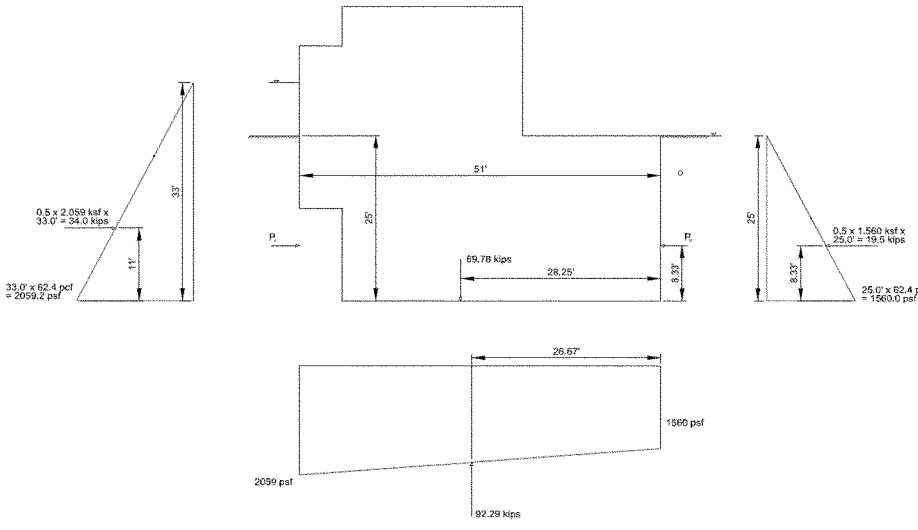
Elevation



Data

Weight =	2266000 lbs	φ =	28 °	Min_{Stage} =	10149 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	59632 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #6
Global Stability (Unusual Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (33 ft) x (62.4 pcf) = 2059.2 psf
= 2.059 ksf

Pressure on Landside
= (25 ft) x (62.4 pcf) = 1560 psf
= 1.560 ksf

Uplift = 92.29 kips $\bar{x}$ = 24.33 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting $P_R = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 40625 lb/ft $\bar{x}$ = 8.33 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 21553 lb/ft $\bar{x}$ = 8.33 ft

Overturning Stability (about bottom corner of Landside)

*Weight	69.78 kips x 28.25 ft =	1971.56 kip-ft
*Vert. Fric.	21.55 kips x 51 ft =	1099.19 kip-ft
*Uplift	-92.29 kips x 26.67 ft =	-2461.59 kip-ft
ΣV =	39.67 kips	

	19.5 kips x 8.33 ft =	162.50 kip-ft
	40.63 kips x 8.33 ft =	338.54 kip-ft
	-33.98 kips x 11 ft =	-373.74 kip-ft
	-21.55 kips x 8.33 ft =	-179.61 kip-ft
ΣH =	4.60 kips	556.85 kip-ft / 39.67 kips = 14.04 ft = x_R

a = $3x_R$ = 42.11 ft > b = 51 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 82.57% > 75%

Therefore criteria is satisfied. Suitable in Overturning.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #6
Global Stability (Unusual Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 39.67 kips
T = ΣH = 4.60 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{39.67 \text{ kips} \times \tan(28°) + 0.23 \text{ ksf} \times 51 \text{ ft}}{4.6 \text{ kips}}$

FS_s = 7.09

FSs > 1.5, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{59.63 \text{ kips} + 10.15 \text{ kips} + 0 \text{ kips}}{92.29 \text{ kips} - 0 \text{ kips}}$

FS_f = 1.43

FSf > 1.2, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ = $\tan^{-1}$(4.6 / 39.67) = 6.61 °

e = B/2 - x_R = ½ x 51 ft - 14.04 ft = 11.46 ft

$\bar{B}$ = B - 2e = 51 ft - 2 x 11.46 ft = 28.07 ft

γ' = $\gamma_s - \gamma_w$ = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 25 ft = 1690.00 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #6
Global Stability (Unusual Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\overline{B}$) x tan(45° + φ/2) = 1 + 0.2*(25 / 28.07) x tan(45° + 28°/2)
= 1.30

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(25 / 28.07) x tan(45° + 28°/2)
1.15

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 6.61° / 90°)² = 0.86

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 6.61° / 28°)² = 0.58

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right]=$$

= 28.07 ft x [(1.3 x 0.86 x 1 x 1 x 225 x 25.8) +
(1.15 x 0.86 x 1 x 1 x 1690 x 14.72) +
½ x (1.15 x 0.58 x 1 x 1 x 28.07 ft x 130 pcf x 11.19)] =

= 1254108 lbs

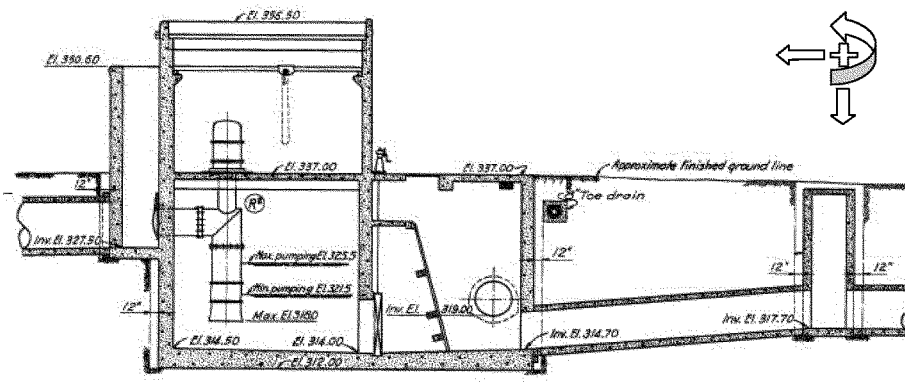
FS = 1.15Q / N' = 1442.22 kips / 39.67 kips = 36.36 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject:	Paducah, KY Feasability	Page	1	of 4
	Pump Station #6	Computed by:	N. Cash	10-Nov-09
	Global Stability (Extreme Condition)	Checked by:		

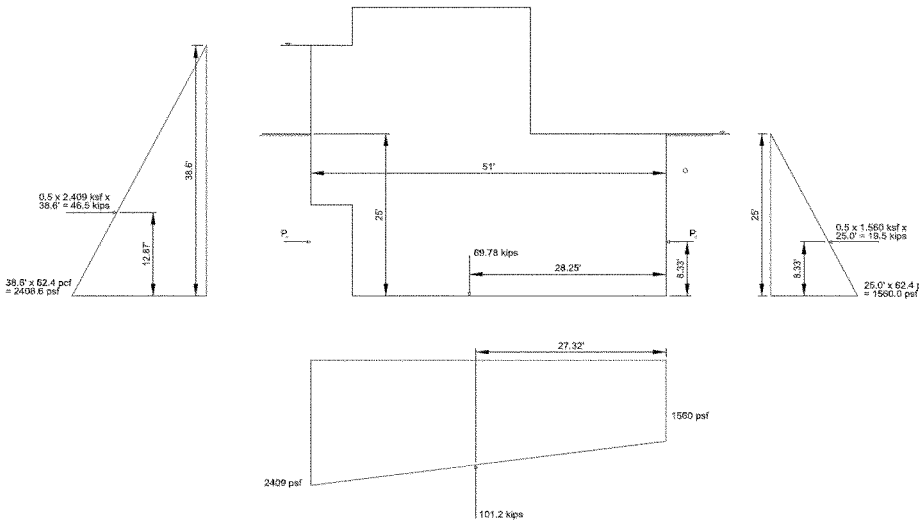
Elevation



Data

Weight =	2266000 lbs	φ =	28 °	Min_{Stage} =	10149 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	59632 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #6
Global Stability (Extreme Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (38.6 ft) x (62.4 pcf) = 2408.64 psf
= 2.409 ksf

Pressure on Landside
= (25 ft) x (62.4 pcf) = 1560 psf
= 1.560 ksf

Uplift = 101.20 kips $\bar{x}$ = 23.68 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting P_R = $0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 40625 lb/ft $\bar{x}$ = 8.33 ft

Driving P_D = $0.5 \times K_D \times \gamma \times h^2$
K_D = $(1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 21553 lb/ft $\bar{x}$ = 8.33 ft

Overturning Stability (about bottom corner of Landside)

*Weight	69.78 kips x 28.25 ft =	1971.56 kip-ft
*Vert. Fric.	21.55 kips x 51 ft =	1099.19 kip-ft
*Uplift	-101.2 kips x 27.32 ft =	-2764.55 kip-ft
ΣV =	30.76 kips	

	19.5 kips x 8.33 ft =	162.50 kip-ft
	40.63 kips x 8.33 ft =	338.54 kip-ft
	-46.49 kips x 12.87 ft =	-598.13 kip-ft
	-21.55 kips x 8.33 ft =	-179.61 kip-ft
ΣH =	-7.91 kips	29.5 kip-ft / 30.76 kips = 0.96 ft = x_R

a = $3x_R$ = 2.88 ft > b = 51 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 5.64% < 75%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #6
Global Stability (Extreme Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 30.76 kips
T = ΣH = 7.91 kips

$$FS_s = \frac{N' \tan\phi + cL}{T}$$

Eq. 3-1, EM 1110-2-2100
**Over 1 foot section*

$$FS_s = \frac{30.76 \text{ kips} \times \tan(28°) + 0.23 \text{ ksf} \times 51 \text{ ft}}{7.91 \text{ kips}}$$

FS_s = 3.52

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$$FS_f = \frac{W_S + W_C + S}{U - W_G}$$

$$FS_f = \frac{59.63 \text{ kips} + 10.15 \text{ kips} + 0 \text{ kips}}{101.2 \text{ kips} - 0 \text{ kips}}$$

FS_f = 1.30

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right) = \tan^{-1}(7.91 / 30.76) = 14.43°$$

e = B/2 - x_R = ½ x 51 ft - 0.96 ft = 24.54 ft

$\bar{B}$ = B - 2e = 51 ft - 2 x 24.54 ft = 1.92 ft

γ' = γ_s - γ_w = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 25 ft = 1690.00 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #6
Global Stability (Extreme Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\overline{B}$) x tan(45° + φ/2) = 1 + 0.2*(25 / 1.92) x tan(45° + 28°/2)
= 5.34

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(25 / 1.92) x tan(45° + 28°/2)
3.17

$\xi_{qi} = \xi_{ci}$ = $(1 - \delta / 90°)^2$ = (1 - 14.43° / 90°)² = 0.71

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 14.43° / 28°)² = 0.23

$\xi_{\gamma g} = \xi_{qg}$ = $(1 - \tan(\beta))^2$ = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = $(1 - \alpha \times \tan(\varphi))^2$ = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right]=$$

= 1.92 ft x [(5.34 x 0.71 x 1 x 1 x 225 x 25.8) +
(3.17 x 0.71 x 1 x 1 x 1690 x 14.72) +
½ x (3.17 x 0.23 x 1 x 1 x 1.92 ft x 130 pcf x 11.19)] =

= 150528 lbs

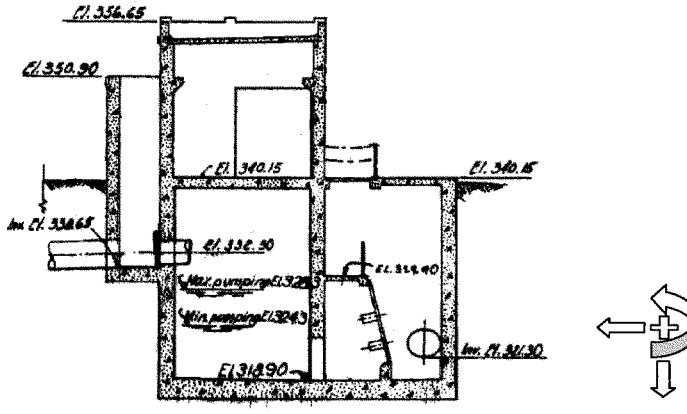
FS = 1.5Q / N' = 225.79 kips / 30.76 kips = 7.34 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject:	Paducah, KY LSE	Page	1 of	4
	Pump Station #7	Computed by:	N. Cash	10-Nov-09
	Global Stability (Unusual Condition)	Checked by:		

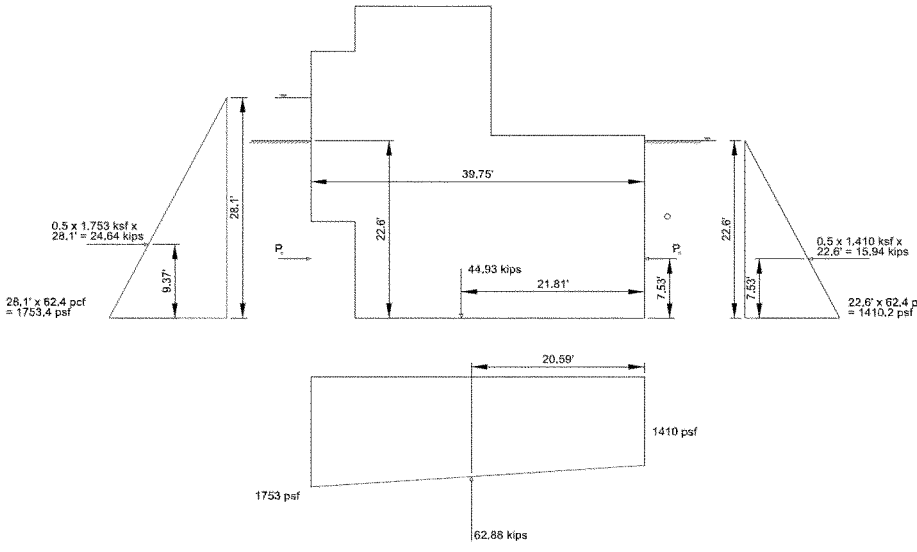
Elevation



Data

Weight =	944126 lbs	φ =	28 °	Min_{Stage} =	3882 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	41049 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #7
Global Stability (Unusual Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (28.1 ft) x (62.4 pcf) = 1753.44 psf
= 1.753 ksf

Pressure on Landside
= (22.6 ft) x (62.4 pcf) = 1410.24 psf
= 1.410 ksf

Uplift = 62.88 kips $\bar{x}$ = 19.16 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting P_R = $0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 33199 lb/ft $\bar{x}$ = 7.53 ft

Driving P_D = $0.5 \times K_D \times \gamma \times h^2$
K_D = $(1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 17613 lb/ft $\bar{x}$ = 7.53 ft

Overturning Stability (about bottom corner of Landside)

*Weight	44.93 kips x 21.81 ft =	979.78 kip-ft
*Vert. Fric.	17.61 kips x 39.75 ft =	700.13 kip-ft
*Uplift	-62.88 kips x 20.59 ft =	-1294.89 kip-ft
ΣV =	32.87 kips	

	15.94 kips x 7.53 ft =	120.05 kip-ft
	33.2 kips x 7.53 ft =	250.10 kip-ft
	-24.64 kips x 9.37 ft =	-230.76 kip-ft
	-17.61 kips x 7.53 ft =	-132.69 kip-ft
ΣH =	6.89 kips	391.72 kip-ft / 32.87 kips = 11.92 ft = x_R

a = $3x_R$ = 35.76 ft > b = 39.75 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 89.95% > 75%

Therefore criteria is satisfied. Suitable in Overturning.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #7
Global Stability (Unusual Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 32.87 kips
T = ΣH = 6.89 kips

$$FS_s = \frac{N' \tan\phi + cL}{T}$$

Eq. 3-1, EM 1110-2-2100
**Over 1 foot section*

$$FS_s = \frac{32.87 \text{ kips} \times \tan(28°) + 0.23 \text{ ksf} \times 39.75 \text{ ft}}{6.89 \text{ kips}}$$

FS_s = 3.84

FSs > 1.5, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$$FS_f = \frac{W_S + W_C + S}{U - W_G}$$

$$FS_f = \frac{41.05 \text{ kips} + 3.88 \text{ kips} + 0 \text{ kips}}{62.88 \text{ kips} - 0 \text{ kips}}$$

FS_f = 1.52

FSf > 1.2, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right) = \tan^{-1}(6.89 / 32.87) = 11.83°$$

e = B/2 - x_R = ½ x 39.75 ft - 11.92 ft = 7.96 ft

$\bar{B}$ = B - 2e = 39.75 ft - 2 x 7.96 ft = 23.84 ft

γ' = $\gamma_s - \gamma_w$ = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 22.6 ft = 1527.76 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #7
Global Stability (Unusual Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\overline{B}$) x tan(45° + φ/2) = 1 + 0.2*(22.6 / 23.84) x tan(45° + 28°/2)
= 1.32

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(22.6 / 23.84) x tan(45° + 28°/2)
1.16

$\xi_{qi} = \xi_{ci}$ = $(1 - \delta / 90°)^2$ = (1 - 11.83° / 90°)² = 0.75

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 11.83° / 28°)² = 0.33

$\xi_{\gamma g} = \xi_{qg}$ = $(1 - \tan(\beta))^2$ = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = $(1 - \alpha \times \tan(\varphi))^2$ = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right]=$$

= 23.84 ft x [(1.32 x 0.75 x 1 x 1 x 225 x 25.8) +
(1.16 x 0.75 x 1 x 1 x 1527.76 x 14.72) +
½ x (1.16 x 0.33 x 1 x 1 x 23.84 ft x 130 pcf x 11.19)] =

= 765029 lbs

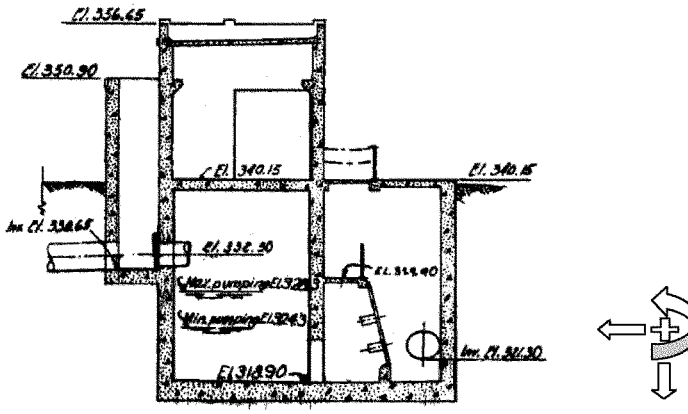
FS = 1.15Q / N' = 879.78 kips / 32.87 kips = 26.77 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject:	Paducah, KY Feasability	Page	1 of	4
	Pump Station #7	Computed by:	N. Cash	10-Nov-09
	Global Stability (Extreme Condition)	Checked by:		

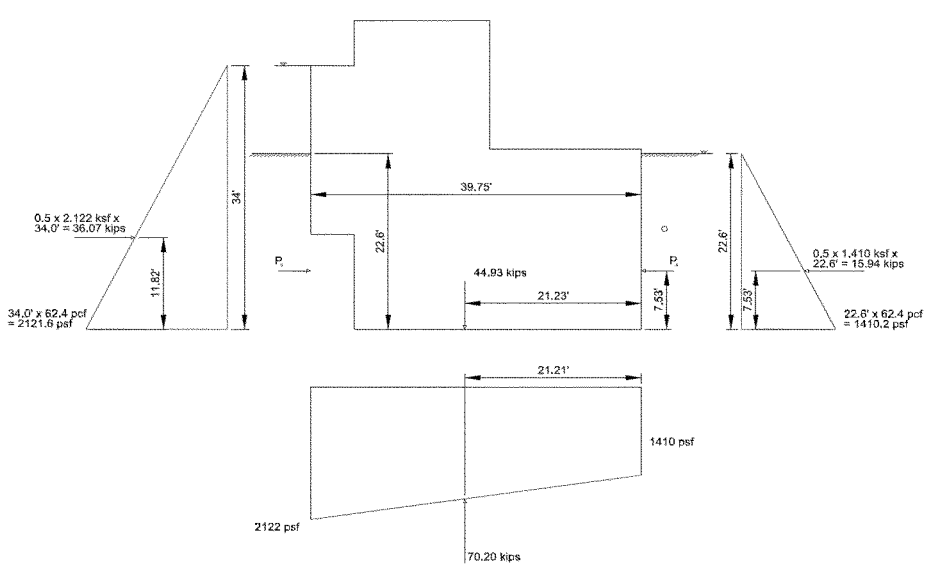
Elevation



Data

Weight =	944126 lbs	φ =	28 °	Min_{Stage} =	3882 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	41049 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #7
Global Stability (Extreme Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (34 ft) x (62.4 pcf) = 2121.6 psf
= 2.122 ksf

Pressure on Landside
= (22.6 ft) x (62.4 pcf) = 1410.24 psf
= 1.410 ksf

Uplift = 70.20 kips $\bar{x}$ = 18.54 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting $P_R = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 33199 lb/ft $\bar{x}$ = 7.53 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 17613 lb/ft $\bar{x}$ = 7.53 ft

Overturning Stability (about bottom corner of Landside)

*Weight	44.93 kips x 21.81 ft =	979.78 kip-ft
*Vert. Fric.	17.61 kips x 39.75 ft =	700.13 kip-ft
*Uplift	-70.2 kips x 21.21 ft =	-1488.80 kip-ft
ΣV =	25.55 kips	

	15.94 kips x 7.53 ft =	120.05 kip-ft
	33.2 kips x 7.53 ft =	250.10 kip-ft
	-36.07 kips x 11.33 ft =	-408.76 kip-ft
	-17.61 kips x 7.53 ft =	-132.69 kip-ft
ΣH =	-4.55 kips	19.81 kip-ft / 25.55 kips = 0.78 ft = x_R

a = $3x_R$ = 2.33 ft > b = 39.75 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 5.85% < 75%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #7
Global Stability (Extreme Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 25.55 kips
T = ΣH = 4.55 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{25.55 \text{ kips} \times \tan(28°) + 0.23 \text{ ksf} \times 39.75 \text{ ft}}{4.55 \text{ kips}}$

FS_s = 4.96

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{41.05 \text{ kips} + 3.88 \text{ kips} + 0 \text{ kips}}{70.2 \text{ kips} - 0 \text{ kips}}$

FS_f = 1.36

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ = $\tan^{-1}$(4.55 / 25.55) = 10.09 °

e = B/2 - x_R = ½ x 39.75 ft - 0.78 ft = 19.10 ft

$\bar{B}$ = B - 2e = 39.75 ft - 2 x 19.1 ft = 1.55 ft

γ' = γ_s - γ_w = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 22.6 ft = 1527.76 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #7
Global Stability (Extreme Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\overline{B}$) x tan(45° + φ/2) = 1 + 0.2*(22.6 / 1.55) x tan(45° + 28°/2)
= 5.85

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(22.6 / 1.55) x tan(45° + 28°/2)
3.43

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 10.09° / 90°)² = 0.79

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 10.09° / 28°)² = 0.41

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right]=$$

= 1.55 ft x [(5.85 x 0.79 x 1 x 1 x 225 x 25.8) +
(3.43 x 0.79 x 1 x 1 x 1527.76 x 14.72) +
½ x (3.43 x 0.41 x 1 x 1 x 1.55 ft x 130 pcf x 11.19)] =

= 138163 lbs

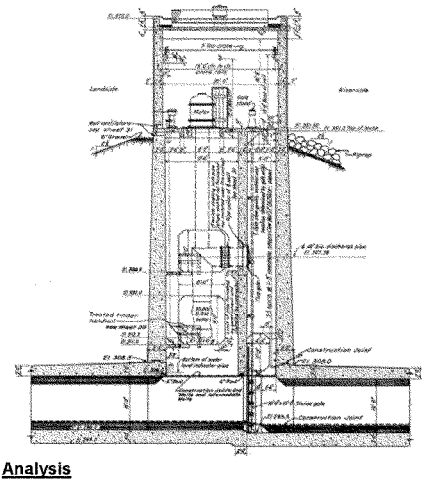
FS = 1.5Q / N' = 207.25 kips / 25.55 kips = 8.11 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject:	Paducah, KY Feasability	Page	1 of	4
	Pump Station #11	Computed by:	N. Cash	13-Oct-09
	Global Stability (Extreme Condition)	Checked by:		

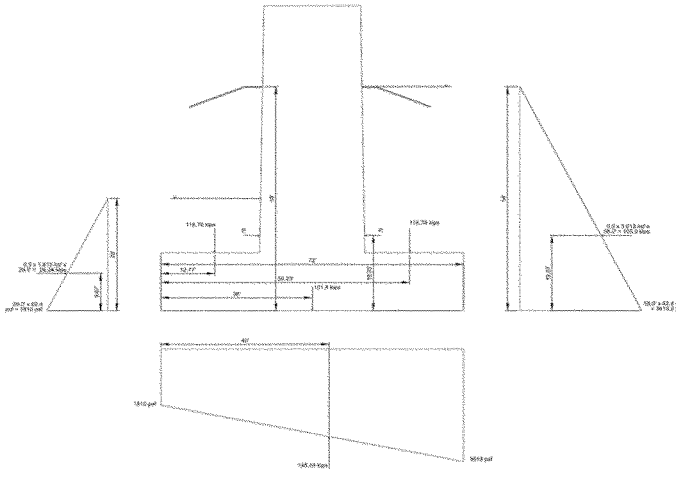
Elevation



Data

Weight =	930700	lbs
Weight/ft =	101808	lbs/ft
γ_s =	125	pcf
φ =	26	°
c =	200	psf
WC =	18%	
Max_{Stage} =	23368	lbs/ft
Slope =	-2.5	V:1H

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #11
Global Stability (Extreme Condition)

Page 2 of 4
Computed by: N. Cash 13-Oct-09
Checked by:

Vertical Soil Weight

Landside Soil Weight = Riverside Soil Weight = 116.76 kips

$\bar{x}$ = 11.73 ft from face of Pump Station

Landside Moment Arm = 12.77 ft
Riverside Moment Arm = 59.23 ft

Water Pressures

Pressure on Riverside
= (58 ft) x (62.4 pcf) = 3619.2 psf
= 3.619 ksf

Pressure on Landside
= (29 ft) x (62.4 pcf) = 1809.6 psf
= 1.810 ksf

Uplift = 195.44 kips $\bar{x}$ = 32.00 ft

Horizontal Soil Forces

Resisting $P_P = 0.5 \times K_P \times \gamma_b \times h^2$

$K_P = K_O \times (1 + \sin\beta) =$ 0.35

$K_O = (1 - \sin\varphi) =$ 0.56

= 74227.74 lb/ft $\bar{x}$ = 19.33 ft

Driving $\Phi_d = \tan^{-1}(\tan(\varphi)/1.5) =$ 18.01 °

$\beta =$ -21.80 °

$c_1 = 2\tan\Phi_d =$ 0.650

$c_2 = 1 - \tan\Phi_d \tan\beta - \tan\beta / \tan\Phi_d =$ 2.360

$\alpha = \tan^{-1}(½ \times (c_1 + \sqrt{(c_1^2 + 4c_2)})) =$ 62.19 °

$$K_1 = \frac{\cos^2\phi_d}{\left[1+\sqrt{\frac{\sin\phi_d \sin(\phi_d - \beta)}{\cos\beta}}\right]^2} = 0.423$$

P_A = 75412.15 lb/ft $\bar{x}$ = 19.33 ft

Overturning Stability (about bottom corner of Landside)

	125.18 kips x 36 ft =	4506.34 kip-ft
	116.76 kips x 12.77 ft =	1491.54 kip-ft
	116.76 kips x 59.23 ft =	6914.91 kip-ft
	-195.44 kips x 40 ft =	-7817.47 kip-ft
ΣV =	163.25 kips	

	26.24 kips x 9.67 ft =	253.65 kip-ft	
	74.23 kips x 19.33 ft =	1435.07 kip-ft	
	-104.96 kips x 19.33 ft =	-2029.16 kip-ft	
	-75.41 kips x 19.33 ft =	-1457.97 kip-ft	
ΣH =	-79.90 kips	3296.9 kip-ft / 163.25 kips =	20.20 ft = x_R

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #11
Global Stability (Extreme Condition)

Page 3 of 4
Computed by: N. Cash 13-Oct-09
Checked by:

Overturning Stability, continued

a = $3x_R$ = 60.59 ft > b = 72 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 84.15% < 100%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

Sliding Stability

N' = ΣV = 163.25 kips
T = ΣH = 79.90 kips

$$FS_s = \frac{N' \tan\phi + cL}{T}$$

Eq. 3-1, EM 1110-2-2100
**Over 1 foot section*

$$FS_s = \frac{163.25 \text{ kips} \times \tan(26°) + 0.2 \text{ ksf} \times 72 \text{ ft}}{79.9 \text{ kips}}$$

FS_s = 1.18

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$$FS_f = \frac{W_S + W_C + S}{U - W_G}$$

$$FS_f = \frac{335.32 \text{ kips} + 23.37 \text{ kips} + 0 \text{ kips}}{195.44 \text{ kips} - 0 \text{ kips}}$$

FS_f = 1.84

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 22.25 N_q = 11.85 N_γ = 8.00 *Tbl. 5-1, φ = 26°*

$$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right) = \tan^{-1}(79.9 / 163.25) = 26.08°$$

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #11
Global Stability (Extreme Condition)

Page 4 of 4
Computed by: N. Cash 13-Oct-09
Checked by:

Bearing Capacity, continued

$e =$	$B/2 - x_R =$	½ x 72 ft - 20.2 ft =	15.80 ft
$\overline{B} =$	$B - 2e =$	72 ft - 2 x 15.8 ft =	40.39 ft
$\gamma' =$	$\gamma_s - \gamma_w =$	125 pcf - 62.4 pcf =	62.60 pcf
$q_o =$	$\gamma' D =$	62.6 pcf x 58 ft =	3630.80 lb/ft

$\xi_{cd} = 1 + 0.2(D / \overline{B}) \times \tan(45° + \varphi/2) =$ 1 + 0.2*(58 / 40.39) x tan(45° + 26°/2)
$= 1.46$

$\xi_{qd} = \xi_{\gamma d} = 1 + 0.1(D / B) \times \tan(45° + \varphi/2) =$ 1 + 0.1*(58 / 40.39) x tan(45° + 26°/2)
1.23

$\xi_{qi} = \xi_{ci} = (1 - \delta / 90°)^2 =$ (1 - 26.08° / 90°)² = 0.50

$\xi_{\gamma i} = 0$

$\xi_{\gamma g} = \xi_{qg} = (1 - \tan(\beta))^2 =$ (1 - tan(-21.8°))² = 1.96

$\xi_{cg} = \xi qg - (1 - \xi qg) / (Nc \times \tan(\varphi)) =$ 1.96 - (1 - 1.96) / (22.25 x tan(26°))
$= 1.09$

$\xi_{qt} = \xi_{\gamma t} = (1 - \alpha \times \tan(\varphi))^2 =$ (1 - 62.19° x tan(26°))² = 0.22

$\xi_{ct} = \xi qt - (1 - \xi qt) / (Nc \times \tan(\varphi)) =$ 0.22 - (1 - 0.22) / (22.25 x tan(26°))
$= 0.15$

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right] =$$

= 40.39 ft x [(1.46 x 0.5 x 0.15 x 1.09 x 200 x 22.25) +
(1.23 x 0.5 x 0.22 x 1.96 x 3630.8 x 11.85) +
½ x (1.23 x 0 x 0.22 x 1.96 x 40.39 ft x 125 pcf x 8)] =

= 489781 lbs

FS = 1.5Q / N' = 734.67 kips / 163.25 kips = 4.50 > 3

Therefore criteria is satisfied. Suitable in bearing.

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 11:43:51

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+00.00 - 51+47.64
     'Monolith 143/144, Drained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 344.00 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:44:59

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monolith 143/144, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	436.8	152.6	20.7	304.9	568.7	20.7	152.6
342.0	436.8	305.2	41.5	173.1	700.5	41.5	305.2
341.0	436.8	457.8	62.2	41.2	832.4	62.2	457.8
340.7	436.8	505.5	68.7	0.0	873.6	68.7	505.5
340.0	436.8	610.4	83.0	-90.6	964.2	83.0	610.4
339.0	436.8	763.0	103.7	-222.5	1096.1	103.7	763.0
338.0	436.8	915.6	124.5	-354.3	1227.9	124.5	915.6
337.0	436.8	1068.2	145.2	-486.2	1359.8	145.2	1068.2

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Drained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	436.8	1220.8	166.0	-618.0	1491.6	166.0	1220.8
335.0	436.8	1373.4	186.7	-749.9	1623.5	186.7	1373.4
334.0	436.8	1526.0	207.4	-881.7	1755.3	207.4	1526.0
333.0	436.8	1678.6	228.2	-1013.6	1887.2	228.2	1678.6
332.0	436.8	1831.2	248.9	-1145.5	2019.1	248.9	1831.2
331.0	436.8	1983.8	269.7	-1277.3	2150.9	269.7	1983.8
330.0	436.8	2136.4	290.4	-1409.2	2282.8	290.4	2136.4
329.0	436.8	2289.0	311.2	-1541.0	2414.6	311.2	2289.0
328.0	436.8	2441.6	331.9	-1672.9	2546.5	331.9	2441.6
327.0	436.8	2594.2	352.6	-1804.7	2678.3	352.6	2594.2
326.0	436.8	2746.8	373.4	-1936.6	2810.2	373.4	2746.8
325.0	436.8	2899.4	394.1	-2068.4	2942.0	394.1	2899.4
324.0	436.8	3052.0	414.9	-2200.3	3073.9	414.9	3052.0
323.0	436.8	3204.6	435.6	-2332.1	3205.7	435.6	3204.6
322.0	436.8	3357.2	456.4	-2464.0	3337.6	456.4	3357.2
321.0	436.8	3509.8	477.1	-2595.9	3469.5	477.1	3509.8
320.0	436.8	3662.4	497.9	-2727.7	3601.3	497.9	3662.4
319.0	436.8	3815.0	518.6	-2859.6	3733.2	518.6	3815.0
318.0	436.8	3967.6	539.3	-2991.4	3865.0	539.3	3967.6
317.0	436.8	4120.2	560.1	-3123.3	3996.9	560.1	4120.2
316.0	436.8	4272.8	580.8	-3255.1	4128.7	580.8	4272.8
315.0	436.8	4425.4	601.6	-3387.0	4260.6	601.6	4425.4
314.0	436.8	4578.0	622.3	-3518.8	4392.4	622.3	4578.0
313.0	436.8	4730.6	643.1	-3650.7	4524.3	643.1	4730.6

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 11:45:00

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+00.00 - 51+47.64
     'Monolith 143/144, Drained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
        AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

        LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
        AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

   WALL BOTTOM ELEV. (FT)      :       327.02
         PENETRATION (FT)      :        16.98
```

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
MAX. BEND. MOMENT (LB-FT)  :  1.9006E+04
      AT ELEVATION (FT)    :      334.84

MAX. SCALED DEFL. (LB-IN^3):  5.2447E+09
      AT ELEVATION (FT)    :      351.00

          NOTE:  DIVIDE SCALED DEFLECTION MODULUS OF
                 ELASTICITY IN PSI TIMES PILE MOMENT
                 OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
                 IN INCHES.
```

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:45:00

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*****************************
* COMPLETE OF RESULTS FOR   *
*  CANTILEVER WALL DESIGN   *
*****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monolith 143/144, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	5.2447E+09	0.00
350.00	1.0400E+01	31.	4.8924E+09	62.40
349.00	8.3200E+01	125.	4.5402E+09	124.80
348.00	2.8080E+02	281.	4.1881E+09	187.20
347.00	6.6560E+02	499.	3.8365E+09	249.60
346.00	1.3000E+03	780.	3.4861E+09	312.00
345.00	2.2464E+03	1123.	3.1380E+09	374.40
344.00	3.5672E+03	1529.	2.7938E+09	436.80
343.00	5.2924E+03	1900.	2.4559E+09	304.95
342.00	7.3226E+03	2139.	2.1271E+09	173.09
341.00	9.5259E+03	2246.	1.8110E+09	41.24
340.69	1.0230E+04	2252.	1.7154E+09	0.00
340.00	1.1770E+04	2221.	1.5114E+09	-90.62
339.00	1.3924E+04	2065.	1.2321E+09	-222.47
338.00	1.5856E+04	1776.	9.7689E+08	-354.33
337.00	1.7433E+04	1356.	7.4898E+08	-486.18
336.00	1.8524E+04	804.	5.5112E+08	-618.04
335.00	1.8996E+04	120.	3.8519E+08	-749.89
334.00	1.8719E+04	-696.	2.5197E+08	-881.74
333.00	1.7561E+04	-1644.	1.5097E+08	-1013.60
332.00	1.5388E+04	-2723.	8.0175E+07	-1145.45
331.52	1.3933E+04	-3293.	5.5692E+07	-1209.31
331.00	1.2093E+04	-3802.	3.5803E+07	-763.43
330.00	8.0537E+03	-4133.	1.2219E+07	101.19
329.00	4.1153E+03	-3600.	2.5668E+06	965.80

328.00	1.1426E+03	-2202.	1.6435E+05	1830.42
327.02	0.0000E+00	0.	0.0000E+00	2675.32

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	437.	153.	21.	21.	153.
342.00	437.	305.	41.	41.	305.
341.00	437.	458.	62.	62.	458.
340.69	437.	506.	69.	69.	506.
340.00	437.	610.	83.	83.	610.
339.00	437.	763.	104.	104.	763.
338.00	437.	916.	124.	124.	916.
337.00	437.	1068.	145.	145.	1068.
336.00	437.	1221.	166.	166.	1221.
335.00	437.	1373.	187.	187.	1373.
334.00	437.	1526.	207.	207.	1526.
333.00	437.	1679.	228.	228.	1679.
332.00	437.	1831.	249.	249.	1831.
331.52	437.	1905.	259.	259.	1905.
331.00	437.	1984.	270.	270.	1984.
330.00	437.	2136.	290.	290.	2136.
329.00	437.	2289.	311.	311.	2289.
328.00	437.	2442.	332.	332.	2442.
327.02	437.	2594.	353.	353.	2594.
326.00	437.	2747.	373.	373.	2747.

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:30:18

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+00.00 - 51+47.64
     'Monoliths 143 & 144, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 344.00 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:31:36

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monoliths 143 & 144, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0+	436.8	0.0	0.0	436.8	436.8	0.0	0.0
344.0-	436.8	1333.3	0.0	-896.5	1770.1	0.0	1333.3
343.0	436.8	1695.6	0.0	-1258.8	2132.4	0.0	1695.6
342.0	436.8	1758.2	0.0	-1321.4	2195.0	0.0	1758.2
341.0	436.8	1820.8	0.0	-1384.0	2257.6	0.0	1820.8
340.0	436.8	1883.4	0.0	-1446.6	2320.2	0.0	1883.4
339.0	436.8	1946.0	0.0	-1509.2	2382.8	0.0	1946.0
338.0	436.8	2008.6	0.0	-1571.8	2445.4	0.0	2008.6
337.0	436.8	2071.2	0.0	-1634.4	2508.0	0.0	2071.2
336.0	436.8	2133.8	0.0	-1697.0	2570.6	0.0	2133.8
335.0	436.8	2196.4	0.0	-1759.6	2633.2	0.0	2196.4

334.0	436.8	2259.0	0.0	-1822.2	2695.8	0.0	2259.0
333.0	436.8	2321.6	0.0	-1884.8	2758.4	0.0	2321.6
332.0	436.8	2384.2	0.0	-1947.4	2821.0	0.0	2384.2
331.0	436.8	2446.8	0.0	-2010.0	2883.6	0.0	2446.8
330.0	436.8	2509.4	0.0	-2072.6	2946.2	0.0	2509.4
329.0	436.8	2572.0	0.0	-2135.2	3008.8	0.0	2572.0
328.0	436.8	2634.6	0.0	-2197.8	3071.4	0.0	2634.6
327.0	436.8	2697.2	0.0	-2260.4	3134.0	0.0	2697.2
326.0	436.8	2759.8	0.0	-2323.0	3196.6	0.0	2759.8
325.0	436.8	2822.4	0.0	-2385.6	3259.2	0.0	2822.4
324.0	436.8	2885.0	0.0	-2448.2	3321.8	0.0	2885.0
323.0	436.8	2947.6	0.0	-2510.8	3384.4	0.0	2947.6
322.0	436.8	3010.2	0.0	-2573.4	3447.0	0.0	3010.2
321.0	436.8	3072.8	0.0	-2636.0	3509.6	0.0	3072.8
320.0	436.8	3135.4	0.0	-2698.6	3572.2	0.0	3135.4
319.0	436.8	3198.0	0.0	-2761.2	3634.8	0.0	3198.0
318.0	436.8	3260.6	0.0	-2823.8	3697.4	0.0	3260.6
317.0	436.8	3323.2	0.0	-2886.4	3760.0	0.0	3323.2
316.0	436.8	3385.8	0.0	-2949.0	3822.6	0.0	3385.8
315.0	436.8	3448.4	0.0	-3011.6	3885.2	0.0	3448.4
314.0	436.8	3511.0	0.0	-3074.2	3947.8	0.0	3511.0
313.0	436.8	3573.6	0.0	-3136.8	4010.4	0.0	3573.6

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                        BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                        TIME: 13:31:37

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

   I.--HEADING
    'Phase II I-Wall Evaluation
    'Paducah, KY
    'Stations 51+00.00 - 51+47.64
    'Monoliths 143 & 144, Undrained

  II.--SUMMARY

       RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

       LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

  WALL BOTTOM ELEV. (FT)      :       338.97
        PENETRATION (FT)      :         5.03

  MAX. BEND. MOMENT (LB-FT)   :  4.6677E+03
        AT ELEVATION (FT)     :       342.64

  MAX. SCALED DEFL. (LB-IN^3):  2.8613E+08
```

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:31:37

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monoliths 143 & 144, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	2.8613E+08	0.00
350.00	1.0400E+01	31.	2.4966E+08	62.40
349.00	8.3200E+01	125.	2.1323E+08	124.80
348.00	2.8080E+02	281.	1.7695E+08	187.20
347.00	6.6560E+02	499.	1.4119E+08	249.60
346.00	1.3000E+03	780.	1.0661E+08	312.00
345.00	2.2464E+03	1123.	7.4329E+07	374.40
344.00	3.5672E+03	1529.	4.5979E+07	436.80
344.00	3.5672E+03	1529.	4.5979E+07	-896.53
343.00	4.5873E+03	451.	2.3755E+07	-1258.85
342.00	4.3986E+03	-839.	9.2808E+06	-1321.45
341.60	3.9610E+03	-1368.	5.6850E+06	-1346.29
341.00	2.9425E+03	-1923.	2.2186E+06	-492.09
340.00	1.0097E+03	-1707.	1.7038E+05	923.92
339.00	8.3395E-01	-75.	-1.3745E-01	2339.94
338.97	0.0000E+00	0.	0.0000E+00	2384.83

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

ELEVATION (FT)	WATER PRESSURE (PSF)	<----LEFTSIDE-----> PASSIVE (PSF)	ACTIVE (PSF)	<---RIGHTSIDE----> ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00+	437.	0.	0.	0.	0.
344.00+	437.	1333.	0.	0.	1333.
343.00	437.	1696.	0.	0.	1696.
342.00	437.	1758.	0.	0.	1758.
341.60	437.	1783.	0.	0.	1783.
341.00	437.	1821.	0.	0.	1821.
340.00	437.	1883.	0.	0.	1883.
339.00	437.	1946.	0.	0.	1946.
338.97	437.	2009.	0.	0.	2009.
337.00	437.	2071.	0.	0.	2071.

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 11:51:08

                              ****************
                              *  INPUT DATA  *
                              ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+47.64 - 51+67.64
     'Monolith 145, Drained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 344.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:51:31

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
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```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+67.64
'Monolith 145, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.5	405.6	0.0	0.0	405.6	405.6	0.0	0.0
344.0	405.6	76.3	10.4	339.7	471.5	10.4	76.3
343.5	405.6	152.6	20.7	273.7	537.5	20.7	152.6
343.0	405.6	228.9	31.1	207.8	603.4	31.1	228.9
342.0	405.6	381.5	51.9	76.0	735.2	51.9	381.5
341.4	405.6	469.4	63.8	0.0	811.2	63.8	469.4
341.0	405.6	534.1	72.6	-55.9	867.1	72.6	534.1
340.0	405.6	686.7	93.3	-187.7	998.9	93.3	686.7
339.0	405.6	839.3	114.1	-319.6	1130.8	114.1	839.3

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

338.0	405.6	991.9	134.8	-451.5	1262.7	134.8	991.9
337.0	405.6	1144.5	155.6	-583.3	1394.5	155.6	1144.5
336.0	405.6	1297.1	176.3	-715.2	1526.4	176.3	1297.1
335.0	405.6	1449.7	197.1	-847.0	1658.2	197.1	1449.7
334.0	405.6	1602.3	217.8	-978.9	1790.1	217.8	1602.3
333.0	405.6	1754.9	238.6	-1110.7	1921.9	238.6	1754.9
332.0	405.6	1907.5	259.3	-1242.6	2053.8	259.3	1907.5
331.0	405.6	2060.1	280.0	-1374.4	2185.6	280.0	2060.1
330.0	405.6	2212.7	300.8	-1506.3	2317.5	300.8	2212.7
329.0	405.6	2365.3	321.5	-1638.1	2449.3	321.5	2365.3
328.0	405.6	2517.9	342.3	-1770.0	2581.2	342.3	2517.9
327.0	405.6	2670.5	363.0	-1901.9	2713.1	363.0	2670.5
326.0	405.6	2823.1	383.8	-2033.7	2844.9	383.8	2823.1
325.0	405.6	2975.7	404.5	-2165.6	2976.8	404.5	2975.7
324.0	405.6	3128.3	425.3	-2297.4	3108.6	425.3	3128.3
323.0	405.6	3280.9	446.0	-2429.3	3240.5	446.0	3280.9
322.0	405.6	3433.5	466.7	-2561.1	3372.3	466.7	3433.5
321.0	405.6	3586.1	487.5	-2693.0	3504.2	487.5	3586.1
320.0	405.6	3738.7	508.2	-2824.8	3636.0	508.2	3738.7
319.0	405.6	3891.3	529.0	-2956.7	3767.9	529.0	3891.3
318.0	405.6	4043.9	549.7	-3088.5	3899.7	549.7	4043.9
317.0	405.6	4196.5	570.5	-3220.4	4031.6	570.5	4196.5
316.0	405.6	4349.1	591.2	-3352.3	4163.5	591.2	4349.1
315.0	405.6	4501.7	611.9	-3484.1	4295.3	611.9	4501.7
314.0	405.6	4654.3	632.7	-3616.0	4427.2	632.7	4654.3

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 11:51:33

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

   I.--HEADING
    'Phase II I-Wall Evaluation
    'Paducah, KY
    'Stations 51+47.64 - 51+67.64
    'Monolith 145, Drained

  II.--SUMMARY

       RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

       LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

  WALL BOTTOM ELEV. (FT)     :       328.74
        PENETRATION (FT)     :        15.76
```

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. BEND. MOMENT (LB-FT) : 1.5217E+04
AT ELEVATION (FT) : 336.00

MAX. SCALED DEFL. (LB-IN^3): 3.6208E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:51:33

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
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I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+67.64
'Monolith 145, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	3.6208E+09	0.00
350.00	1.0400E+01	31.	3.3588E+09	62.40
349.00	8.3200E+01	125.	3.0970E+09	124.80
348.00	2.8080E+02	281.	2.8352E+09	187.20
347.00	6.6560E+02	499.	2.5740E+09	249.60
346.00	1.3000E+03	780.	2.3140E+09	312.00
345.00	2.2464E+03	1123.	2.0563E+09	374.40
344.50	2.8561E+03	1318.	1.9288E+09	405.60
344.00	3.5632E+03	1505.	1.8025E+09	339.67
343.50	4.3551E+03	1658.	1.6777E+09	273.75
343.00	5.2155E+03	1778.	1.5549E+09	207.82
342.00	7.0757E+03	1920.	1.3163E+09	75.96
341.42	8.1904E+03	1942.	1.1842E+09	0.00
341.00	9.0119E+03	1930.	1.0900E+09	-55.89
340.00	1.0892E+04	1808.	8.7927E+08	-187.74
339.00	1.2585E+04	1555.	6.8732E+08	-319.60
338.00	1.3958E+04	1169.	5.1707E+08	-451.45
337.00	1.4879E+04	652.	3.7087E+08	-583.31
336.00	1.5217E+04	3.	2.5030E+08	-715.16
335.00	1.4840E+04	-779.	1.5592E+08	-847.02
334.00	1.3616E+04	-1691.	8.7064E+07	-978.87
333.00	1.1413E+04	-2736.	4.1595E+07	-1110.73
332.91	1.1155E+04	-2840.	3.8450E+07	-1122.93
332.00	8.2238E+03	-3503.	1.5698E+07	-338.33

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

331.00	4.6961E+03	-3409.	3.9620E+06	526.29
330.00	1.6947E+03	-2450.	4.1705E+05	1390.91
329.00	8.4230E+01	-627.	8.5914E+02	2255.52
328.74	0.0000E+00	0.	0.0000E+00	2484.22

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.50	406.	0.	0.	0.	0.
344.00	406.	76.	10.	10.	76.
343.50	406.	153.	21.	21.	153.
343.00	406.	229.	31.	31.	229.
342.00	406.	381.	52.	52.	381.
341.42	406.	469.	64.	64.	469.
341.00	406.	534.	73.	73.	534.
340.00	406.	687.	93.	93.	687.
339.00	406.	839.	114.	114.	839.
338.00	406.	992.	135.	135.	992.
337.00	406.	1144.	156.	156.	1144.
336.00	406.	1297.	176.	176.	1297.
335.00	406.	1450.	197.	197.	1450.
334.00	406.	1602.	218.	218.	1602.
333.00	406.	1755.	239.	239.	1755.
332.91	406.	1769.	240.	240.	1769.
332.00	406.	1907.	259.	259.	1907.
331.00	406.	2060.	280.	280.	2060.
330.00	406.	2213.	301.	301.	2213.
329.00	406.	2365.	322.	322.	2365.
328.74	406.	2518.	342.	342.	2518.
327.00	406.	2670.	363.	363.	2670.

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:34:23

                              ****************
                              *  INPUT DATA  *
                              ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+47.64 - 51+ 67.64
     'Monolith 145, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 344.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:34:42

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+ 67.64
'Monolith 145, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.5+	405.6	0.0	0.0	405.6	405.6	0.0	0.0
344.5-	405.6	1333.3	0.0	-927.7	1738.9	0.0	1333.3
344.0	405.6	1664.3	0.0	-1258.7	2069.9	0.0	1664.3
343.5	405.6	1695.6	0.0	-1290.0	2101.2	0.0	1695.6
343.0	405.6	1726.9	0.0	-1321.3	2132.5	0.0	1726.9
342.0	405.6	1789.5	0.0	-1383.9	2195.1	0.0	1789.5
341.0	405.6	1852.1	0.0	-1446.5	2257.7	0.0	1852.1
340.0	405.6	1914.7	0.0	-1509.1	2320.3	0.0	1914.7
339.0	405.6	1977.3	0.0	-1571.7	2382.9	0.0	1977.3
338.0	405.6	2039.9	0.0	-1634.3	2445.5	0.0	2039.9
337.0	405.6	2102.5	0.0	-1696.9	2508.1	0.0	2102.5

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	405.6	2165.1	0.0	-1759.5	2570.7	0.0	2165.1
335.0	405.6	2227.7	0.0	-1822.1	2633.3	0.0	2227.7
334.0	405.6	2290.3	0.0	-1884.7	2695.9	0.0	2290.3
333.0	405.6	2352.9	0.0	-1947.3	2758.5	0.0	2352.9
332.0	405.6	2415.5	0.0	-2009.9	2821.1	0.0	2415.5
331.0	405.6	2478.1	0.0	-2072.5	2883.7	0.0	2478.1
330.0	405.6	2540.7	0.0	-2135.1	2946.3	0.0	2540.7
329.0	405.6	2603.3	0.0	-2197.7	3008.9	0.0	2603.3
328.0	405.6	2665.9	0.0	-2260.3	3071.5	0.0	2665.9
327.0	405.6	2728.5	0.0	-2322.9	3134.1	0.0	2728.5
326.0	405.6	2791.1	0.0	-2385.5	3196.7	0.0	2791.1
325.0	405.6	2853.7	0.0	-2448.1	3259.3	0.0	2853.7
324.0	405.6	2916.3	0.0	-2510.7	3321.9	0.0	2916.3
323.0	405.6	2978.9	0.0	-2573.3	3384.5	0.0	2978.9
322.0	405.6	3041.5	0.0	-2635.9	3447.1	0.0	3041.5
321.0	405.6	3104.1	0.0	-2698.5	3509.7	0.0	3104.1
320.0	405.6	3166.7	0.0	-2761.1	3572.3	0.0	3166.7
319.0	405.6	3229.3	0.0	-2823.7	3634.9	0.0	3229.3
318.0	405.6	3291.9	0.0	-2886.3	3697.5	0.0	3291.9
317.0	405.6	3354.5	0.0	-2948.9	3760.1	0.0	3354.5
316.0	405.6	3417.1	0.0	-3011.5	3822.7	0.0	3417.1
315.0	405.6	3479.7	0.0	-3074.1	3885.3	0.0	3479.7
314.0	405.6	3542.3	0.0	-3136.7	3947.9	0.0	3542.3

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:34:42

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+47.64 - 51+ 67.64
     'Monolith 145, Undrained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

        LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

   WALL BOTTOM ELEV. (FT)      :       340.13
         PENETRATION (FT)      :         4.37

   MAX. BEND. MOMENT (LB-FT)   :  3.6196E+03
         AT ELEVATION (FT)     :       343.40
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Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. SCALED DEFL. (LB-IN^3): 1.7908E+08
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:34:42

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+ 67.64
'Monolith 145, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.7908E+08	0.00
350.00	1.0400E+01	31.	1.5396E+08	62.40
349.00	8.3200E+01	125.	1.2886E+08	124.80
348.00	2.8080E+02	281.	1.0392E+08	187.20
347.00	6.6560E+02	499.	7.9500E+07	249.60
346.00	1.3000E+03	780.	5.6262E+07	312.00
345.00	2.2464E+03	1123.	3.5315E+07	374.40
344.50	2.8561E+03	1318.	2.6190E+07	405.60
344.50	2.8561E+03	1318.	2.6190E+07	-927.73
344.00	3.3854E+03	772.	1.8297E+07	-1258.75
343.50	3.6126E+03	134.	1.1855E+07	-1290.05
343.00	3.5172E+03	-518.	6.9627E+06	-1321.35
342.53	3.1235E+03	-1150.	3.7263E+06	-1350.93
342.00	2.3666E+03	-1650.	1.5166E+06	-543.76
341.00	7.0022E+02	-1428.	8.2305E+04	986.76
340.13	0.0000E+00	0.	0.0000E+00	2311.95

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
		<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	WATER PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.50+	406.	0.	0.	0.	0.
344.50+	406.	1333.	0.	0.	1333.
344.00	406.	1664.	0.	0.	1664.
343.50	406.	1696.	0.	0.	1696.
343.00	406.	1727.	0.	0.	1727.
342.53	406.	1757.	0.	0.	1757.
342.00	406.	1790.	0.	0.	1790.
341.00	406.	1852.	0.	0.	1852.
340.13	406.	1915.	0.	0.	1915.
339.00	406.	1977.	0.	0.	1977.

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 11:56:50

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+96.90 - 54+17.98
     'Monolith 151, Drained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 344.00 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:57:18

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*************************
*   SOIL PRESSURES FOR  *
* CANTILEVER WALL DESIGN *
*************************
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I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	436.8	152.6	20.7	304.9	568.7	20.7	152.6
342.0	436.8	305.2	41.5	173.1	700.5	41.5	305.2
341.0	436.8	457.8	62.2	41.2	832.4	62.2	457.8
340.7	436.8	505.5	68.7	0.0	873.6	68.7	505.5
340.0	436.8	610.4	83.0	-90.6	964.2	83.0	610.4
339.0	436.8	763.0	103.7	-222.5	1096.1	103.7	763.0
338.0	436.8	915.6	124.5	-354.3	1227.9	124.5	915.6
337.0	436.8	1068.2	145.2	-486.2	1359.8	145.2	1068.2

336.0	436.8	1220.8	166.0	-618.0	1491.6	166.0	1220.8
335.0	436.8	1373.4	186.7	-749.9	1623.5	186.7	1373.4
334.0	436.8	1526.0	207.4	-881.7	1755.3	207.4	1526.0
333.0	436.8	1678.6	228.2	-1013.6	1887.2	228.2	1678.6
332.0	436.8	1831.2	248.9	-1145.5	2019.1	248.9	1831.2
331.0	436.8	1983.8	269.7	-1277.3	2150.9	269.7	1983.8
330.0	436.8	2136.4	290.4	-1409.2	2282.8	290.4	2136.4
329.0	436.8	2289.0	311.2	-1541.0	2414.6	311.2	2289.0
328.0	436.8	2441.6	331.9	-1672.9	2546.5	331.9	2441.6
327.0	436.8	2594.2	352.6	-1804.7	2678.3	352.6	2594.2
326.0	436.8	2746.8	373.4	-1936.6	2810.2	373.4	2746.8
325.0	436.8	2899.4	394.1	-2068.4	2942.0	394.1	2899.4
324.0	436.8	3052.0	414.9	-2200.3	3073.9	414.9	3052.0
323.0	436.8	3204.6	435.6	-2332.1	3205.7	435.6	3204.6
322.0	436.8	3357.2	456.4	-2464.0	3337.6	456.4	3357.2
321.0	436.8	3509.8	477.1	-2595.9	3469.5	477.1	3509.8
320.0	436.8	3662.4	497.9	-2727.7	3601.3	497.9	3662.4
319.0	436.8	3815.0	518.6	-2859.6	3733.2	518.6	3815.0
318.0	436.8	3967.6	539.3	-2991.4	3865.0	539.3	3967.6
317.0	436.8	4120.2	560.1	-3123.3	3996.9	560.1	4120.2
316.0	436.8	4272.8	580.8	-3255.1	4128.7	580.8	4272.8
315.0	436.8	4425.4	601.6	-3387.0	4260.6	601.6	4425.4
314.0	436.8	4578.0	622.3	-3518.8	4392.4	622.3	4578.0
313.0	436.8	4730.6	643.1	-3650.7	4524.3	643.1	4730.6

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                        TIME: 11:57:20

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

   I.--HEADING
    'Phase II I-Wall Evaluation
    'Paducah, KY
    'Stations 51+96.90 - 54+17.98
    'Monolith 151, Drained

  II.--SUMMARY

       RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

       LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

  WALL BOTTOM ELEV. (FT)     :       327.02
        PENETRATION (FT)     :        16.98
```

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
MAX. BEND. MOMENT (LB-FT)  :  1.9006E+04
      AT ELEVATION (FT)    :      334.84

MAX. SCALED DEFL. (LB-IN^3):  5.2447E+09
      AT ELEVATION (FT)    :      351.00

          NOTE:  DIVIDE SCALED DEFLECTION MODULUS OF
                 ELASTICITY IN PSI TIMES PILE MOMENT
                 OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
                 IN INCHES.
```

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:57:20

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	5.2447E+09	0.00
350.00	1.0400E+01	31.	4.8924E+09	62.40
349.00	8.3200E+01	125.	4.5402E+09	124.80
348.00	2.8080E+02	281.	4.1881E+09	187.20
347.00	6.6560E+02	499.	3.8365E+09	249.60
346.00	1.3000E+03	780.	3.4861E+09	312.00
345.00	2.2464E+03	1123.	3.1380E+09	374.40
344.00	3.5672E+03	1529.	2.7938E+09	436.80
343.00	5.2924E+03	1900.	2.4559E+09	304.95
342.00	7.3226E+03	2139.	2.1271E+09	173.09
341.00	9.5259E+03	2246.	1.8110E+09	41.24
340.69	1.0230E+04	2252.	1.7154E+09	0.00
340.00	1.1770E+04	2221.	1.5114E+09	-90.62
339.00	1.3924E+04	2065.	1.2321E+09	-222.47
338.00	1.5856E+04	1776.	9.7689E+08	-354.33
337.00	1.7433E+04	1356.	7.4898E+08	-486.18
336.00	1.8524E+04	804.	5.5112E+08	-618.04
335.00	1.8996E+04	120.	3.8519E+08	-749.89
334.00	1.8719E+04	-696.	2.5197E+08	-881.74
333.00	1.7561E+04	-1644.	1.5097E+08	-1013.60
332.00	1.5388E+04	-2723.	8.0175E+07	-1145.45
331.52	1.3933E+04	-3293.	5.5692E+07	-1209.31
331.00	1.2093E+04	-3802.	3.5803E+07	-763.43
330.00	8.0537E+03	-4133.	1.2219E+07	101.19
329.00	4.1153E+03	-3600.	2.5668E+06	965.80

328.00	1.1426E+03	-2202.	1.6435E+05	1830.42
327.02	0.0000E+00	0.	0.0000E+00	2675.32

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	437.	153.	21.	21.	153.
342.00	437.	305.	41.	41.	305.
341.00	437.	458.	62.	62.	458.
340.69	437.	506.	69.	69.	506.
340.00	437.	610.	83.	83.	610.
339.00	437.	763.	104.	104.	763.
338.00	437.	916.	124.	124.	916.
337.00	437.	1068.	145.	145.	1068.
336.00	437.	1221.	166.	166.	1221.
335.00	437.	1373.	187.	187.	1373.
334.00	437.	1526.	207.	207.	1526.
333.00	437.	1679.	228.	228.	1679.
332.00	437.	1831.	249.	249.	1831.
331.52	437.	1905.	259.	259.	1905.
331.00	437.	1984.	270.	270.	1984.
330.00	437.	2136.	290.	290.	2136.
329.00	437.	2289.	311.	311.	2289.
328.00	437.	2442.	332.	332.	2442.
327.02	437.	2594.	353.	353.	2594.
326.00	437.	2747.	373.	373.	2747.

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:37:37

                              ****************
                              *  INPUT DATA  *
                              ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 51+96.90 - 54+17.98
     'Monolith 151, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        344.00

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 344.00 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:38:05

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*************************
*   SOIL PRESSURES FOR  *
* CANTILEVER WALL DESIGN *
*************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0+	436.8	0.0	0.0	436.8	436.8	0.0	0.0
344.0-	436.8	1333.3	0.0	-896.5	1770.1	0.0	1333.3
343.0	436.8	1695.6	0.0	-1258.8	2132.4	0.0	1695.6
342.0	436.8	1758.2	0.0	-1321.4	2195.0	0.0	1758.2
341.0	436.8	1820.8	0.0	-1384.0	2257.6	0.0	1820.8
340.0	436.8	1883.4	0.0	-1446.6	2320.2	0.0	1883.4
339.0	436.8	1946.0	0.0	-1509.2	2382.8	0.0	1946.0
338.0	436.8	2008.6	0.0	-1571.8	2445.4	0.0	2008.6
337.0	436.8	2071.2	0.0	-1634.4	2508.0	0.0	2071.2
336.0	436.8	2133.8	0.0	-1697.0	2570.6	0.0	2133.8
335.0	436.8	2196.4	0.0	-1759.6	2633.2	0.0	2196.4

334.0	436.8	2259.0	0.0	-1822.2	2695.8	0.0	2259.0
333.0	436.8	2321.6	0.0	-1884.8	2758.4	0.0	2321.6
332.0	436.8	2384.2	0.0	-1947.4	2821.0	0.0	2384.2
331.0	436.8	2446.8	0.0	-2010.0	2883.6	0.0	2446.8
330.0	436.8	2509.4	0.0	-2072.6	2946.2	0.0	2509.4
329.0	436.8	2572.0	0.0	-2135.2	3008.8	0.0	2572.0
328.0	436.8	2634.6	0.0	-2197.8	3071.4	0.0	2634.6
327.0	436.8	2697.2	0.0	-2260.4	3134.0	0.0	2697.2
326.0	436.8	2759.8	0.0	-2323.0	3196.6	0.0	2759.8
325.0	436.8	2822.4	0.0	-2385.6	3259.2	0.0	2822.4
324.0	436.8	2885.0	0.0	-2448.2	3321.8	0.0	2885.0
323.0	436.8	2947.6	0.0	-2510.8	3384.4	0.0	2947.6
322.0	436.8	3010.2	0.0	-2573.4	3447.0	0.0	3010.2
321.0	436.8	3072.8	0.0	-2636.0	3509.6	0.0	3072.8
320.0	436.8	3135.4	0.0	-2698.6	3572.2	0.0	3135.4
319.0	436.8	3198.0	0.0	-2761.2	3634.8	0.0	3198.0
318.0	436.8	3260.6	0.0	-2823.8	3697.4	0.0	3260.6
317.0	436.8	3323.2	0.0	-2886.4	3760.0	0.0	3323.2
316.0	436.8	3385.8	0.0	-2949.0	3822.6	0.0	3385.8
315.0	436.8	3448.4	0.0	-3011.6	3885.2	0.0	3448.4
314.0	436.8	3511.0	0.0	-3074.2	3947.8	0.0	3511.0
313.0	436.8	3573.6	0.0	-3136.8	4010.4	0.0	3573.6

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                        BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                        TIME: 13:38:06

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

   I.--HEADING
    'Phase II I-Wall Evaluation
    'Paducah, KY
    'Stations 51+96.90 - 54+17.98
    'Monolith 151, Undrained

  II.--SUMMARY

       RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

       LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

  WALL BOTTOM ELEV. (FT)      :       338.97
        PENETRATION (FT)      :         5.03

  MAX. BEND. MOMENT (LB-FT)   :  4.6677E+03
        AT ELEVATION (FT)     :       342.64

  MAX. SCALED DEFL. (LB-IN^3):  2.8613E+08
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Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:38:06

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	2.8613E+08	0.00
350.00	1.0400E+01	31.	2.4966E+08	62.40
349.00	8.3200E+01	125.	2.1323E+08	124.80
348.00	2.8080E+02	281.	1.7695E+08	187.20
347.00	6.6560E+02	499.	1.4119E+08	249.60
346.00	1.3000E+03	780.	1.0661E+08	312.00
345.00	2.2464E+03	1123.	7.4329E+07	374.40
344.00	3.5672E+03	1529.	4.5979E+07	436.80
344.00	3.5672E+03	1529.	4.5979E+07	-896.53
343.00	4.5873E+03	451.	2.3755E+07	-1258.85
342.00	4.3986E+03	-839.	9.2808E+06	-1321.45
341.60	3.9610E+03	-1368.	5.6850E+06	-1346.29
341.00	2.9425E+03	-1923.	2.2186E+06	-492.09
340.00	1.0097E+03	-1707.	1.7038E+05	923.92
339.00	8.3395E-01	-75.	-1.3745E-01	2339.94
338.97	0.0000E+00	0.	0.0000E+00	2384.83

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

ELEVATION (FT)	WATER PRESSURE (PSF)	<----LEFTSIDE-----> PASSIVE (PSF)	ACTIVE (PSF)	<---RIGHTSIDE----> ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00+	437.	0.	0.	0.	0.
344.00+	437.	1333.	0.	0.	1333.
343.00	437.	1696.	0.	0.	1696.
342.00	437.	1758.	0.	0.	1758.
341.60	437.	1783.	0.	0.	1783.
341.00	437.	1821.	0.	0.	1821.
340.00	437.	1883.	0.	0.	1883.
339.00	437.	1946.	0.	0.	1946.
338.97	437.	2009.	0.	0.	2009.
337.00	437.	2071.	0.	0.	2071.

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 12:00:48

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 60+17.30 - 61+02.05
     'Monolith 187, Drained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT         = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 342.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:01:07

```
**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.5	530.4	0.0	0.0	530.4	530.4	0.0	0.0
342.0	530.4	76.3	10.4	464.5	596.3	10.4	76.3
341.5	530.4	152.6	20.7	398.5	662.3	20.7	152.6
341.0	530.4	228.9	31.1	332.6	728.2	31.1	228.9
340.0	530.4	381.5	51.9	200.8	860.0	51.9	381.5
339.0	530.4	534.1	72.6	68.9	991.9	72.6	534.1
338.5	530.4	613.8	83.4	0.0	1060.8	83.4	613.8

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

338.0	530.4	686.7	93.3	-62.9	1123.7	93.3	686.7
337.0	530.4	839.3	114.1	-194.8	1255.6	114.1	839.3
336.0	530.4	991.9	134.8	-326.7	1387.5	134.8	991.9
335.0	530.4	1144.5	155.6	-458.5	1519.3	155.6	1144.5
334.0	530.4	1297.1	176.3	-590.4	1651.2	176.3	1297.1
333.0	530.4	1449.7	197.1	-722.2	1783.0	197.1	1449.7
332.0	530.4	1602.3	217.8	-854.1	1914.9	217.8	1602.3
331.0	530.4	1754.9	238.6	-985.9	2046.7	238.6	1754.9
330.0	530.4	1907.5	259.3	-1117.8	2178.6	259.3	1907.5
329.0	530.4	2060.1	280.0	-1249.6	2310.4	280.0	2060.1
328.0	530.4	2212.7	300.8	-1381.5	2442.3	300.8	2212.7
327.0	530.4	2365.3	321.5	-1513.3	2574.1	321.5	2365.3
326.0	530.4	2517.9	342.3	-1645.2	2706.0	342.3	2517.9
325.0	530.4	2670.5	363.0	-1777.1	2837.9	363.0	2670.5
324.0	530.4	2823.1	383.8	-1908.9	2969.7	383.8	2823.1
323.0	530.4	2975.7	404.5	-2040.8	3101.6	404.5	2975.7
322.0	530.4	3128.3	425.3	-2172.6	3233.4	425.3	3128.3
321.0	530.4	3280.9	446.0	-2304.5	3365.3	446.0	3280.9
320.0	530.4	3433.5	466.7	-2436.3	3497.1	466.7	3433.5
319.0	530.4	3586.1	487.5	-2568.2	3629.0	487.5	3586.1
318.0	530.4	3738.7	508.2	-2700.0	3760.8	508.2	3738.7
317.0	530.4	3891.3	529.0	-2831.9	3892.7	529.0	3891.3
316.0	530.4	4043.9	549.7	-2963.7	4024.5	549.7	4043.9
315.0	530.4	4196.5	570.5	-3095.6	4156.4	570.5	4196.5
314.0	530.4	4349.1	591.2	-3227.5	4288.3	591.2	4349.1
313.0	530.4	4501.7	611.9	-3359.3	4420.1	611.9	4501.7
312.0	530.4	4654.3	632.7	-3491.2	4552.0	632.7	4654.3

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                        BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                    TIME: 12:01:08

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 60+17.30 - 61+02.05
     'Monolith 187, Drained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
        AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

        LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
        AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.
```

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
WALL BOTTOM ELEV. (FT)      :      321.88
      PENETRATION (FT)      :       20.62

MAX. BEND. MOMENT (LB-FT)   :  3.4029E+04
      AT ELEVATION (FT)     :      331.38

MAX. SCALED DEFL. (LB-IN^3):  1.3846E+10
      AT ELEVATION (FT)     :      351.00

          NOTE:  DIVIDE SCALED DEFLECTION MODULUS OF
                 ELASTICITY IN PSI TIMES PILE MOMENT
                 OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
                 IN INCHES.
```

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:01:08

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*****************************
* COMPLETE OF RESULTS FOR   *
*  CANTILEVER WALL DESIGN   *
*****************************
```

```
I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Drained

II.--RESULTS0. (LB))
```

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.3846E+10	0.00
350.00	1.0400E+01	31.	1.3080E+10	62.40
349.00	8.3200E+01	125.	1.2314E+10	124.80
348.00	2.8080E+02	281.	1.1549E+10	187.20
347.00	6.6560E+02	499.	1.0783E+10	249.60
346.00	1.3000E+03	780.	1.0019E+10	312.00
345.00	2.2464E+03	1123.	9.2576E+09	374.40
344.00	3.5672E+03	1529.	8.4998E+09	436.80
343.00	5.3248E+03	1997.	7.7483E+09	499.20
342.50	6.3869E+03	2254.	7.3757E+09	530.40
342.00	7.5776E+03	2503.	7.0060E+09	464.47
341.50	8.8843E+03	2719.	6.6395E+09	398.55
341.00	1.0291E+04	2901.	6.2768E+09	332.62
340.00	1.3337E+04	3168.	5.5655E+09	200.76
339.00	1.6583E+04	3303.	4.8773E+09	68.91
338.48	1.8316E+04	3321.	4.5286E+09	0.00
338.00	1.9899E+04	3306.	4.2177E+09	-62.94
337.00	2.3151E+04	3177.	3.5925E+09	-194.80
336.00	2.6209E+04	2916.	3.0073E+09	-326.65
335.00	2.8940E+04	2524.	2.4673E+09	-458.51
334.00	3.1212E+04	1999.	1.9773E+09	-590.36
333.00	3.2895E+04	1343.	1.5411E+09	-722.22

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

332.00	3.3855E+04	555.	1.1617E+09	-854.07
331.00	3.3961E+04	-365.	8.4064E+08	-985.93
330.00	3.3081E+04	-1417.	5.7812E+08	-1117.78
329.00	3.1083E+04	-2601.	3.7260E+08	-1249.63
328.00	2.7835E+04	-3916.	2.2061E+08	-1381.49
327.34	2.4946E+04	-4856.	1.4704E+08	-1468.44
327.00	2.3213E+04	-5306.	1.1652E+08	-1174.02
326.00	1.7464E+04	-6048.	5.2382E+07	-309.41
325.00	1.1406E+04	-5925.	1.8373E+07	555.21
324.00	5.9031E+03	-4937.	4.1543E+06	1419.83
323.00	1.8200E+03	-3085.	3.4020E+05	2284.44
322.00	2.1306E+01	-368.	4.0821E+01	3149.06
321.88	0.0000E+00	0.	0.0000E+00	3248.59

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.50	530.	0.	0.	0.	0.
342.00	530.	76.	10.	10.	76.
341.50	530.	153.	21.	21.	153.
341.00	530.	229.	31.	31.	229.
340.00	530.	381.	52.	52.	381.
339.00	530.	534.	73.	73.	534.
338.48	530.	614.	83.	83.	614.
338.00	530.	687.	93.	93.	687.
337.00	530.	839.	114.	114.	839.
336.00	530.	992.	135.	135.	992.
335.00	530.	1144.	156.	156.	1144.
334.00	530.	1297.	176.	176.	1297.
333.00	530.	1450.	197.	197.	1450.
332.00	530.	1602.	218.	218.	1602.
331.00	530.	1755.	239.	239.	1755.
330.00	530.	1907.	259.	259.	1907.
329.00	530.	2060.	280.	280.	2060.
328.00	530.	2213.	301.	301.	2213.
327.34	530.	2313.	314.	314.	2313.
327.00	530.	2365.	322.	322.	2365.
326.00	530.	2518.	342.	342.	2518.
325.00	530.	2670.	363.	363.	2670.
324.00	530.	2823.	384.	384.	2823.
323.00	530.	2976.	405.	405.	2976.
322.00	530.	3128.	425.	425.	3128.
321.88	530.	3281.	446.	446.	3281.

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:41:53

                              ****************
                              *  INPUT DATA  *
                              ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 60+17.30 - 61+02.05
     'Monolith 187, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 342.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:42:08

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.5+	530.4	0.0	0.0	530.4	530.4	0.0	0.0
342.5-	530.4	1333.3	0.0	-802.9	1863.7	0.0	1333.3
342.0	530.4	1664.3	0.0	-1133.9	2194.7	0.0	1664.3
341.5	530.4	1695.6	0.0	-1165.2	2226.0	0.0	1695.6
341.0	530.4	1726.9	0.0	-1196.5	2257.3	0.0	1726.9
340.0	530.4	1789.5	0.0	-1259.1	2319.9	0.0	1789.5
339.0	530.4	1852.1	0.0	-1321.7	2382.5	0.0	1852.1
338.0	530.4	1914.7	0.0	-1384.3	2445.1	0.0	1914.7
337.0	530.4	1977.3	0.0	-1446.9	2507.7	0.0	1977.3

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	530.4	2039.9	0.0	-1509.5	2570.3	0.0	2039.9
335.0	530.4	2102.5	0.0	-1572.1	2632.9	0.0	2102.5
334.0	530.4	2165.1	0.0	-1634.7	2695.5	0.0	2165.1
333.0	530.4	2227.7	0.0	-1697.3	2758.1	0.0	2227.7
332.0	530.4	2290.3	0.0	-1759.9	2820.7	0.0	2290.3
331.0	530.4	2352.9	0.0	-1822.5	2883.3	0.0	2352.9
330.0	530.4	2415.5	0.0	-1885.1	2945.9	0.0	2415.5
329.0	530.4	2478.1	0.0	-1947.7	3008.5	0.0	2478.1
328.0	530.4	2540.7	0.0	-2010.3	3071.1	0.0	2540.7
327.0	530.4	2603.3	0.0	-2072.9	3133.7	0.0	2603.3
326.0	530.4	2665.9	0.0	-2135.5	3196.3	0.0	2665.9
325.0	530.4	2728.5	0.0	-2198.1	3258.9	0.0	2728.5
324.0	530.4	2791.1	0.0	-2260.7	3321.5	0.0	2791.1
323.0	530.4	2853.7	0.0	-2323.3	3384.1	0.0	2853.7
322.0	530.4	2916.3	0.0	-2385.9	3446.7	0.0	2916.3
321.0	530.4	2978.9	0.0	-2448.5	3509.3	0.0	2978.9
320.0	530.4	3041.5	0.0	-2511.1	3571.9	0.0	3041.5
319.0	530.4	3104.1	0.0	-2573.7	3634.5	0.0	3104.1
318.0	530.4	3166.7	0.0	-2636.3	3697.1	0.0	3166.7
317.0	530.4	3229.3	0.0	-2698.9	3759.7	0.0	3229.3
316.0	530.4	3291.9	0.0	-2761.5	3822.3	0.0	3291.9
315.0	530.4	3354.5	0.0	-2824.1	3884.9	0.0	3354.5
314.0	530.4	3417.1	0.0	-2886.7	3947.5	0.0	3417.1
313.0	530.4	3479.7	0.0	-2949.3	4010.1	0.0	3479.7
312.0	530.4	3542.3	0.0	-3011.9	4072.7	0.0	3542.3

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                        TIME: 13:42:09

                      ****************************
                      *  SUMMARY OF RESULTS FOR  *
                      *  CANTILEVER WALL DESIGN  *
                      ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 60+17.30 - 61+02.05
     'Monolith 187, Undrained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

        LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

   WALL BOTTOM ELEV. (FT)      :       335.55
         PENETRATION (FT)      :         6.95

   MAX. BEND. MOMENT (LB-FT)  :  8.7439E+03
```

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
        AT ELEVATION (FT)     :       340.50

    MAX. SCALED DEFL. (LB-IN^3):  9.0332E+08
        AT ELEVATION (FT)     :       351.00

            NOTE:  DIVIDE SCALED DEFLECTION MODULUS OF
                   ELASTICITY IN PSI TIMES PILE MOMENT
                   OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
                   IN INCHES.
```

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:42:09

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                    ****************************
                    * COMPLETE OF RESULTS FOR  *
                    *  CANTILEVER WALL DESIGN  *
                    ****************************

     I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 60+17.30 - 61+02.05
     'Monolith 187, Undrained

    II.--RESULTS0. (LB))
```

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	9.0332E+08	0.00
350.00	1.0400E+01	31.	8.1239E+08	62.40
349.00	8.3200E+01	125.	7.2150E+08	124.80
348.00	2.8080E+02	281.	6.3077E+08	187.20
347.00	6.6560E+02	499.	5.4055E+08	249.60
346.00	1.3000E+03	780.	4.5152E+08	312.00
345.00	2.2464E+03	1123.	3.6477E+08	374.40
344.00	3.5672E+03	1529.	2.8197E+08	436.80
343.00	5.3248E+03	1997.	2.0539E+08	499.20
342.50	6.3869E+03	2254.	1.7035E+08	530.40
342.50	6.3869E+03	2254.	1.7035E+08	-802.93
342.00	7.3998E+03	1770.	1.3807E+08	-1133.95
341.50	8.1418E+03	1195.	1.0898E+08	-1165.25
341.00	8.5924E+03	605.	8.3398E+07	-1196.55
340.00	8.5884E+03	-623.	4.3398E+07	-1259.15
339.00	7.3253E+03	-1914.	1.8058E+07	-1321.75
338.86	7.0485E+03	-2097.	1.5616E+07	-1330.39
338.00	4.8739E+03	-2802.	5.1946E+06	-306.56
337.00	2.1165E+03	-2515.	7.0874E+05	881.27
336.00	2.4030E+02	-1040.	7.0667E+03	2069.09
335.55	0.0000E+00	0.	0.0000E+00	2598.24

```
            NOTE:  DIVIDE SCALED DEFLECTION MODULUS OF
                   ELASTICITY IN PSI TIMES PILE MOMENT
                   OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
                   IN INCHES.
```

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.50+	530.	0.	0.	0.	0.
342.50+	530.	1333.	0.	0.	1333.
342.00	530.	1664.	0.	0.	1664.
341.50	530.	1696.	0.	0.	1696.
341.00	530.	1727.	0.	0.	1727.
340.00	530.	1790.	0.	0.	1790.
339.00	530.	1852.	0.	0.	1852.
338.86	530.	1861.	0.	0.	1861.
338.00	530.	1915.	0.	0.	1915.
337.00	530.	1977.	0.	0.	1977.
336.00	530.	2040.	0.	0.	2040.
335.55	530.	2103.	0.	0.	2103.
334.00	530.	2165.	0.	0.	2165.

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 12:04:12

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'PHASE II I-WALL EVALUATION
     'PADUCAH, KY
     'STATIONS 61+02.05 - 62+75.13
     'MONOLITH 193, DRAINED

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        343.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        343.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT         = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 343.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:04:13

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'PHASE II I-WALL EVALUATION
'PADUCAH, KY
'STATIONS 61+02.05 - 62+75.13
'MONOLITH 193, DRAINED

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.5	468.0	0.0	0.0	468.0	468.0	0.0	0.0
343.0	468.0	76.3	10.4	402.1	533.9	10.4	76.3
342.5	468.0	152.6	20.7	336.1	599.9	20.7	152.6
342.0	468.0	228.9	31.1	270.2	665.8	31.1	228.9
341.0	468.0	381.5	51.9	138.4	797.6	51.9	381.5
340.0	468.0	534.1	72.6	6.5	929.5	72.6	534.1
340.0	468.0	541.6	73.6	0.0	936.0	73.6	541.6
339.0	468.0	686.7	93.3	-125.3	1061.3	93.3	686.7

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

338.0	468.0	839.3	114.1	-257.2	1193.2	114.1	839.3
337.0	468.0	991.9	134.8	-389.1	1325.1	134.8	991.9
336.0	468.0	1144.5	155.6	-520.9	1456.9	155.6	1144.5
335.0	468.0	1297.1	176.3	-652.8	1588.8	176.3	1297.1
334.0	468.0	1449.7	197.1	-784.6	1720.6	197.1	1449.7
333.0	468.0	1602.3	217.8	-916.5	1852.5	217.8	1602.3
332.0	468.0	1754.9	238.6	-1048.3	1984.3	238.6	1754.9
331.0	468.0	1907.5	259.3	-1180.2	2116.2	259.3	1907.5
330.0	468.0	2060.1	280.0	-1312.0	2248.0	280.0	2060.1
329.0	468.0	2212.7	300.8	-1443.9	2379.9	300.8	2212.7
328.0	468.0	2365.3	321.5	-1575.7	2511.7	321.5	2365.3
327.0	468.0	2517.9	342.3	-1707.6	2643.6	342.3	2517.9
326.0	468.0	2670.5	363.0	-1839.5	2775.5	363.0	2670.5
325.0	468.0	2823.1	383.8	-1971.3	2907.3	383.8	2823.1
324.0	468.0	2975.7	404.5	-2103.2	3039.2	404.5	2975.7
323.0	468.0	3128.3	425.3	-2235.0	3171.0	425.3	3128.3
322.0	468.0	3280.9	446.0	-2366.9	3302.9	446.0	3280.9
321.0	468.0	3433.5	466.7	-2498.7	3434.7	466.7	3433.5
320.0	468.0	3586.1	487.5	-2630.6	3566.6	487.5	3586.1
319.0	468.0	3738.7	508.2	-2762.4	3698.4	508.2	3738.7
318.0	468.0	3891.3	529.0	-2894.3	3830.3	529.0	3891.3
317.0	468.0	4043.9	549.7	-3026.1	3962.1	549.7	4043.9
316.0	468.0	4196.5	570.5	-3158.0	4094.0	570.5	4196.5
315.0	468.0	4349.1	591.2	-3289.9	4225.9	591.2	4349.1
314.0	468.0	4501.7	611.9	-3421.7	4357.7	611.9	4501.7
313.0	468.0	4654.3	632.7	-3553.6	4489.6	632.7	4654.3

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 12:04:14

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

   I.--HEADING
    'PHASE II I-WALL EVALUATION
    'PADUCAH, KY
    'STATIONS 61+02.05 - 62+75.13
    'MONOLITH 193, DRAINED

  II.--SUMMARY

       RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

       LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

  WALL BOTTOM ELEV. (FT)     :       325.31
```

PENETRATION (FT) : 18.19

MAX. BEND. MOMENT (LB-FT) : 2.3377E+04
AT ELEVATION (FT) : 333.69

MAX. SCALED DEFL. (LB-IN^3): 7.4052E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:04:14

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'PHASE II I-WALL EVALUATION
'PADUCAH, KY
'STATIONS 61+02.05 - 62+75.13
'MONOLITH 193, DRAINED

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	7.4052E+09	0.00
350.00	1.0400E+01	31.	6.9410E+09	62.40
349.00	8.3200E+01	125.	6.4768E+09	124.80
348.00	2.8080E+02	281.	6.0127E+09	187.20
347.00	6.6560E+02	499.	5.5492E+09	249.60
346.00	1.3000E+03	780.	5.0868E+09	312.00
345.00	2.2464E+03	1123.	4.6268E+09	374.40
344.00	3.5672E+03	1529.	4.1706E+09	436.80
343.50	4.3875E+03	1755.	3.9447E+09	468.00
343.00	5.3208E+03	1973.	3.7207E+09	402.07
342.50	6.3545E+03	2157.	3.4990E+09	336.15
342.00	7.4723E+03	2309.	3.2801E+09	270.22
341.00	9.8941E+03	2513.	2.8524E+09	138.36
340.00	1.2454E+04	2585.	2.4418E+09	6.51
339.95	1.2582E+04	2586.	2.4220E+09	0.00
339.00	1.5021E+04	2526.	2.0527E+09	-125.34
338.00	1.7462E+04	2335.	1.6896E+09	-257.20
337.00	1.9646E+04	2012.	1.3566E+09	-389.05
336.00	2.1441E+04	1557.	1.0575E+09	-520.91
335.00	2.2716E+04	970.	7.9540E+08	-652.76
334.00	2.3337E+04	251.	5.7244E+08	-784.62
333.00	2.3174E+04	-599.	3.8970E+08	-916.47
332.00	2.2094E+04	-1582.	2.4687E+08	-1048.33

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

331.00	1.9966E+04	-2696.	1.4206E+08	-1180.18
330.12	1.7137E+04	-3781.	7.8638E+07	-1295.69
330.00	1.6658E+04	-3935.	7.1591E+07	-1188.48
329.00	1.2274E+04	-4691.	2.9739E+07	-323.87
328.00	7.5650E+03	-4582.	9.0503E+06	540.75
327.00	3.3971E+03	-3609.	1.5112E+06	1405.37
326.00	6.3467E+02	-1772.	4.4783E+04	2269.98
325.31	0.0000E+00	0.	0.0000E+00	2866.41

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.50	468.	0.	0.	0.	0.
343.00	468.	76.	10.	10.	76.
342.50	468.	153.	21.	21.	153.
342.00	468.	229.	31.	31.	229.
341.00	468.	381.	52.	52.	381.
340.00	468.	534.	73.	73.	534.
339.95	468.	542.	74.	74.	542.
339.00	468.	687.	93.	93.	687.
338.00	468.	839.	114.	114.	839.
337.00	468.	992.	135.	135.	992.
336.00	468.	1144.	156.	156.	1144.
335.00	468.	1297.	176.	176.	1297.
334.00	468.	1450.	197.	197.	1450.
333.00	468.	1602.	218.	218.	1602.
332.00	468.	1755.	239.	239.	1755.
331.00	468.	1907.	259.	259.	1907.
330.12	468.	2041.	277.	277.	2041.
330.00	468.	2060.	280.	280.	2060.
329.00	468.	2213.	301.	301.	2213.
328.00	468.	2365.	322.	322.	2365.
327.00	468.	2518.	342.	342.	2518.
326.00	468.	2670.	363.	363.	2670.
325.31	468.	2823.	384.	384.	2823.
324.00	468.	2976.	405.	405.	2976.

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:45:00

                              ****************
                              *  INPUT DATA  *
                              ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 61+02.05 - 62+75.13
     'Monolith 193, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        343.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        343.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 343.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:45:23

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 61+02.05 - 62+75.13
'Monolith 193, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.5+	468.0	0.0	0.0	468.0	468.0	0.0	0.0
343.5-	468.0	1333.3	0.0	-865.3	1801.3	0.0	1333.3
343.0	468.0	1664.3	0.0	-1196.3	2132.3	0.0	1664.3
342.5	468.0	1695.6	0.0	-1227.6	2163.6	0.0	1695.6
342.0	468.0	1726.9	0.0	-1258.9	2194.9	0.0	1726.9
341.0	468.0	1789.5	0.0	-1321.5	2257.5	0.0	1789.5
340.0	468.0	1852.1	0.0	-1384.1	2320.1	0.0	1852.1
339.0	468.0	1914.7	0.0	-1446.7	2382.7	0.0	1914.7
338.0	468.0	1977.3	0.0	-1509.3	2445.3	0.0	1977.3
337.0	468.0	2039.9	0.0	-1571.9	2507.9	0.0	2039.9

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	468.0	2102.5	0.0	-1634.5	2570.5	0.0	2102.5
335.0	468.0	2165.1	0.0	-1697.1	2633.1	0.0	2165.1
334.0	468.0	2227.7	0.0	-1759.7	2695.7	0.0	2227.7
333.0	468.0	2290.3	0.0	-1822.3	2758.3	0.0	2290.3
332.0	468.0	2352.9	0.0	-1884.9	2820.9	0.0	2352.9
331.0	468.0	2415.5	0.0	-1947.5	2883.5	0.0	2415.5
330.0	468.0	2478.1	0.0	-2010.1	2946.1	0.0	2478.1
329.0	468.0	2540.7	0.0	-2072.7	3008.7	0.0	2540.7
328.0	468.0	2603.3	0.0	-2135.3	3071.3	0.0	2603.3
327.0	468.0	2665.9	0.0	-2197.9	3133.9	0.0	2665.9
326.0	468.0	2728.5	0.0	-2260.5	3196.5	0.0	2728.5
325.0	468.0	2791.1	0.0	-2323.1	3259.1	0.0	2791.1
324.0	468.0	2853.7	0.0	-2385.7	3321.7	0.0	2853.7
323.0	468.0	2916.3	0.0	-2448.3	3384.3	0.0	2916.3
322.0	468.0	2978.9	0.0	-2510.9	3446.9	0.0	2978.9
321.0	468.0	3041.5	0.0	-2573.5	3509.5	0.0	3041.5
320.0	468.0	3104.1	0.0	-2636.1	3572.1	0.0	3104.1
319.0	468.0	3166.7	0.0	-2698.7	3634.7	0.0	3166.7
318.0	468.0	3229.3	0.0	-2761.3	3697.3	0.0	3229.3
317.0	468.0	3291.9	0.0	-2823.9	3759.9	0.0	3291.9
316.0	468.0	3354.5	0.0	-2886.5	3822.5	0.0	3354.5
315.0	468.0	3417.1	0.0	-2949.1	3885.1	0.0	3417.1
314.0	468.0	3479.7	0.0	-3011.7	3947.7	0.0	3479.7
313.0	468.0	3542.3	0.0	-3074.3	4010.3	0.0	3542.3

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:45:23

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 61+02.05 - 62+75.13
     'Monolith 193, Undrained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

        LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

   WALL BOTTOM ELEV. (FT)      :       337.92
         PENETRATION (FT)      :         5.58

   MAX. BEND. MOMENT (LB-FT)   :  5.7741E+03
         AT ELEVATION (FT)     :       341.99
```

MAX. SCALED DEFL. (LB-IN^3): 4.2084E+08
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:45:23

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 61+02.05 - 62+75.13
'Monolith 193, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	4.2084E+08	0.00
350.00	1.0400E+01	31.	3.7127E+08	62.40
349.00	8.3200E+01	125.	3.2174E+08	124.80
348.00	2.8080E+02	281.	2.7236E+08	187.20
347.00	6.6560E+02	499.	2.2350E+08	249.60
346.00	1.3000E+03	780.	1.7582E+08	312.00
345.00	2.2464E+03	1123.	1.3043E+08	374.40
344.00	3.5672E+03	1529.	8.8981E+07	436.80
343.50	4.3875E+03	1755.	7.0419E+07	468.00
343.50	4.3875E+03	1755.	7.0419E+07	-865.33
343.00	5.1430E+03	1240.	5.3750E+07	-1196.35
342.50	5.6120E+03	634.	3.9293E+07	-1227.65
342.00	5.7740E+03	12.	2.7249E+07	-1258.95
341.00	5.1460E+03	-1278.	1.0545E+07	-1321.55
340.77	4.8144E+03	-1586.	8.0024E+06	-1336.05
340.00	3.3018E+03	-2220.	2.5471E+06	-314.13
339.00	1.1463E+03	-1869.	2.1000E+05	1015.81
338.00	6.6521E+00	-188.	2.3679E+00	2345.75
337.92	0.0000E+00	0.	0.0000E+00	2450.27

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

ELEVATION (FT)	WATER PRESSURE (PSF)	SOIL PRESSURES LEFTSIDE PASSIVE (PSF)	SOIL PRESSURES LEFTSIDE ACTIVE (PSF)	SOIL PRESSURES RIGHTSIDE ACTIVE (PSF)	SOIL PRESSURES RIGHTSIDE PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.50+	468.	0.	0.	0.	0.
343.50+	468.	1333.	0.	0.	1333.
343.00	468.	1664.	0.	0.	1664.
342.50	468.	1696.	0.	0.	1696.
342.00	468.	1727.	0.	0.	1727.
341.00	468.	1790.	0.	0.	1790.
340.77	468.	1804.	0.	0.	1804.
340.00	468.	1852.	0.	0.	1852.
339.00	468.	1915.	0.	0.	1915.
338.00	468.	1977.	0.	0.	1977.
337.92	468.	2040.	0.	0.	2040.
336.00	468.	2103.	0.	0.	2103.

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 12:10:56

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 72+18.54 - 74+03.04
     'Monolith 240, Drained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.00

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.00

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT         = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 342.00 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:11:44

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0	561.6	0.0	0.0	561.6	561.6	0.0	0.0
341.0	561.6	152.6	20.7	429.7	693.5	20.7	152.6
340.0	561.6	305.2	41.5	297.9	825.3	41.5	305.2
339.0	561.6	457.8	62.2	166.0	957.2	62.2	457.8
338.0	561.6	610.4	83.0	34.2	1089.0	83.0	610.4
337.7	561.6	650.0	88.4	0.0	1123.2	88.4	650.0
337.0	561.6	763.0	103.7	-97.7	1220.9	103.7	763.0

336.0	561.6	915.6	124.5	-229.5	1352.7	124.5	915.6
335.0	561.6	1068.2	145.2	-361.4	1484.6	145.2	1068.2
334.0	561.6	1220.8	166.0	-493.2	1616.4	166.0	1220.8
333.0	561.6	1373.4	186.7	-625.1	1748.3	186.7	1373.4
332.0	561.6	1526.0	207.4	-756.9	1880.1	207.4	1526.0
331.0	561.6	1678.6	228.2	-888.8	2012.0	228.2	1678.6
330.0	561.6	1831.2	248.9	-1020.7	2143.9	248.9	1831.2
329.0	561.6	1983.8	269.7	-1152.5	2275.7	269.7	1983.8
328.0	561.6	2136.4	290.4	-1284.4	2407.6	290.4	2136.4
327.0	561.6	2289.0	311.2	-1416.2	2539.4	311.2	2289.0
326.0	561.6	2441.6	331.9	-1548.1	2671.3	331.9	2441.6
325.0	561.6	2594.2	352.6	-1679.9	2803.1	352.6	2594.2
324.0	561.6	2746.8	373.4	-1811.8	2935.0	373.4	2746.8
323.0	561.6	2899.4	394.1	-1943.6	3066.8	394.1	2899.4
322.0	561.6	3052.0	414.9	-2075.5	3198.7	414.9	3052.0
321.0	561.6	3204.6	435.6	-2207.3	3330.5	435.6	3204.6
320.0	561.6	3357.2	456.4	-2339.2	3462.4	456.4	3357.2
319.0	561.6	3509.8	477.1	-2471.1	3594.3	477.1	3509.8
318.0	561.6	3662.4	497.9	-2602.9	3726.1	497.9	3662.4
317.0	561.6	3815.0	518.6	-2734.8	3858.0	518.6	3815.0
316.0	561.6	3967.6	539.3	-2866.6	3989.8	539.3	3967.6
315.0	561.6	4120.2	560.1	-2998.5	4121.7	560.1	4120.2
314.0	561.6	4272.8	580.8	-3130.3	4253.5	580.8	4272.8
313.0	561.6	4425.4	601.6	-3262.2	4385.4	601.6	4425.4
312.0	561.6	4578.0	622.3	-3394.0	4517.2	622.3	4578.0
311.0	561.6	4730.6	643.1	-3525.9	4649.1	643.1	4730.6

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 12:11:45

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

   I.--HEADING
    'Phase II I-Wall Evaluation
    'Paducah, KY
    'Stations 72+18.54 - 74+03.04
    'Monolith 240, Drained

  II.--SUMMARY

       RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

       LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
       AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

  WALL BOTTOM ELEV. (FT)      :       320.17
```

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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        PENETRATION (FT)      :        21.83

   MAX. BEND. MOMENT (LB-FT)  :  4.0395E+04
        AT ELEVATION (FT)     :      330.23

   MAX. SCALED DEFL. (LB-IN^3):  1.8427E+10
        AT ELEVATION (FT)     :      351.00

            NOTE:  DIVIDE SCALED DEFLECTION MODULUS OF
                   ELASTICITY IN PSI TIMES PILE MOMENT
                   OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
                   IN INCHES.
```

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:11:45

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                        ****************************
                        * COMPLETE OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

     I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 72+18.54 - 74+03.04
     'Monolith 240, Drained

    II.--RESULTS0. (LB))
```

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.8427E+10	0.00
350.00	1.0400E+01	31.	1.7464E+10	62.40
349.00	8.3200E+01	125.	1.6501E+10	124.80
348.00	2.8080E+02	281.	1.5539E+10	187.20
347.00	6.6560E+02	499.	1.4577E+10	249.60
346.00	1.3000E+03	780.	1.3616E+10	312.00
345.00	2.2464E+03	1123.	1.2658E+10	374.40
344.00	3.5672E+03	1529.	1.1703E+10	436.80
343.00	5.3248E+03	1997.	1.0755E+10	499.20
342.00	7.5816E+03	2527.	9.8157E+09	561.60
341.00	1.0368E+04	3023.	8.8899E+09	429.75
340.00	1.3583E+04	3387.	7.9820E+09	297.89
339.00	1.7097E+04	3619.	7.0976E+09	166.04
338.00	2.0777E+04	3719.	6.2428E+09	34.18
337.74	2.1742E+04	3723.	6.0268E+09	0.00
337.00	2.4491E+04	3687.	5.4239E+09	-97.67
336.00	2.8107E+04	3523.	4.6473E+09	-229.53
335.00	3.1494E+04	3228.	3.9192E+09	-361.38
334.00	3.4519E+04	2801.	3.2456E+09	-493.24
333.00	3.7051E+04	2241.	2.6314E+09	-625.09
332.00	3.8958E+04	1550.	2.0813E+09	-756.94
331.00	4.0108E+04	728.	1.5983E+09	-888.80
330.00	4.0369E+04	-227.	1.1845E+09	-1020.65

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

329.00	3.9610E+04	-1314.	8.4034E+08	-1152.51
328.00	3.7698E+04	-2532.	5.6444E+08	-1284.36
327.00	3.4501E+04	-3882.	3.5350E+08	-1416.22
326.00	2.9889E+04	-5365.	2.0197E+08	-1548.07
325.95	2.9612E+04	-5444.	1.9568E+08	-1554.82
325.00	2.3870E+04	-6530.	1.0188E+08	-734.49
324.00	1.7117E+04	-6832.	4.2935E+07	130.13
323.00	1.0494E+04	-6270.	1.3584E+07	994.75
322.00	4.8657E+03	-4843.	2.5100E+06	1859.36
321.00	1.0967E+03	-2551.	1.1144E+05	2723.98
320.17	0.0000E+00	0.	0.0000E+00	3439.69

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00	562.	0.	0.	0.	0.
341.00	562.	153.	21.	21.	153.
340.00	562.	305.	41.	41.	305.
339.00	562.	458.	62.	62.	458.
338.00	562.	610.	83.	83.	610.
337.74	562.	650.	88.	88.	650.
337.00	562.	763.	104.	104.	763.
336.00	562.	916.	124.	124.	916.
335.00	562.	1068.	145.	145.	1068.
334.00	562.	1221.	166.	166.	1221.
333.00	562.	1373.	187.	187.	1373.
332.00	562.	1526.	207.	207.	1526.
331.00	562.	1679.	228.	228.	1679.
330.00	562.	1831.	249.	249.	1831.
329.00	562.	1984.	270.	270.	1984.
328.00	562.	2136.	290.	290.	2136.
327.00	562.	2289.	311.	311.	2289.
326.00	562.	2442.	332.	332.	2442.
325.95	562.	2449.	333.	333.	2449.
325.00	562.	2594.	353.	353.	2594.
324.00	562.	2747.	373.	373.	2747.
323.00	562.	2899.	394.	394.	2899.
322.00	562.	3052.	415.	415.	3052.
321.00	562.	3205.	436.	436.	3205.
320.17	562.	3357.	456.	456.	3357.
319.00	562.	3510.	477.	477.	3510.

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:48:21

                              ****************
                              *  INPUT DATA  *
                              ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 72+18.54 - 74+03.04
     'Monolith 240, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.00

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.00

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 342.00 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:48:42

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0+	561.6	0.0	0.0	561.6	561.6	0.0	0.0
342.0-	561.6	1333.3	0.0	-771.7	1894.9	0.0	1333.3
341.0	561.6	1695.6	0.0	-1134.0	2257.2	0.0	1695.6
340.0	561.6	1758.2	0.0	-1196.6	2319.8	0.0	1758.2
339.0	561.6	1820.8	0.0	-1259.2	2382.4	0.0	1820.8
338.0	561.6	1883.4	0.0	-1321.8	2445.0	0.0	1883.4
337.0	561.6	1946.0	0.0	-1384.4	2507.6	0.0	1946.0
336.0	561.6	2008.6	0.0	-1447.0	2570.2	0.0	2008.6
335.0	561.6	2071.2	0.0	-1509.6	2632.8	0.0	2071.2

334.0	561.6	2133.8	0.0	-1572.2	2695.4	0.0	2133.8
333.0	561.6	2196.4	0.0	-1634.8	2758.0	0.0	2196.4
332.0	561.6	2259.0	0.0	-1697.4	2820.6	0.0	2259.0
331.0	561.6	2321.6	0.0	-1760.0	2883.2	0.0	2321.6
330.0	561.6	2384.2	0.0	-1822.6	2945.8	0.0	2384.2
329.0	561.6	2446.8	0.0	-1885.2	3008.4	0.0	2446.8
328.0	561.6	2509.4	0.0	-1947.8	3071.0	0.0	2509.4
327.0	561.6	2572.0	0.0	-2010.4	3133.6	0.0	2572.0
326.0	561.6	2634.6	0.0	-2073.0	3196.2	0.0	2634.6
325.0	561.6	2697.2	0.0	-2135.6	3258.8	0.0	2697.2
324.0	561.6	2759.8	0.0	-2198.2	3321.4	0.0	2759.8
323.0	561.6	2822.4	0.0	-2260.8	3384.0	0.0	2822.4
322.0	561.6	2885.0	0.0	-2323.4	3446.6	0.0	2885.0
321.0	561.6	2947.6	0.0	-2386.0	3509.2	0.0	2947.6
320.0	561.6	3010.2	0.0	-2448.6	3571.8	0.0	3010.2
319.0	561.6	3072.8	0.0	-2511.2	3634.4	0.0	3072.8
318.0	561.6	3135.4	0.0	-2573.8	3697.0	0.0	3135.4
317.0	561.6	3198.0	0.0	-2636.4	3759.6	0.0	3198.0
316.0	561.6	3260.6	0.0	-2699.0	3822.2	0.0	3260.6
315.0	561.6	3323.2	0.0	-2761.6	3884.8	0.0	3323.2
314.0	561.6	3385.8	0.0	-2824.2	3947.4	0.0	3385.8
313.0	561.6	3448.4	0.0	-2886.8	4010.0	0.0	3448.4
312.0	561.6	3511.0	0.0	-2949.4	4072.6	0.0	3511.0
311.0	561.6	3573.6	0.0	-3012.0	4135.2	0.0	3573.6

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:48:43

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 72+18.54 - 74+03.04
     'Monolith 240, Undrained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

        LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

   WALL BOTTOM ELEV. (FT)      :       334.22
         PENETRATION (FT)      :         7.78

   MAX. BEND. MOMENT (LB-FT)   :  1.0729E+04
         AT ELEVATION (FT)     :       339.66
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Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. SCALED DEFL. (LB-IN^3): 1.3188E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:48:43

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
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I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.3188E+09	0.00
350.00	1.0400E+01	31.	1.1960E+09	62.40
349.00	8.3200E+01	125.	1.0733E+09	124.80
348.00	2.8080E+02	281.	9.5074E+08	187.20
347.00	6.6560E+02	499.	8.2869E+08	249.60
346.00	1.3000E+03	780.	7.0782E+08	312.00
345.00	2.2464E+03	1123.	5.8925E+08	374.40
344.00	3.5672E+03	1529.	4.7461E+08	436.80
343.00	5.3248E+03	1997.	3.6620E+08	499.20
342.00	7.5816E+03	2527.	2.6706E+08	561.60
342.00	7.5816E+03	2527.	2.6706E+08	-771.73
341.00	9.6625E+03	1574.	1.8100E+08	-1134.05
340.00	1.0659E+04	409.	1.1148E+08	-1196.65
339.00	1.0460E+04	-819.	6.0201E+07	-1259.25
338.00	9.0006E+03	-2110.	2.6819E+07	-1321.85
337.78	8.5132E+03	-2397.	2.1749E+07	-1335.39
337.00	6.3152E+03	-3097.	8.8054E+06	-451.41
336.00	3.1804E+03	-2985.	1.6391E+06	676.56
335.00	7.2215E+02	-1744.	6.5940E+04	1804.52
334.22	0.0000E+00	0.	0.0000E+00	2681.52

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

ELEVATION (FT)	WATER PRESSURE (PSF)	<----------SOIL PRESSURES----------> <----LEFTSIDE-----> PASSIVE (PSF)	ACTIVE (PSF)	<---RIGHTSIDE----> ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00+	562.	0.	0.	0.	0.
342.00+	562.	1333.	0.	0.	1333.
341.00	562.	1696.	0.	0.	1696.
340.00	562.	1758.	0.	0.	1758.
339.00	562.	1821.	0.	0.	1821.
338.00	562.	1883.	0.	0.	1883.
337.78	562.	1897.	0.	0.	1897.
337.00	562.	1946.	0.	0.	1946.
336.00	562.	2009.	0.	0.	2009.
335.00	562.	2071.	0.	0.	2071.
334.22	562.	2134.	0.	0.	2134.
333.00	562.	2196.	0.	0.	2196.

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
Page 1 of 6

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 12:14:47

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
     'Monoliths 280 & 307, Drained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        340.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        340.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

      VI.--WATER DATA
         UNIT WEIGHT          = 62.40 (PCF)
         RIGHTSIDE ELEVATION = 351.00 (FT)
         LEFTSIDE ELEVATION  = 340.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:15:38

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
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```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0	561.6	0.0	0.0	561.6	561.6	0.0	0.0
341.0	624.0	0.0	0.0	624.0	624.0	0.0	0.0
340.5	655.2	0.0	0.0	655.2	655.2	0.0	0.0
340.0	655.2	76.3	10.4	589.3	721.1	10.4	76.3
339.5	655.2	152.6	20.7	523.3	787.1	20.7	152.6
339.0	655.2	228.9	31.1	457.4	853.0	31.1	228.9
338.0	655.2	381.5	51.9	325.6	984.8	51.9	381.5

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
Page 3 of 6

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

337.0	655.2	534.1	72.6	193.7	1116.7	72.6	534.1
336.0	655.2	686.7	93.3	61.9	1248.5	93.3	686.7
335.5	655.2	758.3	103.1	0.0	1310.4	103.1	758.3
335.0	655.2	839.3	114.1	-70.0	1380.4	114.1	839.3
334.0	655.2	991.9	134.8	-201.9	1512.3	134.8	991.9
333.0	655.2	1144.5	155.6	-333.7	1644.1	155.6	1144.5
332.0	655.2	1297.1	176.3	-465.6	1776.0	176.3	1297.1
331.0	655.2	1449.7	197.1	-597.4	1907.8	197.1	1449.7
330.0	655.2	1602.3	217.8	-729.3	2039.7	217.8	1602.3
329.0	655.2	1754.9	238.6	-861.1	2171.5	238.6	1754.9
328.0	655.2	1907.5	259.3	-993.0	2303.4	259.3	1907.5
327.0	655.2	2060.1	280.0	-1124.8	2435.2	280.0	2060.1
326.0	655.2	2212.7	300.8	-1256.7	2567.1	300.8	2212.7
325.0	655.2	2365.3	321.5	-1388.5	2698.9	321.5	2365.3
324.0	655.2	2517.9	342.3	-1520.4	2830.8	342.3	2517.9
323.0	655.2	2670.5	363.0	-1652.3	2962.7	363.0	2670.5
322.0	655.2	2823.1	383.8	-1784.1	3094.5	383.8	2823.1
321.0	655.2	2975.7	404.5	-1916.0	3226.4	404.5	2975.7
320.0	655.2	3128.3	425.3	-2047.8	3358.2	425.3	3128.3
319.0	655.2	3280.9	446.0	-2179.7	3490.1	446.0	3280.9
318.0	655.2	3433.5	466.7	-2311.5	3621.9	466.7	3433.5
317.0	655.2	3586.1	487.5	-2443.4	3753.8	487.5	3586.1
316.0	655.2	3738.7	508.2	-2575.2	3885.6	508.2	3738.7
315.0	655.2	3891.3	529.0	-2707.1	4017.5	529.0	3891.3
314.0	655.2	4043.9	549.7	-2838.9	4149.3	549.7	4043.9
313.0	655.2	4196.5	570.5	-2970.8	4281.2	570.5	4196.5
312.0	655.2	4349.1	591.2	-3102.7	4413.1	591.2	4349.1
311.0	655.2	4501.7	611.9	-3234.5	4544.9	611.9	4501.7
310.0	655.2	4654.3	632.7	-3366.4	4676.8	632.7	4654.3
309.0	655.2	4806.9	653.4	-3498.2	4808.6	653.4	4806.9
308.0	655.2	4959.5	674.2	-3630.1	4940.5	674.2	4959.5

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                        TIME: 12:15:38

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
     'Monoliths 280 & 307, Drained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
        AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.
```

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

```
WALL BOTTOM ELEV. (FT)      :      315.03
      PENETRATION (FT)      :       25.47

MAX. BEND. MOMENT (LB-FT)   :  6.4145E+04
      AT ELEVATION (FT)     :      326.76

MAX. SCALED DEFL. (LB-IN^3):  3.9827E+10
      AT ELEVATION (FT)     :      351.00
```

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:15:38

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****************************
* COMPLETE OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	3.9827E+10	0.00
350.00	1.0400E+01	31.	3.8044E+10	62.40
349.00	8.3200E+01	125.	3.6260E+10	124.80
348.00	2.8080E+02	281.	3.4477E+10	187.20
347.00	6.6560E+02	499.	3.2694E+10	249.60
346.00	1.3000E+03	780.	3.0913E+10	312.00
345.00	2.2464E+03	1123.	2.9133E+10	374.40
344.00	3.5672E+03	1529.	2.7358E+10	436.80
343.00	5.3248E+03	1997.	2.5589E+10	499.20
342.00	7.5816E+03	2527.	2.3829E+10	561.60
341.00	1.0400E+04	3120.	2.2083E+10	624.00
340.50	1.2039E+04	3440.	2.1216E+10	655.20
340.00	1.3838E+04	3751.	2.0354E+10	589.27
339.50	1.5785E+04	4029.	1.9498E+10	523.35
339.00	1.7862E+04	4274.	1.8649E+10	457.42
338.00	2.2343E+04	4666.	1.6976E+10	325.56
337.00	2.7149E+04	4925.	1.5341E+10	193.71
336.00	3.2150E+04	5053.	1.3753E+10	61.86

335.53	3.4525E+04	5068.	1.3026E+10	0.00
335.00	3.7212E+04	5049.	1.2220E+10	-70.00
334.00	4.2204E+04	4913.	1.0752E+10	-201.85
333.00	4.6994E+04	4645.	9.3566E+09	-333.71
332.00	5.1451E+04	4246.	8.0425E+09	-465.56
331.00	5.5442E+04	3714.	6.8172E+09	-597.42
330.00	5.8835E+04	3051.	5.6876E+09	-729.27
329.00	6.1500E+04	2256.	4.6596E+09	-861.13
328.00	6.3303E+04	1329.	3.7377E+09	-992.98
327.00	6.4113E+04	270.	2.9250E+09	-1124.83
326.00	6.3799E+04	-921.	2.2230E+09	-1256.69
325.00	6.2227E+04	-2244.	1.6311E+09	-1388.54
324.00	5.9267E+04	-3698.	1.1465E+09	-1520.40
323.00	5.4787E+04	-5284.	7.6404E+08	-1652.25
322.00	4.8655E+04	-7003.	4.7606E+08	-1784.11
321.77	4.7023E+04	-7410.	4.2292E+08	-1813.96
321.00	4.0815E+04	-8554.	2.7189E+08	-1145.12
320.00	3.1832E+04	-9267.	1.3809E+08	-280.50
319.00	2.2568E+04	-9115.	5.9249E+07	584.11
318.00	1.3889E+04	-8099.	1.9494E+07	1448.73
317.00	6.6585E+03	-6218.	3.9477E+06	2313.34
316.00	1.7413E+03	-3472.	2.4059E+05	3177.96
315.03	0.0000E+00	0.	0.0000E+00	4012.97

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00	562.	0.	0.	0.	0.
341.00	624.	0.	0.	0.	0.
340.50	655.	0.	0.	0.	0.
340.00	655.	76.	10.	10.	76.
339.50	655.	153.	21.	21.	153.
339.00	655.	229.	31.	31.	229.
338.00	655.	381.	52.	52.	381.
337.00	655.	534.	73.	73.	534.
336.00	655.	687.	93.	93.	687.
335.53	655.	758.	103.	103.	758.
335.00	655.	839.	114.	114.	839.
334.00	655.	992.	135.	135.	992.
333.00	655.	1144.	156.	156.	1144.
332.00	655.	1297.	176.	176.	1297.
331.00	655.	1450.	197.	197.	1450.
330.00	655.	1602.	218.	218.	1602.

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
Page 6 of 6

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

329.00	655.	1755.	239.	239.	1755.
328.00	655.	1907.	259.	259.	1907.
327.00	655.	2060.	280.	280.	2060.
326.00	655.	2213.	301.	301.	2213.
325.00	655.	2365.	322.	322.	2365.
324.00	655.	2518.	342.	342.	2518.
323.00	655.	2670.	363.	363.	2670.
322.00	655.	2823.	384.	384.	2823.
321.77	655.	2858.	388.	388.	2858.
321.00	655.	2976.	405.	405.	2976.
320.00	655.	3128.	425.	425.	3128.
319.00	655.	3281.	446.	446.	3281.
318.00	655.	3433.	467.	467.	3433.
317.00	655.	3586.	487.	487.	3586.
316.00	655.	3739.	508.	508.	3739.
315.03	655.	3891.	529.	529.	3891.
314.00	655.	4044.	550.	550.	4044.

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 13:53:37

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
     'Monoliths 280 & 307, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        340.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        340.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                        <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

     VI.--WATER DATA
        UNIT WEIGHT          = 62.40 (PCF)
        RIGHTSIDE ELEVATION = 351.00 (FT)
        LEFTSIDE ELEVATION  = 340.50 (FT)
```

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:54:15

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**************************
*   SOIL PRESSURES FOR   *
* CANTILEVER WALL DESIGN *
**************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0	561.6	0.0	0.0	561.6	561.6	0.0	0.0
341.0	624.0	0.0	0.0	624.0	624.0	0.0	0.0
340.5+	655.2	0.0	0.0	655.2	655.2	0.0	0.0
340.5-	655.2	1333.3	0.0	-678.1	1988.5	0.0	1333.3
340.0	655.2	1664.3	0.0	-1009.1	2319.5	0.0	1664.3
339.5	655.2	1695.6	0.0	-1040.4	2350.8	0.0	1695.6
339.0	655.2	1726.9	0.0	-1071.7	2382.1	0.0	1726.9
338.0	655.2	1789.5	0.0	-1134.3	2444.7	0.0	1789.5
337.0	655.2	1852.1	0.0	-1196.9	2507.3	0.0	1852.1

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Undrained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	655.2	1914.7	0.0	-1259.5	2569.9	0.0	1914.7
335.0	655.2	1977.3	0.0	-1322.1	2632.5	0.0	1977.3
334.0	655.2	2039.9	0.0	-1384.7	2695.1	0.0	2039.9
333.0	655.2	2102.5	0.0	-1447.3	2757.7	0.0	2102.5
332.0	655.2	2165.1	0.0	-1509.9	2820.3	0.0	2165.1
331.0	655.2	2227.7	0.0	-1572.5	2882.9	0.0	2227.7
330.0	655.2	2290.3	0.0	-1635.1	2945.5	0.0	2290.3
329.0	655.2	2352.9	0.0	-1697.7	3008.1	0.0	2352.9
328.0	655.2	2415.5	0.0	-1760.3	3070.7	0.0	2415.5
327.0	655.2	2478.1	0.0	-1822.9	3133.3	0.0	2478.1
326.0	655.2	2540.7	0.0	-1885.5	3195.9	0.0	2540.7
325.0	655.2	2603.3	0.0	-1948.1	3258.5	0.0	2603.3
324.0	655.2	2665.9	0.0	-2010.7	3321.1	0.0	2665.9
323.0	655.2	2728.5	0.0	-2073.3	3383.7	0.0	2728.5
322.0	655.2	2791.1	0.0	-2135.9	3446.3	0.0	2791.1
321.0	655.2	2853.7	0.0	-2198.5	3508.9	0.0	2853.7
320.0	655.2	2916.3	0.0	-2261.1	3571.5	0.0	2916.3
319.0	655.2	2978.9	0.0	-2323.7	3634.1	0.0	2978.9
318.0	655.2	3041.5	0.0	-2386.3	3696.7	0.0	3041.5
317.0	655.2	3104.1	0.0	-2448.9	3759.3	0.0	3104.1
316.0	655.2	3166.7	0.0	-2511.5	3821.9	0.0	3166.7
315.0	655.2	3229.3	0.0	-2574.1	3884.5	0.0	3229.3
314.0	655.2	3291.9	0.0	-2636.7	3947.1	0.0	3291.9
313.0	655.2	3354.5	0.0	-2699.3	4009.7	0.0	3354.5
312.0	655.2	3417.1	0.0	-2761.9	4072.3	0.0	3417.1
311.0	655.2	3479.7	0.0	-2824.5	4134.9	0.0	3479.7
310.0	655.2	3542.3	0.0	-2887.1	4197.5	0.0	3542.3
309.0	655.2	3604.9	0.0	-2949.7	4260.1	0.0	3604.9
308.0	655.2	3667.5	0.0	-3012.3	4322.7	0.0	3667.5

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:54:16

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****************************
*  SUMMARY OF RESULTS FOR  *
*  CANTILEVER WALL DESIGN  *
****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Undrained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
WALL BOTTOM ELEV. (FT)      :      330.34
      PENETRATION (FT)      :       10.16

MAX. BEND. MOMENT (LB-FT)   :  1.7927E+04
      AT ELEVATION (FT)     :      337.24

MAX. SCALED DEFL. (LB-IN^3):  3.4143E+09
      AT ELEVATION (FT)     :      351.00

          NOTE:  DIVIDE SCALED DEFLECTION MODULUS OF
                 ELASTICITY IN PSI TIMES PILE MOMENT
                 OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
                 IN INCHES.
```

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:54:16

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*****************************
* COMPLETE OF RESULTS FOR   *
*  CANTILEVER WALL DESIGN   *
*****************************
```

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	3.4143E+09	0.00
350.00	1.0400E+01	31.	3.1533E+09	62.40
349.00	8.3200E+01	125.	2.8924E+09	124.80
348.00	2.8080E+02	281.	2.6316E+09	187.20
347.00	6.6560E+02	499.	2.3713E+09	249.60
346.00	1.3000E+03	780.	2.1122E+09	312.00
345.00	2.2464E+03	1123.	1.8555E+09	374.40
344.00	3.5672E+03	1529.	1.6026E+09	436.80
343.00	5.3248E+03	1997.	1.3560E+09	499.20
342.00	7.5816E+03	2527.	1.1186E+09	561.60
341.00	1.0400E+04	3120.	8.9444E+08	624.00
340.50	1.2039E+04	3440.	7.8878E+08	655.20
340.50	1.2039E+04	3440.	7.8878E+08	-678.13
340.00	1.3661E+04	3018.	6.8832E+08	-1009.15
339.50	1.5042E+04	2506.	5.9375E+08	-1040.45
339.00	1.6164E+04	1978.	5.0567E+08	-1071.75
338.00	1.7595E+04	874.	3.5081E+08	-1134.35
337.00	1.7892E+04	-291.	2.2618E+08	-1196.95
336.00	1.6992E+04	-1519.	1.3229E+08	-1259.55
335.00	1.4832E+04	-2810.	6.7590E+07	-1322.15
334.59	1.3577E+04	-3354.	4.8819E+07	-1347.64
334.00	1.1387E+04	-3976.	2.8328E+07	-752.40

333.00	7.2021E+03	-4227.	8.6337E+06	251.77
332.00	3.2688E+03	-3473.	1.4214E+06	1255.94
331.00	5.9135E+02	-1715.	3.8481E+04	2260.11
330.34	0.0000E+00	0.	0.0000E+00	2924.36

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

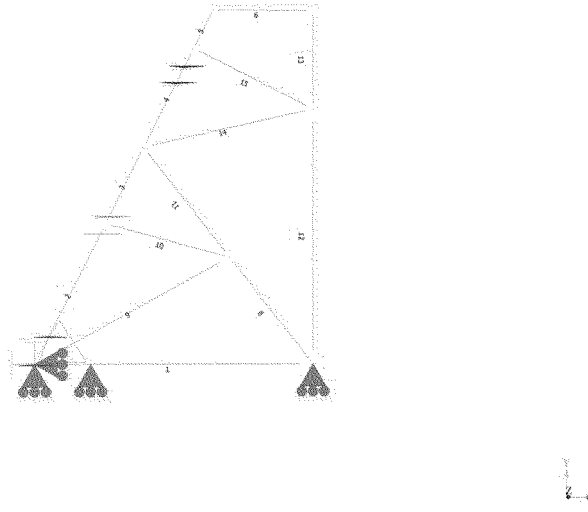
III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00	562.	0.	0.	0.	0.
341.00	624.	0.	0.	0.	0.
340.50+	655.	0.	0.	0.	0.
340.50+	655.	1333.	0.	0.	1333.
340.00	655.	1664.	0.	0.	1664.
339.50	655.	1696.	0.	0.	1696.
339.00	655.	1727.	0.	0.	1727.
338.00	655.	1790.	0.	0.	1790.
337.00	655.	1852.	0.	0.	1852.
336.00	655.	1915.	0.	0.	1915.
335.00	655.	1977.	0.	0.	1977.
334.59	655.	2003.	0.	0.	2003.
334.00	655.	2040.	0.	0.	2040.
333.00	655.	2103.	0.	0.	2103.
332.00	655.	2165.	0.	0.	2165.
331.00	655.	2228.	0.	0.	2228.
330.34	655.	2290.	0.	0.	2290.
329.00	655.	2353.	0.	0.	2353.

Bentley USACE

Current Date: 10/21/2009 1:29 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah25+15.adv\

Closure 25+15
Members

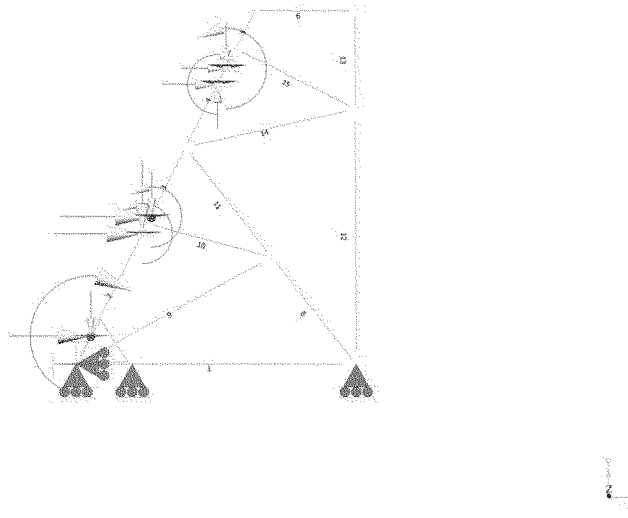


Bentley USACE

Current Date: 10/21/2009 1:30 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah25+15.adv\

Closure 25+15

Loads



Bentley USACE Closure 25+15

Current Date: 10/22/2009 8:07 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah25+15.adv\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :
DS1=DL

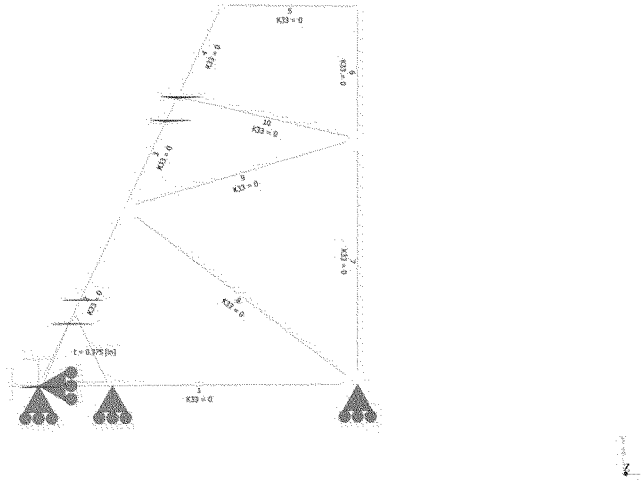
Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	T2L 2-1_2X2-1_2X1_4	1	DS1 at 20.83%	**0.11**	**OK**	(Sec. E)
		2	DS1 at 93.75%	**0.64**	**OK**	(H1-1b)
		3	DS1 at 0.00%	**0.21**	**OK**	(H1-1b)
		4	DS1 at 81.25%	**0.86**	**OK**	(H1-1b)
		5	DS1 at 0.00%	**0.26**	**OK**	(H1-1b)
		6	DS1 at 0.00%	**0.13**	**OK**	(H1-1b)
		8	DS1 at 0.00%	**0.24**	**OK**	(H1-1a)
		11	DS1 at 100.00%	**0.10**	**OK**	(H1-1b)
	T2LU 2-1_2X2X1_4LLBB	9	DS1 at 0.00%	**0.09**	**OK**	(Sec. E)
		10	DS1 at 100.00%	**0.24**	**OK**	(H1-1b)
		14	DS1 at 0.00%	**0.11**	**OK**	(H1-1b)
		15	DS1 at 0.00%	**0.35**	**OK**	(H1-1b)
	T2LU 3X2-1_2X1_4LLBB	12	DS1 at 0.00%	**0.08**	**OK**	(Sec. E)
		13	DS1 at 0.00%	**0.09**	**OK**	(H1-1b)

Bentley USACE

Current Date: 10/21/2009 1:32 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah75+85.adv\

Closure 75+85

Members

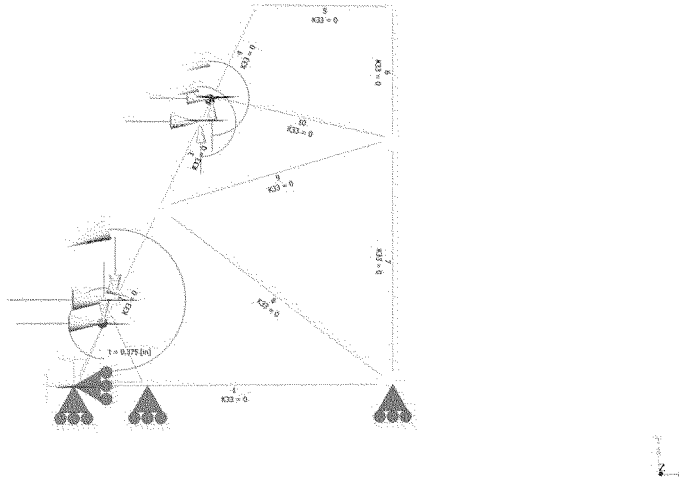


Bentley USACE

Current Date: 10/21/2009 1:33 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah75+85.adv\

Closure 75+85

Loads



Bentley USACE Closure 75+85

Current Date: 10/22/2009 8:17 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah75+85.adv\

Steel Code Check

Report: Summary - For all selected load conditions

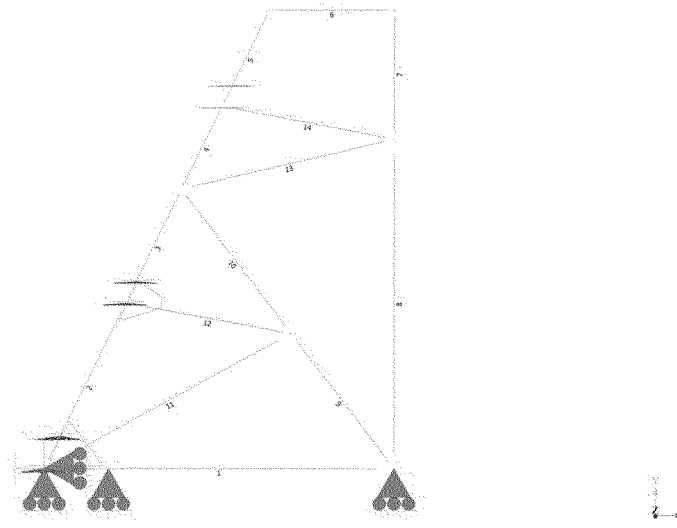
Load conditions to be included in design :
DS1=DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	T2L 2-1_2X2-1_2X1_4	1	DS1 at 0.00%	**0.15**	**OK**	(H1-1b)
		2	DS1 at 35.42%	**0.62**	**OK**	(H1-1b)
		3	DS1 at 97.92%	**0.39**	**OK**	(H1-1b)
		4	DS1 at 0.00%	**0.01**	**OK**	(H1-1b)
		5	DS1 at 100.00%	**0.01**	**OK**	(H1-1b)
		6	DS1 at 0.00%	**0.01**	**OK**	(H1-1b)
		7	DS1 at 0.00%	**0.06**	**OK**	(Sec. E)
	T2LU 2-1_2X2X1_4LLBB	8	DS1 at 0.00%	**0.13**	**OK**	(Sec. E)
		9	DS1 at 0.00%	**0.10**	**OK**	(Sec. E)
		10	DS1 at 0.00%	**0.12**	**OK**	(Sec. E)

Bentley USACE

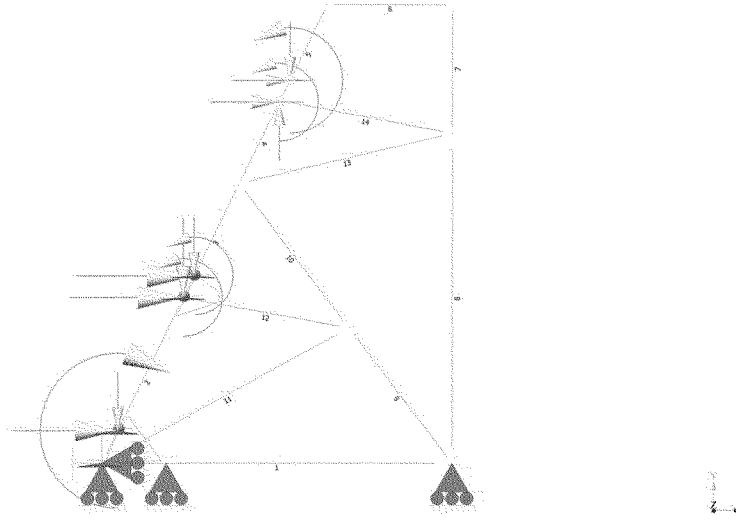
Current Date: 10/22/2009 8:09 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah83+92.adv\

Closure 83+92
Members



Bentley USACE
Current Date: 10/22/2009 8:11 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah83+92.adv\

Closure 83+92
Loads



Bentley USACE

Closure 83+92

Current Date: 10/22/2009 8:06 AM
Units system: English
File name: C:\DOCUME-1\h2edmbla\MYDOCU-1\PADUCA-1\paducah83+92.adv\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :
DS1=DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	T2L 2-1_2X2-1_2X1_4	1	DS1 at 10.42%	**0.16**	**OK**	(H1-1b)
		2	DS1 at 0.00%	**0.34**	**OK**	(H1-1b)
		3	DS1 at 0.00%	**0.84**	**OK**	(H1-1b)
		4	DS1 at 100.00%	**0.33**	**OK**	(H1-1b)
		5	DS1 at 0.00%	**0.37**	**OK**	(H1-1b)
		6	DS1 at 100.00%	**0.03**	**OK**	(H1-1b)
	T2LU 2-1_2X2X1_4LLBB	9	DS1 at 0.00%	**0.36**	**OK**	(H1-1a)
		10	DS1 at 0.00%	**0.13**	**OK**	(Sec. E)
		11	DS1 at 0.00%	**0.18**	**OK**	(Sec. E)
		12	DS1 at 0.00%	**0.35**	**OK**	(H1-1a)
		13	DS1 at 0.00%	**0.11**	**OK**	(Sec. E)
		14	DS1 at 0.00%	**0.13**	**OK**	(Sec. E)
	T2LU 3X2-1_2X1_4SLBB	7	DS1 at 0.00%	**0.03**	**OK**	(H1-1b)
		8	DS1 at 0.00%	**0.07**	**OK**	(Sec. E)

Paducah Closure Connection Check

.5" dia. A325 bolt → F_{nv}/Ω= 30 ksi
Thread X, Single Shear (AISC 13th ed. Table 7-1)

Nominal Bolt Area= 0.19635 in^2

r_n/Ω_v= **5.89 k/ bolt**

Closure 83+92

Member 12

Axial Force=	12.3 k		min. edge distance=
# of bolts=	2		(Table J3.4)
capacity=	11.78 k	NOT OK	

Member 14

Axial Force=	4.9 k	
# of bolts=	2	
capacity=	11.78 k	OK

Closure 25+15

Member 10

Axial Force=	6.7 k	
# of bolts=	3	
capacity=	17.67 k	OK

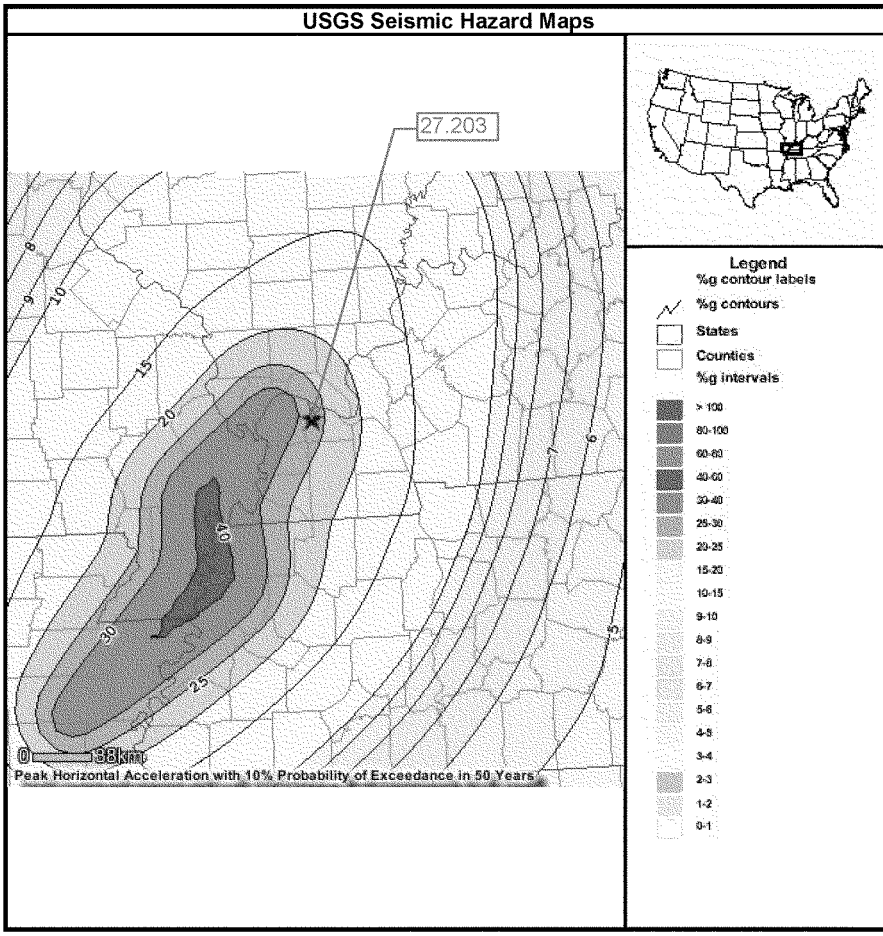
Member 14

Axial Force=	4.9 k	
# of bolts=	2	
capacity=	11.78 k	OK

Closure 75+85

Member 10

Axial Force=	4.39 k	
# of bolts=	1	
capacity=	5.89 k	OK


USGS Seismic Hazard Maps
27.203
Legend
%g contour labels
%g contours
States
Counties
%g intervals
> 100
80-100
60-80
40-60
30-40
25-30
20-25
15-20
10-15
9-10
8-9
7-8
6-7
5-6
4-5
3-4
2-3
1-2
0-1
0 38km
Peak Horizontal Acceleration with 10% Probability of Exceedance in 50 Years

Conterminous 48 States
2006 International Building Code
Zip Code = 42001
Spectral Response Accelerations Ss and S1
Ss and S1 = Mapped Spectral Acceleration Values
Data are based on a 0.01 deg grid spacing

Period (sec)	Centroid Sa (g)	
0.2	1.552	(Ss)
1.0	0.522	(S1)

Period (sec)	Maximum Sa (g)	
0.2	2.223	(Ss)
1.0	0.600	(S1)

Period (sec)	Minimum Sa (g)	
0.2	1.500	(Ss)
1.0	0.461	(S1)

Conterminous 48 States
2006 International Building Code
Zip Code = 42001
Spectral Response Accelerations SMs and SM1
SMs = Fa x Ss and SM1 = Fv x S1
Site Class D

Period (sec)	Centroid Sa (g)	
0.2	1.552	(SMs, Fa = 1.000)
1.0	0.783	(SM1, Fv = 1.500)

Period (sec)	Maximum Sa (g)	
0.2	2.223	(SMs, Fa = 1.000)
1.0	0.900	(SM1, Fv = 1.500)

Period (sec)	Minimum Sa (g)	
0.2	1.500	(SMs, Fa = 1.000)
1.0	0.710	(SM1, Fv = 1.539)

Conterminous 48 States
2006 International Building Code
Zip Code = 42001
Spectral Response Accelerations SDs and SD1
SDs = 2/3 x SMs and SD1 = 2/3 x SM1
Site Class D

Period (sec)	Centroid Sa (g)	
0.2	1.035	(SDs)
1.0	0.522	(SD1)

Period (sec)	Maximum Sa (g)	
0.2	1.482	(SDs)
1.0	0.600	(SD1)

Period (sec)	Minimum Sa (g)	
0.2	1.000	(SDs)
1.0	0.473	(SD1)

Paducah LFPP
Pump Station 1
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338\log(S_{s475}) - 3.7338\log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338\log(S_{1475}) - 3.7338\log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n1}^{x}$ $T_a = 0.327$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS1}$ $V_M = 3.463 \times 10^{5}\,\text{lb}$

Wind Loading

$$Wind := 15\frac{lb}{ft^2}$$

$Ra := Wind \cdot h_{n1} \cdot ft \cdot 40ft$ $\qquad$ $Ra = 2.49 \times 10^4 \cdot lb$

$$if\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Controls"}$$

Pump Station 1

Building is integrated with LOP

$h_{n1} := 41.5\,\text{feet}$

Section B on sheet 934-12.3/3

$Wall_{15b} := 2 \cdot 25ft \cdot 24in$

$Wall_{26b} := 2 \cdot 14.5ft \cdot 12in$

$Wall_{37b} := 2 \cdot 1.5ft \cdot 6in$

$Wall_{48b} := 2 \cdot 6in \cdot 12in + 1ft \cdot 1ft$

$Wall_{910b} := 2 \cdot 1.5ft \cdot 6in$

$Roof_{11b} := 20ft \cdot 6in$

$Floor_{12b} := 20ft \cdot 8in + 2 \cdot 3in \cdot 9in$

$Floor_{13b} := 20ft \cdot 24in$

$Roof_{14b} := 5ft \cdot 6in$

$Floor_{15b} := 38ft \cdot 1.5ft$

$$WWall_{1617b} := 2 \cdot 18in \cdot \left[33ft \cdot \left(\frac{14ft + 9in}{2}\right)\right]$$

$Depth_b := 40ft$

$$Total_b := WWall_{1617b} + Depth_b \cdot \left(\begin{array}{l} Wall_{15b} + Wall_{26b} + Wall_{37b} + Wall_{48b} + Wall_{910b} + Roof_{11b} \cdots \\ + Floor_{12b} + Floor_{13b} + Roof_{14b} + Floor_{15b} \end{array}\right.$$

$Total_b = 1.102 \times 10^4 \cdot ft^3$

Building Total

$Volume := Total_b$

$Volume = 1.102 \times 10^4 \cdot ft^3$

$$W_c := 150 \frac{lb}{ft^3}$$

$W_{equip} := 200000lb$

$W_{PS1} := W_c \cdot Volume + W_{equip}$ $\qquad W_{PS1} = 1.673 \times 10^6\,lb$

Paducah LFPP
Pump Station 2
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n2}^{x}$ $T_a = 0.327$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS2}$ $V_M = 5.198 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (h_{n2} \cdot ft - 23 \cdot ft)^2 \cdot 34.5ft$ $Ra = 2.127 \times 10^6 lb$

$\text{if}(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}) = \text{"Seismic Does Not Control"}$

Pump Station 2

Building is integrated with LOP

$h_{n2} := 41.5\,\text{feet}$

Section A on sheet 934-12.3/17

$Wall_{15a} := 2 \cdot 34.5ft \cdot 24in$

$Wall_{26a} := 2 \cdot 20.75ft \cdot 12in$

$Wall_{37a} := 2 \cdot 1.5ft \cdot 9in$

$Wall_{4a} := 24.5ft \cdot 18in$

$Wall_{8a} := 5ft \cdot 12in$

$Roof_{9a} := 34.5ft \cdot 6in$

$Floor_{10a} := 34.5ft \cdot 6in$

$Floor_{11a} := 3 \cdot 1ft \cdot 6in$

$Roof_{12a} := 4ft \cdot 18in$

$Roof_{13a} := 8.75ft \cdot .5ft$

$Depth_a := 61ft + 10in$

$$Total_a := Depth_a \cdot \left(\begin{array}{l} Wall_{15a} + Wall_{26a} + Wall_{37a} + Wall_{4a} + Wall_{8a} + Roof_{9a} + Floor_{10a} \cdots \\ + Floor_{11a} + Roof_{12a} + Roof_{13a} \end{array} \right)$$

$Total_a = 1.669 \times 10^4 \cdot ft^3$

Section B on sheet 934-12.3/17

$Wall_{15b} := 2 \cdot 34.5ft \cdot 24in$

$Wall_{26b} := 2 \cdot 21.5ft \cdot 12in$

$Wall_{37b} := 2 \cdot 1.5ft \cdot 9in$

$Wall_{4b} := 5 \cdot 18in \cdot 12in$

$Roof_{8b} := 61ft \cdot 6in$

$Floor_{9b} := 6 \cdot 28in \cdot 18in$

$Floor_{10b} := 61ft \cdot 8in$

$Floor_{11b} := 61ft \cdot 3ft$

$Depth_b := 34.5ft$

$$Total_b := Depth_b \cdot \left(\begin{array}{l} Wall_{15b} + Wall_{26b} + Wall_{37b} + Wall_{4b} + Roof_{8b} \ldots \\ + Floor_{9b} + Floor_{10b} + Floor_{11b} \end{array} \right)$$

$Total_b = 1.607 \times 10^4 \cdot ft^3$

Building Total

$Volume := Total_b$

$Volume = 1.607 \times 10^4 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 5 \cdot 200000 lb$

$W_{PS2} := W_c \cdot Volume + W_{equip}$ $\qquad$ $W_{PS2} = 2.511 \times 10^6 lb$

Wind Loading

$$Wind := 15\frac{lb}{ft^2}$$

$Ra := Wind \cdot h_{n2} \cdot ft \cdot 61ft$ $\qquad$ $Ra = 3.797 \times 10^4 \cdot lb$

Paducah LFPP
Pump Station 3
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n3}^{x}$ $T_a = 0.25$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS3}$ $V_M = 8.197 \times 10^{4}\,\text{lb}$

Water Loading

$$\gamma := 62.4 \frac{lb}{ft^3}$$

$$Ra := \frac{1}{2} \cdot \gamma \cdot \left(h_{n3} \cdot ft\right)^2 \cdot 13ft \qquad Ra = 3.411 \times 10^5 \cdot lb$$

$$if\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Does Not Control"}$$

Pump Station 3

Building is integrated with LOP

$h_{n3} := 29$ feet

Section B on sheet 934-12.3/33

$Wall_{1b} := 22.5ft \cdot 12in$

$Wall_{2b} := 27.75ft \cdot 12in$

$Wall_{3b} := 27.25ft \cdot 12in$

$Wall_{4b} := 13.5ft \cdot 18in$

$Wall_{5b} := 1.25ft \cdot 6in$

$Wall_{6b} := 1.5ft \cdot 6in$

$Roof_{7b} := 10ft \cdot 5in$

$Floor_{8b} := 10ft \cdot 12in$

$Roof_{9b} := 3.25ft \cdot 6in$

$Floor_{10b} := 3ft \cdot 2ft$

$Floor_{11b} := 10ft \cdot 2ft$

$Floor_{12b} := 11ft \cdot 2ft$

$Depth_b := 16ft$

$$Total_b := Depth_b \cdot \left(\begin{array}{l} Wall_{1b} + Wall_{2b} + Wall_{3b} + Wall_{4b} + Wall_{5b} + Wall_{6b} + Roof_{7b} + Floor_{8b} \cdots \\ + Roof_{9b} + Floor_{10b} + Floor_{11b} + Floor_{12b} \end{array} \right)$$

$Total_b = 2.607 \times 10^3 \cdot ft^3$

Building Total

$Volume := Total_b$

$Volume = 2.607 \times 10^3 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 5000lb$

$W_{PS3} := W_c \cdot Volume + W_{equip}$ $\qquad W_{PS3} = 3.96 \times 10^5 lb$

Paducah LFPP
Pump Station 4
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n4}^{x}$ $T_a = 0.203$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS4}$ $V_M = 1.107 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\qquad$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $\qquad$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $\qquad$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (h_{n4} \cdot ft)^2 \cdot 13ft$ $\qquad$ $Ra = 1.133 \times 10^6 lb$

Pump Station 4

Building is a "can" underground.

$h_{n4} := 22$ feet

Section C on sheet 934-12.7/3

$Wall_{1c} := 20.5ft \cdot 18in$

$Wall_{2c} := 20.5ft \cdot 18in$

$Wall_{3c} := 1.5ft \cdot 9in$

$Wall_{4c} := 1.5ft \cdot 9in$

$Wall_{5c} := 4ft \cdot 9in$

$Wall_{6c} := 4ft \cdot 9in$

$Roof_{78c} := 2 \cdot 4.5ft \cdot 6in$

$Floor_{9c} := 13ft \cdot 2ft$

$Depth_c := 13ft + 4in$

$$Total_c := Depth_c \cdot \left(Wall_{1c} + Wall_{2c} + Wall_{3c} + Wall_{4c} + Wall_{5c} + Wall_{6c} + Roof_{78c} + Floor_{9c}\right)$$

$$Total_c = 1.337 \times 10^3 \cdot ft^3$$

Section D on sheet 934-12.7/4

$Wall_{1d} := 17ft \cdot 18in$

$Wall_{2d} := 17ft \cdot 18in$

$Wall_{3d} := 3.2ft \cdot 9in$

$Wall_{4d} := 4.2ft \cdot 9in$

$Roof_{5d} := 10ft \cdot 12in$

$Floor_{6d} := 13ft \cdot 1.2 \cdot ft$

$Depth_d := 10ft + 2in$

$$Total_d := Depth_d \cdot \left(Wall_{1d} + Wall_{2d} + Wall_{3d} + Wall_{4d} + Roof_{5d} + Floor_{6d}\right)$$

$$Total_d = 835.192 \cdot ft^3$$

Section F on sheet 934-12.7/4

$Wall_{1f} := 22ft \cdot 18in$

$Wall_{2f} := 17ft \cdot 18in$

$Wall_{3f} := 17ft \cdot 18in$

$Wall_{4f} := 8ft \cdot 6in$

$Wall_{5f} := 1.5ft \cdot 9in$

$Wall_{6f} := 4ft \cdot 9in$

$Wall_{7f} := 5ft \cdot 15in$

$Wall_{8f} := 4.2ft \cdot 9in$

$Wall_{9f} := 4.2ft \cdot 9in$

$Roof_{10f} := 1.5ft \cdot 9in$

$Roof_{11f} := 1.5ft \cdot 6in$

$Roof_{12f} := 18.5ft \cdot 9in$

$Roof_{1314f} := 2 \cdot 16in \cdot 15in$

$Floor_{15f} := 24.75ft \cdot 2.5ft$

$Depth_f := 13ft$

$$Total_f := Depth_f \cdot \left(\begin{array}{l} Wall_{1f} + Wall_{2f} + Wall_{3f} + Wall_{4f} + Wall_{5f} + Wall_{6f} + Wall_{7f} + Wall_{8f} \ldots \\ + Wall_{9f} + Roof_{10f} + Roof_{11f} + Roof_{12f} + Roof_{1314f} + Floor_{15f} \end{array} \right)$$

$Total_f = 2.413 \times 10^3 \cdot ft^3$

Building Total

$$Volume := Total_c + Total_d + Total_f - Depth_f \cdot \left(Roof_{10f} + Roof_{11f} + Roof_{12f} + Roof_{1314f} + Floor_{15f}\right)$$

$$Volume = 3.533 \times 10^3 \cdot ft^3$$

$$W_c := 150 \frac{lb}{ft^3}$$

$$W_{equip} := 5000lb$$

$$W_{PS4} := W_c \cdot Volume + W_{equip} \qquad W_{PS4} = 5.349 \times 10^5 \cdot lb$$

Paducah LFPP
Pump Station 5
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n5}^{x}$ $T_a = 0.26$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS5}$ $V_M = 3.269 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (h_{n5} \cdot ft - 23 \cdot ft)^2 \cdot 34.5ft$ $Ra = 3.496 \times 10^5 lb$

if $(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}) = \text{"Seismic Does Not Control"}$

Pump Station 5

Building is integrated with LOP

$h_{n5} := 30.5\,\text{feet}$

Section A on sheet 934-12.3/43

$Wall_{1a} := 25ft \cdot 18in$

$Wall_{25a} := 2 \cdot 24ft \cdot 18in$

$Wall_{36a} := 2 \cdot 15ft \cdot 13in$

$Wall_{47a} := 2 \cdot 6in \cdot 18in$

$Wall_{8a} := 2 \cdot 6in \cdot 12in + 1ft \cdot 1ft$

$Roof_{9a} := 19ft \cdot 6in$

$Floor_{10a} := 19ft \cdot 8in$

$Floor_{11a} := 4.5 \cdot ft \cdot 15in$

$Floor_{12a} := 19ft \cdot 2ft$

$315.5 - 328 = -12.5$

$3\sqrt{17} = 12.369$

$WWall_{1617a} := 15in \cdot 22ft \cdot 13ft$

$Depth_a := 47.5ft$

$$Total_a := WWall_{1617a} + Depth_a \cdot \left(\begin{array}{l} Wall_{1a} + Wall_{25a} + Wall_{36a} + Wall_{47a} + Wall_{8a} + Roof_{9a} \cdots \\ + Floor_{10a} + Floor_{11a} + Floor_{12a} \end{array} \right)$$

$Total_a = 1.039 \times 10^4 \cdot ft^3$

Building Total

$Volume := Total_a$

$Volume = 1.039 \times 10^4 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 20000lb$

$W_{PS5} := W_c \cdot Volume + W_{equip}$ $\qquad W_{PS5} = 1.579 \times 10^6 lb$

Wind Loading

$$Wind := 15\frac{lb}{ft^2}$$

$Ra := Wind \cdot h_{n5} \cdot ft \cdot 40ft$ $\qquad$ $Ra = 1.83 \times 10^4 \cdot lb$

$$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Controls"}$$

Paducah LFPP
Pump Station 6
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n6}^{x}$ $T_a = 0.345$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS6}$ $V_M = 4.69 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (h_{n6} \cdot ft - 23 \cdot ft)^2 \cdot 34.5ft$ $Ra = 2.873 \times 10^6 lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Water Loading

$\gamma_w := 62.4 \frac{lb}{ft^3}$

$Ra := \frac{1}{2} \cdot \gamma \cdot (h_{n6} \cdot ft)^2 \cdot 13ft$ $Ra = 8.032 \times 10^5 \cdot lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Pump Station 6

Building is integrated with LOP

$h_{n6} := 44.5\,\text{feet}$

$Wall_{1a} := 24.6ft \cdot 18in$

$Wall_{25a} := 2 \cdot 25ft \cdot 21in$

$Wall_{36a} := 2 \cdot 18.5ft \cdot 18in + (2 \cdot 6in \cdot 12in + 1ft \cdot 1ft)$

$Wall_{47a} := 2 \cdot 27in \cdot 9in$

$Wall_{8a} := 25ft \cdot 18in$

$Roof_{9a} := 25.5ft \cdot 6in$

$Floor_{10a} := 25.5ft \cdot 8in$

$Floor_{11a} := 18 \cdot ft \cdot 12in$

$Floor_{12a} := 45ft \cdot 2.5ft$

$WWall_{13a} := 18in \cdot 5ft$

$Depth_a := 38ft + 4in$

$$Total_a := Depth_a \cdot \begin{pmatrix} Wall_{1a} + Wall_{25a} + Wall_{36a} + Wall_{47a} + Wall_{8a} + Roof_{9a} \cdots \\ + Floor_{10a} + Floor_{11a} + Floor_{12a} + WWall_{13a} \end{pmatrix}$$

$Total_a = 1.497 \times 10^4 \cdot ft^3$

Building Total

$Volume := Total_a$

$Volume = 1.497 \times 10^4 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 20000lb$

$W_{PS6} := W_c \cdot Volume + W_{equip}$ $\qquad W_{PS6} = 2.266 \times 10^6\,lb$

Paducah LFPP
Pump Station 7
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n7}^{x}$ $T_a = 0.318$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS7}$ $V_M = 1.929 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (23 \cdot ft)^2 \cdot D_2$ $Ra = 1.112 \times 10^6 lb$

$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Does Not Control"}$

Water Loading

$\gamma_w := 62.4 \frac{lb}{ft^3}$

$Ra := \frac{1}{2} \cdot \gamma \cdot \left(h_{n7} ft\right)^2 \cdot D_2$ $Ra = 5.824 \times 10^5 \cdot lb$

$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Does Not Control"}$

Pump Station 7

Building is integrated with LOP

$h_{n7} := 40$ feet

Section A on Sheet 934-12.3/66

$D_1 := 23ft$ $\quad D_2 := 11ft + 8in$

$Wall_{1a} := D_1 \cdot 21.75ft \cdot 15in$

$Wall_{25a} := D_1 \cdot 2 \cdot 23.25ft \cdot 18in$

$Wall_{36a} := D_1 \cdot 2 \cdot 15ft \cdot 15in + D_1 \cdot (2 \cdot 6in \cdot 12in + 1ft \cdot 1ft)$

$Wall_{47a} := D_1 \cdot 2 \cdot 27in \cdot 9in$

$Wall_{8a} := D_2 \cdot 23.17ft \cdot 18in$

$Roof_{9a} := D_1 \cdot 16.25ft \cdot 6in$

$Floor_{10a} := D_1 \cdot 16.25ft \cdot 12in$

$Floor_{11a} := D_2 \cdot 11.5 \cdot ft \cdot 8in$

$Floor_{12a} := D_1 \cdot 34.5ft \cdot (2ft + 2in)$

$WWall_{13a} := D_2 \cdot (12in \cdot 5ft + 2 \cdot 18in \cdot 10in)$

$$Total_a := \begin{pmatrix} Wall_{1a} + Wall_{25a} + Wall_{36a} + Wall_{47a} + Wall_{8a} + Roof_{9a} \cdots \\ + Floor_{10a} + Floor_{11a} + Floor_{12a} + WWall_{13a} \end{pmatrix}$$

$Total_a = 6.078 \times 10^3 \cdot ft^3$

Building Total

$Volume := Total_a$

$Volume = 6.078 \times 10^3 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 20000lb$

$W_{PS7} := W_c \cdot Volume + W_{equip}$ $\quad W_{PS7} = 9.317 \times 10^5 lb$

Paducah LFPP
Pump Station 9
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n9}^{x}$ $T_a = 0.339$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS9}$ $V_M = 9.014 \times 10^{4}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (28.3 \cdot ft)^2 \cdot D_2$ $Ra = 7.213 \times 10^5 lb$

$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Does Not Control"}$

Pump Station 9

Building is integrated with LOP

$h_{n9} := 43.5\,\text{feet}$

Section A on Sheet 934-12.3/66

$D_1 := 16\text{ft}$ $\qquad D_2 := 5\text{ft}$

$Wall_{1a} := D_2 \cdot 10.75\text{ft} \cdot 15\text{in}$

$Wall_{25a} := D_1 \cdot 2 \cdot 29\text{ft} \cdot 18\text{in}$

$Wall_{36a} := D_1 \cdot 2 \cdot 14.5\text{ft} \cdot 15\text{in} + D_1 \cdot (2 \cdot 6\text{in} \cdot 12\text{in} + 1\text{ft} \cdot 1\text{ft})$

$Wall_{47a} := D_1 \cdot 2 \cdot 24\text{in} \cdot 9\text{in}$

$Roof_{8a} := D_1 \cdot 10\text{ft} \cdot 10\text{in}$

$Floor_{9a} := D_1 \cdot 10\text{ft} \cdot 8\text{in}$

$Floor_{10a} := D_2 \cdot 6 \cdot \text{ft} \cdot 17\text{in}$

$Floor_{11a} := D_1 \cdot 20\text{ft} \cdot 1.4\text{ft}$

$$Total_a := \begin{pmatrix} Wall_{1a} + Wall_{25a} + Wall_{36a} + Wall_{47a} + Roof_{8a} \ldots \\ + Floor_{9a} + Floor_{10a} + Floor_{11a} \end{pmatrix}$$

$Total_a = 2.85 \times 10^3 \cdot \text{ft}^3$

Building Total

$Volume := Total_a$

$Volume = 2.85 \times 10^3 \cdot \text{ft}^3$

$W_c := 150 \dfrac{\text{lb}}{\text{ft}^3}$

$W_{equip} := 8000\text{lb}$

$W_{PS9} := W_c \cdot Volume + W_{equip}$ $\qquad W_{PS9} = 4.355 \times 10^5\,\text{lb}$

Paducah LFPP
Pump Station 11
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = ▮ \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = ▮ \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = ▮$

$b_s := 10^{(4.7338\log(S_{s475}) - 3.7338\log(S_{s2475}))}$ $b_s = ▮$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = ▮$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = ▮$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = ▮$

$b_1 := 10^{(4.7338\log(S_{1475}) - 3.7338\log(S_{12475}))}$ $b_1 = ▮$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = ▮$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = ▮$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} =$ ▮ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} =$ ▮

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} =$ ▮ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} =$ ▮

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} =$ ▮ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} =$ ▮

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} =$ ▮ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} =$ ▮

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n11}{}^{x}$ $T_a =$ ▮

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} =$ ▮ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} =$ ▮

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) =$ ▮

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) =$ ▮

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} =$ ▮ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} =$ ▮ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}{}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} =$ ▮ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} =$ ▮

$V_M := C_{sM} \cdot W_{PS11}$ $V_M =$ ▮

$\theta := 0deg$ $\qquad$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := atan\left(\frac{-1}{2.5}\right)$ $\qquad$ $\beta =$

$\alpha := \frac{29}{3}deg$

$k_o := 1 - \sin(\phi)$ $\qquad$ $k_o =$

$k_{o\beta} := k_o \cdot (1 + \sin(\beta))$ $\qquad$ $k_{o\beta} =$

$$k_a := \frac{\cos(\phi)^2}{\left(1 + \sqrt{\frac{\sin(\phi)\cdot\sin(\phi - \beta)}{\cos(\beta)}}\right)^2}$$ $\qquad$ $k_a =$

$$k_p := \frac{\cos(\phi)^2}{\left(1 - \sqrt{\frac{\sin(\phi)\cdot\sin(\phi + \beta)}{\cos(\beta)}}\right)^2}$$ $\qquad$ $k_p =$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (56 \cdot ft)^2 \cdot D_2$ $\qquad$ $Ra =$

$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) =$

Pump Station 11
(Island Creek Dam)

$h_{n11} := 80$ feet

Section B on Sheet 934-12.5/7

$D_1 := 62ft$ $D_2 := 47.5ft$

$Wall_{14b} := 2D_1 \cdot 43ft \cdot 30in$

$Wall_{25b} := D_1 \cdot 2 \cdot 19ft \cdot 16in + D_1 \cdot (2 \cdot 6in \cdot 12in + 1ft \cdot 1ft)$

$Wall_{36b} := D_1 \cdot 2 \cdot 1.5ft \cdot 9in$

$Wall_{7b} := D_1 \cdot 2 \cdot 43ft \cdot 18in$

$Roof_{8b} := D_1 \cdot 20ft \cdot 6in$

$Floor_{9b} := D_1 \cdot 20ft \cdot 8in$

$Floor_{10b} := D_1 \cdot 43 \cdot ft \cdot 3ft$

$$Floor_{11b} := \frac{D_2 + D_1}{2} \cdot 20ft \cdot 2.5ft \cdot 2$$

$$WWall_{12b} := \frac{D_1 + D_2}{2} \cdot 20ft \cdot 2 \cdot 3ft$$

$$Total_b := \begin{pmatrix} Wall_{14b} + Wall_{25b} + Wall_{36b} + Wall_{7b} + Roof_{8b} \ldots \\ + Floor_{9b} + Floor_{10b} + Floor_{11b} + WWall_{12b} \end{pmatrix}$$

$Total_b = \blacksquare \cdot ft^3$

Additional walls from Section A on 934-12.5/6

$D_1 := 23ft$

$Wall_{1a} := 2D_1 \cdot 5ft \cdot 10ft$

$Wall_{2a} := 3D_1 \cdot 5ft \cdot 10ft$

$Wall_{3a} := 2D_1 \cdot 45.5ft \cdot 2.5ft$

$Wall_{4a} := 3D_1 \cdot 45.5ft \cdot 18in$

$Total_a := Wall_{1a} + Wall_{2a} + Wall_{3a} + Wall_{4a}$

$Total_a = \blacksquare \cdot ft^3$

Building Total

$Volume := Total_a + Total_b$

$Volume = \blacksquare \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 20000lb$

$W_{PS11} := W_c \cdot Volume + W_{equip}$ $\qquad W_{PS11} = \blacksquare$

Paducah LFPP
Pump Station 12
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1-0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1-0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n12}^{x}$ $T_a = 0.305$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS12}$ $V_M = 1.369 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (21.5 \cdot ft)^2 \cdot D_2$ $Ra = 8.743 \times 10^5 lb$

$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Does Not Control"}$

Pump Station 12

$h_{n12} := 37.75$ feet

Section A on Sheet 934-12.3/76

$D_1 := 24.5ft \qquad D_2 := 10.5ft$

$Wall_{1a} := D_1 \cdot 4ft \cdot 18in$

$Wall_{25a} := D_1 \cdot 2 \cdot 17ft \cdot 15in$

$Wall_{36a} := D_1 \cdot 2 \cdot 13.5ft \cdot 15in + D_1 \cdot (2 \cdot 6in \cdot 12in + 1ft \cdot 1ft)$

$Wall_{47a} := D_1 \cdot 2 \cdot 21in \cdot 6in$

$Roof_{8a} := D_1 \cdot 18.5ft \cdot 6in$

$Floor_{9a} := D_1 \cdot 18.5ft \cdot 12in$

$Floor_{10a} := D_1 \cdot 34.5 \cdot ft \cdot 18in$

$Floor_{11a} := D_2 \cdot 5ft \cdot 6in$

$WWall_{12a} := \frac{(4ft + 11in + 8.75ft)}{2} \cdot 16ft \cdot 2 \cdot 15in$

$$Total_a := \begin{pmatrix} Wall_{1a} + Wall_{25a} + Wall_{36a} + Wall_{47a} + Roof_{8a} \ldots \\ +Floor_{9a} + Floor_{10a} + Floor_{11a} + WWall_{12a} \end{pmatrix}$$

$Total_a = 4.354 \times 10^3 \cdot ft^3$

Building Total

$Volume := Total_a$

$Volume = 4.354 \times 10^3 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 8000lb$

$W_{PS12} := W_c \cdot Volume + W_{equip} \qquad W_{PS12} = 6.612 \times 10^5 lb$

TB12

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.38.06

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00	ft
Height of stem (HTS)	=	9.75	ft
Thickness top of stem (TTS)	=	1.50	ft
Thickness bottom of stem (TBS)	=	1.83	ft
Dist. of batter at bot. of stem (TBSR)	=	0.16	ft
Depth of heel (THEEL)	=	5.50	ft
Distance of batter for heel (BTRH)	=	0.33	ft
Depth of toe (TTOE)	=	1.50	ft
Width of toe (TWIDTH)	=	4.08	ft
Distance of batter for toe (BTRT)	=	0.75	ft
Width of base (BWIDTH)	=	12.00	ft
Depth of key (HK)	=	4.00	ft
Width of bottom of key (TK)	=	1.50	ft
Dist. of batter at bot. of key (BTRK)	=	1.00	ft

Structure coordinates:

x (ft)	y (ft)
0.00	335.42
0.00	340.92
6.09	341.25
6.26	351.00
7.76	351.00
7.92	341.25
12.00	340.50
12.00	339.00
2.50	339.42
1.50	335.42

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	341.55

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB12

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1493.90	341.55
2	6.10	341.55

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	341.55	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	7.92	341.55
2	507.92	341.55

Foundation property data:
phi for soil-structure interface = 27.00 (deg)
c for soil-structure interface = 0.228 (ksf)
phi for soil-soil interface = 27.00 (deg)
c for soil-soil interface = 0.285 (ksf)

Water data:
Driving side elevation = 351.00 ft
Resisting side elevation = 339.05 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.33
Overturning = 75.00% base in compression

Crack options:
o Crack *is* down to bottom of heel
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

**********	*** Satisfied ***	
* Overturning *	Required base in comp. =	75.00 %
**********	Actual base in comp. =	76.65 %
	Overturning ratio =	1.70

TB12

```
Xr (measured from toe) =   3.07 ft
Resultant ratio        = 0.2555
Stem ratio             = 0.3400
Base pressure at x=   9.20 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.6362 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   3.28


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.38.06

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       337.37     0.8505
       335.42     0.8720

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       341.55     0.0000
       337.37     0.0000
       335.42     0.0736

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       339.05     0.0000
       339.00     0.0057
```

TB12

335.42	0.8083

Earth pressures:

Elevation (ft)	Pressure (ksf)
341.55	0.0000
339.00	0.1738

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
339.00	1.6393
335.42	1.6393

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	0.8720
1.50	0.8083
2.50	0.3835
12.00	0.0057

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	6.848		-6.46	-44.23
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.365		-9.31	-3.40
Water above structure.....	0.000		0.00	0.00
Water above soil.....	3.643		-8.91	-32.46
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.350		-1.66	-0.58
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.072	-2.93	-0.21
Shear (due to delta).....	0.023		-12.00	-0.28
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		7.476	1.67	12.51
Resisting side:				
Effective earth loads.....		-0.222	0.85	-0.19
Balancing earth load.....		-5.869	-1.79	10.50
Water loads.....		-1.457	-2.38	3.47
Foundation:				
Vertical force on base.....	-7.525		-3.07	23.07
Uplift.....	-3.705		-8.59	31.81
** Statics Check ** SUMS =	0.000	0.000		0.00

TB12

```
Angle of base        =    16.61 degrees
Normal force on base =    8.888 kips
Shear force on base  =    3.473 kips
Max. available shear force =    9.139 kips

Base pressure at x=   9.20 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.6362 ksf

Xr (measured from toe) =     3.07 ft
Resultant ratio        =   0.2555
Stem ratio             =   0.3400
Base in compression    =    76.65 %
Overturning ratio      =     1.70

Volume of concrete =     1.69 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



**********************
**  Sliding Results  **
**********************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ================================
     1       0.000       0.000
     2       7.573       3.643
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
   number   (ksf)    (ksf)     (ft)       (ksf)
  ==============================================
     1    0.0000    0.0000
     2                          0.0000     0.9722
     2                         12.0000     0.0061
     3    0.0000    0.0061

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   335.42 ft
  Point 2 (right), x =    12.00 ft,   y =   339.00 ft

Depth of cracking =     6.13 ft
Crack extends to bottom of base of structure.

          Failure   Total    Weight    Submerged   Uplift
  Wedge    angle    length  of wedge    length     force
  number   (deg)     (ft)    (kips)      (ft)      (kips)
  ==========================================================
```

TB12

1	0.000	0.000	0.000	0.000	0.000
2	16.612	12.523	9.695	12.523	6.125
3	40.706	3.910	0.480	0.077	0.000

Wedge number	Net force (kips)
1	0.000
2	-1.079
3	1.080
SUM =	0.000

```
+-----------------------------+
| Factor of safety =    3.281 |
+-----------------------------+
```

```
************************
**  Bearing Results   **
************************

            Base width =     12.523 (ft)
                    Xr =      3.066 (ft)
  Effective base width =      6.399 (ft)
   (measured along slope)
            Base slope =    16.6115 (deg)

                   Phi =     27.000 (deg)
                     C =      0.228 (ksf)
       Effective Gamma =     0.0666 (kcf)

           Normal load =      8.888 (kips)
      Load inclination =     21.341 (deg)
     Load eccentricity =      3.062 (ft)

             Surcharge =     0.3208 (kips)
             Embedment =      2.550 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1301	1.0650	1.0650
Inclination	0.5820	0.5820	0.0439
Base Tilt	0.7039	0.7264	0.7264
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.3579 (ksf)

```
+------------------------------+
| Factor of safety =      3.137 |
+------------------------------+
```

TB14

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.39.57

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	11.67 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.94 ft
Dist. of batter at bot. of stem (TBSR)	=	0.22 ft
Depth of heel (THEEL)	=	6.33 ft
Distance of batter for heel (BTRH)	=	0.25 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	4.86 ft
Distance of batter for toe (BTRT)	=	0.83 ft
Width of base (BWIDTH)	=	14.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.75
0.00	339.08
7.20	339.33
7.42	351.00
8.92	351.00
9.14	339.33
14.00	338.50
14.00	337.00
2.67	337.42
1.50	332.75

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	339.80

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB14

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.79	339.80
2	7.21	339.80

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	339.80	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.13	339.80
2	509.13	339.80

Foundation property data:
phi for soil-structure interface = 27.00 (deg)
c for soil-structure interface = 0.228 (ksf)
phi for soil-soil interface = 27.00 (deg)
c for soil-soil interface = 0.285 (ksf)

Water data:
Driving side elevation = 351.00 ft
Resisting side elevation = 337.30 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.33
Overturning = 75.00% base in compression

Crack options:
o Crack *is* down to bottom of heel
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
****************     *** Not Satisfied ***
* Overturning *     Required base in comp. =  75.00 %
****************     Actual base in comp.   =  73.78 %
                     Overturning ratio      =   1.66
```

```
  To increase stability try one or a combination
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add/remove key

Xr (measured from toe) =   3.44 ft
Resultant ratio        = 0.2459
Stem ratio             = 0.3471
Base pressure at x=  10.33 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.8597 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.79


********************** Output Results **********************

Date: 2009/11/ 6                                Time: 15.39.57

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       335.62     0.9597
       332.75     1.0009

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       339.80     0.0000
       335.62     0.0000
       332.75     0.1077

** Resisting side pressures **
```

Water pressures:

Elevation (ft)	Pressure (ksf)
337.30	0.0000
337.00	0.0331
332.75	1.0009

Earth pressures:

Elevation (ft)	Pressure (ksf)
339.80	0.0000
337.00	0.1764

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	1.8586
332.75	1.8586

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0009
1.50	0.9412
2.67	0.4582
14.00	0.0331

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	8.402		-7.59	-63.81
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.553		-10.65	-5.89
Water above structure.....	0.000		0.00	0.00
Water above soil.....	5.112		-10.34	-52.87
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.546		-2.05	-1.12
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.155	-3.29	-0.51
Shear (due to delta).....	0.050		-14.00	-0.70
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		10.194	1.93	19.70
Resisting side:				
Effective earth loads.....		-0.247	0.93	-0.23
Balancing earth load.....		-7.899	-2.13	16.80

```
                                                TB14
  Water loads...............                   -2.202      -2.78      6.12
Foundation:
  Vertical force on base.....   -9.605                    -3.44     33.07
  Uplift....................    -5.059                    -9.77     49.44
=========================================================================
** Statics Check **   SUMS =     0.000      0.000                    0.00

Angle of base        =    16.89 degrees
Normal force on base =   11.485 kips
Shear force on base  =    4.768 kips
Max. available shear force =   11.501 kips

Base pressure at x=  10.33 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.8597 ksf

Xr (measured from toe) =     3.44 ft
Resultant ratio        =   0.2459
Stem ratio             =   0.3471
Base in compression    =    73.78 %
Overturning ratio      =     1.66

Volume of concrete =     2.07 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



************************
**  Sliding Results  **
************************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge     Loads       Loads
  Number   (kips)      (kips)
  ==================================
     1      0.000       0.000
     2     10.392       5.112
     3      0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ==================================================
      1    0.0000    0.0000
      2                        0.0000     1.1388
      2                       14.0000     0.0359
      3    0.0000    0.0359

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   332.75 ft
  Point 2 (right), x =    14.00 ft,   y =   337.00 ft
```

TB14

Depth of cracking = 7.05 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	0.000	0.000	0.000	0.000	0.000
2	16.887	14.631	12.534	14.631	8.593
3	40.043	4.352	0.593	0.466	0.008

Wedge number	Net force (kips)
1	0.000
2	-1.398
3	1.398
SUM =	0.000

```
+-----------------------------+
| Factor of safety =    2.795 |
+-----------------------------+
```

```
**********************
**  Bearing Results  **
**********************

            Base width =     14.631 (ft)
                    Xr =      3.443 (ft)
  Effective base width =      7.196 (ft)
   (measured along slope)
            Base slope =    16.8868 (deg)

                   Phi =     27.000 (deg)
                     C =      0.228 (ksf)
       Effective Gamma =     0.0666 (kcf)

           Normal load =     11.485 (kips)
      Load inclination =     22.547 (deg)
     Load eccentricity =      3.717 (ft)

             Surcharge =     0.3375 (kips)
             Embedment =      2.800 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1270	1.0635	1.0635
Inclination	0.5617	0.5617	0.0272
Base Tilt	0.6994	0.7222	0.7222
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.2405 (ksf)

```
+-----------------------------+
```

TB14

```
| Factor of safety =      2.657 |
+-------------------------------+
```

TB15

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.40.37

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	13.00 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.96 ft
Dist. of batter at bot. of stem (TBSR)	=	0.23 ft
Depth of heel (THEEL)	=	6.75 ft
Distance of batter for heel (BTRH)	=	0.21 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	5.25 ft
Distance of batter for toe (BTRT)	=	0.88 ft
Width of base (BWIDTH)	=	15.00 ft
Depth of key (HK)	=	5.00 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.25 ft

Structure coordinates:

x (ft)	y (ft)
0.00	331.04
0.00	337.79
7.79	338.00
8.02	351.00
9.52	351.00
9.75	338.00
15.00	337.12
15.00	335.62
2.75	336.04
1.50	331.04

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	340.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB15

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.17	340.00
2	7.83	340.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	340.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.71	340.00
2	509.71	340.00

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 337.50 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack depth is to be calculated
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Satisfied ***
* Overturning *     Required base in comp. =  75.00 %
***************     Actual base in comp.   =  77.35 %
                    Overturning ratio      =   1.64
```

TB15

```
Xr (measured from toe) =   3.87 ft
Resultant ratio        = 0.2578
Stem ratio             = 0.3500
Base pressure at x=  11.60 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.9952 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   4.94


********************** Output Results **********************

Date: 2009/11/ 6                                Time: 15.40.37

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       335.82     0.9472
       331.04     1.0653

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       340.00     0.0000
       335.82     0.0000
       331.04     0.1584

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       337.50     0.0000
       335.62     0.1882
       331.04     1.0653
```

TB15

Earth pressures:

Elevation (ft)	Pressure (ksf)
340.00	0.0000
335.62	0.2030

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
335.62	1.9402
331.04	1.9402

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0653
1.50	1.0184
2.75	0.5452
15.00	0.1882

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.294		-8.15	-75.70
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	2.120		-11.16	-23.66
Water above structure.....	0.000		0.00	0.00
Water above soil.....	5.438		-11.04	-60.03
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.577		-2.53	-4.00
Saturated soil.....	0.056		-0.76	-0.04
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.379	-2.99	-1.13
Shear (due to delta).....	0.123		-15.00	-1.85
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		11.999	2.25	27.06
Resisting side:				
Effective earth loads.....		-0.445	1.46	-0.65
Balancing earth load.....		-8.886	-2.29	20.34
Water loads.....		-3.047	-2.62	7.99
Foundation:				
Vertical force on base.....	-11.575		-3.87	44.77
Uplift.....	-7.032		-9.51	66.90
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 16.98 degrees

TB15

Normal force on base = 13.665 kips
Shear force on base = 5.118 kips
Max. available shear force = 13.158 kips

Base pressure at x= 11.60 ft from toe = 0.0000 ksf
Base pressure at toe = 1.9952 ksf

Xr (measured from toe) = 3.87 ft
Resultant ratio = 0.2578
Stem ratio = 0.3500
Base in compression = 77.35 %
Overturning ratio = 1.64

Volume of concrete = 2.29 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution did not converge in 30 iterations.
Results of last iteration is printed.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.030	5.161
2	3.775	5.438
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.7480	1.2455		
2			0.0000	1.2455
2			15.0000	0.2075
3	0.0000	0.2075		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 331.04 ft
Point 2 (right), x = 15.00 ft, y = 335.62 ft

Depth of cracking = 0.99 ft

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	-46.679	10.960	4.824	10.960	10.924

TB15

2	16.979	15.684	16.587	15.684	11.394
3	42.241	6.515	1.345	2.797	0.290

Wedge number	Net force (kips)
1	-7.264
2	5.209
3	2.012
SUM =	-0.043

```
+-----------------------------+
| Factor of safety =    4.942 |
+-----------------------------+
```

```
************************
**  Bearing Results   **
************************

            Base width =     15.684 (ft)
                    Xr =      3.868 (ft)
  Effective base width =      8.088 (ft)
   (measured along slope)
            Base slope =    16.9791 (deg)

                   Phi =     27.000 (deg)
                     C =      0.228 (ksf)
       Effective Gamma =     0.0666 (kcf)

           Normal load =     13.665 (kips)
      Load inclination =     20.533 (deg)
     Load eccentricity =      3.798 (ft)

             Surcharge =     0.4427 (kips)
             Embedment =      4.380 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1768	1.0884	1.0884
Inclination	0.5958	0.5958	0.0574
Base Tilt	0.6979	0.7208	0.7208
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 5.3097 (ksf)

```
+-------------------------------+
| Factor of safety =      3.142 |
+-------------------------------+
```

TB17

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.41.16

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	14.54 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.04 ft
Dist. of batter at bot. of stem (TBSR)	=	0.27 ft
Depth of heel (THEEL)	=	7.58 ft
Distance of batter for heel (BTRH)	=	0.13 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	6.48 ft
Distance of batter for toe (BTRT)	=	0.96 ft
Width of base (BWIDTH)	=	18.00 ft
Depth of key (HK)	=	5.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.42 ft

Structure coordinates:

x (ft)	y (ft)
0.00	328.75
0.00	336.33
9.48	336.46
9.75	351.00
11.25	351.00
11.52	336.46
18.00	335.50
18.00	334.00
2.92	334.42
1.50	328.75

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	337.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB17

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1490.51	337.00
2	9.49	337.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	337.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	11.51	337.00
2	511.51	337.00

Foundation property data:
phi for soil-structure interface = 27.00 (deg)
c for soil-structure interface = 0.228 (ksf)
phi for soil-soil interface = 27.00 (deg)
c for soil-soil interface = 0.285 (ksf)

Water data:
Driving side elevation = 351.00 ft
Resisting side elevation = 334.50 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.33
Overturning = 75.00% base in compression

Crack options:
o Crack *is* down to bottom of heel
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****

*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 78.20 %
Overturning ratio = 1.66

TB17

```
Xr (measured from toe) =   4.69 ft
Resultant ratio        = 0.2607
Stem ratio             = 0.3600
Base pressure at x=  14.08 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.9094 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.35


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.41.16

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       332.82     1.1344
       328.75     1.2087

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       337.00     0.0000
       332.82     0.0000
       328.75     0.1500

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       334.50     0.0000
       334.00     0.0533
```

328.75	1.1533

Earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	0.0000
334.00	0.1795

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
334.00	2.2735
328.75	2.2735

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.2087
1.50	1.1533
2.92	0.5838
18.00	0.0533

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	11.164		-9.87	-110.22
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.740		-13.43	-9.94
Water above structure.....	0.000		0.00	0.00
Water above soil.....	8.404		-13.19	-110.85
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.840		-2.73	-2.30
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.305	-3.89	-1.19
Shear (due to delta).....	0.099		-18.00	-1.79
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		15.080	2.31	34.90
Resisting side:				
Effective earth loads.....		-0.269	1.00	-0.27
Balancing earth load.....		-11.936	-2.63	31.34
Water loads.....		-3.181	-3.41	10.84
Foundation:				
Vertical force on base.....	-13.439		-4.69	63.06
Uplift.....	-7.808		-12.35	96.41
** Statics Check ** SUMS =	0.000	0.000		0.00

TB17

```
Angle of base        =    16.26 degrees
Normal force on base =   16.243 kips
Shear force on base  =    7.695 kips
Max. available shear force =   16.088 kips

Base pressure at x=  14.08 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.9094 ksf

Xr (measured from toe) =     4.69 ft
Resultant ratio        =   0.2607
Stem ratio             =   0.3600
Base in compression    =    78.20 %
Overturning ratio      =     1.66

Volume of concrete =     2.76 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



***********************
**  Sliding Results  **
***********************

Solution did not converge in 30 iterations.
Results of last iteration is printed.

           Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ================================
     1       0.000       0.000
     2      15.446       8.404
     3       0.000       0.000

  Water pressures on wedges:

             Top      Bottom
    Wedge    press.   press.   x-coord.    press.
    number   (ksf)    (ksf)     (ft)       (ksf)
  ================================================
      1    0.0000    0.0000
      2                          0.0000     1.3884
      2                         18.0000     0.0579
      3    0.0000    0.0579

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   328.75 ft
  Point 2 (right), x =    18.00 ft,   y =   334.00 ft

Depth of cracking =     8.25 ft
Crack extends to bottom of base of structure.

          Failure   Total    Weight    Submerged   Uplift
  Wedge    angle    length  of wedge    length     force
  number   (deg)     (ft)    (kips)      (ft)      (kips)
```

TB17

1	0.000	0.000	0.000	0.000	0.000
2	16.260	18.750	17.790	18.750	13.559
3	39.349	4.732	0.697	0.789	0.023

Wedge number	Net force (kips)
1	0.000
2	-2.419
3	1.669
SUM =	-0.750

```
+-----------------------------+
| Factor of safety =    2.348 |
+-----------------------------+
```

```
************************
**  Bearing Results   **
************************

            Base width =     18.750 (ft)
                    Xr =      4.692 (ft)
  Effective base width =      9.775 (ft)
   (measured along slope)
            Base slope =    16.2602 (deg)

                   Phi =     27.000 (deg)
                     C =      0.228 (ksf)
       Effective Gamma =     0.0666 (kcf)

           Normal load =     16.243 (kips)
      Load inclination =     25.349 (deg)
     Load eccentricity =      4.487 (ft)

             Surcharge =     0.3508 (kips)
             Embedment =      3.000 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1002	1.0501	1.0501
Inclination	0.5160	0.5160	0.0037
Base Tilt	0.7097	0.7317	0.7317
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.9049 (ksf)

```
+-------------------------------+
| Factor of safety =      2.350 |
+-------------------------------+
```

TB18

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.42.11

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	15.50 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.08 ft
Dist. of batter at bot. of stem (TBSR)	=	0.29 ft
Depth of heel (THEEL)	=	8.00 ft
Distance of batter for heel (BTRH)	=	0.08 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	6.88 ft
Distance of batter for toe (BTRT)	=	1.00 ft
Width of base (BWIDTH)	=	19.00 ft
Depth of key (HK)	=	6.00 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.50 ft

Structure coordinates:

x (ft)	y (ft)
0.00	327.42
0.00	335.42
10.04	335.50
10.33	351.00
11.83	351.00
12.12	335.50
19.00	334.50
19.00	333.00
3.00	333.42
1.50	327.42

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	336.27

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB18

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1489.95	336.27
2	10.05	336.27

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	336.27	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	12.11	336.27
2	512.11	336.27

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 333.77 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Satisfied ***
* Overturning *     Required base in comp. =  75.00 %
***************     Actual base in comp.   =  77.59 %
                    Overturning ratio      =   1.65
```

TB18

```
Xr (measured from toe) =   4.91 ft
Resultant ratio        = 0.2586
Stem ratio             = 0.3621
Base pressure at x=  14.74 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.0087 ksf

***********     *** Satisfied ***
* Sliding *     Min. Required =   1.33
***********     Actual FS     =   2.23


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.42.11

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       332.09     1.1799
       327.42     1.2725

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       336.27     0.0000
       332.09     0.0000
       327.42     0.1711

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       333.77     0.0000
       333.00     0.0808
```

327.42	1.2725

Earth pressures:

Elevation (ft)	Pressure (ksf)
336.27	0.0000
333.00	0.1835

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
333.00	2.3613
327.42	2.3613

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.2725
1.50	1.2191
3.00	0.6245
19.00	0.0808

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	12.042		-10.46	-125.95
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.050		-14.06	-14.76
Water above structure.....	0.000		0.00	0.00
Water above soil.....	9.368		-13.90	-130.25
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.110		-2.99	-3.32
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.400	-4.02	-1.61
Shear (due to delta).....	0.130		-19.00	-2.47
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		16.883	2.45	41.42
Resisting side:				
Effective earth loads.....		-0.300	1.09	-0.33
Balancing earth load.....		-13.176	-2.79	36.77
Water loads.....		-3.807	-3.58	13.62
Foundation:				
Vertical force on base.....	-14.807		-4.91	72.77
Uplift.....	-8.894		-12.83	114.12
** Statics Check ** SUMS =	0.000	0.000		0.00

TB18

```
Angle of base        =    16.37 degrees
Normal force on base =   17.920 kips
Shear force on base  =    8.470 kips
Max. available shear force =   17.557 kips

Base pressure at x=  14.74 ft from toe =   0.0000 ksf
Base pressure at toe                   =   2.0087 ksf

Xr (measured from toe) =     4.91 ft
Resultant ratio        =   0.2586
Stem ratio             =   0.3621
Base in compression    =    77.59 %
Overturning ratio      =     1.65

Volume of concrete =     2.97 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



***********************
**  Sliding Results  **
***********************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ==================================
     1       0.000       0.000
     2      17.348       9.368
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ==============================================
      1    0.0000    0.0000
      2                          0.0000     1.4714
      2                         19.0000     0.0883
      3    0.0000    0.0883

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   327.42 ft
  Point 2 (right), x =    19.00 ft,   y =   333.00 ft

Depth of cracking =     8.85 ft
Crack extends to bottom of base of structure.

         Failure   Total    Weight    Submerged   Uplift
  Wedge   angle    length  of wedge    length     force
  number  (deg)     (ft)    (kips)      (ft)      (kips)
  ========================================================
```

TB18

1	0.000	0.000	0.000	0.000	0.000
2	16.367	19.802	19.895	19.802	15.443
3	38.698	5.230	0.848	1.232	0.054

Wedge number	Net force (kips)
1	0.000
2	-2.095
3	2.095
SUM =	0.000

```
+-----------------------------+
| Factor of safety =    2.234 |
+-----------------------------+
```

```
***********************
**  Bearing Results  **
***********************

            Base width =     19.802 (ft)
                    Xr =      4.914 (ft)
  Effective base width =     10.244 (ft)
   (measured along slope)
            Base slope =    16.3666 (deg)

                   Phi =     27.000 (deg)
                     C =      0.228 (ksf)
       Effective Gamma =     0.0666 (kcf)

           Normal load =     17.920 (kips)
      Load inclination =     25.298 (deg)
     Load eccentricity =      4.779 (ft)

             Surcharge =     0.3688 (kips)
             Embedment =      3.270 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1042	1.0521	1.0521
Inclination	0.5168	0.5168	0.0040
Base Tilt	0.7080	0.7301	0.7301
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.0014 (ksf)

```
+-------------------------------+
| Factor of safety =      2.287 |
+-------------------------------+
```

TB20

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.42.55

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	17.83 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.17 ft
Dist. of batter at bot. of stem (TBSR)	=	0.33 ft
Depth of heel (THEEL)	=	8.83 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	7.67 ft
Distance of batter for toe (BTRT)	=	1.08 ft
Width of base (BWIDTH)	=	21.00 ft
Depth of key (HK)	=	6.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.67 ft

Structure coordinates:

x (ft)	y (ft)
0.00	324.34
0.00	333.17
11.16	333.17
11.50	351.00
13.00	351.00
13.33	333.17
21.00	332.09
21.00	330.59
3.17	331.01
1.50	324.34

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	334.27

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB20

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1488.82	334.27
2	11.18	334.27

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	334.27	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	13.31	334.27
2	513.31	334.27

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 331.77 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Not Satisfied ***
* Overturning *     Required base in comp. =  75.00 %
***************     Actual base in comp.   =  71.87 %
                    Overturning ratio      =   1.60
```

TB20

```
  To increase stability try one or a combination
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add/remove key

Xr (measured from toe) =   5.03 ft
Resultant ratio        = 0.2396
Stem ratio             = 0.3652
Base pressure at x=  15.09 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.3702 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.00


********************** Output Results **********************

Date: 2009/11/ 6                                Time: 15.42.55

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       330.09     1.3047
       324.34     1.4243

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       334.27     0.0000
       330.09     0.0000
       324.34     0.2144

** Resisting side pressures **
```

Water pressures:

Elevation (ft)	Pressure (ksf)
331.77	0.0000
330.59	0.1227
324.34	1.4243

Earth pressures:

Elevation (ft)	Pressure (ksf)
334.27	0.0000
330.59	0.1895

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
330.59	2.6958
324.34	2.6958

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.4243
1.50	1.3722
3.17	0.7168
21.00	0.1227

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	13.988		-11.61	-162.36
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.585		-15.41	-24.43
Water above structure.....	0.000		0.00	0.00
Water above soil.....	11.839		-15.33	-181.48
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.599		-3.42	-5.46
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.617	-4.33	-2.67
Shear (due to delta).....	0.200		-21.00	-4.21
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		21.488	2.86	61.45
Resisting side:				
Effective earth loads.....		-0.349	1.23	-0.43
Balancing earth load.....		-16.849	-3.12	52.65

```
                                                TB20
  Water loads................                  -4.907      -3.94     19.32
Foundation:
  Vertical force on base.....  -17.885                    -5.03     89.98
  Uplift....................   -11.326                   -13.92    157.65
=====================================================================
** Statics Check **   SUMS =     0.000      0.000                   0.00

Angle of base        =    16.57 degrees
Normal force on base =   21.948 kips
Shear force on base  =   11.047 kips
Max. available shear force =   20.901 kips

Base pressure at x=  15.09 ft from toe =   0.0000 ksf
Base pressure at toe                   =   2.3702 ksf

Xr (measured from toe) =     5.03 ft
Resultant ratio        =   0.2396
Stem ratio             =   0.3652
Base in compression    =    71.87 %
Overturning ratio      =     1.60

Volume of concrete =     3.45 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



**********************
**  Sliding Results  **
**********************

Solution converged.  Summation of forces = 0.

           Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ================================
     1       0.000       0.000
     2      22.176      11.839
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ================================================
      1    0.0000    0.0000
      2                         0.0000     1.6636
      2                        21.0000     0.1350
      3    0.0000    0.1350

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   324.34 ft
  Point 2 (right), x =    21.00 ft,   y =   330.59 ft
```

TB20

Depth of cracking = 9.93 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	0.000	0.000	0.000	0.000	0.000
2	16.574	21.910	24.284	21.910	19.703
3	37.901	5.991	1.106	1.921	0.130

Wedge number	Net force (kips)
1	0.000
2	-2.725
3	2.724
SUM =	-0.001

+----------+
| Factor of safety = 1.999 |
+----------+

****
** Bearing Results **
****

Base width =	21.910	(ft)
Xr =	5.031	(ft)
Effective base width = (measured along slope)	10.497	(ft)
Base slope =	16.5740	(deg)
Phi =	27.000	(deg)
C =	0.228	(ksf)
Effective Gamma =	0.0666	(kcf)
Normal load =	21.948	(kips)
Load inclination =	26.716	(deg)
Load eccentricity =	5.706	(ft)
Surcharge =	0.3961	(kips)
Embedment =	3.680	(ft)
Ground slope =	0.0000	(deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1144	1.0572	1.0572
Inclination	0.4944	0.4944	0.0001
Base Tilt	0.7046	0.7269	0.7269
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.9555 (ksf)

+----------+

TB20

```
| Factor of safety =      1.892 |
+-------------------------------+
```

TB2-14

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.43.42

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.80 ft
Height of stem (HTS)	=	11.67 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.92 ft
Dist. of batter at bot. of stem (TBSR)	=	0.21 ft
Depth of heel (THEEL)	=	6.33 ft
Distance of batter for heel (BTRH)	=	0.25 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	4.88 ft
Distance of batter for toe (BTRT)	=	0.83 ft
Width of base (BWIDTH)	=	14.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.55
0.00	338.88
7.20	339.13
7.41	350.80
8.91	350.80
9.12	339.13
14.00	338.30
14.00	336.80
2.67	337.22
1.50	332.55

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.131	16.67	340.60

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB2-14

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.77	340.60
2	7.23	340.60

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.131	340.60	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.09	340.60
2	509.09	340.60

Foundation property data:
phi for soil-structure interface = 28.00 (deg)
c for soil-structure interface = 0.180 (ksf)
phi for soil-soil interface = 28.00 (deg)
c for soil-soil interface = 0.225 (ksf)

Water data:
Driving side elevation = 350.80 ft
Resisting side elevation = 338.10 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.33
Overturning = 75.00% base in compression

Crack options:
o Crack *is* down to bottom of heel
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
****************     *** Satisfied ***
* Overturning *     Required base in comp. =  75.00 %
****************     Actual base in comp.   =  84.42 %
                     Overturning ratio      =   1.74
```

TB2-14

```
Xr (measured from toe) =   3.94 ft
Resultant ratio        = 0.2814
Stem ratio             = 0.3486
Base pressure at x=  11.82 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.7444 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   3.39


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.43.42

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -53.5517
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4149
  Driving side at rest Kc   =   0.5880
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.25 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.80     0.0000
       337.35     0.8390
       332.55     0.9552

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       340.60     0.0000
       337.35     0.0000
       332.55     0.1804

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       338.10     0.0000
       336.80     0.1308
```

332.55	0.9077

Earth pressures:

Elevation (ft)	Pressure (ksf)
340.60	0.0000
336.80	0.1934

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
336.80	1.8175
332.55	1.8175

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	0.9552
1.50	0.9077
2.67	0.4638
14.00	0.1308

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	8.383		-7.60	-63.73
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.507		-10.49	-15.80
Water above structure.....	0.000		0.00	0.00
Water above soil.....	4.658		-10.34	-48.17
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.198		-2.27	-2.72
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.433	-2.65	-1.15
Shear (due to delta).....	0.130		-14.00	-1.82
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		9.951	2.03	20.21
Resisting side:				
Effective earth loads.....		-0.367	1.27	-0.46
Balancing earth load.....		-7.725	-2.13	16.42
Water loads.....		-2.292	-2.54	5.82
Foundation:				
Vertical force on base.....	-10.308		-3.94	40.61
Uplift.....	-5.568		-9.12	50.77
** Statics Check ** SUMS =	0.000	0.000		0.00

TB2-14

```
Angle of base        =    16.89 degrees
Normal force on base =   12.108 kips
Shear force on base  =    4.397 kips
Max. available shear force =   11.297 kips

Base pressure at x=  11.82 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.7444 ksf

Xr (measured from toe) =     3.94 ft
Resultant ratio        =   0.2814
Stem ratio             =   0.3486
Base in compression    =    84.42 %
Overturning ratio      =     1.74

Volume of concrete =     2.07 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



***********************
**  Sliding Results  **
***********************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ==================================
     1       0.000       0.000
     2      10.392       4.658
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ==================================================
      1    0.0000    0.0000
      2                          0.0000     1.1388
      2                         14.0000     0.1458
      3    0.0000    0.1458

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   332.55 ft
  Point 2 (right), x =    14.00 ft,   y =   336.80 ft

Depth of cracking =     8.05 ft
Crack extends to bottom of base of structure.

          Failure   Total    Weight    Submerged   Uplift
  Wedge    angle    length  of wedge    length     force
  number   (deg)     (ft)    (kips)      (ft)      (kips)
  ========================================================
```

TB2-14

1	0.000	0.000	0.000	0.000	0.000
2	16.887	14.631	14.169	14.631	9.397
3	40.697	5.828	1.092	1.994	0.145

Wedge number	Net force (kips)
1	0.000
2	-1.839
3	1.840
SUM =	0.000

```
+-----------------------------+
| Factor of safety =    3.387 |
+-----------------------------+
```

```
************************
**  Bearing Results   **
************************

            Base width =     14.631 (ft)
                    Xr =      3.940 (ft)
  Effective base width =      8.234 (ft)
   (measured along slope)
            Base slope =    16.8868 (deg)

                   Phi =     28.000 (deg)
                     C =      0.180 (ksf)
       Effective Gamma =     0.0686 (kcf)

           Normal load =     12.108 (kips)
      Load inclination =     19.959 (deg)
     Load eccentricity =      3.198 (ft)

             Surcharge =     0.4142 (kips)
             Embedment =      3.800 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1536	1.0768	1.0768
Inclination	0.6056	0.6056	0.0825
Base Tilt	0.6901	0.7111	0.7111
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 5.0744 (ksf)

```
+-------------------------------+
| Factor of safety =      3.451 |
+-------------------------------+
```

TB2-15

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.44.21

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.80	ft
Height of stem (HTS)	=	12.63	ft
Thickness top of stem (TTS)	=	1.50	ft
Thickness bottom of stem (TBS)	=	1.96	ft
Dist. of batter at bot. of stem (TBSR)	=	0.23	ft
Depth of heel (THEEL)	=	6.75	ft
Distance of batter for heel (BTRH)	=	0.21	ft
Depth of toe (TTOE)	=	1.50	ft
Width of toe (TWIDTH)	=	5.27	ft
Distance of batter for toe (BTRT)	=	0.88	ft
Width of base (BWIDTH)	=	15.00	ft
Depth of key (HK)	=	5.00	ft
Width of bottom of key (TK)	=	1.50	ft
Dist. of batter at bot. of key (BTRK)	=	1.25	ft

Structure coordinates:

x (ft)	y (ft)
0.00	331.21
0.00	337.96
7.77	338.17
8.00	350.80
9.50	350.80
9.73	338.17
15.00	337.29
15.00	335.79
2.75	336.21
1.50	331.21

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.131	18.67	339.20

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB2-15

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.21	339.20
2	7.79	339.20

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.131	339.20	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.71	339.20
2	509.71	339.20

Foundation property data:
phi for soil-structure interface = 28.00 (deg)
c for soil-structure interface = 0.180 (ksf)
phi for soil-soil interface = 28.00 (deg)
c for soil-soil interface = 0.225 (ksf)

Water data:
Driving side elevation = 350.80 ft
Resisting side elevation = 336.70 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.33
Overturning = 75.00% base in compression

Crack options:
o Crack *is* down to bottom of heel
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Satisfied ***
* Overturning *     Required base in comp. =  75.00 %
***************     Actual base in comp.   =  79.57 %
                    Overturning ratio      =   1.71
```

TB2-15

```
Xr (measured from toe) =   3.98 ft
Resultant ratio        = 0.2652
Stem ratio             = 0.3513
Base pressure at x=  11.94 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.8844 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.71


********************** Output Results **********************

Date: 2009/11/ 6                                Time: 15.44.21

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -53.5517
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4061
  Driving side at rest Kc   =   0.5756
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.25 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.80     0.0000
       335.95     0.9264
       331.21     1.0268

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       339.20     0.0000
       335.95     0.0000
       331.21     0.1837

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       336.70     0.0000
       335.79     0.0943
```

331.21	1.0268

Earth pressures:

Elevation (ft)	Pressure (ksf)
339.20	0.0000
335.79	0.1856

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
335.79	1.9691
331.21	1.9691

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0268
1.50	0.9755
2.75	0.4873
15.00	0.0943

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.197		-8.17	-75.17
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.157		-11.23	-12.99
Water above structure.....	0.000		0.00	0.00
Water above soil.....	5.714		-11.05	-63.16
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.008		-2.38	-2.40
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.436	-3.00	-1.31
Shear (due to delta).....	0.147		-15.00	-2.21
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		11.510	2.15	24.73
Resisting side:				
Effective earth loads.....		-0.317	1.13	-0.36
Balancing earth load.....		-9.019	-2.29	20.65
Water loads.....		-2.610	-2.87	7.49
Foundation:				
Vertical force on base.....	-11.245		-3.98	44.74
Uplift.....	-5.978		-10.03	59.97
** Statics Check ** SUMS =	0.000	0.000		0.00

```
Angle of base        =    16.98 degrees
Normal force on base =   13.389 kips
Shear force on base  =    5.342 kips
Max. available shear force =   12.477 kips

Base pressure at x=  11.94 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.8844 ksf

Xr (measured from toe) =     3.98 ft
Resultant ratio        =   0.2652
Stem ratio             =   0.3513
Base in compression    =    79.57 %
Overturning ratio      =     1.71

Volume of concrete =     2.27 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



**********************
**  Sliding Results  **
**********************

Solution did not converge in 30 iterations.
Results of last iteration is printed.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ================================
     1       0.000       0.000
     2      11.974       5.714
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ================================================
      1    0.0000    0.0000
      2                         0.0000     1.2224
      2                        15.0000     0.1050
      3    0.0000    0.1050

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   331.21 ft
  Point 2 (right), x =    15.00 ft,   y =   335.79 ft

Depth of cracking =     7.99 ft
Crack extends to bottom of base of structure.

          Failure   Total    Weight    Submerged   Uplift
  Wedge    angle    length  of wedge    length     force
  number   (deg)     (ft)    (kips)      (ft)      (kips)
```

TB2-15

1	0.000	0.000	0.000	0.000	0.000
2	16.979	15.684	14.958	15.684	10.410
3	39.760	5.332	0.909	1.423	0.075

Wedge number	Net force (kips)
1	0.000
2	-1.858
3	1.756
SUM =	-0.103

```
+-----------------------------+
| Factor of safety =    2.712 |
+-----------------------------+
```

```
************************
**  Bearing Results   **
************************

            Base width =     15.684 (ft)
                    Xr =      3.978 (ft)
  Effective base width =      8.319 (ft)
   (measured along slope)
            Base slope =    16.9791 (deg)

                   Phi =     28.000 (deg)
                     C =      0.180 (ksf)
       Effective Gamma =     0.0686 (kcf)

           Normal load =     13.389 (kips)
      Load inclination =     21.750 (deg)
     Load eccentricity =      3.682 (ft)

             Surcharge =     0.3874 (kips)
             Embedment =      3.410 (ft)
           Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1364	1.0682	1.0682
Inclination	0.5751	0.5751	0.0498
Base Tilt	0.6885	0.7097	0.7097
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.5279 (ksf)

```
+-----------------------------+
| Factor of safety =      2.813 |
+-----------------------------+
```

TB2-19

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.45.13

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.60 ft
Height of stem (HTS)	=	16.46 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.13 ft
Dist. of batter at bot. of stem (TBSR)	=	0.31 ft
Depth of heel (THEEL)	=	8.42 ft
Distance of batter for heel (BTRH)	=	0.04 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	7.27 ft
Distance of batter for toe (BTRT)	=	1.04 ft
Width of base (BWIDTH)	=	20.00 ft
Depth of key (HK)	=	6.33 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.58 ft

Structure coordinates:

x (ft)	y (ft)
0.00	325.68
0.00	334.10
10.60	334.14
10.92	350.60
12.42	350.60
12.73	334.14
20.00	333.10
20.00	331.60
3.08	332.01
1.50	325.68

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.131	16.67	334.60

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB2-19

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1489.39	334.60
2	10.61	334.60

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.131	334.60	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	12.72	334.60
2	512.72	334.60

Foundation property data:
phi for soil-structure interface = 28.00 (deg)
c for soil-structure interface = 0.180 (ksf)
phi for soil-soil interface = 28.00 (deg)
c for soil-soil interface = 0.225 (ksf)

Water data:
Driving side elevation = 350.60 ft
Resisting side elevation = 332.10 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.33
Overturning = 75.00% base in compression

Crack options:
o Crack depth is to be calculated
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

**********	*** Satisfied ***	
* Overturning *	Required base in comp.	= 75.00 %
**********	Actual base in comp.	= 77.54 %
	Overturning ratio	= 1.67

TB2-19

```
Xr (measured from toe) =   5.17 ft
Resultant ratio        = 0.2585
Stem ratio             = 0.3635
Base pressure at x=  15.51 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.1023 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.65


********************** Output Results **********************

Date: 2009/11/ 6                                Time: 15.45.13

***************************
**  Overturning Results  **
***************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -53.5517
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4149
  Driving side at rest Kc   =   0.5880
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.25 ft

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.60     0.0000
       331.35     1.2009
       325.68     1.3127

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       334.60     0.0000
       331.35     0.0000
       325.68     0.2355

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       332.10     0.0000
       331.60     0.0526
       325.68     1.3127
```

Earth pressures:

Elevation (ft)	Pressure (ksf)
334.60	0.0000
331.60	0.1793

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
331.60	2.5393
325.68	2.5393

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.3127
1.50	1.2591
3.08	0.6312
20.00	0.0526

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	12.967		-11.04	-143.17
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.667		-14.77	-9.85
Water above structure.....	0.000		0.00	0.00
Water above soil.....	10.747		-14.62	-157.10
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.926		-2.99	-2.77
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.668	-4.03	-2.69
Shear (due to delta).....	0.200		-20.00	-4.00
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		18.688	2.62	49.01
Resisting side:				
Effective earth loads.....		-0.269	1.00	-0.27
Balancing earth load.....		-15.033	-2.96	44.49
Water loads.....		-4.054	-3.86	15.64
Foundation:				
Vertical force on base.....	-16.301		-5.17	84.26
Uplift.....	-9.207		-13.74	126.46
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 16.49 degrees

```
Normal force on base =   19.897 kips
Shear force on base  =    9.788 kips
Max. available shear force =   18.574 kips

Base pressure at x=  15.51 ft from toe =   0.0000 ksf
Base pressure at toe                   =   2.1023 ksf

Xr (measured from toe) =     5.17 ft
Resultant ratio        =   0.2585
Stem ratio             =   0.3635
Base in compression    =    77.54 %
Overturning ratio      =     1.67

Volume of concrete =     3.20 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



***********************
**  Sliding Results  **
***********************

Solution did not converge in 30 iterations.
Results of last iteration is printed.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)       (kips)
  ==================================
     1       0.078       7.021
     2       7.987      10.747
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ==================================================
      1    1.0973    1.5550
      2                          0.0000     1.5550
      2                         20.0000     0.0582
      3    0.0000    0.0582

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   325.68 ft
  Point 2 (right), x =    20.00 ft,   y =   331.60 ft

Depth of cracking =     1.59 ft

          Failure   Total    Weight    Submerged   Uplift
  Wedge    angle    length  of wedge    length     force
  number   (deg)     (ft)    (kips)      (ft)      (kips)
  ==========================================================
     1   -46.205    10.162      4.839   10.162    13.476
```

TB2-19

2	16.489	20.858	21.036	20.858	16.824
3	39.611	4.705	0.707	0.784	0.023

Wedge number	Net force (kips)
1	-8.728
2	6.952
3	1.475
SUM =	-0.301

```
+----------------------------+
| Factor of safety =    2.647 |
+----------------------------+
```

```
***********************
**  Bearing Results  **
***********************

            Base width =     20.858 (ft)
                    Xr =      5.169 (ft)
  Effective base width =     10.782 (ft)
   (measured along slope)
            Base slope =    16.4888 (deg)

                   Phi =     28.000 (deg)
                     C =      0.180 (ksf)
       Effective Gamma =     0.0686 (kcf)

           Normal load =     19.897 (kips)
      Load inclination =     26.194 (deg)
     Load eccentricity =      5.038 (ft)

             Surcharge =     0.3593 (kips)
             Embedment =      3.000 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.0926	1.0463	1.0463
Inclination	0.5026	0.5026	0.0042
Base Tilt	0.6968	0.7174	0.7174
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.6499 (ksf)

```
+-----------------------------+
| Factor of safety =      1.978 |
+-----------------------------+
```

TB2-22

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.46.14

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.30 ft
Height of stem (HTS)	=	19.25 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.25 ft
Dist. of batter at bot. of stem (TBSR)	=	0.38 ft
Depth of heel (THEEL)	=	3.92 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	8.88 ft
Distance of batter for toe (BTRT)	=	1.25 ft
Width of base (BWIDTH)	=	24.00 ft
Depth of key (HK)	=	1.58 ft
Width of bottom of key (TK)	=	2.83 ft
Dist. of batter at bot. of key (BTRK)	=	3.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	327.13
0.00	331.05
12.87	331.05
13.24	350.30
14.74	350.30
15.12	331.05
24.00	329.80
24.00	328.30
6.00	328.71
2.83	327.13

NOTE: X=0 is located at the left-hand side of the structure. The Y values correspond to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.132	16.67	333.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB2-22

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1487.09	333.00
2	12.91	333.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.132	333.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	15.08	333.00
2	515.08	333.00

Foundation property data:
phi for soil-structure interface = 28.00 (deg)
c for soil-structure interface = 0.180 (ksf)
phi for soil-soil interface = 28.00 (deg)
c for soil-soil interface = 0.225 (ksf)

Water data:
Driving side elevation = 350.30 ft
Resisting side elevation = 330.50 ft
Unit weight of water = 0.0624 kcf
Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
Sliding FS = 1.33
Overturning = 75.00% base in compression

Crack options:
o Crack *is* down to bottom of heel
o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

```
***************     *** Satisfied ***
* Overturning *     Required base in comp. =  75.00 %
***************     Actual base in comp.   =  81.50 %
                    Overturning ratio      =   1.32
```

TB2-22

```
Xr (measured from toe) =   6.52 ft
Resultant ratio        = 0.2717
Stem ratio             = 0.3700
Base pressure at x=  19.56 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.7622 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   1.43


********************** Output Results **********************

Date: 2009/11/ 6                                Time: 15.46.14

****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF          = -54.5578
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4125
  Driving side at rest Kc   =   0.5839
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.22 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.30     0.0000
       329.78     1.2803
       327.13     1.3323

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       333.00     0.0000
       329.78     0.0000
       327.13     0.0969

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       330.50     0.0000
       328.30     0.2314
```

327.13	1.3323

Earth pressures:

Elevation (ft)	Pressure (ksf)
333.00	0.0000
328.30	0.2037

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
328.30	12.8885
327.13	12.8885

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.3323
2.83	1.2130
6.00	0.9650
24.00	0.2314

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	14.605		-12.24	-178.83
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	3.318		-17.56	-58.24
Water above structure.....	0.000		0.00	0.00
Water above soil.....	14.113		-17.46	-246.46
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	2.751		-4.29	-11.80
Saturated soil.....	0.230		-1.66	-0.38
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.129	-0.29	-0.04
Shear (due to delta).....	0.039		-24.00	-0.92
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		16.599	6.62	109.81
Resisting side:				
Effective earth loads.....		-0.479	1.57	-0.75
Balancing earth load.....		-15.080	-0.58	8.81
Water loads.....		-1.169	-0.40	0.47
Foundation:				
Vertical force on base.....	-17.234		-6.52	112.37
Uplift.....	-17.822		-14.92	265.96
** Statics Check ** SUMS =	0.000	0.000		0.00

```
Angle of base        =     2.79 degrees
Normal force on base =   17.948 kips
Shear force on base  =   14.223 kips
Max. available shear force =   15.876 kips

Base pressure at x=  19.56 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.7622 ksf

Xr (measured from toe) =     6.52 ft
Resultant ratio        =   0.2717
Stem ratio             =   0.3700
Base in compression    =    81.50 %
Overturning ratio      =     1.32

Volume of concrete =     3.61 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



**********************
**  Sliding Results  **
**********************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)      (kips)
  ================================
     1       0.000       0.000
     2      16.750      14.113
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
   number   (ksf)    (ksf)     (ft)       (ksf)
  ==============================================
     1    0.0000    0.0000
     2                          0.0000     1.4458
     2                         24.0000     0.2409
     3    0.0000    0.2409

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   327.13 ft
  Point 2 (right), x =    24.00 ft,   y =   328.30 ft

Depth of cracking =     5.87 ft
Crack extends to bottom of base of structure.

          Failure   Total    Weight    Submerged   Uplift
  Wedge    angle    length  of wedge    length     force
  number   (deg)     (ft)    (kips)      (ft)      (kips)
  ========================================================
```

TB2-22

1	0.000	0.000	0.000	0.000	0.000
2	2.791	24.029	22.648	24.029	20.265
3	34.840	8.227	2.070	3.851	0.464

Wedge number	Net force (kips)
1	0.000
2	-4.828
3	4.828
SUM =	0.000

```
+-----------------------------+
| Factor of safety =    1.430 |
+-----------------------------+
```

```
************************
**  Bearing Results   **
************************

            Base width =     24.029 (ft)
                    Xr =      6.520 (ft)
  Effective base width =     13.056 (ft)
   (measured along slope)
            Base slope =     2.7910 (deg)

                   Phi =     28.000 (deg)
                     C =      0.180 (ksf)
       Effective Gamma =     0.0696 (kcf)

           Normal load =     17.948 (kips)
      Load inclination =     38.394 (deg)
     Load eccentricity =      5.486 (ft)

             Surcharge =     0.4781 (kips)
             Embedment =      4.700 (ft)
          Ground slope =     0.0000 (deg)
```

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1198	1.0599	1.0599
Inclination	0.3288	0.3288	0.0000
Base Tilt	0.9451	0.9489	0.9489
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.7853 (ksf)

```
+-------------------------------+
| Factor of safety =      2.754 |
+-------------------------------+
```

OHIO RIVER SHORELINE, PADUCAH, KENTUCKY LFPP RECONSTRUCTION FEASIBILITY REPORT VOLUME 4 APPENDIX C

SECTION 4 AS-BUILT DRAWINGS

April 2011
Final Submittal

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93312.2	1	GENERAL PLAN	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	2.1	CONCRETE & BUTRESS DAM	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	3	CASE 1,CASE 2,SECTION C-C,SECTION D-D & MOTOR FLR	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	4	BORINGS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	5	CELLULAR SHEET PILE DAM	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	6	TEST PITS - PLAN	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	7	ROLLED FILL LEVEE, CONC. CULVRTS & SEPRT PUMP PLNT	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	8	PLAN AND ELEVATION	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	9	PLAN AND ELEVATION	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	10	PLAN AND ELEVATION	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	A	ISLND CRK DAM-SLAB & BUTTRESS TYPE STABLTY ANALYS.	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	B	ISLAND CREEK DAM - EARTH DAM ANALYSIS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.3	0	TITLE SHEET	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	1	GENERAL PLAN	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	2	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	3	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	4	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	5	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	6	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	7	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	8	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	9	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	10	BORINGS (DELETED)	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	11	BORINGS (DELETED)	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	12	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	13	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	14	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	15	PLAN, PROFILE 7 SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	16	"I" WALL DETAILS & MONOLITHS NO. 165	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	17	MISC. PIPES THRU WALL	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	18	DESIGN DATA STA. 72+50	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	19	SERVICE OPENINGS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	20	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS STA. NOS. 1, 429 & 12
93312.3	21	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 2 & 3
93312.3	22	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 10 & 11
93312.3	23	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 13
93312.3	24	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 14
93312.3	25	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 15, 17, 18 & 19
93312.3	26	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 16
93312.3	27	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 101
93312.3	28	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 102 TO 105
93312.3	29	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 106
93312.3	30	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 286 TO 289
93312.3	31	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 290

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93312.3	32	DESIGN DATA - 18 FT. "T" WALL	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	33	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 157
93312.3	34	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 158 TO 164
93312.3	35	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 166 TO 169 & 215 TO 227
93312.3	36	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 124 & 125
93312.3	37	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 126-137,170,171,174,207-214 & 228-234
93312.3	38	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 172 & 173
93312.3	39	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 119
93312.3	40	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 120-123,175-181,198-203,206,264-252 & 255-259
93312.3	41	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 204 & 205
93312.3	42	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 245
93312.3	43	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 246
93312.3	44	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 253
93312.3	45	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 254
93312.3	46	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 96
93312.3	47	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 97 TO 100 & 107
93312.3	48	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 108-112,138-140,142,182,183,260-270 & 273
93312.3	49	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 113 TO 117, 141 & 272
93312.3	50	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 118
93312.3	51	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 184 & 275
93312.3	52	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 242 & 271
93312.3	53	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 274
93312.3	54	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 20
93312.3	55	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 21, 22 & 23
93312.3	56	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 85, 86, 90 & 91
93312.3	57	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 87 TO 89 & 92 TO 94
93312.3	58	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 95
93312.3	59	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 24 TO 26, 44 TO 68, 70, 72 TO 74 & 77
93312.3	60	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 69 & 78
93312.3	61	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 75 & 76
93312.3	62	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 71
93312.3	63	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 79 TO 84
93312.3	64	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 27 TO 31
93312.3	65	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 32 & 35 TO 43
93312.3	66	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 33 & 34
93312.3	67	MISCELLANEOUS DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	68	DESIGN DATA STA. 29+80.3,31+01.3,30+40.0 & 36+84.5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	69	MVBLE CLOSRS STA. 4+49.5 & 5+34.5 - MASONRY DETS &	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT STA. 4+00.0
93312.3	70	REINFORCING DETAILS STA. 4+49.5 & STA. 5+34.5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILLS & ABUTMENTS
93312.3	71	REINFORCING DETAILS STAS. 4+00.0 & 83.28.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	72	MOVABLE CLOSURES STA. 9+44.0 & 10+40.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	73	REINFORCING DETAILS STA. 9+44.0 & 10+40.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	74	REINFORCINC DETALS STA. 10+40.0--STORAGE VAULT	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	75	MASONRY DETAILS--MOVABLE CLOSURE STA. 25+15.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93312.3	76	REINFORCING DETAILS STA. 25+15.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	77	MASONRY DETAILS--STORAGE VAULT STA. 26+02.29	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	78	REINFORCING DETIALS STA. 26+02.29--STORAGE VAULT	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	79	MASONRY DETAILS--MOVABLE CLOSURE STA. 26+90.3	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	80	REINFORCING DETAILS STA. 26+90.3--SILL & ABUTMENTS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	81	MOVABLE CLOSRS STAS. 29+80.3,31+01.3 & 36+84.544 &	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS STAS. 30+32.8 & 36+40.0--MASONRY DETAILS
93312.3	82	REINFORCING DETAILS STA. 29+80.3,31+01.3 & 36+84.5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	83	REINFORCING DETAILS STA. 30+32.8 & STA. 36+40.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	84	MOVABLE CLOSURES STA. 31+51.4, 71+74.5 & 75+85.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	85	REINFORCING DETAILS STA. 31+51.4,71+74.5 & 75+85.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	86	REINFORCING DETAILS STA. 31+51.4,71+74.5 & 75+85.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	87	MOVABLE CLOSURES STAS. 51+87.3 & 54+37.6	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	88	REINFORCING DETAILS STAS. 51+87.3 & 54+37.6	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL, ABUTMENT & STORAGE VAULT
93312.3	89	MASONRY DETAILS--MOVABLE CLOSURE STA. 62+84.3	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	90	REINFORCING DETAILS STA. 62+84.3--SILL & ABUTMENTS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	91	REINFORCING DETAILS STA. 62+84.3--"T" WALL	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	92	MASONRY DETAILS--STORAGE VAULT STA. 68+61.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	93	REINFORCING DETAILS STA. 62+84.3 & STA. 68+61.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	94	MOVABLE CLOSURES STAS. 67+73.4 & 69+64.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	95	REINFORCING DETAILS STA. 67+73.4 & 69+64.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	96	MASONRY DETAILS--MOVABLE CLOSURE STA. 83+92.1 &	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT STA. 83+28.1
93312.3	97	REINFORCING DETAILS STA. 83+92.1--SILL & ABUTMENTS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	98	TRUSS ANCHORAGE DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	99	MISCELLANEOUS DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	100	MISCELLANEOUS DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	101	CATCH BASINS NOS. 1 & 5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	102	CATCH BASIN NO. 2	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	103	CATCH BASINS NOS. 4 & 6 & DRAINAGE STR STA. 64+87	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	104	MANHOLE NO. 1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	105	MANHOLE NO. 2	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	106	MANHOLE NO. 3	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	107	MANHOLE NO. 4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	108	MANHOLE NO. 5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	109	MANHOLE NO. 6	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	110	DRAINAGE STRUCTURE STA. 19+11	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	111	REINFORCING DETAILS STA. 19+11	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	112	SEWER OUTLET & DRAINAGE STRUCTURE DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.5	1	LOCATION PLAN, SITE PLAN & INDEX	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	2	SITE PLANS, MANHOLES NOS. 3A AND 4A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	3	SITE PLANS, MANHOLE NOS. 6A AND 7A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	4	SITE PLANS, MANHOLE NOS. 15A AND 16A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	5	SITE PLANS, MANHOLE NOS. 2A AND 8A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	6	SITE PLANS AND MANHOLE NO. 5A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93314.1	1	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93314.1	2	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	3	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	4	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	5	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	6	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	7	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	8	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	9	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	10	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	11	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	12	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	13	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93412.1	1P	PLAN & VICINITY MAP	LFPP	PADUCAH, KENTUCKY	
93412.1	2P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	3P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	4P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	5P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	6P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	7P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	8P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	9P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	10P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	11P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	12P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	13A-P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	13P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	14P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	15P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	16P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	17P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	18P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	19P	TYPICAL SECTIONS	LFPP	PADUCAH, KENTUCKY	
93412.2	0	TITLE SHEET	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	1	PADUCAH, KENTUCKY GENERAL MAP	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	2	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	4.1	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	5	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	6	TYPICAL SECTIONS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	7	DRAINAGE STRUCTURE STA. 84+00	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	8	DRAINAGE STRUCTURE STA. 111+67	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	9	REINFORCING DETAILS STA. 111+67	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	10	DRAINAGE STRUCTURE STA. 130+00	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	11	DRAINAGE STRUCTURE STA. 147+25	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	12	DRAINAGE STRUCTURE STA. 151+25	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.2	13	DRAINAGE STRUCTURE STA. 157+63	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	14	REINFORCING DETAILS STA. 157+63	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	17.1	HIGHWAY RAMP DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	25	MOVABLE CLOSURE STA. 140+50.8 - MASONRY DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	26	SILL & ABUTMENT WALLS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	27	WING WALLS & SEEPAGE CUT-OFF WALLS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	28	STORAGE VAULT	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	0	TITLE SHEET	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	1	PADUCAH, KENTUCKY GENERAL MAP	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	2	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	3	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	4	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	5	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	6	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	7	TYPICAL SECTIONS	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	11	DRAINAGE STRUCTURE STA. 32+12	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	12	REINFORCING DETAILS STA. 32+12	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	13	GATE OPERATING TOWER DETAILS STA. 32+12	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	14	DRAINAGE STRUCTURE STA. 51+28	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	15	DRAINAGE STRUCTURE STA. 92+70	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	16	REINFORCING DETAILS STA. 92+70	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	17	DRAINAGE STRUCTURE STA. 150+05	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	18	DRAINAGE STRUCTURE STA. 172+08	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	19	DRAINAGE STRUCTURE STA. 176+47	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	20	DRAINAGE STRUCTURE STA. 176+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	21	REINFORCING DETAILS STA 176+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	22	DRAINAGE STRUCTURE STA. 199+80	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	23	DRAINAGE STRUCTURE STA. 200+55	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	24	DRAINAGE STRUCTURE STA. 217+35	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	25	DRAINAGE STRUCTURE STA. 223+57	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	26	DRAINAGE STRUCTURE STA. 224+17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	27	DRAINAGE STRUCTURE STA. 224+65	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	28	DRAINAGE STRUCTURE STA. 254+06	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
~~93412.2~~	~~28~~	~~STORAGE VAULT~~	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	29	DRAINAGE STRUCTURE STA. 291+75	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	30	BEE BRANCH DIVERSION CHANNEL D3	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	31.1	MOVABLE CLOSURE STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	31.1A	RAILROAD RAMP DETAILS	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	32.1	REINFORCING DETAILS STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	33.1	REINFORCING DETAILS STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	34.1	REINFORCING DETAILS STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	35	CONCRETE CULVERT DETAILS STA. 0+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	36	REINFORCING DETAILS STA. 0+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	37	HIGHWAY RAMP DETAILS	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.3	0	TITLE SHEET	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	1	GENERAL PLAN--PUMPING PLANTS NOS. 1,2,3,5,6,7 & 12	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	2	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	3	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	4	MASINRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	5	REINF. DETS. - BASE SLAB,LOADING PLATFORM & STAIRS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	6	REINFORCING DETAILS - ROOF SLAB & MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	7	REINFORCING DETAILS - NORTH & SOUTH WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	8	REINFORCING DETAILS - EAST, SOUTH & WEST WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	9	PUMPING PLANTS NOS. 1, 5, 6 & 7 - WIRING DIAGRAM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	10	PUMPING PLANTS NOS. 1, 5 & 6 -- SUB-STATION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	11	MASONRY & REINFORCING DETS.--SUB-STATION PLATFORM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 1, 2, 5 & 6
93412.3	12	SUB-STATION VENTS - LOCATIONS, PLANS & DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 1, 2, 5 & 6
93412.3	13	LIGHTING & POWER SYSTEM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	14	MASONRY & REINFORCING DETAILS - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	15	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	16	MASONRY DETAILS - PLANS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	17	MASONRY DETAILS - SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	18	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	19	BOTTOM BASE, WEIR & LOADING PLATFORM STEPS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2 (REINFORCING DETAILS)
93412.3	20	REINFORCING DETAILS - BASE,TOP REINFORCING & PIERS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	21	REINFORCING DETAILS - MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	22	REINFORCING DETAILS - NORTH WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	23	REINFORCING DETAILS - S WALL & INTAKE CHAMBER WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	24	REINFORCING DETAILS - EAST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	25	REINFORCING DETAILS - WEST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	26	ROOF SLAB, INTAKE & LOADING PLATFORMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2 (REINFORCING DETAILS)
93412.3	27	WIRING DIAGRAM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	28	SUB-STATION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	29	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	30	MASONRY DETAILS - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	31	REINFORCING DETAILS - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	32	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	33	MASONRY DETAILS - PLAN & ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	34	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	35	MOTOR FLOOR, ROOF, TRASH RACK WALKWAY & BASE SLAB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3 (REINFORCING DETAILS)
93412.3	36	REINFORCING DETAILS - NORTH, SOUTH & WEST WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	37	EAST WALL, SURGE CHAMBER & WEST WALL, TRASH RACK	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3 (REINFORCING DETAILS)
93412.3	38	PUMPING PLANTS NOS. 3 & 12 - WIRING DIAGRAMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	39	2-POLE TRANSFORMER SUB-STATION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 3, 7 & 12
93412.3	40	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	41	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	42	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	43	MASONRY DETAILS - PLANS & SECITONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.3	44	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	45	REINFORCING DETAILS - SUPER & SUB-STRUCTURE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	46	REINFORCING DETAILS - EAST WALL & SEWER OPENINGS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	47	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	49	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	50	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	51	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	52	MASONRY DETAILS - ROOF PLAN & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	53	REINFORCING DETAILS - BASE SLAB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	54	REINFORCING DETAILS - NORTH WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	55	REINFORCING DETAILS - SOUTH WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	56	REINFORCING DETAILS - EAST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	57	REINFORCING DETAILS - WEST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	58	REINFORCING DETAILS - MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	59	ROOF SLAB, PULIN, PIER & NORTH WALL TRASH CHAMBER	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6 (REINFORCING DETAILS)
93412.3	60	DISCHARGE CHAMBER WALL,FLR & W WALL TRASH	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6 (REINFORCING DETAILS)
93412.3	61	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	62	MASONRY DETIALS - CLARK SREET OUTFALL HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	63	REINFORCING DETAILS - CLARK ST. OUTFALL HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	64	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	65	MASONRY DETAILS - BASE PLAN & SECTION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	66	MASONRY DETAILS - PLAN & SECTION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	67	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	68	MASONRY DETIALS - ROOF PLAN & ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	69	REINFORCING DETAILS - BASE SLB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	70	EAST WALL,DISCHARGE CHAMBER WALL & FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7 (REINFORCING DETAILS)
93412.3	71	DISCHARGE CHAMBER & WALLS,N,S & TRASH CHAMBER WLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7 (REINFORCING DETAILS)
93412.3	72	RF SLB,TRSH CHMBR RF,SLB,TRSH CHMBR WLKWY & PRLINS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7 (REINFORCING DETAILS)
93412.3	73	REINFORCING DETAILS - WEST WALL & MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	74	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	75	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	76	MASONRY DETIALS - PLAN & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	77	MASONRY DETAILS - ROOF PLANS & ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	78	REINFORCING DETAILS - BASE SLAB & WING WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	79	REINFORCING DETAILS - SUPER STRUCTURAL WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	80	SUB-STRUCTURAL WALLS & LOADING PLATFORM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12 (REINFORCING DETAILS)
93412.3	81	REINFORCING DETAIS - MOTOR FLOOR & ROOF SLAB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	82	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	83	MASONRY & REINFORCING DETS. - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	84	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	85	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	86	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	87	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	88	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.3	89	MASONRY & REINFORCING T-WALL MONOLITHS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	90	MASONRY DETAILS - MOVABLE CLOSURE STA. 90+38.17B	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	91	REINFORCING DETAILS STA. 90+38.17B -SILL/ABUTMENTS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	92	REINFORCING DETAILS STA. 10.00B - STORAGE VAULT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	93	MASONRY & REINF. DETS STA. 108+63.17B STORAGE VLT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	94	MASONRY DETAILS STA. 162+01.57B - STORAGE VAULTS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	95	REINFORCING DETAILS STA 162+01.57B - STORAGE VAULT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	96	INTERCEPTING SEWER - PLAN & PROFILE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	97	INTERCEPTING SEWER - PLAN & PROFILE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	98	INTERCEPTING SEWER - PLAN & PROFILE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	99	MASONRY & REINF. DETS. - MONOLITHIC CONC. SEWERS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	100	MANHOLES NOS. 1 & 2	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER NASONRY & REINFORCING DETAILS
93412.3	101	MANHOLES NOS. 3 & 4	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	102	MANHOLES NOS. 5 & 6	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	103	MANHOLES NOS. 7 & 8	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	104	MANHOLE NO. 9	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	105	MANHOLE NO. 10	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	106	MANHOLE NO. 11	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	A	DESIGN DATA	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3M	116	PUMPING PLANTS NOS. 2,3,4, & 6 - PIPING REVISIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.4	A	PUMPING PLANT NO. 11 & ISLAND CREEK DAM	DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	MULTIPLE BOX CULVERT
93412.5	0	INDEX	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	1	LOCATION PLAN	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	2	PLAN & PROFILE	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	3	GENERAL LAYOUT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	4	SECTION & ELEVATION	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	5	BORINGS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	6	MASONRY DETAILS - PLAN & SECTION	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	7	MASONRY DETAILS - PLAN & SECTION	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	8	MASONRY DETAILS - ROOF PLAN & ELEVATIONS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	9	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINF. DETS. - LANDSIDE & RIVERSIDE SUPER STRUCTURE WALLS
93412.5	10	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS - SUPER STRUCTURE & WALLS & ROOF SLAB
93412.5	11.1	REINFORCING DETAILS - MOTOR FLOOR	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	12.1	REINFORCING DETAILS - PUMPING PLANT BASE	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	13.1	REINFORCING DETAILS - PUMPING PLANT BASE	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	14.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETS. - LANDSIDE & RIVERSIDE SUB-STRUCTURE WALLS
93412.5	15.1	REINFORCING DETAILS - DISCHARGE CHAMBER WALL	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	16.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS - EAST, WEST & INTERMEDIATE WALLS
93412.5	17	MASONRY DETAILS - STILLING BASIN PLAN	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	18	MASONRY DETAILS - STILLING BASIN SECTIONS & DETS.	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	19.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS - STILLING BASIN SLAB, PIERS & BAFFLES
93412.5	20.1	REINFORCING DETAILS - STILLING BASIN WALL NO. 7	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	21.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINF. DETS. - STILLING BASIN WALLS NOS. 8-14 INCLUSIVE
93412.5	22.1	MASONRY & REINFORCING DETAILS - MONOLITH NO. 1	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.5	23.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS - MONOLITHS NOS. 2,3,4,5 & 6
93412.5	24	MASONRY DETAILS - LANDSIDE HEADWALL	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	25	REINFORCING DETAILS - LANDSIDE HEADWALL	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	26	MASONRY DETAILS - MULTIPLE BOX CULVERT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	27.1	REINFORCING DETAILS - MULTIPLE BOX CULVERT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	28.1	REINFORCING DETAILS - MULTIPLE BOX CULVERT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	29	MISCELLANEOUS DETAILS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	30	MISCELLANEOUS DETAILS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	31	MISCELLANEOUS DETAILS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	32	LIGHTING & POWER SYSTEMS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	33	HYDROGRAPHS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	34	BORROW PIT - LOCATIONS & BORINGS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5S1	1	ANCHOR BOLT LAYOUT FOR GATE, ETC...	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.6	1	EXT. TO DIVERSION CHANNEL D2	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.7	0	INDEX	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7	1	GENERAL PLAN - PUMPING PLANTS 4, 8, 9 & 10	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7	2	GENERAL LAYOUT	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	3	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	4	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	5.1	REINFORCING DETAILS - BASE SLAB	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	6	REINFORCING DETAILS - WALL & PLATFORM	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	7	REINFORCING DETAILS - NORTH & SOUTH WALLS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	8	REINFORCING DETAILS - WALLS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	9	REINFORCING DETAILS - ROOF SLAB	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	10	WIRING DIAGRAMS - PLANT NOS. 4 & 9	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	11	LIGHTING & POWER SYSTEM	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	12	TWO POLE TRANSFORMER SUB-STATION--PLANT NOS. 4 & 9	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	13	MASONRY & REINFORCING DETAILS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 8
93412.7	14	GENERAL LAYOUT	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	15	MASONRY DETAILS--MOTOR FLOOR, ROOF--PLAN & SECTION	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	16	MASONRY DETAILS - ELEVATION & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	17	REINFORCING DETAILS - BASE SLAB & MOTOR FLOOR	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	18	REINFORCING DETAILS - NORTH WALL	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	19	REINFORCING DETAILS - SOUTH WALL	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	20.1	SUPER STRUCTURE & SUB-STRUCTURE EAST WALL	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9 (REINFORCING DETAILS)
93412.7	21.1	REINF. DETS.--SUB-STRUCTURE WEST WALL & ROOF SLAB	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	22	REINFORCING DETAILS - SUPER STRUCTURE WALLS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	23.1	REINFORCING DETAILS - INTAKE CHAMBER	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	24	LIGHTING & POWER SYSTEM	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	25	MASONRY DETAILS - PLAN & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 10
93412.7	26	POLE STRUCTURES	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 10
93412.7	27	MISCELLANEOUS DETAILS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7	28	MISCELLANEOUS DETAILS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7M	29	REVISED DETAILS FOR BASE OF TANK	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.8	0	INDEX	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	1	GENERAL PLAN	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.8	2	PLANS & SECITONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.8	3	LIGHT & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.8	4	PLANS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.8	5	SECTIONS & DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.8	6	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.8	7	PLANS & ELEVATIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.8	8	LIGHT & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.8	9	PLANS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.8	10	DETAILS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.8	11	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.8	12	LOCATION PLAN & SECITONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.8	13	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.8	14	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.8	15	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.8	16	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.8	17	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.8	18	PLANS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.8	19	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.8	20	MISCELLANEOUS DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.8	21	LOCATION PLAN	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTER SEWER MANHOLES
93412.8	22	GATE INSTALLATION DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTER SEWER MANHOLES
93412.8	23	LOCATION PLAN	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	24	DETAILS--SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	25	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	26	SUB-STATION SLAB & MISCELLANEOUS DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	27	WIRING DIAGRAM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	28	SUB-STATION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	29	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	30	GATES & TOWER	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 32+38.1
93412.8	31	TOWER & WALKWAY DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 32+38.1
93412.8	32	WALKWAY DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 32+38.1
93412.8	33	PUMPING PLANTS NOS. 1, 5, 6 & 7--WIRING DIAGRAMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	34	PUMPING PLANTS NOS. 1, 5, 6 & 7--WIRING DIAGRAMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	35	PUMPING PLANT NO. 2 - LIGHTING & POWER SYSTEM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	36	PUMPING PLANT NO. 2 - WIRING DIAGRAM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	37	PUMPING PLANT NO. 2 - WIRING DIAGRAM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	38	FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMING PLANT NO. 2 - WIRING DIAGRAM
93412.8	39	ELECTRODE WELLS, SECTIONS & DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NOS. 2, 3, 5, 6 & 7
93412.8	40	PUMPING PLANT NO. 3 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	41	PUMPING PLANTS NOS. 3, 7 & 12--WIRING DIAGRAMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	42	PUMPING PLANT NO. 5 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	43	FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 5 & 7 - WIRING DIAGRAM

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.8	44	PUMPING PLANT NO. 6 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	45	FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6 - WIRING DIAGRAM
93412.8	46	PUMPING PLANT NO. 7 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.10	1	LIGHTING & POWER SYSTEM	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	PUMPING & EQUIPMENT GATES
93412.10	2	WIRING DIAGRAM	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	PUMPING & EQUIPMENT GATES
93412.11	0	INDEX	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	1.1	STRUCTURAL DETAILS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	2.1	STRUCTURAL DETAILS & PINS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	3.1	STRUCTURAL DETAILS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	4.1	STRUCTURAL DETAILS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.13	1	SHEETING PANELS & WALKWAY OPENING BULKHEADS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	1	GENERAL PLAN	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	2	PUMPING PLANT NO. 1	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	3	PUMPING PLANT NO. 1	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	4	PUMPING PLANT NO. 2	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	5	PUMPING PLANT NO. 2	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	6	PUMPING PLANT NO. 3	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	7	PUMPING PLANT NO. 3	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	8	PUMPING PLANT NO. 5	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	9	PUMPING PLANT NO. 5	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	10	PUMPING PLANT NO. 6	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	11	PUMPING PLANT NO. 6	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	12	PUMPING PLANT NO. 7	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	13	PUMPING PLANT NO. 7	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	14	PUMPING PLANT NO. 7	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	15	PUMPING PLANT NO. 9	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	16	PUMPING PLANT NO. 9	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	17	ISLAND CREEK	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	18	ISLAND CREEK	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	19	PUMPING PLANT NO. 12	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	20	PUMPING PLANT NO. 12	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	21	MISCELLANEOUS DETAILS	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	22	MISCELLANEOUS DETAILS	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.15	1	GENERAL PLANS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93412.15	2	PUMPING PLANTS NO. 1 & 2	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93412.15	3	PLANS & SECTIONS--MANHOLE NOS. 4A, 5A & 16A	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93412.15	4	COVER PLATES & DETAILS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93416.1	1	GENERAL PLAN	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	2	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	3	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	4	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	5	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	6	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	7	DETAILS & SECTIONS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93416.4	3	INSTALLATION OF FLAP GATE IN BRIDGE STREET MANHOLE	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	
93416.4	4	SEE REMARKS	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	BEE-BRANCH DIVERSION - CHANNEL CLEANOUT - PLAN & PROFILE
93416.4	5	SEE REMARKS	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	BEE-BRANCH DIVERSION - CHANNEL CLEANOUT - PLAN & PROFILE
93418.1	1	ACCESS DRIVES	PUMPING PLANTS NOS. 1, 2 & 6	FLOOD PROTECTION - PADUCAH, KY	
93418.2	1	MODIFICATION OF EXISTING CATCH BASIN & DITCH	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	VICINITY GULF REFINING CO.
93418.3	1	MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.3	2	MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.3	3	MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.3	4	PUMPING PLANT NO. 9 - MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.6	1	REPAIRS TO 60-INCH DISCHARGE GATES	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93418.6	2	REPAIRS TO 30-INCH & 40-INCH DISCHARGE GATES	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93418.6	3	CALIBRATION OF INDICATOR BOARD	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93418.6	4	FLAP GATE INDICATOR DETAILS	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93419.2	1	GENERAL PLAN	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	2	OUTLET CHANNEL STA. 32+25 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	3	ADDITIONAL HANDRAIL STA. 32+25 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	4	BEE BRANCH DIVERSION CHANNEL CLEANING	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	5	BEE BRANCH DIVERSION CHANNEL CLEANING	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	6	SEE REMARKS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 217+32.5 "C",CULVERT STA. 214+70 "C"
93419.2	7	DRAINAGE STRUCTURE DETAILS STA. 32.5 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	8	PUMPING FACILITIES STA. 291+75 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	9.1	INSTALLATION OF FLAP GATE-BRIDGE ST. AT LOCUST ST.	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	10	TRASH RACK & PLATFORM STA. 19+11 "B"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	11	YEISER ST. DIVERSION SEWER	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	12	WAVE WASH REPAIR AND TERRELL ST. CULVERT	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	13.1	PINE ST. DIVERSION SEWER	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	14	DEHUMIDIFICATION EQUIPMENT - LOCATION PLANS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	15	SEE REMARKS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4 - MASONRY DETAILS - PLANS & SECTIONS
93419.2	16	SEE REMARKS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4 - MASONRY DETAILS - PLANS & SECTIONS
93419.2	17	DEHUMIDIFICATION EQUIPMENT PUMPING PLANT NO. 8	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	18	DEHUMIDIFICATION EQUIPMENT PUMPING PLANT NO. 10	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93420.3	1	LEVEE AT CAIRO ROAD	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	
93420.4	1	WIRE GUARD FOR PUMP SHAFTS	PUMPING PLANTS NOS. 8 & 10	FLOOD PROTECTION - PADUCAH, KY	
934A1	1	MASONRY/REINFORCING DETS.- MANHOLES NOS. 12 & 13	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
934A1	2	MANHOLE NO. 14	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
934A2	1	GENERAL PLAN	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	2	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	PLAN, PROFILE, BORING & MONOLITHS--STA. 91+49.33 TO 95+04.47
934A2	3	MASONRY DETAILS--MOVABLE CLOSURE STA. 91+96.00	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	4	MASONRY DETAILS--MONOLITH NO. 14 & "T" WALL	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	5	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS--MOVABLE CLOSURES STA. 93+57.18 & 94+63.76
934A2	6	MISCELLANEOUS DETAILS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	7	MISCELLANEOUS DETAILS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	8	MISCELLANEOUS DETAILS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	9	REINFORCING DETAILS - MONOLITH NO. 14	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
934A2	10	REINFORCING DETAILS - "T" WALL MONOLITHS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	11	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 91+96.00 - SILL & ABUTMENTS
934A2	12	REINFORCING DETAILS--STA. 93+57.18--SILL	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	13	REINFORCING DETAILS--STA. 93+57.18--ABUTMENTS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	14	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS--STA. 94+63.76--SILL & ABUTMENTS
934A2	15	REINFORCING DETAILS--STA. 94+63.76--STORAGE VAULT	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934C1	1	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
934C1	2	HIGHWAY RAMP DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
934C1	3	MISCELLANEOUS DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
934CM2	2	DRAINAGE STRUCTURE DETAILS STATION 32+38.1	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	
934CM3	1	MASONRY & HANDRAIL DETAILS	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
934CM3	2	REINFORCING DETAILS - STILLING BASIN NO. 7	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
934CM4	1	GUARDS FOR MULTIPLE BOX CULVERT	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
934CM7	1	LIGHTING & POWER SYSTEM	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93512.2	0	TITLE SHEET	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	1	GENERAL PLAN	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	2	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	3	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	4	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	5	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	6	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	7	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	8	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	9	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	10	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	11	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	12	ILLINOIS CENTRAL RAILROAD REVISIONS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	13	ILLINOIS CENTRAL RAILROAD REVISIONS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	14	STREET & RAILROAD REVISIONS, 1ST STRRET VICINITY	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	15	BORINGS (DELETED)	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	16	BORINGS (DELETED)	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	17	BORINGS & TYPICAL SECTION	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	18	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	19	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	20	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	21	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	22	STRIPPING & BACKFILL	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	23	MASONRY & REINFORCING DETAILS--MONOLITH NO. 14	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	24	MONOLITHS MOS. 16, 41 & 96	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	25	MONOLITHS NOS. 80 & 167	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	26	MONOLTHS NOS. 115,131,132 & BULKHEAD & FRAME DETS.	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	27	MONOLITHS NOS. 144, 151 & 182	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	28	MONOLITHS NOS. 150, 171 & 185	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	29	MONOLITH NO. 194	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93512.2	30	MONOLITHS NOS. 204 & 223	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	31	MONOLITHS NOS. 225, 253 & 272	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	32	MONOLITH NO. 245	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	33	MONOLITHS NOS. 280, 281, 195 & 244	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	34	MONOLITHS NOS. 300 & 301	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	35	MASONRY & REINFORCING DETAILS--"T" WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	36	MASONRY & REINFORCING DETAILS--"T" WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	37	MASONRY & REINFORCING DETAILS--"T" WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	38	MISCELLANEOUS PIPES THRU WALL & DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	39	MISCELLANEOUS PIPES THRU WALL & DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	40	GENERAL PLAN--WASHINGTON & 1ST STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	41	GENERAL PLAN--KENTUCKY & 1ST STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	42	GENERAL PLAN--BROADWAY & 1ST STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	43	GENERAL PLAN--MADISON & 2ND STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	44	GENERAL PLAN--3RD & HARRISON STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	45	GENERAL PLAN--CLAY & 3RD STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	46	GENERAL PLAN--4TH 5TH STREETS AT PARK AVENUE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	47	SEE REMARKS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	TUNNEL APPROX. STA. 117+20 & U.S.G.S. GAGING STATION
93512.2	48	MOVABLE CLOSURES STAS. 90+41.17 & 103+63.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93512.2	49	REINFORCING DETAILS--STAS. 90+41.17 & 103+63.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	50	REINF. DETS. STAS. 90+51.33,103+73.67 & 106+21.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT
93512.2	51-58	DELETION OF PORTION OF WALL	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	DELETED ACCORDING TO TITLE SHEET
93512.2	59	MOVEABLE CLOSURES STAS. 98+88.50 & 108+53.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93512.2	60	REINFORCING DETAILS--STAS. 98+88.50 & 108+53.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND SOUTH ABUTMENT
93512.2	61	REINFORCING DETAILS--STAS. 98+88.50 & 108+53.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	NORTH ABUTMENT AND STORAGE VAULT
93512.2	62	MASONRY DETAILS--MOVEABLE CLOSURE STA. 106+10.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	63	REINFORCING DETAILS--STA. 106+10.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	64	MASONRY DETAILS--MOVEABLE CLOSURE STA. 114+98.71	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	65	REINFORCING DETAILS--STA. 114+98.71	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	66	REINFORCING DETAILS--STA. 114+98.71--STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	67	MOVEABLE CLOSURES STAS. 119+62.65 & 123+80.40	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93512.2	68	REINFORCING DETAILS--STAS. 119+62.65 & 123+80.40	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	69	STAS. 120+07.65 & 124+25.40--STORAGE VAULTS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	70	MASONRY DETAILS--MOVEABLE CLOSURE STA. 128+19.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	71	REINFORCING DETAILS STA. 128+19.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & EAST ABUTMENT
93512.2	72	MASONRY DETAILS--MOVEABLE CLOSURE STA. 132+40.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	73	REINFORCING DETAILS--STA. 132+40.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	74	REINFORCING DETAILS--STA. 132+40.50--STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	75	MASONTRY DETAILS--MOVEABLE CLOSURE STA. 135+22.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	76	REINFORCING DETAILS-- STA. 135+22.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & EAST ABUTMENT
93512.2	77	REINFORCING DETAILS--STAS. 128+19.75 & 135+22.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT & WEST ABUTMENT
93512.2	78	MASONRY DETAILS--MOVEABLE CLOSURE STA. 145+74.30	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	79	REINFORCING DETAILS--STA. 145+74.30	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	80	MASONRY DETAILS--MOVEABLE CLOSURE STA. 138+23.25	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93512.2	81	MASONRY DETAILS--MOVEABLE CLOSURE STA. 149+87.30	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	82	REINFORCING DETAILS-- STAS. 149+87.30 & 136+23.25	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	83	REINFORCING DETAILS STAS. 149+27.80 & 137+65.25	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT AND WALKWAY PLANKING SCHEDULE
93512.2	84	MASONRY DETAILS - MOVABLE CLOSURE STA. 157+26.10	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	85	REINFORCING DETAILS STA. 157+26.10	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND ABUTMENTS
93512.2	86	REINFORCING DETAILS STA. 166+48.50 - STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	87	MASONRY DETAILS - MOVABLE CLOSURE STA. 161+53.15	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	88	REINFORCING DETAILS STA. 161+53.15	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND ABUTMENTS
93512.2	89	MASONRY DETAILS - MOVABLE CLOSURE STA. 166+48.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	90	REINFORCING DETAILS STA. 166+48.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND ABUTMENTS
93512.2	91	REINFORCING DETAILS STA. 166+48.50 - STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	92	MASONRY DETAILS - MOVABLE CLOSURE STA. 170+04.36	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	93	REINFORCING DETAILS STA. 170+04.36	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND EAST ABUTMENT
93512.2	94	REINFORCING DETAILS STA. 170+04.36	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT AND MONOLITH NO. 340
93512.2	95	MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	96	MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	97	MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	98	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	99	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	100	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	101	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	102	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	103	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	104	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	105	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	106	STRUCTURAL & MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	107	MISCELLANOUS STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	108	MISCELLANOUS STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	109	MISCELLANOUS STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	110	CATCH BASINS AND MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	111	LOCATION PLANS - MANHOLES NOS. 2, 3, 11 AND 12,	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	AND HEADWALL DETAILS STA. 128+61
93512.2	112	MASONRY & REINFORCING DETAILS - MANHOLE NO. 1	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	113	MANHOLES NOS. 2, 8, 12 AND 15	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	114	MASONRY DETAILS - MANHOLE NO. 3	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	115	REINFORCING DETAILS - MANHOLE NO. 3	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	116	MOANHOLE NOS. 4, 5, 9, 10, 17, 18, 19, 21 AND 22	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	117	MANHOLES NOS. 6 AND 16	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	118	MANHOLES NOS. 7 AND 11	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	119	MANHOLES NOS. 13 AND 14	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	120.1	MANHOLE NO. 20	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	121.1	SEWER STA. 66+27	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	122.1	MANHOLE NO. 23	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	123.1	MANHOLE NO. 24	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	124	DRAINAGE STRUCTURE STA. 175+40	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
935C6	1	REINFORCING DETAILS - MONOLITHS NOS. 79A & 84A	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	A	18' T-WALL	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	B	19' T-WALL ON COMPACTED BACKFILL	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	C	22' T-WALL STA. 129+41.25 TO STA. 131+70.33	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	D	19' T-WALL ON BEARING PILES	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	E	STAS. 96+88.50, 108+53.00, 99+09.17 & 108+73.67	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE DEPARTMENT OF THE ARMY
AND THE
CITY OF PADUCAH, KENTUCKY
FOR WORK PROVIDED OR PERFORMED
PRIOR TO EXECUTION OF
A
PROJECT PARTNERSHIP AGREEMENT
FOR
PADUCAH, KENTUCKY
LOCAL FLOOD PROTECTION PROJECT

THIS MEMORANDUM OF UNDERSTANDING (hereinafter the "MOU") is entered into this 17th day of November, 2008 by and between the Department of the Army (hereinafter the "Government"), represented by the U.S. Army Engineer, Louisville District (hereinafter the "District Engineer") and the City of Paducah, Kentucky (hereinafter the "Non-Federal Interest"), represented by the Mayor.

WITNESSETH, THAT:

WHEREAS, Section 221(a) of the Flood Control Act of 1970, as amended by Section 2003 of the Water Resources Development Act of 2007, provides that a cost sharing partnership agreement may provide credit for the value of materials or services provided before the execution of such cost sharing partnership agreement if the Secretary and the non-Federal interest enter into an agreement under which the non-Federal interest shall carry out such work and only work carried out following the execution of such agreement shall be eligible for credit;

WHEREAS, the Non-Federal Interest understands and acknowledges that any credit for eligible in-kind contributions will be afforded only toward the required non-Federal contribution of funds (i.e. cash contribution) under the Project Partnership Agreement for the project or separable element of the project except such credit will not be afforded toward the non-Federal requirement to provide in cash 5 percent of the costs allocated to structural flood damage reduction; and

WHEREAS, by letter dated October 02, 2008, the Non-Federal Interest stated its intent to perform certain work (hereinafter the "Proposed Work", as defined in Paragraph 1 of this MOU) prior to the execution of the Project Partnership Agreement for the Paducah, Kentucky Local Flood Protection Project at Ohio River Mile 934.4 in Paducah, Kentucky.

NOW, THEREFORE, the Government and the Non-Federal Interest agree as follows:

1. The Non-Federal Interest shall provide or perform the Proposed Work in accordance

with the terms and conditions of this MOU. The Proposed Work shall consist of the reconstruction of existing drainage structures, including corrugated metal pipes, at the Paducah, Kentucky Local Flood Protection Project, as generally described in the Ohio River, Paducah, Kentucky Section 905(b) Analysis dated May 2000, and the above-referenced letter from the Non-Federal Interest.

2. The Non-Federal Interest shall develop all necessary engineering plans and specifications for the Proposed Work.

3. The Non-Federal Interest shall complete all necessary environmental coordination and obtain all applicable Federal, State, and local permits required for the performance of the Proposed Work.

4. The Non-Federal Interest shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for construction and subsequent operation and maintenance of the Proposed Work, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

5. Nothing in this MOU creates any duty, obligation, or responsibility for the Government. Any activity undertaken by the Non-Federal Interest for the implementation of the Proposed Work is solely at the Non-Federal Interest's own risk and responsibility.

6. The Non-Federal Interest shall keep books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this MOU to the extent and in such detail as will properly reflect total costs for the Proposed Work and the Non-Federal Interest shall make such evidence available for inspection and audit by authorized representatives of the Government.

7. The Non-Federal Interest understands that any costs incurred for the clean-up of hazardous material regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"; 42 U.S.C. Sections 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way required for the Proposed Work are a Non-Federal Interest responsibility and that no credit shall be afforded for such clean-up costs. In addition, the Non-Federal Interest understands that as between the Government and the Non-Federal Interest, the Non-Federal Interest shall be considered the operator of the Proposed Work for the purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Interest shall operate, maintain, repair, replace, and rehabilitate the Proposed Work in a manner that will not cause liability to arise under CERCLA.

8. The parties to this MOU shall each act in an independent capacity in the performance of their respective functions under this MOU, and neither party is to be considered the officer, agent, or employee of the other.

9. The Non-Federal Interest understands that to be eligible for credit for the costs of the Proposed Work:

a. The Government must make a determination that the Proposed Work is integral to the project;

b. The Proposed Work shall be subject to a review or on-site inspection, as applicable, and certification by the Government that the work was accomplished in a satisfactory manner and in accordance with applicable Federal laws, regulations, and policies;

c. The costs for the Proposed Work that may be eligible for credit shall be subject to an audit by the Government to determine the reasonableness, allocability, and allowability of such costs;

d. The costs incurred for the Proposed Work are not subject to interest charges, nor are they subject to adjustment to reflect changes in price levels between the time the Proposed Work is completed and the time that credit may be afforded;

e. The Non-Federal Interest shall not use Federal program funds (either funds or grants provided by a Federal agency as well as any non-Federal matching share or contribution that was required by such Federal agency for such program or grant) for the Proposed Work unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is expressly authorized by Federal law;

f. Only the costs of the Proposed Work that do not exceed the Government's estimate of the cost of such work if the work been accomplished by the Government may be eligible for credit;

g. Any contract awarded for the Proposed Work shall include provisions consistent with all applicable Federal laws and regulations and the Non-Federal Interest shall comply with all applicable Federal and State laws and regulations, including, but not limited to Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

h. The Non-Federal Interest must comply with applicable Federal labor laws covering non-Federal construction, including but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)); and

i. Crediting for the costs of the Proposed Work may be withheld, in whole or in part, as a result of the Non-Federal Interest's failure to comply with the terms of this MOU.

10. If the parties agree to enter into a Project Partnership Agreement for the Paducah, Kentucky Local Flood Protection Project at Ohio River Mile 934.4 in Paducah, Kentucky, then the Project Partnership Agreement will contain provisions regarding affording credit for costs of the Proposed Work, if the Secretary determines that the Proposed Work is integral to the project.

11. Execution of this MOU shall not be interpreted as a Federal assurance regarding later approval of any project; shall not commit the United States to any type of reimbursement or credit for the Proposed Work; does not alter any process to be followed by the Government in making a determination to execute a future Project Partnership Agreement; nor does it provide any assurance that any future agreement will ever be executed for the project, the Proposed Work, or any portion of the project. Further, this MOU shall not be interpreted to signify any Federal participation in or commitment to the project or the Proposed Work. Finally, this MOU shall not be construed as committing the Government to assume any responsibility placed upon the Non-Federal Interest or any other non-Federal entity or as preventing the Government from modifying the project that could result in the Proposed Work performed by the Non-Federal Interest no longer being an integral part of the design of the project.

IN WITNESS WHEREOF, the parties hereto have executed this MOU, which shall become effective upon the date it is signed by the District Engineer.

DEPARTMENT OF THE ARMY

BY: _____
Keith A. Landry
Colonel, Corps of Engineers
District Commander

DATE: 11/17/08

CITY OF PADUCAH, KENTUCKY

BY: _____
William F. Paxton
Mayor
City of Paducah

DATE: 11/17/08

CERTIFICATE OF AUTHORITY

I, W. David Denton, do hereby certify that I am the principal legal officer of the City of Paducah, Kentucky, that the City of Paducah, Kentucky is a legally constituted public body with full authority and legal capability to perform the terms of the MOU between the Department of the Army and the City of Paducah, Kentucky, in connection with the Proposed Work to be provided or performed prior to execution of a Project Partnership Agreement for the Paducah, Kentucky Local Flood Protection Project at Ohio River Mile 934.4 in Paducah, Kentucky, and that the persons who have executed this MOU on behalf of the City of Paducah, Kentucky have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this 17 day of November 2008

BY: _____
W. David Denton
City Attorney,
City of Paducah, Kentucky

ADOPTED

MUNICIPAL ORDER NO. 1418

A MUNICIPAL ORDER AUTHORIZING THE MAYOR TO EXECUTE A MEMORANDUM OF UNDERSTANDING BETWEEN THE DEPARTMENT OF THE ARMY AND THE CITY OF PADUCAH FOR WORK PROVIDED OR PERFORMED PRIOR TO EXECUTION OF A PROJECT PARTNERSHIP AGREEMENT FOR THE CITY'S LOCAL FLOOD PROTECTION PROJECT

BE IT ORDERED BY THE CITY OF PADUCAH, KENTUCKY:

SECTION 1. That the City of Paducah hereby authorizes the Mayor to execute a Memorandum of Understanding between the Department of the Army, represented by the U.S. Army Engineer, Louisville District and the City of Paducah for work provided or performed prior to execution of a Project Partnership Agreement for Paducah Kentucky Local Flood Protection Project contingent upon the Assistant Secretary of the Army Civil Works approving an "Exception to Policy for Paducah".

SECTION 2. This Order shall be in full force and effect from and after the date of its adoption.

Mayor

ATTEST:

Tammara S. Brock, City Clerk

Adopted by the Board of Commissioners, November 11, 2008
Recorded by Tammara S. Brock, City Clerk, November 11, 2008
\mo\MOU-Local Flood Protection Project

CERTIFICATION

I hereby certify that the above is a true and correct copy of an Ordinance adopted by the City of Paducah, KY on November 11, 2008.

Tammara S. Brock, City Clerk

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P. O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

RECEIVED
NOV 20 2008
ENGINEERING DEPARTMENT

November 18, 2008

Civil Project Management Branch

Mr. Rick Murphy, P.E.
City Engineer
City of Paducah
300 South 5th Street
Paducah, Kentucky 42002-2267

Dear Mr. Murphy:

Enclosed are two executed copies of the November 17, 2008 Memorandum of Understanding between the Department of the Army and City of Paducah, Kentucky.

Please contact me at (502) 315-6783 if you have any questions regarding this agreement.

Sincerely,

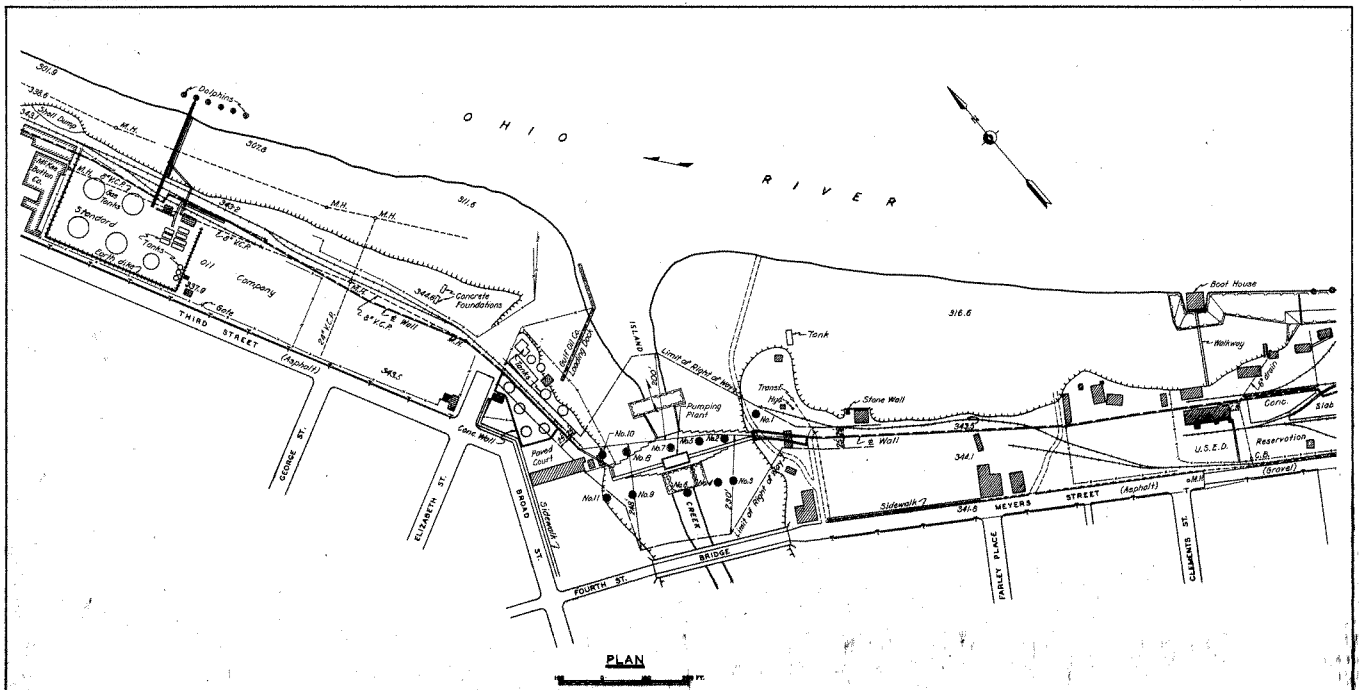
Michael Q. Holley

Michael Q. Holley, P.E.
Project Manager

Tammy: This Information Is To Be Received & Filed For Our Carugated Metal Pipe Rehab. Project w/ The Floodwall.
Thxs Rick

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



General Notes:
All elevations referred to U.S.C.&G. datum.
Borings shown on plan thus: ●
For log of borings see sheet 6.

1948	6-24-48	Added settling basin, riprap and ramp
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK WALL & PUMPING PLANT

SHEET 1 OF SHEETS SCALES AS SHOWN

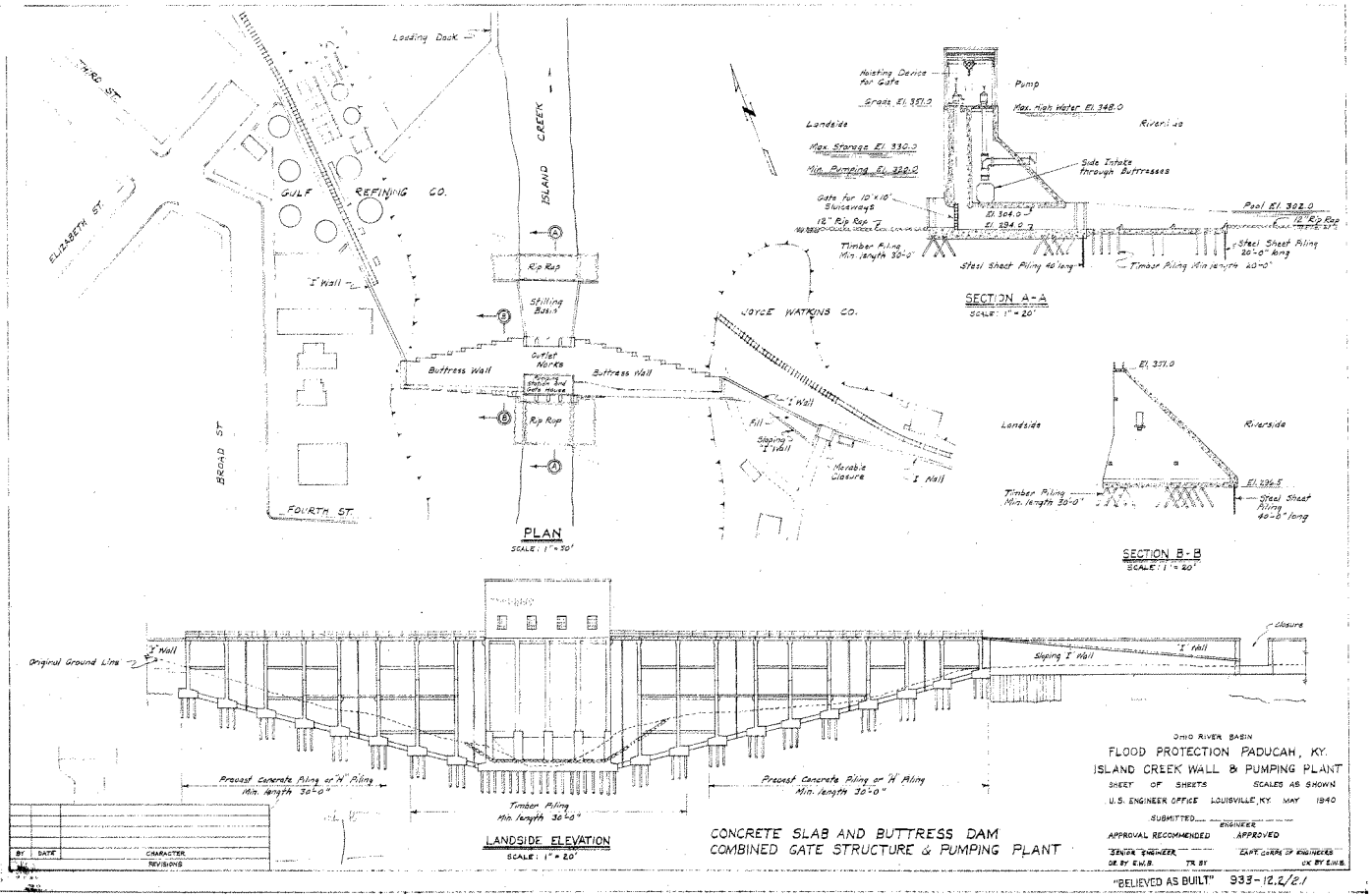
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH, 1948

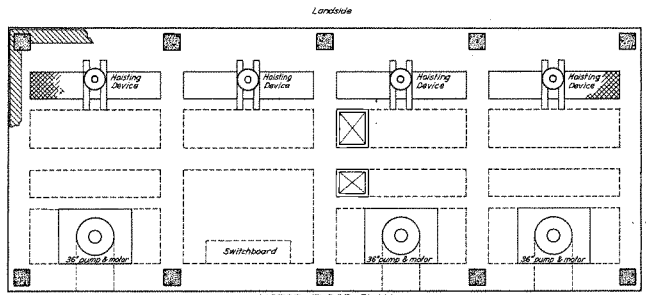
SUBMITTED: APPROVED:

67

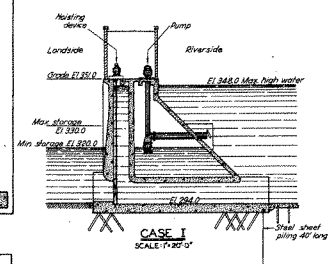
WAR DEPARTMENT

CORPS OF ENGINEERS U. S. ARMY

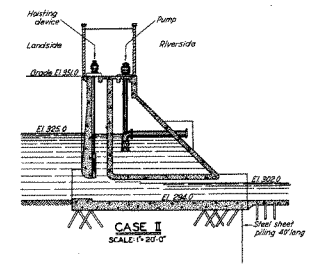




MOTOR FLOOR PLAN
SCALE: 1"=4'-0"



CASE I
SCALE: 1"=20'-0"



CASE II
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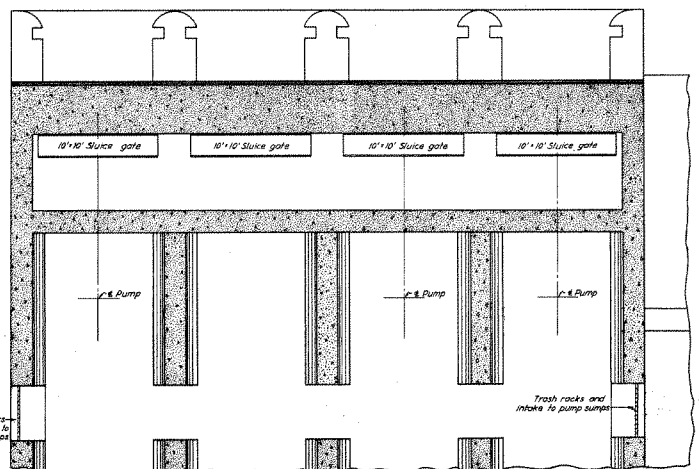
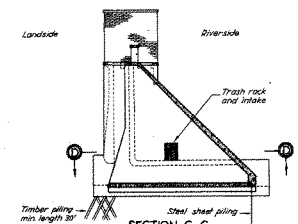


SECTION D-D
SCALE: 1"=4'-0"



SECTION C-C
SCALE: 1"=20'-0"

BY	DATE	CHARACTER
E.W.B.	5-10-40	Shiling basin & pumps revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK WALL & PUMPING PLANT

SHEET 3 OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1940

SUBMITTED: District Engineer

APPROVAL RECOMMENDED: Senior Engineer, Design Section

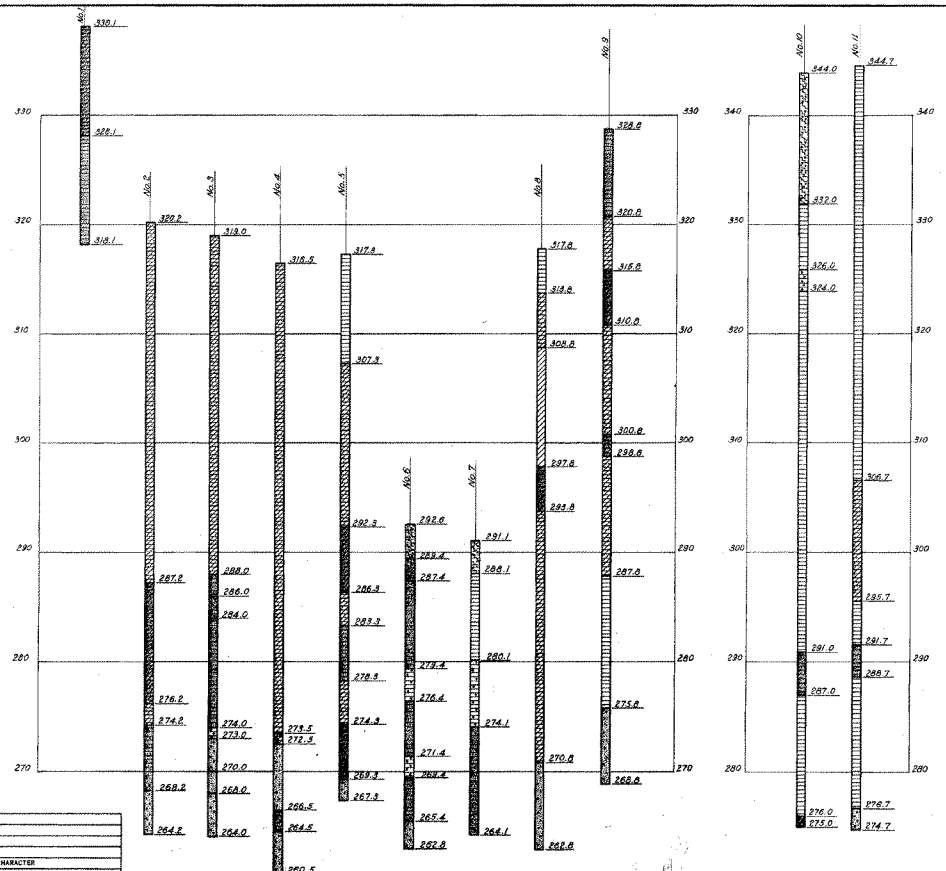
APPROVED: Chief, Engineering Division

DR. BY P.A. TR. BY B.A. CK. BY E.W.B.

"BELIEVED AS BUILT" 933-12.2/3

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

BORINGS

SHEET 4 OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1949

SUBMITTED: ENGINEER, CHIEF OF BRANCH

APPROVAL RECOMMENDED: APPROVED:

REVIEW ENGINEER, CHIEF OF FLOOD CONTROL DIVISION, DR. BY R.C.Z. TR. BY W.J.B.

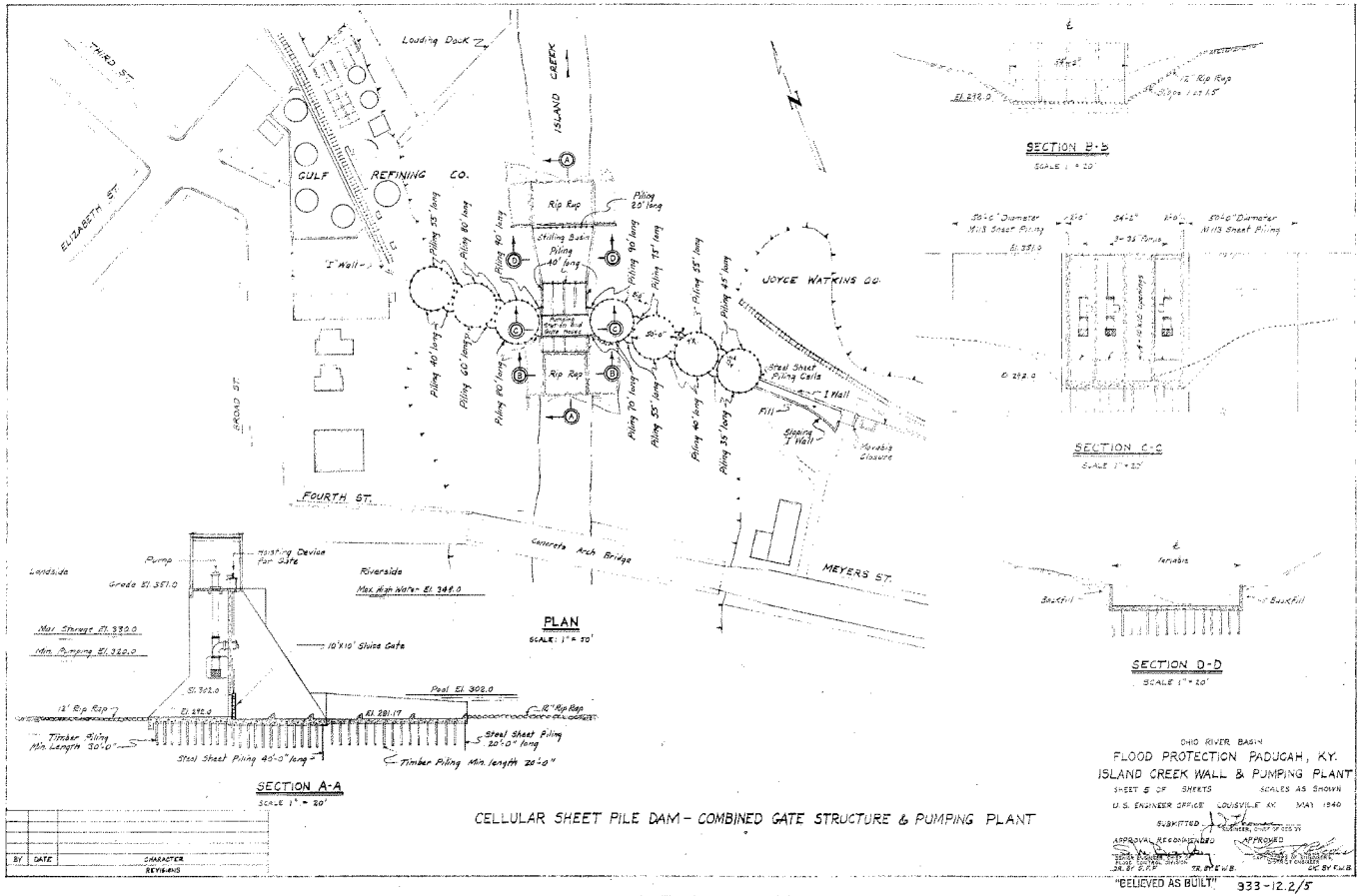
CHIEF, CIVIL ACCOUNTANT, CONTRACT ENGINEER, CK. BY E.W.B.

"BELIEVED AS BUILT" 933-12.2/4

112

WAR DEPARTMENT

CORPS OF ENGINEERS U. S. ARMY



CELLULAR SHEET PILE DAM - COMBINED GATE STRUCTURE & PUMPING PLANT

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK WALL & PUMPING PLANT

SHEET 5 OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE KY. MAY 1940

SUBMITTED

ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED APPROVED

CHIEF, FLOOD CONTROL DIVISION

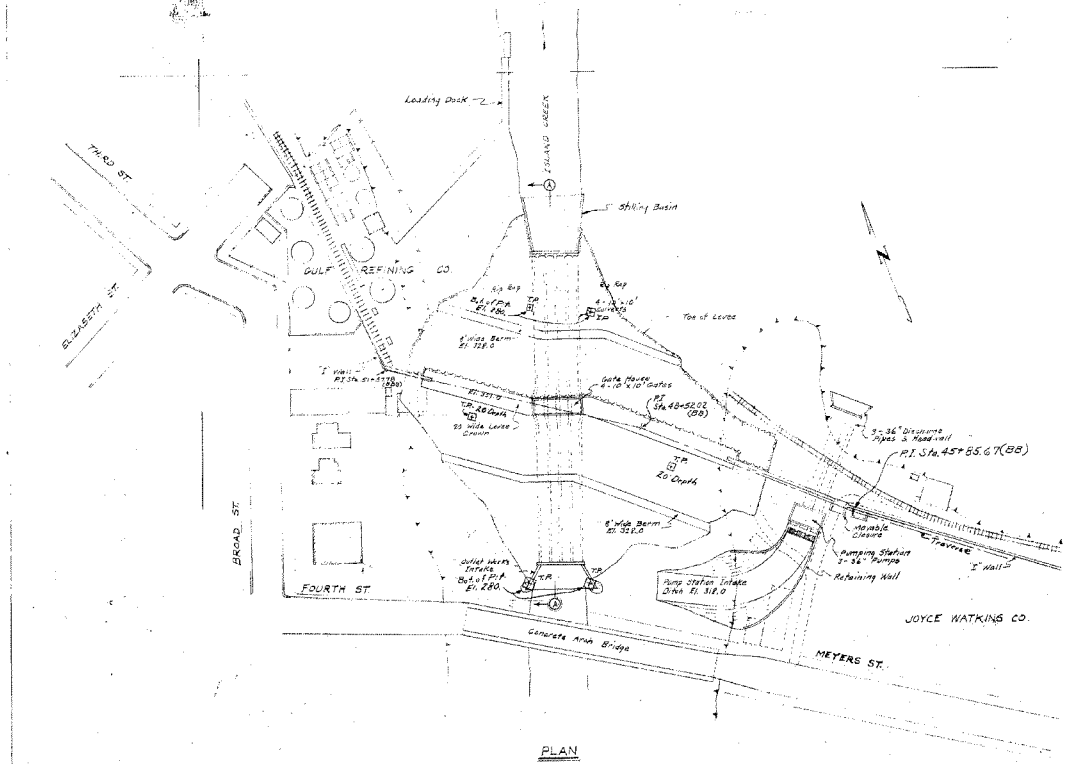
CHIEF OF ENGINEERS

"BELIEVED AS BUILT" 933-12.2/5

113

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

Note:
ROLLED FILL LEVEE, CONCRETE CULVERTS & SEPARATE PUMPING PLANT SHOWN ARE FROM PRELIMINARY DESIGNS AND SHOULD NOT INFLUENCE SELECTION OF ACTUAL TEST

BY	DATE	CHARACTER REVISION

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.
TEST PITS FOR
ISLAND CREEK WALL & PUMPING PLANT

SHEET 6 OF SHEETS SCALE: 1" = 50'

U.S. ENGINEER OFFICE LOUISVILLE, KY. MAY 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH, FLOOD CONTROL DIVISION

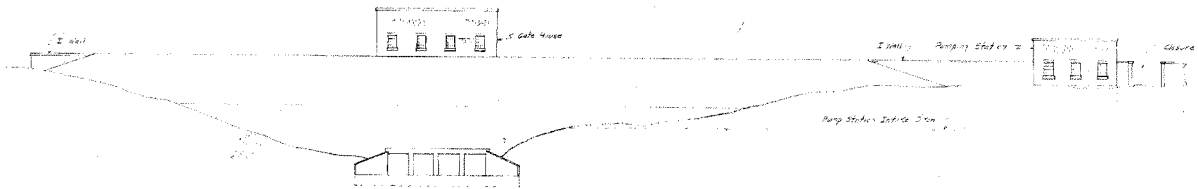
APPROVED: CHIEF, DESIGNER, STRUCT. DESIGNER

DR. BY E.W.B. TR. BY CK. BY E.W.B.

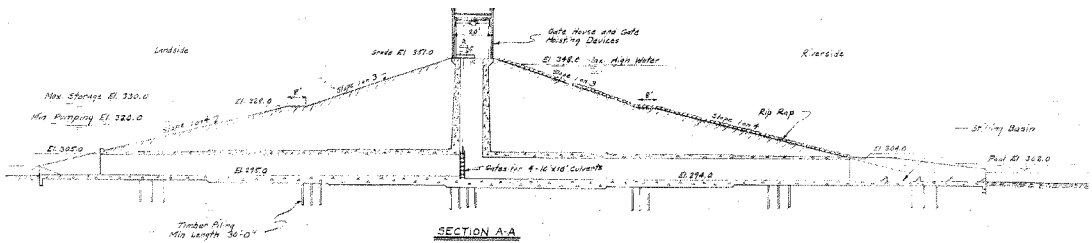
"BELIEVED AS BUILT" 833-12.2/6

WAR DEPARTMENT

CORPS OF ENGINEERS U. S. ARMY



LANDSIDE ELEVATION



SECTION A-A

BY	DATE	CHARACTER REVISIONS

ROLLED FILL LEVEE, CONCRETE CULVERTS & SEPARATE PUMPING PLANT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK WALL & PUMPING PLANT

SHEET 7 OF SHEETS SCALE: 1" = 20'

U.S. ENGINEER OFFICE LOUISVILLE KY. MAY 1940

SUBMITTED

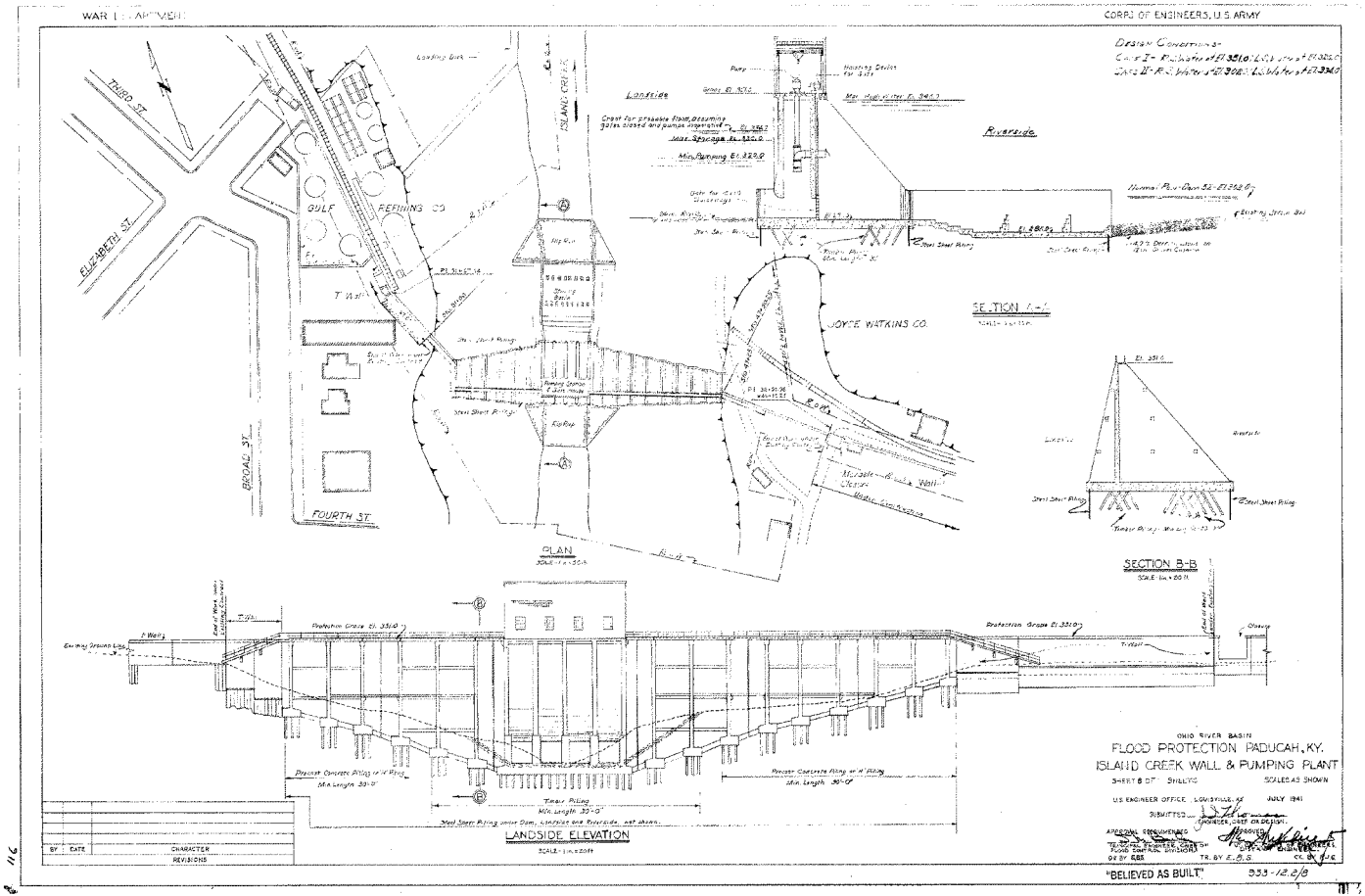
APPROVAL RECOMMENDED

APPROVED

DR. BY E.W.B. TR. BY CK. BY E.W.B.

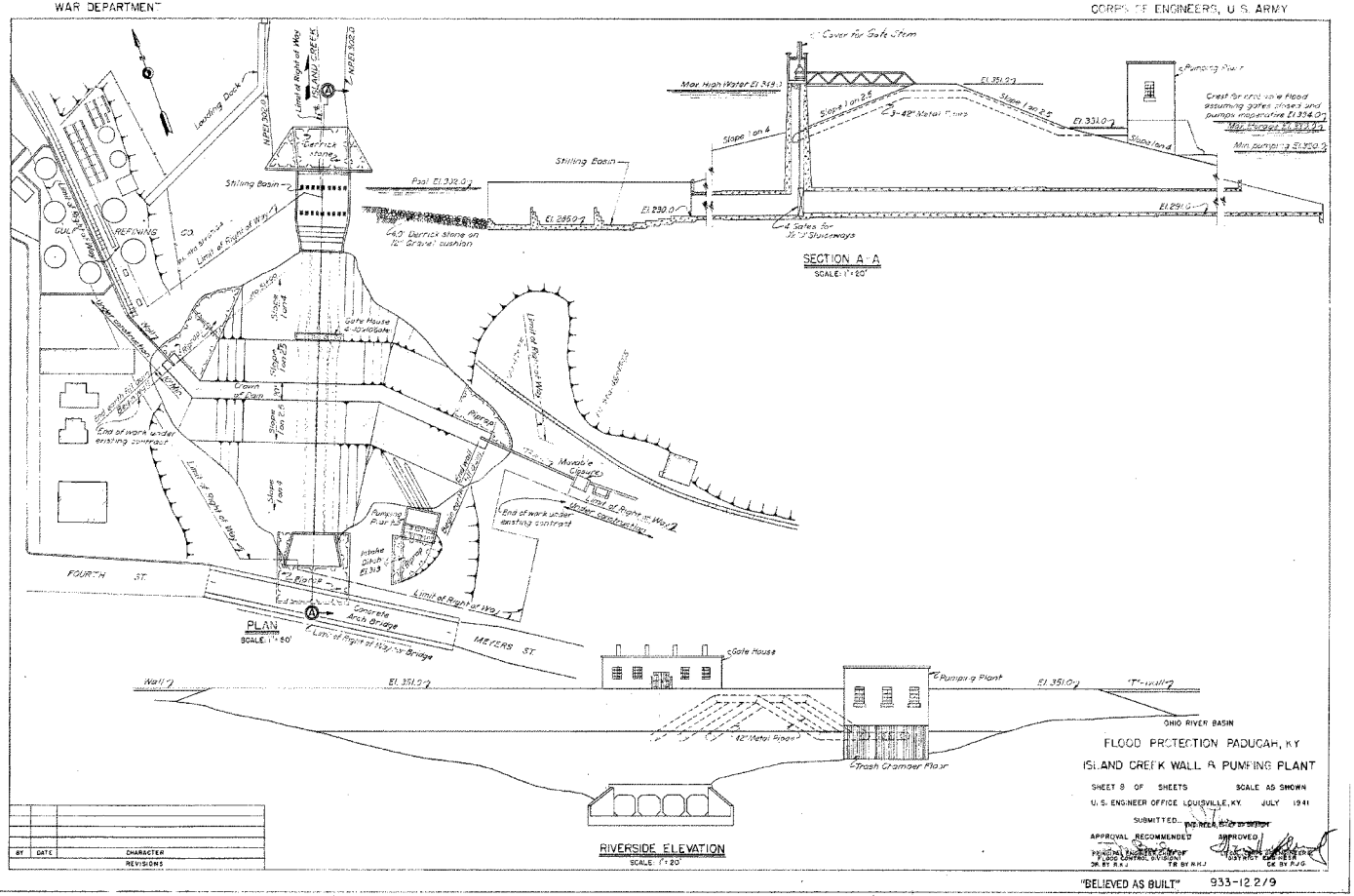
"BELIEVED AS BUILT" 933-12.2/7

115


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
Design Conditions
Landside
Riverside
ELIZABETH ST.
THIRD ST.
BROAD ST.
FOURTH ST.
GULF REFINING CO.
JOYCE WATKINS CO.
ISLAND CREEK
SECTION A-A
PLAN
SECTION B-B
LANDSIDE ELEVATION
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK WALL & PUMPING PLANT
SHEET 8 OF SHEETS
SCALE AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY
JULY 1941
"BELIEVED AS BUILT"
533-12.2/8

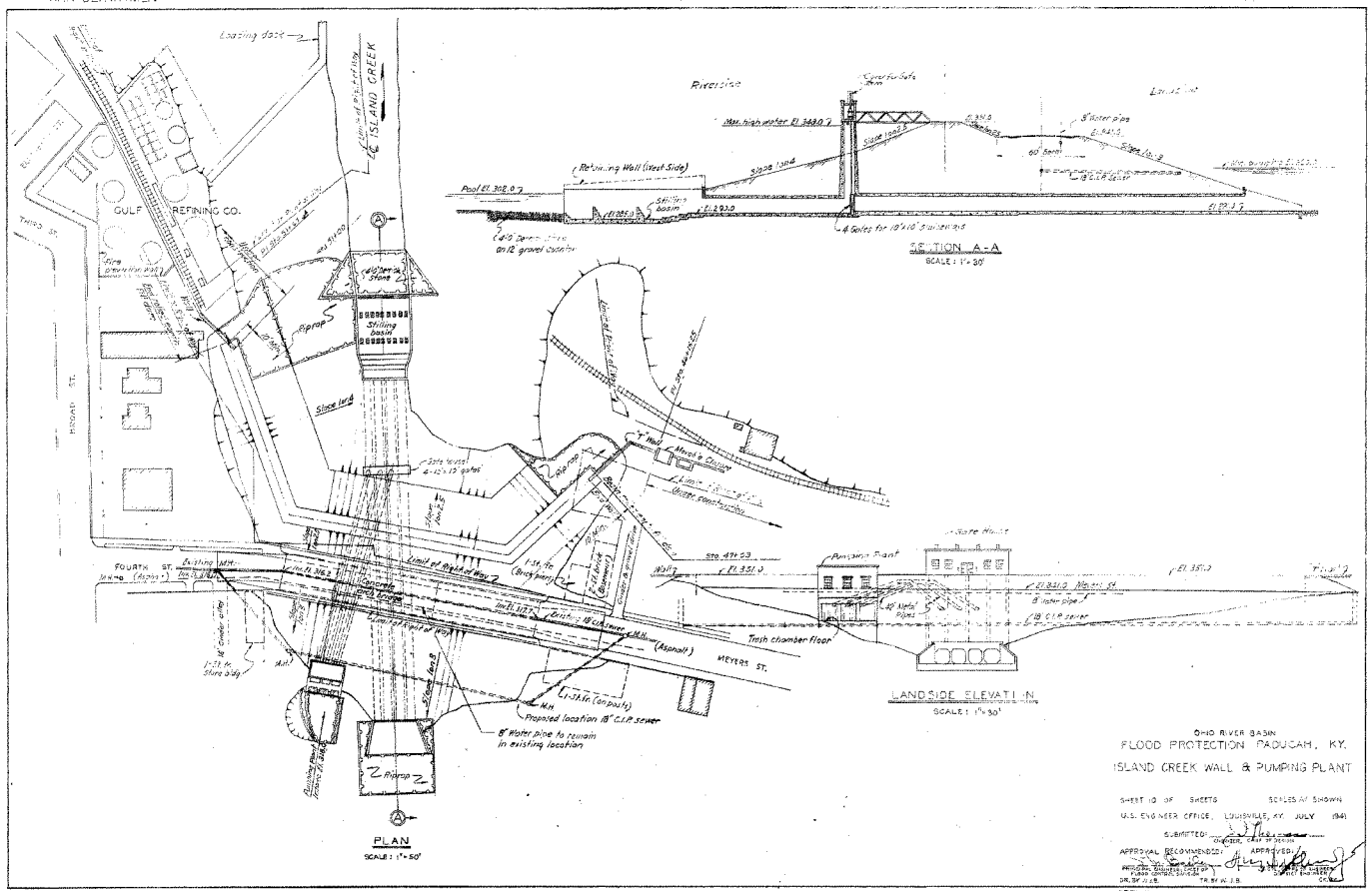
WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

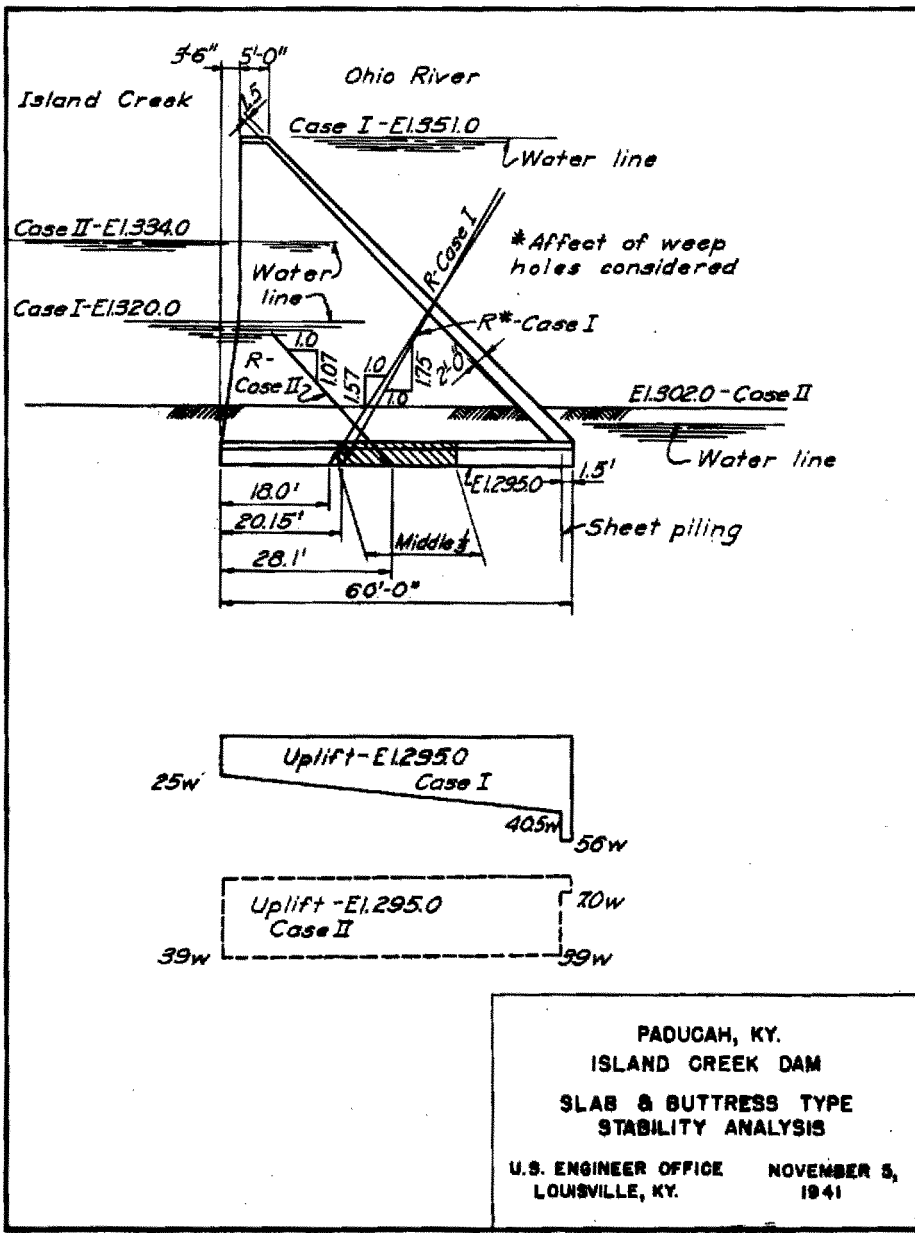


WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



118



PADUCAH, KY.
ISLAND CREEK DAM

SLAB & BUTTRESS TYPE
STABILITY ANALYSIS

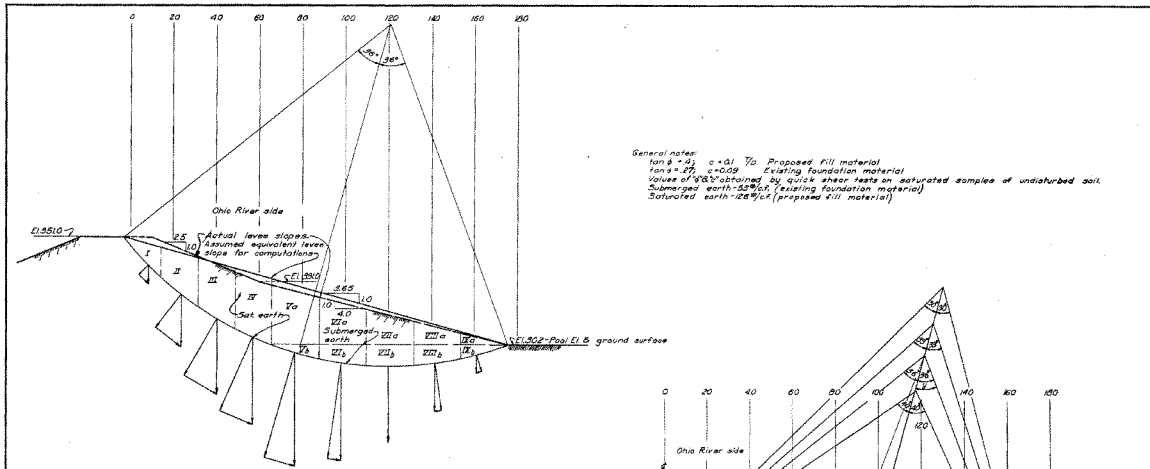
U.S. ENGINEER OFFICE
LOUISVILLE, KY.

NOVEMBER 5, 1941

"BELIEVED AS BUILT" - 12.2/A

WAR DEPARTMENT

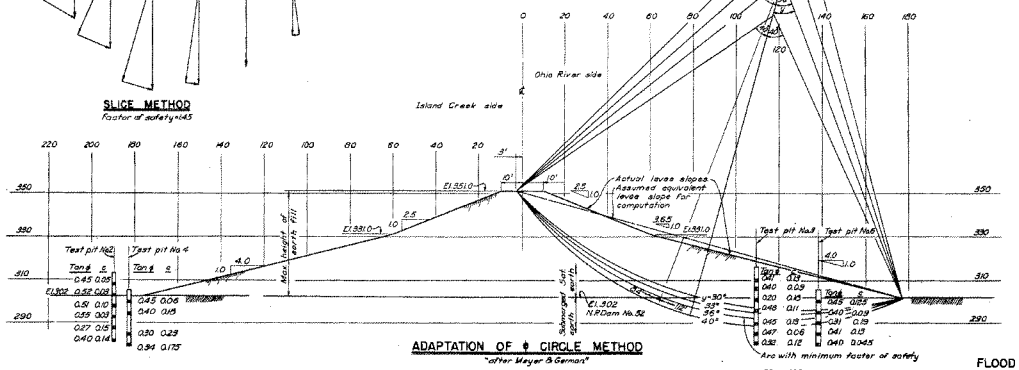
CORPS OF ENGINEERS, U. S. ARMY



General notes:
tan φ = 0.1, c = 0.1 T/□' Proposed fill material
tan φ = .27, c = 0.09 Existing foundation material
Values of φ & c obtained by quick shear tests on saturated samples of undisturbed soil.
Submerged earth - 53#/c.f. (existing foundation material)
Saturated earth - 126#/c.f. (proposed fill material)

SLICE METHOD

Factor of safety = 1.45



ADAPTATION OF φ CIRCLE METHOD

"after Meyer & German"

Min. factor of safety: $(y = 36°)\ \frac{1 - r_u \frac{b}{L}}{\sin \phi} + C_1 \sin \phi = \frac{0.0252}{0.0692} \times (3.51 \times 3.1) = 1.47 = F$

φ is weighted value computed as follows:
Tan φ × Length of arc
.4 × 84 = 33.6
.27 × 112 = 30.2
.36 × 86 = 31.0
φ = tan⁻¹ 0.326

SCALES: DIMENSIONS 1" = 20', FORCE 1" = 30,000#

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.
ISLAND CREEK DAM
EARTH DAM ANALYSIS

SHEET 2 OF 2 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOVEMBER, 1941

SUBMITTED: [signature] SENIOR ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN

APPROVED: [signature] LIEUTENANT COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY P.J.G. TR. BY R.L.B. CK. BY H.J.B.

BY	DATE	CHARACTER
		REVISIONS

"BELIEVED AS BUILT" 933-12.2/8

109

AS BUILT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B", UNIT I

IN 112 SHEETS — TITLE SHEET

U.S. ENGINEER OFFICE, LOUISVILLE, KY.

CONTENTS

933-12.3/ 1 GENERAL PLAN
933-12.3/ 2 PLAN AND PROFILE
933-12.3/ 3 PLAN AND PROFILE
933-12.3/ 4 PLAN AND PROFILE
933-12.3/ 5 PLAN AND PROFILE
933-12.3/ 6 PLAN AND PROFILE
933-12.3/ 7 PLAN AND PROFILE
933-12.3/ 8 PLAN AND PROFILE
933-12.3/ 9 PLAN, PROFILE & SECTIONS
(R) 933-12.3/10 BORINGS (DELETED)
(R) 933-12.3/11 BORINGS (DELETED)
933-12.3/12 WALL MONOLITHS
933-12.3/13 WALL MONOLITHS
933-12.3/14 WALL MONOLITHS
933-12.3/15 WALL MONOLITHS
933-12.3/16 "I" WALL DETAILS & MONOLITH NO.165
933-12.3/17 MISCELLANEOUS PIPES THRU WALL
933-12.3/18 DESIGN DATA STA. 72+50
933-12.3/19 SERVICE OPENINGS
933-12.3/20 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 1, 4 TO 9 & 12
933-12.3/21 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 2 & 3
933-12.3/22 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 10 & 11
933-12.3/23 MASONRY & REINFORCING DETAILS MONOLITH NO. 13
933-12.3/24 MASONRY & REINFORCING DETAILS MONOLITH NO. 14
933-12.3/25 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 15, 17, 18, & 19
933-12.3/26 MASONRY & REINFORCING DETAILS MONOLITH NO. 16
933-12.3/27 MASONRY & REINFORCING DETAILS MONOLITH NO. 101
933-12.3/28 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 102 TO 105
933-12.3/29 MASONRY & REINFORCING DETAILS MONOLITH NO. 106
933-12.3/30 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 286 TO 289
933-12.3/31 MASONRY & REINFORCING DETAILS MONOLITH NO. 290
933-12.3/32 DESIGN DATA 18 FT. "T" WALL
933-12.3/33 MASONRY & REINFORCING DETAILS MONOLITH NO. 157
933-12.3/34 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 158 TO 164
933-12.3/35 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 166 TO 169 & 215 TO 227
933-12.3/36 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 124 & 125
933-12.3/37 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 128 TO 137, 170, 171, 174, 207 TO 214 & 228 TO 234
933-12.3/38 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 172 & 173
933-12.3/39 MASONRY & REINFORCING DETAILS MONOLITH NO. 119
933-12.3/40 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 120 TO 123, 175 TO 181, 198 TO 203, 206, 246 TO 252 & 255 TO 259
933-12.3/41 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 204 & 205
933-12.3/42 MASONRY & REINFORCING DETAILS MONOLITH NO. 235
933-12.3/43 MASONRY & REINFORCING DETAILS MONOLITH NO. 236
933-12.3/44 MASONRY & REINFORCING DETAILS MONOLITH NO. 253
933-12.3/45 MASONRY & REINFORCING DETAILS MONOLITH NO. 254
933-12.3/46 MASONRY & REINFORCING DETAILS MONOLITH NO. 96
933-12.3/47 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 97 TO 100 & 107
933-12.3/48 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 108 TO 112, 138 TO 140, 142, 182, 183, 260 TO 270 & 273
933-12.3/49 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 113 TO 117, 141 & 272
933-12.3/50 MASONRY & REINFORCING DETAILS MONOLITH NO. 118
933-12.3/51 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 184 & 273
933-12.3/52 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 242 & 271
933-12.3/53 MASONRY & REINFORCING DETAILS MONOLITH NO. 274
933-12.3/54 MASONRY & REINFORCING DETAILS MONOLITH NO. 20
933-12.3/55 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 21, 22 & 23
933-12.3/56 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 85, 86, 90 & 91
933-12.3/57 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 87 TO 89 & 92 TO 94
933-12.3/58 MASONRY & REINFORCING DETAILS MONOLITH NO. 95
933-12.3/59 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 24 TO 26, 44 TO 68, 70, 72 TO 74 & 77
933-12.3/60 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 69 & 76
933-12.3/61 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 75 & 78
933-12.3/62 MASONRY & REINFORCING DETAILS MONOLITH NO. 71
933-12.3/63 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 79 TO 84
933-12.3/64 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 27 TO 31
933-12.3/65 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 32 & 33 TO 43
933-12.3/66 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 33 & 34
933-12.3/67 MISCELLANEOUS DETAILS
933-12.3/68 DESIGN DATA STAS. 29+80.3, 30+32.8, 31+01.3, 35+40.0 & 36+84.5
933-12.3/69 MASONRY DETAILS MOVABLE CLOSURES STA. 4+49.5 & STA. 5+34.5 & STORAGE VAULT STA. 4+00.0
933-12.3/70 REINFORCING DETAILS STA. 4+49.5 AND STA. 5+34.5 SILL AND ABUTMENTS
933-12.3/71 REINF. DETAILS STAS. 4+00.0 & 93+28.1 STORAGE VAULTS
933-12.3/72 MASONRY DETAILS MOVABLE CLOSURES STA. 9+44.0 & STA. 10+40.0
933-12.3/73 REINF. DETAILS STAS. 9+44.0 & 10+40.0 SILL & ABUTMENTS
933-12.3/74 REINFORCING DETAILS STA. 10+40.0 STORAGE VAULT
933-12.3/75 MASONRY DETAILS MOVABLE CLOSURE STA. 25+15.4
933-12.3/76 REINFORCING DETAILS STA. 25+15.4
933-12.3/77 MASONRY DETAILS STORAGE VAULT STA. 28+02.29
933-12.3/78 REINFORCING DETAILS STA. 26+02.29 STORAGE VAULT
933-12.3/79 MASONRY DETAILS MOVABLE CLOSURE STA. 26+90.3
933-12.3/80 REINFORCING DETAILS STA. 26+90.3 SILL AND ABUTMENTS
933-12.3/81 MASONRY DETAILS MOVABLE CLOSURES STAS. 29+80.3, 31+01.3 & 36+84.5 & STORAGE VAULTS STAS. 30+32.8 & 36+40.0
933-12.3/82 REINFORCING DETAILS STA. 29+80.3, STA. 31+01.3 & STA. 36+84.5 SILL & ABUTMENTS
933-12.3/83 REINFORCING DETAILS STA. 30+32.8 & STA. 36+40.0 STORAGE VAULTS
933-12.3/84 MASONRY DETAILS MOVABLE CLOSURES STA. 31+51.4, STA. 71+74.5 & STA. 75+85.1
933-12.3/85 REINFORCING DETAILS STA. 31+51.4, STA. 71+74.5 & STA. 75+85.1 SILL AND ABUTMENT
933-12.3/86 REINFORCING DETAILS STA. 31+51.4, STA. 71+74.5 & STA. 75+85.1 STORAGE VAULTS
933-12.3/87 MASONRY DETAILS MOVABLE CLOSURES STAS. 51+87.3 & 54+37.6
933-12.3/88 REINF. DETAILS STAS. 51+87.3 & 54+37.6 SILL, ABUTMENT & STORAGE VAULT
933-12.3/89 MASONRY DETAILS MOVABLE CLOSURE STA. 62+84.3
933-12.3/90 REINFORCING DETAILS STA. 62+84.3 SILL AND ABUTMENTS
933-12.3/91 REINFORCING DETAILS STA. 62+84.3 "T" WALL
933-12.3/92 MASONRY DETAILS STORAGE VAULT STA. 68+61.0
933-12.3/93 REINFORCING DETAILS STA. 62+84.3 AND STA. 68+61.0 STORAGE VAULTS
933-12.3/94 MASONRY DETAILS MOVABLE CLOSURES STAS. 67+73.4 & 69+54.4
933-12.3/95 REINFORCING DETAILS STAS. 67+73.4 & 69+54.4 SILL AND ABUTMENTS
933-12.3/96 MASONRY DETAILS MOVABLE CLOSURE STA. 83+92.1 & STORAGE VAULT STA. 83+26.1
933-12.3/97 REINFORCING DETAILS STA. 83+92.1 SILL & ABUTMENTS
933-12.3/98 TRUSS ANCHORAGE DETAILS
933-12.3/99 MISCELLANEOUS DETAILS
933-12.3/100 MISCELLANEOUS DETAILS
933-12.3/101 MASONRY & REINFORCING DETAILS CATCH BASINS NOS. 1 & 5
933-12.3/102 MASONRY & REINFORCING DETAILS CATCH BASIN NO. 2
933-12.3/103 MASONRY & REINFORCING DETAILS CATCH BASINS NOS. 4 & 6 AND DRAINAGE STRUCTURE STA. 64+87
933-12.3/104 MASONRY & REINFORCING DETAILS MANHOLE NO. 1
933-12.3/105 MASONRY & REINFORCING DETAILS MANHOLE NO. 2
933-12.3/106 MASONRY & REINFORCING DETAILS MANHOLE NO. 3
933-12.3/107 MASONRY & REINFORCING DETAILS MANHOLE NO. 4
933-12.3/108 MASONRY & REINFORCING DETAILS MANHOLE NO. 5
933-12.3/109 MASONRY & REINFORCING DETAILS MANHOLE NO. 6
933-12.3/110 DRAINAGE STRUCTURE STA. 19+11
933-12.3/111 REINFORCING DETAILS STA. 19+11
933-12.3/112 SEWER OUTLET & DRAINAGE STRUCTURE DETAILS

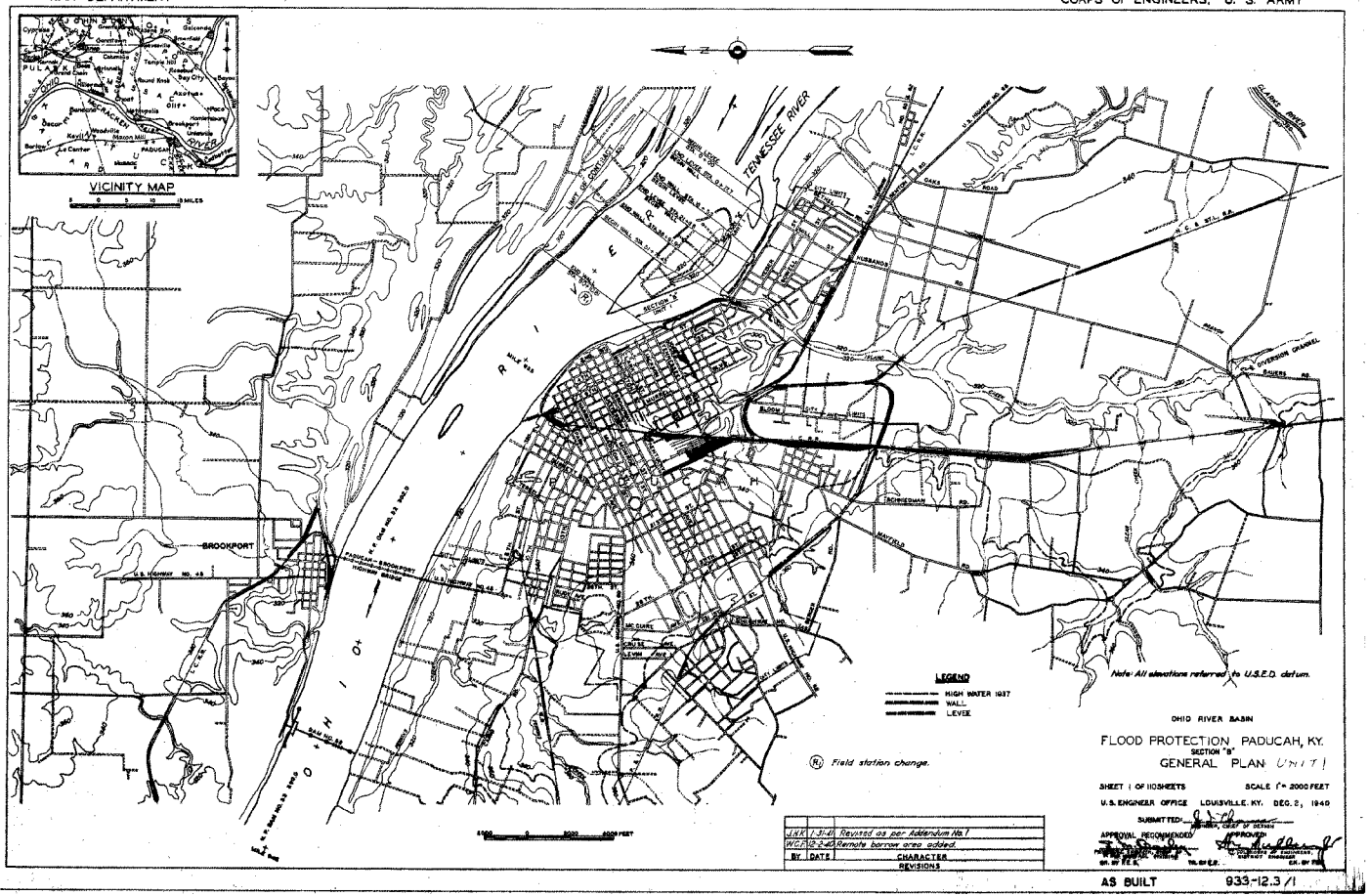
(R) Sheets deleted

AS BUILT

661

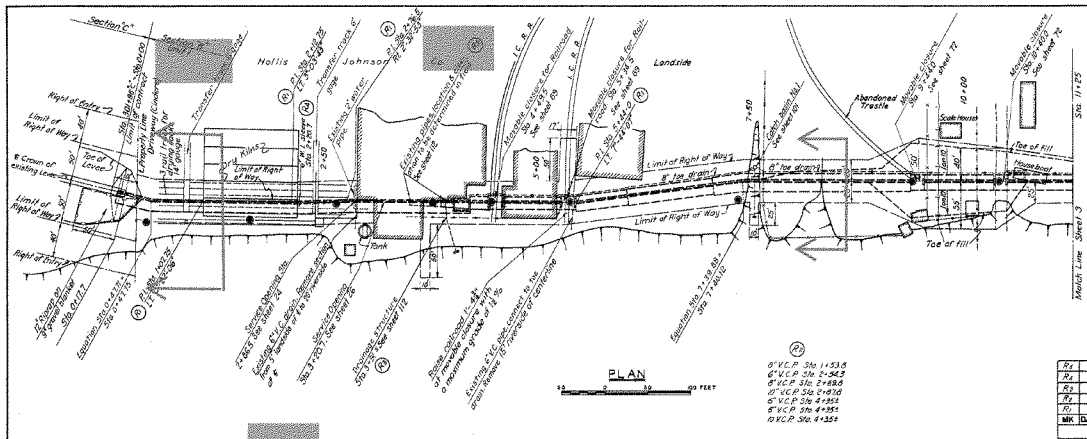
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

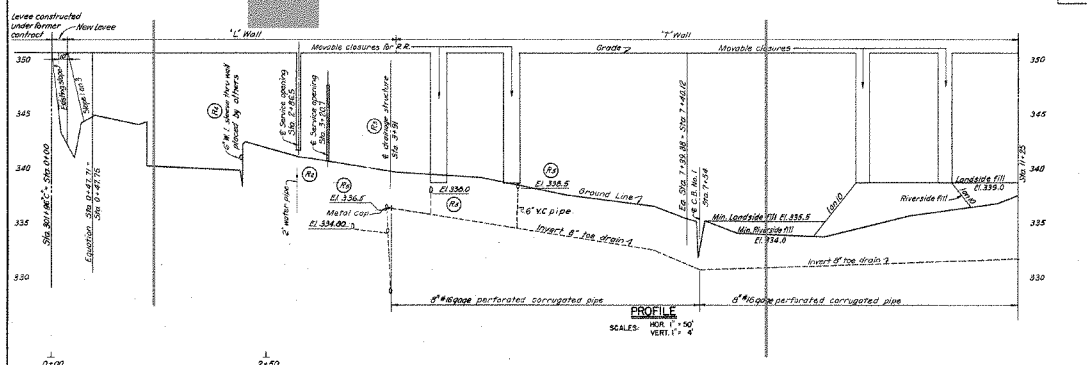


PLAN

General Notes:
All elevations referred to U.S.C.D. datum.
For log of borings see sheets 10 & 11
For typical sections see sheet 9
For table of sewer connections see sheet 10.
For location of remote borrow area see sheet 1.

R1	Field		Relocation of pipes
R2	Field		8" W.I. sleeve placed
R3	Field		Drainage structure location changed
R4	Field		Pipes abandoned
R5	Field		Station and angles added
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS



PROFILE
SCALES: HOR. 1" = 50' VERT. 1" = 4'

F.B.R.	11-20-42	Minor corrections & right-of-way revised
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE

SHEET 2 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] Chief of Design

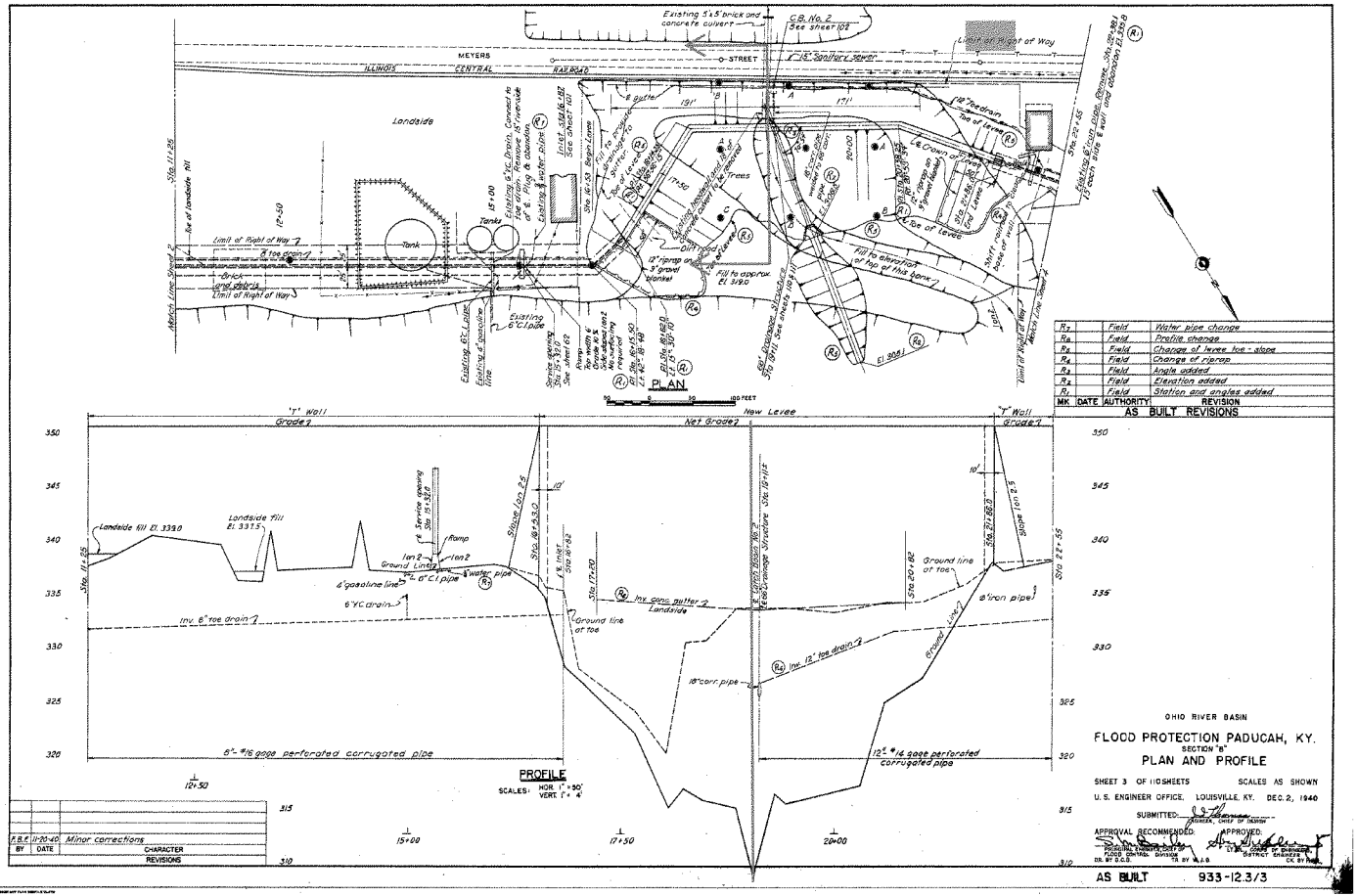
APPROVAL RECOMMENDED: APPROVED:

AS BUILT 933-12.3/2

663

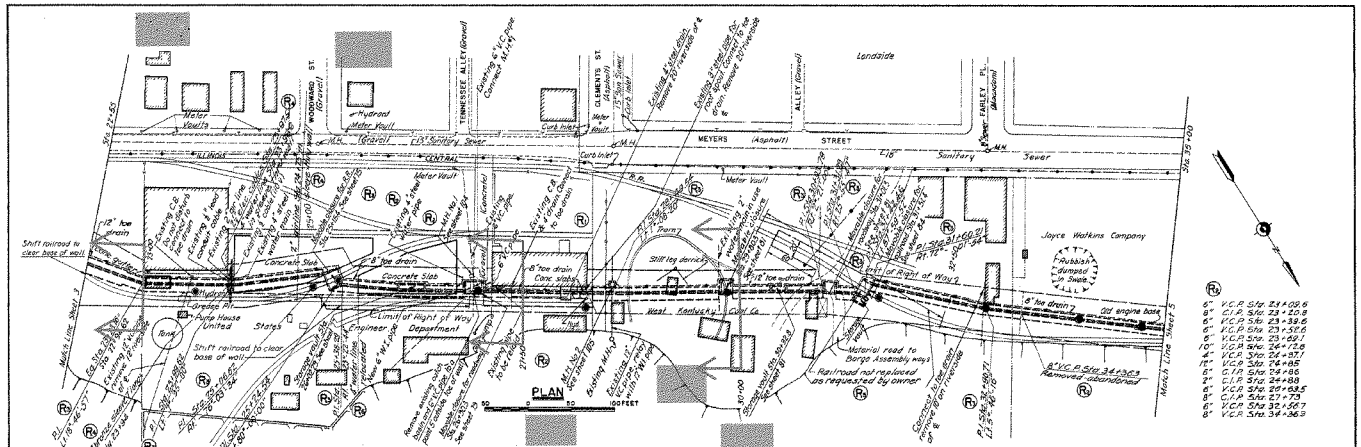
WAR DEPARTMENT

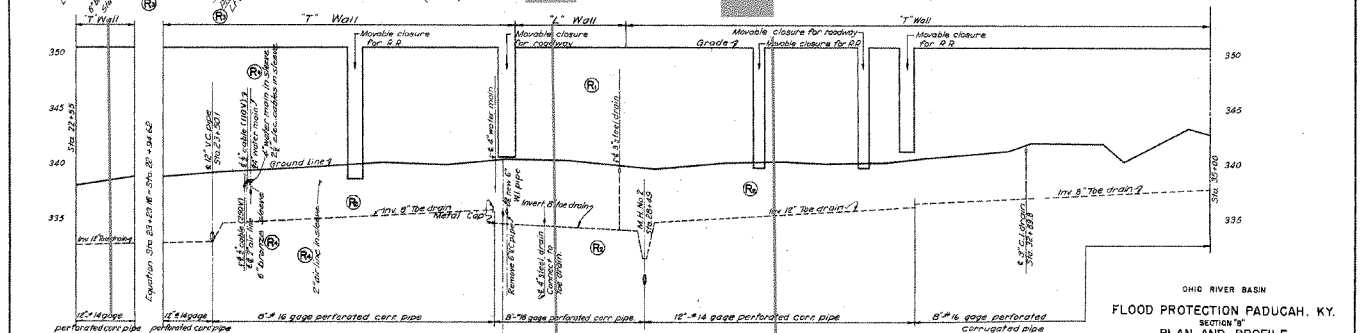
CORPS OF ENGINEERS, U. S. ARMY


PLAN
PROFILE
SCALES: HOR. 1" = 50'
VERT. 1" = 4'
Landside
Tank
Tanks
MEYERS STREET
ILLINOIS CENTRAL RAILROAD
Existing 5'x5' brick and concrete culvert
C.B. No. 2 See sheet 102
15" sanitary sewer
Limit of Right of Way
Brick
Land stairs
Limit of Right of Way
Existing 8" C.I. pipe
Existing 6" gasoline line
Existing 6" V.C. Drain. Connect to toe drain. Remove 15" riverside of E. Bldg. & abandon
Existing 4" water pipe
Inlet Sta. 16+82 See sheet 101
Sta. 16+58 Begin Levee
Fill to provide 2' freeboard
Fill to approx. El. 319.0
Fill to elevation of top of this bank
Fill to approx. El. 319.0
Old flood wall
Existing concrete culvert
Existing concrete pipe culvert
Trees
Service opening Sta. 15+30.5 See sheet 102
Top wall & Stoop W.S. Stoop wall not necessary
Sta. 16+15.50 El. 322.8 to 319
Sta. 16+15.50 El. 319.0
Sta. 16+15.50 El. 319.0
Sta. 16+15.50 El. 319.0

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





PROFILE

SCALE: HOR. 1" = 50'
VERT. 1" = 4'

F.B.F.	1-20-40	Minor corrections & right-of-way revised	
BY	DATE	CHARACTER	
		REVISIONS	

22		Field	Water line relocated
21		Field	Interchanged
20		Field	Sleeve thru wall
19		Field	Station and angles added
18		Field	Pipes removed
17	5-1-41	C.D.#1	Service opening deleted
MK	DATE	AUTHORITY	REVISION
		AS BUILT	REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 4 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] Assistant, Chief of Design

APPROVAL RECOMMENDED: [illegible] Chief, Design Section

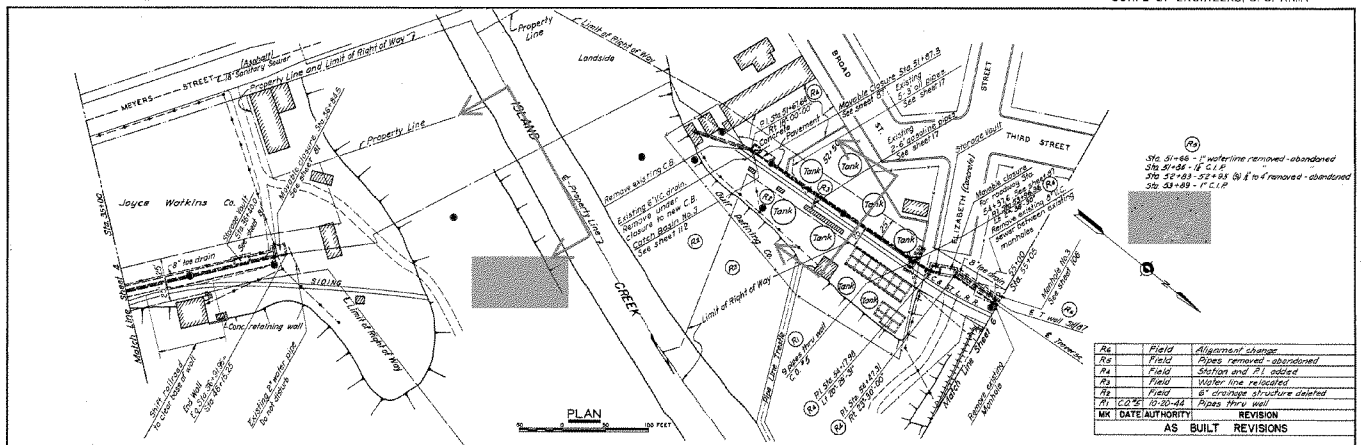
APPROVED: [illegible] Lt. Col., Corps of Engineers, District Engineer

DR. BY P.S. — CK. BY A.D.C. — TR. BY A.D.C. — CK. BY M.M.

AS BUILT 933-12.3/4

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	AUTHORITY	REVISION
R6		Field	Alignment change
R5		Field	Pipes removed - abandoned
R4		Field	Station and P.I. added
R3		Field	Water line relocated
R2		Field	6" drainage structure deleted
R1	C.O.#5	10-20-44	Pipes thru wall

AS BUILT REVISIONS

BY	DATE	CHARACTER
J.R.K.	1-31-41	Revised as per Addendum No. 1
F.B.S.	11-20-40	Wall location changed Sta. 51+57.54 to Island Creek dam and minor corrections.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 5 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] Project Engr. of Design

APPROVAL RECOMMENDED: [signature] Principal Engineer, Chief Flood Control Division

APPROVED: [signature] Lt. Col., C.E., Chief of Engineering, District Engineer

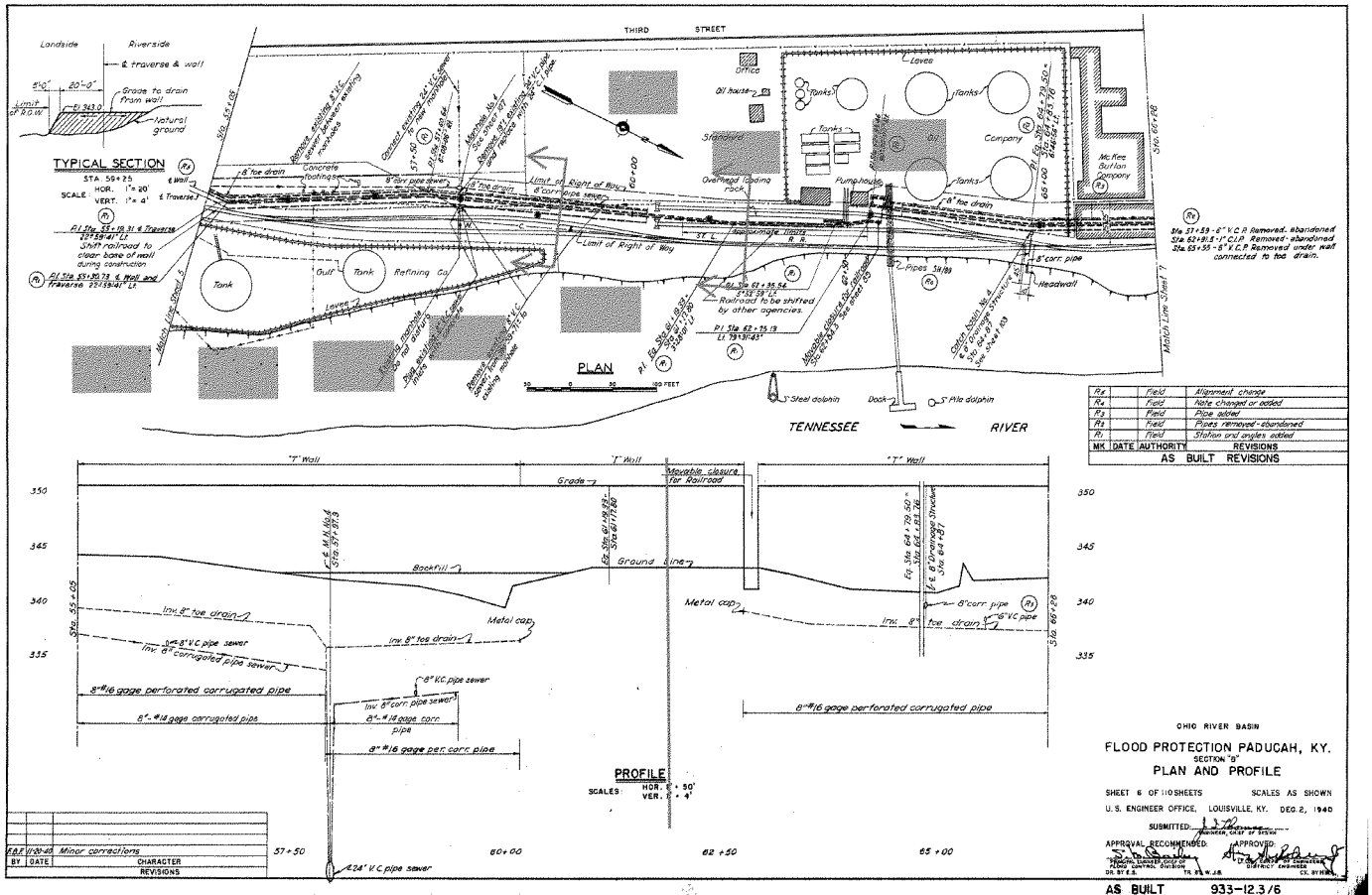
DR. BY P.S. TR. BY P.S. CK. BY M.S.S.

AS BUILT 933-12.3/5

666

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R6		Field	Alignment change
R4		Field	Note changed or added
R3		Field	Pipe added
R2		Field	Pipes removed - abandoned
R1		Field	Station and angles added
MK	DATE	AUTHORITY	REVISIONS

AS BUILT REVISIONS

F.B.X. 11-30-48	Minor corrections	
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 6 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: J. J. Warner
ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: Thos. R. Jones
CHIEF, FLOOD CONTROL DIVISION

APPROVED: Alex W. Bailey
DISTRICT ENGINEER

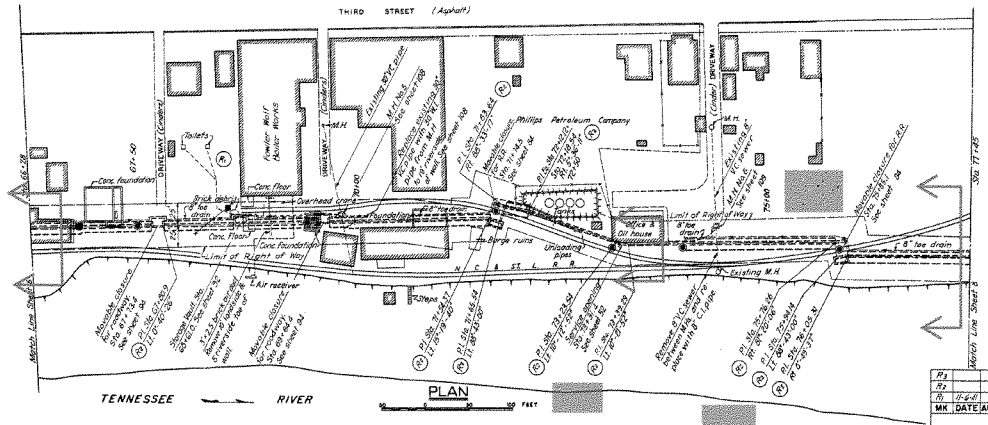
DR. BY E.S. TR. BY W.J.B. CK. BY H.W.L.

AS BUILT 933-12.3/6

667

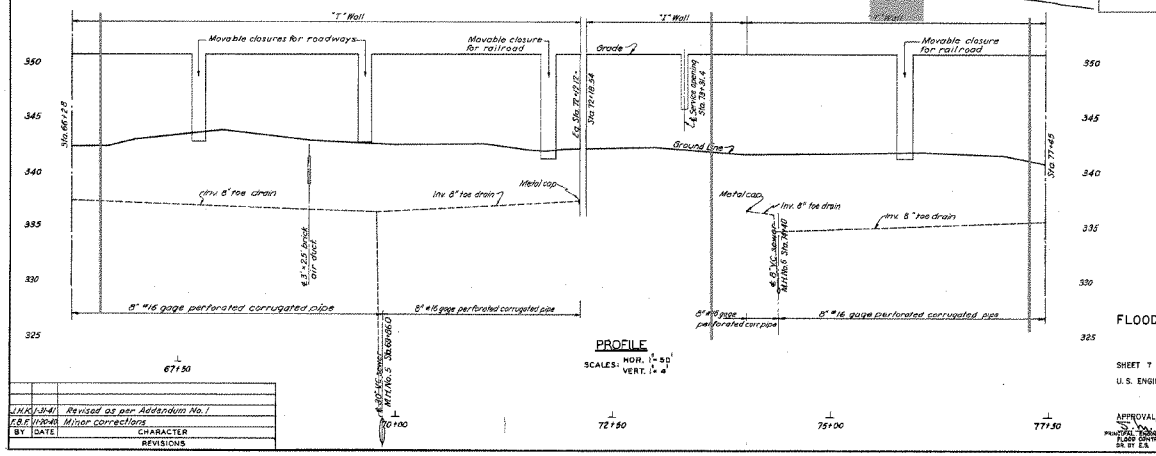
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R3		Field	Pipes removed, abandoned
R2		Field	Station and angles added
R1	11-6-41	C.D.K.	8" corrugated sewer Sta 66+08 to M.H. No. 5
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS



J.H.K.	1-31-41	Revised as per Addendum No. 1
F.B.K.	11-20-40	Minor corrections
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 7 OF 110 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: LOUIS A. PAGANINI, DISTRICT ENGINEER

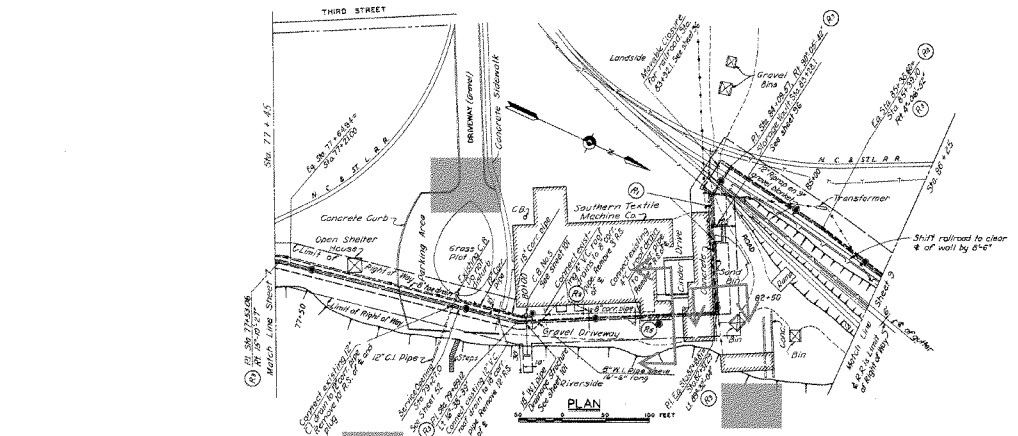
DR. BY E.A. TR. BY T.S. CK. BY W.M.L.

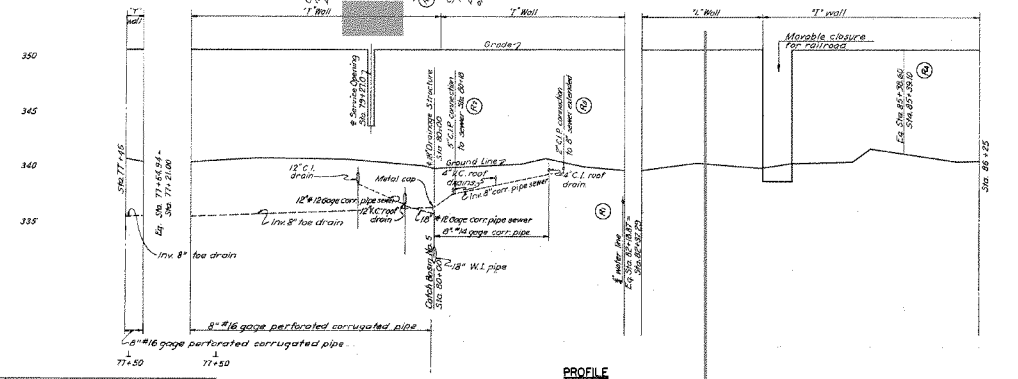
AS BUILT 933-12.3/7

668

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





MK	DATE	AUTHORITY	REVISIONS
R4		Field	Pipe removed under wall & connected to 8" sewer
R3		Field	Station change
R2		Field	Station and angles added
R1		Field	8" C.I.P. removed under wall & connected to 8" sewer
R1		U-741 C.O. #11	℄ water line relocated

AS BUILT REVISIONS

BY	DATE	CHARACTER REVISIONS
F.B.E.	11-30-40	Minor corrections

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 8 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION, CR. BY E.B.

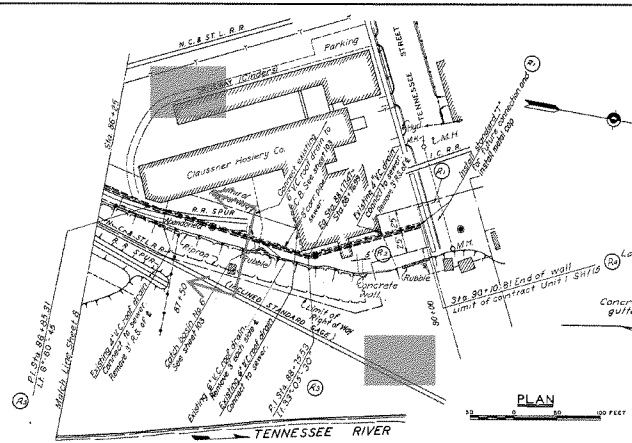
APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER, CR. BY H.W.L. TR. BY A.B.D.

AS BUILT 933-12.3/8

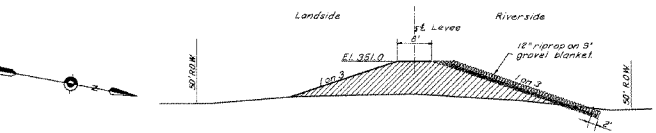
699

WAR DEPARTMENT

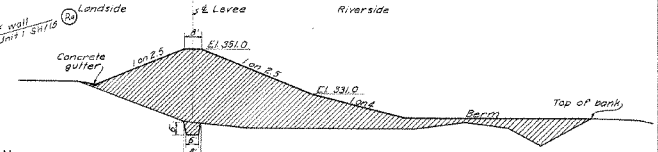
CORPS OF ENGINEERS, U. S. ARMY



PLAN

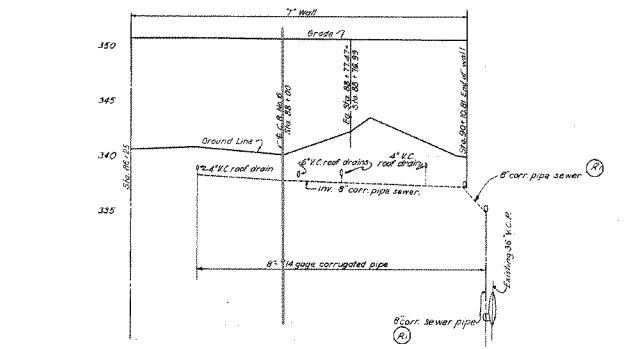


LEVEE
STA. 0+12
SCALE: 1" = 10'

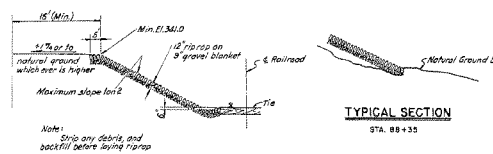


LEVEE
STA. 20+30
SCALE: 1" = 20'

TYPICAL SECTIONS



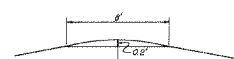
PROFILE
HOR 1" = 50'
VERT. 1" = 4'



Note:
Strip any debris, and backfill before laying riprap

TYPICAL SECTION
STA. 88+50
SHOWING RIPRAPPED BANK
NOT TO SCALE

TYPICAL SECTION
STA. 88+35



CROWN DETAIL
NO SCALE

MK.	DATE	AUTHORITY	REVISION
R4		Field	Station change
R3		Field	Station & angles added
R2		Field	24" V.C.P. removed under wall & connected to sewer
R1	7-31-41	C.O. # 3	Wall moved 3.19 deleted, Mono. 32.0 rear corner sheet 8 joint relocated SH/17

AS BUILT REVISIONS

BY	DATE	CHARACTER REVISIONS
JNK	1-31-41	Revised as per Addendum No. 1
F.B.F.	11-20-40	Minor corrections

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

PLAN, PROFILE & SECTIONS

SHEET 9 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible]
DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible]
PRINCIPAL ASSISTANT ENGINEER
DR. BY O.R.L.

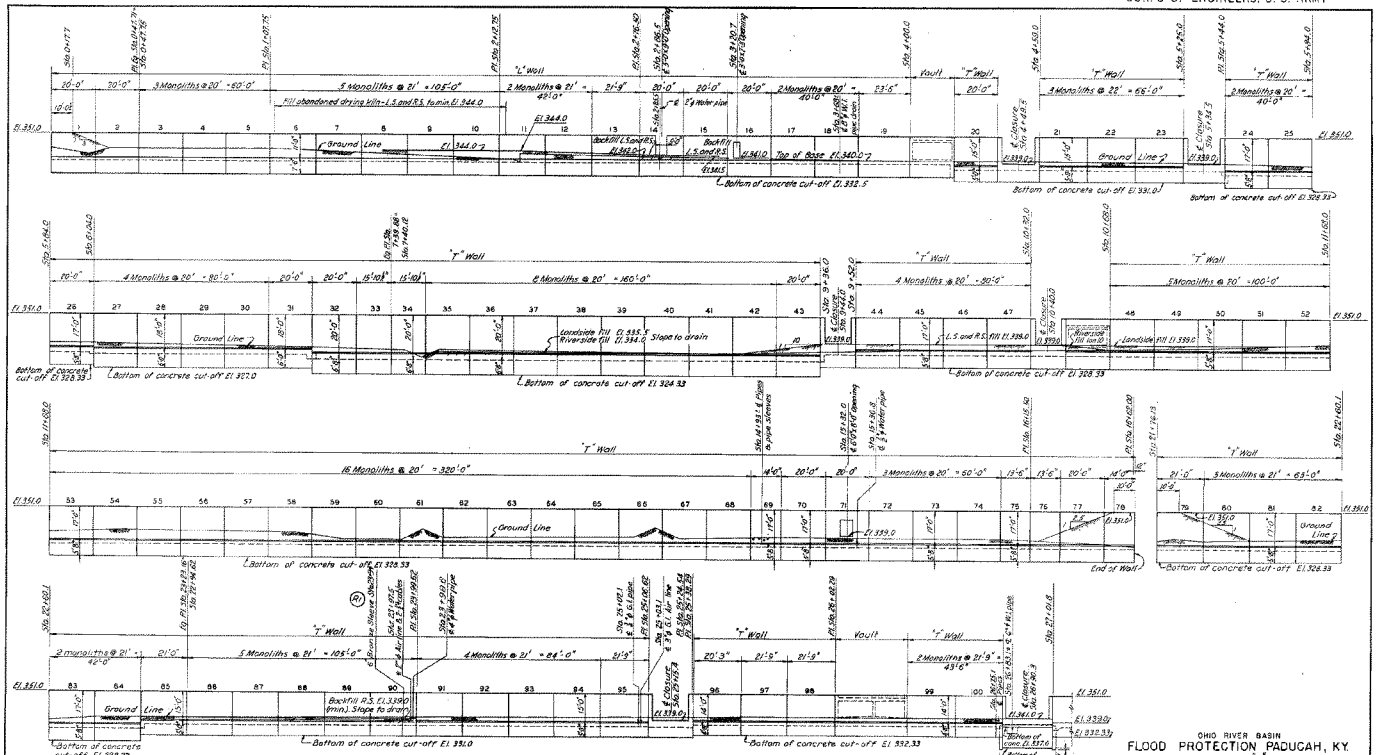
APPROVED: [illegible]
LT. COLONEL OF ENGINEERS
DISTRICT ENGINEER
TR. BY D. R. L. CK. BY M.E.

AS BUILT 933-12.3/9

670

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



General Notes:
All monolith joints for "T" walls are to be made on pile interlocks.
Expansion joints with copper seal strip and premolded filler strips shall be placed on all monolith joints except where special expansion joints are shown on the drawings.
For typical expansion joint details see sheet 67.
For special expansion joint details see sheet 102.
For typical sections showing backfill at wall see sheets 6 and 52.
For excavation payment line see sheet 87.
For detail of copper seal strip see sheet 93 & 67

(R1) Change in pipes - Stations "Field"

BY	DATE	CHARACTER OF REVISIONS
JHK	1-31-41	Revised as per Addendum No. 1
FBK	10-30-40	Minor corrections

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

WALL MONOLITHS

SHEET 10 OF 110 SHEETS SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] CAPTAIN, CORPS OF ENGINEERS

APPROVAL RECOMMENDED: [signature] PRINCIPAL ASSISTANT ENGINEER, FLOOD CONTROL DIVISION

APPROVED: [signature] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY H. A. TR. BY W.J.B. CK. BY K.S.F.

AS BUILT

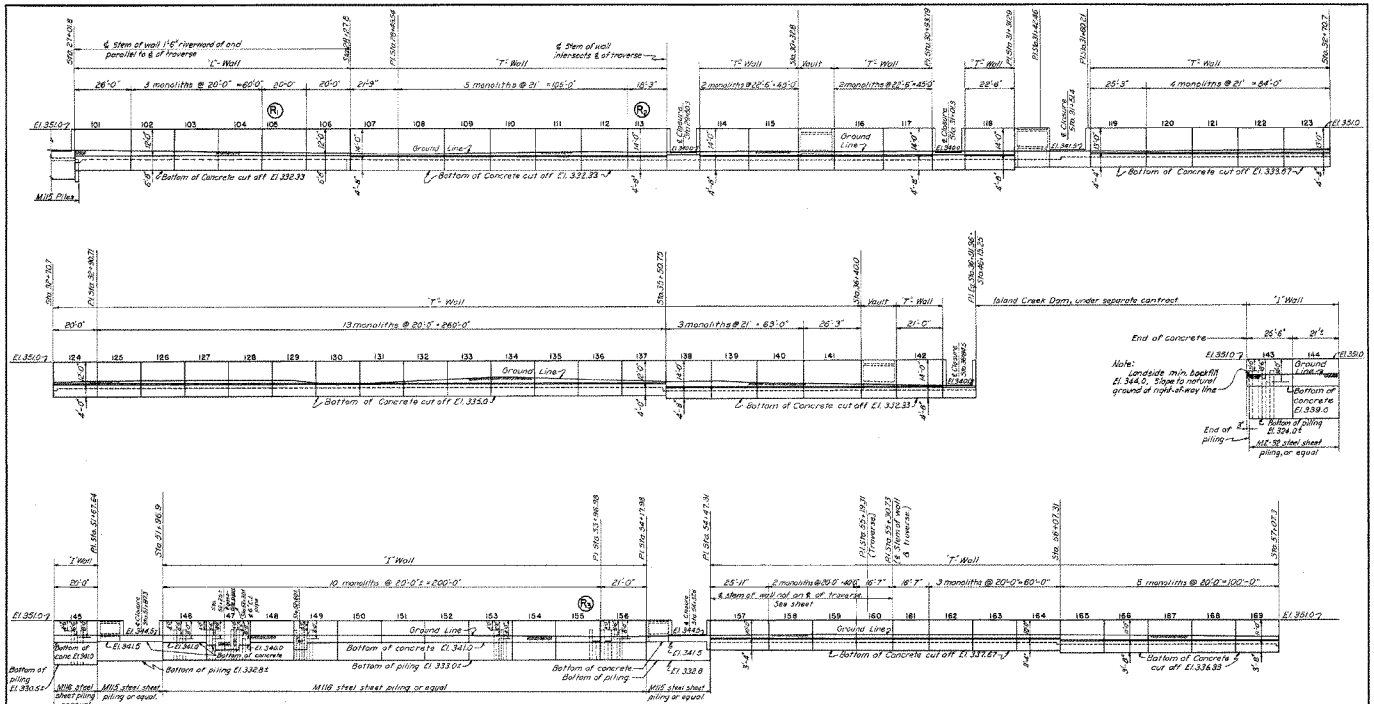
933-12.3/12

671

395

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 11 OF 110 SHEETS — SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] PROJECT CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER FLOOD CONTROL DIVISION DA. 81 K.M.A.

APPROVED: [signature] F. B. GIL, MAJOR, CORPS OF ENGINEERS, DISTRICT ENGINEER TR. BY MS.G. CR. BY FMP.

BY	DATE	CHARACTER REVISIONS
T.B.T.	11-20-40	Traverse revised and monolith 165 changed.

MK	DATE	AUTHORITY	REVISION
(Rs)	10-29-41	C.O. #5	9 pipes thru wall
(Rn)		Field	Pipe removed - abandoned
(R)	5-19-41	C.O. #7	Service opening deleted

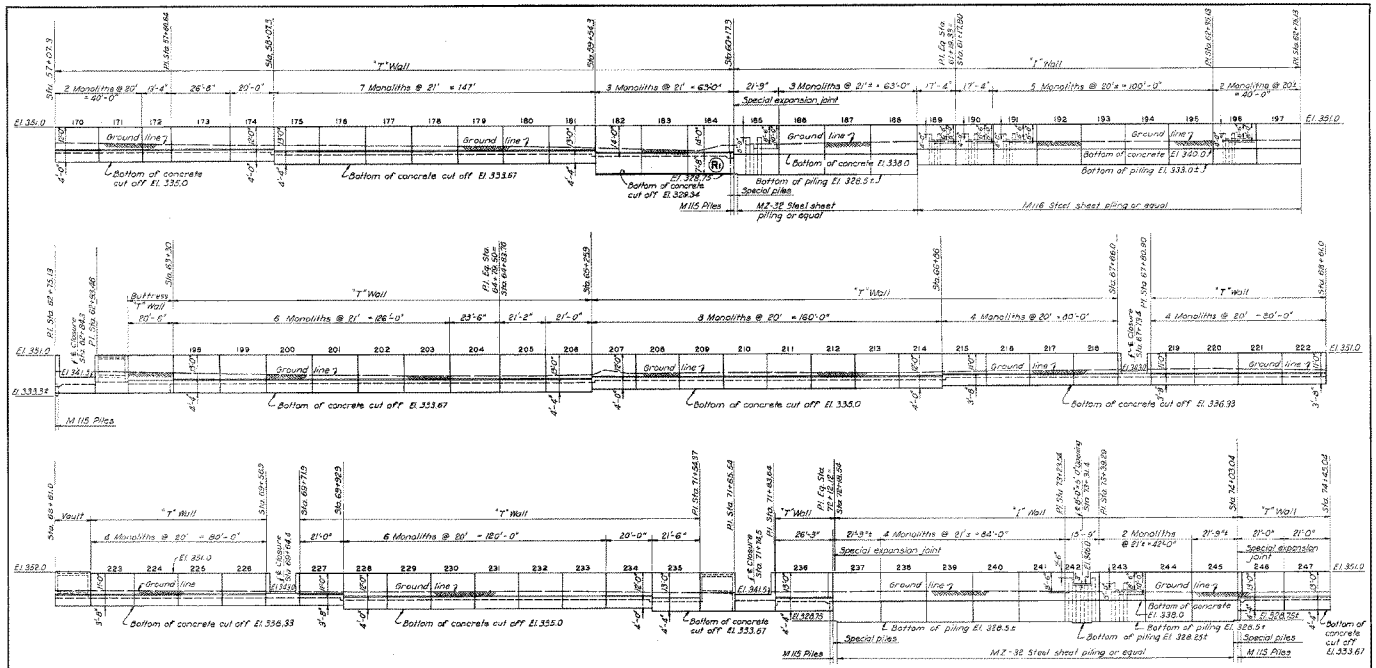
AS BUILT REVISIONS

AS BUILT 933-12.3/13

672

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 12 OF 110 SHEETS SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: CHIEF, DESIGN SECTION, CHIEF, TECHNICAL DIVISION

APPROVED: CHIEF, ENGINEERING DIVISION, CHIEF ENGINEER

DR. BY K.H.A. TR. BY E.B.G. CK. BY F.B.

BY	DATE	CHARACTER OF REVISIONS
JHK	1-31-41	Revised as per Addendum No. 1

MK	DATE	AUTHORITY	REVISION
(R)	6-29-41	C.O. #7	Monoliths 182 to 184 increased in depth from 4'-8" to 7'-8"

AS BUILT REVISIONS

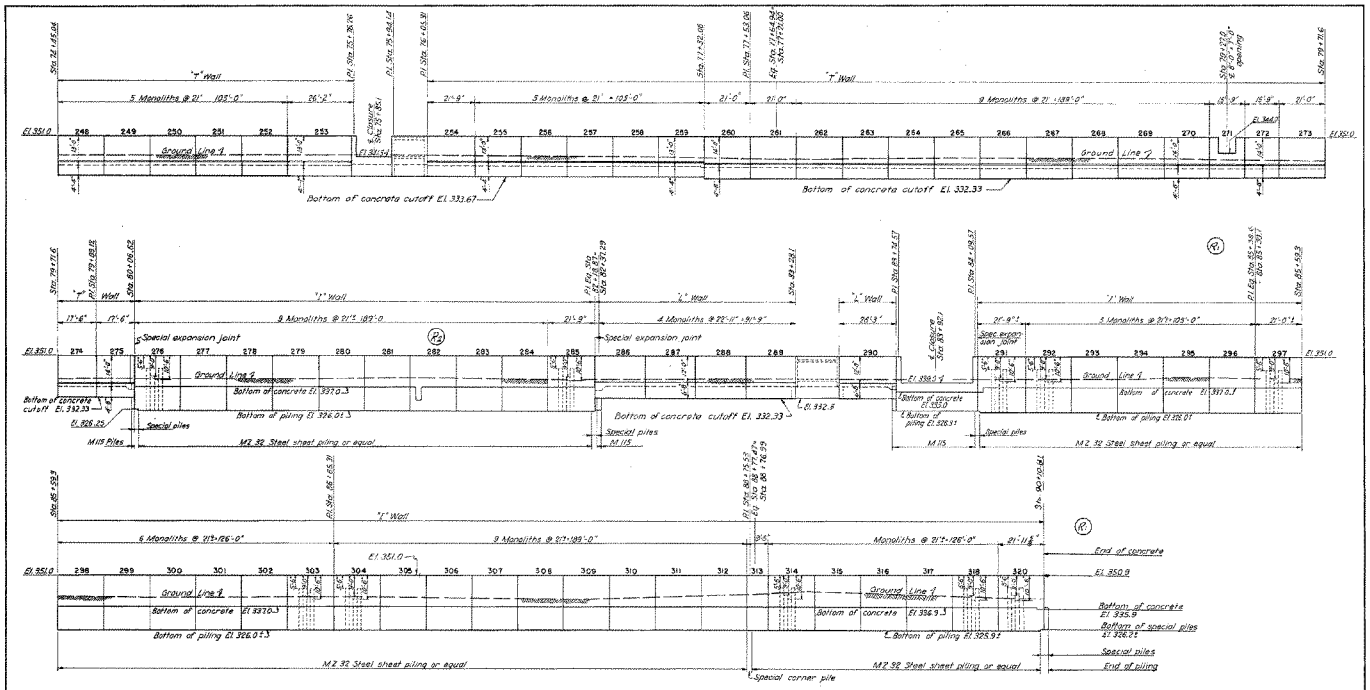
AS BUILT 933-12.3/14

673

377

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 13 OF 110 SHEETS SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PROJECT ENGINEER CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY H.R.K. TR. BY R.G. CK. BY F.B.

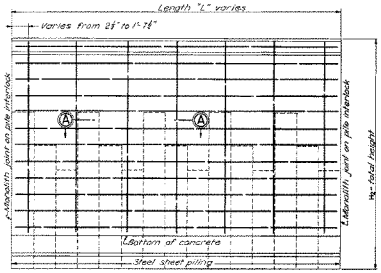
BY	DATE	CHARACTER
		REVISIONS

R2		Field	4" W.I. Pipe removed-abandoned
R1	3/1/41	C.O. # 3	Mono. 3 lengthened 320 rearrange
MK.	DATE	AUTHORITY	REVISION & pipe relocated

AS BUILT REVISIONS

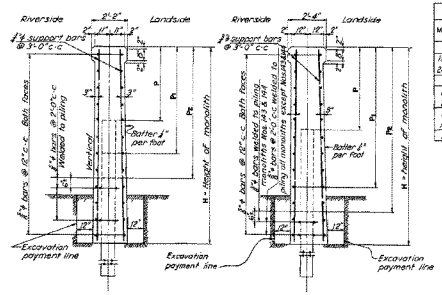
AS BUILT 933-12.3/15

674



TYPICAL "I" WALL MONOLITH

SCALE: ⅛" = 1'-0"



TYPICAL SECTION

SCALE: ⅛" = 1'-0"

MONOLITHS NOS. 146 TO 156, 190 TO 197

TYPICAL SECTION

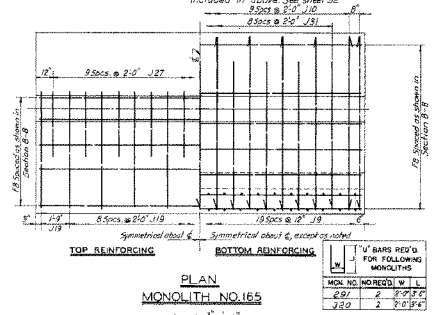
SCALE: ⅛" = 1'-0"

MONOLITHS NOS. 143, 144, 185 TO 188, 237 TO 245, 276 TO 285, 291 TO 320

PILE CUT-OFF TABLE					
MONOLITH NO.	P	P_1	P_2	H_2	ODD LENGTH PILING
143	4'-6"	6'-6"	8'-0"	20'-6"	
185-188, 237-241, 243-245	5'-0"	8'-6"	10'-0"	22'-6"	
242	2'-6"	8'-6"		22'-6"	5 @ 17'-6" Lg.
276-285					
291-320	5'-6"	9'-0"	10'-6"	25'-0"	
146-156					
188-197	4'-0"	6'-6"	8'-0"	18'-0"	1 @ 7'-6" Sch. Mon. 47; 1 @ 9'-0" Sch. Mon. 49
143-144	5'-0"	8'-6"	10'-0"	27'-0"	

REINFORCING STEEL-I-WALL					
NO. OF MONOLITHS	MON. HT. = H	MON. LG. = L	WT. ⅝" ϕ VERT. BARS	WT. ⅝" ϕ HORIZ. BARS	WT. ⅝" ϕ HORIZ. BARS
1	12'-0"	21'-0"	241.8	560.6	
13	10'-0"	20'-0"	2,107.7	4,512.0	16.9
8	11'-0"	20'-0"	1,864.5	4,356.3	17.8
1	10'-0"	21'-0"	199.8	474.3	
3	13'-0"	21'-9"	901.5	2,010.6	
9	13'-0"	21'-0"	2,366.1	5,821.2	
2	11'-0"	17'-4"	378.4	922.0	
36	14'-0"	21'-0"	10,402.2	24,836.4	24.0
3	14'-0"	21'-9"	1,081.7	2,144.7	
1	14'-0"	9'-5"	162.2	303.0	
1	12'-0"	26'-6"	310.9	705.1	
			20,122.9	46,352.2	58.7

Note: "I" Wall monolith 242 is a special detail not included in above. See sheet 52



TOP REINFORCING

BOTTOM REINFORCING

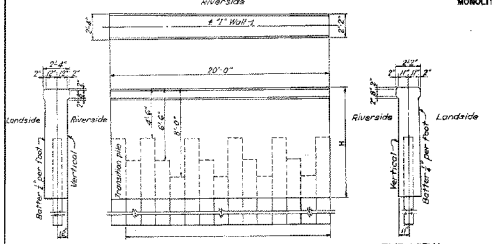
PLAN

MONOLITH NO. 165

SCALE: ⅛" = 1'-0"

"U" BARS REQ'D. FOR FOLLOWING MONOLITHS			
MON. NO.	NO. REQ'D.	W	L
291	2	2'-0"	3'-6"
320	2	2'-0"	3'-6"

Note: These bars included in reinforcing schedule



END VIEW

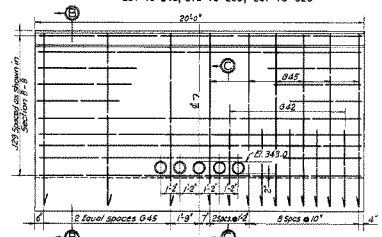
END VIEW

RIVERSIDE ELEVATION

MASONRY DETAILS

MONOLITHS NOS. 145 & 189

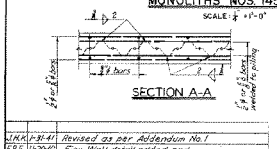
SCALE: ½" = 1'-0"



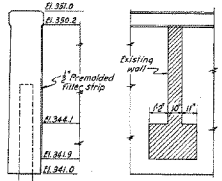
RIVERSIDE ELEVATION

MONOLITH NO. 165

SCALE: ⅛" = 1'-0"

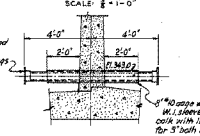


SECTION A-A

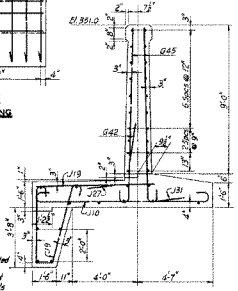


TYPICAL FIRE WALL CONNECTION AT STA. 52+16 & STA. 54+01

SCALE: ½" = 1'-0"



SECTION C-C



SECTION B-B

Note:
Backfill to existing ground line or to specified elevation at "I" wall and slope to drain away from wall to natural ground line within right of way limits.

J.R.K.	1-31-41	Revised as per Addendum No. 1	
F.B.F.	11-20-40	"I"-Wall detail added and "I"-Wall revised and monolith No. 165 added	
BY	DATE	CHARACTER REVISIONS	

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

"I" WALL DETAILS & MONOLITH NO. 165

SHEET 14 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: Lyndon, Chief of Design

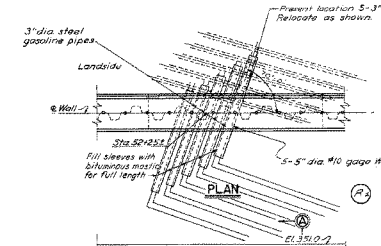
APPROVAL RECOMMENDED: Wm. Chief, Design Branch, Flood Control Division

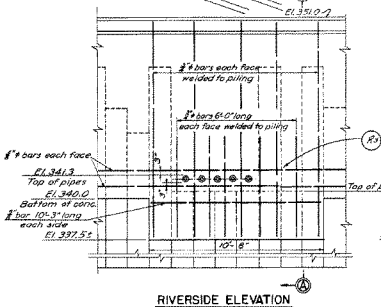
APPROVED: Col. Corps of Engineers, District Engineer

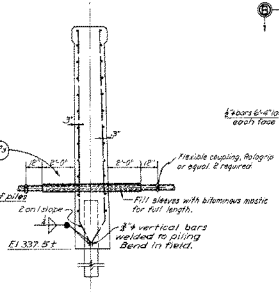
GD. BY K.H.A. TR. BY W.S. CK. BY F.B.F.

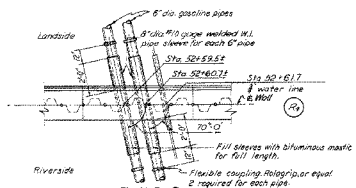
AS BUILT 933-12.3/16

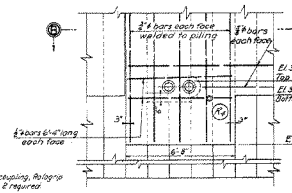
675

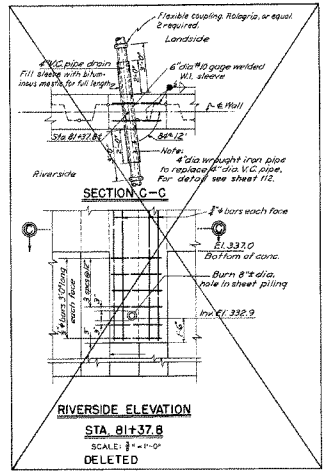


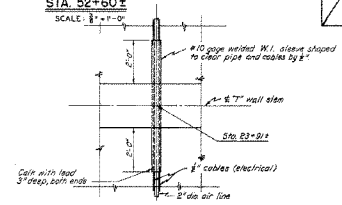


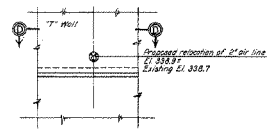












MK.	DATE	AUTHORITY	REVISION
R4		Field	3/4" water pipe
R3		Field	Pipe removed abandoned
R2		Field	Pipes relocated
R1		Field	Pipe removed under wall & conn to 8" sewer

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS PIPES THRU WALL

SHEET 15 OF 110 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CORPS OF ENGINEERS

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION, FLOOD CONTROL DIVISION

APPROVED: [signature] DIVISION ENGINEER, OHIO RIVER DIVISION

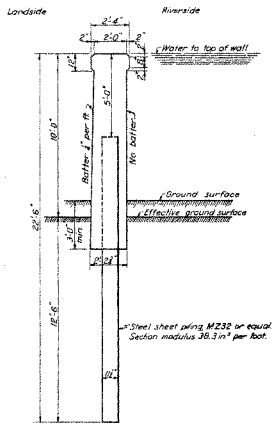
CK. BY D.C.B. DATE TR. BY R.W.J. CK. BY R.W.J.

BY	DATE	CHARACTER
T.B.F.	11-20-40	Reinforcing revised.

REVISIONS

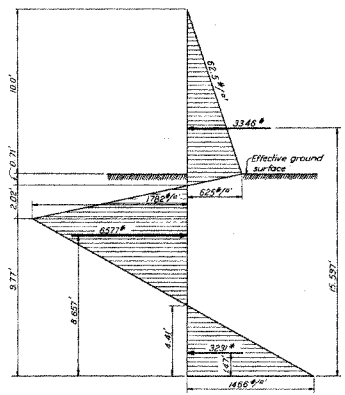
AS BUILT 933-12.3/17

676



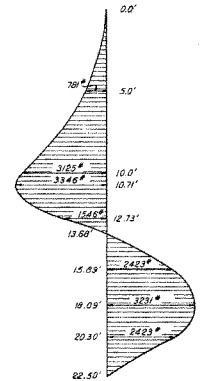
TYPICAL SECTION

SCALE: 1/8" = 1'-0"



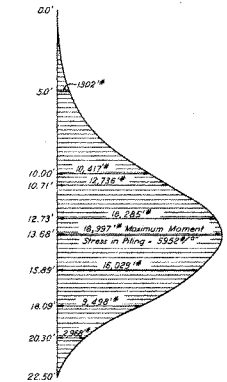
LOADING DIAGRAM

SCALE: HORIZONTAL 1" = 500#
VERTICAL 1/8" = 1'-0"



SHEAR DIAGRAM

SCALE: HORIZONTAL 1" = 1800#
VERTICAL 1/8" = 1'-0"



MOMENT DIAGRAM

SCALE: HORIZONTAL 1" = 5000 FT. LBS.
VERTICAL 1/8" = 1'-0"

I. General Requirements.
A. Combined reinforced concrete and steel sheet piling structure designed as a cantilever and secured from sliding and overturning by penetration of steel sheet piling below ground surface.
B. Protection - (3 feet above 1937 High Water)
C. Bottom of concrete shall be a minimum of 3 feet below ground surface for protection against frost action and air circulation.
D. Structure designed for water to top of wall on riverside.

II. Basic Assumptions.
A. Both landside and riverside earth assumed to be saturated.
B. Active force on the wall to consist of hydrostatic pressure only, with no additional fluid pressure from the saturated earth fluxuation.
C. Passive resistance developed by the undisturbed saturated earth is derived from experimental observations.
D. Friction between the wall and the earth neglected.

III. Allowable Working Stresses.

A.	Steel sheet piling	20000 lbs. per sq. in.
B.	Steel reinforcement	18000 lbs. per sq. in.
C.	Concrete.	
1.	Ultimate compressive strength of 28 days	3000 lbs. per sq. in.
2.	Compression-extreme fibre stress.	1200 lbs. per sq. in.
3.	Shear	60 lbs. per sq. in.
4.	Bond	150 lbs. per sq. in.

IV. Weights and Pressures.

A	Weights.	
1.	Water.	62.5 lbs. per cu. ft.
2.	Saturated earth.	125 lbs. per cu. ft.
B.	Active pressures.	
1.	Water	62.5 lbs. per cu. ft.

BY	DATE	CHARACTER
T.B.F.	9-20-40	Station changed in Mile

REVISIONS

OHIO RIVER BASIN

FL000 PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA STA. 72+50

SHEET 16 OF 110 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

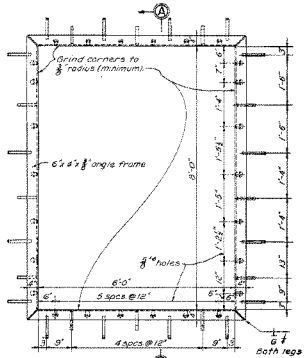
APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION, PLANS CONTROL BRANCH

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY J.H.K. TR. BY C.A.M. CK. BY E.M.S.

AS BUILT 933-12.3/18

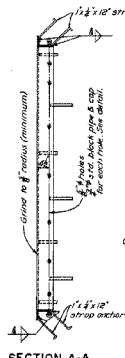
677



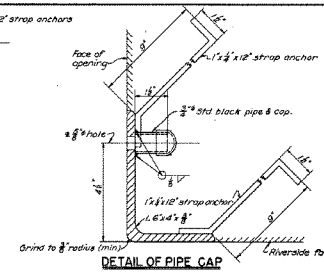
DETAIL OF BULKHEAD FRAME STA.15+32.0

MAKE: 1 MATERIAL: MARK BF3 STRUCTURAL STEEL WT. 383# EACH

SCALE: 1/4" = 1'-0"

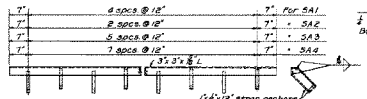


SECTION A-A



DETAIL OF PIPE CAP

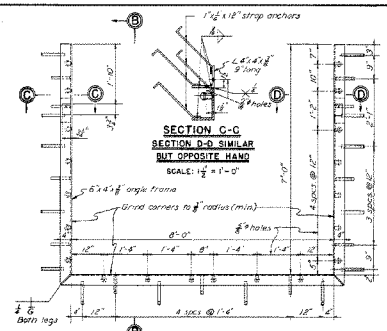
SCALE: HALF SIZE



SILL ANGLE

SEE SCHEDULE
MATERIAL: STRUCTURAL STEEL

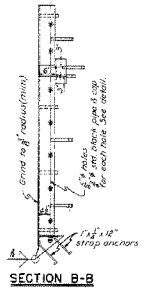
SCALE: 1/4" = 1'-0"



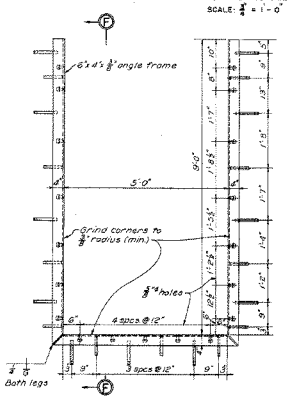
DETAIL OF BULKHEAD FRAME STA.27+96.2 & STA.79+27.0

MAKE: 2 MATERIAL: MARK BF4 STRUCTURAL STEEL WT. 309# EACH

SCALE: 1/4" = 1'-0"



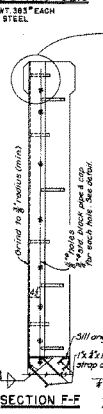
SECTION B-B



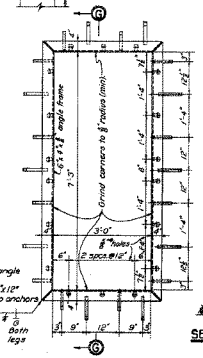
DETAIL OF BULKHEAD FRAME STA.2+86.5

MAKE: 1 MATERIAL: MARK BF1 STRUCTURAL STEEL WT. 311#

SCALE: 1/4" = 1'-0"



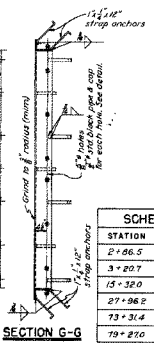
SECTION F-F



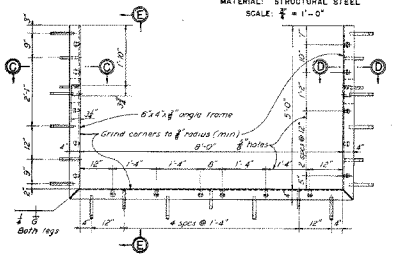
DETAIL OF BULKHEAD FRAME STA.3+20.7

MAKE: 1 MATERIAL: MARK BF2 STRUCTURAL STEEL WT. 284#

SCALE: 1/4" = 1'-0"



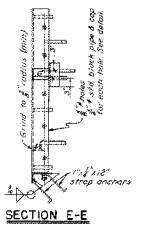
SECTION G-G



DETAIL OF BULKHEAD FRAME STA.73+31.4

MAKE: 1 MATERIAL: MARK BF5 STRUCTURAL STEEL WT. 255#

SCALE: 1/4" = 1'-0"



SECTION E-E

SCHEDULE OF SILL ANGLES

STATION	LENGTH	NO. REQ'D.	WT.	MARK
2+86.5	5'-2"	1	35.6	SA1
3+20.7	3'-2"	1	21.9	SA2
15+32.0	6'-2"	1	42.7	SA3
27+96.2	8'-2"	1	57.0	SA4
73+31.4	8'-2"	1	57.0	SA4
79+27.0	8'-2"	1	57.0	SA4

BY	DATE	CHARACTER
F.B.F.	11-20-40	Pipe cap detail revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

SERVICE OPENINGS

SHEET 17 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

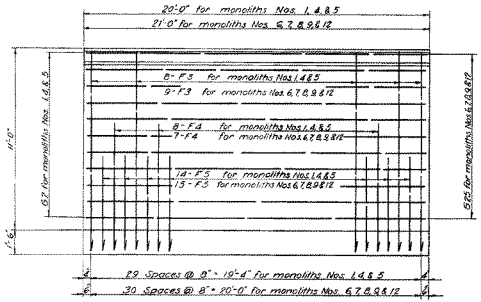
SUBMITTED: [illegible] ASSISTANT CHIEF OF DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

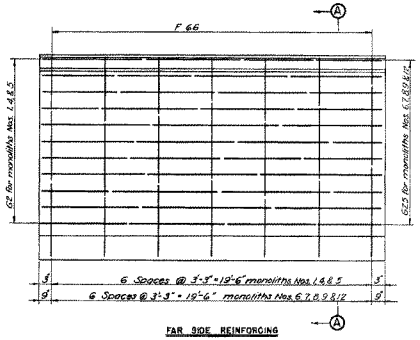
APPROVED: [illegible] DISTRICT ENGINEER

DR. BY K.H.A. TR. BY W.B.S.-C.C.P. CK. BY F.B.F.

AS BUILT 933-12.3/19

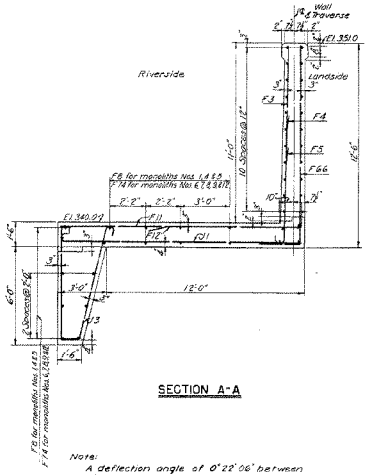


NEAR SIDE REINFORCING



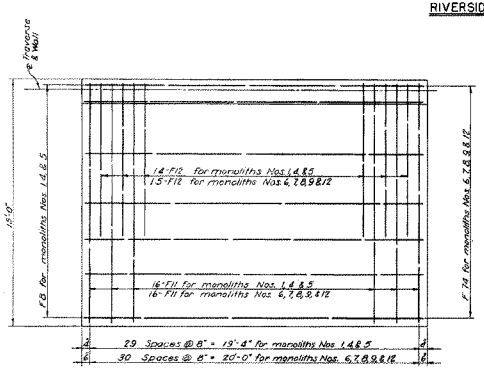
FAR SIDE REINFORCING

RIVERSIDE ELEVATION

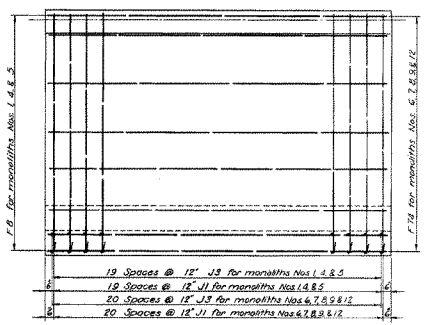


SECTION A-A

Note:
A deflection angle of 0°22'06" between monoliths Nos. 5 & 6 is too small to affect the reinforcing bars.
Make reinforcement for monoliths Nos. 5 & 6 same as adjacent monoliths.



TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER REVISIONS
F.B.T.	11-20-40	Cut off key and reinforcing in base revised.

OHIO RIVER BASIN

FLOOD PROTECTION PUDUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 1, 4 TO 9 & 12.

SHEET 18 OF 110 SHEETS SCALE: ⅛" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF, FLOOD CONTROL DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DESIGN

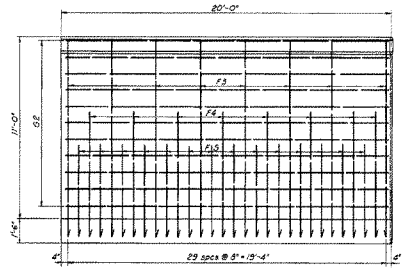
APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G. H. S. TR. BY J. J. Z. CK. BY H. W.

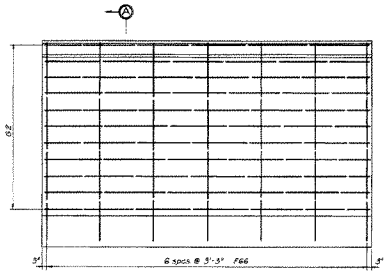
AS BUILT 933-12.3/20

679

403

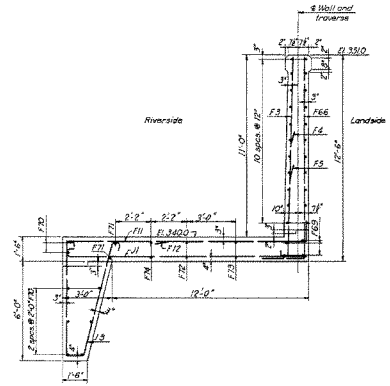


NEAR SIDE REINFORCING
MONOLITH NO. 2

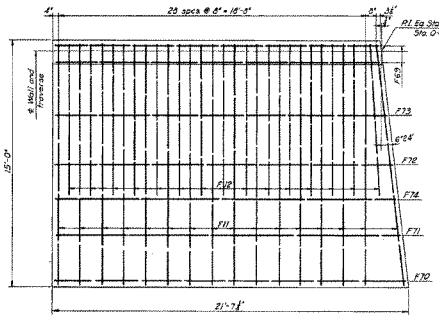


FAR SIDE REINFORCING
MONOLITH NO. 3

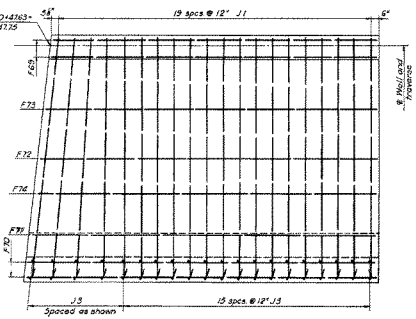
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING
MONOLITH NO. 2 AS SHOWN
MONOLITH NO. 3 OPPOSITE HAND



BOTTOM REINFORCING
MONOLITH NO. 3 AS SHOWN
MONOLITH NO. 2 OPPOSITE HAND

PLAN

TB.E. U-20-40		Cut-off key & reinforcing in base revised
BY	DATE	CHARACTER
		REVISIONS

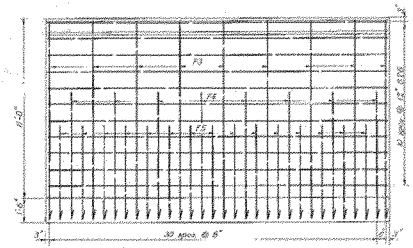
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 2 & 3
SHEET 19 OF 110 SHEETS SCALE: $\frac{3}{8}$" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [signature] SUBMITTER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: [signature] PRINCIPAL SUBMITTER CHIEF OF PONTOON & BRIDGE DIVISION DR. BY F.E.B. TR. BY V.L.
APPROVED: [signature] LT. COL. CHIEF OF SUBMITTER, DISTRICT ENGINEER CK. BY H.W.

AS BUILT

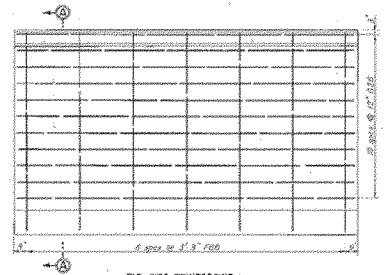
933-12.3/21

680

104

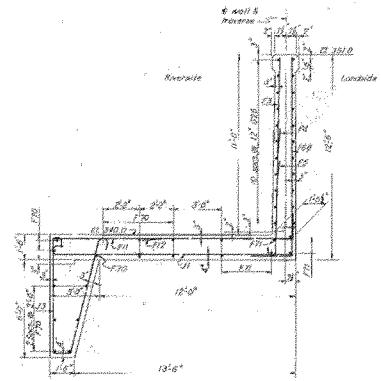


NEAR SIDE REINFORCING
MONOLITH NO. 10 AS SHOWN
MONOLITH NO. 11 OPPOSITE HAND

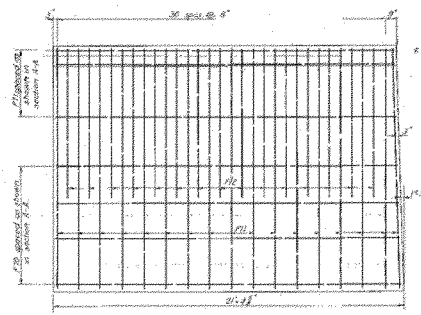


FAR SIDE REINFORCING
MONOLITH NO. 11 AS SHOWN
MONOLITH NO. 10 OPPOSITE HAND

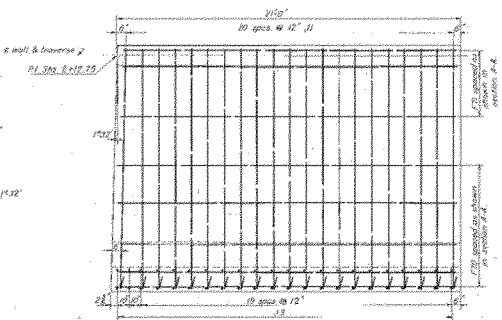
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING
MONOLITH NO. 10 AS SHOWN
MONOLITH NO. 11 OPPOSITE HAND



BOTTOM REINFORCING
MONOLITH NO. 11 AS SHOWN
MONOLITH NO. 10 OPPOSITE HAND

PLAN

NO.	DATE	CHARACTER REVISIONS

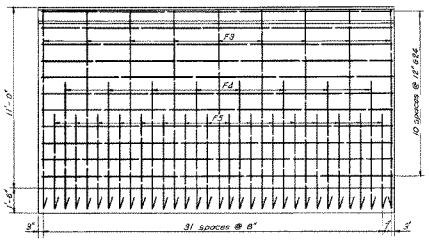
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 10 & 11
SHEET 26 OF 110 SHEETS SCALE: 1/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 12, 1940

SUBMITTED:
APPROVAL RECOMMENDED: APPROVED:

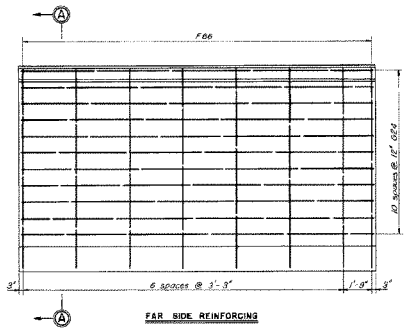
AS BUILT 933-12.3/22

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

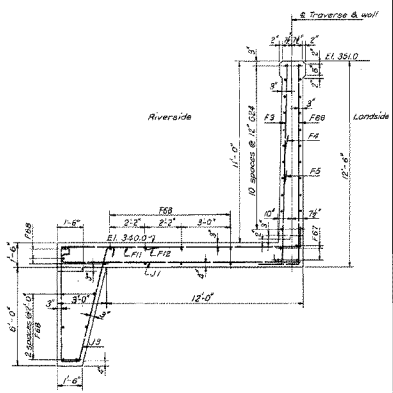


NEAR SIDE REINFORCING

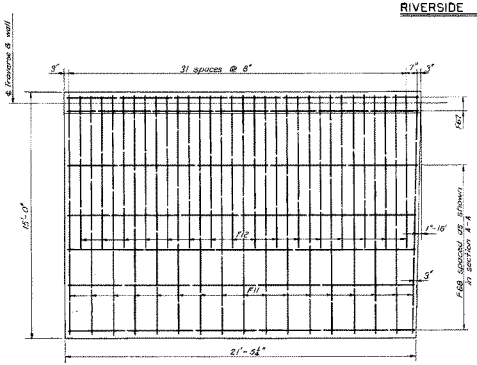


FAR SIDE REINFORCING

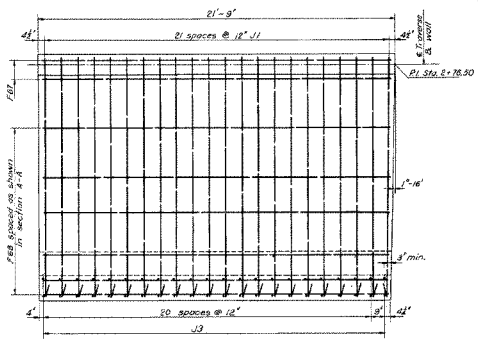
RIVERSIDE ELEVATION



SECTION A-A



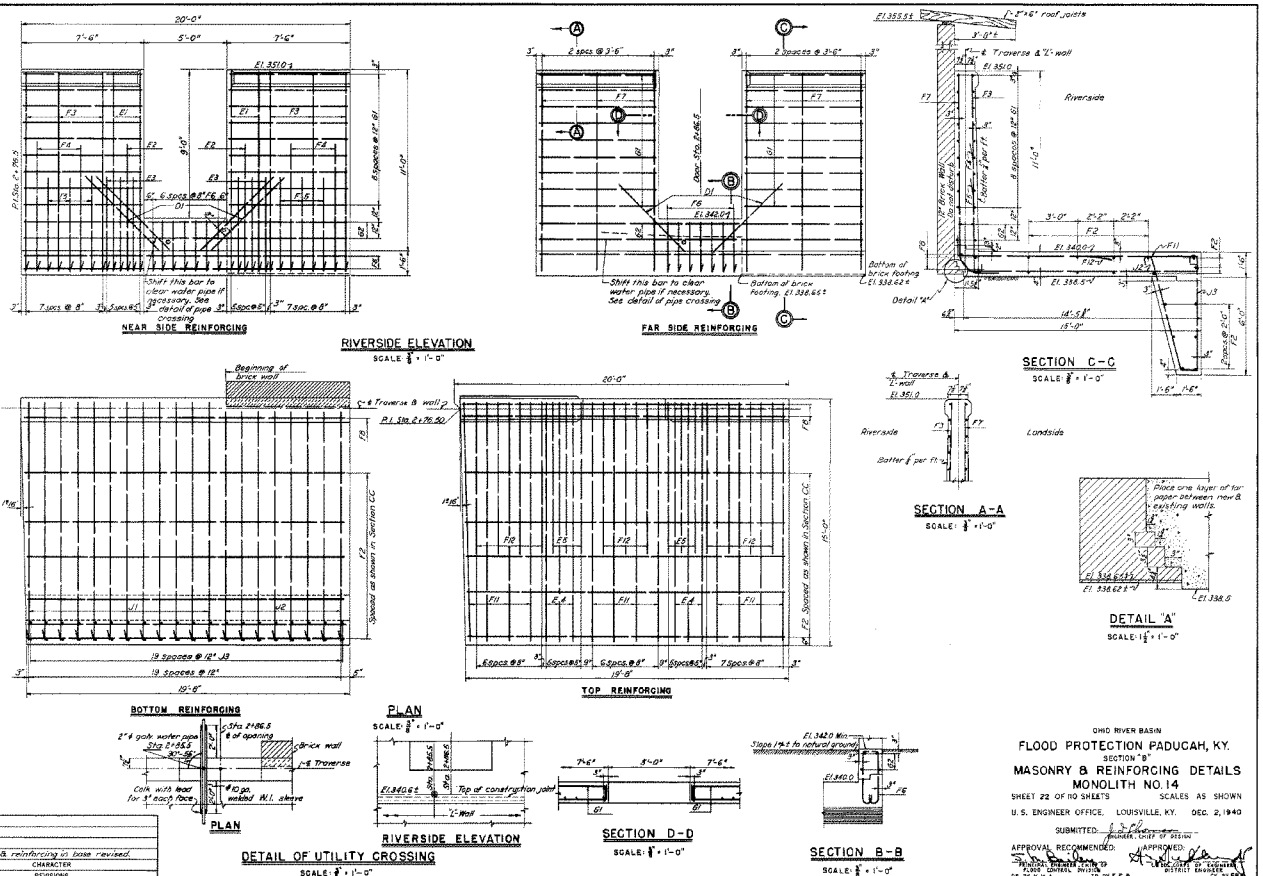
TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER



BY	DATE	CHARACTER REVISIONS
E.B.F.	11-20-40	Cut-off key & reinforcing in base revised.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 14

SHEET 22 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: TECHNICAL ENGINEER (WITH TO PUBLIC WORKS DIVISION) SR. BY H.H.A. TR. BY F.E.B.

APPROVED: DISTRICT ENGINEER CK. BY F.E.B.

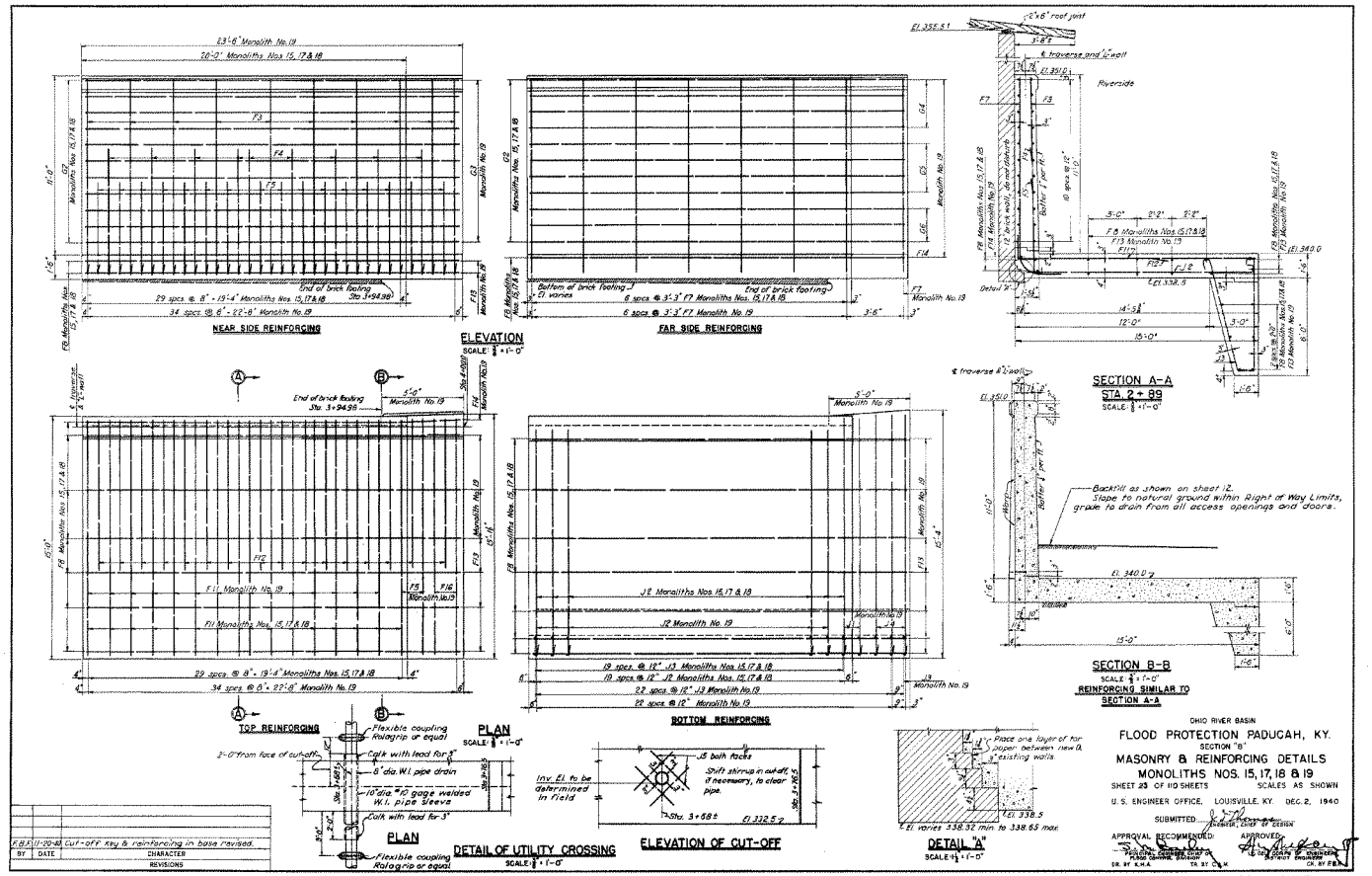
AS BUILT 933-12.3/24

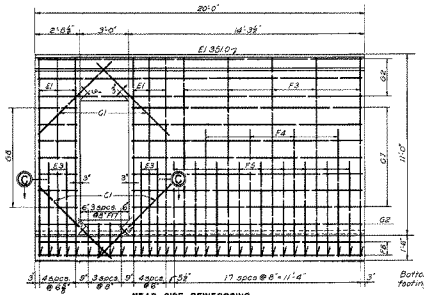
683

407

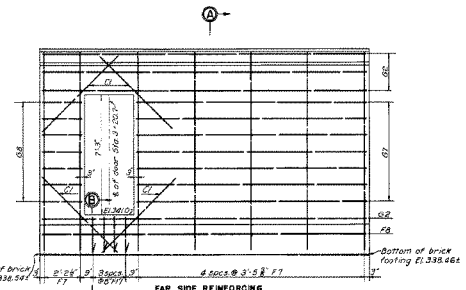
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





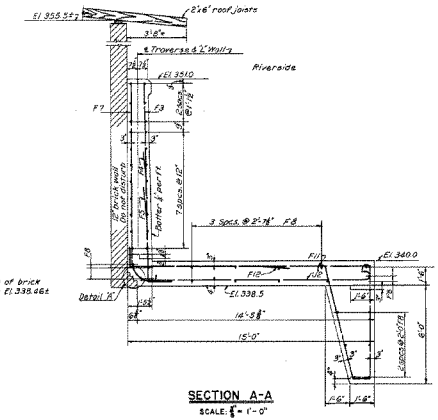
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

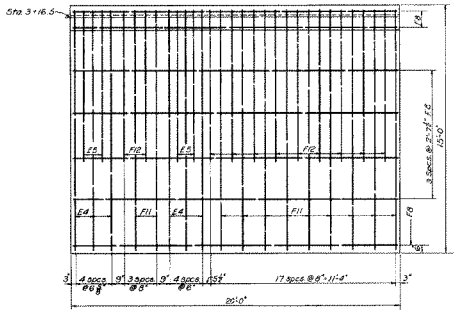
RIVERSIDE ELEVATION

SCALE: ⅛" = 1'-0"

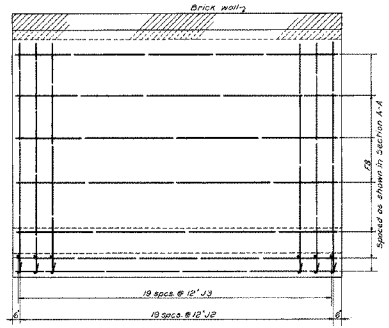


SECTION A-A

SCALE: ⅛" = 1'-0"



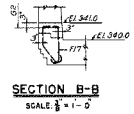
TOP REINFORCING



BOTTOM REINFORCING

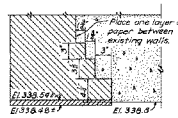
PLAN

SCALE: ⅛" = 1'-0"



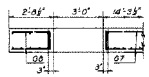
SECTION B-B

SCALE: ½" = 1'-0"



DETAIL "A"

SCALE: 1½" = 1'-0"



SECTION C-C

SCALE: ⅛" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 16

SHEET 24 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH, FLOOD CONTROL DIVISION

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY K.H.A. TR. BY W.S.S. CK. BY F.B.F.

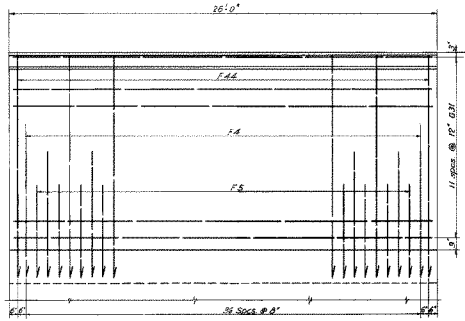
BY	DATE	CHARACTER	
F.B.F.	11-20-40	Cut-off key & reinf. in base & stem revised.	

REVISIONS

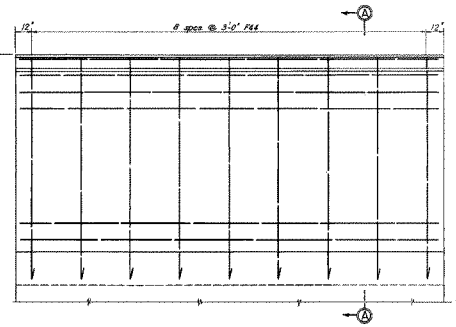
AS BUILT 933-12.3/26

685

407



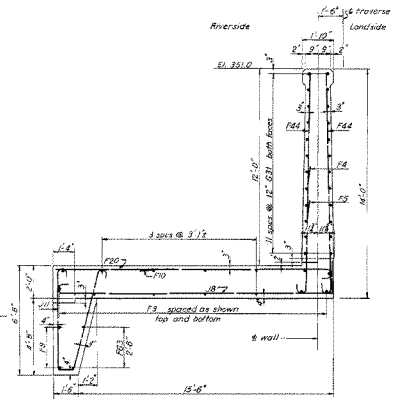
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

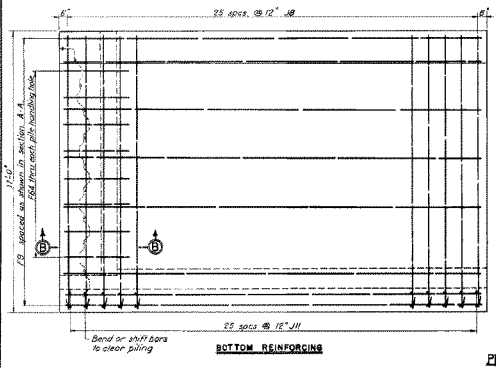
RIVERSIDE ELEVATION

SCALE: 1/8" = 1'-0"

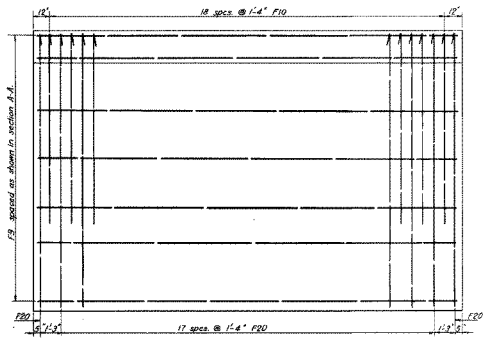


SECTION A-A

SCALE: 1/8" = 1'-0"



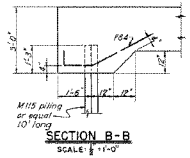
BOTTOM REINFORCING



TOP REINFORCING

PLAN

SCALE: 1/8" = 1'-0"



SECTION B-B

SCALE: 1/8" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 101

SHEET 25 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: J. S. Fair, ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: J. S. Fair, PROJECT ENGINEER, CHIEF OF DESIGN, CH. BY G.H.S. TR. BY C.A.W.

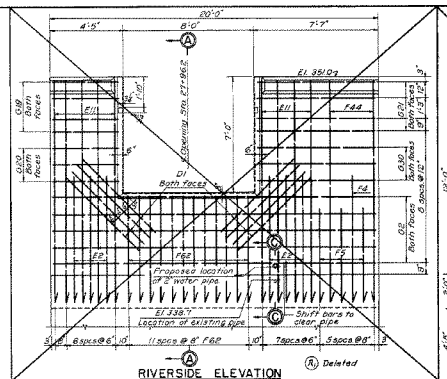
APPROVED: H. L. Cox, LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER, CH. BY H.M.J.

BY	DATE	CHARACTER
F.B.K.	11-20-40	Cut-off key and reinforcing in base revised.

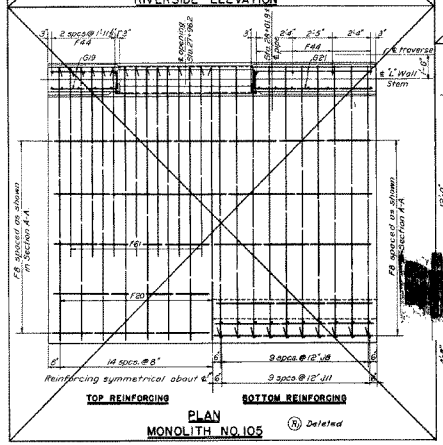
REVISIONS

AS BUILT 933-12.3/27

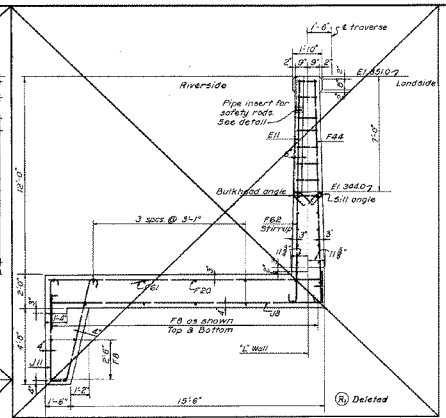
686



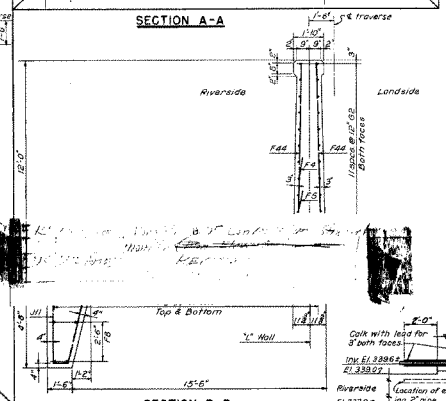
RIVERSIDE ELEVATION



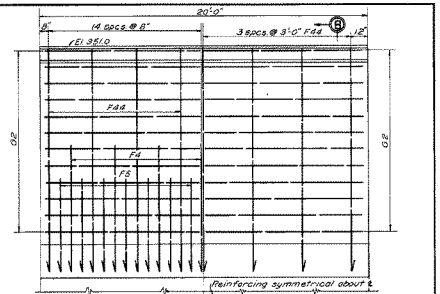
PLAN
MONOLITH NO. 105



SECTION A-A

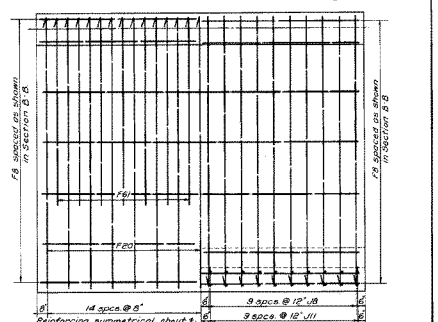


SECTION B-B

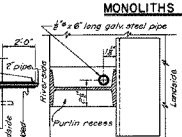


NEAR SIDE REINFORCING — FAR SIDE REINFORCING

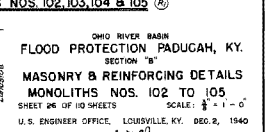
RIVERSIDE ELEVATION



PLAN
MONOLITHS NOS. 102, 103, 104 & 105



SECTION C-C



DETAIL OF PIPE INSERT
MARK: P1 MAKE 2 WT. 0.43# EACH
MATERIAL: GALVANIZED STEEL
SCALE: NONE

Note: For bulkhead and sill angle for this opening see sheet 13

BY	DATE	CHARACTER
F.B.F.	V-20-40	Cut-off key & reinforcing in base revised.

REVISIONS

MK	DATE	AUTHORITY	REVISION
R_1	5-1-41	CO #1	Monolith. No. 105 converted into standard monlith

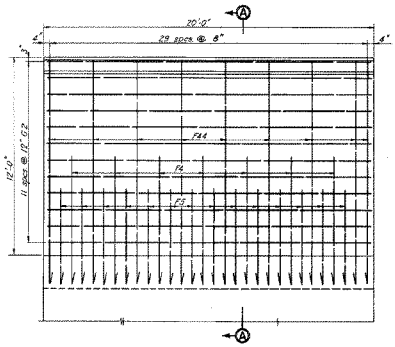
AS BUILT REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 102 TO 105
SHEET 26 OF 110 SHEETS SCALE: 1/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: ASSISTANT ENGINEER, CHIEF OF DESIGN
APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER
DR. BY R.M.A. TR. BY W.G.S. CK. BY F.B.F.

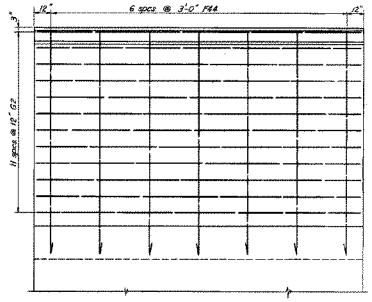
AS BUILT 933-12.3/28

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

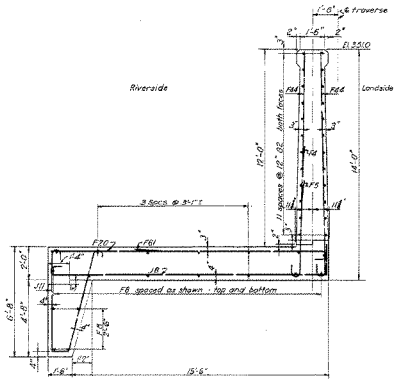


NEAR SIDE REINFORCING

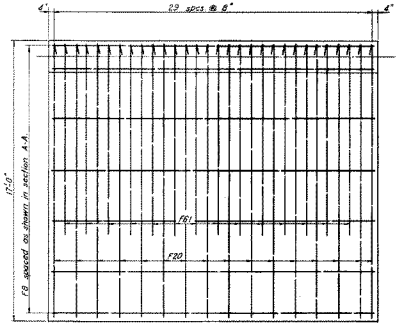


FAR SIDE REINFORCING

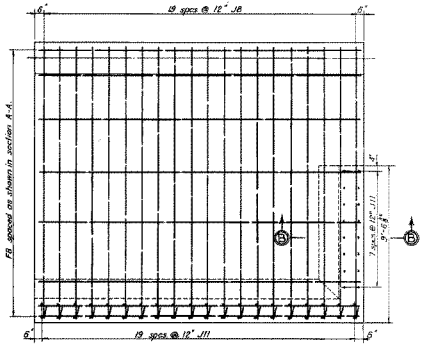
RIVERSIDE ELEVATION



SECTION A-A

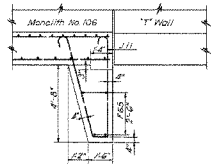


TOP REINFORCING



BOTTOM REINFORCING

PLAN



SECTION B-B

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 106

SHEET 27 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

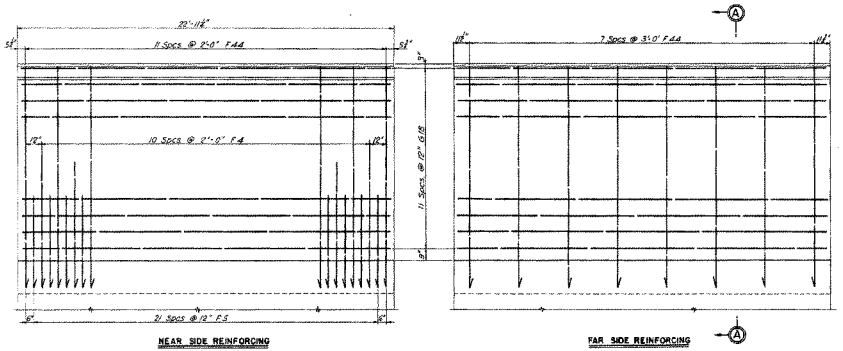
DR. BY W.K.S. TR. BY D.A.M. CK. BY W.M.L.

BY	DATE	CHARACTER
F.B.F.	11-28-40	Cut-off key & paint in base revised

REVISIONS

AS BUILT 933-12.3/29

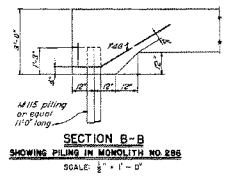
688



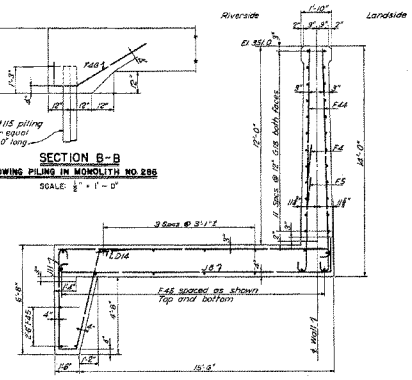
NEAR SIDE REINFORCING

FAR SIDE REINFORCING

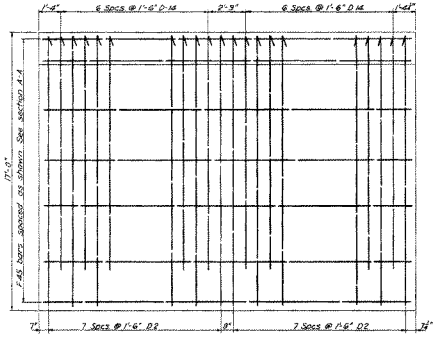
RIVERSIDE ELEVATION



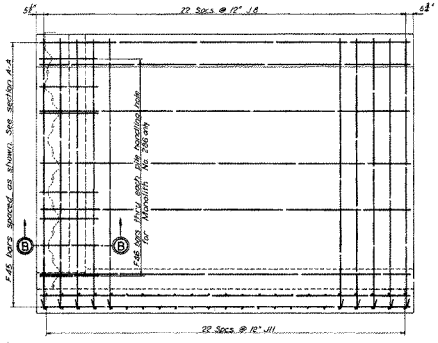
SECTION B-B
SHOWING PILING IN MONOLITH NO. 286
SCALE: ½" = 1'-0"



SECTION A-A

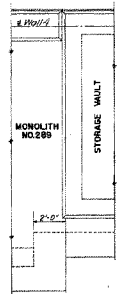


TOP REINFORCING

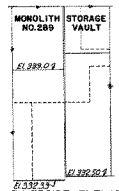


BOTTOM REINFORCING

PLAN
SCALE: ⅜" = 1'-0"



PLAN
DETAIL SEAL BLOCK
SCALE: ⅜" = 1'-0"



RIVERSIDE ELEVATION
SCALE: ⅜" = 1'-0"

Note: No additional reinforcing will be required for seal block in monolith No. 289.

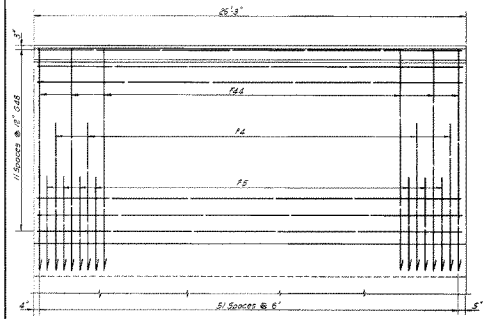
BY	DATE	CHARACTER REVISIONS
F.B.C.	11-10-40	Cut off key & reinf. in base revised

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 286 TO 289
SHEET 28 OF 110 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 3, 1940
SUBMITTED: ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION
APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER
DR. BY G.C.B. TR. BY W.G. CK. BY H.R.

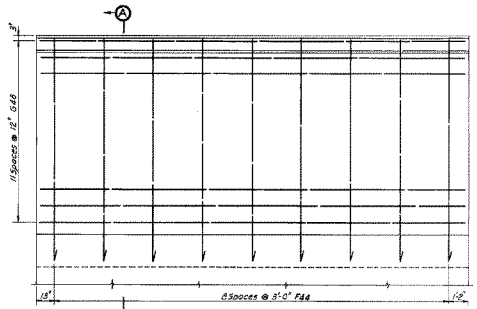
AS BUILT 933-12.3/30

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

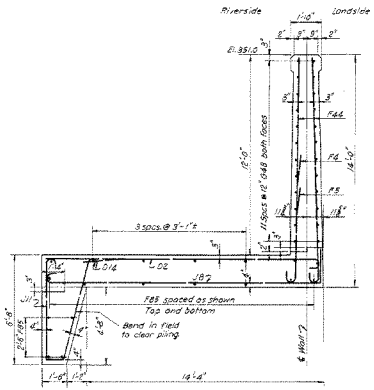


NEAR SIDE REINFORCING

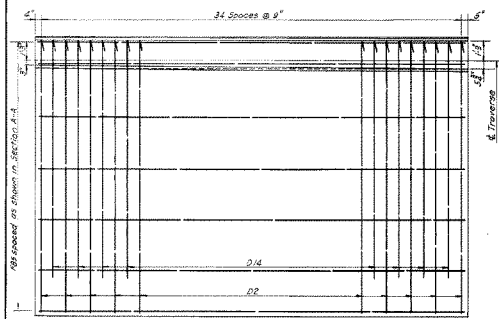


FAR SIDE REINFORCING

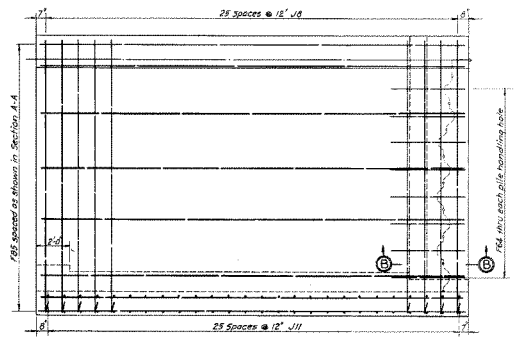
RIVERSIDE ELEVATION



SECTION A-A

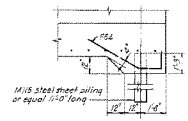


TOP REINFORCING



BOTTOM REINFORCING

PLAN



SECTION B-B

F.B.F.	10-20-40	Cut-off key and reinforcing in base revised.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 290

SHEET 29 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

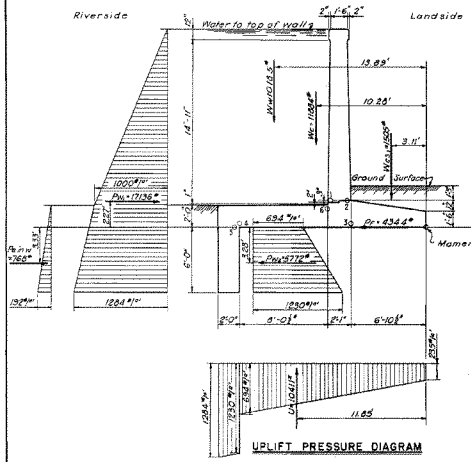
APPROVAL RECOMMENDED: [illegible] PROJECT ENGINEER, CHIEF OF DESIGN, OHIO RIVER DIVISION

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

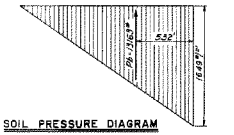
DR. BY O.R.L. TR. BY W.S.B. CK. BY H.M.L.

AS BUILT 933-12.3/31

069



UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

CASE I

SCALES: DIMENSIONS 1/4" = 1'-0"
FORCES 1" = 600#

Nomenclature

Ww = Total weight of water acting on base.
Wc = Total weight of concrete.
W_{s1}, W_{s2} = Total weight of saturated earth acting on base.
U = Total hydro static uplift on base.
P_w, P_{ss}, P_{sp} = Total horizontal pressure of water acting on structure.
Pe in w = Total horizontal pressure of earth in water acting on structure
Pp = Total passive resistance developed by soil.
Pf = Horizontal resistance developed by friction on base.
Pb = Total soil reaction on base.

Allowable Working Stresses

A. Steel Reinforcing — 18,000 lbs per sq. in.
B. Concrete
1. Ultimate compressive strength at 28 days. — 3,000 lbs. per sq. in
2. Compression - extreme fibre stress. — 1,200 " " " "
3. Shear — 60 " " " "
4. Bond — 150 " " " "

Weights and Pressures

A. Weights
1. Concrete — 150 lbs. per cu. ft.
2. Water — 62.5 " " " "
3. Saturated earth — 125 " " " "
4. Earth in water (net) — 62.5 " " " "
B. Active Pressures We $\tan^2(45° - \phi/2)$
1. Water — 62.5 lbs. per sq. ft.
2. Saturated earth - angle of repose 26°-34' — 86 " " " "
3. Earth in water (net) — 24 " " " "

I. General Requirements:-

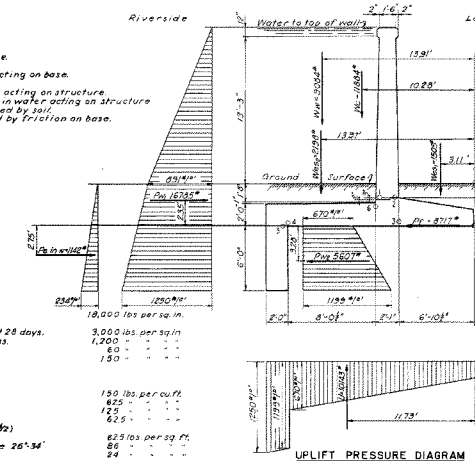
A. Cantilever type flood wall with concrete cutoff at heel, founded on soil or rock where failure by scour or undermining is improbable.
B. Protection - 3 ft above 1937 High Water.
C. Structure designed for water to top of wall on riverside
D. Bottom of concrete base shall be placed at least 3 ft. below ground surface for protection against frost action.
E. Stability.
1. Resultant of forces acting on structure to fall within middle third of base when considering active forces only.
2. Factor of safety against overturning of structure to be not less than 1.25 when considering all forces, including passive resistance.

II. Basic Assumption

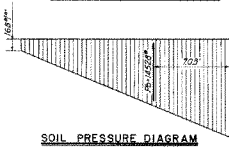
A. Active forces on wall to consist of hydrostatic pressure and the equivalent fluid pressure of the saturated earth.
B. Uplift derived from seepage pressure gradient.
C. Passive resistance of soil equal to difference between net active horizontal forces and frictional resistance developed between concrete base and soil, with passive resistance assumed to vary from zero at landside ground surface to a maximum at elevation of bottom of cutoff.
D. Coefficient of friction of concrete base on foundation assumed to vary between the limits of 0.33 to 0.60 for various types of soil. 0.33 used with Case I and 0.60 with Case II in order to produce most severe conditions.
E. Maximum wind pressure not to exceed 30#/ft² of stem.

III Design Conditions

A. Case I - Governs design at points 3, 4, & 5
1. Water to top of wall on riverside.
2. Riverside earth scoured to elevation of top of base
3. Landside earth saturated to ground level
4. Coefficient of friction of base on foundation - 0.33
B. Case II - Governs design at points 1 & 6
1. Water to top of wall on riverside.
2. No scour
3. Landside and riverside earth saturated to ground level.
4. Coefficient of friction of base on foundation - 0.60
C. Case III - (Not Shown) Governs design of point 2.
1. Normal river stage. No water against wall
2. Maximum wind pressure acting on stem from landside.



UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

CASE II

SCALES: DIMENSIONS 1/4" = 1'-0"
FORCES 1" = 600#

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA

18 FT. "T" WALL

SHEET 30 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] PRINCIPAL CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN DIVISION — CH. BY A.M.J. — TR. BY E.B.

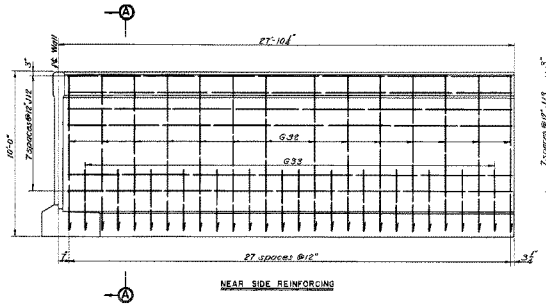
APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER — CH. BY E.M.H.

BY	DATE	CHARACTER
		REVISIONS

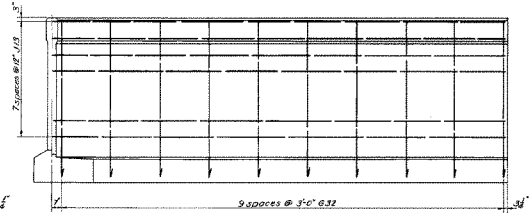
AS BUILT 933-12.3/32

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

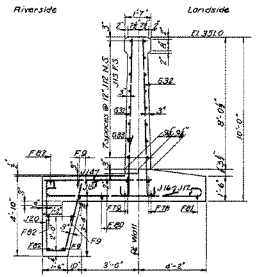


NEAR SIDE REINFORCING

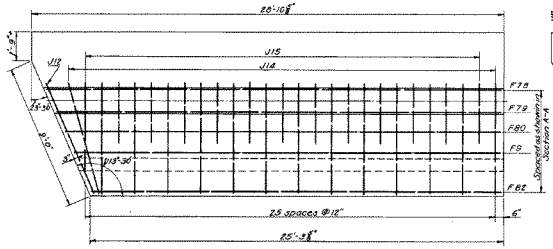


FAR SIDE REINFORCING

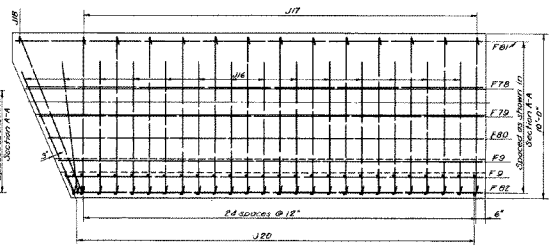
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 157

SHEET 31 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF, COST ENGRS.

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEERING DIVISION, FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY F. E. B. TR. BY A. J. J. CK. BY F.E.B.

BY	DATE	CHARACTER
FB.E.	11-29-40	Cut-off key & reinforcing in base revised

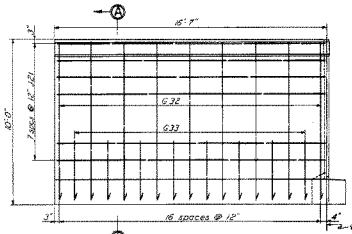
REVISIONS

AS BUILT 933-12.3/33

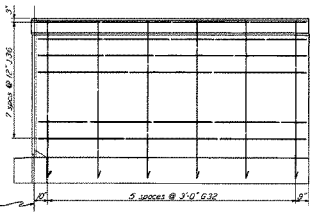
416

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

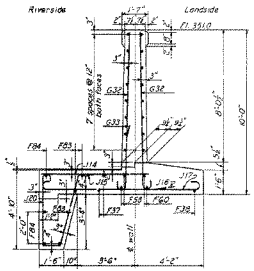


NEAR SIDE REINFORCING
MONOLITH NO. 160

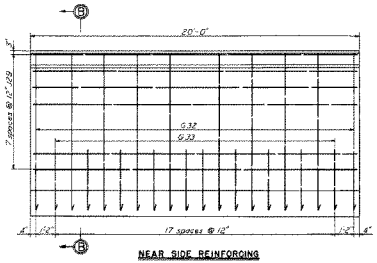


FAR SIDE REINFORCING
MONOLITH NO. 161

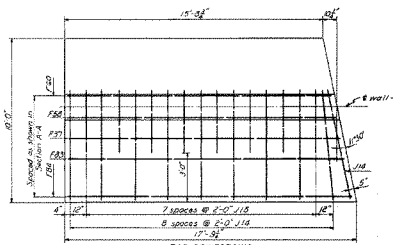
RIVERSIDE ELEVATION



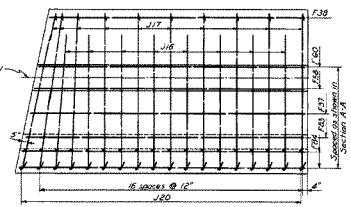
SECTION A-A



NEAR SIDE REINFORCING

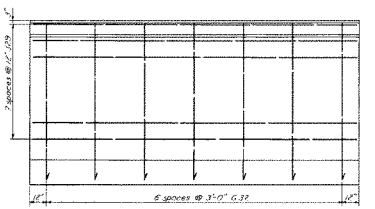


TOP REINFORCING
MONOLITH NO. 160 AS SHOWN
MONOLITH NO. 161 OPPOSITE HAND



BOTTOM REINFORCING
MONOLITH NO. 161 AS SHOWN
MONOLITH NO. 160 OPPOSITE HAND

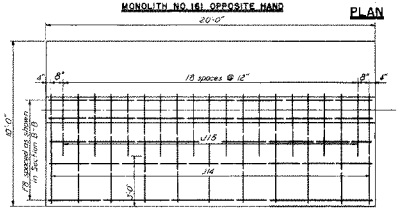
SECTION C-C



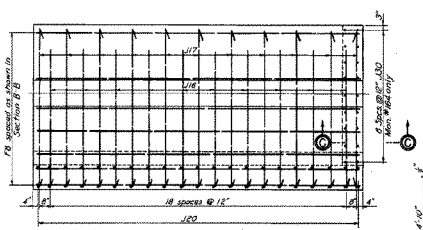
FAR SIDE REINFORCING

RIVERSIDE ELEVATION
MONOLITHS NOS. 158, 159 & 162 TO 164

PLAN

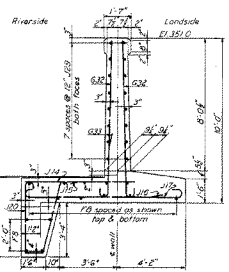


TOP REINFORCING



BOTTOM REINFORCING

PLAN
MONOLITHS NOS. 158, 159 & 162 TO 164



SECTION B-B

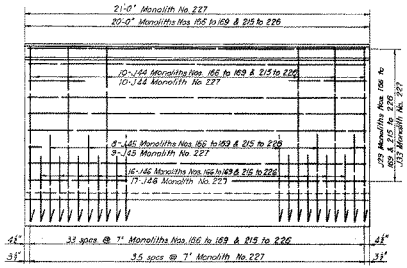
BY	DATE	CHARACTER REVISIONS
J.B.K.	11-20-40	Monolith 165 deleted and cut-off key & reinforcing in base revised.

DHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "a"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 158 TO 164
SHEET 32 OF 110 SHEETS SCALE: ⅜" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [illegible]
APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION
APPROVED: [illegible] EX. SECRETARY OF ENGINEERS
DR. BY F.E.B. TR. BY G.C.P. CK. BY F.B.

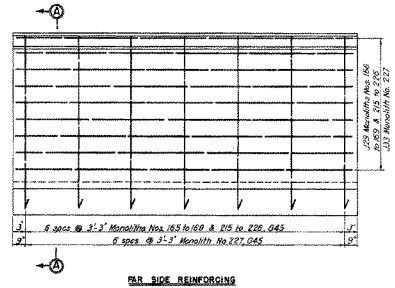
AS BUILT 933-12.3/34

693

417

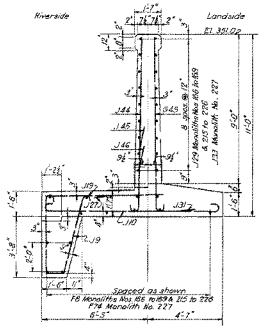


NEAR SIDE REINFORCING

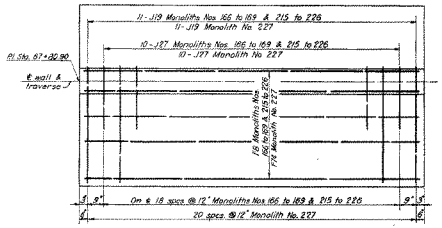


FAR SIDE REINFORCING

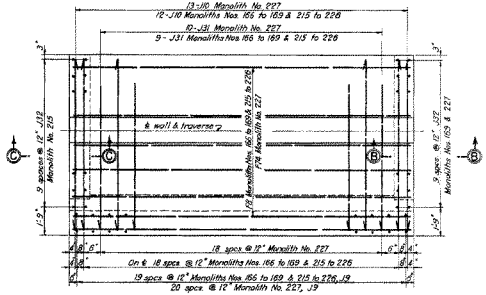
RIVERSIDE ELEVATION



SECTION A-A

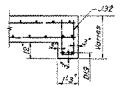


TOP REINFORCING



BOTTOM REINFORCING

PLAN



SECTION B-B

SECTION C-C SIMILAR BUT OPPOSITE HAND

Note:
A deflection angle of 0° 40'-26" between movable closure of Sta 67+73.4 and Monolith No. 219 is too small to affect the reinforcing bars. Reinforcement for Monolith No. 219 same as for Monoliths Nos. 215 to 218 & 220 to 227.

BY	DATE	CHARACTER
FBF	11-20-40	Cut-off key & reinforcing in base and stem revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 166 TO 169 & 215 TO 227

SHEET 33 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: J. T. Fitzhugh, Chief, Design Section

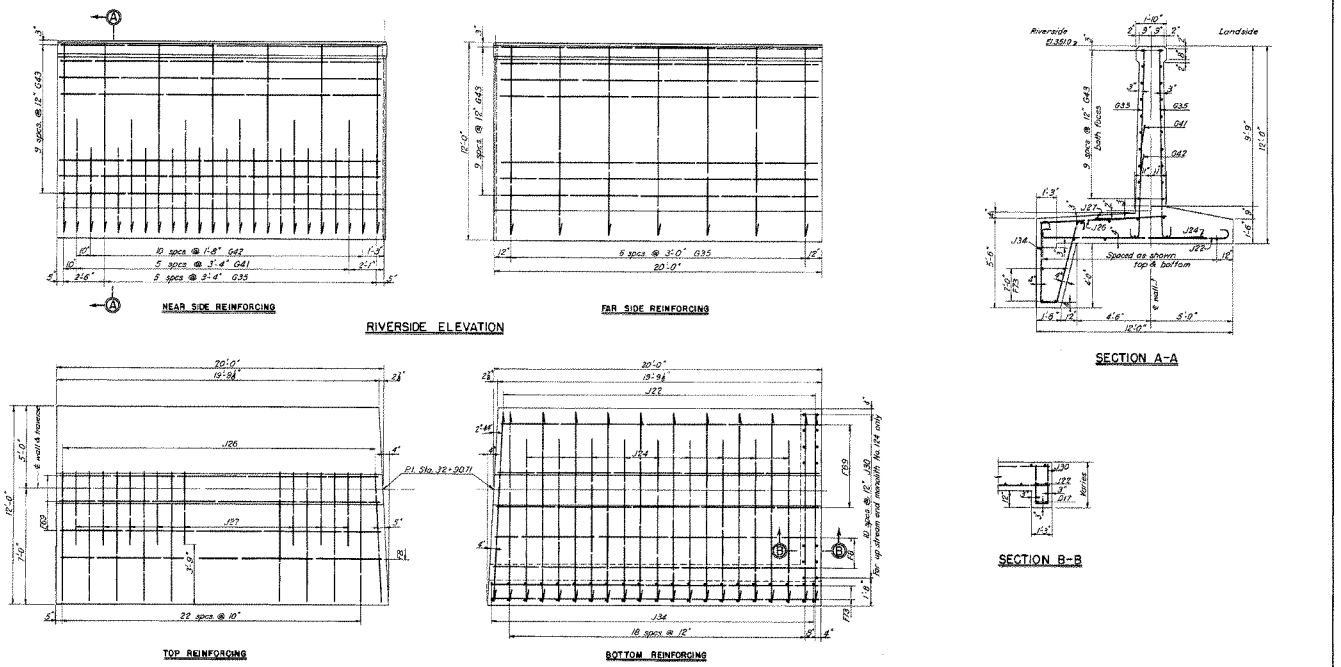
APPROVED RECOMMENDED: APPROVED:

Chief, Design Section — District Engineer

DR. BY R.N.A. TR. BY C.A.M. CK. BY F.B.F.

AS BUILT 933-12.3/35

694



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 124 & 125

SHEET 34 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] DIVISION CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [illegible] DISTRICT ENGINEER

DR. BY G.H.S. TR. BY C.S.M. CK. BY F.B.V.

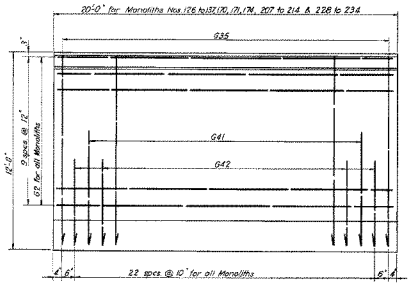
BY	DATE	CHARACTER
T.B.F.	11-20-40	Cut-off key & reinforcing in base revised

REVISIONS

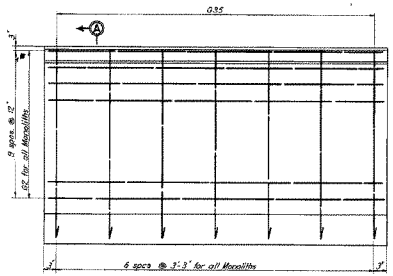
AS BUILT 933-12.3/36

695

419

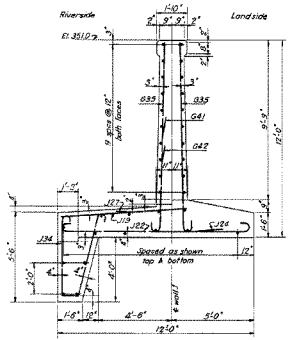


NEAR SIDE REINFORCING

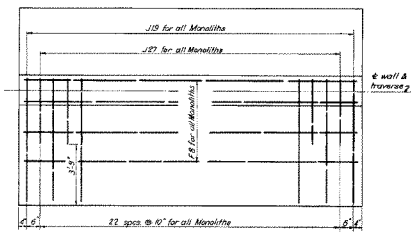


FAR SIDE REINFORCING

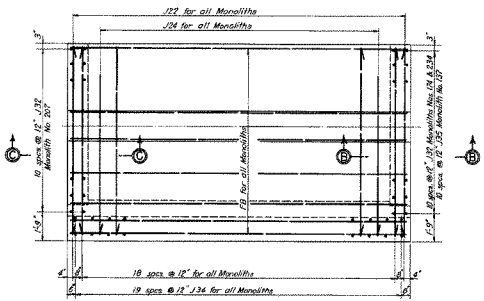
RIVERSIDE ELEVATION



SECTION A-A

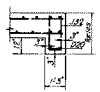


TOP REINFORCING

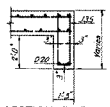


BOTTOM REINFORCING

PLAN



SECTION B-B
MONOLITHS NOS. 174 & 234
SECTION C-C MONOLITH NO. 207
SIMILAR BUT OPPOSITE HAND



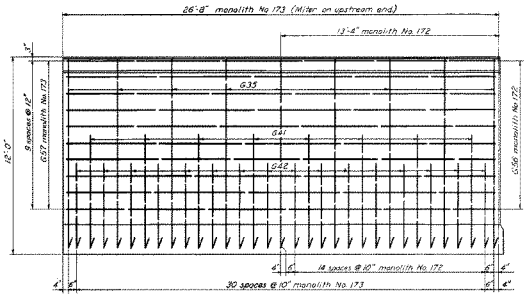
SECTION B-B
MONOLITH NO. 137

BY	DATE	CHARACTER
J.H.K.	1-31-41	Revised as per Addendum No. 1
F.B.T.	11-20-40	Cut-off key & reinforcing in base revised

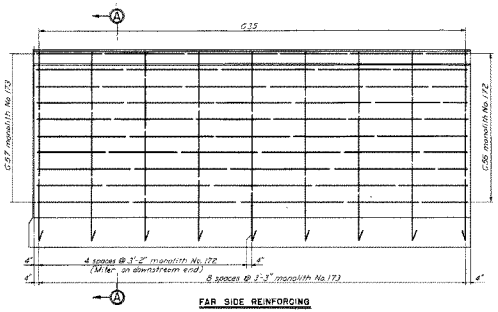
REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 126 TO 137, 170, 171, 174, 207 TO 214 & 228 TO 234
SHEET 35 OF 110 SHEETS SCALE: 1/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION
DR. BY S.W.S. TR. BY C.A.M.
APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER
CK. BY R.B.

AS BUILT 933-12.3/37

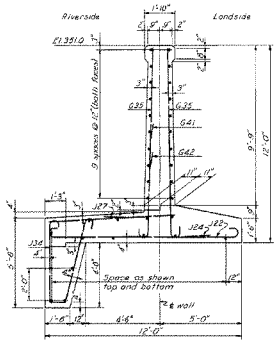


NEAR SIDE REINFORCING

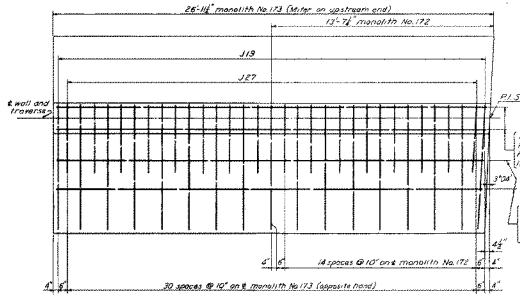


FAR SIDE REINFORCING

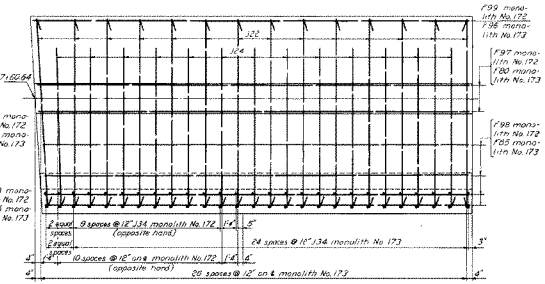
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER
TBF	11-20-40	Cut-off key & reinforcing in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 172 & 173

SHEET 36 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

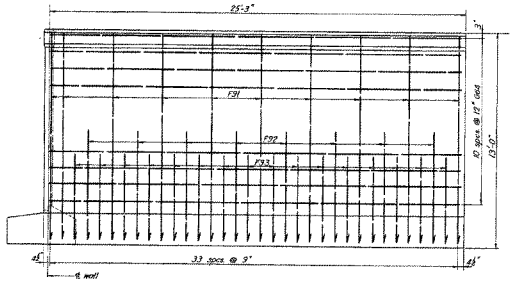
APPROVED: [illegible] CHIEF, ENGINEERING DIVISION

DR. BY R.H.A. TR. BY C.C.P. CK. BY [illegible]

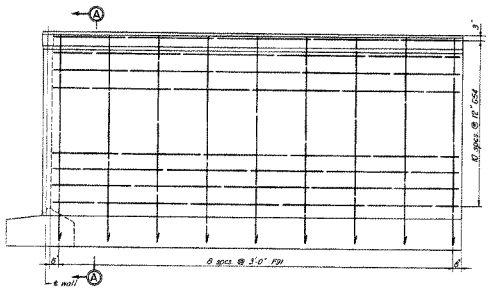
AS BUILT 933-12.3/38

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



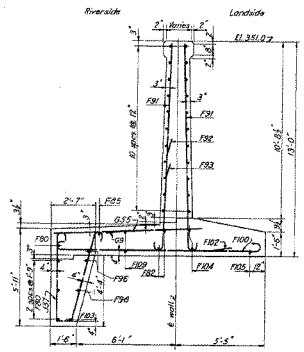
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

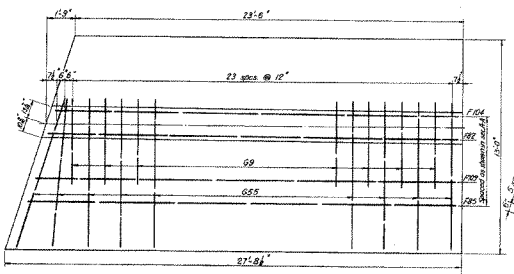
RIVERSIDE ELEVATION

SCALE: 1/8" = 1'-0"

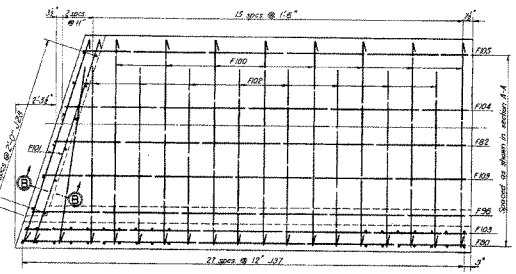


SECTION A-A

SCALE: 1/8" = 1'-0"



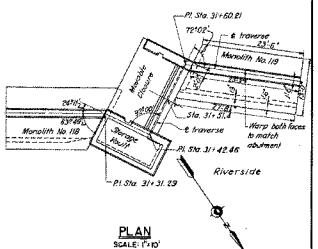
TOP REINFORCING



BOTTOM REINFORCING

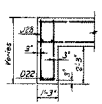
PLAN

SCALE: 1/8" = 1'-0"



PLAN

SCALE: 1" = 10'



SECTION B-B

SCALE: 1/8" = 1'-0"

BY	DATE	CHARACTER
TB.F.	11-20-40	Cut-off key & reinforcing in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 119

SHEET 37 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature], CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY F.E.B. TR. BY D.A.M. CK. BY

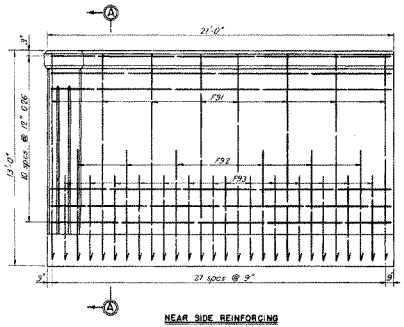
AS BUILT 933-12.3/39

869

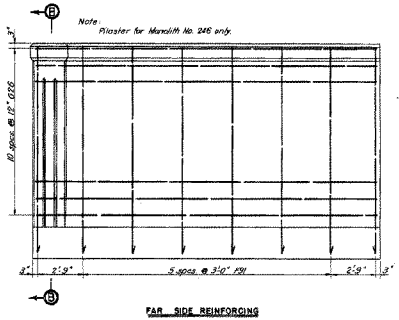
422

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

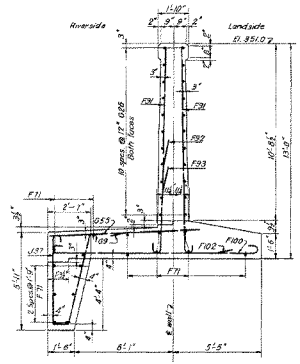


NEAR SIDE REINFORCING

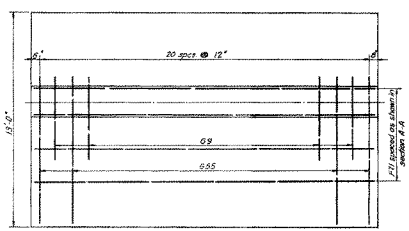


FAR SIDE REINFORCING

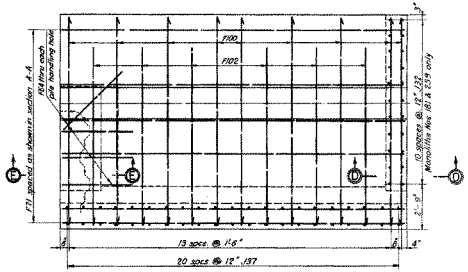
RIVERSIDE ELEVATION



SECTION A-A

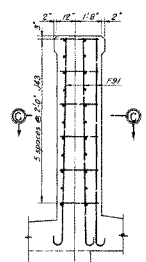


TOP REINFORCING

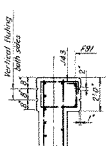


BOTTOM REINFORCING

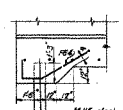
PLAN



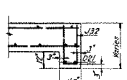
SECTION B-B
MONOLITH NO. 246 ONLY



SECTION C-C



SECTION E-E
MONOLITH NO. 246 ONLY



SECTION D-D
MONOLITHS NOS. 181 & 259 ONLY

BY	DATE	CHARACTER
F.B.E.	11-20-40	Cut-off key & reinf. in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 120 TO 123, 175 TO 181, 198 TO 203, 206, 246 TO 252 & 255 TO 259

SHEET 38 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] DIVISION ENGINEER

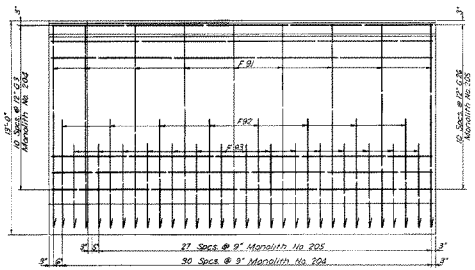
APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION, FLOOD CONTROL BRANCH OR. BY F.E.B. TR. BY C.A.M.

APPROVED: [signature] DISTRICT ENGINEER CR. BY F.B.E.

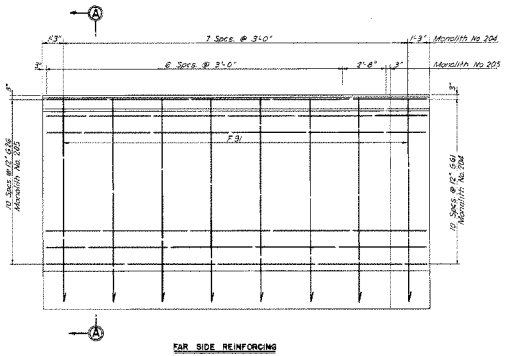
AS BUILT 933-12.3/40

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

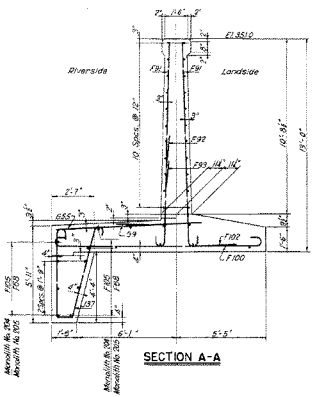


NEAR SIDE REINFORCING

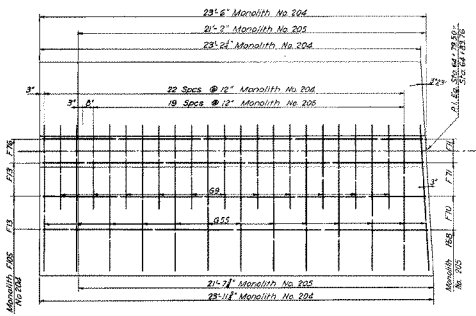


FAR SIDE REINFORCING

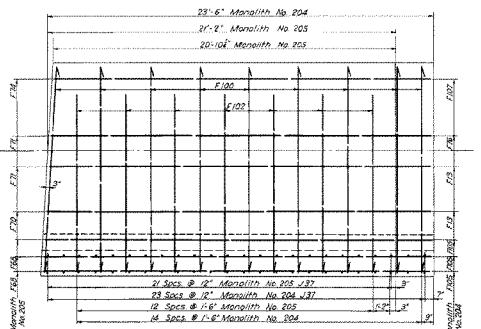
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING
MONOLITH NO. 204 AS SHOWN
MONOLITH NO. 205 OPPOSITE HAND



BOTTOM REINFORCING
MONOLITH NO. 205 AS SHOWN
MONOLITH NO. 204 OPPOSITE HAND

PLAN

BY	DATE	CHARACTER
F.B.F.	11-20-40	Cut-off key and reinforcing in base revised.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 204 & 205

SHEET 39 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

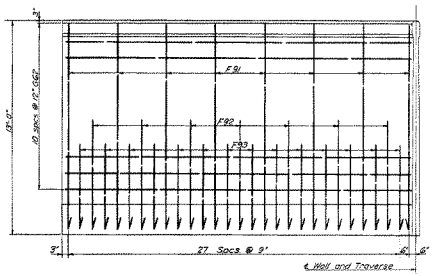
SUBMITTED: ENGINEER, DIST. OF BASIN

APPROVAL RECOMMENDED: PRINCIPAL ASSISTANT DIST. OF FLOOD CONTROL DIVISION

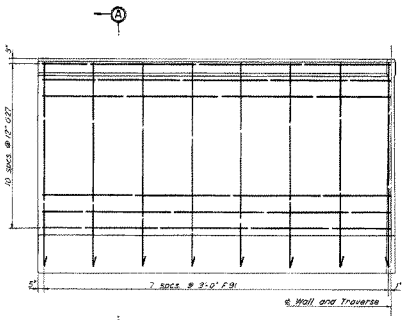
APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY: D.E.L. TR. BY: R.S. CK. BY: R.B.F.

AS BUILT 933-12.3/41



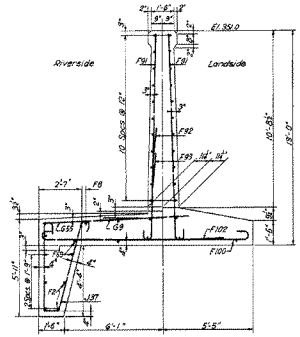
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

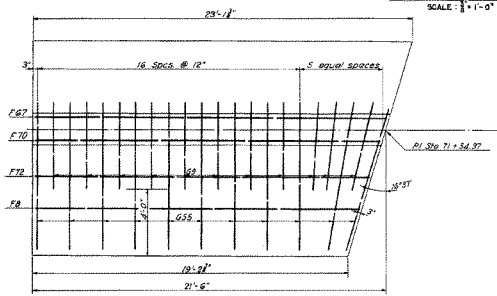
RIVERSIDE ELEVATION

SCALE: 1/8" = 1'-0"

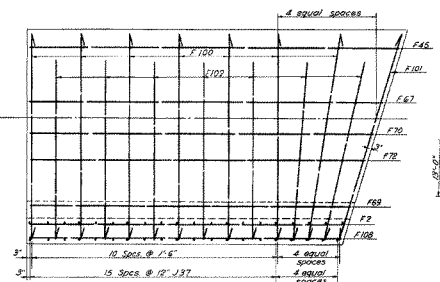


SECTION A-A

SCALE: 1/8" = 1'-0"



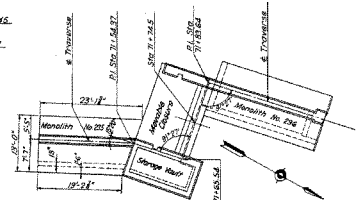
TOP REINFORCING



BOTTOM REINFORCING

PLAN

SCALE: 1/8" = 1'-0"



PLAN

SCALE: 1/16"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 235

SHEET 40 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] ASSISTANT CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

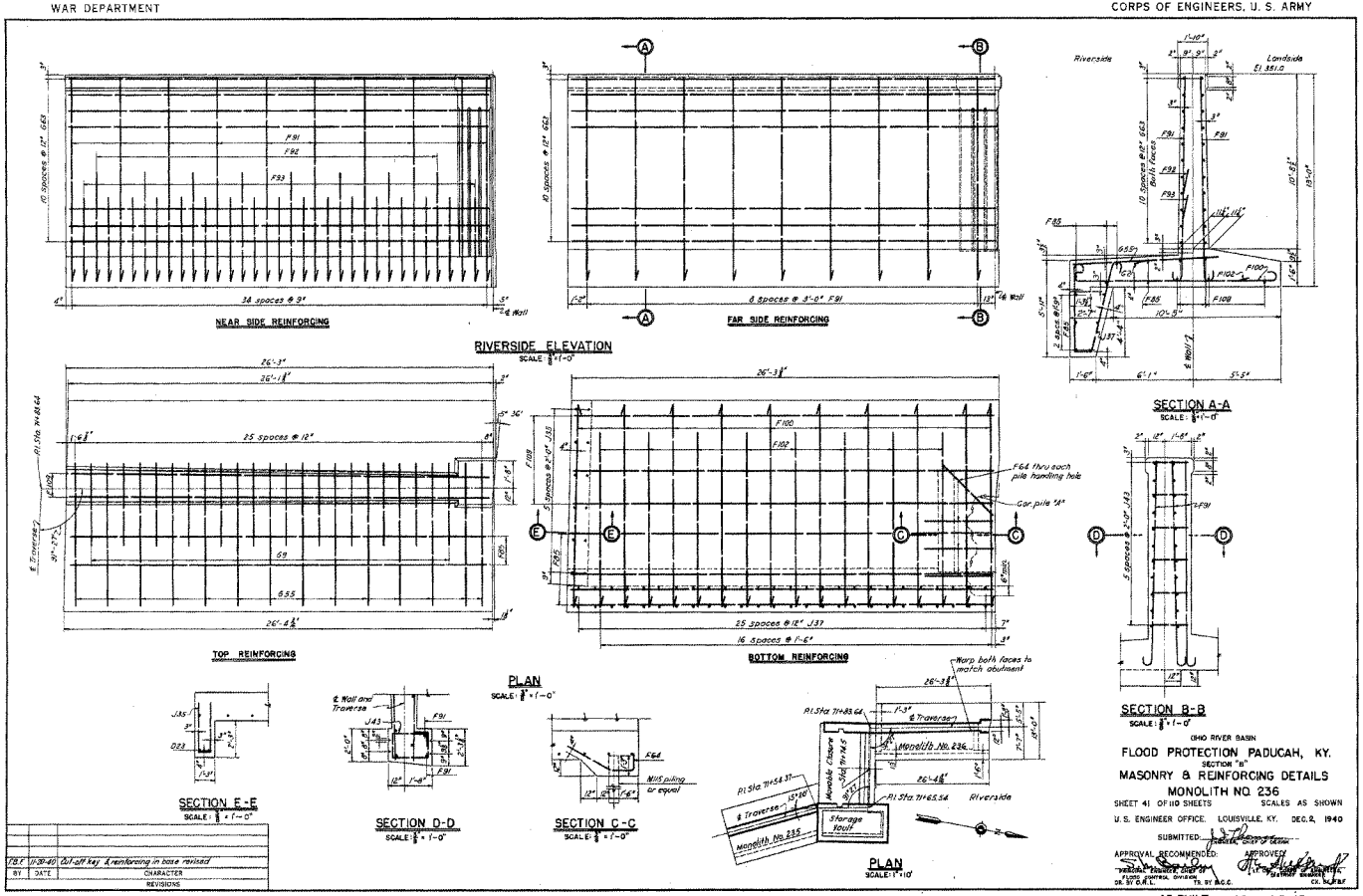
DR. BY D.B.L. TR. BY P.B. CK. BY F.B.K.

AS BUILT 933 - 12.3/42

BY	DATE	CHARACTER OF REVISIONS
F.B.K.	1-20-40	Cut off key and reinforcing revised in base.

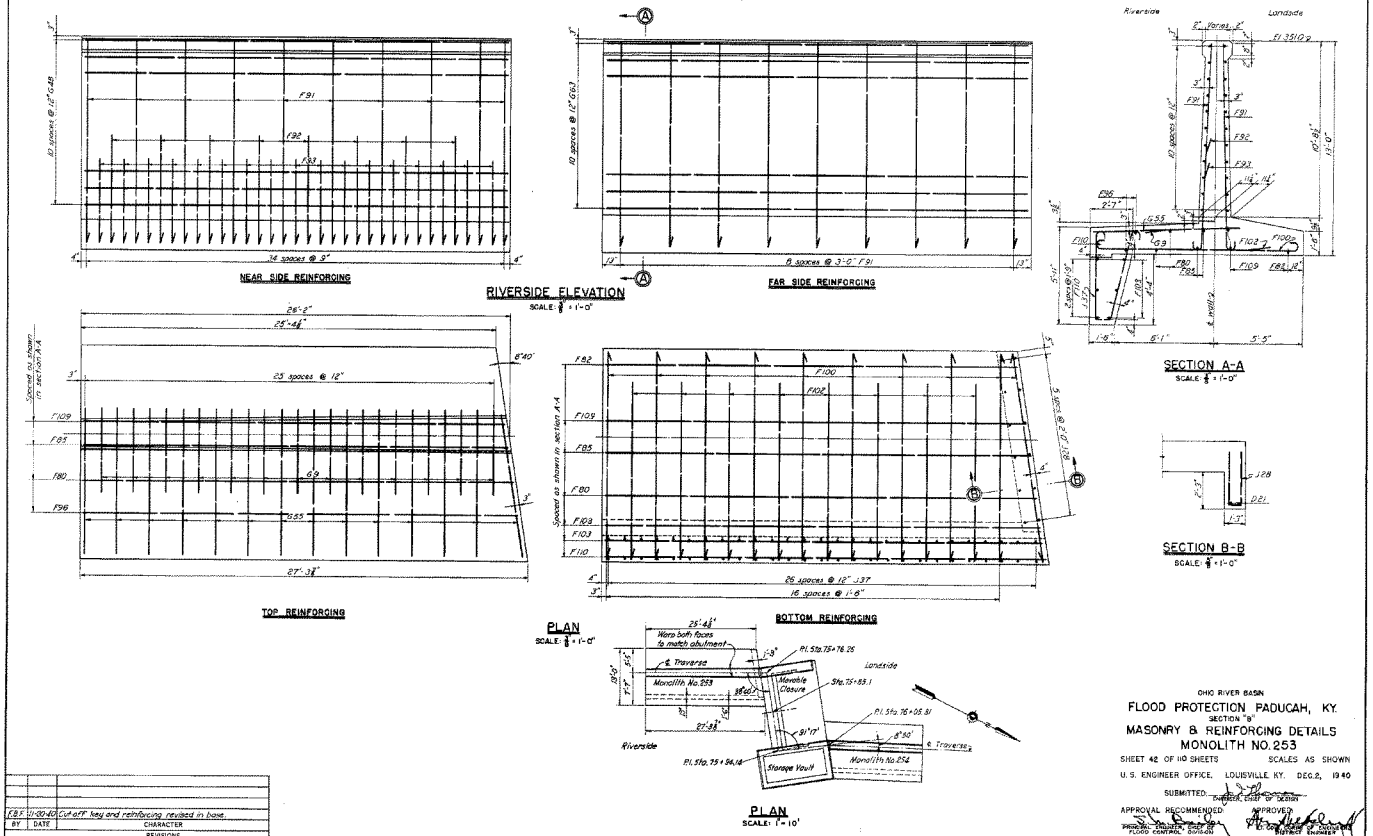
701

642.5


NEAR SIDE REINFORCING
FAR SIDE REINFORCING
RIVERSIDE ELEVATION
SCALE: 1/8" = 1'-0"
SECTION A-A
SCALE: 1/8" = 1'-0"
TOP REINFORCING
BOTTOM REINFORCING
PLAN
SCALE: 1/8" = 1'-0"
SECTION B-B
SCALE: 1/8" = 1'-0"
SECTION E-E
SCALE: 1/8" = 1'-0"
SECTION D-D
SCALE: 1/8" = 1'-0"
SECTION C-C
SCALE: 1/8" = 1'-0"
PLAN
SCALE: 1" = 10'
Riverside
Landside
Warp both faces to match abutment
Storage Vault
Monolith No. 236
Monolith No. 235
Monolith Closure
Riverside
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 236
SHEET 41 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
FLOOD CONTROL DIVISION
DR. BY O.R.L.
TR. BY W.C.C.
CH. DR. BY
AS BUILT 933-12.3/43
7/31 11-30-40 Cut-off key & reinforcing in base revised
BY DATE CHARACTER
REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER
CBS	11-20-40	Cut off key and reinforcing revised in base.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 253

SHEET 42 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE KY. DEC. 2, 1940

SUBMITTED: Assistant Chief of Division

APPROVAL RECOMMENDED: Principal Assistant Engineer, Flood Control, Div. on Dr. By: G.R.L.

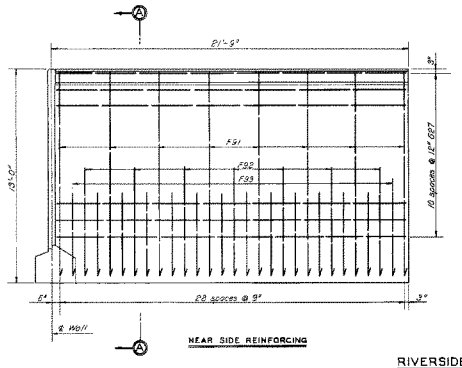
APPROVED: Lt. Colonel, Corps of Engineers, District Engineer. Ch. By: C.E.P.

ASBUILT 933-12.3/44

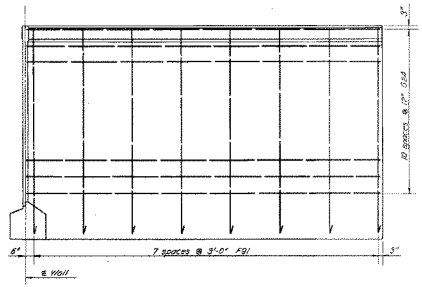
703

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



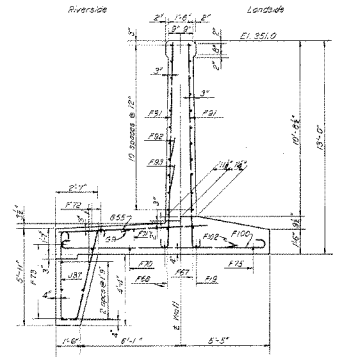
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

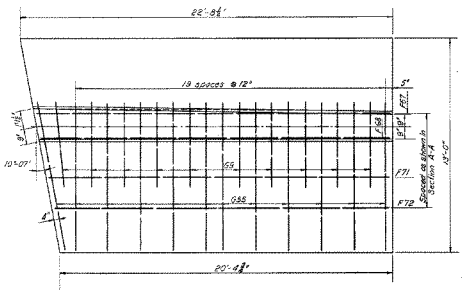
RIVERSIDE ELEVATION

SCALE: 1/8" = 1'-0"

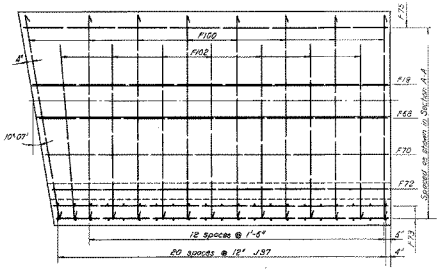


SECTION A-A

SCALE: 1/8" = 1'-0"



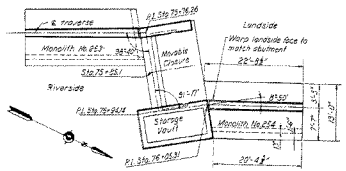
TOP REINFORCING



BOTTOM REINFORCING

PLAN

SCALE: 1/8" = 1'-0"



PLAN

SCALE: 1" = 10'

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 254

SHEET 43 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] — PROJECT CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] — PRINCIPAL ASSISTANT CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [illegible] — LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

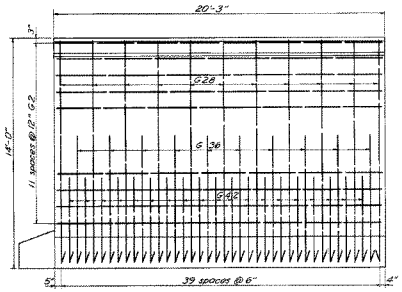
DR. BY F.E.B. — TR. BY H.E.S. — CK. BY F.R.E.

BY	DATE	CHARACTER
F.B.F.	11-20-40	Cut-off key and reinforcing in base revised.

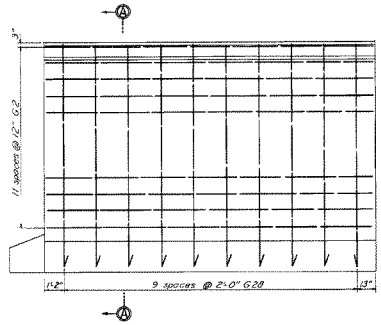
REVISIONS

AS BUILT

933-12.3/45

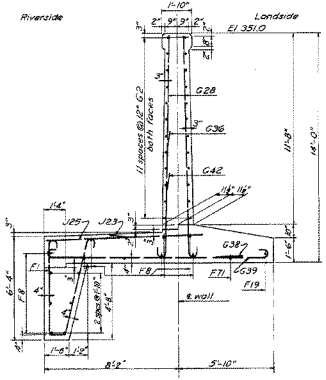


NEAR SIDE REINFORCING

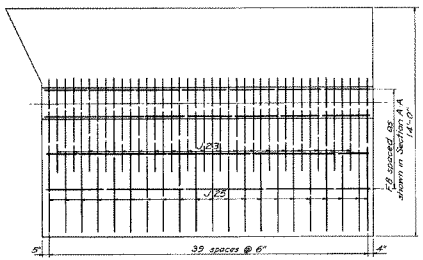


FAR SIDE REINFORCING

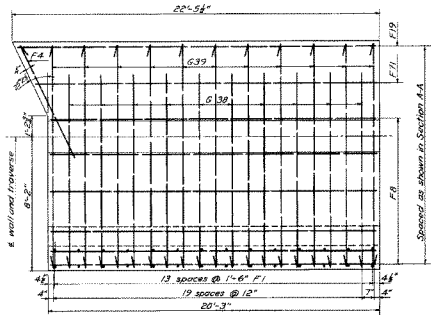
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER
TBT	1-30-48	Cutoff key & reinforcing in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 96

SHEET 44 OF 110 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF, CIVIL DESIGN BRANCH

APPROVAL RECOMMENDED: [illegible] CHIEF, CIVIL DESIGN BRANCH, FLOOD CONTROL DIVISION

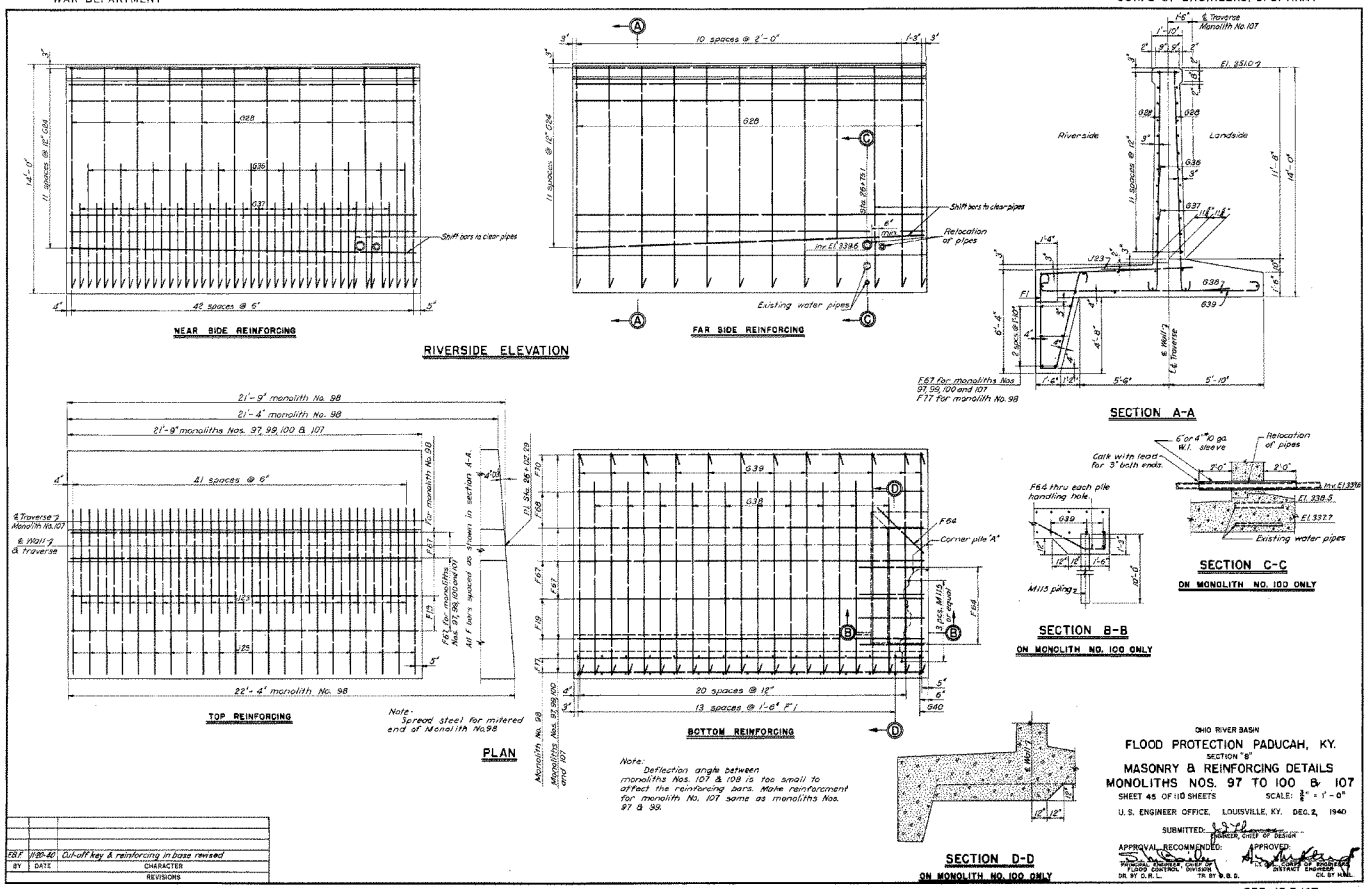
APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY FEB.-G.V.L. TR. BY R.K.J. CK. BY H.M.L.

AS BUILT 933-12.3/46

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



F87	11-20-40	Cut-off key & reinforcing in base revised
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 97 TO 100 & 107

SHEET 45 OF 110 SHEETS

SCALE: $\frac{3}{8}$" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

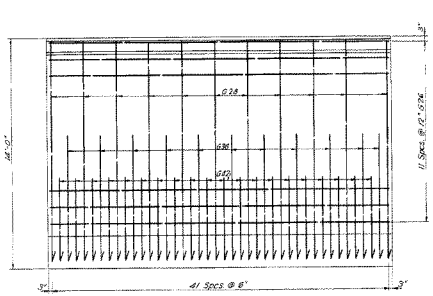
SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] NATIONAL ENGINEER CHIEF OF FLOOD CONTROL DIVISION DR. BY C.R.L.

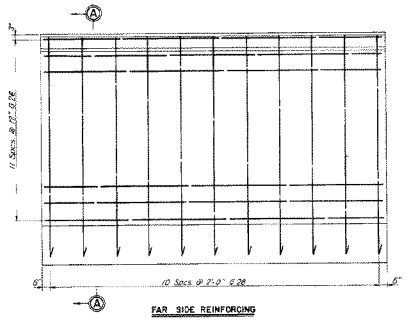
APPROVED: [illegible] CHIEF OF ENGINEERS DISTRICT ENGINEER CK. BY H.M.L. TR. BY B.B.D.

AS BUILT 933-12.3/47

706

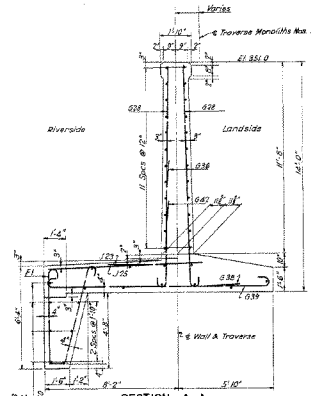


NEAR SIDE REINFORCING



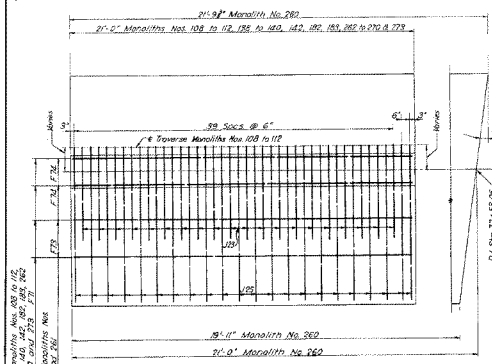
FAR SIDE REINFORCING

RIVERSIDE ELEVATION

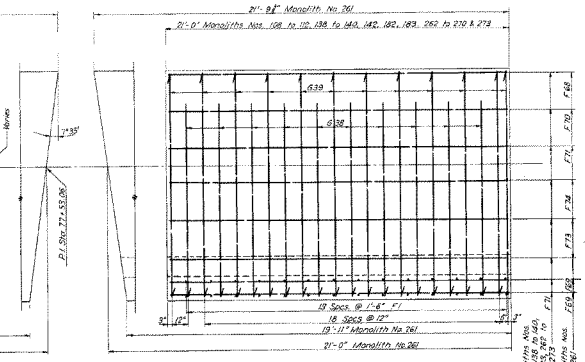


SECTION A-A

Note:
Deflection angle between Monoliths Nos. 107 and 108 is too small to affect the reinforcing bars. Make reinforcement for Monolith No 108 same as for Monolith No. 109.



TOP REINFORCING



BOTTOM REINFORCING

Note:
Spread steel for mitered end of Monolith No. 261.

PLAN

BY	DATE	CHARACTER
T.B.T.	11-20-40	Cut-off key & reinforcing in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 108 TO 112, 138 TO 140, 142, 182, 183, 260 TO 270 & 273

SHEET 46 OF 110 SHEETS SCALE: ¼"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

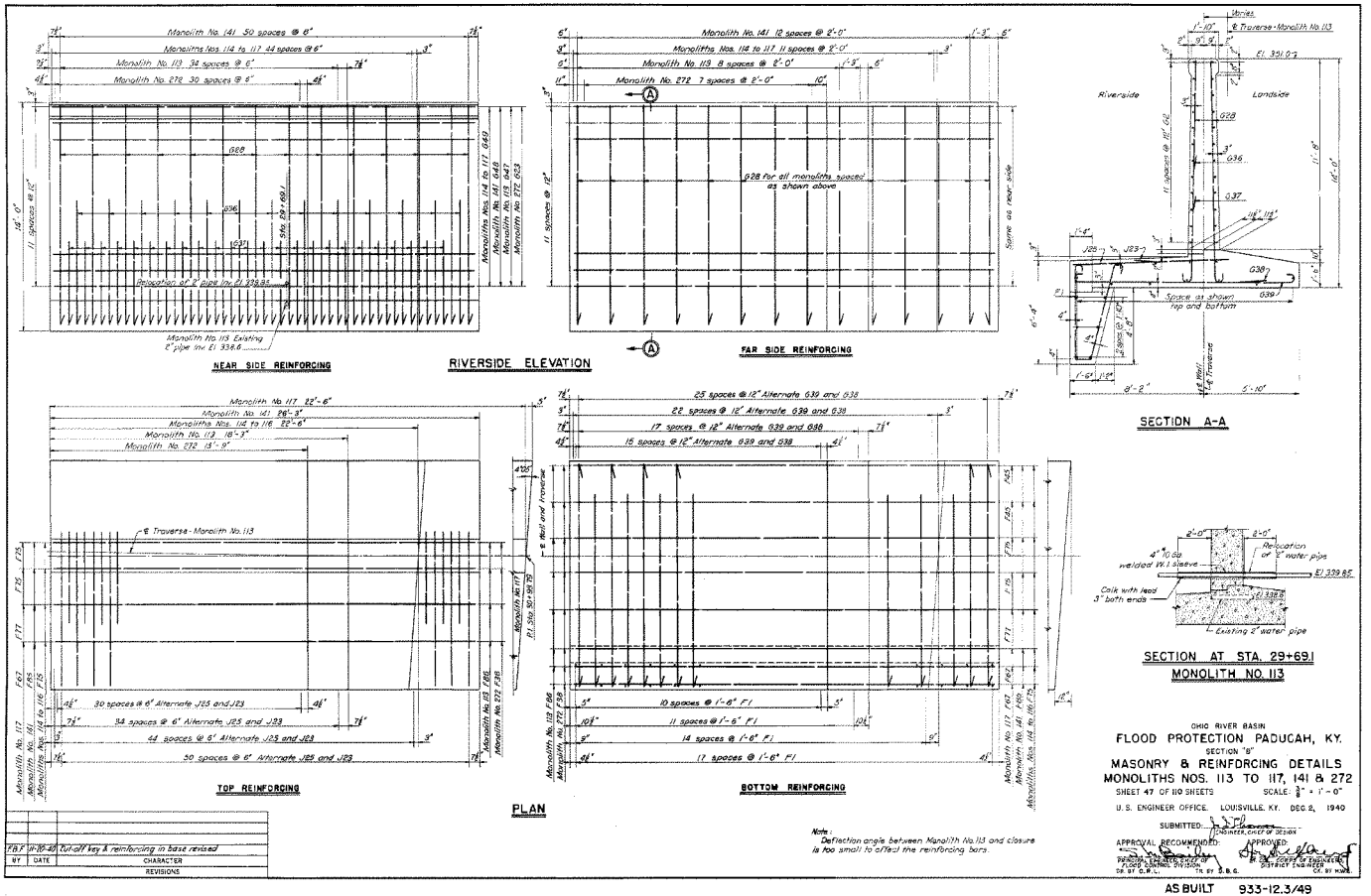
DR. BY: D. B. L. TR. BY: K. S. CK. BY: H.M.

AS BUILT 933-12,3/48

707

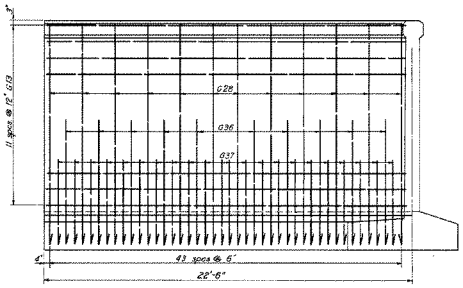
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

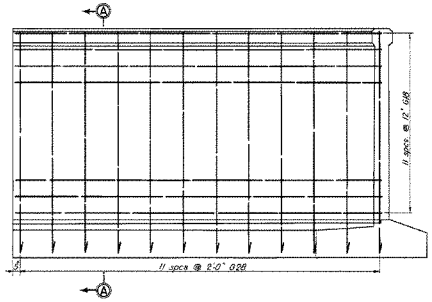


WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

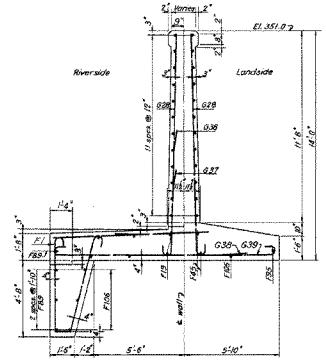


NEAR SIDE REINFORCING

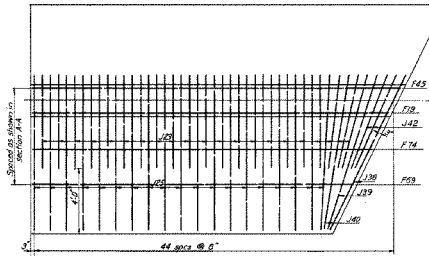


FAR SIDE REINFORCING

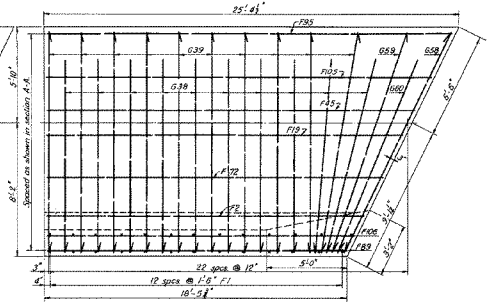
RIVERSIDE ELEVATION
SCALE: 3/8" = 1'-0"



SECTION A-A
SCALE: 3/8" = 1'-0"

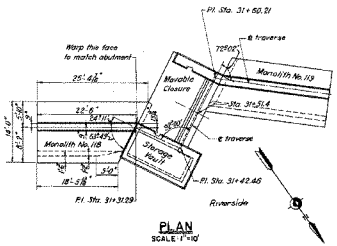


TOP REINFORCING



BOTTOM REINFORCING

PLAN
SCALE: 3/8" = 1'-0"



PLAN
SCALE: 1" = 10'

F.B.F.	9-27-40	Cut-off key & reinforcing in base revised
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 118

SHEET 48 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: DISTRICT ENGINEER

APPROVAL RECOMMENDED: APPROVED

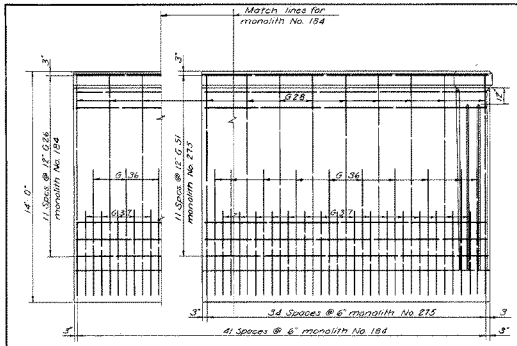
ASSISTANT ENGINEER, CHIEF OF FLOOD CONTROL DIVISION. DR. BY G.V.L. TR. BY G.A.M.

CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER. CK. BY F.W.H.

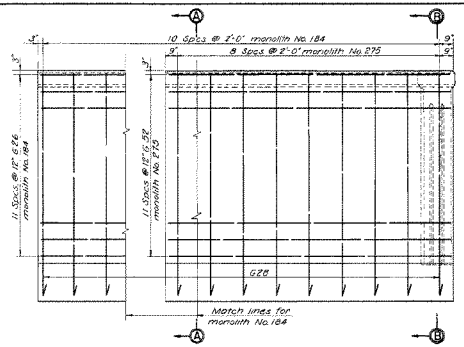
AS BUILT 933-12.3/50

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

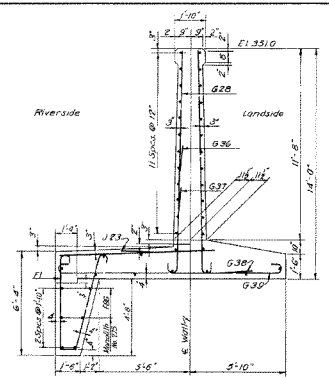


NEAR SIDE REINFORCING

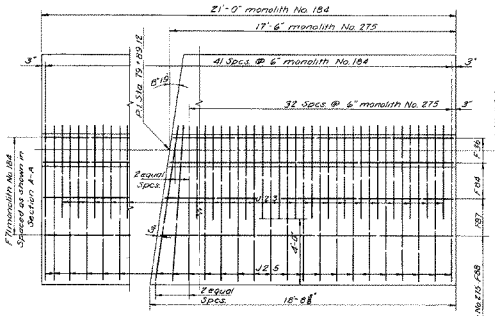


FAR SIDE REINFORCING

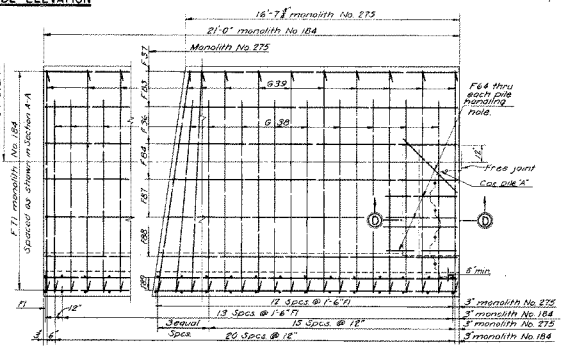
RIVERSIDE ELEVATION



SECTION A-A

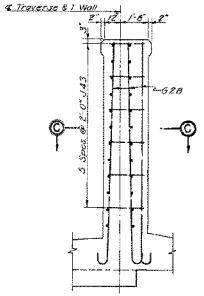


TOP REINFORCING

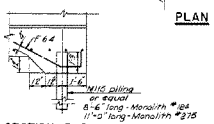


BOTTOM REINFORCING

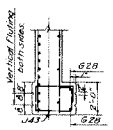
PLAN



SECTION B-B



SECTION D-D



SECTION C-C

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 184 & 275

SHEET 49 OF 110 SHEETS SCALE: ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF OF DESIGN

APPROVED RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.R.L. TR. A.J.K. CK. BY A.J.

RY	DATE	CHARACTER
F.B.F.	1/20-42	Cut-off key and reinforcing in base revised.

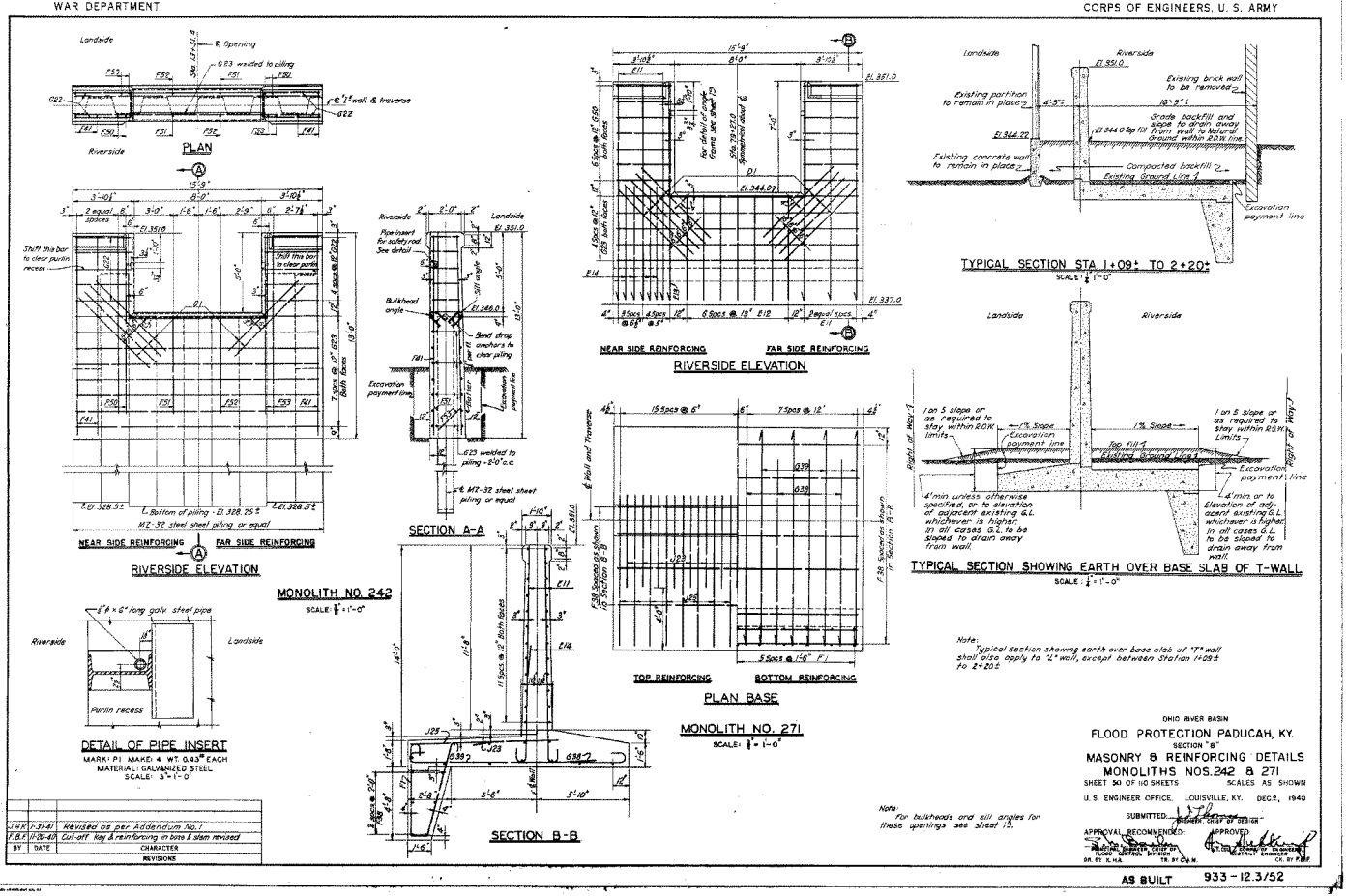
REVISIONS

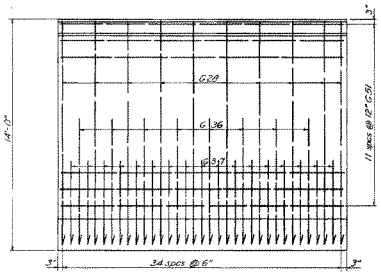
AS BUILT 933-12.3/51

434

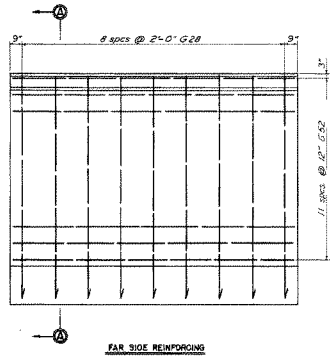
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



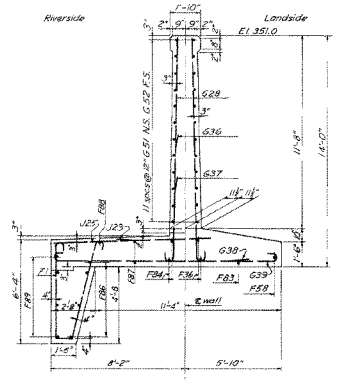


NEAR SIDE REINFORCING

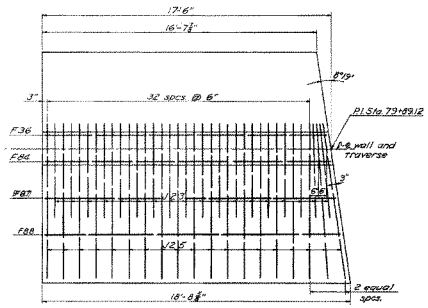


FAR SIDE REINFORCING

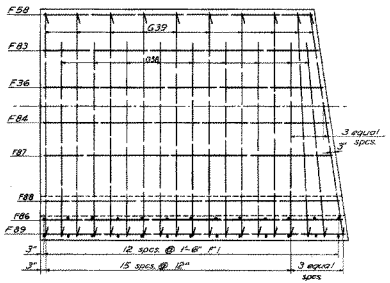
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER
F.B.F.	11/20/40	Cut-off key & reinforcing in base revised.

REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 274

SHEET 51 OF 110 SHEETS SCALE: 3/8"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: District Engineer, Chief of Design

APPROVAL RECOMMENDED: Assistant Engineer Chief of Design, Flood Control Division

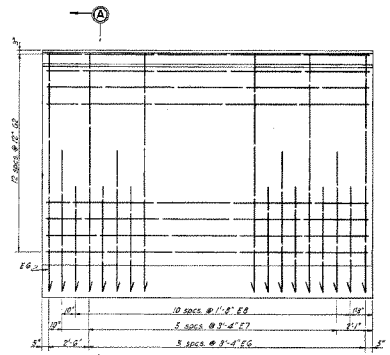
APPROVED: Lt. Col., Corps of Engineers, District Engineer

DR. BY C.R.L. TR. BY R.K.J. CK. BY R.W.

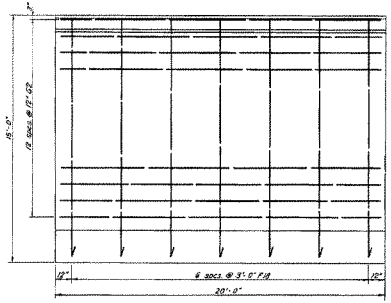
AS BUILT 933-12.3/53

712

426

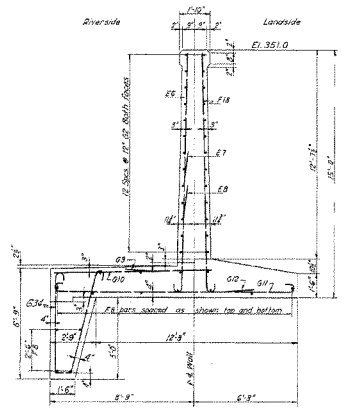


NEAR SIDE REINFORCING

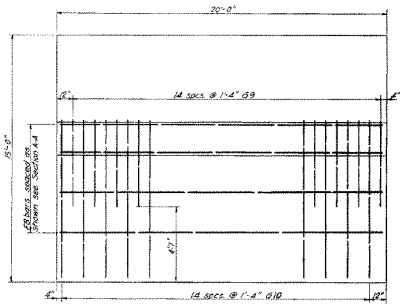


FAR SIDE REINFORCING

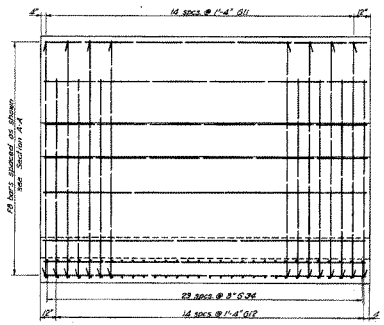
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER REVISIONS
F.B.F.	11-20-46	Cut-off key & reinforcing in base revised.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

"SECTION B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 20

SHEET 52 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

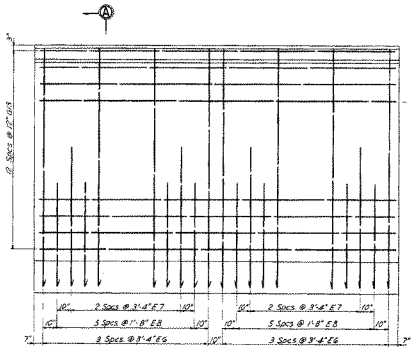
SUBMITTED: [illegible] ENGINEER, OHIO RIVER DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEERING DIVISION, FLOOD CONTROL BRANCH

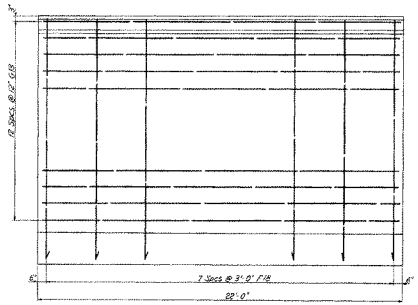
APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DEPUTY ENGINEER

DR. BY G.S.B. TR. BY PB. CALC. BY WL.

AS BUILT 933-12.3/54

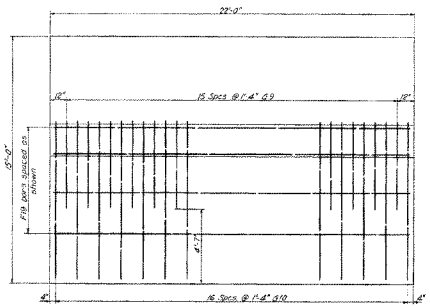


NEAR SIDE REINFORCING

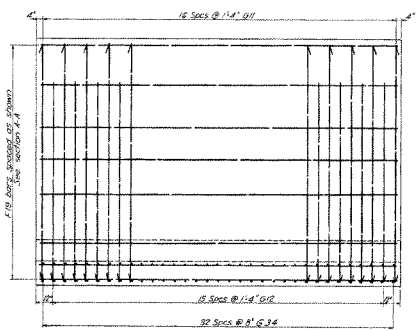


FAR SIDE REINFORCING

RIVERSIDE ELEVATION

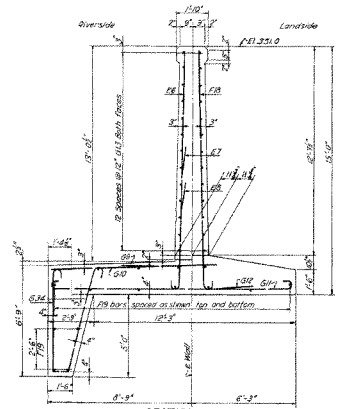


TOP REINFORCING



BOTTOM REINFORCING

PLAN



SECTION A-A

Notes:
Monolith No. 21 shown, Monoliths No. 22 and 23 similar.

F.B.F.	11-20-40	Cut off keys & reinf in base revised
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 21, 22 & 23

SHEET 53 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: _____ ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: _____ PATERNAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

CK. BY G.C.B. TRN. BY W.S.

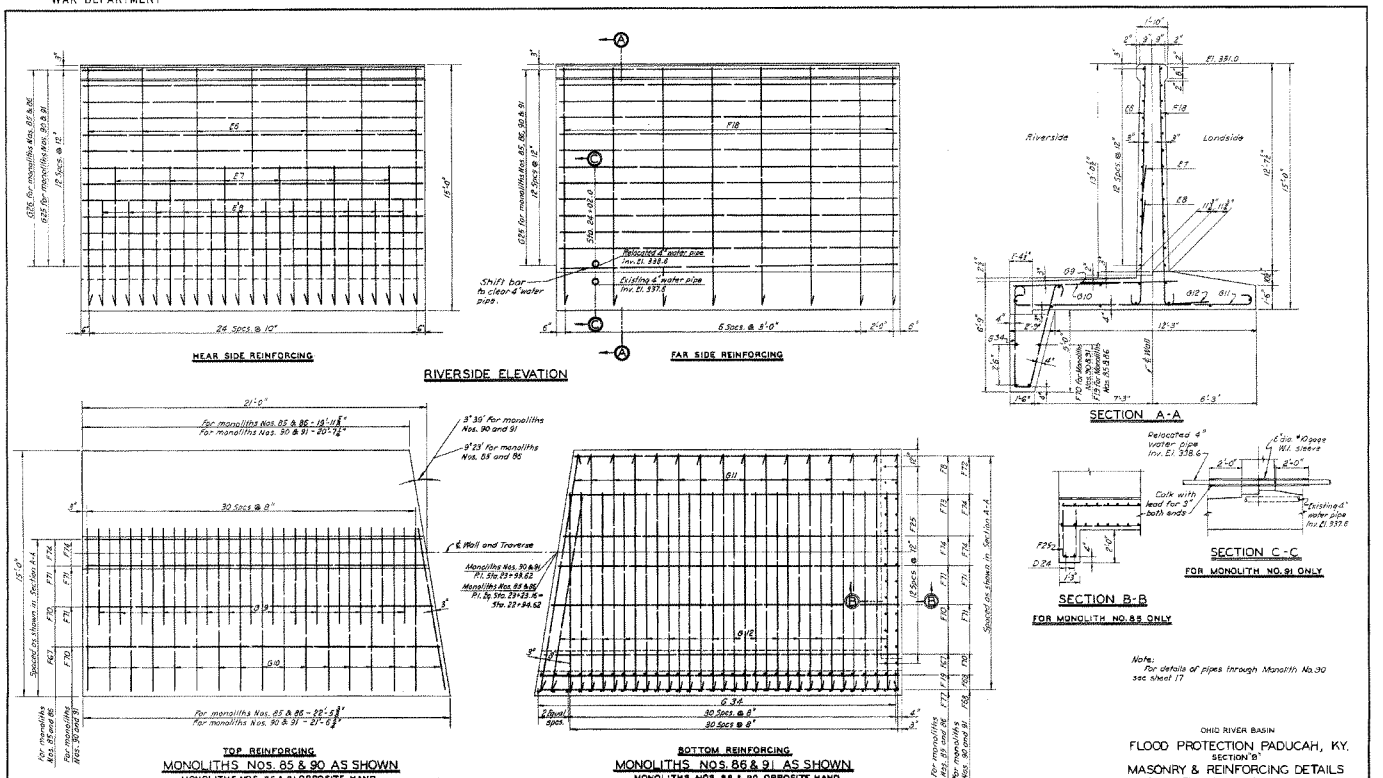
APPROVED: _____ LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

CK. BY P.B.F.

AS BUILT 933-12.3/55

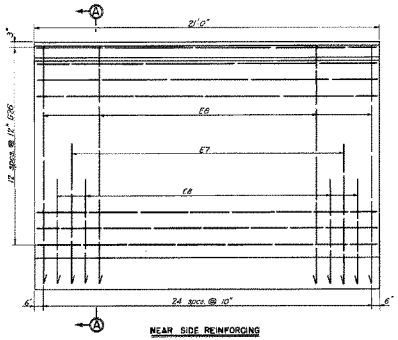
714

434

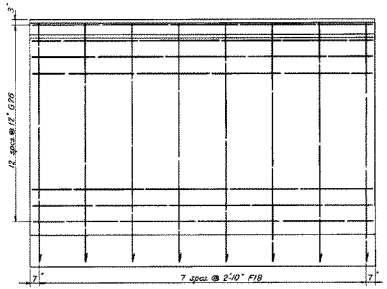

NEAR SIDE REINFORCING
FAR SIDE REINFORCING
RIVERSIDE ELEVATION
Relocated 4" water pipe Inv. El. 338.6
Existing 4" water pipe Inv. El. 337.6
Shift bar to clear 4" water pipe.
24 Spcs. @ 10"
6 Spcs. @ 8'-0"
Riverside
Landside
SECTION A-A
Relocated 4" water pipe Inv. El. 338.6
Cast with lead for 3" both ends
Existing 4" water pipe Inv. El. 337.6
SECTION C-C
FOR MONOLITH NO. 91 ONLY
SECTION B-B
FOR MONOLITH NO. 85 ONLY
Note: For details of pipes through Monolith No. 30 see sheet 17
TOP REINFORCING
MONOLITHS NOS. 85 & 90 AS SHOWN
MONOLITHS NOS. 86 & 91 OPPOSITE HAND
BOTTOM REINFORCING
MONOLITHS NOS. 86 & 91 AS SHOWN
MONOLITHS NOS. 85 & 90 OPPOSITE HAND
PLAN
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS Nos. 85, 86, 90 & 91
SHEET 54 OF 110 SHEETS
SCALE: 3/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED
F.D.F. 1/20/40 Cut off key and reinforcing in stem and base revised.
BY DATE CHARACTER
REVISIONS
AS BUILT 933-12.3/56

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

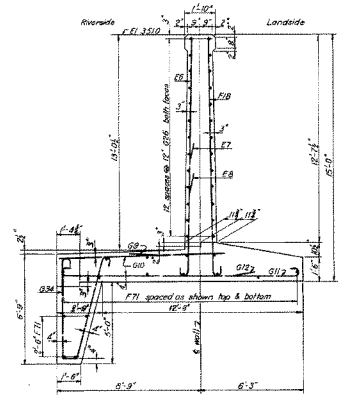


NEAR SIDE REINFORCING

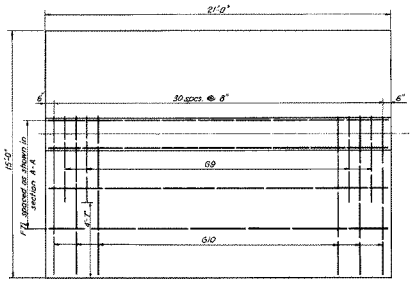


FAR SIDE REINFORCING

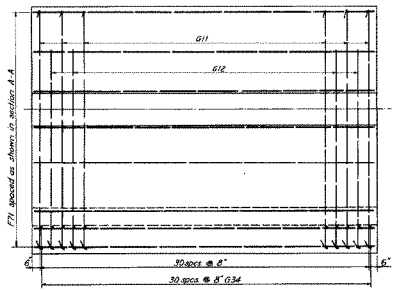
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER
TBF	11-20-48	Cut-off key & reinforcing in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 87 TO 89 & 92 TO 94

SHEET 55 OF 105 SHEETS SCALE: ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

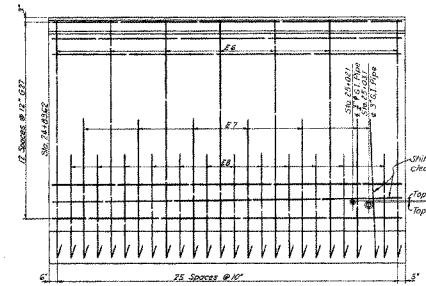
SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

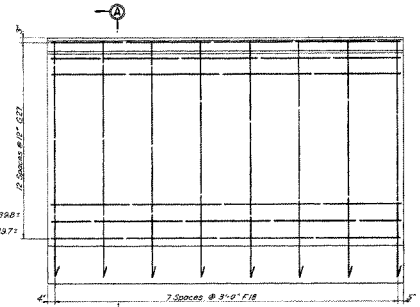
APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY F.E.B. TR. BY G.A.M. CK. BY F.E.B.

AS BUILT 933-12.3/57

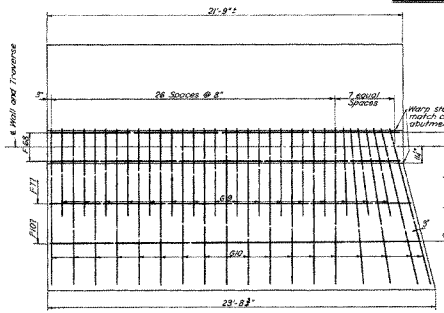


NEAR SIDE REINFORCING

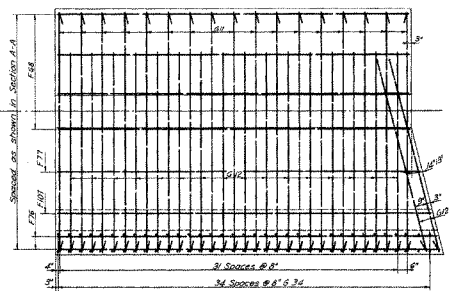


FAR SIDE REINFORCING

RIVERSIDE ELEVATION

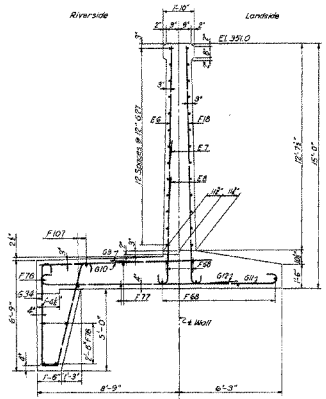


TOP REINFORCING

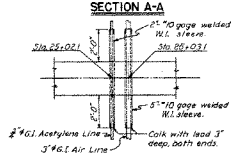


BOTTOM REINFORCING

PLAN



SECTION A-A



DETAIL OF PIPES THRU WALL

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 95

SHEET 56 OF 110 SHEETS SCALE: ⅛" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PADUCAH SUBDISTRICT CHIEF OF FLOOD CONTROL SECTION. DR. BY O.R.L. TR. BY W.B.

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER. CK. BY F.B.P.

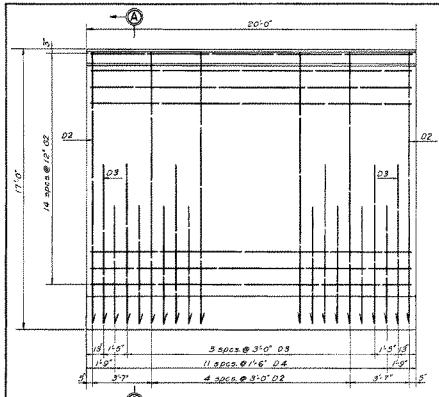
BY	DATE	CHARACTER REVISIONS
F.B.P.	11/20/46	Cut-off key & reinf in base revised

AS BUILT 933-12.3/58

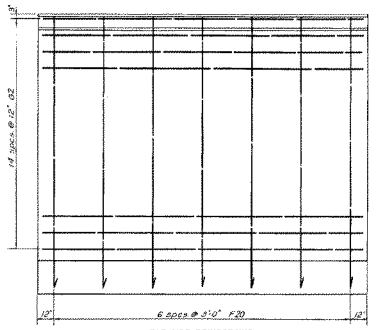
717

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

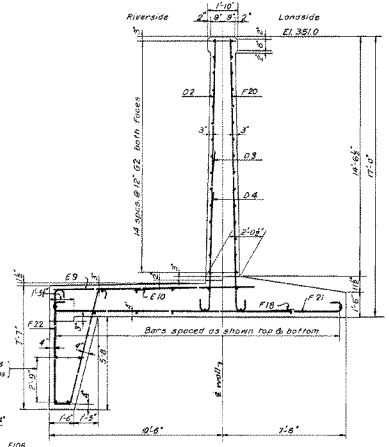


NEAR SIDE REINFORCING

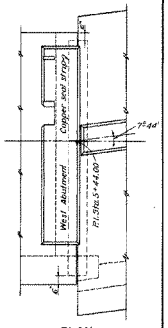


FAR SIDE REINFORCING

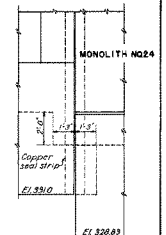
RIVERSIDE ELEVATION



SECTION A-A

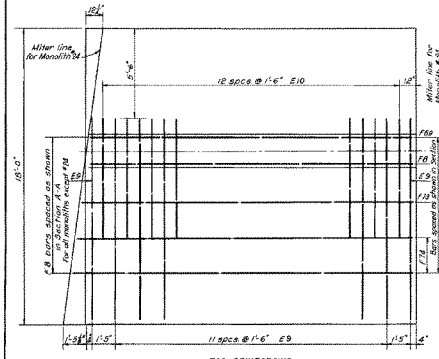


PLAN

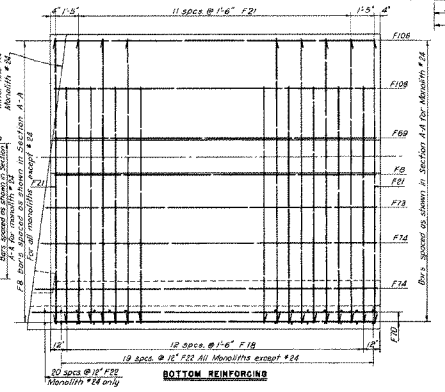


RIVERSIDE ELEVATION

DETAIL SEAL BLOCK



TOP REINFORCING



BOTTOM REINFORCING

PLAN

Note:
Reinforcing in the base of monolith #24 shall be placed as shown above, except bars will be spread at the mitered end of the monolith.
For detail of seal block connection between monoliths 26 & 27 see sheet 61.

FBF	11/20/40	Cut-off key & reinforcing in base revised.
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 24 TO 26, 44 TO 68, 70, 72 TO 74 & 77

SHEET 57 OF 105 SHEETS SCALE: ⅛" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] MILITARY, CHIEF OF DESIGN

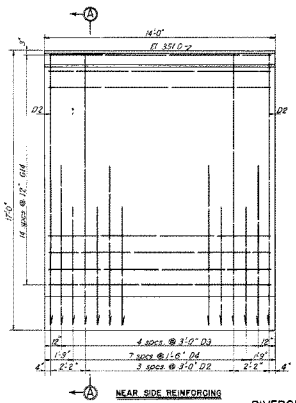
APPROVAL RECOMMENDED: [illegible] PERSONAL ENGINEER, CHIEF OF DESIGN, CIVIL DIVISION

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

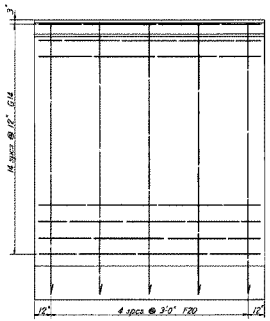
OK. BY O.H.S. TR. BY W.S.S. CK. BY [illegible]

AS BUILT 933-12.3/59

718

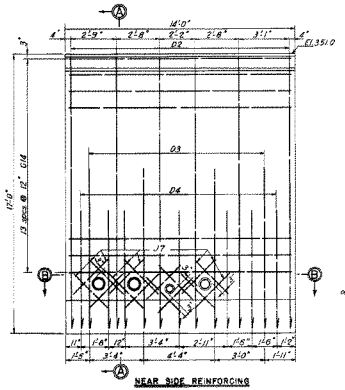


NEAR SIDE REINFORCING

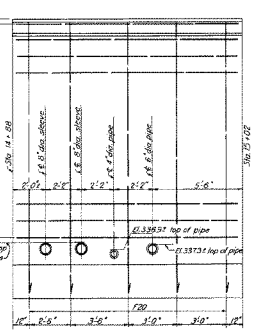


FAR SIDE REINFORCING

RIVERSIDE ELEVATION
MONOLITH NO. 78

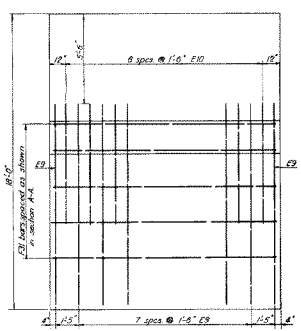


NEAR SIDE REINFORCING

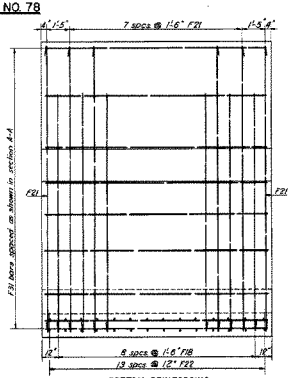


FAR SIDE REINFORCING

RIVERSIDE ELEVATION
MONOLITH NO. 69

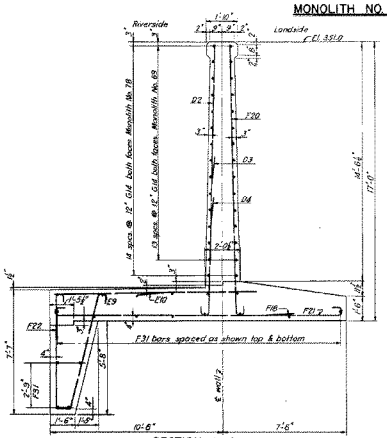


TOP REINFORCING

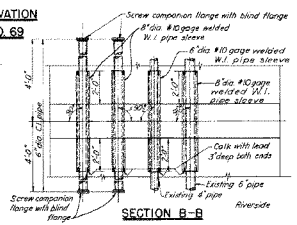


BOTTOM REINFORCING

PLAN
MONOLITHS NOS. 69 & 78



SECTION A-A



SECTION B-B

18 F 11-20-40	Cut off key & reinforcing in base revised	
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 69 & 78

SHEET 59 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

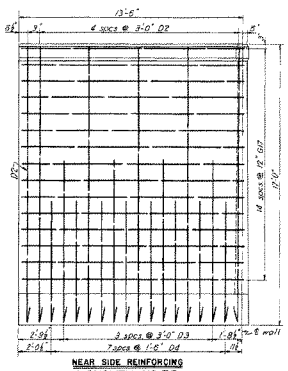
APPROVED: CHIEF, CORPS OF ENGINEERS DISTRICT ENGINEER

DR. 37 C.H.S. TR. 37 C.A.M. CK. 37 C.A.M.

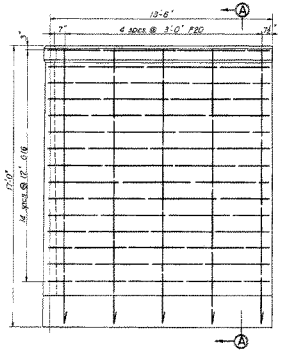
AS BUILT 933-12.3/60

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

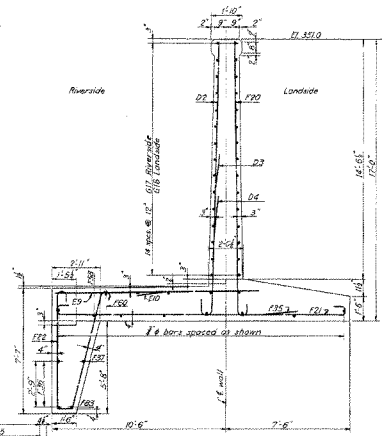


NEAR SIDE REINFORCING
MONOLITH NO. 75

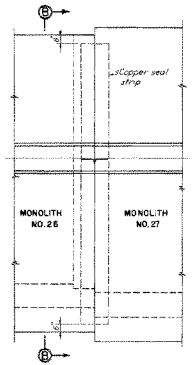


FAR SIDE REINFORCING
MONOLITH NO. 76

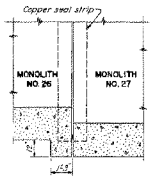
RIVERSIDE ELEVATION



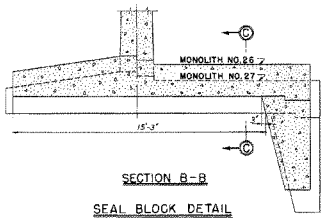
SECTION A-A



PLAN

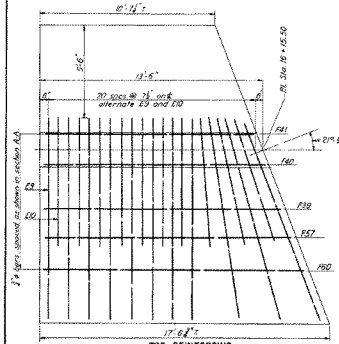


SECTION C-C

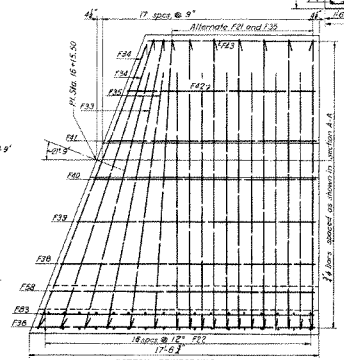


SECTION B-B

SEAL BLOCK DETAIL
MONOLTHS NOS. 26 & 27



TOP REINFORCING
MONOLITH NO. 75
REINFORCING FOR MONOLITH NO. 76 IS IDENTICAL AS SHOWN BUT OPPOSITE HAND



BOTTOM REINFORCING
MONOLITH NO. 76
REINFORCING FOR MONOLITH NO. 75 IS IDENTICAL AS SHOWN BUT OPPOSITE HAND

PLAN
MONOLITHS NOS. 75 & 76

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 75 & 76

SHEET 59 OF 110 SHEETS SCALE: ⅜" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY W.K.S. TR. BY C.A.M. CK. BY F.B.R.

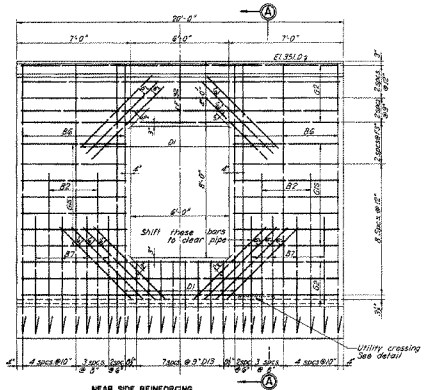
BY	DATE	CHARACTER
F.B.R.	11-20-40	Reinforcing & cut-off key revised.

REVISIONS

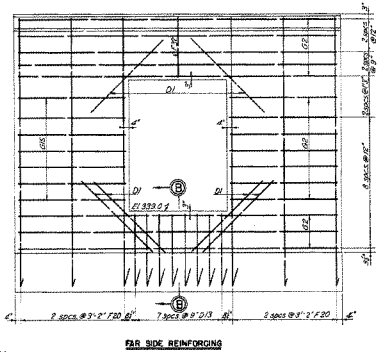
AS BUILT 933-12.3/61

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

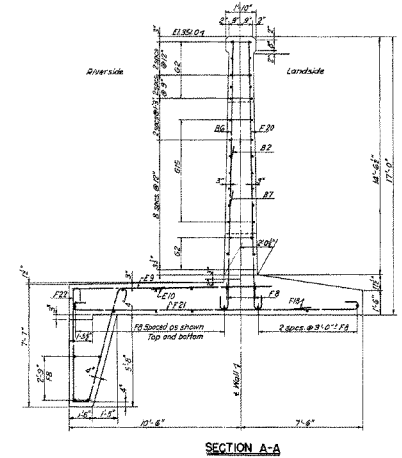


NEAR SIDE REINFORCING

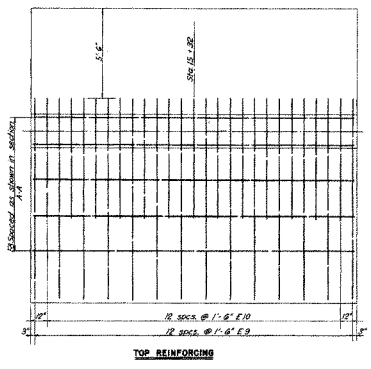


FAR SIDE REINFORCING

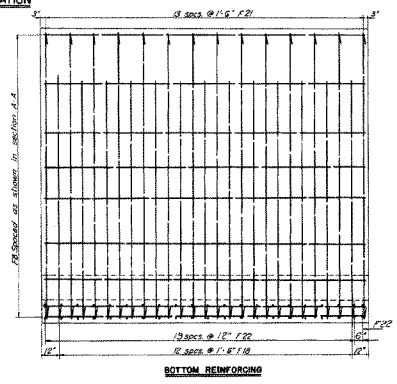
RIVERSIDE ELEVATION



SECTION A-A

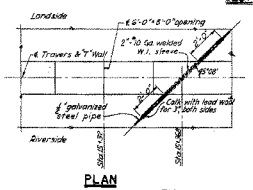


TOP REINFORCING

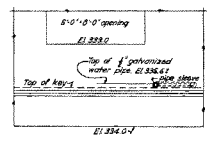


BOTTOM REINFORCING

PLAN

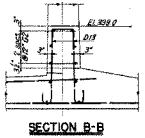


PLAN



ELEVATION

DETAIL OF UTILITY CROSSING



SECTION B-B

BY	DATE	CHARACTER
FBE	11-20-40	Cut off key & reinforcing in base & stem revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "G"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 71

SHEET 60 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940

SUBMITTED: PROJECT CHIEF OF DESIGN

APPROVAL RECOMMENDED: APPROVED:

CHIEF, DESIGN BRANCH

PRINCIPAL ASSISTANT CHIEF OF PLANS CONTROL DIVISION

CHIEF, PLANS & CONTROL DIVISION

DISTRICT ENGINEER

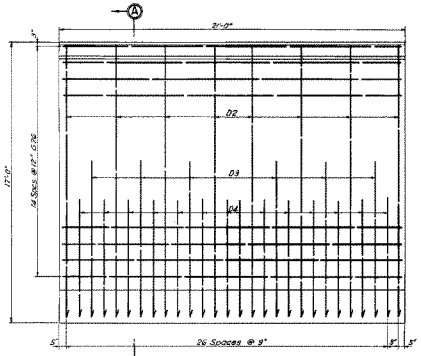
DR. BY K.H.K. TR. BY W.S. CK. BY H.W.L.

AS BUILT 933-12.3/62

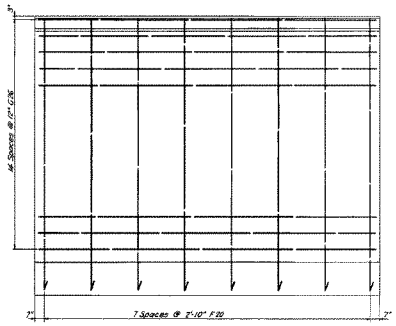
PATTERSON COPYRIGHT NO. 22

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

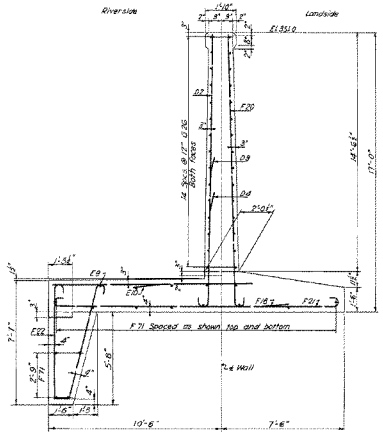


NEAR SIDE REINFORCING

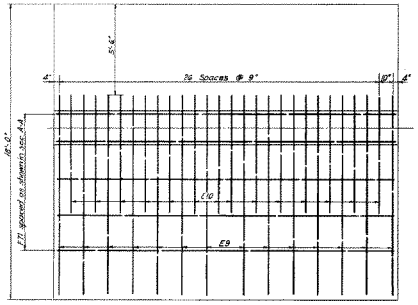


FAR SIDE REINFORCING

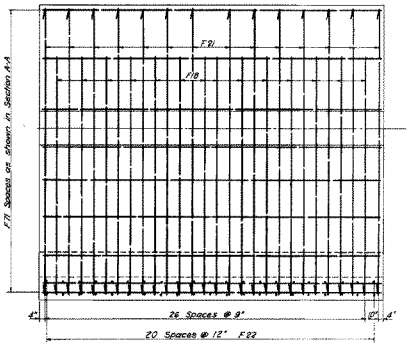
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

BY	DATE	CHARACTER
T.B.F.	11-20-48	Cut-off key & reinforcing in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 79 TO 84

SHEET 61 OF 110 SHEETS SCALE: $\frac{1}{8}$" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION OR BY F.E.B. TO BY R.G.

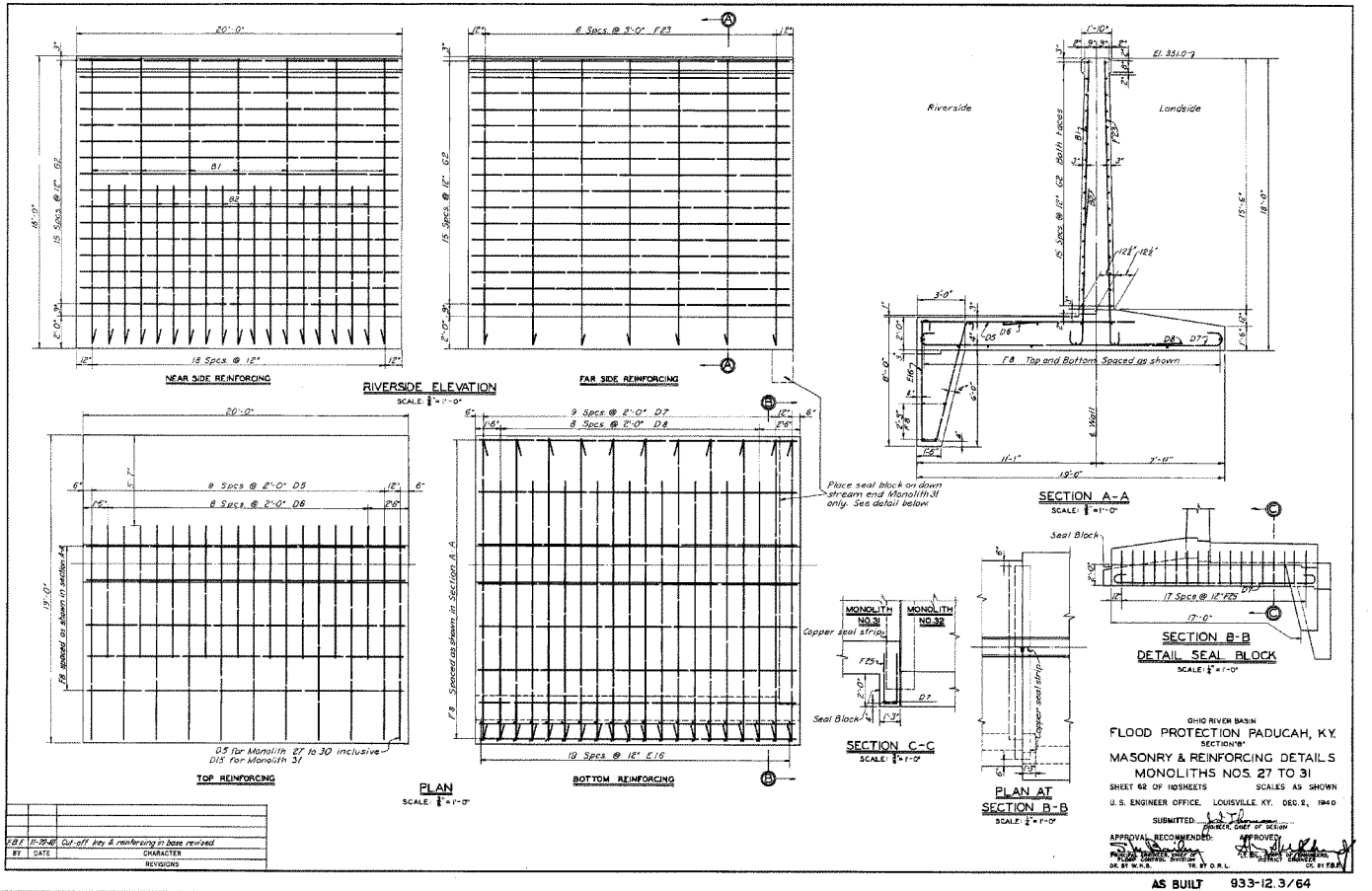
APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER CK. BY F.B.F.

AS BUILT 933-12.3/63

722

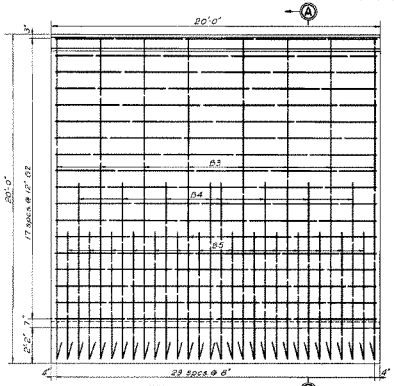
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

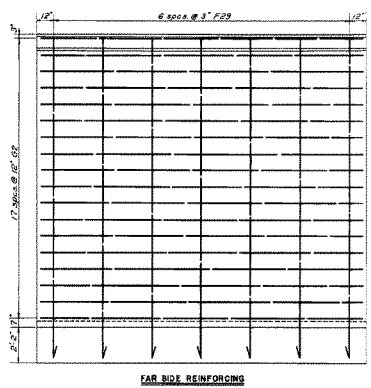


WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

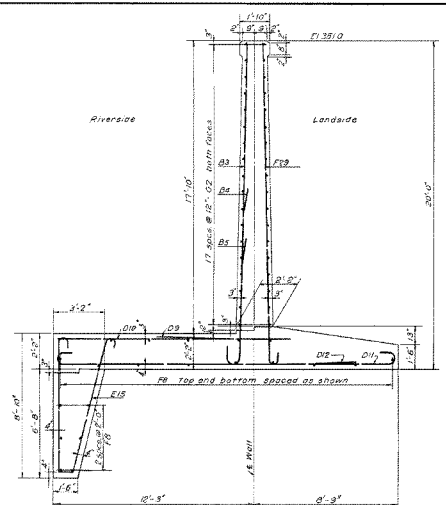


NEAR SIDE REINFORCING

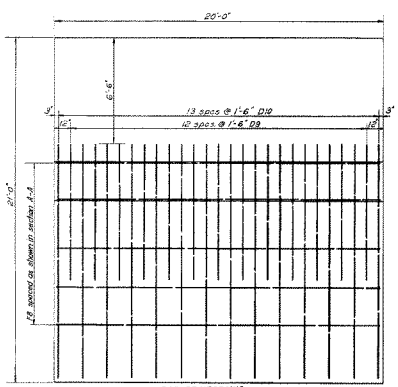


FAR SIDE REINFORCING

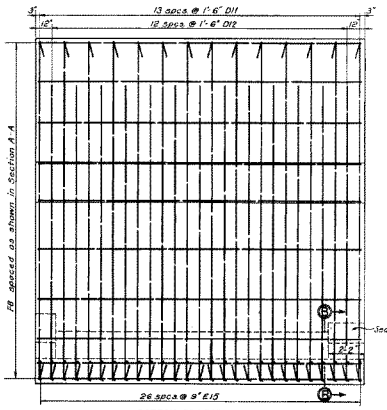
RIVERSIDE ELEVATION



SECTION A-A

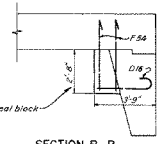


TOP REINFORCING



BOTTOM REINFORCING

PLAN

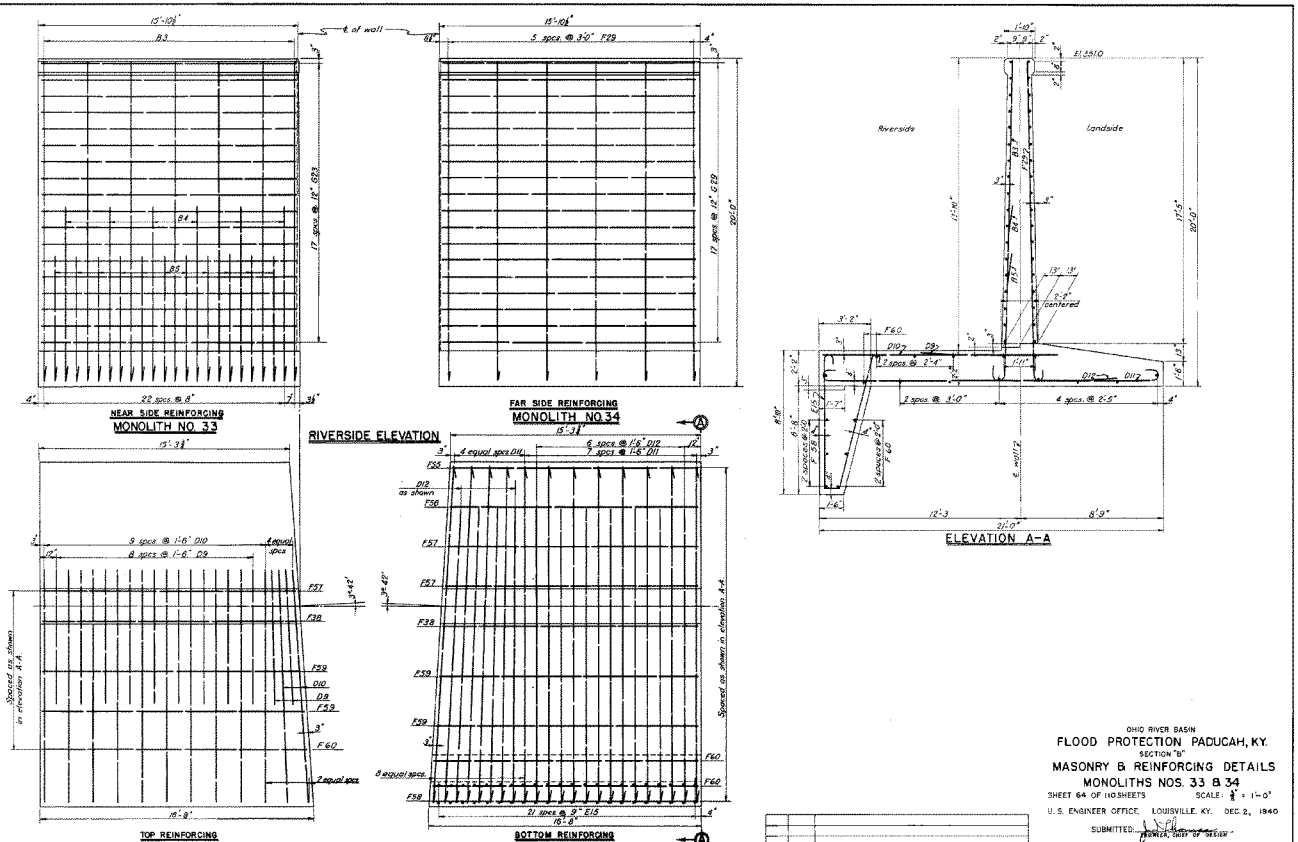


SECTION B-B
DETAIL SEAL BLOCK
MONOLITH 43 ONLY

Note:
For detail of seal block connecting monoliths 31 and 32 see sheet 64.
No additional reinforcing will be required in monolith 32 for seal block.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 32 & 35 TO 43
SHEET 63 OF 110 SHEETS SCALE: 1/8" = 1' - 0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [illegible] PROJECT CHIEF OF DESIGN
APPROVAL RECOMMENDED: [illegible] PROJECT ENGINEER, CHIEF OF DESIGN, OR BY W.K.S.
APPROVED: [illegible] CHIEF, CORPS OF ENGINEERS, DIRECT BUDGET OR BY W.K.S.

BY	DATE	CHARACTER



BY	DATE	CHARACTER REVISIONS
FBF	11-20-40	Cut-off key & reinforcing in base revised

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 33 & 34

SHEET 64 OF 110 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

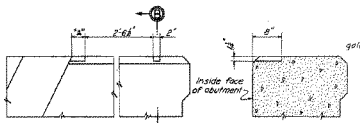
SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY O.R.L. TR. BY S.A.M. CK. BY F.B.F.

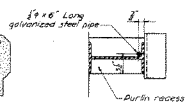
AS BUILT 933-12.3/66



WALKWAY RECESS DETAIL

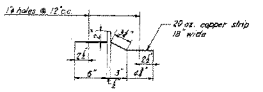
SCALE: 1" = 1'-0"

WALKWAY RECESS DIMENSIONS	
STATION	"A"
4+49.5	3½"
5+34.5	3½"
9+44.0	3½"
10+40.0	3½"
25+15.4	3½"
26+90.3	3½"
29+80.3	6"
31+01.3	6"
31+51.4	3½"
36+84.5	6
62+84.3	3½"
71+74.3	3½"
75+85.1	3½"
83+28.1	3½"
83+92.1	3½"



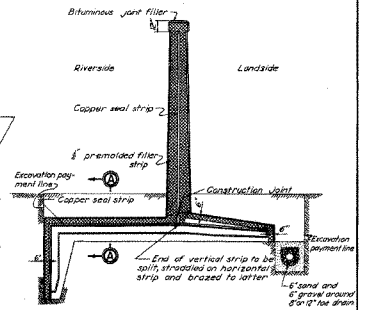
DETAIL OF PIPE INSERT

MARK: PI MAKE: 42 WT. .043# EACH
MATERIAL: GALVANIZED STEEL
SCALE: ½" = 1'-0"



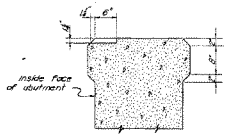
COPPER SEAL STRIP

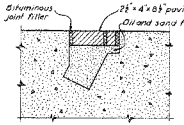
SCALE: 1½" = 1'-0"



TYPICAL "T" WALL EXPANSION JOINT

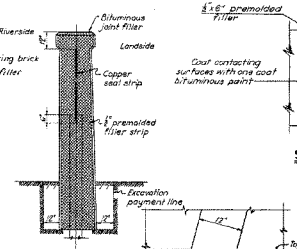
SCALE: ½" = 1'-0"





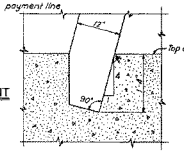
SEAL TRENCH FILLER IN SHEETING RECESS

SCALE: 1" = 1'-0"
STATION 26+90.3



"L" WALL EXPANSION JOINT

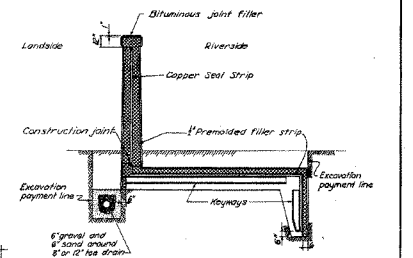
SCALE: ⅜" = 1'-0"



DETAIL OF SHEETING RECESS

SCALE: 1" = 1'-0"

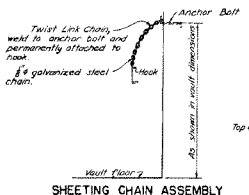
STATION 9+44.0
STATION 10+40.0



"L" WALL EXPANSION JOINT

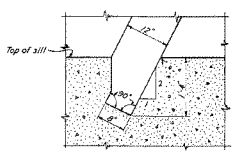
SCALE: ⅜" = 1'-0"

CHAIN SCHEDULE			
STATION	NO. REQD	LENGTH	APPROX. WT. LBS.
4+00.0	2	3'-0"	1.23
10+40.0	2	2'-0"	.82
28+02.3	2	1'-6"	.62
	2	2'-0"	.82
30+31.3	2	2'-0"	.82
31+51.4	2	1'-6"	.62
38+39.0	2	1'-6"	.62
62+84.3	2	1'-6"	.62
68+61.0	2	2'-0"	.82
71+74.3	2	1'-6"	.62
75+85.1	2	1'-6"	.62
83+28.1	2	3'-0"	1.23



SHEETING CHAIN ASSEMBLY

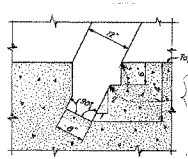
SCALE: ¾" = 1'-0"



DETAIL OF SHEETING RECESS

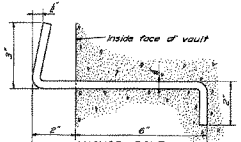
SCALE: 1" = 1'-0"

STATION 4+49.5
STATION 5+34.5
STATION 25+15.4
STATION 31+51.4
STATION 62+84.3
STATION 71+74.3
STATION 75+85.1
STATION 83+92.1



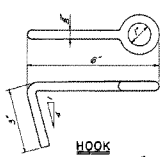
DETAIL OF SHEETING RECESS

SCALE: 1" = 1'-0"
STATION 26+90.3



ANCHOR BOLT

MARK: CA MAKE: 24 WT. .38# EACH
MATERIAL: WROUGHT IRON
SCALE: HALF SIZE



HOOK

MARK: CH MAKE: 24 WT. .35# EACH
MATERIAL: WROUGHT IRON
SCALE: HALF SIZE

FB.F.	11-20-40	Vertical keyway in walls removed
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MISCELLANEOUS DETAILS

SHEET 65 OF 110 SHEETS SCALES AS SHOWN

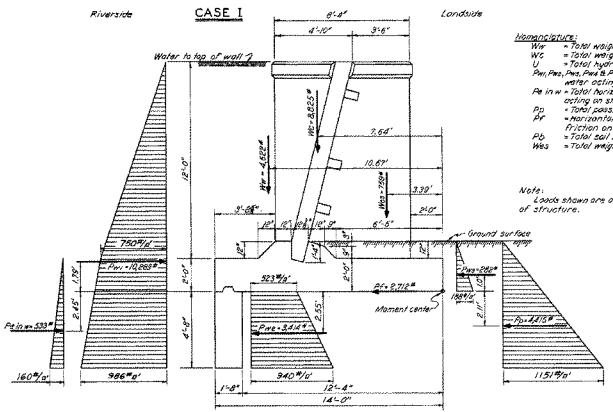
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

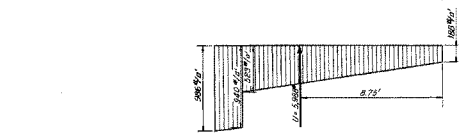
SUBMITTED: DISTRICT ENGINEER

APPROVAL RECOMMENDED: APPROVED:

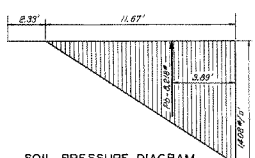
DR. BY B.C.B. TR. BY A.B.S. CK. BY N.W.L.

AS BUILT 933-12.3/67





UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

SILL SECTION - CLOSURES

STAS. 29+80.3, 31+01.3 & 36+84.5

SCALES: DIMENSIONS: 1/8" = 1'-0"
FORCES: 1" = 500#

Nomenclature:

Wr = Total weight of water acting on base.
Ws = Total weight of concrete.
U = Total hydrostatic uplift on base.
Pwr, Pwe, Pwe, Pwe & Pwe = Total horizontal pressure of water acting on structure.
Pe in w = Total horizontal pressure of earth in water acting on structure.
Pp = Total passive resistance developed by soil.
Pr = Horizontal resistance developed by friction on base.
Pb = Total soil reaction on base.
Wes = Total weight of saturated soil on base.

Note:
Loads shown are average loads per foot of structure.

Design Conditions
Case I. Sill. Water to top of structure on riverside. Uplift on base. Soil scoured off top of base riverside of sheeling.
Case II. Vault. Water to top of structure on riverside. Uplift on base. Soil on top of base on riverside.

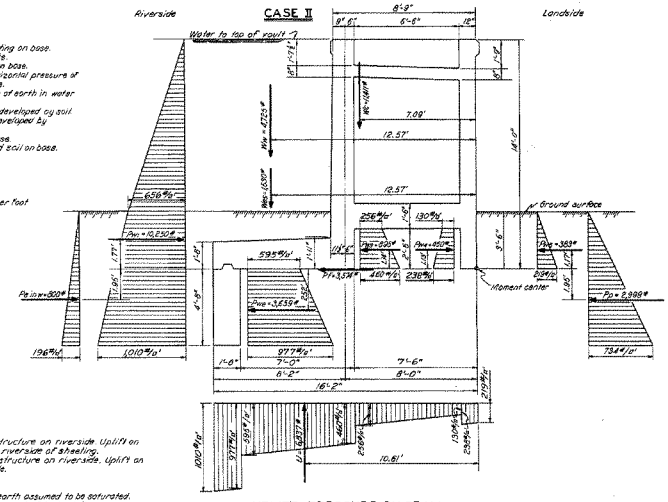
Basic Assumptions
A. Both landside and riverside earth assumed to be saturated.
B. Active forces on structure to consist of hydrostatic pressure and the equivalent fluid pressure of saturated earth.
C. The passive resistance of the soil is assumed to increase uniformly from the ground line to the bottom of the concrete at an increment not to exceed 328 #/□' per foot of depth.
D. Uplift derived from seepage pressure gradient.
E. Weight of beams and sheeting neglected.

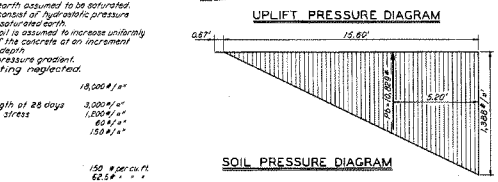
Allowable Working Stresses

A. Steel reinforcing	18,000 #/□"
B. Concrete	
1. Ultimate compressive strength at 28 days	3,000 #/□"
2. Compression - extreme fibre stress	1,200 #/□"
3. Shear	60 #/□"
4. Bond	150 #/□"

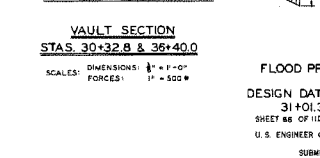
Weights and Pressures

A. Weights	
1. Concrete	150 # per cu. ft.
2. Water	62.5 # " " "
3. Saturated earth	125 # " " "
4. Earth in water (net)	62.5 # " " "
B. Active Pressures We. tan²(45° - φ/2)	
1. Water	62.5 # per sq. ft.
2. Saturated earth - angle of repose 25°-34'	36 # " " "
3. Earth in water (net)	24 # " " "





UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

VAULT SECTION

STAS. 30+32.8 & 36+40.0

SCALES: DIMENSIONS: 1/8" = 1'-0"
FORCES: 1" = 500#

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA STAS. 29+80.3, 30+32.8, 31+01.3, 36+40.0 & 36+84.5

SHEET 86 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN

APPROVED: [signature] V.C. DEWAELE, ASSISTANT, CHIEF ENGINEER

DR. BY W.A.H. TR. BY E.S. CK. BY R.H.

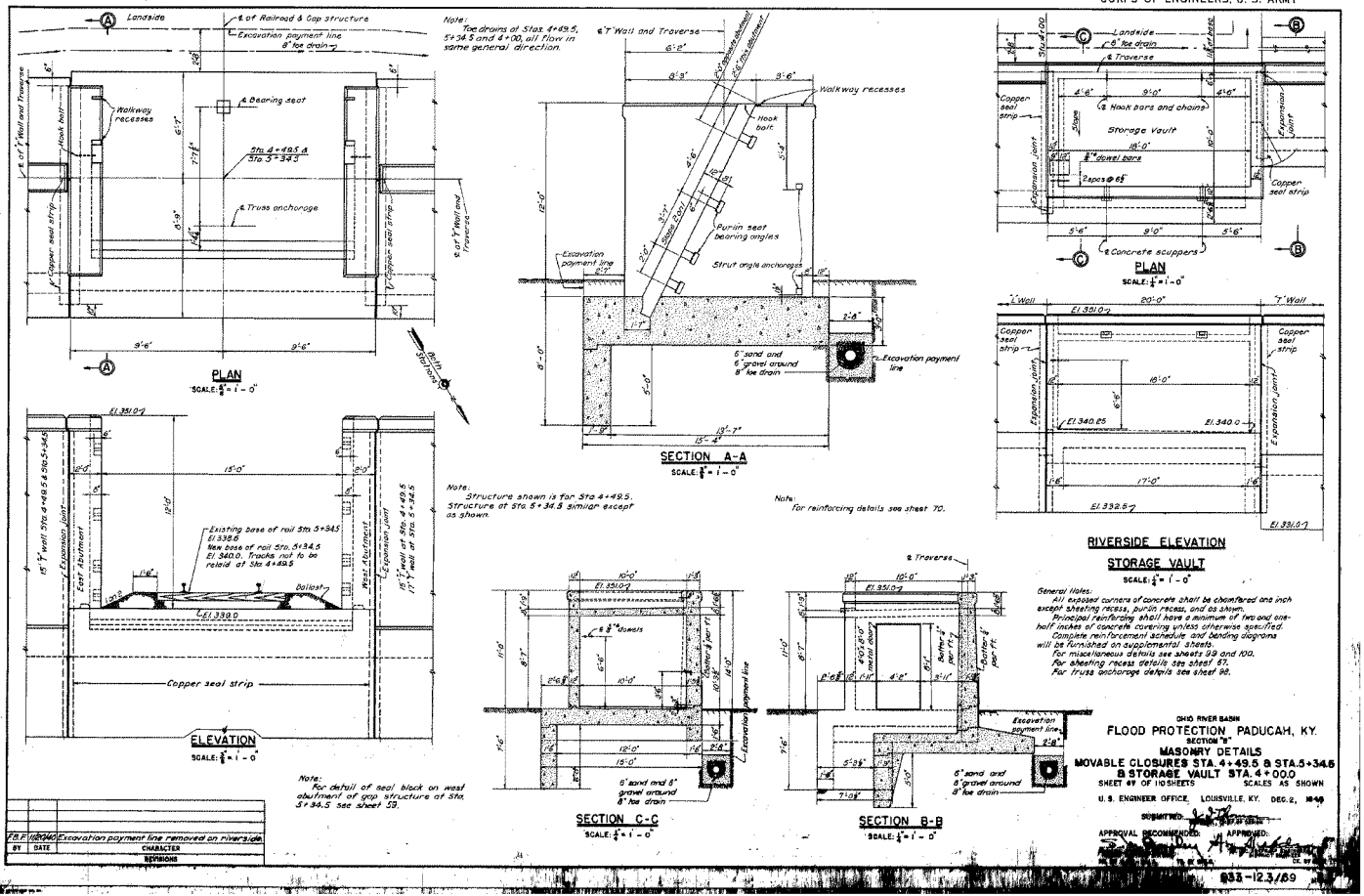
AS BUILT

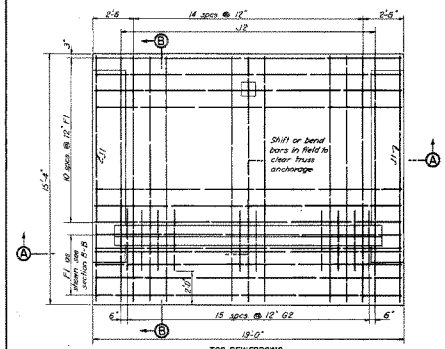
933-12.3/68

BY	DATE	CHARACTER REVISIONS

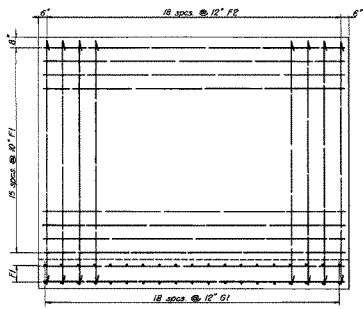
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

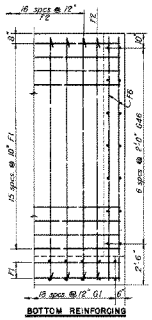




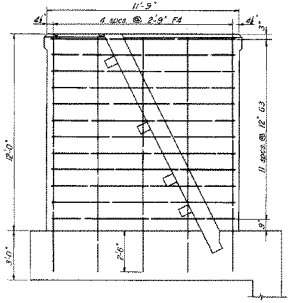
TOP REINFORCING
STA. 4+49.5 & STA. 5+34.5



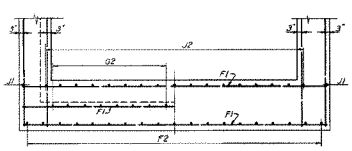
BOTTOM REINFORCING
STA. 4+49.5



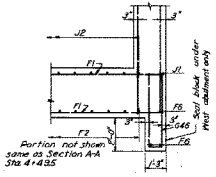
BOTTOM REINFORCING
STA. 5+34.5



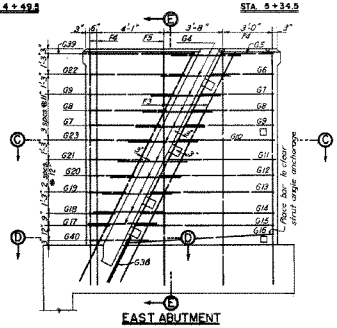
FAR SIDE REINFORCING
BOTH ABUTMENTS



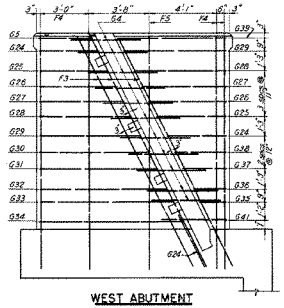
SECTION A-A STA. 4+49.5



SECTION A-A
STA. 5+34.5

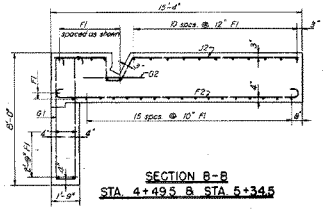


EAST ABUTMENT

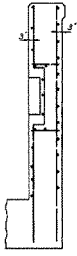


WEST ABUTMENT

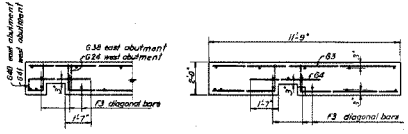
NEAR SIDE REINFORCING
ELEVATIONS



SECTION B-B
STA. 4+49.5 & STA. 5+34.5



SECTION E-E



SECTION D-D

SECTION C-C

TYPICAL SECTIONS FOR BOTH ABUTMENTS

Note:
Abutments shown are typical for both Station 4+49.5 and Station 5+34.5
For masonry details Station 5+34.5 see sheet 69

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 4+49.5 AND STA. 5+34.5
SILL AND ABUTMENTS

SHEET 68 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

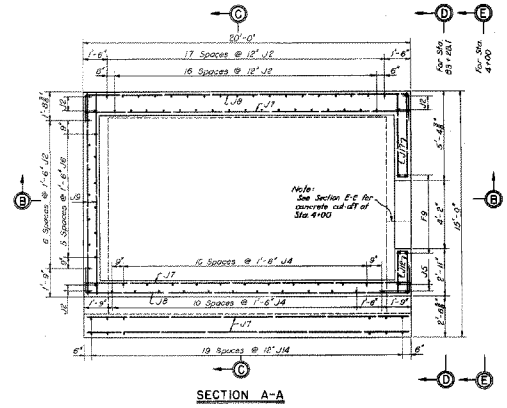
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF DESIGN

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

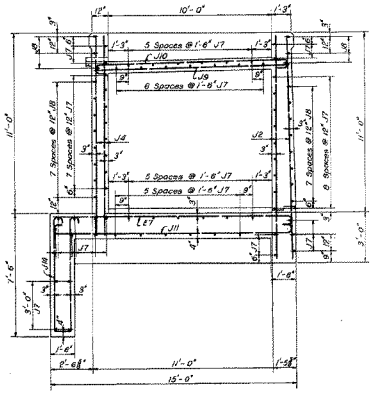
DR. BY B.C.B. TR. BY D.L.M. CK. BY F.B.S.

AS BUILT 933-123/70

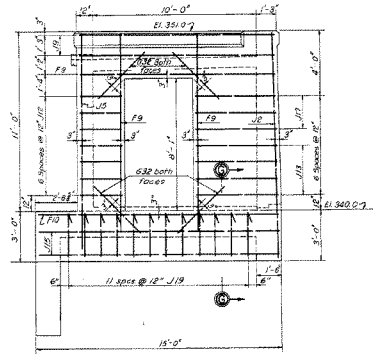
729



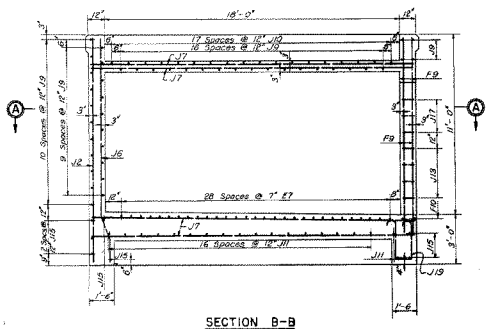
SECTION A-A



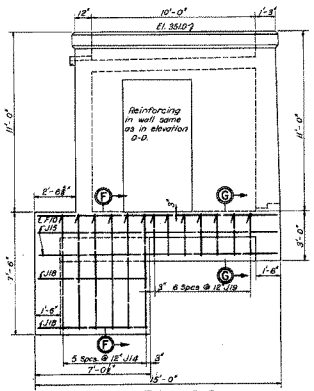
SECTION C-C



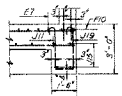
ELEVATION D-D
SHOWING CONCRETE CUT-OFF FOR VAULT AT STA. 83+28.1



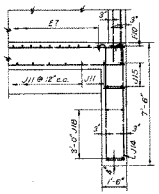
SECTION B-B



ELEVATION E-E
SHOWING CONCRETE CUT-OFF FOR VAULT AT STA. 4+00



SECTION G-G



SECTION F-F

Note:
Reinforcing for vaults at Sta. 4+00 & Sta 83+28.1 similar except as noted.
For masonry details see sheet 63

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINF. DETAILS STAS. 4+000 & 83+28.1
STORAGE VAULTS

SHEET 69 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

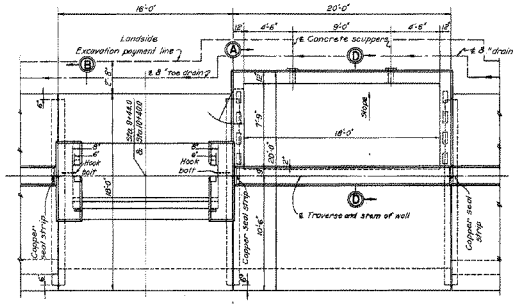
SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEER DIVISION, FLOOD CONTROL DIV. DR. BY R.H.A.

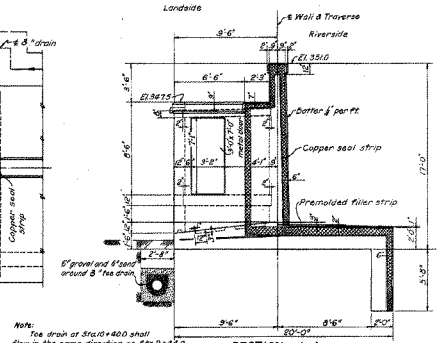
APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER TR. BY D.B.Q. CK. BY

AS BUILT 933-12.3/71

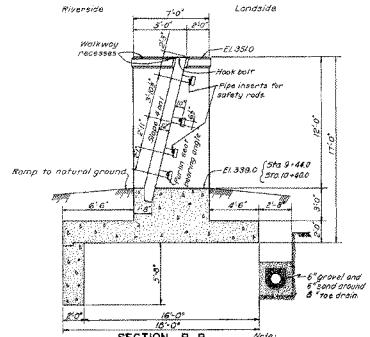
BY	DATE	CHARACTER
		REVISIONS



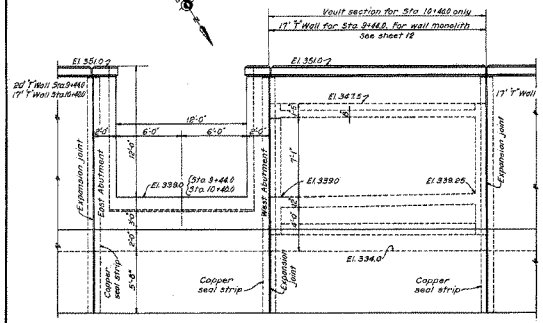
PLAN



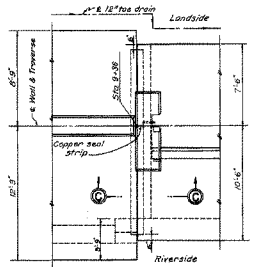
SECTION A-A



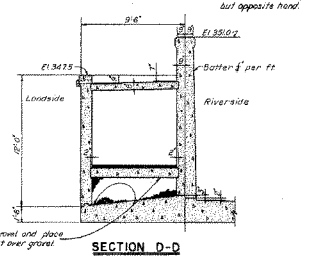
SECTION B-B



RIVERSIDE ELEVATION

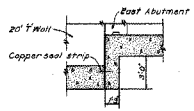


PLAN STA. 9+36



SECTION D-D

Note:
For reinforcing details see sheet 73 & 74



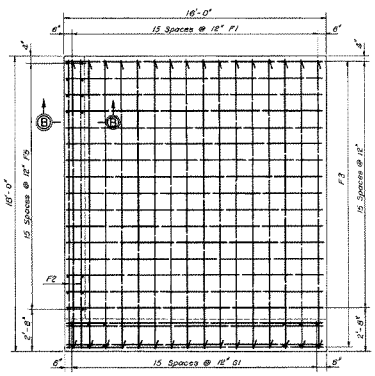
SECTION C-C

BY	DATE	CHARACTER REVISIONS
LMK	1-31-41	Revised as per Addendum No. 1
FBF	11-12-40	Excavation payment line removed on R.S.

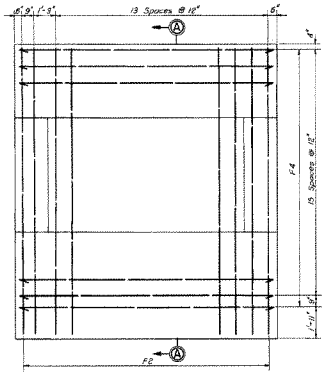
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURES STA. 9+44.0
& STA. 10+40.0
SHEET 70 OF 110 SHEETS SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [illegible] CHIEF OF DESIGN
APPROVAL RECOMMENDED: [illegible] TR. A.W.S.S. APPROVED: [illegible] CHIEF OF DESIGN
933-12.3/72

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

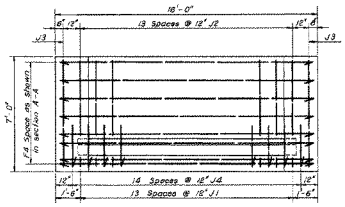


BOTTOM REINFORCING



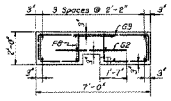
INTERMEDIATE REINFORCING

PLAN
STA. 9+44.0

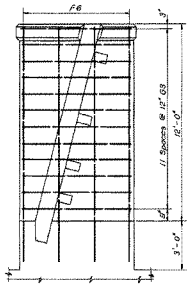


TOP REINFORCING

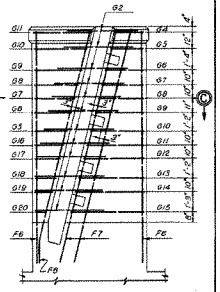
PLAN



SECTION C-C



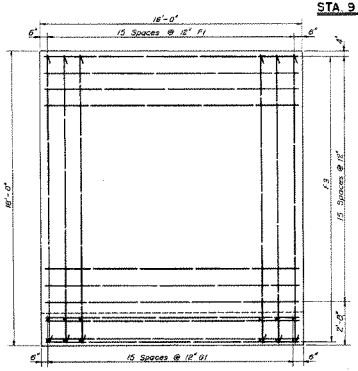
FAR SIDE REINFORCING



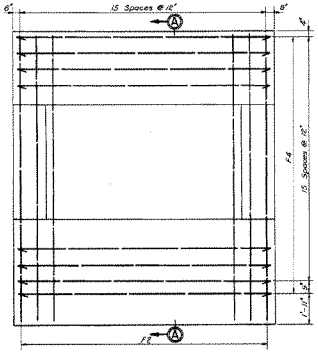
NEAR SIDE REINFORCING

ELEVATION EAST ABUTMENT

REINF. FOR WEST ABUTMENT SIMILAR BUT OPPOSITE HAND

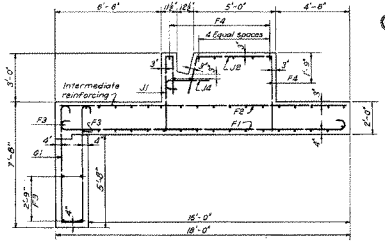


BOTTOM REINFORCING

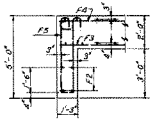


INTERMEDIATE REINFORCING

PLAN
STA. 10+40.0



SECTION A-A



SECTION B-B

Note:
For masonry details see sheet 72

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINF. DETAILS STAS. 9+44.0 & 10+400

SILL & ABUTMENTS

SHEET 71 OF 105 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: CHIEF, DESIGN DIVISION

APPROVED: LT. COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.H.S. TR. BY D.B.G. CK. BY

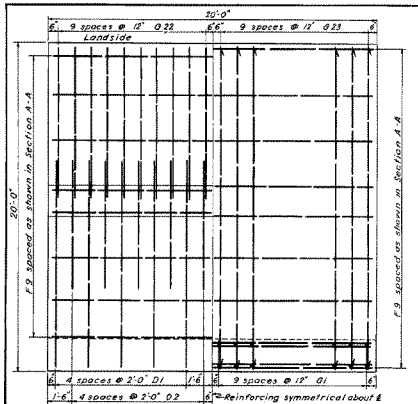
AS BUILT

933-12.3/73

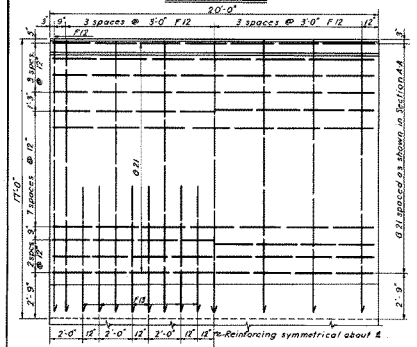
732

WAR DEPARTMENT

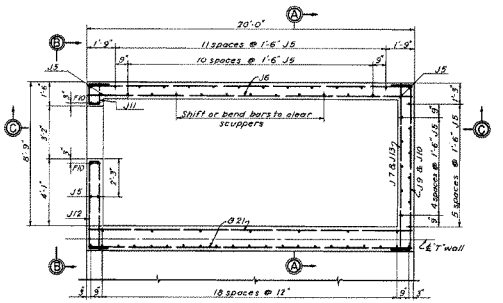
CORPS OF ENGINEERS, U. S. ARMY



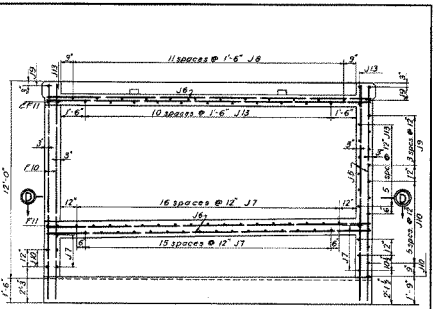
PLAN BASE



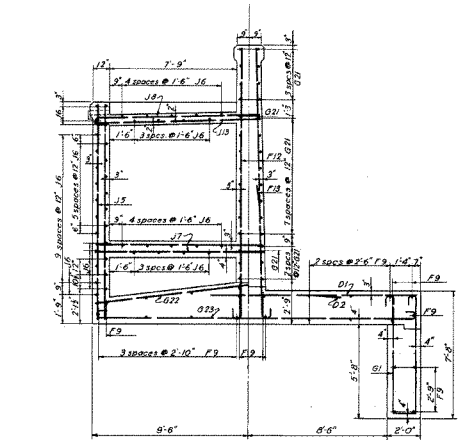
RIVERSIDE ELEVATION "T" WALL



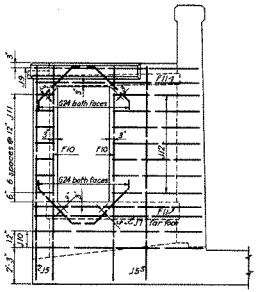
SECTION D-D



SECTION C-C



SECTION A-A



ELEVATION B-B

Note: For masonry details see sheet 72

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 10 + 40.0

STORAGE VAULT

SHEET 72 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER CHIEF OF FLOOD CONTROL DIVISION DR. W. H. A.

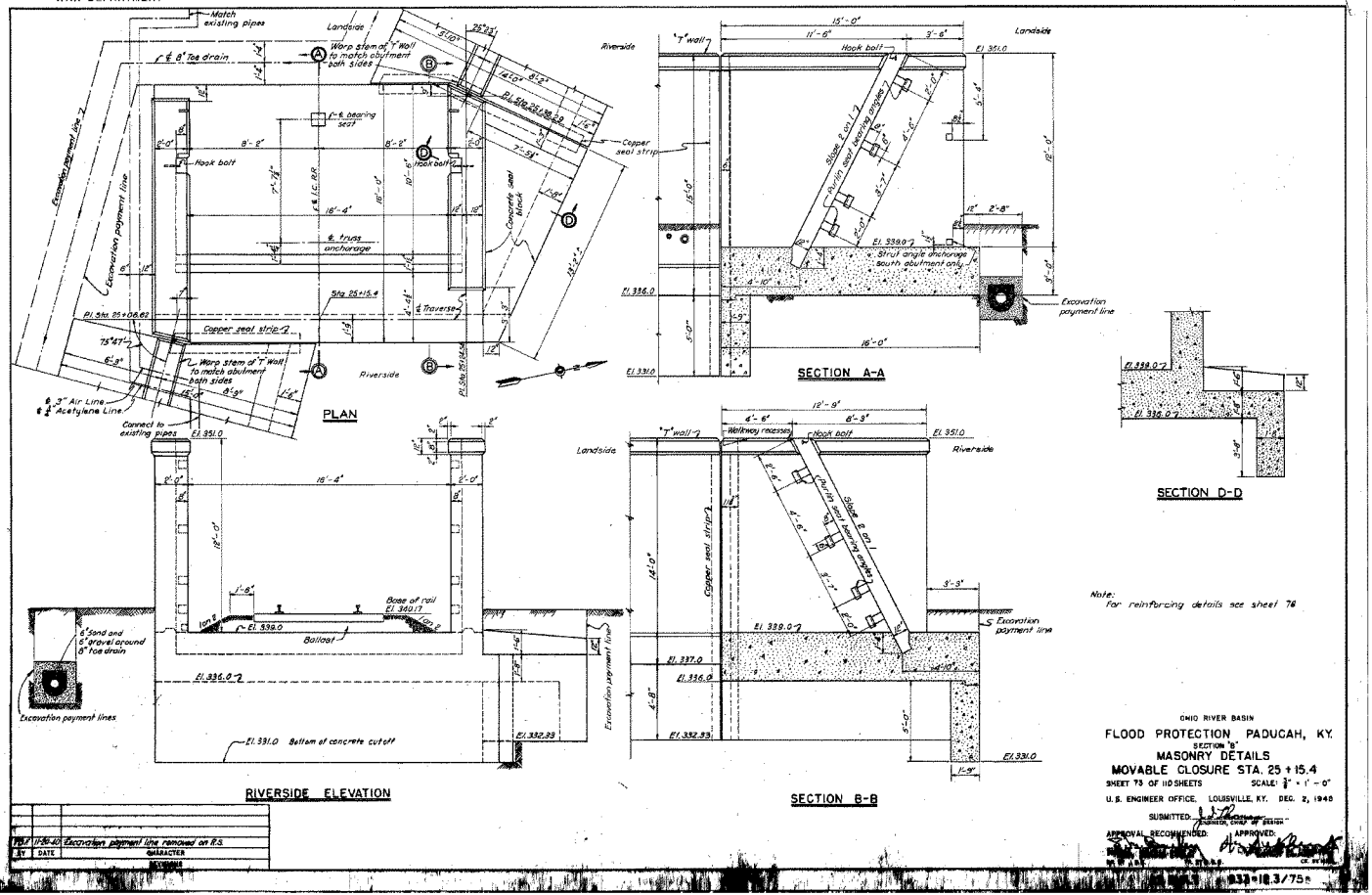
APPROVED: LT. COL. CORPS OF ENGINEERS DIVISION ENGINEER OHIO RIVER

AS BUILT 933-123/74

733

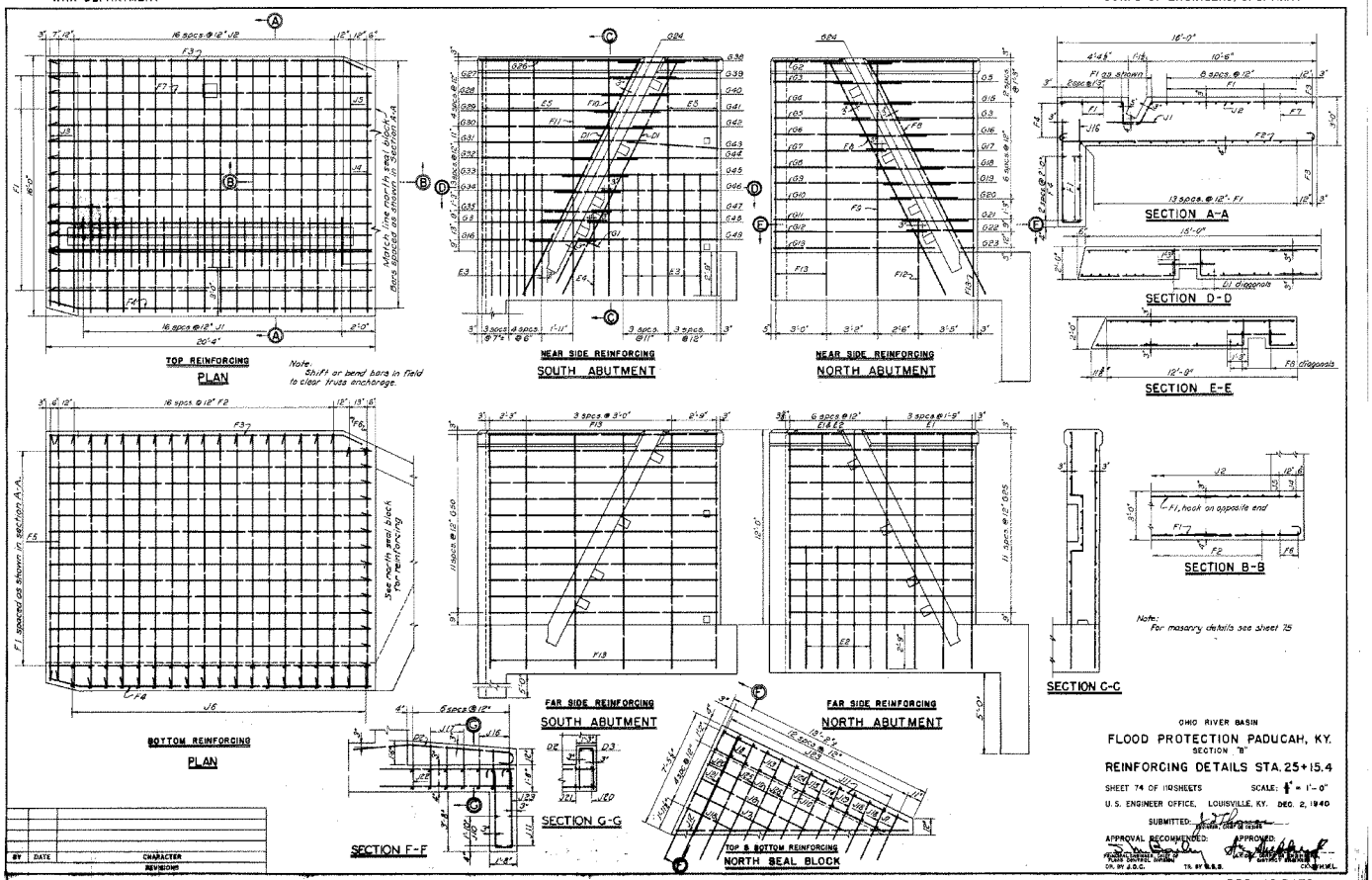
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 25+15.4

SHEET 74 OF 110 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

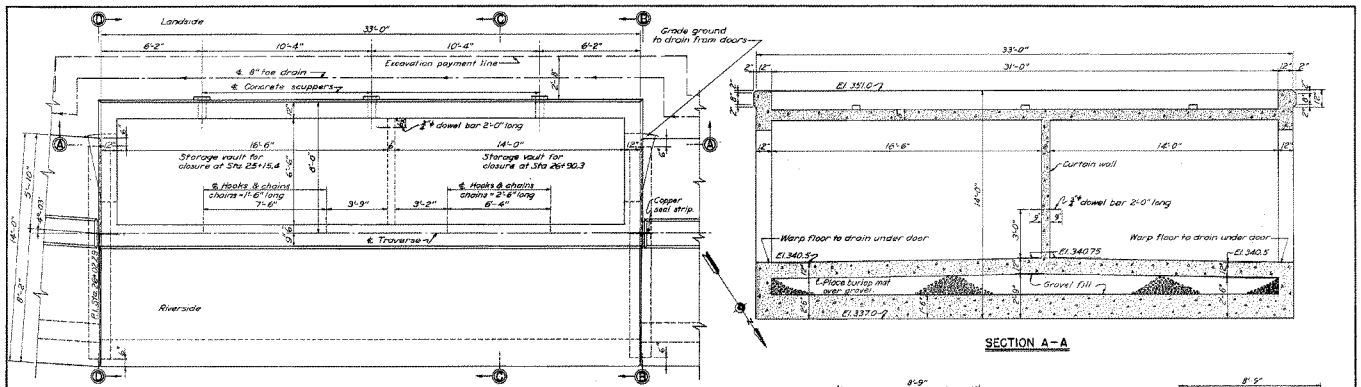
CHIEF, DESIGN BRANCH, PLANT CONTROL DIVISION — DISTRICT ENGINEER

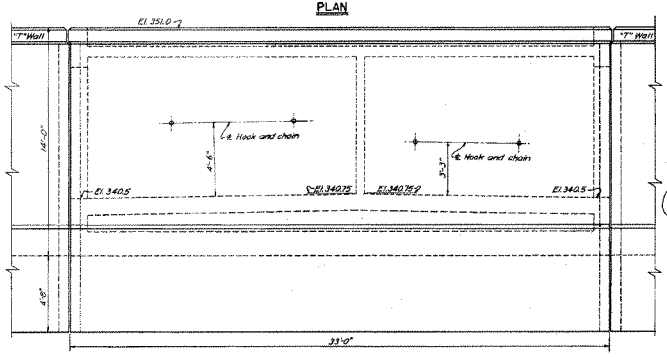
DR. BY J.D.C. TS. BY G.S.S. CH. BY W.M.L.

AS BUILT 933-12.3/76

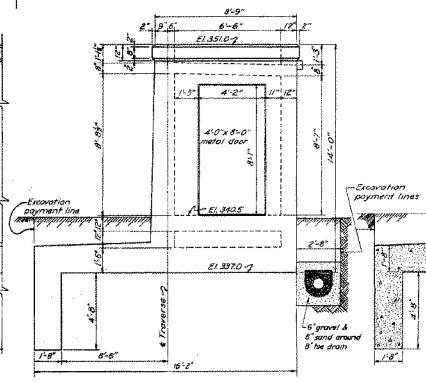
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





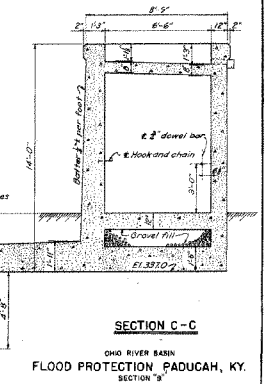
RIVERSIDE ELEVATION



SECTION B-B

SECTION D-D SIMILAR BUT OPPOSITE HAND

Note: For reinforcing details see sheet 78



F.B.F.	VI-20-40	Excavation payment line removed on Riverside and floor revised.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

STORAGE VAULT STA. 26+02.29

SHEET 75 OF 110 SHEETS

SCALE ¼" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible]

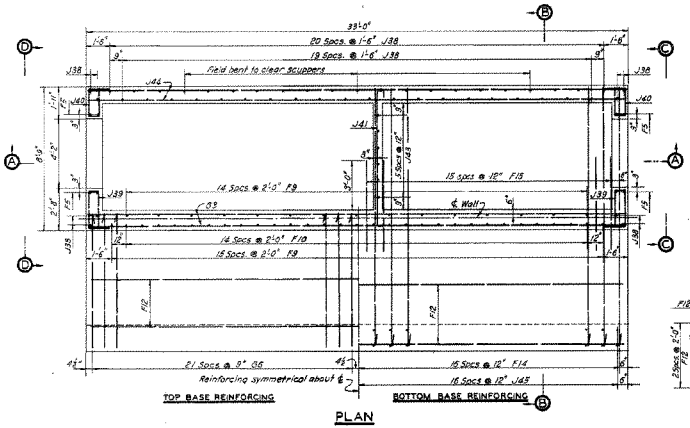
APPROVAL RECOMMENDED: [illegible]

APPROVED: [illegible]

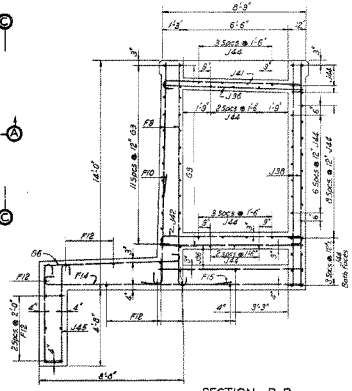
DR. BY K.H.A.-J.D.G. TR. BY M.K.J. CK. BY M.L.

AS BUILT

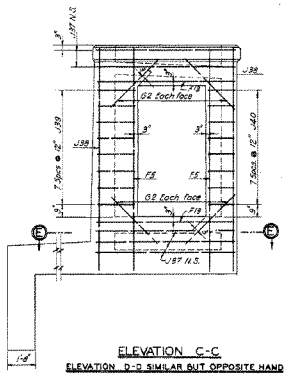
933-12.3/77



PLAN

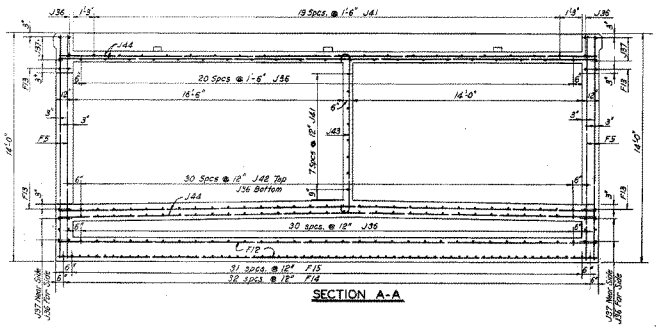


SECTION B-B

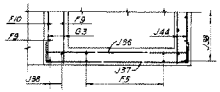


ELEVATION C-C

ELEVATION D-D SIMILAR BUT OPPOSITE HAND



SECTION A-A



SECTION E-E

Note:
For masonry details see sheet 77

BY	DATE	CHARACTER REVISIONS
F.B.T.	11-20-40	Reinf. in Vault Floor revised

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 26+02.29

STORAGE VAULT

SHEET 76 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

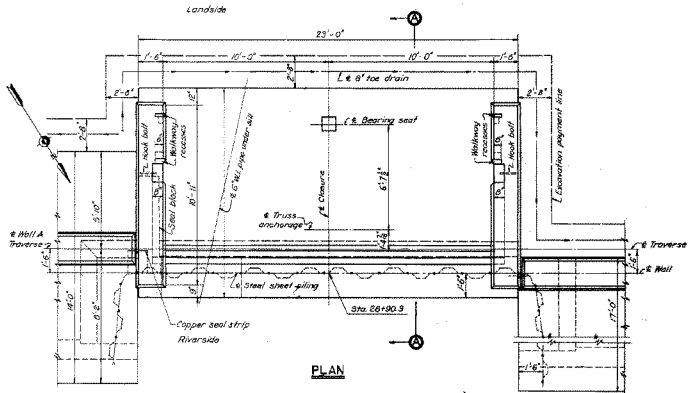
SUBMITTED: L. S. Pollard, ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: Thomas Chisholm, ENGINEER, CHIEF OF FLOOD CONTROL, ENG. DIV. DR. BY F.J.H.A. TR. BY W.J.B.

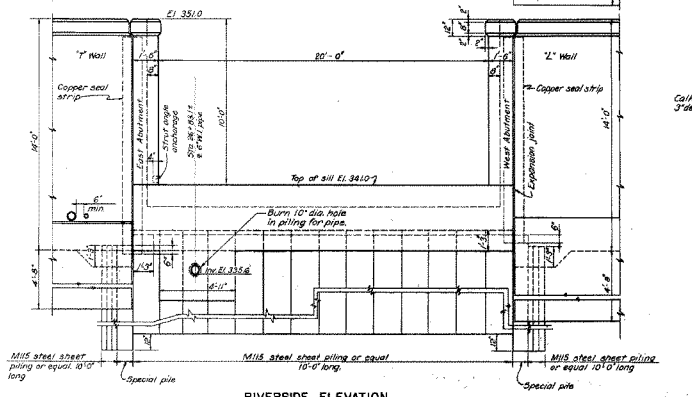
APPROVED: Lt. Col. Charles Pringle, DISTRICT ENGINEER, CH. BY A.M.F.

AS BUILT 933-12.3/78

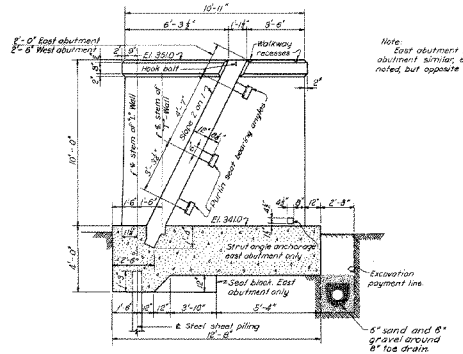
737



PLAN

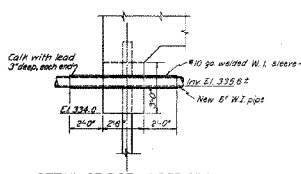


RIVERSIDE ELEVATION



Note:
East abutment shown, West abutment similar, except as noted, but opposite hand.

SECTION A-A



DETAIL OF PIPE UNDER SILL

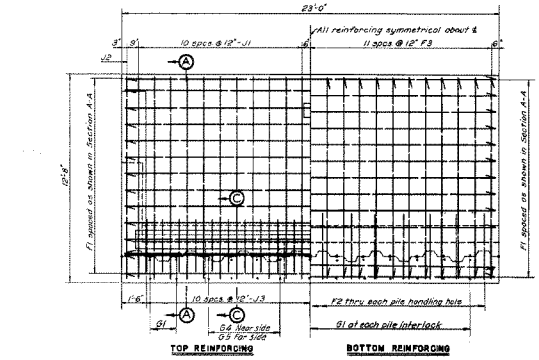
Note
For reinforcing details see sheet 80
For detail of connection to "T" wall see sheet 47.

BY	DATE	CHARACTER
F.B.E.	11-25-40	Traverse line changed and excavation payment line removed R.S.

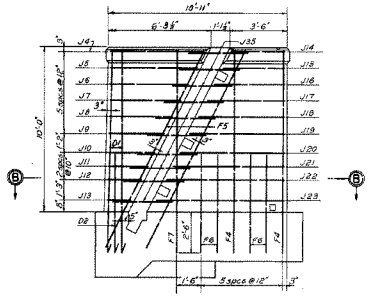
REVISIONS

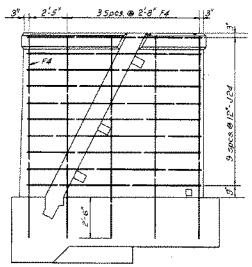
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 26+90.3
SHEET 77 OF 110 SHEETS SCALE: ½" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [illegible] CHIEF OF DESIGN
APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

632-12.3/70

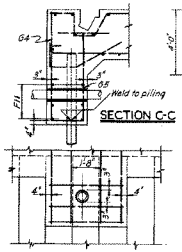


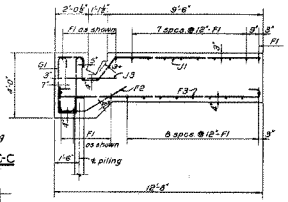
PLAN

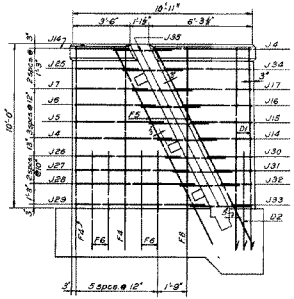




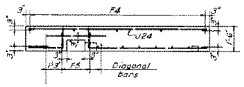
EAST ABUTMENT







WEST ABUTMENT



SECTION B-B

Note: For masonry details see sheet 79

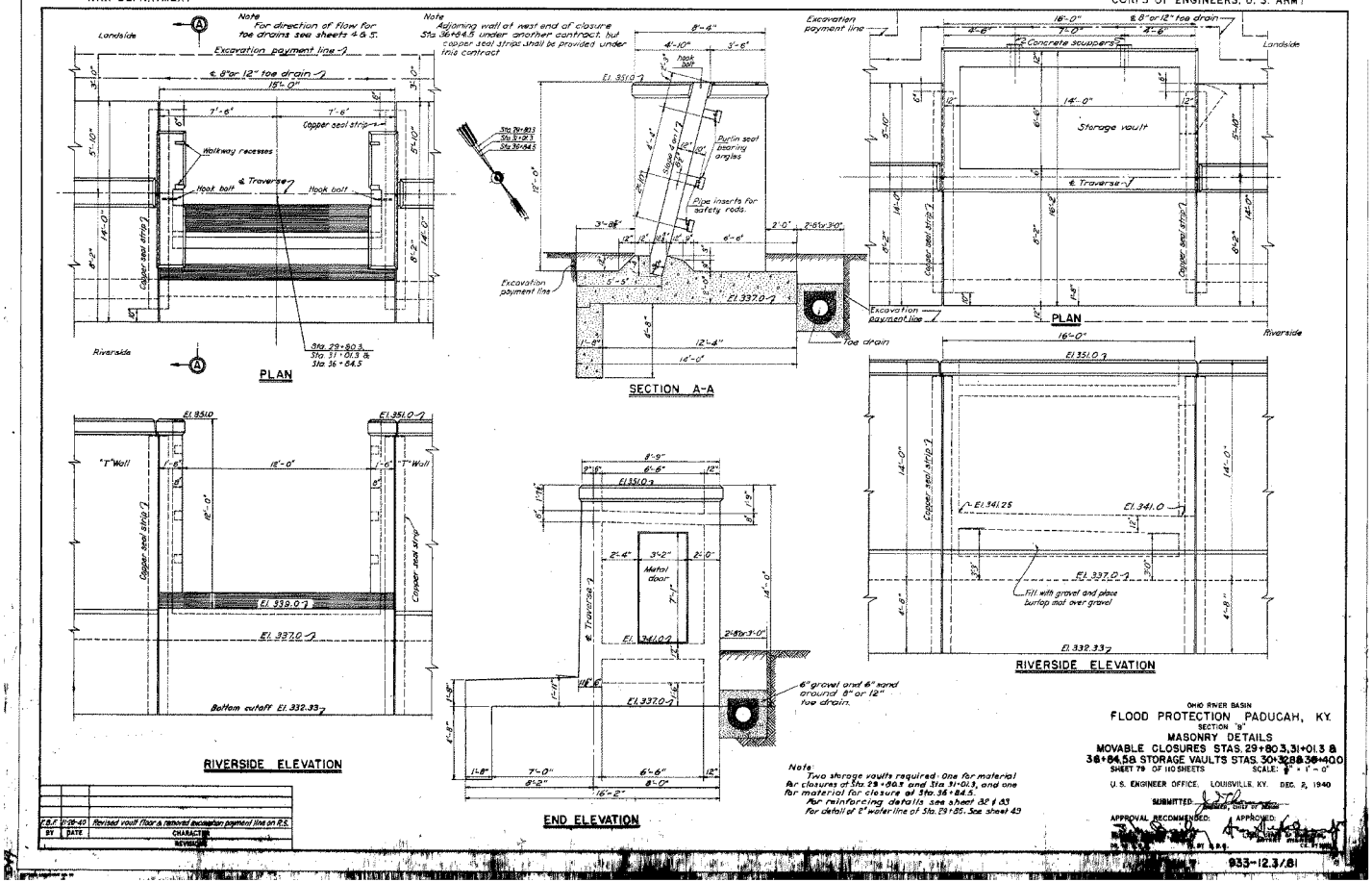
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 26+90.3
SILL AND ABUTMENTS
SHEET 78 OF 110 SHEETS SCALE: ⅛" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: Lt. Colonel, Corps of Engineers, District Engineer
APPROVAL RECOMMENDED: Principal Engineer (In Lieu of Chief, Hydraulic Division) OR BY R.H.A. TR. N. W.S.S.
APPROVED: Lt. Colonel, Corps of Engineers, District Engineer CK. BY K.W.

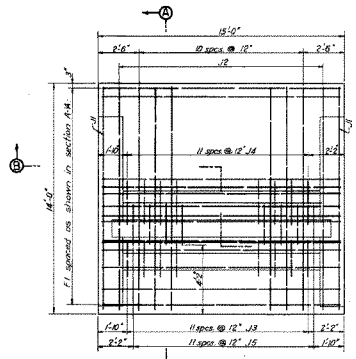
BY	DATE	CHARACTER REVISIONS

AS BUILT 933-12.3/80

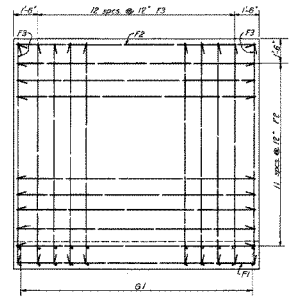
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



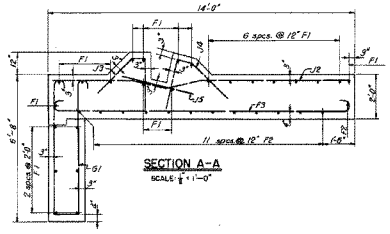


TOP REINFORCING

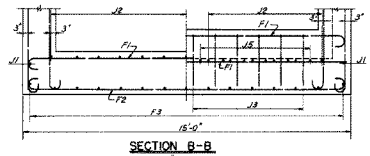


BOTTOM REINFORCING

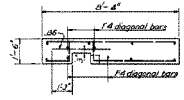
PLAN
SCALE: 1/8" = 1'-0"



SECTION A-A
SCALE: 1/4" = 1'-0"

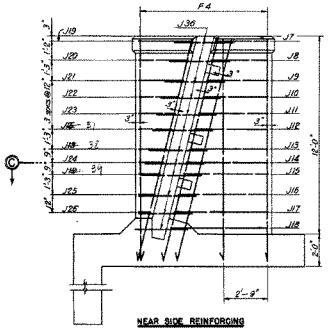


SECTION B-B
SCALE: 1/4" = 1'-0"

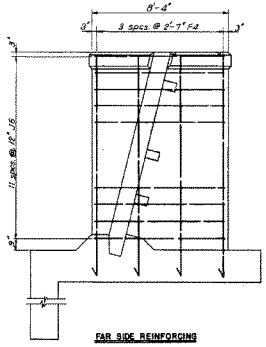


SECTION C-C
SCALE: 1/4" = 1'-0"

Note:
For masonry details see sheet 81



NEAR SIDE REINFORCING



FAR SIDE REINFORCING

ELEVATION EAST ABUTMENT
WEST ABUTMENT SIMILAR BUT OPPOSITE HAND
EXCEPT AS SHOWN
SCALE: 1/8" = 1'-0"

BY	DATE	CHARACTER	REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 29+80.3
STA. 31+01.3 & STA. 36 + 84.5
SILL & ABUTMENTS
SHEET 80 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

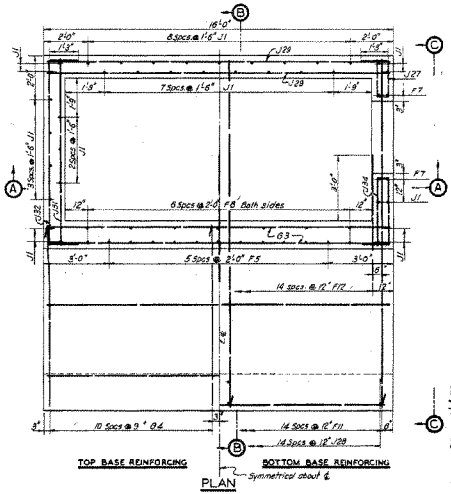
DR. BY R.E.B. TR. BY G.A.M. CK. BY H.M.

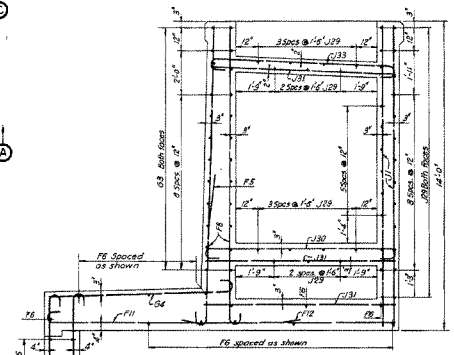
AS BUILT 933-12.3/82

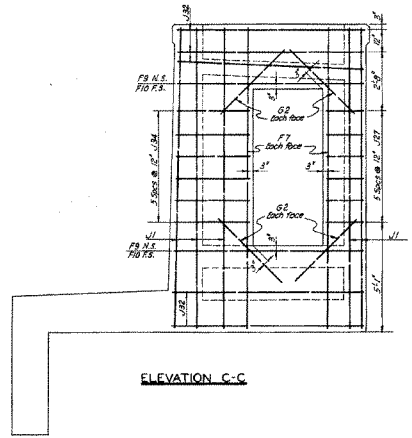
741

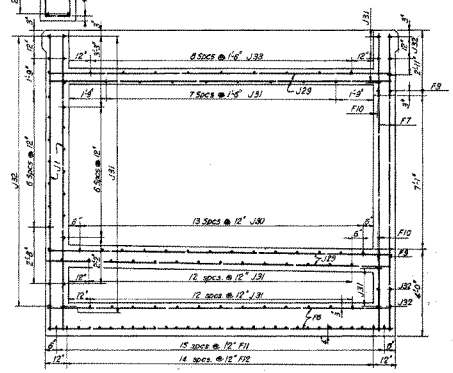
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY









Note:
For masonry details see sheet 81

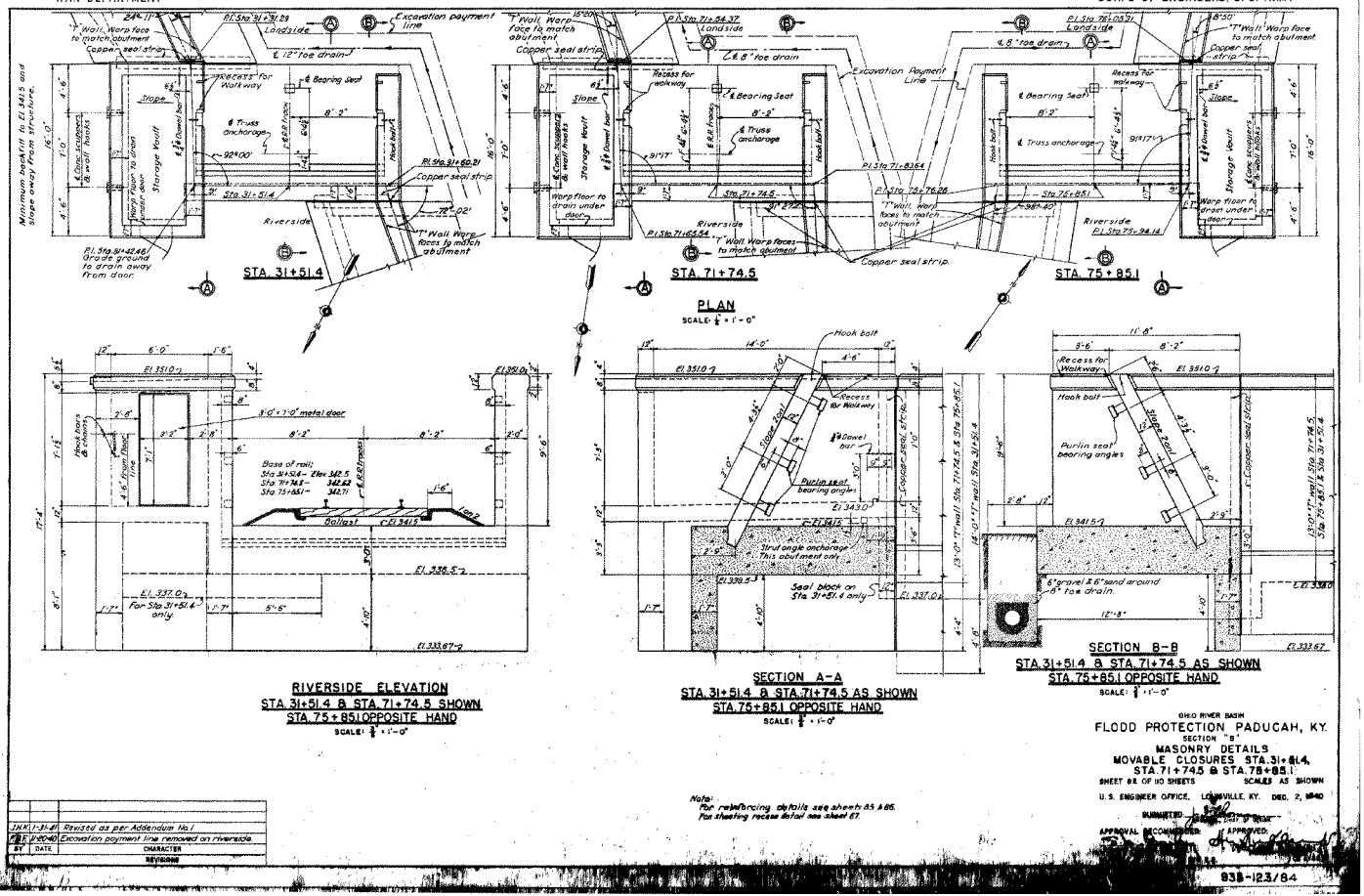
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS
STA. 30+32.8 & STA. 36+40.0
STORAGE VAULTS
SHEET 81 OF 110 SHEETS SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: (Officer, Corps of Engrs.)
APPROVAL RECOMMENDED: APPROVED:

BY	DATE	CHARACTER REVISIONS

AS BUILT 933-12.3/83

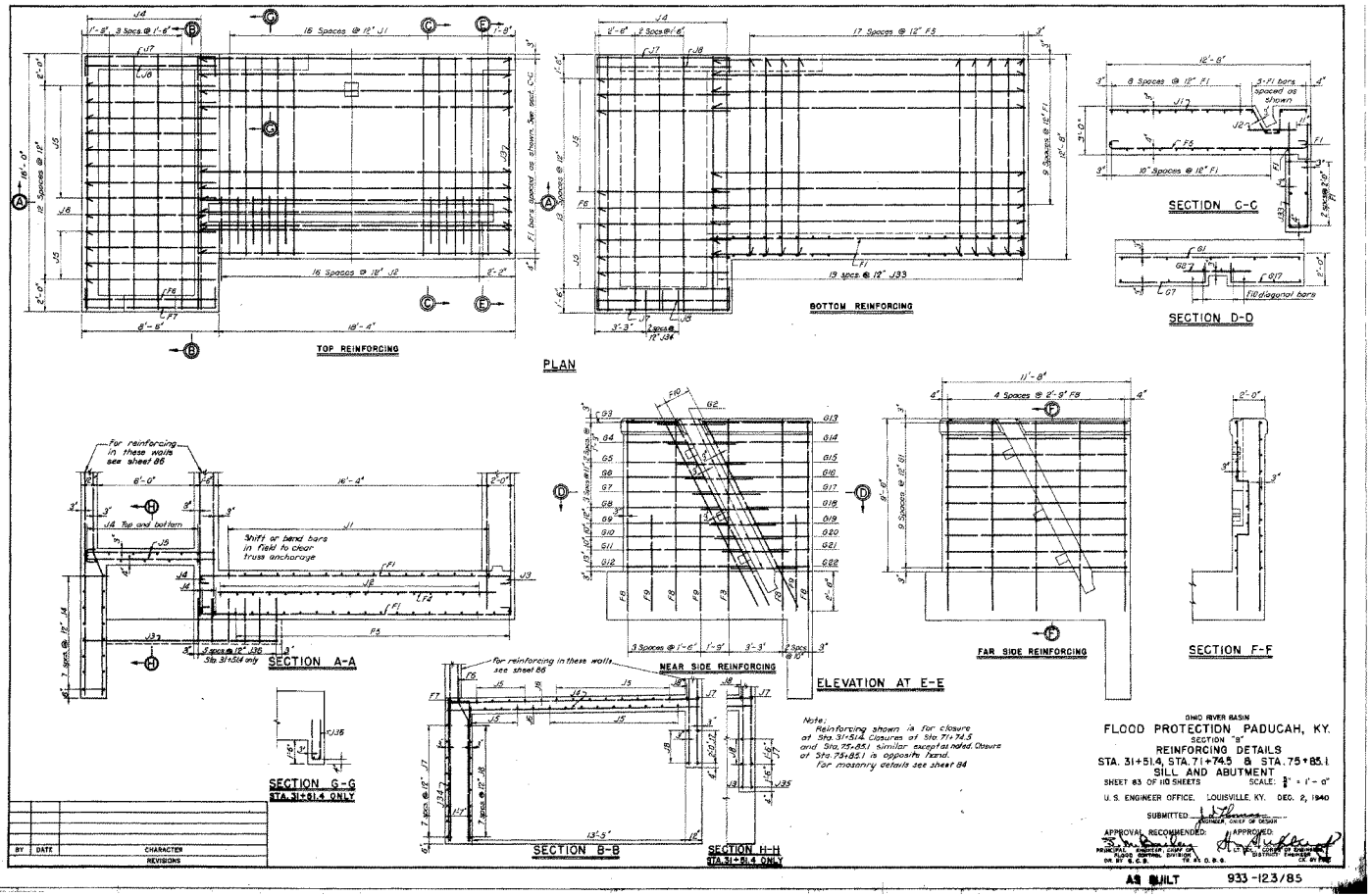
WAR DEPARTMENT

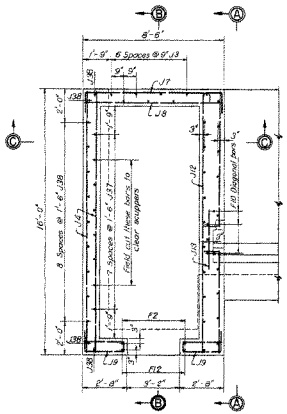
CORPS OF ENGINEERS, U. S. ARMY



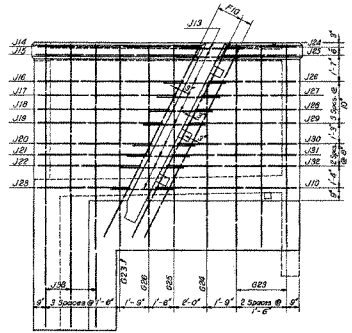
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



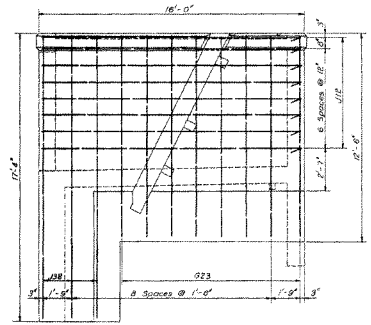


PLAN

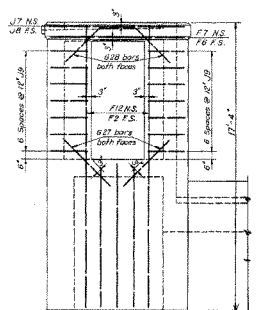


NEAR SIDE REINFORCING

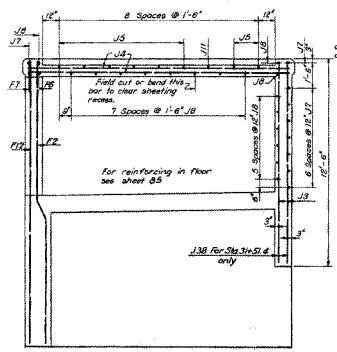
ELEVATION AT A-A



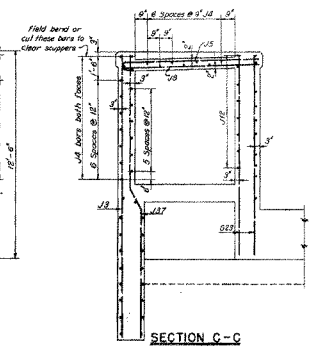
FAR SIDE REINFORCING



FRONT ELEVATION



SECTION B-B



SECTION C-C

Note:
For masonry details see sheet 84
Reinforcing for Sta. 75+85.1, opposite hand.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "a"
REINFORCING DETAILS STA. 31+51.4, STA. 71+74.5 & STA. 75+85.1
STORAGE VAULTS

SHEET 84 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [illegible] COLONEL, CORPS OF ENGINEERS DISTRICT ENGINEER

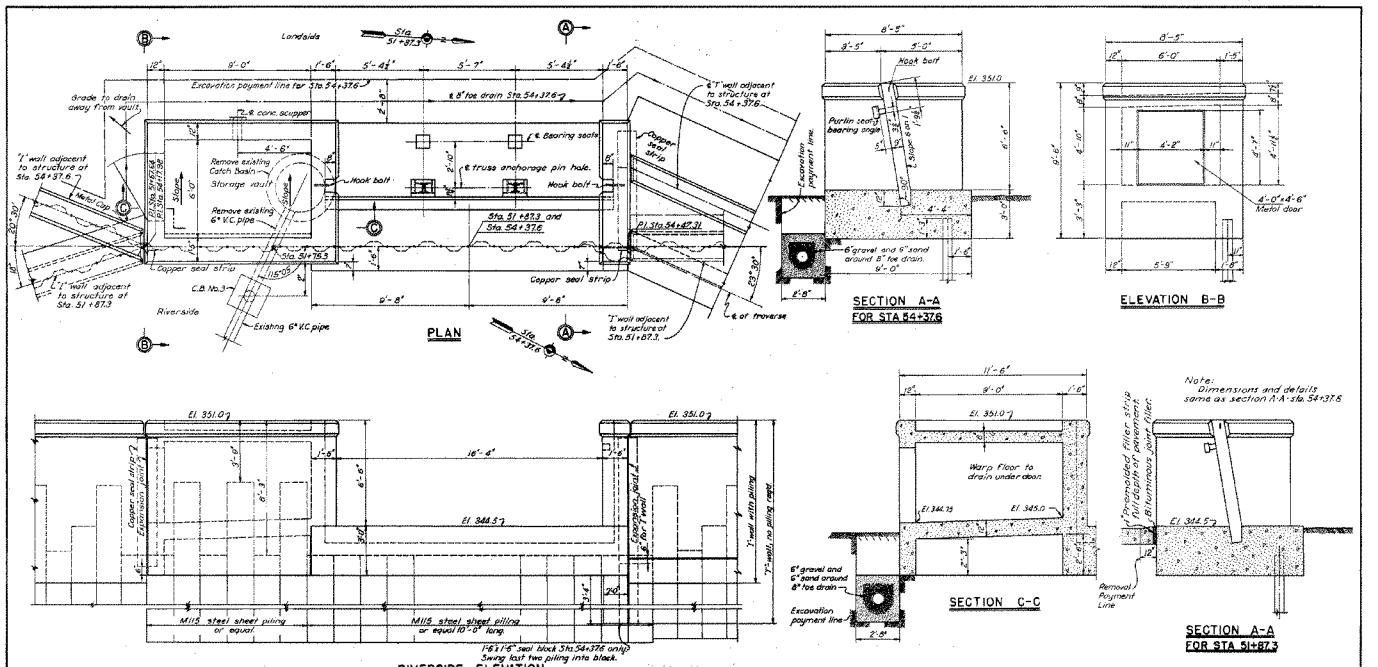
DR. BY G.C.D. TR. BY D.D.S. CK. BY [illegible]

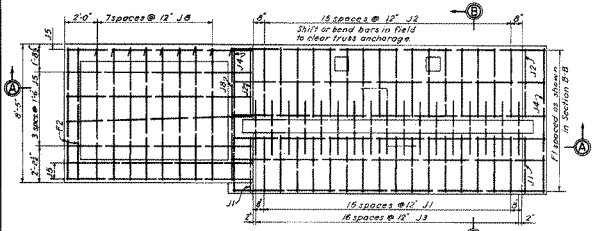
BY	DATE	CHARACTER
		REVISIONS

AS BUILT 933-12.3/86

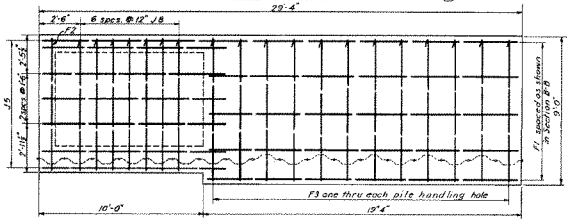
745

19


PLAN
Landside
Riverside
Excavation payment line for Sta. 54+37.6
℄ 8" toe drain Sta. 54+37.6
℄ Bearing seats
℄ truss anchorage pin hole
Hook bolt
Remove existing Catch Basin
Storage vault
Remove existing 6" V.C. pipe
Existing 6" V.C. pipe
Copper seal strip
Sta. 51+87.3 and Sta. 54+37.6
Sta. 51+76.3
C.B. No. 3
"T" wall adjacent to structure at Sta. 51+87.3
"T" wall adjacent to structure at Sta. 54+37.6
℄ of traverse
Grade to drain away from vault
Metal cap
SECTION A-A FOR STA 54+37.6
Purlin seat & bearing angle
6" gravel and 6" sand around 8" toe drain
Excavation payment line
ELEVATION B-B
4'-0"x4'-6" Metal door
RIVERSIDE ELEVATION
Mill5 steel sheet piling or equal
1'-6"x1'-6" seal block Sta. 54+37.6 only
Swag last two piling into block
"T" wall with piling
"T" wall no piling reqd.
SECTION C-C
Warp floor to drain under door
6" gravel and 6" sand around 8" toe drain
Excavation payment line
SECTION A-A FOR STA 51+87.3
Prepolded filler strip Protection board Bituminous joint filler
Removal Payment Line
Note: Dimensions and details same as section A-A Sta. 54+37.6
Note: Structure at Sta. 54+37.6 shown. Structure at Sta. 51+87.3 similar except as indicated.
Note: For reinforcing details see sheet 88.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURES STAS. 51+87.3 & 54+37.6
SHEET 85 OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
ENGINEER OFFICE OF DESIGN
APPROVAL RECOMMENDED
APPROVED
12-8-87
F.B.I. 7-30-40 Excavation payment line removed on riverside.
BY DATE CHARACTER
REVISIONS

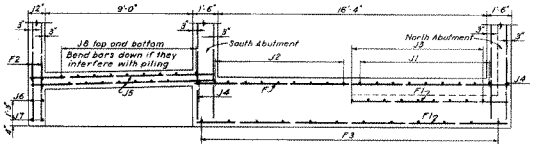


TOP REINFORCING

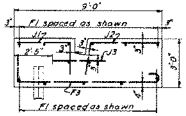


BOTTOM REINFORCING

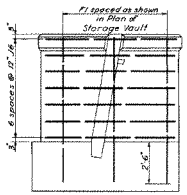
PLAN



SECTION A-A

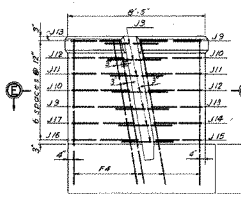


SECTION B-B



FAR SIDE REINFORCING

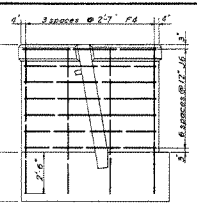
SOUTH ABUTMENT



NEAR SIDE REINFORCING

NORTH ABUTMENT SHOWN

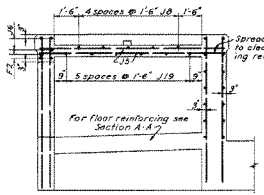
SOUTH ABUTMENT OPPOSITE HAND



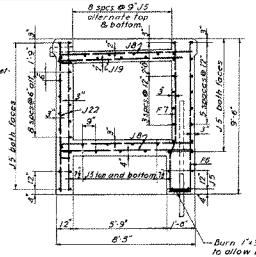
FAR SIDE REINFORCING

NORTH ABUTMENT

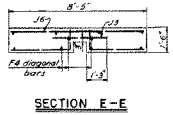
ELEVATIONS OF ABUTMENTS



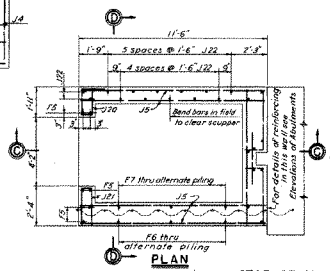
SECTION C-C



SECTION D-D

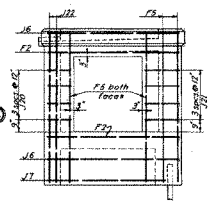


SECTION E-E



PLAN

STORAGE VAULT



END ELEVATION

Note:
Structure at Sta. 54+37.6 shown
Structure at Sta. 51+87.3 similar except as noted.
For masonry details see sheet 87

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINF. DETAILS STAS. 51+87.3 & 54+37.6

SILL, ABUTMENT & STORAGE VAULT

SHEET 86 OF 110 SHEETS SCALE $\frac{3}{8}$"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: District Chief of Design

APPROVAL RECOMMENDED: Principal Assistant Engineer

APPROVED: District Engineer

DR. BY G. C. B. TR. BY F. C. B. CK. BY H. [illegible]

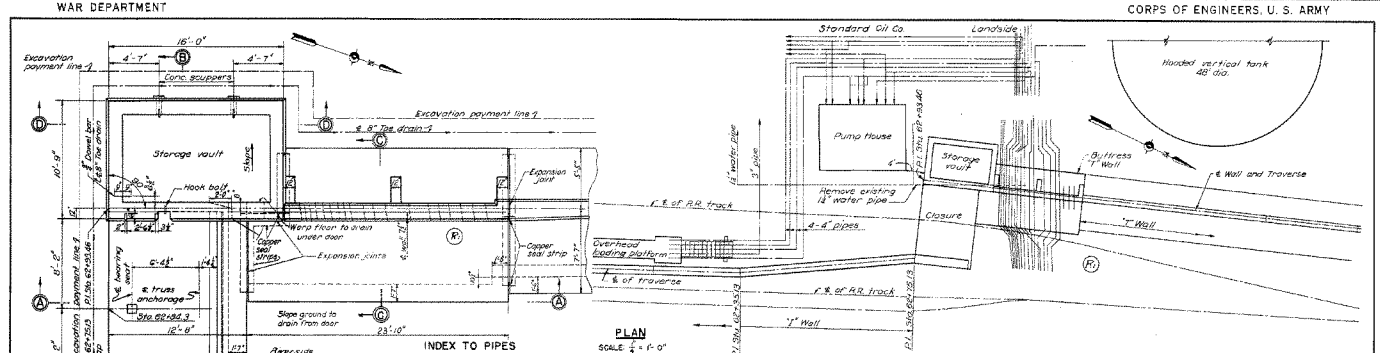
BY	DATE	CHARACTER
		REVISIONS

AS BUILT

935-12.3/88

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

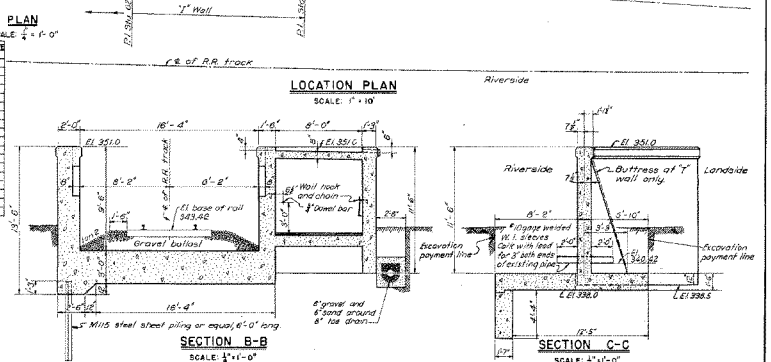


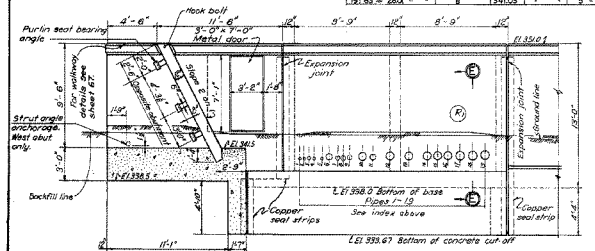
PLAN

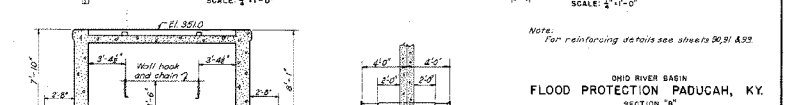
SCALE: 1/4" = 1'-0"

INDEX TO PIPES

NO	STA. @ ℄	SIZE PIPE	SIZE SLEEVE	FUEL ELEV.	USE OF PIPE	LGTH. SLEEVE
1	63+11	-	1½"	341.0	ELEC. COND.	6'-0"
2	63+11	1"	2"	341.0	WATER	4'-9"
3	63+11.9	2½"	4"	341.03	GASOLINE	5'-7"
4	63+12.6	2½"	3½"	341.0	FUEL OIL	6'-0"
5	63+13.1	3"	3½"	341.0	GASOLINE	6'-0"
6	63+13.7	4"	6"	341.05	KEROSENE	4'-3"
7	63+14.5	2"	3"	341.04	KEROSENE	5'-5"
8	63+15.0	2"	3½"	341.0	FUEL OIL	6'-0"
9	63+15.6	2"	3"	340.96	FUEL OIL	5'-6"
10	63+15.8	6"	7"	341.0	GASOLINE	6'-0"
11	63+17.7	2"	4½"	341.03	GASOLINE	5'-6"
12	63+18.8	6"	7"	340.95	FUEL OIL	6'-0"
13	63+20.0	6"	7"	341.0	FUEL OIL	6'-0"
14	63+22.7	6"	7"	341.03	GASOLINE	6'-0"
15	63+23.7	6"	7"	341.03	FUEL OIL	6'-0"
16	63+24.6	6"	7"	341.03	GASOLINE	6'-0"
17	63+25.7	NOT PLACED	9"	341.0	FUTURE INSTAL.	5'-6"
18	63+26.8	-	8"	341.03	"	5'-6"
19	63+28.0	-	8"	341.03	"	5'-6"







(R) Pipes thru wall relocated "Field"

BY	DATE	CHARACTER REVISIONS
F.B.F.	11-20-43	Excavation payment line removed on riverside

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 62+84.3

SHEET 87 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — DEC. 2, 1940

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

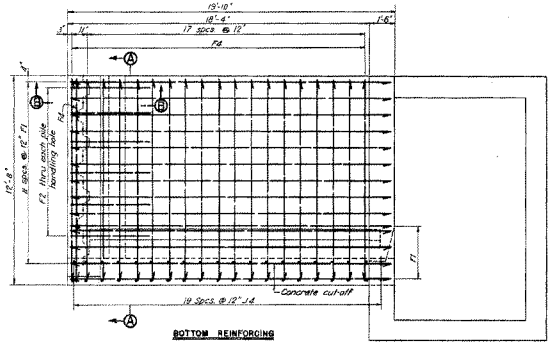
APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, CHIEF OF DESIGN, OFFICE OF CHIEF OF ENGINEERS, CORPS OF ENGINEERS, U.S. ARMY, OR BY D.E.O.

APPROVED: [illegible] CHIEF OF ENGINEERS, DISTRICT ENGINEER, OR BY D.E.O.

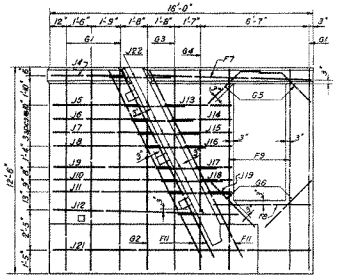
AS BUILT — 933-12.3/89

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

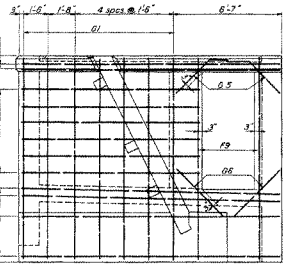


BOTTOM REINFORCING

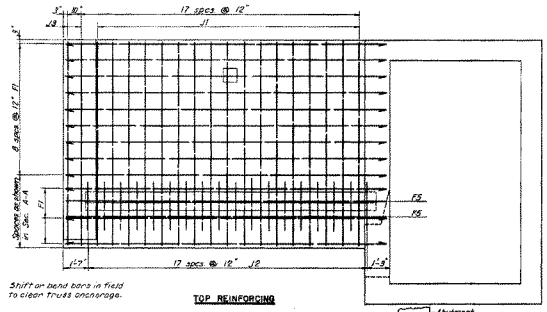


NEAR SIDE REINFORCING

WEST ABUTMENT



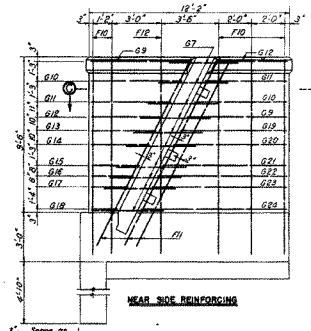
FAR SIDE REINFORCING



Shift or bend bars in field to clear truss anchorage.

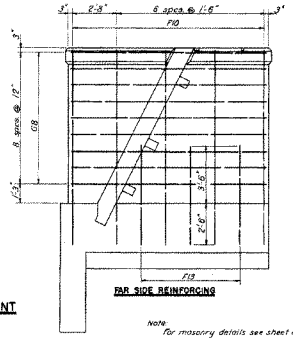
TOP REINFORCING

SILL



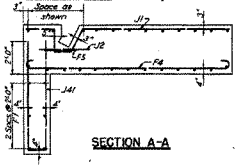
NEAR SIDE REINFORCING

EAST ABUTMENT

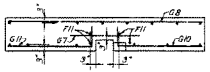


FAR SIDE REINFORCING

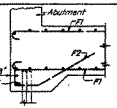
Note:
For masonry details see sheet 89



SECTION A-A



SECTION C-C



SECTION B-B

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 62 + 84.3

SILL AND ABUTMENTS

SHEET 88 OF 110 SHEETS SCALE: 1" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ASSISTANT, CHIEF OF FLOOD CONTROL DIVISION

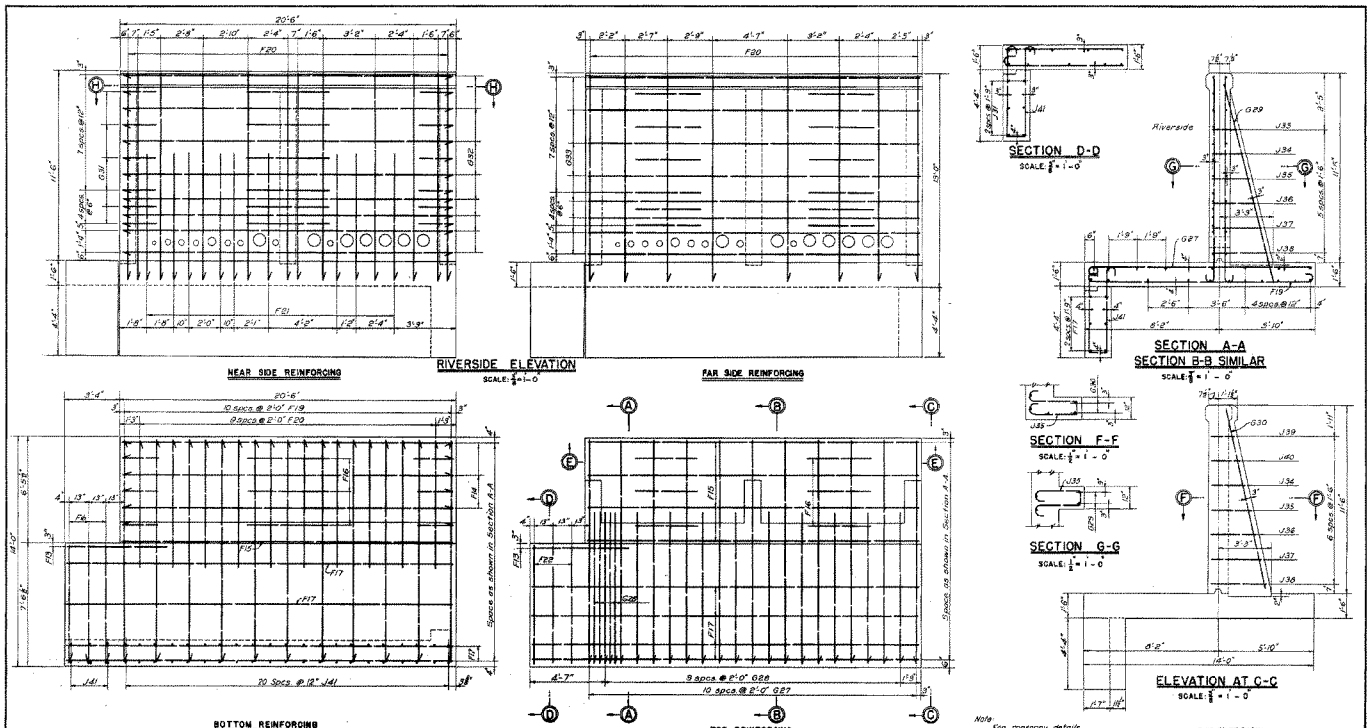
APPROVED: DISTRICT ENGINEER

DR. BY G.N.S. TR. BY C.A.M. CK. BY J.K.

AS BUILT

933-12.3/90

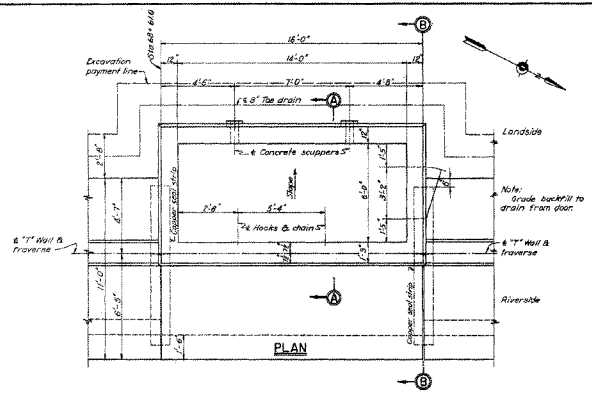
933

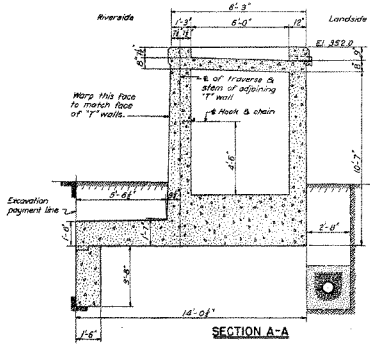

NEAR SIDE REINFORCING
RIVERSIDE ELEVATION
SCALE: 1/8" = 1'-0"
FAR SIDE REINFORCING
SECTION D-D
SCALE: 1/2" = 1'-0"
SECTION A-A
SECTION B-B SIMILAR
SCALE: 1/2" = 1'-0"
SECTION F-F
SCALE: 1/2" = 1'-0"
SECTION G-G
SCALE: 1/2" = 1'-0"
ELEVATION AT C-C
SCALE: 1/2" = 1'-0"
BOTTOM REINFORCING
PLAN
SCALE: 1/8" = 1'-0"
TOP REINFORCING
SECTION H-H
SCALE: 1/2" = 1'-0"
SECTION E-E
SCALE: 1/2" = 1'-0"
Note: For masonry details see Sheet 89
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA.62+84.3
"T" WALL
SHEET 89 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
BY DATE CHARACTER OF REVISIONS
AS BUILT 933-123/91

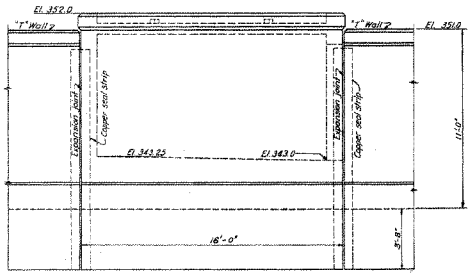
750

WAR DEPARTMENT

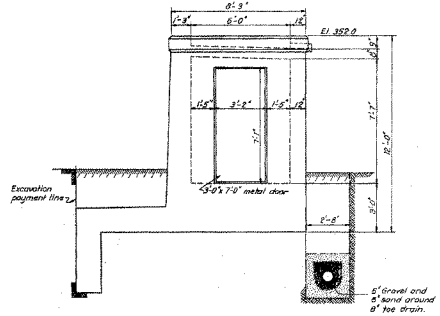
CORPS OF ENGINEERS, U. S. ARMY







ELEVATION



ELEVATION B-B

Note: For reinforcing details see sheet 93

BY	DATE	CHARACTER
		REVISIONS
E.B.F.	11-20-40	Excavation payment line removed on riverside

OHIO RIVER BASIN

FLOOD PROTECTION, PAOUCAH, KY.

SECTION "B"

MASONRY DETAILS

STORAGE VAULT STA. 68+61.0

SHEET 90 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL BRANCH

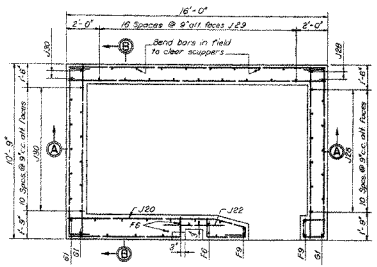
APPROVED: [illegible] CHIEF OF ENGINEERS

DR. BY J.D.C. TR. BY C.A.M. CK. BY H.M.L.

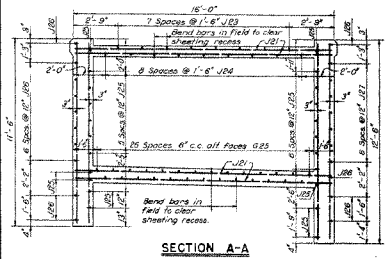
AS BUILT 933-12.3/92

WAR DEPARTMENT

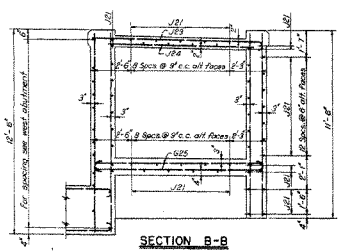
CORPS OF ENGINEERS, U. S. ARMY



PLAN



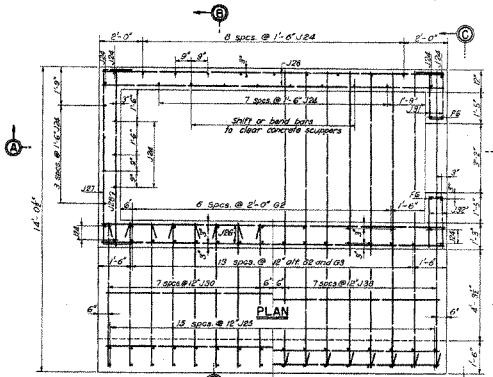
SECTION A-A



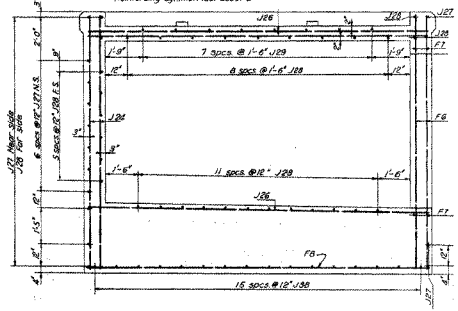
SECTION B-B

STA. 62+84.3

SCALE: 3/8" = 1'-0"



TOP REINFORCING (B) — Reinforcing symmetrical about ℄ — BOTTOM REINFORCING (C)

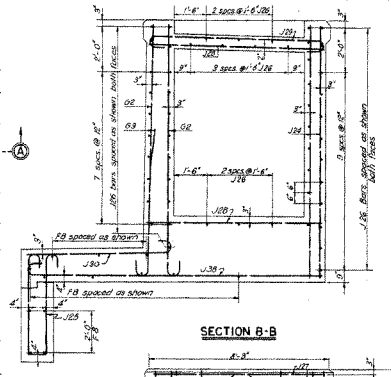


SECTION A-A

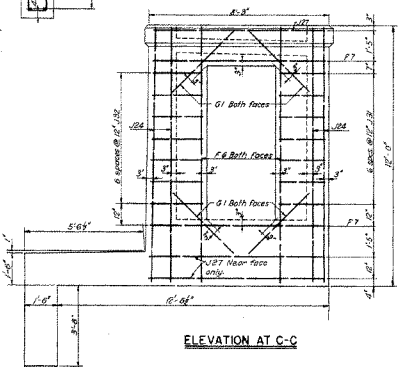
STA. 68+61.0

SCALE: 1/4" = 1'-0"

Note: For masonry details see sheets 89 & 92



SECTION B-B



ELEVATION AT C-C

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 62+84.3 AND STA. 68+61.0 STORAGE VAULTS

SHEET 91 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF OF DESIGN

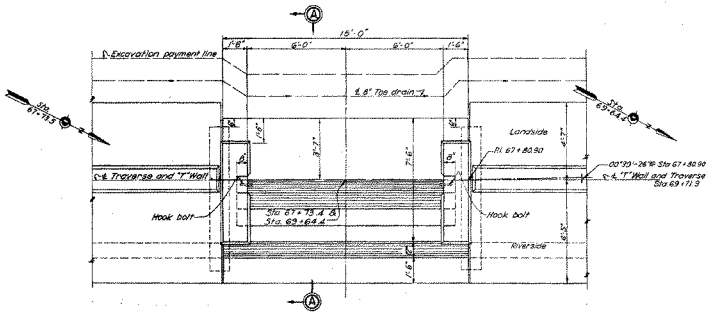
APPROVAL RECOMMENDED: [illegible] CHIEF OF FLOOD CONTROL DIVISION — APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

AS BUILT

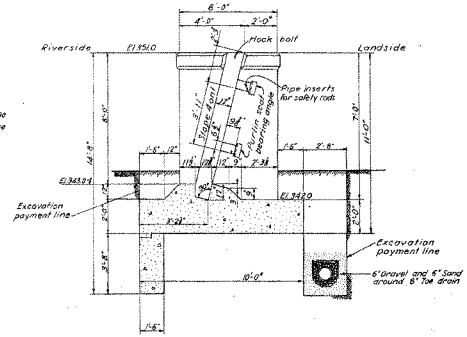
933-12.3/93

WAR DEPARTMENT

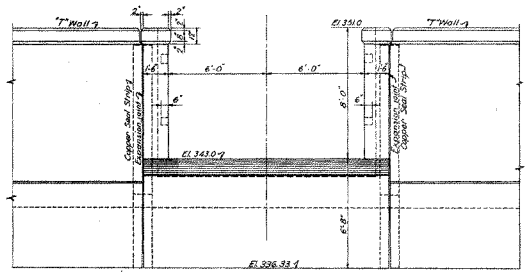
CORPS OF ENGINEERS, U. S. ARMY



PLAN



SECTION A-A



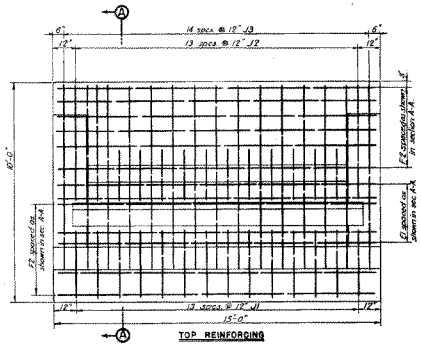
RIVERSIDE ELEVATION

Note:
For reinforcing details see sheet 95

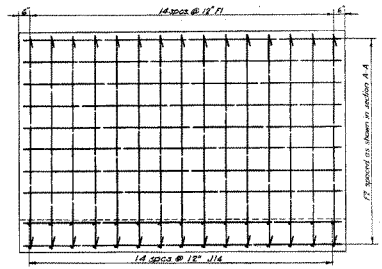
BY	DATE	CHARACTER

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

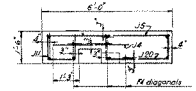


TOP REINFORCING

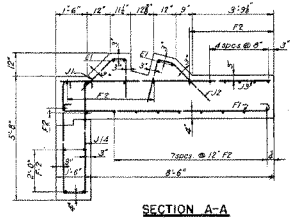


BOTTOM REINFORCING

PLAN

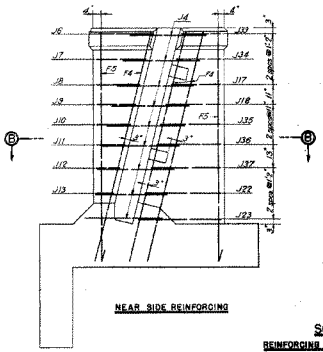


SECTION B-B

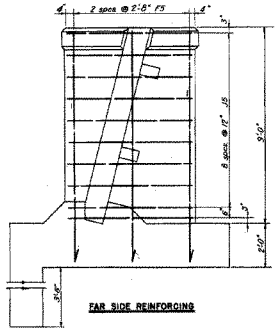


SECTION A-A

Note: for masonry details see sheet 94



NEAR SIDE REINFORCING



FAR SIDE REINFORCING

SOUTH ABUTMENT

REINFORCING FOR NORTH ABUTMENT IS IDENTICAL AS SHOWN BUT OPPOSITE HAND.

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STAS. 67+73.4 & 69+64.4

SILL AND ABUTMENTS

SHEET 93 OF 110 SHEETS SCALE: 1/2" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: BRANCH ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

DR. BY: J.B.C. TR. BY: C.V.M.

APPROVED: COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

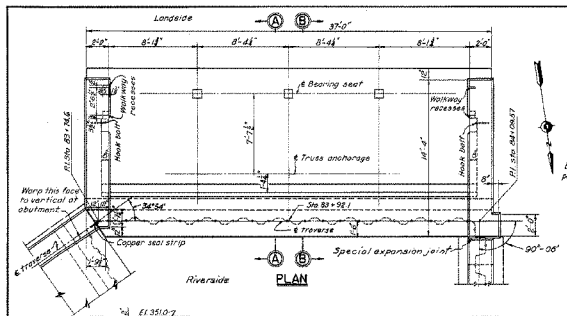
CH. BY: R.W.L.

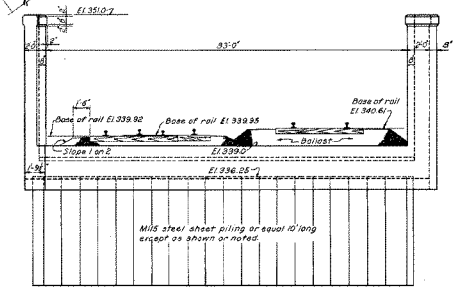
AS BUILT

933-12.3/95

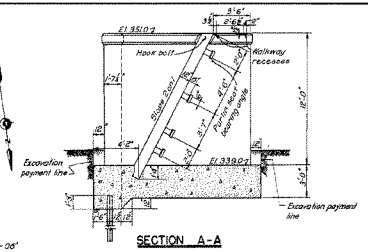
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

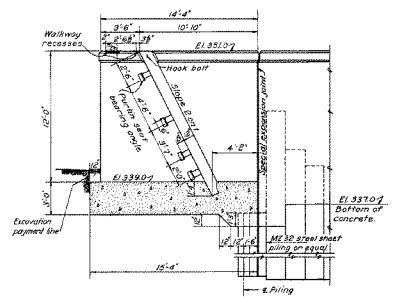




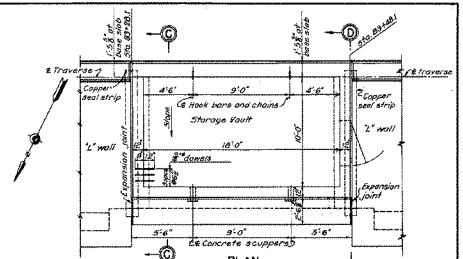
RIVERSIDE ELEVATION

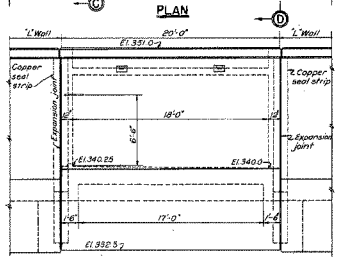


SECTION A-A

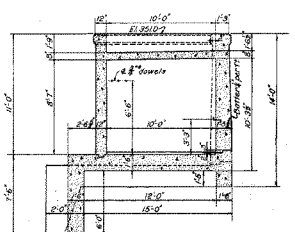


SECTION B-B

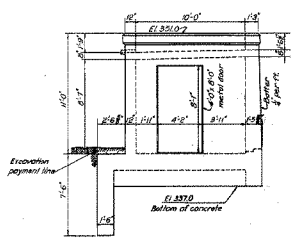




RIVERSIDE ELEVATION
STORAGE VAULT



SECTION C-C



SECTION D-D

Note: For reinforcing details see sheet 37

BY	DATE	CHARACTER
T.B.E.	1-20-40	Excavation payment line removed on riverside.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 83+92.1

& STORAGE VAULT STA. 83+26.1

SHEET 94 OF 110 SHEETS

SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] Engineer, Chief of Design

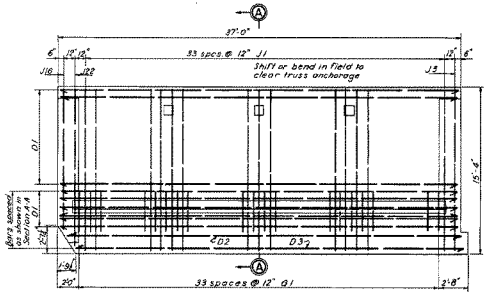
APPROVAL RECOMMENDED: [illegible] Chief, Design Branch

APPROVED: [illegible] Colonel, Corps of Engineers, District Engineer

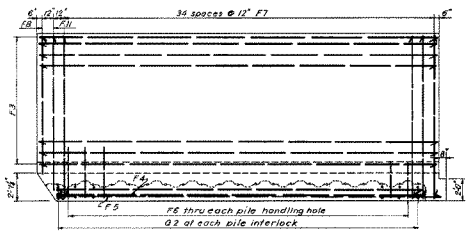
DR. BY K.R.A. DES. BY [illegible] TR. BY W.S.S. CK. BY [illegible]

AS BUILT 933-12.3/96

755



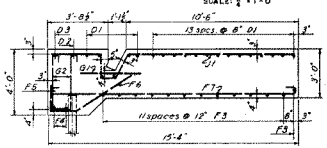
TOP REINFORCING



BOTTOM REINFORCING

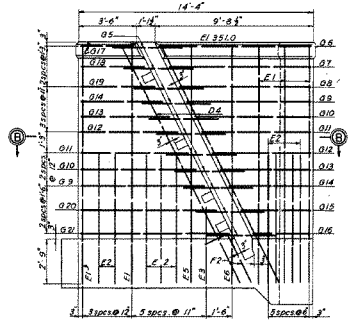
PLAN

SCALE: 1/4" = 1'-0"

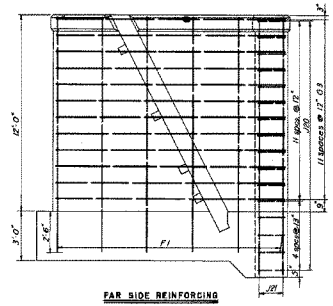


SECTION A-A

SCALE: 3/8" = 1'-0"



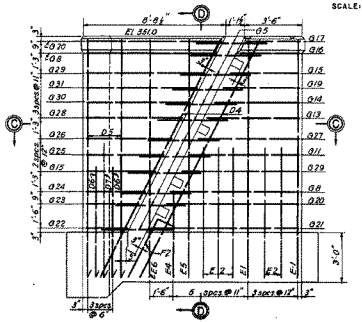
NEAR SIDE REINFORCING



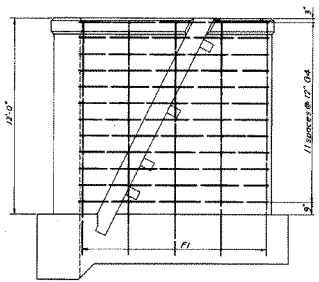
FAR SIDE REINFORCING

ELEVATION WEST ABUTMENT

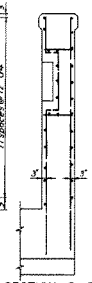
SCALE: 3/8" = 1'-0"



NEAR SIDE REINFORCING



FAR SIDE REINFORCING

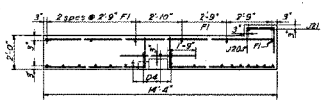


SECTION D-D

SCALE: 3/8" = 1'-0"

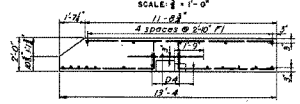
ELEVATION EAST ABUTMENT

SCALE: 3/8" = 1'-0"



SECTION B-B

SCALE: 3/8" = 1'-0"



SECTION C-C

SCALE: 3/8" = 1'-0"

Note: For masonry details see sheet 96

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 83+92.1

SILL & ABUTMENTS

SHEET 95 OF 110 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: CHIEF, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PHYSICAL DESIGN SECTION, FLOOD CONTROL DIVISION DR. BY K.H.A. TR. BY P.E.B.

APPROVED: U.S. ENGINEER OFFICE DISTRICT ENGINEER DR. BY C.B.J.

AS BUILT 933-12.3/97

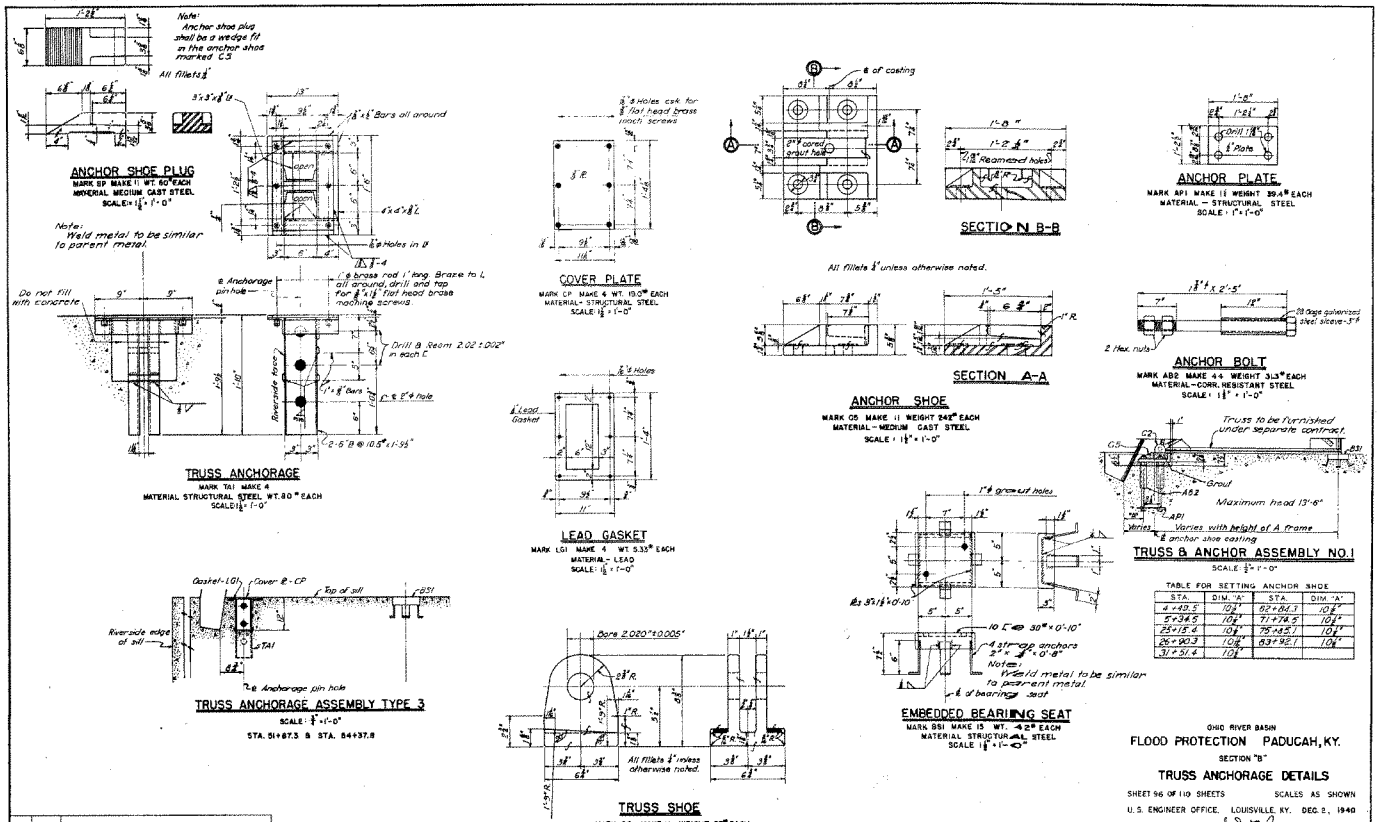


TABLE FOR SETTING ANCHOR SHOE

STA.	DIM. 'A'	STA.	DIM. 'A'
4+43.5	10 1/4"	92+84.3	10 1/4"
5+34.5	10 1/4"	71+74.5	10 1/4"
25+15.4	10 1/4"	75+45.5	10 1/4"
26+90.3	10 1/4"	83+92.1	10 1/4"
31+51.4	10 1/4"		

BY	DATE	CHARACTER	REVISIONS
T.B.E.	11-10-49	Anchor shoe plug added	

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

TRUSS ANCHORAGE DETAILS

SHEET 96 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 8, 1940

SUBMITTED: J. T. Thomas
CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ASSISTANT, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: BY ORDER OF THE DISTRICT ENGINEER

DR. BY G.K.B. TR. BY C.A.M. CK. BY F.B.T.

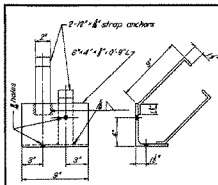
AS BUILT 933-12.3/98

757

031

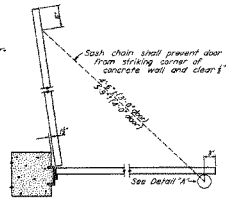
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



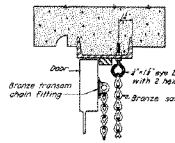
PURLIN SEAT BEARING ANGLE

MAKE 108 MARK P.S.A. WEIGHT 13.55# EACH
MATERIAL: STRUCTURAL STEEL
SCALE: 2" = 1'-0"



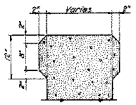
DOOR CHECK DETAIL

SCALE: 1" = 1'-0"



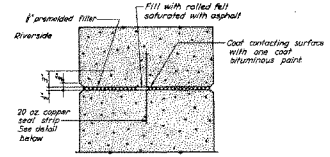
DETAIL "A"

SCALE: 3" = 1'-0"



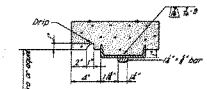
COPING DETAIL

SCALE: 1" = 1'-0"

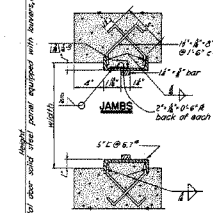


TYPICAL EXPANSION JOINT IN STEM OF WALL

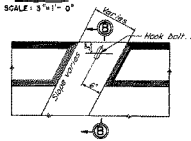
SCALE: 1 1/2" = 1'-0"



HEAD

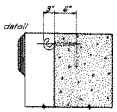


DOOR OPENING SCHEDULE			
STATION	NO. DOORS	HEIGHT	WIDTH
4+00.0	1	8'-1"	4'-2"
10+40.0	1	7'-1"	3'-2"
26+02.29	2	8'-1"	4'-2"
30+92.8	1	7'-1"	3'-2"
37+51.4	1	7'-1"	3'-2"
38+40.0	1	7'-1"	3'-2"
51+87.3	1	6'-7"	4'-2"
54+97.6	1	6'-1"	4'-2"
62+84.3	1	7'-1"	3'-2"
68+81.0	1	7'-1"	3'-2"
71+74.5	1	7'-1"	3'-2"
75+85.1	1	7'-1"	3'-2"
83+28.1	1	8'-1"	4'-2"



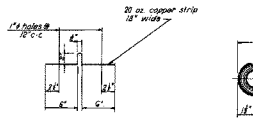
LOCATION OF HOOK BOLT

SCALE: 1" = 1'-0"



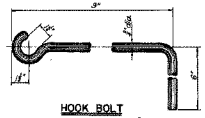
SECTION B-B

SCALE: 1" = 1'-0"



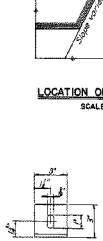
COPPER SEAL STRIP

SCALE: 1 1/2" = 1'-0"



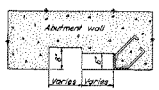
HOOK BOLT

MAKE 36 MARK H.B. WT. 2.25# EACH
MATERIAL: WROUGHT IRON
SCALE: 3" = 1'-0"



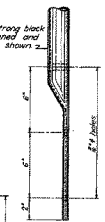
DOOR FRAME ANGLE DETAIL

SCALE: 3" = 1'-0"



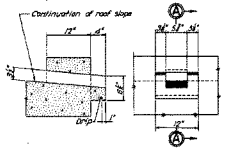
SECTION THRU PURLIN RECESS

SCALE: 1 1/2" = 1'-0"



DETAIL "C"

SCALE: 3" = 1'-0"

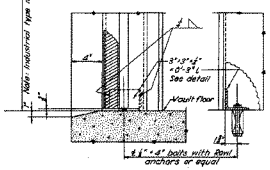


SECTION A-A

ELEVATION

CONCRETE SCUPPER

SCALE: 1" = 1'-0"

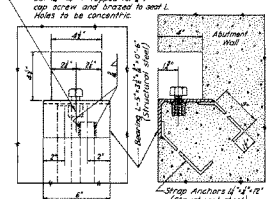


SILL

VAULT DOOR FRAME DETAILS

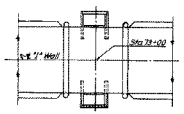
SCALE: 2" = 1'-0"

Note:
For door hasp details see sheet 100

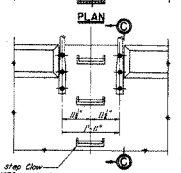


STRUT ANGLE ANCHORAGE

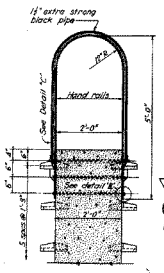
MAKE 10 MARK A.A. WEIGHT 6.80# EACH
MATERIAL AS NOTED
SCALE: 3" = 1'-0"



PLAN



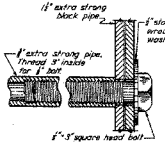
ELEVATION



LADDER DETAIL

SCALE: 3/4" = 1'-0"

SECTION C-C



DETAIL "B"

SCALE: FULL SIZE

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

MISCELLANEOUS DETAILS

SHEET 97 OF 110 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

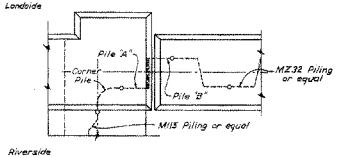
SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] — APPROVED: [illegible]

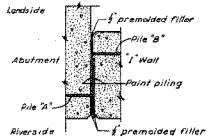
F.B.F.	1/12/46	Expansion joint revised and minor revisions.
BY	DATE	CHARACTER
		REVISIONS

AS BUILT

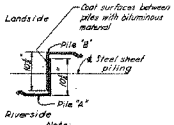
933-12.3/99



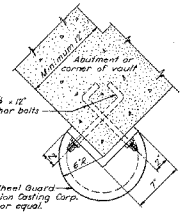
PLAN



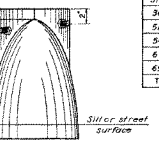
SECTION A-A
SCALE: 1" = 1'-0"



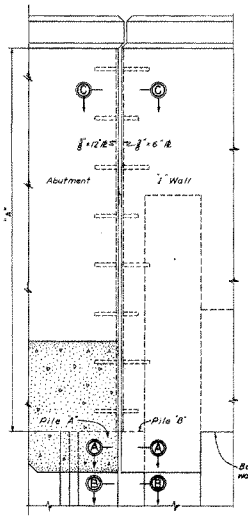
SECTION B-B
SCALE: 1" = 1'-0"



WHEEL GUARD SCHEDULE	
STATION	NO. REQUIRED
9+44.0	4
10+40.0	5
26+90.3	4
31+01.3	4
36+84.5	4
51+67.5	4
54+37.6	4
67+73.4	4
69+69.3	4
TOTAL	37

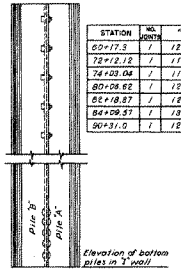


WHEEL GUARD DETAIL
SCALE: 2" = 1'-0"



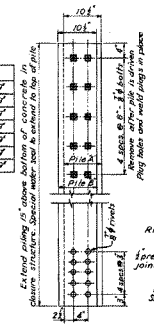
RIVERSIDE ELEVATION
SPECIAL EXPANSION JOINT
SCALE ⅛" = 1'-0"

Note: The steel sheet piling shall be cut off square and smooth after driving to form a good butt joint with special water seal.

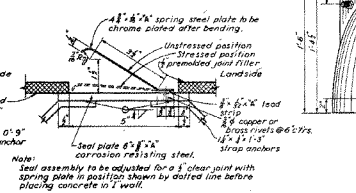


Elevation of bottom piles in ½" wall

STATION	NO. JOINTS	"A"
60+17.3	1	12'-9"
72+12.12	1	11'-9"
74+03.04	1	11'-9"
80+26.62	1	12'-9"
82+18.87	1	12'-9"
84+09.37	1	13'-9"
90+31.0	1	12'-9"

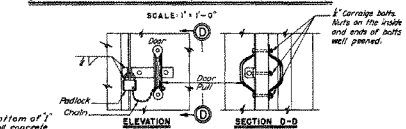


DETAIL OF PILING AT SPECIAL EXPANSION JOINT
SCALE: 1" = 1'-0"



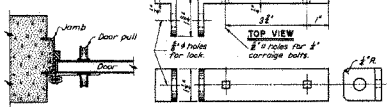
Note: Seal assembly to be adjusted for a ½" clear joint with spring plate in position shown by dotted line before placing concrete in ½" wall.

SPECIAL WATER SEAL
MATERIAL AS SHOWN
SCALE: HALF SIZE

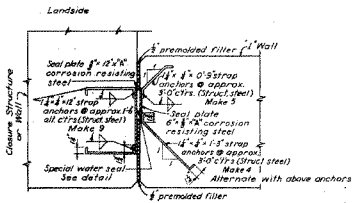


DOOR LOCK ASSEMBLY
SCALE: 2" = 1'-0"

Note: For additional door details see sheet 98.



DETAIL OF WROUGHT IRON HASP
SCALE: HALF SIZE



SECTION C-C
SCALE: 1½" = 1'-0"

F.B.F. 11-12-40	Minor corrections & door hasp added.	
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

MISCELLANEOUS DETAILS

SHEET 98 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF OF FLOOD CONTROL DESIGN SECTION

APPROVED: [illegible] DISTRICT ENGINEER

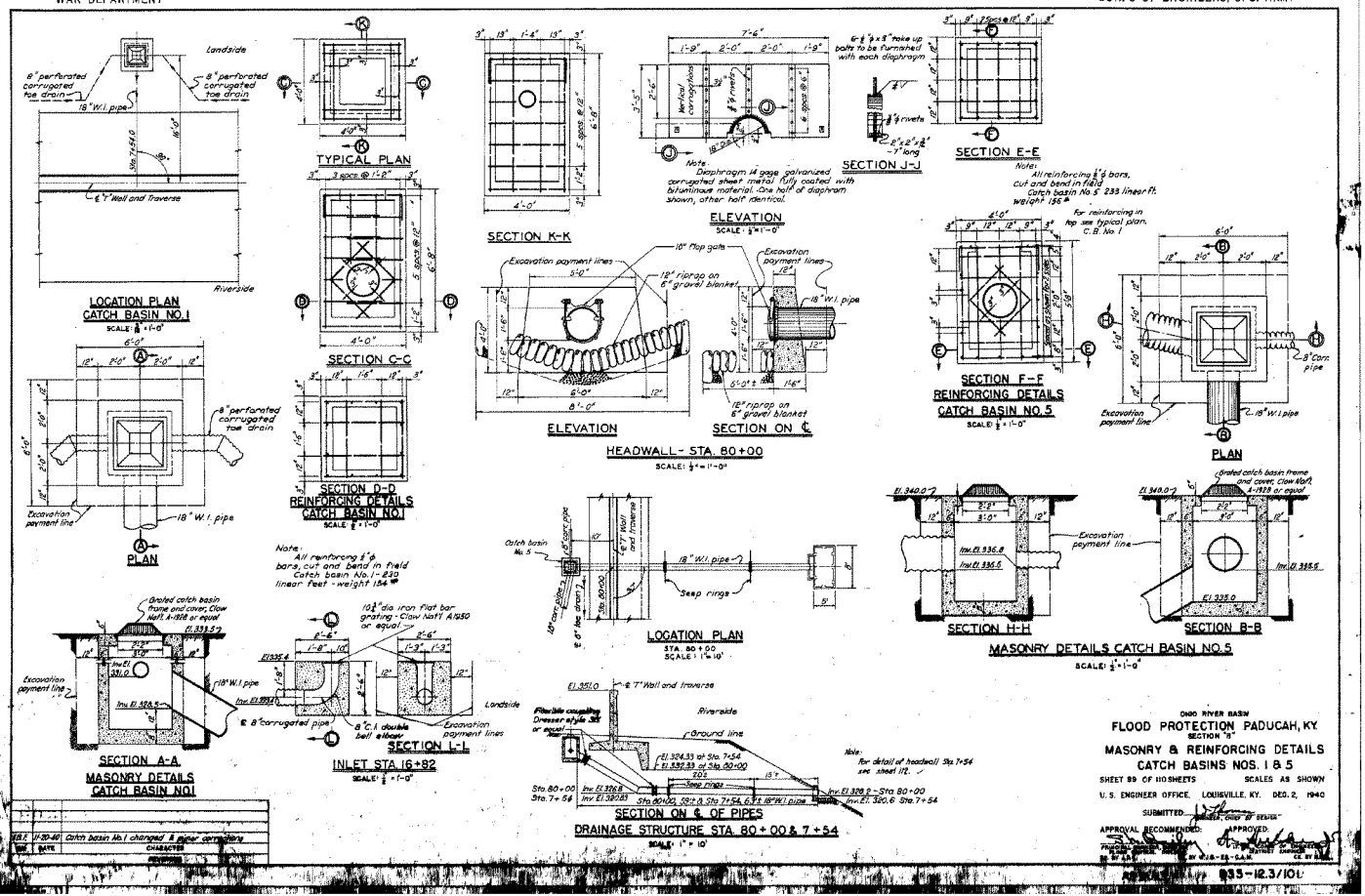
DR. BY E.L.S. TR. BY K.E.B. CK. BY [illegible]

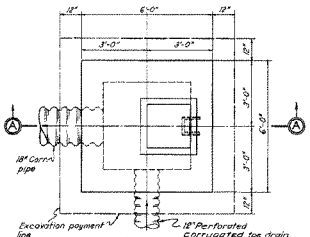
AS BUILT 933-12.3/100

759

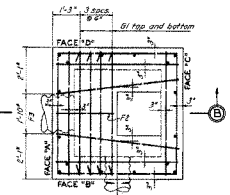
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

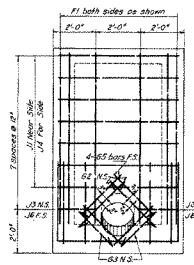




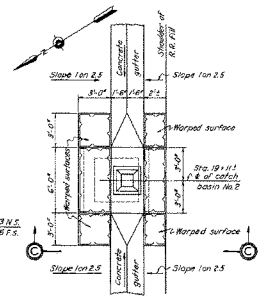
PLAN



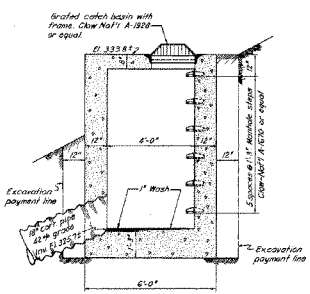
PLAN



ELEVATION FACE "A"



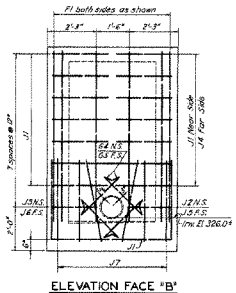
PLAN



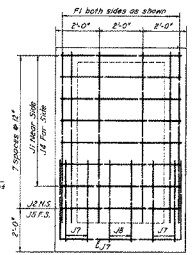
SECTION A–A

MASONRY DETAILS

SCALE: $\frac{1}{4}$"=1'-0"

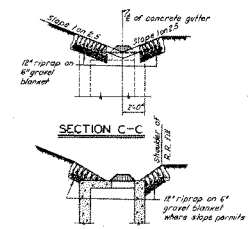


ELEVATION FACE "B"



ELEVATION FACE "C"

FACE "D" SIMILAR

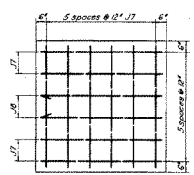


SECTION C–C

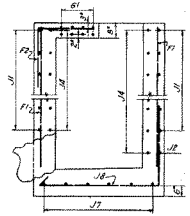
SECTION ON ℄ OF CATCH BASIN

RIPRAP DETAILS

SCALE: $\frac{1}{4}$"=1'-0"



PLAN OF BASE



REINFORCING DETAILS

SCALE: $\frac{1}{4}$"=1'-0"

SECTION B–B

REINFORCEMENT SCHEDULE

SIZE	D
3/4" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT
F1	16	3/4" ϕ	7'-9"	Straight	11.64	186.2
F2	1	"	5'-6"	2'-7" 2'-7" 4"	8.26	8.3
F3	2	"	5'-8"	Straight	8.51	17.0
G1	8	3/4" ϕ	7'-0"	5'-8"	7.30	58.4
G2	2	"	4'-6"	3'-3"	4.69	9.4
G3	2	"	3'-6"	2'-3"	3.65	7.3
G4	4	"	3'-10"	2'-6"	4.00	16.0
G5	8	"	2'-6"	Straight	2.61	20.9
J1	14	3/4" ϕ	10'-6"	2'-6" 5'-6" 2'-6"	7.01	98.1
J2	1	"	10'-6"	2'-0" 5'-6" 3'-0"	7.01	7.0
J3	2	"	3'-9"	1'-9" 2'-0"	2.50	5.0
J4	28	"	5'-6"	Straight	3.67	102.8
J5	1	"	6'-3"	1'-4" 4'-7" 2'-10"	5.84	5.8
J6	2	"	3'-0"	1'-4" 1'-8"	2.00	4.0
J7	10	"	12'-9"	3'-8" 5'-5" 3'-8"	8.52	85.2
J8	2	"	9'-9"	12" 5'-6" 3'-8"	6.51	13.0
				TOTAL		644#

BY	DATE	CHARACTER REVISIONS
J.H.K.	1-31-41	Revised as per Addendum No. 1

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

CATCH BASIN NO. 2

SHEET 100 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: CHIEF, CHIEF OF DESIGN

APPROVAL RECOMMENDED: APPROVED:

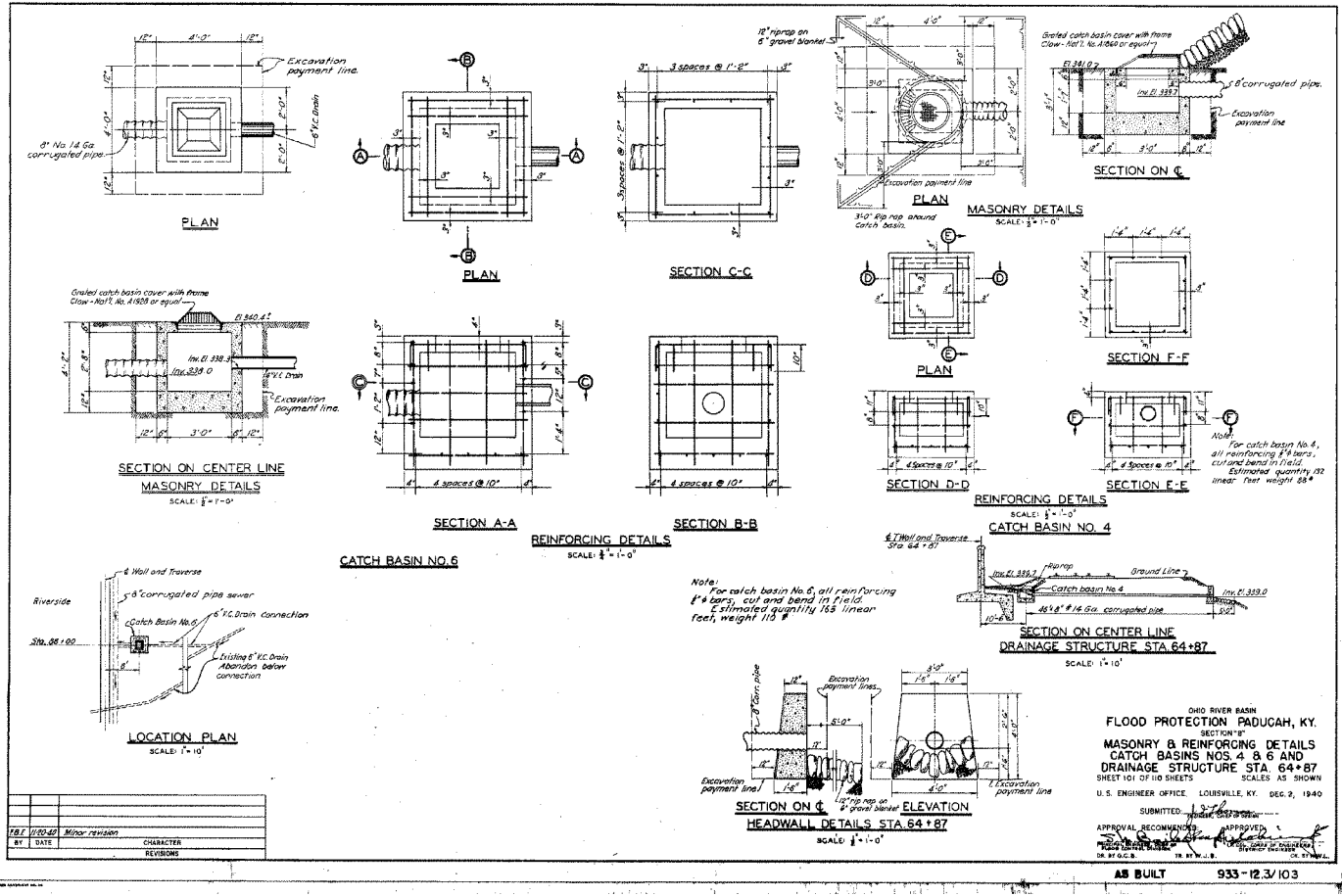
CHIEF, FLOOD CONTROL SECTION DR. BY E.C.B. TR. BY E.C.B.

CHIEF, DIVISION OF ENGINEERING DISTRICT ENGINEER DR. BY

AS BUILT 933-12.3/102

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER
T.B.F.	11-20-40	Minor revision

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS
CATCH BASINS NOS. 4 & 6 AND
DRAINAGE STRUCTURE STA. 64+87

SHEET 101 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] District Engineer

APPROVAL RECOMMENDED: [illegible] Chief, Design Branch — APPROVED: [illegible] Chief of Engineers

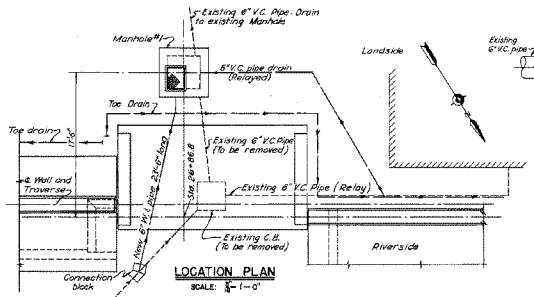
DR. BY G.C.B. — TR. BY W.J.B. — CK. BY [illegible]

AS BUILT

933-12.3/103

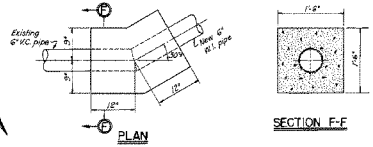
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



LOCATION PLAN

SCALE: 3/16" = 1'-0"

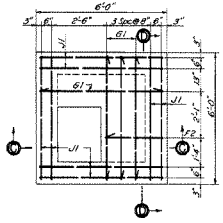


PLAN

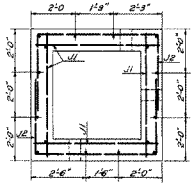
CONNECTION BLOCK

SCALE: 1" = 1'-0"

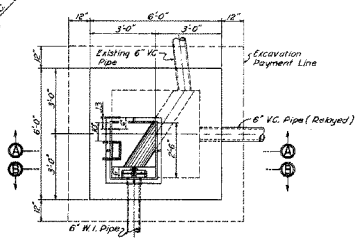
SECTION F-F



PLAN



SECTION E-E



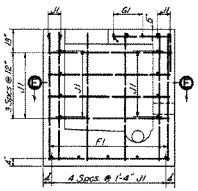
PLAN

REINFORCEMENT SCHEDULE

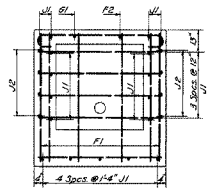
SIZE	D
3" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	3/4"	6'-0"	Straight	9.01	144.2
F2	1	"	5'-6"	2'-4" 1'-2" 2'-4"	8.26	8.3
G1	4	5/8"	7'-0"	2'-6"	7.30	29.2
J1	34	3/4"	5'-8"	Straight	3.79	128.9
J2	8	"	12'-6"	3'-4" 2'-6" 3'-4"	8.35	66.8
J3	2	"	12"	2" 10"	0.67	1.3
				TOTAL		379#



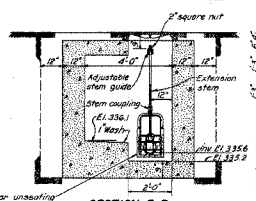
SECTION C-G



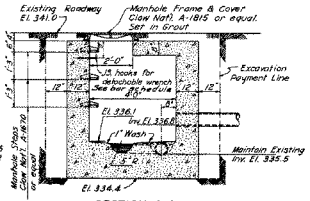
SECTION D-D

REINFORCING DETAILS

SCALE: 1/4" = 1'-0"



SECTION B-B



SECTION A-A

MASONRY DETAILS

SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER
F.B.F.	11-20-40	Gate changed & 6" W.I. pipe revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 1

SHEET 102 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: CHIEF, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, DESIGN CONTROL SECTION — DR. BY G.H.S.

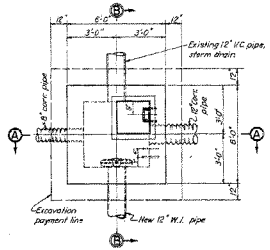
APPROVED: CHIEF OF ENGINEERS, DISTRICT ENGINEER — TR. BY N.B.B. — CK. BY F.B.F.

AS BUILT

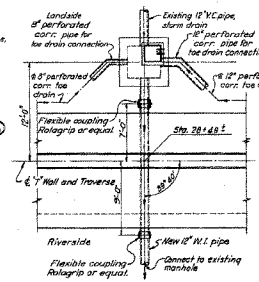
933-12.3/104

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

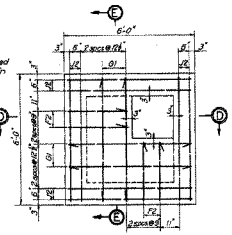


PLAN

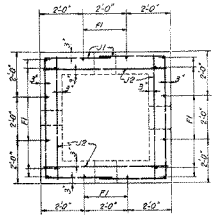


LOCATION PLAN

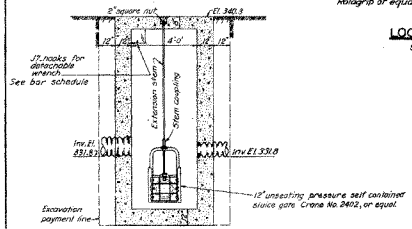
SCALE: 1/8" = 1'-0"



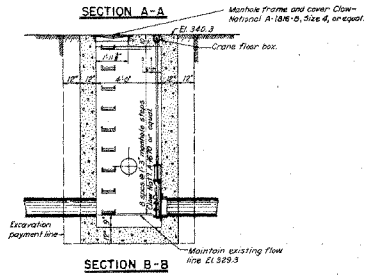
PLAN



SECTION F-F



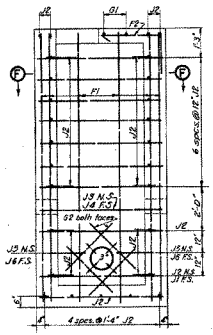
SECTION A-A



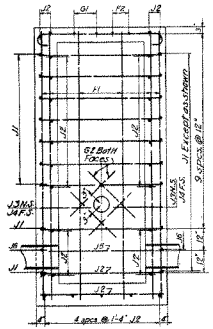
SECTION B-B

MASONRY DETAILS

SCALE: 1/8" = 1'-0"



SECTION D-D



SECTION E-E

REINFORCING DETAILS

SCALE: 1/8" = 1'-0"

REINFORCEMENT SCHEDULE

SIZE	D
3/8	6"
1/2	8"
5/8	10"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	5/8	12'-3"	Straight	18.48	294.4
F2	4	"	6'-6"	1'-8" 3" 2'-7" 1'-8"	6.75	27.0
G1	4	3/4	7'-0"	3" 5'-8"	7.30	29.2
G2	16	"	3'-0"	Straight	3.13	50.1
J1	18	5/8	11'-6"	3'-0" 5'-6" 3'-0"	7.58	136.5
J2	54	"	5'-8"	Straight	3.79	204.7
J3	2	"	9'-0"	1'-9" 5'-6" 1'-9"	6.01	12.0
J4	2	"	10'-0"	2'-3" 5'-6" 2'-3"	6.68	13.4
J5	2	"	7'-9"	1'-7" 4'-7" 1'-7"	5.18	10.4
J6	2	"	9'-6"	2'-0" 5'-6" 2'-0"	6.35	12.7
J7	2	"	18"	2" 18"	0.67	1.3
				TOTAL		793#

BY	DATE	CHARACTER
FBF	8-20-41	Changed gate & location of opening

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "a"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 2

SHEET 103 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

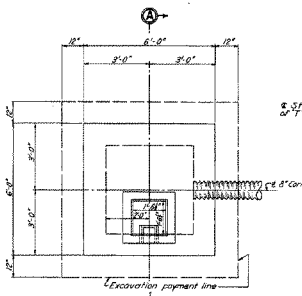
SUBMITTED: [illegible], CHIEF OF STAFF

APPROVAL RECOMMENDED: [illegible], CHIEF, ENGINEERING DIVISION

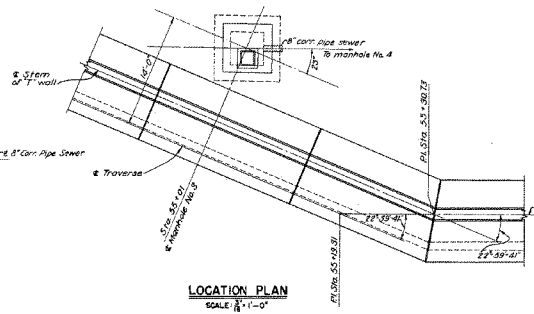
APPROVED: [illegible], DISTRICT ENGINEER

AS BUILT

933 - 12.3/105

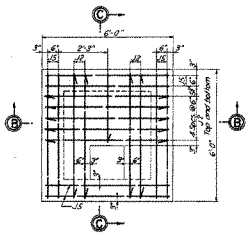


PLAN

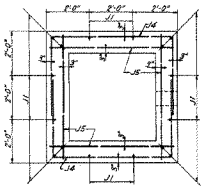


LOCATION PLAN

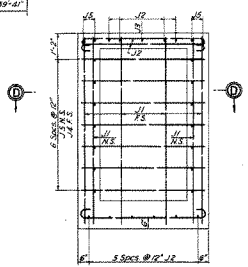
SCALE: $\frac{1}{16}$" = 1'-0"



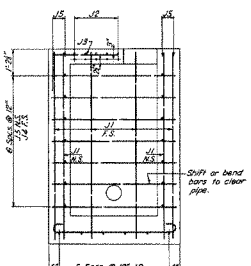
PLAN



SECTION D-D



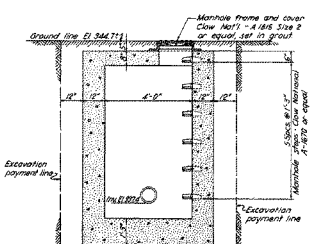
SECTION B-B



SECTION C-C

REINFORCING DETAILS

SCALE: $\frac{1}{8}$" = 1'-0"



SECTION A-A

MASONRY DETAILS

SCALE: $\frac{1}{8}$" = 1'-0"

REINFORCEMENT SCHEDULE

SIZE	D	DIMENSION GIVEN IN BENDING DIAGRAM				
8" OR LESS	6"					
BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
MANHOLE NO. 3						
J1	16	$\frac{5}{8}$"φ	8'-6"	Straight	5.68	90.9
J2	26	"	7'-0"	5'-8"	4.68	121.7
J3	1	"	5'-0"	3'-0" 1'-7"	3.34	3.3
J4	14	"	12'-6"	3'-6" 5'-8" 3'-6"	8.35	116.9
J5	36	"	5'-9"	Straight	3.84	138.2
				TOTAL		471 #

BY	DATE	CHARACTER REVISIONS
JHK	1-31-41	Revised as per Addendum No. 1
FBT	11-22-40	Minor corrections

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 3

SHEET 104 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PROJECT ENGINEER, FLOOD CONTROL DIVISION — DR. BY: K.H.A.

APPROVED: CHIEF, FLOOD CONTROL DIVISION — CK. BY: F.B.T.

AS BUILT

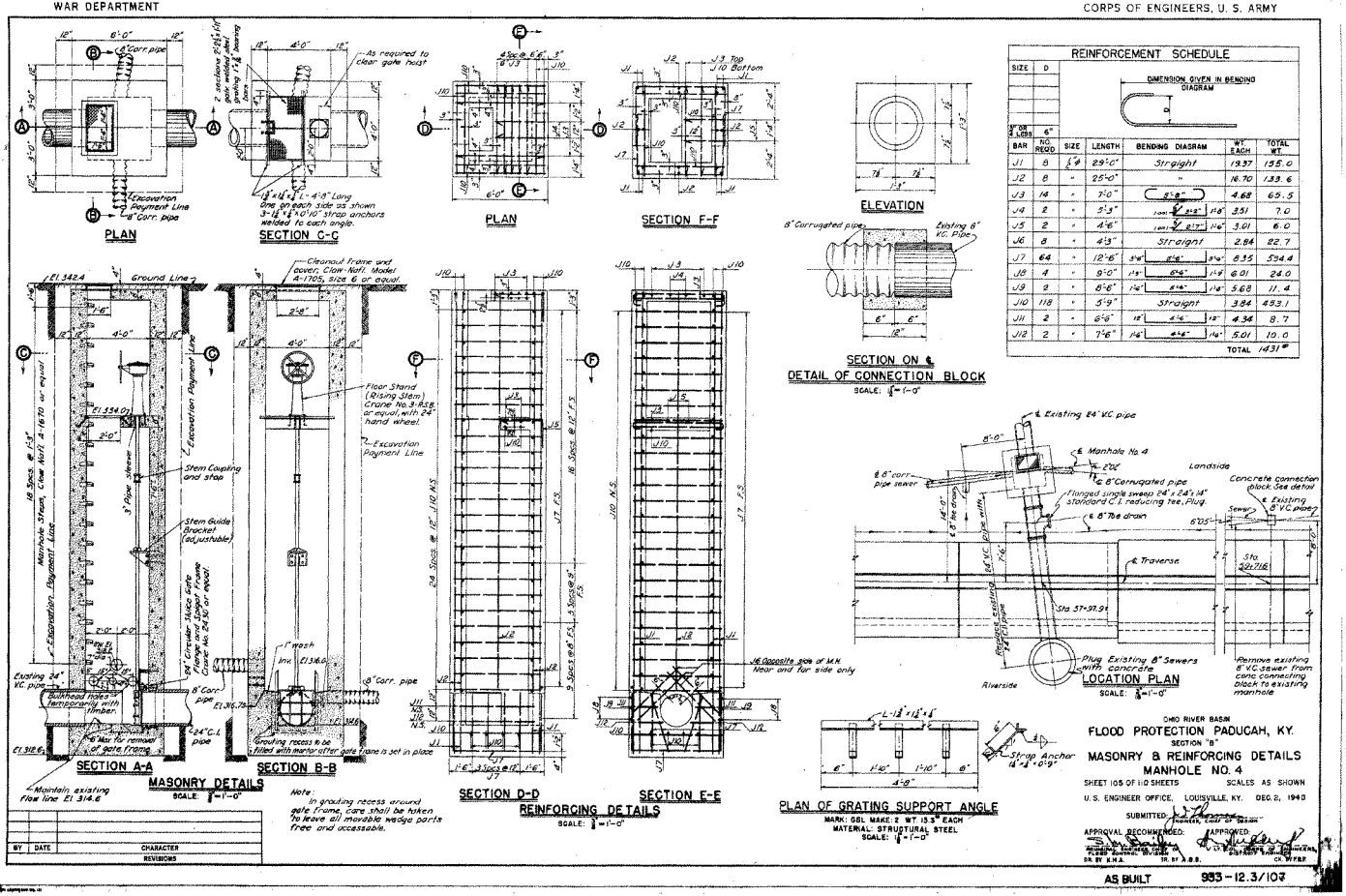
933-12.3/106

765

039

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SIZE	D
3" OR 3 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	8	5/8"	29'-0"	Straight	19.37	155.0
J2	8	"	25'-0"	"	16.70	133.6
J3	14	"	7'-0"	5'-8"	4.68	65.5
J4	2	"	3'-3"	1'-0" 1'-8" 1'-8"	3.51	7.0
J5	2	"	4'-6"	1'-0" 1'-8" 1'-8"	3.01	6.0
J6	8	"	4'-3"	Straight	2.84	22.7
J7	64	"	12'-6"	3'-6" 6'-6" 3'-6"	8.35	534.4
J8	4	"	9'-0"	1'-9" 6'-6" 1'-9"	6.01	24.0
J9	2	"	8'-8"	1'-6" 6'-6" 1'-6"	5.68	11.4
J10	118	"	5'-9"	Straight	3.84	453.1
J11	2	"	6'-8"	1'-8" 4'-4" 1'-8"	4.34	8.7
J12	2	"	7'-8"	1'-8" 4'-4" 1'-8"	5.01	10.0
					TOTAL	1431#

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 4

SHEET 105 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] PROJECT ENGR. OR DESIGNER

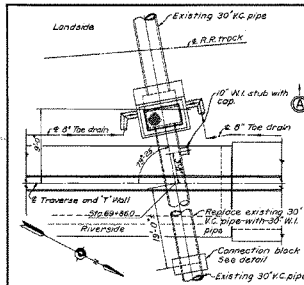
APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DESIGN BRANCH

APPROVED: [illegible] DISTRICT ENGINEER

SA. BY A.H.A. IN. BY J.B.S. CK. W.F.B.F.

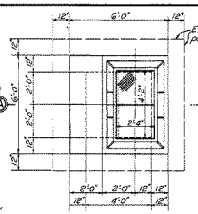
AS BUILT

983-12.3/107

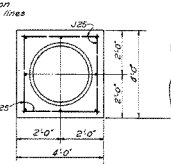


LOCATION PLAN

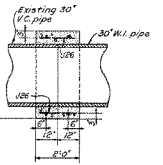
SCALE: $\frac{3}{16}$" = 1'-0"



PLAN



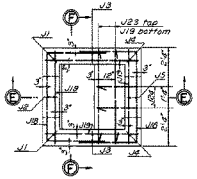
ELEVATION



SECTION ON CENTER LINE

DETAIL OF CONNECTION BLOCK

SCALE: $\frac{1}{4}$" = 1'-0"



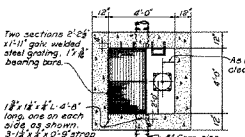
SECTION D-D

REINFORCEMENT SCHEDULE

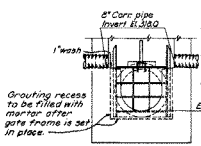
SIZE	D
5/4" OR less	6"

DIMENSION GIVEN IN BENDING DIAGRAM

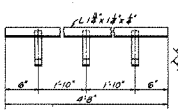
BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	4	1 1/4"	28'-6"	21'-6" 2'-0" 5'-0"	18.04	76.2
J2	2	"	23'-9"	16'-9" R.55 2'-0" 5'-0"	15.86	31.7
J3	4	"	28'-3"	21'-6" 2'-0" 5'-0"	18.87	75.5
J4	4	"	28'-3"	Straight	18.87	75.5
J5	2	"	23'-9"	"	15.86	31.7
J6	2	"	3'-6"	"	2.34	4.7
J7	2	"	3'-9"	"	2.50	5.0
J8	10	"	4'-3"	"	2.84	28.4
J9	2	"	4'-6"	"	3.01	6.0
J10	2	"	4'-9"	"	3.17	6.3
J11	2	"	5'-3"	"	3.51	7.0
J12	2	"	5'-6"	"	3.67	7.3
J13	6	"	9'-0"	1'-9" 5'-6" 1'-9"	6.01	36.1
J14	1	"	10'-0"	2'-3" 5'-6" 2'-3"	6.68	6.7
J15	1	"	10'-6"	2'-6" 5'-6" 2'-6"	7.01	7.0
J16	1	"	11'-0"	2'-9" 5'-6" 2'-9"	7.35	7.4
J17	1	"	12'-0"	3'-3" 5'-6" 3'-3"	8.02	8.0
J18	56	"	12'-6"	3'-6" 5'-6" 3'-6"	8.35	467.6
J19	92	"	5'-9"	Straight	3.84	353.3
J20	4	"	7'-0"	1'-3" 4'-6" 1'-3"	4.68	18.7
J21	2	"	6'-6"	1'-8" 4'-6" 1'-2"	4.34	8.7
J22	4	"	8'-0"	1'-3" 5'-6" 1'-3"	5.34	21.4
J23	2	"	7'-0"	3'-3"	4.68	9.4
J24	2	"	4'-6"	1'-8" 4'-6" 1'-7" (or)	3.01	6.0
J25	6	"	3'-6"	Straight	2.34	18.7
J26	5	"	1'-6"	"	1.00	8.0
					TOTAL	1332#



SECTION B-B



SECTION C-C

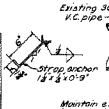


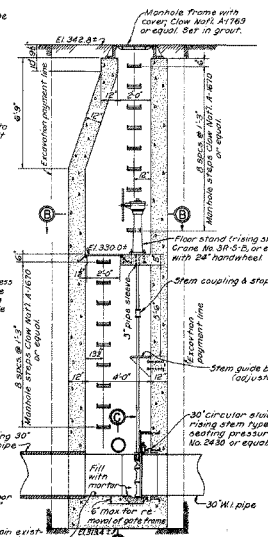
PLAN OF GRATING SUPPORT ANGLE

MARK: GSL MAKE 2 WT. 13.3# EACH

MATERIAL: STRUCTURAL STEEL

SCALE: 1½" = 1'-0"

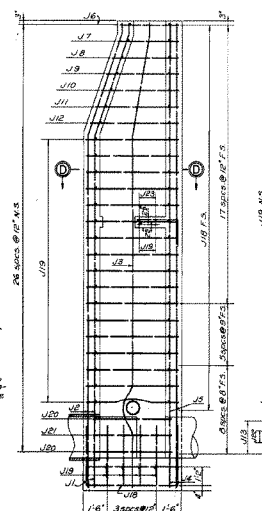




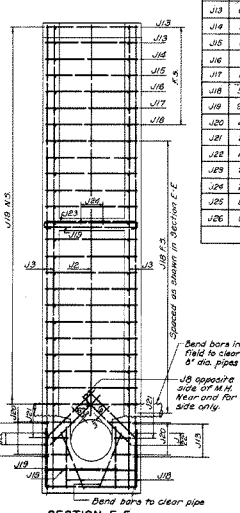
SECTION A-A

MASONRY DETAILS

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION E-E



SECTION F-F

REINFORCING DETAILS

SCALE: $\frac{1}{4}$" = 1'-0"

BY	DATE	CHARACTER
F.B.F.	11-19-40	Reinforcing added to connection block and location changed

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B" OF DESIGN

MASONRY AND REINFORCING DETAILS

MANHOLE NO. 5

SHEET 106 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: APPROVED:

CHIEF, ENGINEERING DIVISION — CHIEF, DESIGN BRANCH — CHIEF OF DIVISION OF ENGINEERING — DISTRICT ENGINEER

DR. BY B.A.V.S.A. TR. BY W.B.S. CK. BY

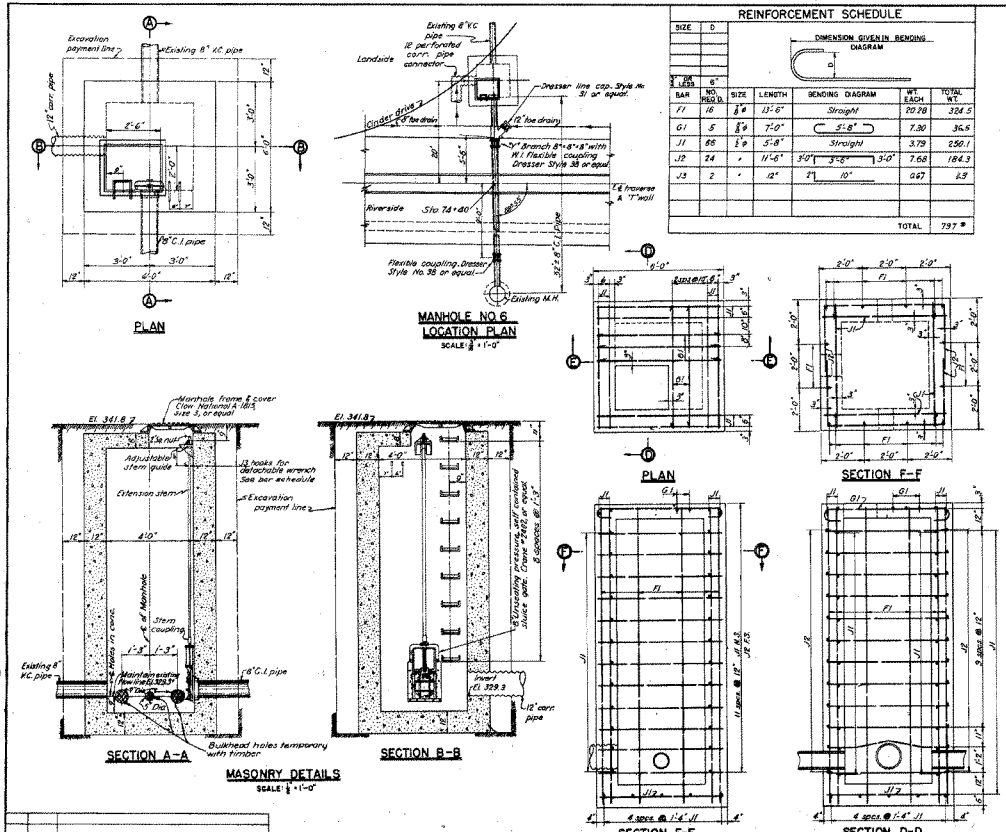
AS BUILT

933-12.3/108

767

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



REINFORCEMENT SCHEDULE

SIZE	D
3" OR 4 LEGS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	1/8" φ	13'-6"	Straight	20.28	324.5
G1	5	5/8" φ	7'-0"	5'-8"	7.30	36.5
J1	86	1/2" φ	5'-8"	Straight	3.79	250.1
J2	24	"	11'-6"	3'-0" 3'-6" 3'-0"	7.68	184.3
J3	2	"	12"	2" 10"	0.67	1.3
					TOTAL	797 #

BY	DATE	CHANGE
J.H.K.	1-31-41	Revised as per Addendum No. 1
K.B.A.	1/1/1940	Change gate & size of cover

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 6

SHEET 107 OF 110 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF OF DESIGN

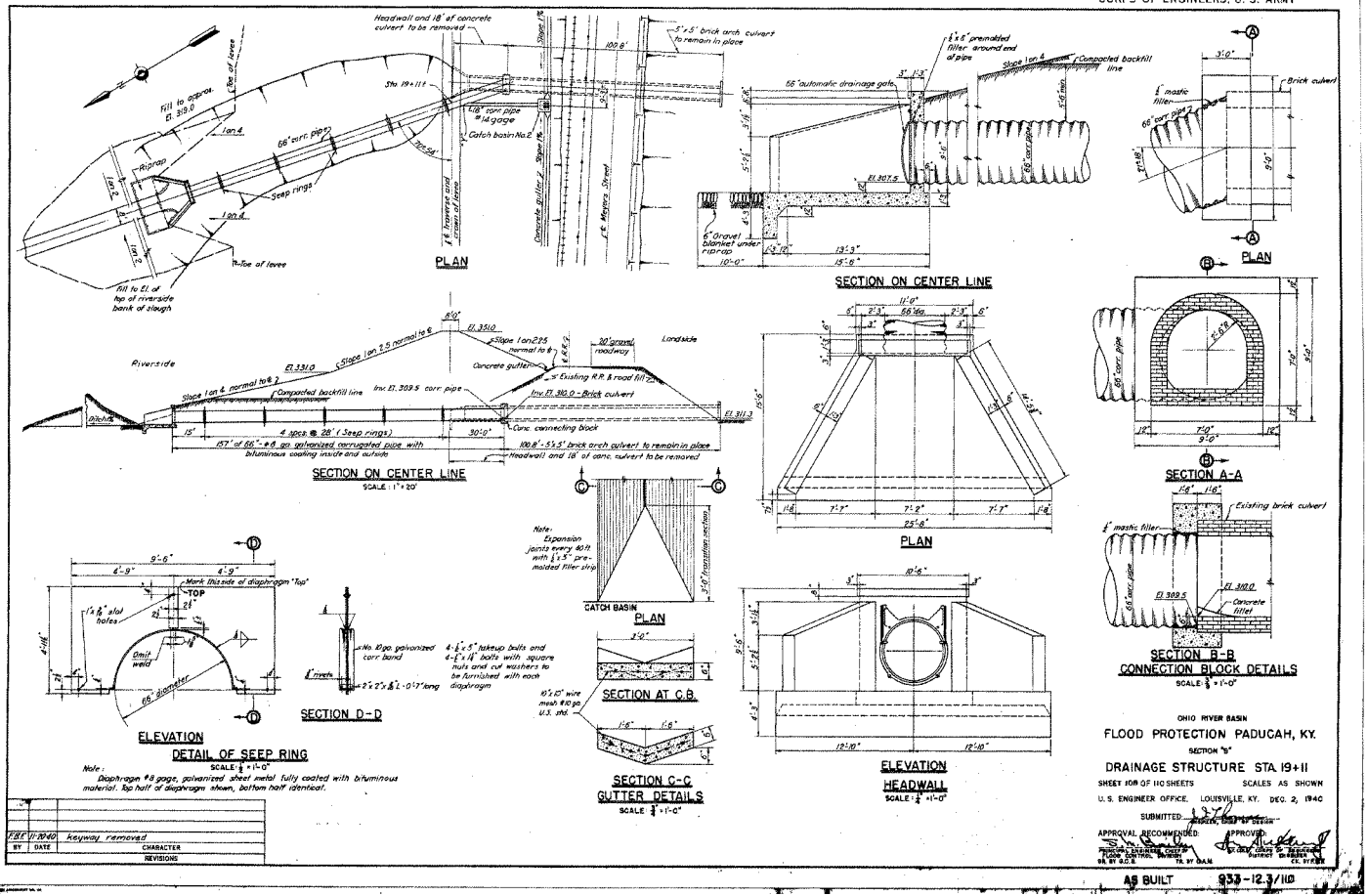
APPROVAL RECOMMENDED: [illegible] CHIEF OF DESIGN

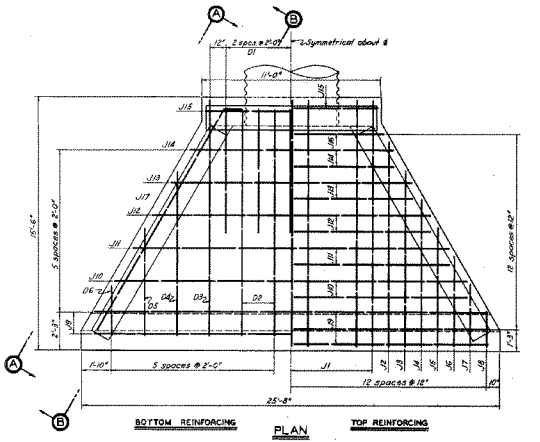
APPROVED: [illegible] DISTRICT ENGINEER

DR. BY: A.B.C. TR. BY: C.A.M. CK. BY: R.M.

AS BUILT

933-12.3/109

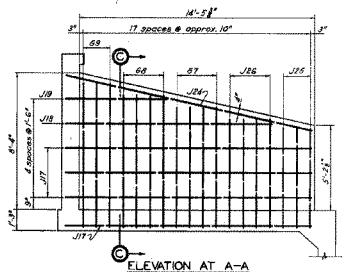

PLAN
SECTION ON CENTER LINE
SCALE: 1" = 20'
SECTION ON CENTER LINE
PLAN
SECTION A-A
PLAN
SECTION B-B
CONNECTION BLOCK DETAILS
SCALE: 3/8" = 1'-0"
ELEVATION
DETAIL OF SEEP RING
SCALE: 1/8" = 1'-0"
SECTION D-D
CATCH BASIN
PLAN
SECTION AT C.B.
SECTION C-C
GUTTER DETAILS
SCALE: 3/4" = 1'-0"
ELEVATION
HEADWALL
SCALE: 1/4" = 1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
DRAINAGE STRUCTURE STA. 19+11
SHEET 108 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933-12.3/110



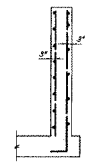
BOTTOM REINFORCING

TOP REINFORCING

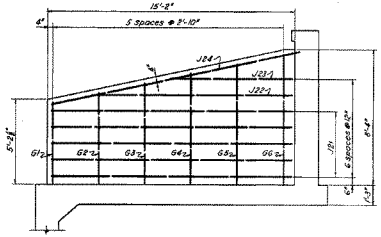
PLAN



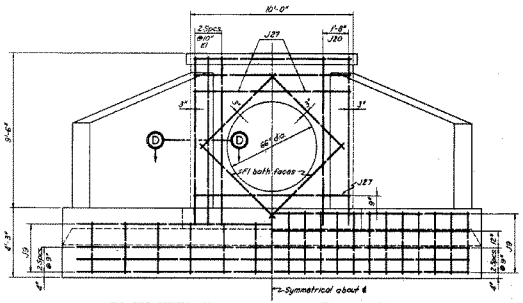
ELEVATION AT A-A



SECTION C-C



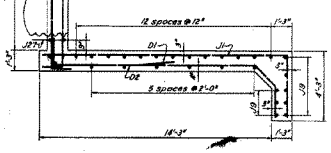
SECTION B-B



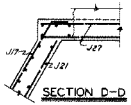
FAR SIDE REINFORCING

NEAR SIDE REINFORCING

ELEVATION



SECTION ON ℄



SECTION D-D

REINFORCEMENT SCHEDULE

SIZE	D
1"	8"
7/8"	7"
3/4" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	5	1" ▭	9'-3"	7'-6" 1'-9"	24.70	123.5
D2	4	"	17'-0"	1'-9" 12'-6" 1'-3" 1'-9"	45.39	181.6
D3	2	"	16'-6"	12'-0" 1'-3" 1'-3"	44.06	88.1
D4	2	"	12'-6"	8'-11"	33.38	66.8
D5	2	"	8'-0"	5'-8"	21.03	42.1
D6	2	"	5'-3"	1'-9" 1'-3" 1'-3"	14.02	28.0
E1	6	3/4" ▭	11'-6"	10'-3" 1'-3"	23.51	141.1
F1	8	3/4" ▭	6'-6"	Straight	9.76	78.1
G1	2	3/4" ▭	5'-0"	"	5.22	10.4
G2	2	"	5'-6"	"	5.74	11.5
G3	2	"	6'-3"	"	6.52	13.0
G4	2	"	6'-9"	"	7.04	14.1
G5	2	"	7'-6"	"	7.82	15.6
G6	2	"	8'-0"	"	8.34	16.7
G7	8	"	8'-6"	7'-4" 1'-2"	8.87	71.0
G8	8	"	9'-3"	8'-1" 1'-2"	9.65	77.2
G9	6	"	10'-0"	8'-10" 1'-2"	10.43	62.6
J1	11	1/2" ▭	12'-9"	12'-0" 3'-3"	12.52	137.7
J2	2	"	16'-3"	12'-6" 3'-9"	10.65	21.7
J3	2	"	14'-6"	10'-9" 3'-9"	9.69	19.4
J4	2	"	12'-9"	9'-0" 3'-9"	8.52	17.0
J5	2	"	11'-0"	7'-3" 3'-9"	7.35	14.7
J6	2	"	9'-3"	5'-6" 3'-9"	6.18	12.4
J7	2	"	7'-6"	3'-9" 3'-9"	5.01	10.0
J8	2	"	6'-0"	2'-3" 3'-9"	4.01	8.0
J9	11	"	24'-9"	Straight	16.20	178.2
J10	3	"	21'-3"	"	14.58	43.6
J11	3	"	19'-6"	"	13.03	39.1
J12	3	"	17'-3"	"	11.52	34.6
J13	3	"	14'-3"	"	9.85	29.6
J14	3	"	12'-0"	"	8.33	25.0
J15	2	"	10'-6"	"	7.01	14.0
J16	1	"	11'-3"	"	7.51	7.5
J17	8	"	16'-7"	15'-9" 12" 1/2"	11.08	88.6
J18	2	"	13'-9"	12'-9" 12" 1/2"	9.18	18.4
J19	2	"	7'-6"	6'-6" 12" 1/2"	5.01	10.0
J20	4	"	11'-6"	10'-3" 1'-3"	7.68	30.7
J21	10	"	14'-9"	Straight	9.85	98.5
J22	2	"	12'-6"	"	8.35	16.7
J23	2	"	7'-9"	"	5.18	10.4
J24	2	"	17'-6"	16'-6" 3'-0" 1/2"	11.69	46.8
J25	6	"	6'-9"	6'-1" 8"	4.51	27.1
J26	8	"	7'-3"	6'-7" 8"	4.84	38.7
J27	8	"	9'-6"	Straight	6.35	50.8
				TOTAL		2097#

Note:
For masonry details see sheet 110

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 19 + 11

SHEET 109 OF 110 SHEETS SCALE: 1/8"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER, CHIEF

DR. BY E.C.S. TR. BY E.C.C.

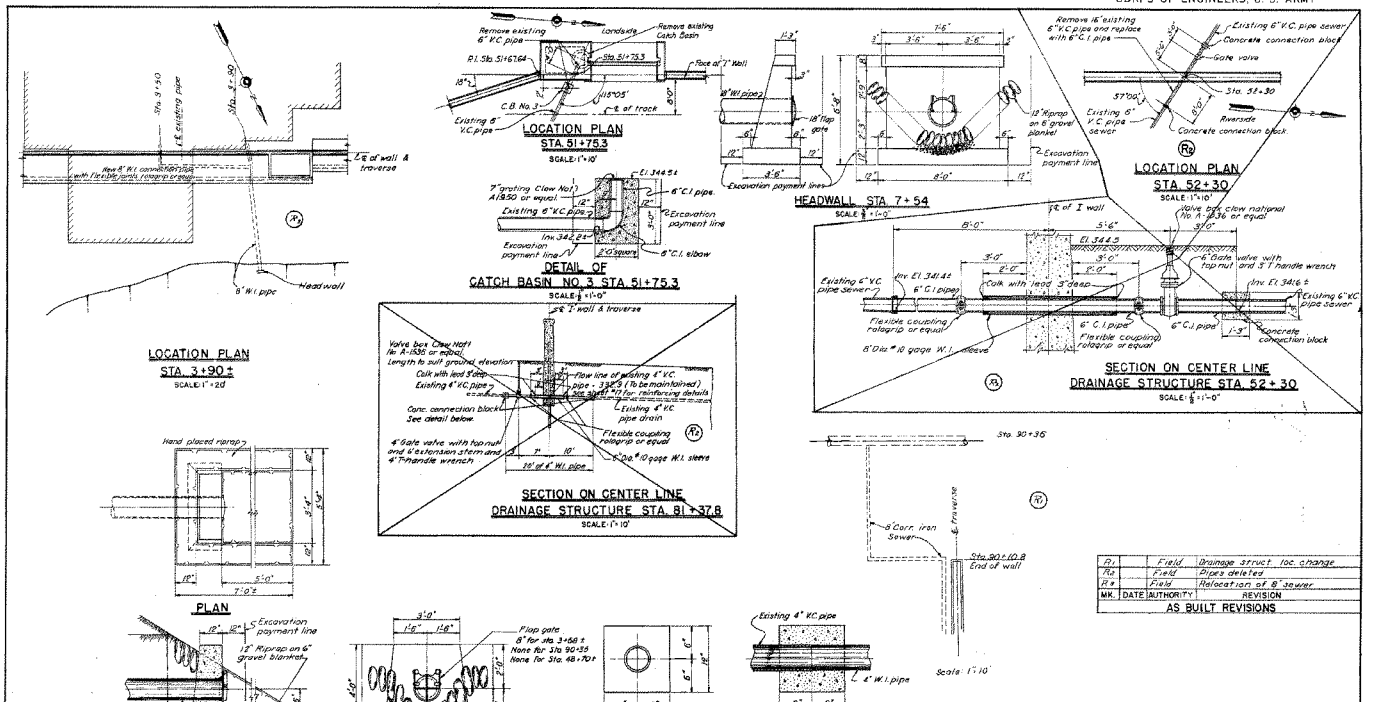
BY	DATE	CHARACTER REVISIONS
F.B.F.	11-20-40	Keyway removed

AS BUILT

933-12.3/111

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK.	DATE	AUTHORITY	REVISION
R1		Field	Drainage struct. loc. change
R2		Field	Pipes deleted
R3		Field	Relocation of 8" sewer

AS BUILT REVISIONS

BY	DATE	CHARACTER
J.H.K.	1-31-41	Revised as per Addendum No. 1
T.B.E.	11-20-40	Headwall details Sta. 7+54 added

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

SEWER OUTLET & DRAINAGE STRUCTURE DETAILS

SHEET NO OF NO SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH

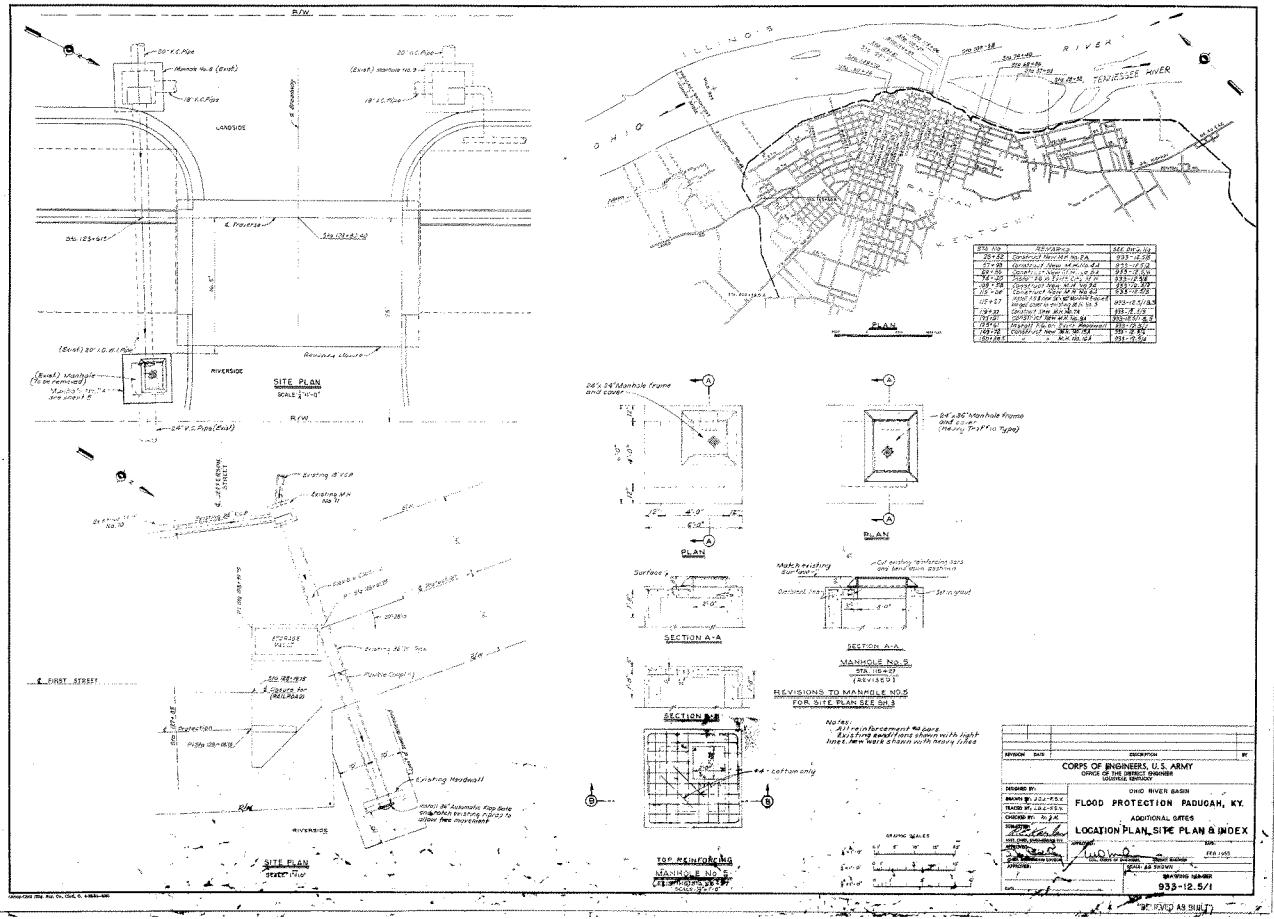
APPROVED: [illegible] DISTRICT ENGINEER

AS BUILT 933-12.3/112

771

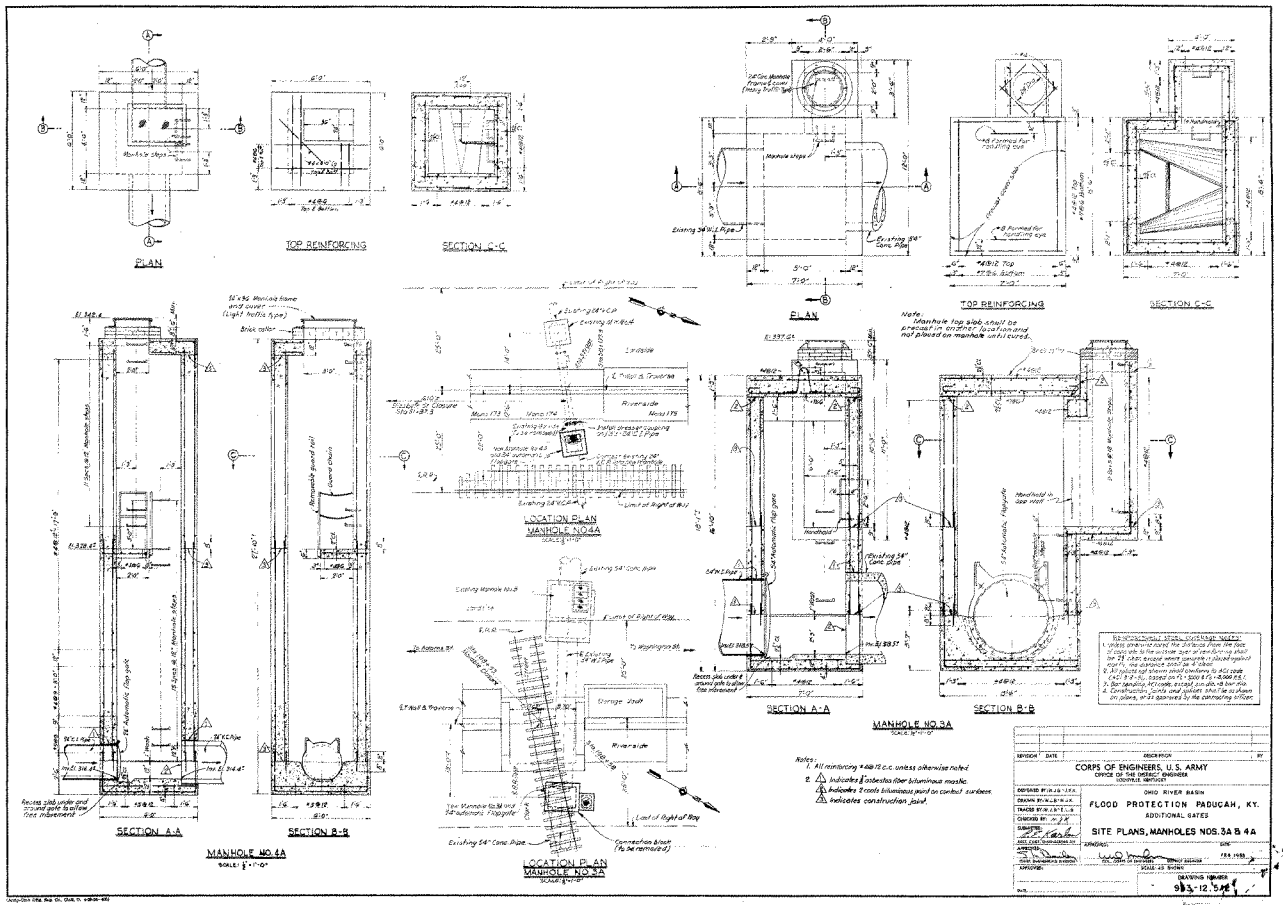
CORPS OF ENGINEERS

U.S. ARMY



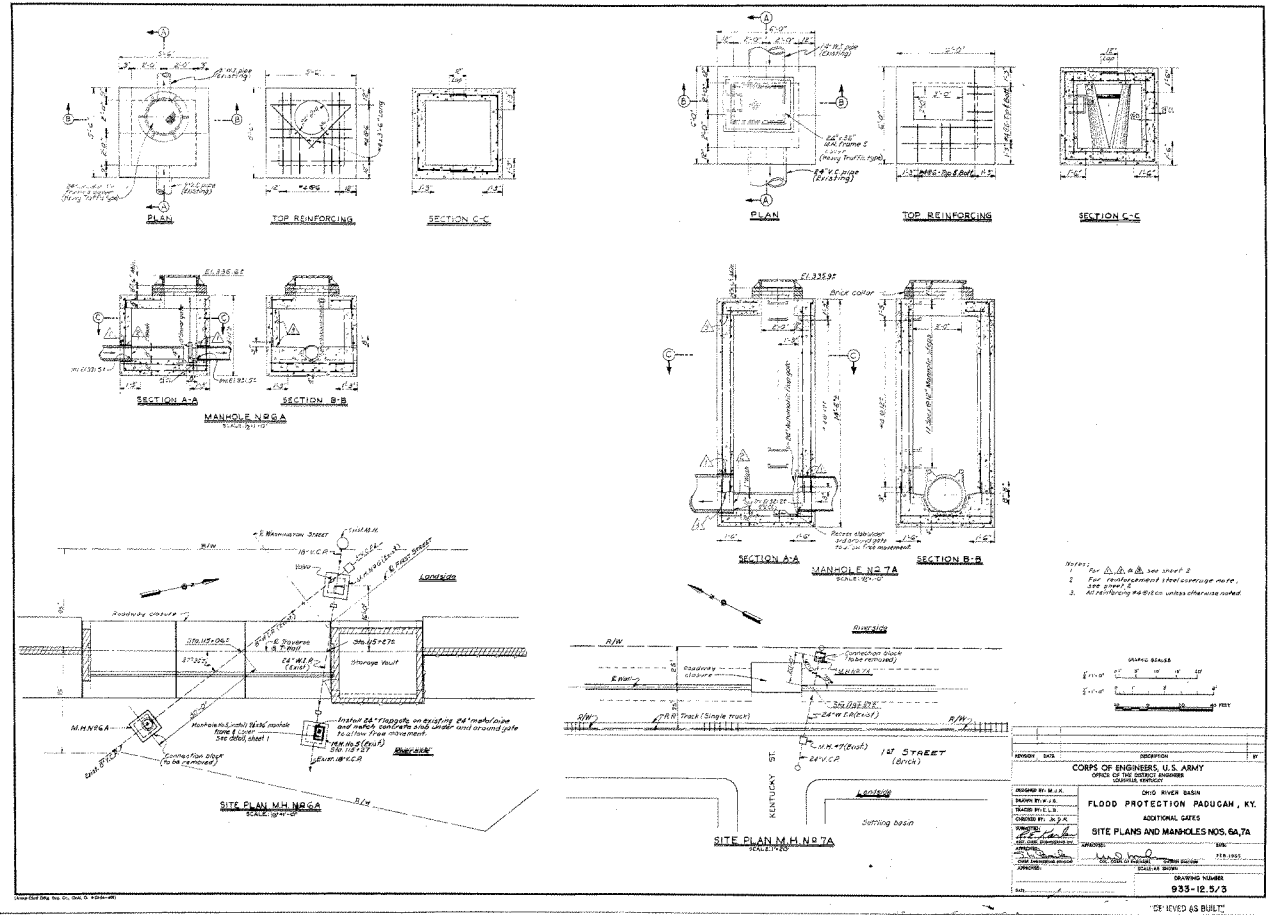
772

CORPS OF ENGINEERS U.S. ARMY



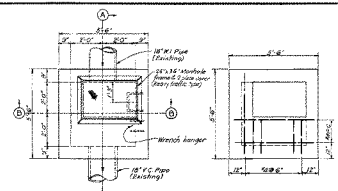
CORPS OF ENGINEERS

U.S. ARMY



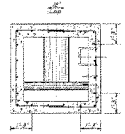
CORPS OF ENGINEERS

U.S. ARMY

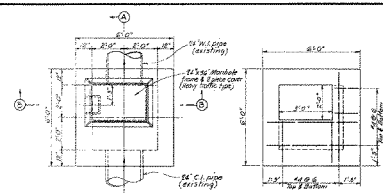


PLAN

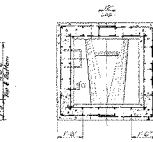
TOP REINFORCING



SECTION C-C

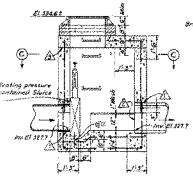


PLAN

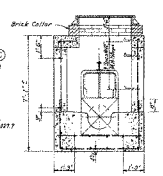


TOP REINFORCING

SECTION C-C



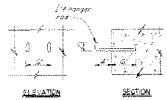
SECTION A-A



SECTION B-B

MANHOLE NO 15A

SCALE: 1/4"=1'-0"

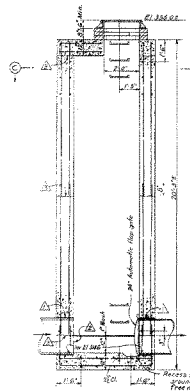


ELEVATION

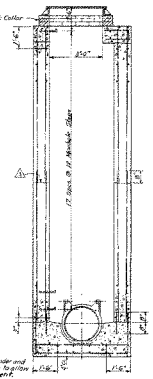
SECTION

WRENCH HANGER DETAIL

SCALE: 1"=1'-0"



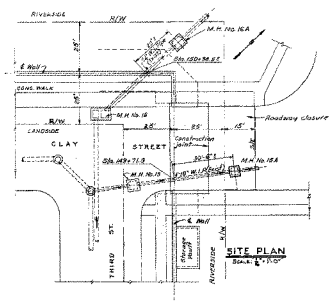
SECTION A-A



SECTION B-B

MANHOLE NO. 16A

SCALE: 1/4"=1'-0"



SITE PLAN

SCALE: 1/8"=1'-0"

Notes:

1. For ⊥, ⊥, ⊥ & ⊥ see sheet 2
2. For reinforcement steel coverage note, see sheet 2
3. All reinforcing #5 @ 12" unless otherwise noted

GRAPHIC SCALES

1/4"=1'-0" 12" 6" 0" 12" 24" 36" 48"

1/8"=1'-0" 1' 0" 1' 2' 3' 4'

1/16"=1'-0" 2' 1' 0" 2' 4' 6' 8'

1	Wall W. Side of Manhole frame & cover changed	G.C.B.
REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE, KENTUCKY

DESIGNED BY: R.J.K.
DRAWN BY: W.J.S.
TRACED BY: C.L.S.
CHECKED BY: Z.P.K.
SUBMITTED: [signature]
ASST. CHIEF, DESIGN BRANCH
APPROVAL: [signature]
CHIEF, ENGINEERING DIVISION
APPROVED: [signature]

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ADDITIONAL GATES

SITE PLAN & MANHOLES NO.15A,16A

APPROVED: [signature]
COL. CORPS OF ENGINEERS, DISTRICT ENGINEER
DATE: FEB. 1950

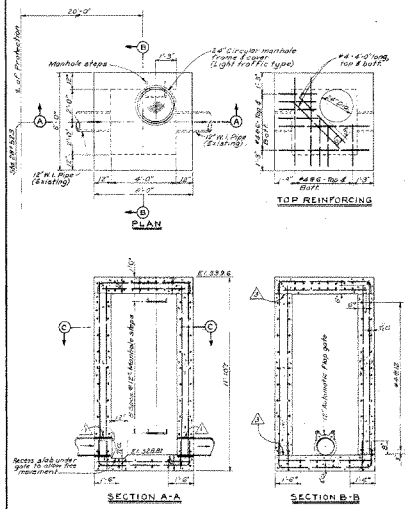
SCALE: AS SHOWN

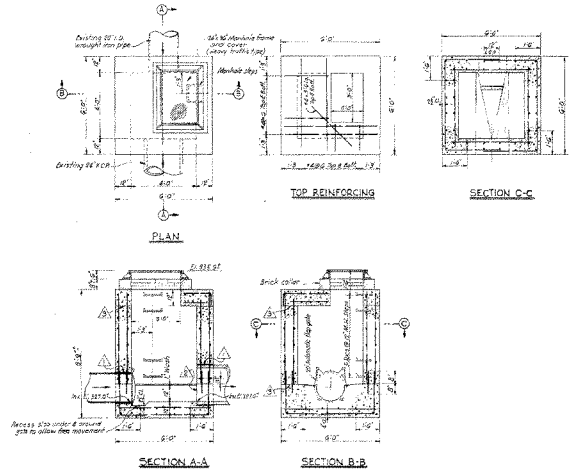
DRAWING NUMBER
933-12.5/4

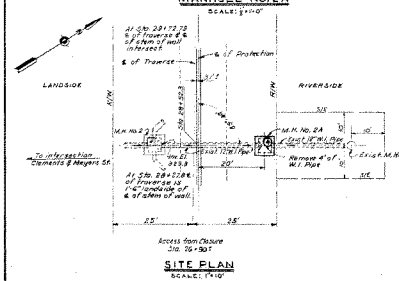
BELIEVED AS BUILT

CORPS OF ENGINEERS

U. S. ARMY







Notes:
1. For ①, ②, ③ & ④ see sheet 2.
2. For reinforcement steel coverage note, see sheet 2.
3. All reinforcing #4@12" (c.c. unless otherwise noted.
4. For section plan (A.H. No. 8A) see sheet 1

GRAPHIC SCALES

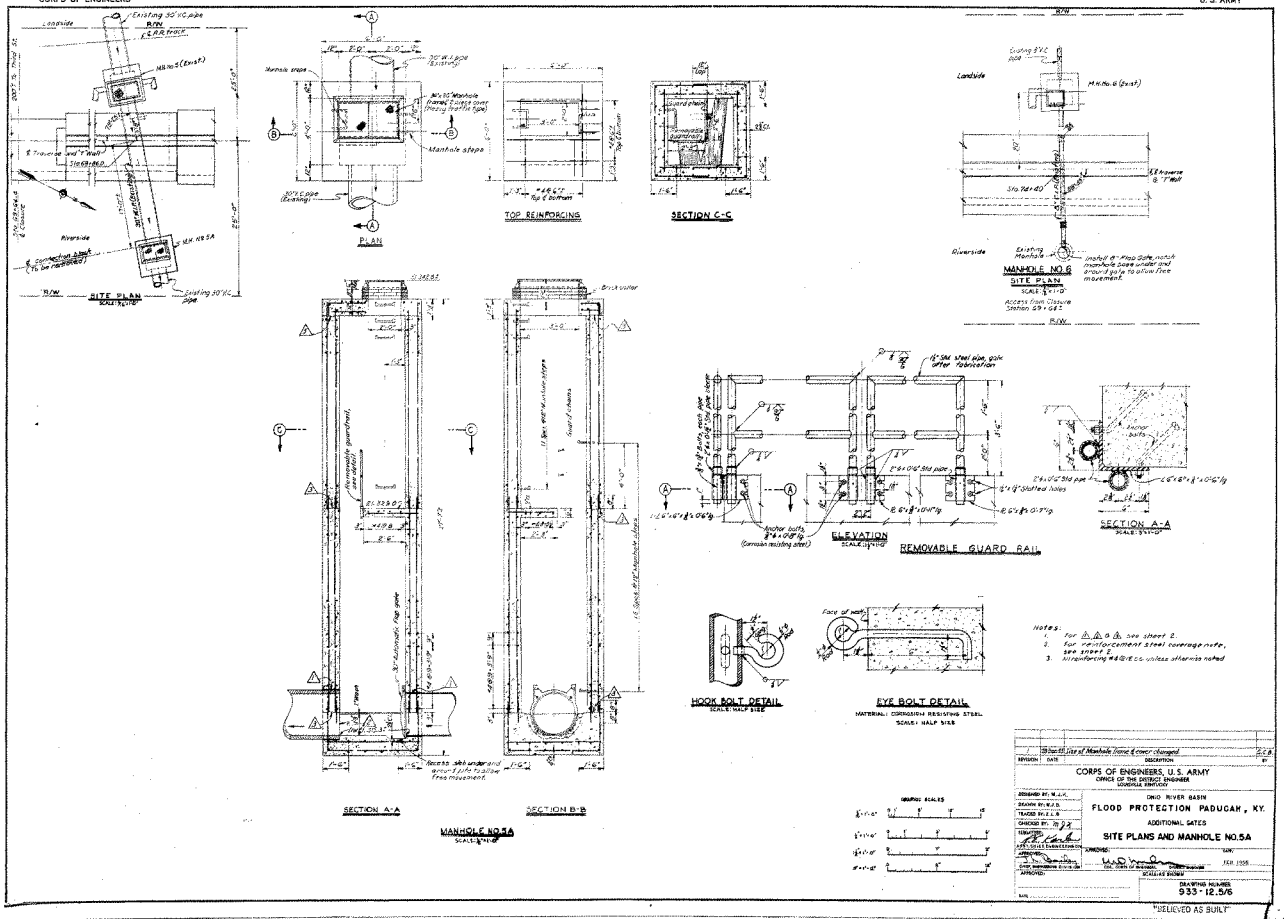
REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE, KENTUCKY

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ADDITIONAL GATES
SITE PLAN AND MANHOLE NOS. 2A AND 8A

DESIGNED BY: W.J.K.
DRAWN BY: W.J.B.
TRACED BY: J.P.M.
CHECKED BY: R.H.
CHIEF, DESIGN BRANCH
CHIEF, CIVIL ENGINEERING DIV.
APPROVED: L. A. D. P.
DATE: 10-1951
CHIEF, ENGINEERING DIV. APPROVED: DATE:
CHIEF, PLANNING DIV. APPROVED: DIV. TOWN & CITY PLANNING, DISTRICT ENGINEER
DATE:
SCALE AS SHOWN
DRAWING NUMBER
933-12.5/5

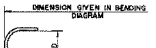
"RELIEVED AS BUILT"


SITE PLAN
PLAN
TOP REINFORCING
SECTION C-C
MANHOLE NO. 6
SITE PLAN
ELEVATION
REMOVABLE GUARD RAIL
SECTION A-A
HOOK BOLT DETAIL
EYE BOLT DETAIL
SECTION A-A
SECTION B-B
MANHOLE NO. 5A
Notes:
1. For △ △ ○ ○, see sheet 2.
2. For reinforcement steel coverage note, see sheet 2.
3. All reinforcing #4 @ 12" c.c. unless otherwise noted.
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ADDITIONAL GATES
SITE PLANS AND MANHOLE NO. 5A
933-12.5/6
"BELIEVED AS BUILT"

REINFORCEMENT SCHEDULE

SIZE	D
1" & 1/2"	10"
1 1/2"	9"
1"	8"
3/4"	7"
3/8" OR 1/4" LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM



BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
SHEET 933-12.3/16 MONOLITH NO. 165						
F8	14	3/4" ϕ	19'-9"	Straight	29.66	415.2
G42	10	3/4" ϕ	5'-9"	5'-1"	6.00	60.0
G45	18	"	11'-2"	10'-6"	11.65	209.7
J9	20	3/4" ϕ	11'-9"	5'-10" 5'-10"	7.85	157.0
J10	12	"	11'-10"	10'-6"	7.90	94.8
J19	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J29	20	"	19'-9"	"	13.19	263.8
J31	9	"	9'-9"	9'-1"	6.51	58.6
				TOTAL		1339*
SHEET 933-12.3/20 MONOLITHS NOS.1,4 & 5						
F3	8	3/4" ϕ	12'-8"	12'-0"	19.03	152.2
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F8	20	"	19'-9"	Straight	29.66	593.2
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	14	"	10'-6"	9'-3"	15.77	220.8
F66	7	"	14'-6"	12'-0"	21.78	152.5
G2	22	3/4" ϕ	19'-9"	Straight	20.60	453.2
J1	20	3/4" ϕ	15'-3"	14'-7"	10.19	203.8
J3	20	"	16'-6"	15'-3"	11.02	220.4
				TOTAL 1		2610*
				TOTAL 3		2890*
MONOLITHS NOS. 6,7,8,9 & 12						
F3	9	3/4" ϕ	12'-8"	12'-0"	19.03	171.3
F4	7	"	8'-4"	7'-8"	12.52	87.6
F5	15	"	6'-4"	5'-8"	9.51	142.7
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	15	"	10'-6"	9'-3"	15.77	236.6
F66	7	"	14'-6"	12'-0"	21.78	152.5
F74	20	"	20'-6"	Straight	30.79	615.8
G25	22	3/4" ϕ	20'-6"	"	21.38	470.4
J1	21	3/4" ϕ	15'-3"	14'-7"	10.19	214.0
J3	21	"	16'-6"	15'-3"	11.02	231.4
				TOTAL 1		2703*
				TOTAL 5		13514*
SHEET 933-12.3/21 MONOLITHS NOS. 2 & 3						
F3	8	3/4" ϕ	12'-8"	12'-0"	19.03	152.2
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	15	"	10'-6"	9'-3"	15.77	236.6

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F66	7	3/4" ϕ	14'-6"	12'-0"	21.78	152.5
F68	4	"	19'-6"	Straight	29.29	117.2
F70	8	"	21'-0"	"	31.54	252.3
F71	2	"	20'-9"	"	31.17	62.3
F72	2	"	20'-3"	"	30.42	60.8
F73	2	"	20'-0"	"	30.04	60.1
F74	2	"	20'-6"	"	30.79	61.6
G2	22	3/4" ϕ	19'-9"	"	20.60	453.2
J1	20	3/4" ϕ	15'-3"	14'-7"	10.19	203.8
J3	20	"	16'-6"	15'-3"	11.02	220.4
				TOTAL 1		2647*
				TOTAL 2		5294*
SHEET 933-12.3/22 MONOLITHS NOS.10 & 11						
F3	9	3/4" ϕ	12'-8"	12'-0"	19.03	171.3
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	15	"	6'-4"	5'-8"	9.51	142.7
F11	17	"	15'-10"	14'-7"	23.78	404.3
F12	15	"	10'-6"	9'-3"	15.77	236.6
F66	7	"	14'-6"	12'-0"	21.78	152.5
F70	14	"	21'-0"	Straight	31.54	441.6
F71	6	"	20'-9"	"	31.17	187.0
G26	22	5/8" ϕ	20'-9"	"	21.64	476.1
J1	21	3/4" ϕ	15'-3"	14'-7"	10.19	214.0
J3	22	"	16'-6"	15'-3"	11.02	242.4
				TOTAL 1		2769*
				TOTAL 2		5537*
SHEET 933-12.3/23 MONOLITH NO.13						
F3	9	3/4" ϕ	12'-8	12'-0"	19.03	171.3
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	16	"	6'-4"	5'-8"	9.51	152.2
F11	17	"	15'-10"	14'-7"	23.78	404.3
F12	16	"	10'-6"	9'-3"	15.77	252.3
F66	8	"	14'-6"	12'-0"	21.78	174.2
F67	4	"	21'-6"	Straight	32.29	129.2
F68	16	"	21'-3"	"	31.92	510.7
G24	22	3/4" ϕ	21'-6"	"	22.42	493.2
J1	22	3/4" ϕ	15'-3"	14'-7"	10.19	224.2
J3	22	"	16'-6"	15'-3"	11.02	242.4
				TOTAL		2854*
SHEET 933-12.3/24 MONOLITH NO.14						
D1	6	1" ϕ	6'-3"	Straight	16.69	100.1
E1	4	3/4" ϕ	12'-10"	12'-0"	26.25	104.9
E2	2	"	8'-6"	7'-8"	17.37	34.7
E3	6	"	6'-6"	5'-8"	13.29	79.7
E4	6	"	15'-10"	14'-7"	32.36	194.2
E5	6	"	10'-6"	9'-3"	21.46	128.8
F2	16	3/4" ϕ	19'-3"	Straight	28.91	462.6
F3	6	"	12'-8"	12'-0"	19.03	114.2

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F4	4	3/4" ϕ	8'-4"	7'-8"	12.52	50.1
F5	6	"	6'-4"	5'-8"	9.51	57.1
F6	7	"	8'-7"	7'-9"+ 7'-9"+	12.89	90.2
F7	6	"	14'-0"	10'-8" 10'-8"	21.03	126.2
F8	3	"	19'-9"	Straight	29.66	89.0
F11	12	"	15'-10"	14'-7"	23.78	285.4
F12	11	"	10'-6"	9'-3"	15.77	173.5
G1	36	3/4" ϕ	8'-2"	7'-7"	8.52	306.7
G2	4	"	19'-9"	Straight	20.60	82.4
J1	12	3/4" ϕ	15'-3"	14'-7"	10.19	122.3
J2	8	"	14'-8	14'-0"	9.80	78.4
J3	20	"	16'-6"	15'-3"	11.02	220.4
				TOTAL		2981*
SHEET 933-12.3/25 MONOLITHS NOS.15 & 18						
F3	8	3/4" ϕ	12'-8"	12'-0"	19.03	152.2
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F7	7	"	14'-0"	10'-8" 10'-8"	21.03	147.2
F8	19	"	19'-9"	Straight	29.66	563.5
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	14	"	10'-6"	9'-3"	15.77	220.8
G2	22	3/4" ϕ	19'-9"	Straight	20.60	453.2
J2	20	3/4" ϕ	14'-8"	14'-0"	9.80	196.0
J3	20	"	16'-6"	15'-3"	11.02	220.4
				TOTAL 1		2567*
				TOTAL 2		5134*
MONOLITH NO. 17						
F3	8	3/4" ϕ	12'-8"	12'-0"	19.03	152.2
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F7	7	"	14'-0"	10'-8" 10'-8"	21.03	147.2
F8	19	"	19'-9"	Straight	29.66	563.5
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	14	"	10'-6"	9'-3"	15.77	220.8
G2	22	3/4" ϕ	19'-9"	Straight	20.60	453.2
J2	20	3/4" ϕ	14'-8"	14'-0"	9.80	196.0
J3	20	"	16'-6"	15'-3"	11.02	220.4
J5	6	"	3'-4"	Straight	2.29	17.8
				TOTAL		2565*
MONOLITH NO. 19						
F3	10	3/4" ϕ	12'-8"	12'-0"	19.03	190.3
F4	9	"	8'-4"	7'-8"	12.52	112.7
F5	16	"	6'-4"	5'-8"	9.51	152.2
F7	8	"	14'-0"	10'-8" 10'-8"	21.03	168.2
F11	15	"	15'-10"	14'-7"	23.78	356.7
F12	16	"	10'-6"	9'-3"	15.77	252.3
F18	18	"	23'-3"	Straight	34.92	628.6
F14	1	"	23'-3"	18'-5"	34.92	34.9

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
* F15	2	3/4" ϕ	16'-0"	14'-9"	24.03	48.1
F16	2	"	16'-2"	14'-11"	24.28	48.6
G3	11	3/4" ϕ	23'-3"	Straight	34.92	384.2
G4	4	"	23'-3"	18'-5" 18'-5"	34.92	97.0
G5	4	"	23'-3"	18'-5" 18'-5"	34.92	97.0
G6	3	"	23'-3"	18'-5" 18'-5"	34.92	72.6
J1	2	3/4" ϕ	15'-3"	14'-7"	10.19	20.4
J2	19	"	14'-8"	14'-0"	9.80	186.2
J3	24	"	16'-6"	15'-3"	11.02	264.5
J4	3	"	15'-6"	14'-10"	10.35	31.1
				TOTAL		3028*
SHEET 933-12.3/26 MONOLITH NO. 16						
C1	8	1" ϕ	6'-3"	Straight	21.25	170.0
E1	6	3/4" ϕ	12'-10"	12'-0"	26.23	157.4
E3	4	"	6'-6"	5'-8"	13.29	53.2
E4	6	"	15'-10"	14'-7"	32.36	194.2
E5	4	"	10'-6"	9'-3"	21.46	85.8
F3	5	3/4" ϕ	12'-8"	12'-0"	19.03	95.2
F4	4	"	8'-4"	7'-8"	12.52	50.1
F5	9	"	6'-4"	5'-8"	9.51	85.6
F7	7	"	14'-0"	10'-8" 10'-8"	21.03	147.2
F8	19	"	19'-9"	Straight	29.66	563.5
F11	11	"	15'-10"	14'-7"	23.78	261.6
F12	11	"	10'-6"	9'-3"	15.77	173.5
F17	4	"	6'-10"	5'-8"	10.26	41.0
G2	8	3/4" ϕ	19'-9"	Straight	20.60	164.8
G7	14	"	15'-0"	14'-0"	15.65	219.1
G8	14	"	3'-3"	2'-5"	3.56	49.8
J2	20	3/4" ϕ	14'-8"	14'-0"	9.80	196.0
J3	20	"	16'-6"	15'-3"	11.02	220.4
				TOTAL		2939*
SHEET 933-12.3/27 MONOLITH NO. 101						
F4	11	3/4" ϕ	8'-4"	7'-8"	12.52	137.7
F5	18	"	6'-4"	5'-8"	9.51	171.2
F9	16	"	25'-6	Straight	38.30	612.8
F10	19	"	12'-2"	11'-6"	18.27	347.1

* F5 in Top Reinforcing Plan should be F15, Sheet 933-12.3/25

778

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "a"

REINFORCEMENT SCHEDULE

SHEET 1 OF 13 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. 1941

SUBMITTED: [signature] CHIEF, DESIGN BRANCH

APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH, FLOOD CONTROL BRANCH

APPROVED: [signature] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

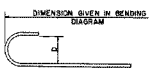
DR. BY P.B. TR. BY P.B. CK. BY K.B.E.

"BELIEVE AS BUILT" 933-14.1/1

REINFORCEMENT SCHEDULE

SIZE	D
1"	8"
1 1/8"	7"
1 1/4 OR 1 3/4 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM



BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
MONOLITH NO. 101 (CONT'D.)						
F20	20	3/4"ϕ	17'-2"	16'-6"	25.78	515.6
F44	13	"	14'-2"	13'-6"	21.28	404.3
F65	2	"	23'-9"	Straight	35.67	71.3
F64	8	"	6'-0"	1'-4" 3'-8"	9.01	72.1
G31	24	3/4"ϕ	25'-6"	Straight	26.60	638.4
J8	26	3/4"ϕ	19'-2"	18'-6"	12.80	332.8
J11	26	"	14'-7"	13'-6"	9.74	253.2
				TOTAL		3557*
SHEET 933-12.3/28 MONOLITHS NOS.102,103 & 104						
F4	7	3/4"ϕ	8'-4"	7'-8"	12.52	87.6
F5	14	"	6'-4"	5'-8"	9.51	133.1
F8	18	"	19'-9"	Straight	29.66	533.9
F10	15	"	17'-2"	16'-6"	25.78	386.7
F44	15	"	14'-2"	13'-6"	21.28	319.2
F61	14	"	12'-2"	11'-6"	18.27	255.8
G2	24	3/4"ϕ	19'-9"	Straight	29.60	494.4
J8	20	3/4"ϕ	19'-2"	18'-6"	12.80	256.0
J11	20	"	14'-7"	13'-6"	9.74	194.8
				TOTAL 1		3662*
				TOTAL 3		7985*
MONOLITH NO. 105						
D1	16	1"ϕ	6'-3"	Straight	16.69	267.0
E2	6	3/4"ϕ	8'-6"	7'-8"	17.37	104.2
E11	9	"	14'-3"	13'-5"	29.13	262.2
F4	1	3/4"ϕ	8'-4"	7'-8"	12.52	12.5
F5	3	"	6'-4"	5'-8"	9.51	28.5
F8	18	"	19'-9"	Straight	29.66	533.9
F20	15	"	17'-2"	16'-6"	25.78	386.7
F44	9	"	14'-2"	13'-6"	21.28	191.5
F61	14	"	12'-2"	11'-6"	18.27	255.8
F82	12	"	15'-7"	3'-9" 3'-9"	23.41	280.9
G2	10	3/4"ϕ	19'-9"	Straight	29.60	296.0
G19	8	"	5'-4"	4'-1"	5.56	44.5
G20	6	"	5'-6"	4'-1"	5.74	34.4
G21	8	"	8'-6"	7'-3"	8.87	71.0
G30	6	"	8'-8"	7'-3"	9.06	54.2
J8	20	3/4"ϕ	19'-2"	18'-6"	12.80	256.0
J11	20	"	14'-7"	13'-6"	9.74	194.8
				TOTAL		3184*
SHEET 933-12.3/29 MONOLITH NO. 106						
F4	7	3/4"ϕ	8'-4"	7'-8"	12.52	87.6
F5	14	"	6'-4"	5'-8"	9.51	133.1

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F8	18	3/4"ϕ	19'-9"	Straight	29.66	533.9
F20	18	"	17'-2"	16'-6"	25.78	463.8
F44	18	"	14'-2"	13'-6"	21.28	383.0
F61	14	"	12'-2"	11'-6"	18.27	255.8
F65	4	"	9'-9"	Straight	14.69	58.8
G2	24	3/4"ϕ	19'-9"	"	29.60	494.4
J8	20	3/4"ϕ	19'-2"	18'-6"	12.80	256.0
J11	28	"	14'-7"	13'-6"	9.74	272.7
				TOTAL		2642*
SHEET 933-12.3/30 MONOLITH NO. 286						
D2	16	1"ϕ	17'-5"	16'-6"	46.50	744.0
D14	14	"	15'-2"	14'-3"	40.50	567.0
F4	11	3/4"ϕ	8'-4"	7'-8"	12.52	137.7
F5	22	"	6'-4"	5'-8"	9.51	209.2
F44	20	"	14'-2"	13'-6"	21.28	425.6
F65	18	"	22'-6"	Straight	33.80	608.4
F46	9	"	5'-9"	13" 3'-8"	8.64	77.8
G18	24	3/4"ϕ	22'-6"	Straight	33.47	803.3
J8	23	3/4"ϕ	19'-2"	18'-6"	12.80	294.4
J11	23	"	14'-7"	13'-6"	9.74	224.0
				TOTAL		3851*
MONOLITHS NOS. 287, 288 & 289						
D2	16	1"ϕ	17'-5"	16'-6"	46.50	744.0
D14	14	"	15'-2"	14'-3"	40.50	567.0
F4	11	3/4"ϕ	8'-4"	7'-8"	12.52	137.7
F5	22	"	6'-4"	5'-8"	9.51	209.2
F44	20	"	14'-2"	13'-6"	21.28	425.6
F65	18	"	22'-6"	Straight	33.80	608.4
G18	24	3/4"ϕ	22'-6"	"	33.47	803.3
J8	23	3/4"ϕ	19'-2"	18'-6"	12.80	294.4
J11	23	"	14'-7"	13'-6"	9.74	224.0
				TOTAL 1		3774*
				TOTAL 3		11,321*
SHEET 933-12.3/31 MONOLITH NO. 290						
D2	18	1"ϕ	17'-5"	16'-6"	46.50	837.0
D14	17	"	15'-2"	14'-3"	40.50	688.5
F4	13	3/4"ϕ	8'-4"	7'-8"	12.52	162.8
F5	25	"	6'-4"	5'-8"	9.51	237.8
F44	23	"	14'-2"	13'-6"	21.28	489.4
F64	8	"	6'-0"	1'-4" 3'-8"	9.01	72.1
F85	18	"	26'-0"	Straight	39.05	702.9
G48	24	3/4"ϕ	26'-0"	"	27.12	650.9
J9	26	3/4"ϕ	19'-2"	18'-6"	12.80	332.8
J11	26	"	14'-7"	13'-6"	9.74	253.2
				TOTAL		4427*
SHEET 933-12.3/33 MONOLITH NO. 157						
F9	4	3/4"ϕ	25'-6"	Straight	38.30	153.2
F18	2	"	27'-9"	"	41.68	83.4

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F19	2	3/4"ϕ	27'-3"	Straight	40.93	81.9
F30	2	"	26'-3"	"	39.43	78.9
F81	1	"	28'-6"	"	42.81	42.8
F82	3	"	25'-0"	"	37.55	112.7
G32	24	3/4"ϕ	10'-9"	9'-7"	16.69	256.6
G33	14	"	4'-9"	3'-7"	4.43	62.0
J12	8	3/4"ϕ	27'-3"	Straight	18.20	145.6
J13	8	"	27'-9"	"	18.54	148.3
J14	14	"	6'-9"	"	4.51	63.1
J15	13	"	3'-9"	"	2.50	32.5
J16	14	"	8'-9"	8'-1"	5.84	81.8
J17	13	"	10'-9"	9'-5"	7.18	93.3
J18	1	"	11'-0"	10'-4"	7.35	7.4
* J19	1	"	7'-3"	Straight	4.84	4.8
J20	26	"	11'-3"	10'-7"	7.51	195.3
				TOTAL		1644*
SHEET 933-12.3/34 MONOLITHS NOS.160 & 161						
F37	2	3/4"ϕ	16'-6"	Straight	24.78	49.6
F38	1	"	15'-6"	"	23.28	23.3
F58	2	"	16'-3"	"	24.41	48.8
F60	2	"	16'-0"	"	24.03	48.1
F83	3	"	16'-9"	"	25.16	75.5
F84	4	"	17'-9"	"	25.91	103.6
G32	15	3/4"ϕ	10'-3"	9'-7"	10.69	160.4
G33	8	"	4'-3"	3'-7"	4.43	35.4
J14	10	3/4"ϕ	6'-9"	Straight	4.51	45.1
J15	8	"	3'-9"	"	2.50	20.0
J16	8	"	8'-9"	8'-1"	5.84	46.7
J17	10	"	10'-9"	9'-5"	7.18	71.8
J20	18	"	11'-3"	10'-7"	7.51	135.2
J21	8	"	16'-3"	Straight	10.85	86.8
J36	8	"	16'-0"	"	10.69	85.5
				TOTAL 1		1036*
				TOTAL 2		2072*
MONOLITHS NOS. 158, 159, 162 & 163						
F8	14	3/4"ϕ	19'-9"	Straight	29.66	415.2
G32	17	3/4"ϕ	10'-3"	9'-7"	10.69	181.7
G33	10	"	4'-3"	3'-7"	4.43	44.3
J14	11	3/4"ϕ	6'-9"	Straight	4.51	49.6
J15	10	"	3'-9"	"	2.50	25.0
J16	10	"	8'-9"	8'-1"	5.84	58.4
J17	11	"	10'-9"	9'-5"	7.18	79.0
J20	21	"	11'-3"	10'-7"	7.51	157.7
J29	18	"	19'-9"	Straight	13.19	211.0
				TOTAL 1		1222*
				TOTAL 4		4888*
MONOLITH NO. 164						
D19	2	1"ϕ	11'-4"	9'-6"	30.26	60.5

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F8	14	3/4"ϕ	19'-9"	Straight	29.66	415.2
G32	17	3/4"ϕ	10'-3"	9'-7"	10.69	181.7
G33	10	"	4'-3"	3'-7"	4.43	44.3
J14	11	3/4"ϕ	6'-9"	Straight	4.51	49.6
J15	10	"	3'-9"	"	2.50	25.0
J18	10	"	8'-0"	7'-4"	5.84	58.4
J17	11	"	10'-9"	9'-5"	7.18	79.0
J20	21	"	11'-3"	10'-7"	7.51	157.7
J29	16	"	19'-9"	Straight	13.19	211.0
J30	9	3/4"ϕ	4'-11"	4'-1"	3.28	29.5
				TOTAL		1912*
SHEET 933-12.3/35						
MONOLITHS NOS. 166 TO 168 & 216 TO 226						
F8	14	3/4"ϕ	19'-9"	Straight	29.66	415.2
G45	7	3/4"ϕ	11'-2"	10'-6"	11.65	81.6
J9	20	3/4"ϕ	10'-9"	9'-7"	7.85	157.0
J10	12	"	11'-10"	10'-6"	7.90	94.8
J19	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J29	18	"	19'-9"	"	13.19	237.4
J31	9	"	9'-9"	9'-1"	6.51	58.6
J44	10	"	11'-2"	10'-6"	7.46	74.6
J45	8	"	6'-0"	5'-4"	4.01	32.1
J46	16	"	4'-9"	4'-1"	3.17	50.7
				TOTAL 1		1282*
				TOTAL 14		17,948
MONOLITHS NOS. 169 & 215						
D19	2	1"ϕ	10'-9"	Straight	28.76	57.4
F8	14	3/4"ϕ	19'-9"	"	29.66	415.2
G45	7	3/4"ϕ	11'-2"	10'-6"	11.65	81.6
J9	20	3/4"ϕ	11'-9"	10'-6"	7.85	157.0
J10	12	"	11'-10"	10'-6"	7.90	94.8
J19	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J29	18	"	19'-9"	"	13.19	237.4
J31	9	"	9'-9"	9'-1"	6.51	58.6

* J19 marked J12 Top Reinforcing Plan, Sheet 933-12.3/33

779

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 2 OF 13 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [illegible] Capt. C.E.

APPROVAL RECOMMENDED: [illegible] Major, Corps of Engrs. DR. BY MS. TR. BY MS.

APPROVED: [illegible] Colonel, Corps of Engrs. CH. ENGR.

"BELIEVED AS BUILT" 933-14.1/2

REINFORCEMENT SCHEDULE

SIZE	D
#	8"
3" OR 4 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
MONOLITHS NOS. 169 & 215 (CONT'D.)						
J32	10	3/4"ϕ	4'-9"	2'-0"	3.17	31.7
J44	10	"	11'-2"	10'-6"	7.46	74.6
J45	8	"	6'-0"	5'-4"	4.01	32.1
J46	16	"	4'-9"	4'-1"	3.17	50.7
				TOTAL 1		1371*
				TOTAL 2		2742*
MONOLITH NO. 227						
D19	2	1"ϕ	10'-9"	Straight	28.70	57.4
F24	14	3/4"ϕ	20'-6"	"	30.79	431.1
G45	7	5/8"ϕ	11'-2"	10'-6"	11.65	81.6
J19	21	5/8"ϕ	11'-9"		7.85	164.9
J10	13	"	11'-10"	10'-6"	7.90	102.7
J18	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J31	10	"	9'-9"	9'-1"	6.51	65.1
J32	10	"	4'-9"	2'-0"	3.17	31.7
J33	18	"	20'-6"	Straight	13.69	246.4
J44	10	"	11'-2"	10'-6"	7.46	74.6
J45	9	"	6'-0"	5'-4"	4.01	36.1
J46	17	"	4'-9"	4'-1"	3.17	53.9
				TOTAL		1425*
SHEET 933-12.3/36 MONOLITH NO. 124						
D17	2	1"ϕ	13'-4"	11'-6"	35.60	71.2
F8	3	3/4"ϕ	19'-9"	Straight	29.66	89.0
F69	6	"	19'-6"	"	29.29	175.7
F73	3	"	20'-0"	"	30.04	150.2
G35	14	5/8"ϕ	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	11	"	5'-9"	5'-1"	6.00	66.0
G43	20	"	19'-6"	Straight	20.34	406.8
J22	12	5/8"ϕ	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J26	13	"	7'-9"	Straight	5.18	67.3
J27	11	"	4'-0"	"	2.67	29.4
J30	11	"	5'-3"	2'-3"	3.51	38.6
J34	21	"	12'-4"		8.24	173.0
				TOTAL		1659*
MONOLITH NO. 125						
F8	3	3/4"ϕ	19'-9"	Straight	29.66	89.0
F69	6	"	19'-6"	"	29.29	175.7
F73	5	"	20'-0"	"	30.04	150.2
G35	14	5/8"ϕ	12'-2"	11'-6"	12.69	177.7

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G41	6	5/8"ϕ	7'-6"	6'-10"	7.82	46.9
G42	11	"	5'-9"	5'-1"	6.00	66.0
G43	20	"	19'-6"	Straight	20.34	406.8
J22	12	5/8"ϕ	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J26	13	"	7'-9"	Straight	5.18	67.3
J27	11	"	4'-0"	"	2.67	29.4
J34	21	"	12'-4"		8.24	173.0
				TOTAL		1549*
SHEET 933-12.3/37 MONOLITHS NOS. 126 TO 136 170 TO 171, 208 TO 214 & 228 TO 233						
F8	14	3/4"ϕ	19'-9"	Straight	29.66	415.2
G2	20	5/8"ϕ	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	5/8"ϕ	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J27	12	"	4'-0"	Straight	2.67	32.0
J34	20	"	12'-4"		8.24	164.8
				TOTAL 1		1550*
				TOTAL 26		40,300*
MONOLITHS NOS. 174 & 207						
D20	2	1"ϕ	11'-6"	Straight	30.71	61.4
F8	14	3/4"ϕ	19'-9"	"	29.66	415.2
G2	20	5/8"ϕ	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	5/8"ϕ	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J27	12	"	4'-0"	Straight	2.67	32.0
J32	11	5/8"ϕ	4'-9"	2'-0"	3.17	34.9
J34	20	"	12'-4"		8.24	164.8
				TOTAL 1		1646*
				TOTAL 2		3292*
MONOLITH NO. 137						
D20	2	1"ϕ	11'-6"	Straight	30.71	61.4
F8	14	3/4"ϕ	19'-9"	"	29.66	415.2
G2	20	5/8"ϕ	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	5/8"ϕ	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J27	12	5/8"ϕ	4'-0"	Straight	2.67	32.0
J34	20	"	12'-4"		8.24	164.8
J35	11	"	6'-9"	1'-9"	4.51	49.6
				TOTAL		1661*
MONOLITH NO. 234						
D20	2	1"ϕ	11'-6"	Straight	30.71	61.4
F8	14	3/4"ϕ	19'-9"	"	29.66	415.2
G2	20	5/8"ϕ	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	5/8"ϕ	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J27	12	"	4'-0"	Straight	2.67	32.0
J32	11	"	4'-9"	2'-0"	3.17	34.9
J34	20	"	12'-4"		8.24	164.8
				TOTAL		1647*
SHEET 933-12.3/38 MONOLITH NO. 172						
F97	4	3/4"ϕ	19'-0"	Straight	19.33	76.1
F98	9	"	19'-9"	"	19.15	172.4
F99	1	"	19'-9"	"	19.90	19.9
G35	10	5/8"ϕ	12'-2"	11'-6"	12.69	126.9
G41	4	"	7'-6"	6'-10"	7.82	31.3
G42	8	"	5'-9"	5'-1"	6.00	48.0
G56	20	"	19'-0"	Straight	13.56	271.2
J19	9	5/8"ϕ	7'-3"	"	4.84	43.6
J22	7	"	12'-9"	11'-5"	8.52	59.6
J24	6	"	10'-9"	10'-1"	7.18	43.1
J27	8	"	4'-0"	Straight	2.67	21.4
J34	13	"	12'-4"		8.24	107.1
				TOTAL		1029*
MONOLITH NO. 173						
F80	4	3/4"ϕ	26'-9"	Straight	39.43	157.7
F85	9	"	26'-0"	"	39.05	351.5
F96	1	"	26'-6"	"	39.80	39.8
G35	18	5/8"ϕ	12'-2"	11'-6"	12.69	228.4
G41	8	"	7'-6"	6'-10"	7.82	62.6
G42	16	"	5'-9"	5'-1"	6.00	96.0
G57	20	"	28'-8"	Straight	27.38	547.6
J19	17	5/8"ϕ	7'-3"	"	4.84	82.3
J22	14	"	12'-9"	11'-5"	8.52	119.3
J24	13	"	10'-9"	10'-1"	7.18	93.3
J27	18	"	4'-0"	Straight	2.67	48.7
J34	27	"	12'-4"		8.24	222.5
				TOTAL		2044*
SHEET 933-12.3/39 MONOLITH NO. 119						
D22	2	1"ϕ	13'-0"	Straight	34.71	69.4

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F80	4	3/4"ϕ	26'-9"	Straight	39.43	157.7
F82	2	"	25'-0"	"	37.55	75.1
F85	1	"	26'-0"	"	39.05	39.1
F91	19	"	13'-3"	12'-7"	19.90	378.1
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	16	"	5'-9"	5'-1"	8.64	138.2
F96	3	"	26'-6"	Straight	39.80	119.4
F100	5	"	13'-9"	12'-5"	20.65	103.2
F101	2	"	14'-3"	12'-11"	21.40	42.8
F102	8	"	11'-3"	10'-7"	16.90	135.2
F103	1	"	26'-9"	Straight	40.18	40.2
F104	2	"	24'-6"	"	36.80	73.6
F105	1	"	23'-6"	"	35.30	35.3
F109	2	"	25'-9"	"	38.68	77.4
G9	12	5/8"ϕ	5'-3"	"	5.48	65.8
G54	11	"	24'-9"	"	25.81	283.9
G55	14	"	9'-0"	"	9.39	131.5
G64	11	"	25'-0"	"	26.08	286.9
J18	6	3/4"ϕ	7'-3"	1'-9"	4.84	29.0
J37	28	"	13'-2"		8.80	246.4
				TOTAL		2671*
SHEET 933-12.3/40 MONOLITHS NOS. 120 TO 123, 175 TO 180, 198 TO 203, 206, 247 TO 252 & 255 TO 258						
F71	16	3/4"ϕ	20'-9"	Straight	31.17	498.7
F91	16	"	13'-3"	12'-7"	19.90	318.4
F92	6	"	7'-3"	6'-7"	10.89	65.3
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	9	"	13'-9"	12'-5"	20.65	185.9
F102	6	"	11'-3"	10'-7"	16.90	101.4
G9	10	5/8"ϕ	5'-9"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	11	"	9'-0"	"	9.39	103.3
J37	21	3/4"ϕ	13'-2"		8.80	184.8
				TOTAL 1		2110*
				TOTAL 27		56,962*

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 3 OF 13 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: CHIEF, SUB-OFFICE

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, SUB-OFFICE, FLOOD CONTROL DIVISION, OR SUB-OFFICE

APPROVED: COL. CORPS OF ENGINEERS, DISTRICT ENGINEER, OR SUB-OFFICE

"BELIEVED AS BUILT" 933-14.1/3

780

127

REINFORCEMENT SCHEDULE

SIZE	D
1½	10"
1¼	9"
1	8"
¾	7"
½ OR ⅜ LESS	6"

MONOLITHS NOS. 181 & 259

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D21	2	1"φ	12'-9"	Straight	34.04	68.1
F71	16	¾"φ	20'-9"	"	31.17	498.7
F91	16	"	13'-9"	12'-7"	19.90	318.4
F92	6	"	7'-3"	6'-7"	10.89	65.3
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	9	"	13'-9"	12'-5"	20.65	185.9
F102	6	"	11'-3"	10'-7"	16.90	101.4
G9	10	¾"φ	5'-3"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	11	"	9'-0"	"	9.39	103.3
J32	11	¾"φ	4'-9"	2'-10"; 1'-9"	3.17	34.9
J37	21	"	13'-2"	4'-3"; 8'-7"	8.80	184.8
				TOTAL 1		2213
				TOTAL 2		4425

MONOLITH NO. 246

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F64	4	¾"φ	6'-0"	1'-6"; 4'-6"	9.01	36.0
F71	16	"	20'-9"	Straight	31.17	498.7
F91	18	"	13'-3"	12'-7"	19.90	358.2
F92	6	"	7'-3"	6'-7"	10.89	65.3
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	9	"	13'-9"	12'-5"	20.65	185.8
F102	6	"	11'-3"	10'-7"	16.90	101.4
G9	10	¾"φ	5'-3"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	11	"	9'-0"	"	9.39	103.3
J37	21	¾"φ	13'-2"	4'-3"; 8'-7"	8.80	184.8
J49	6	"	9'-0"	4'-9"; 4'-3"	6.01	36.1
				TOTAL		3221 *

SHEET 933-12.3/41 MONOLITH NO. 204

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F13	4	¾"φ	23'-3"	Straight	34.92	139.7
F76	2	"	23'-0"	"	34.55	69.1
F91	17	"	13'-3"	12'-7"	19.90	338.3
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	15	"	5'-9"	5'-1"	8.64	129.6
F100	9	"	13'-9"	12'-5"	20.65	185.9
F102	7	"	11'-3"	10'-7"	16.90	118.3
F105	9	"	23'-0"	Straight	35.30	317.7
F107	1	"	22'-9"	"	34.17	34.2
G3	11	¾"φ	23'-3"	"	24.25	266.8
G9	11	"	5'-3"	"	5.48	60.3
G55	13	"	9'-0"	"	9.39	122.1

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G61	11	¾"φ	23'-0"	Straight	23.99	263.9
J37	24	¾"φ	13'-2"	4'-3"; 8'-7"	8.80	211.2
				TOTAL		2344

MONOLITH NO. 205

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F68	9	¾"φ	21'-3"	Straight	31.92	287.3
F70	2	"	21'-0"	"	31.54	63.1
F71	4	"	20'-9"	"	31.17	124.7
F74	1	"	20'-6"	"	30.79	30.8
F91	16	"	13'-3"	12'-7"	19.90	318.4
F92	7	"	7'-3"	6'-7"	10.89	76.2
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	8	"	13'-9"	12'-5"	20.65	165.2
F102	7	"	11'-3"	10'-7"	16.90	118.3
G9	10	¾"φ	5'-3"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	12	"	9'-0"	"	9.39	112.7
J37	22	¾"φ	13'-2"	4'-3"; 8'-7"	8.80	193.6
				TOTAL		2142 *

SHEET 933-12.3/42 MONOLITH NO. 235

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F2	2	¾"φ	18'-9"	Straight	28.91	57.8
F8	1	"	19'-9"	"	29.66	29.7
F45	1	"	22'-6"	"	33.80	33.8
F67	2	"	21'-6"	"	32.29	64.6
F69	2	"	19'-6"	"	29.29	58.6
F70	2	"	21'-0"	"	31.54	63.1
F72	2	"	20'-3"	"	30.42	60.8
F91	16	"	13'-3"	12'-7"	19.90	318.4
F92	7	"	7'-3"	6'-7"	10.89	76.2
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	7	"	13'-9"	12'-5"	20.65	144.6
F101	1	"	14'-3"	12'-11"	21.40	21.4
F102	7	"	11'-3"	10'-7"	16.90	118.3
F108	4	"	19'-0"	Straight	28.54	114.2
G9	11	¾"φ	5'-3"	"	5.48	60.3
G27	11	"	21'-3"	"	22.16	243.8
G55	11	"	9'-0"	"	9.39	103.3
G62	11	"	21'-0"	"	21.90	240.9
J37	20	¾"φ	13'-2"	4'-3"; 8'-7"	8.80	176.0
				TOTAL		2107 *

SHEET 933-12.3/43 MONOLITH NO. 236

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D23	2	1"φ	12'-6"	Straight	33.38	66.8
F64	4	¾"φ	6'-0"	1'-6"; 4'-6"	9.01	36.0
F85	11	"	26'-0"	Straight	39.05	429.6
F91	21	"	13'-3"	12'-7"	19.90	417.9
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	17	"	5'-9"	5'-1"	8.64	146.9
F100	10	"	13'-9"	12'-5"	20.65	206.5
F102	8	"	11'-3"	10'-7"	16.90	135.2

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	*BENDING DIAGRAM	WT. EACH	TOTAL WT.
F109	5	¾"φ	25'-9"	Straight	38.68	193.4
G9	12	¾"φ	5'-3"	"	5.48	65.8
G55	14	"	9'-0"	"	9.39	131.5
G63	22	"	25'-9"	"	26.86	590.9
J35	6	¾"φ	6'-9"	5'-3"; 1'-6"	4.51	27.1
J37	26	"	13'-2"	4'-3"; 8'-7"	8.80	228.8
J43	6	"	9'-0"	4'-3"; 4'-9"	6.01	36.1
				TOTAL		2800 *

SHEET 933-12.3/44 MONOLITH NO. 253

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D21	2	1"φ	12'-9"	Straight	34.04	68.1
F80	2	¾"φ	26'-3"	"	39.43	78.9
F82	1	"	25'-0"	"	37.55	37.6
F85	2	"	26'-0"	"	39.05	78.1
F91	19	"	13'-3"	12'-7"	19.90	378.1
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	17	"	5'-9"	5'-1"	8.64	146.9
F96	2	"	26'-6"	Straight	39.80	79.6
F100	10	"	13'-9"	12'-5"	20.65	206.5
F102	8	"	11'-3"	10'-7"	16.90	135.2
F109	3	"	26'-9"	Straight	40.18	120.5
F109	2	"	25'-9"	"	38.68	77.4
F110	4	"	27'-0"	"	40.55	162.2
G9	13	¾"φ	5'-3"	"	5.48	71.2
G48	11	"	26'-0"	"	27.12	298.3
G55	14	"	9'-0"	"	9.39	131.5
G63	11	"	25'-9"	"	26.86	295.5
J26	6	¾"φ	7'-3"	4'-3"; 2'-9"	4.84	29.0
J37	27	"	13'-2"	4'-3"; 8'-7"	8.80	237.6
				TOTAL		2719 *

SHEET 933-12.3/45 MONOLITH NO. 254

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F19	1	¾"φ	21'-9"	Straight	32.67	32.7
F67	1	"	21'-6"	"	32.29	32.3
F68	2	"	21'-3"	"	31.92	63.8
F70	1	"	21'-0"	"	31.54	31.5
F71	1	"	20'-9"	"	31.17	31.2
F72	3	"	20'-3"	"	30.42	91.3
F78	6	"	20'-0"	"	30.04	180.2
F75	1	"	22'-3"	"	33.42	33.4
F91	16	"	13'-3"	12'-7"	19.90	318.4
F92	7	"	7'-3"	6'-7"	10.89	76.2
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	8	"	13'-9"	12'-5"	20.65	165.2
F102	7	"	11'-3"	10'-7"	16.90	118.3
G9	10	¾"φ	5'-3"	Straight	5.48	54.8
G24	11	"	21'-6"	"	32.42	246.6
G27	11	"	21'-3"	"	22.16	243.8
G55	12	"	9'-0"	"	9.39	112.7
J37	21	¾"φ	13'-2"	4'-3"; 8'-7"	8.80	184.8

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
				TOTAL		2138 *

SHEET 933-12.3/46 MONOLITH NO. 96

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	14	¾"φ	14'-0"	2'-9"; 11'-3"	21.09	294.4
F4	1	"	8'-4"	7'-8"	12.52	12.5
F8	15	"	19'-9"	Straight	29.66	444.9
F19	1	"	21'-9"	"	32.67	32.7
F71	1	"	20'-9"	"	31.17	31.2
G2	28	¾"φ	19'-9"	"	20.60	494.4
G28	21	"	14'-2"	13'-6"	14.78	310.4
G36	10	"	8'-6"	7'-10"	8.87	88.7
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	11	"	14'-10"	13'-6"	15.47	170.2
G42	19	"	5'-9"	5'-1"	6.00	114.0
J23	19	¾"φ	5'-9"	Straight	3.84	73.0
J25	21	"	9'-6"	"	6.35	133.4
				TOTAL		2930 *

SHEET 933-12.3/47 MONOLITHS NOS. 97, 99 & 107

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	15	¾"φ	14'-0"	2'-9"; 11'-3"	21.09	315.5
F67	17	"	21'-6"	Straight	32.29	548.9
G24	24	¾"φ	21'-6"	"	32.42	538.1
G28	24	"	14'-2"	13'-6"	14.78	354.7
G36	11	"	8'-6"	7'-10"	8.87	97.6
G37	20	"	6'-0"	5'-4"	6.26	125.2
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	12	"	14'-10"	13'-6"	15.47	185.6
J23	21	¾"φ	5'-9"	Straight	3.84	80.6
J25	22	"	9'-6"	"	6.35	139.7
				TOTAL 1		2516 *
				TOTAL 3		7549 *

MONOLITH NO. 98

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	15	¾"φ	14'-0"	2'-9"; 11'-3"	21.09	315.5
F19	6	"	21'-9"	Straight	32.67	130.7
F67	3	"	21'-6"	"	32.29	96.9
F68	2	"	21'-3"	"	31.92	63.8
F70	1	"	21'-0"	"	31.54	31.5
F71	1	"	20'-9"	"	31.17	31.2
F77	7	"	22'-0"	"	33.04	231.3

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 4 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN

APPROVED: [signature] COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY P.S. TR. BY P.S. CK. BY F.S.F.

"BELIEVED AS BUILT" 933-14.1/4

781

REINFORCEMENT SCHEDULE

SIZE	D
1 1/2"	10"
1 1/8"	9"
1"	8"
7/8"	7"
3/4" OR 3/4" LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

MONOLITH NO. 98 (CONT'D.)

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G24	24	3/4"φ	21'-6"	Straight	22.42	538.1
G28	24	"	14'-2"	13'-6"	14.78	354.7
G36	11	"	8'-6"	7'-10"	8.87	97.6
G37	20	"	6'-0"	5'-4"	6.26	125.2
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	12	"	14'-10"	13'-6"	15.47	185.6
J23	21	3/4"φ	5'-9"	Straight	3.84	80.6
J25	22	"	9'-6"	"	6.35	139.7
				TOTAL		2522#

MONOLITH NO. 100

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	15	3/4"φ	14'-0"	13'-6"	21.03	315.5
F64	5	"	5'-6"	1'-6" 1/2"	8.26	41.3
F67	17	"	21'-6"	Straight	32.29	548.9
G24	24	3/4"φ	21'-6"	"	22.42	538.1
G28	24	"	14'-2"	13'-6"	14.78	354.7
G36	11	"	8'-6"	7'-10"	8.87	97.6
G37	20	"	6'-0"	5'-4"	6.26	125.2
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	13	"	14'-10"	13'-6"	15.47	201.1
J23	21	3/4"φ	5'-9"	Straight	3.84	80.6
J25	22	"	9'-6"	"	6.35	139.7
				TOTAL		2573#

SHEET 933-12.3/48 MONOLITHS NOS. 260 & 261

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	14	3/4"φ	14'-0"	13'-6"	21.03	294.4
F68	1	"	21'-3"	Straight	31.92	31.9
F69	7	"	19'-6"	"	29.29	205.0
F70	1	"	21'-0"	"	31.54	31.5
F71	1	"	20'-9"	"	31.17	31.2
F73	4	"	20'-0"	"	30.04	120.2
F74	3	"	20'-6"	"	30.79	92.4
G24	24	3/4"φ	20'-9"	"	21.64	519.4
G28	22	"	14'-2"	13'-6"	14.78	325.2
G36	11	"	8'-6"	7'-10"	8.87	97.6
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	12	"	14'-10"	13'-6"	15.47	185.6
G42	20	"	5'-9"	5'-1"	6.00	120.0
J29	20	3/4"φ	5'-9"	Straight	3.84	76.8
J25	22	"	9'-6"	"	6.35	139.7
				TOTAL 1		2401#
				TOTAL 2		4803#

REINFORCEMENT SCHEDULE

MONOLITHS NOS. 108 TO 112, 138 TO 140 142, 182, 183, 262 TO 270 & 273

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	14	3/4"φ	14'-0"	13'-6"	21.03	294.4
F71	17	"	20'-9"	Straight	31.17	529.9
G26	24	3/4"φ	20'-9"	"	21.64	519.4
G28	22	"	14'-2"	13'-6"	14.78	325.2
G36	11	"	8'-6"	7'-10"	8.87	97.6
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	12	"	14'-10"	13'-6"	15.47	185.6
G42	20	"	5'-9"	5'-1"	6.00	120.0
J23	20	3/4"φ	5'-9"	Straight	3.84	76.8
J25	22	"	9'-6"	"	6.35	139.7
				TOTAL 1		2419#
				TOTAL 21		50,799

SHEET 933-12.3/49 MONOLITH NO. 272

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	11	3/4"φ	14'-0"	13'-6"	21.03	231.3
F38	17	"	15'-6"	Straight	23.28	395.7
G23	24	3/4"φ	15'-6"	"	16.17	388.1
G28	16	"	14'-2"	13'-6"	14.78	236.5
G36	7	"	8'-6"	7'-10"	8.87	62.1
G37	15	"	6'-0"	5'-4"	6.26	93.9
G38	7	"	12'-6"	11'-10"	13.04	91.3
G39	9	"	14'-10"	13'-6"	15.47	139.2
J23	15	3/4"φ	5'-9"	Straight	3.84	57.6
J25	16	"	9'-6"	"	6.35	101.6
				TOTAL		1797#

MONOLITH NO. 113

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	12	3/4"φ	14'-0"	13'-6"	21.03	252.4
F86	17	"	18'-0"	Straight	27.04	459.7
G28	20	3/4"φ	14'-2"	13'-6"	14.78	295.6
G36	9	"	8'-6"	7'-10"	8.87	79.8
G37	16	"	6'-0"	5'-4"	6.26	112.7
G38	9	"	12'-6"	11'-10"	13.04	117.4
G39	10	"	14'-10"	13'-6"	15.47	139.2
G47	24	"	18'-0"	Straight	18.77	450.5
J23	17	3/4"φ	5'-9"	"	3.84	65.3
J25	18	"	9'-6"	"	6.35	114.3
				TOTAL		2087#

MONOLITH NO. 117

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	15	3/4"φ	14'-0"	13'-6"	21.03	315.5
F45	2	"	22'-6"	Straight	33.80	67.6
F67	9	"	21'-6"	"	32.29	290.6
F75	4	"	22'-9"	"	33.42	133.7
F77	2	"	22'-0"	"	33.04	66.1
G28	24	3/4"φ	14'-2"	13'-6"	14.78	354.7
G36	11	"	8'-6"	7'-10"	8.87	97.6
G37	22	"	6'-0"	5'-4"	6.26	137.7
G38	8	"	12'-6"	11'-10"	13.04	143.4

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G39	12	3/4"φ	14'-10"	13'-6"	15.47	185.6
G49	24	"	22'-3"	Straight	23.21	557.0
J23	22	3/4"φ	5'-9"	"	3.84	84.5
J25	23	"	9'-6"	"	6.35	146.1
				TOTAL		2580#

MONOLITHS NOS. 114 TO 116

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	15	3/4"φ	14'-0"	13'-6"	21.03	315.5
F75	17	"	22'-3"	Straight	33.42	568.1
G28	24	3/4"φ	14'-2"	13'-6"	14.78	354.7
G36	11	"	8'-6"	7'-10"	8.87	97.6
G37	22	"	6'-0"	5'-4"	6.26	137.7
G38	11	"	12'-6"	11'-10"	13.04	143.4
G39	12	"	14'-10"	13'-6"	15.47	185.6
G49	24	"	22'-3"	Straight	23.21	557.0
J23	22	3/4"φ	5'-9"	"	3.84	84.5
J25	23	"	9'-6"	"	6.35	146.1
				TOTAL 1		2590#
				TOTAL 3		7771#

MONOLITH NO. 141

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	18	3/4"φ	14'-0"	13'-6"	21.03	378.5
F85	17	"	26'-0"	Straight	39.05	663.9
G28	28	3/4"φ	14'-2"	13'-6"	14.78	413.8
G36	13	"	8'-6"	7'-10"	8.87	115.3
G37	24	"	6'-0"	5'-4"	6.26	150.2
G38	12	"	12'-6"	11'-10"	13.04	156.5
G39	14	"	14'-10"	13'-6"	15.47	216.6
G48	24	"	26'-0"	Straight	27.12	650.9
J23	26	3/4"φ	5'-9"	"	3.84	99.8
J25	25	"	9'-6"	"	6.35	158.8
				TOTAL		3004#

SHEET 933-12.3/50 MONOLITH NO. 118

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	13	3/4"φ	14'-0"	13'-6"	21.03	273.4
F2	1	"	18'-3"	Straight	26.91	26.9
F19	2	"	21'-9"	"	32.67	65.3
F45	2	"	22'-6"	"	33.80	67.6
F69	1	"	19'-6"	"	29.29	29.3
F72	1	"	20'-3"	"	30.42	30.4
F74	1	"	20'-6"	"	30.79	30.8
F99	4	"	18'-3"	"	27.41	109.6
F95	1	"	24'-9"	"	37.17	37.2
F105	1	"	23'-6"	"	35.30	35.3
F106	3	"	18'-9"	"	28.16	84.5
G13	12	3/4"φ	21'-9"	"	22.69	272.3
G16	12	"	22'-6"	"	23.47	281.6
G28	24	"	14'-2"	13'-6"	14.78	354.7
G36	10	"	8'-6"	7'-10"	8.87	88.7
G37	22	"	6'-0"	5'-4"	6.26	137.7
G38	10	"	12'-6"	11'-10"	13.04	130.4

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G39	10	3/4"φ	14'-10"	13'-6"	15.47	154.7
G58	1	"	16'-3"	14'-11"	16.95	17.0
G59	1	"	15'-3"	13'-11"	15.91	15.9
G60	1	"	13'-3"	12'-7"	13.82	13.8
J23	21	3/4"φ	5'-9"	Straight	3.84	80.6
J25	19	"	9'-6"	"	6.35	120.7
J38	1	"	10'-9"	"	7.18	7.2
J39	1	"	10'-3"	"	6.85	6.9
J40	1	"	9'-9"	"	6.51	6.5
J42	2	"	6'-0"	"	4.01	8.0
				TOTAL		2469#

SHEET 933-12.3/51 MONOLITH NO. 184

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	15	3/4"φ	14'-0"	13'-6"	21.03	315.5
F64	4	"	6'-0"	1'-6" 1/2"	9.01	36.0
F71	17	"	20'-9"	Straight	31.17	529.9
G26	24	3/4"φ	20'-9"	"	21.64	519.4
G28	24	"	14'-2"	13'-6"	14.78	354.7
G36	11	"	8'-6"	7'-10"	8.87	97.6
G37	20	"	6'-0"	5'-4"	6.26	125.2
G38	11	"	12'-6"	11'-10"	13.04	143.4
G39	11	"	14'-10"	13'-6"	15.47	170.2
J23	20	3/4"φ	5'-9"	Straight	3.84	76.8
J25	22	"	9'-6"	"	6.35	139.7
J43	6	"	9'-0"	2'-2"	6.01	36.1
				TOTAL		2545#

MONOLITH NO. 275

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	13	3/4"φ	14'-0"	13'-6"	21.03	273.4
F36	2	"	17'-0"	Straight	25.53	51.1
F37	1	"	16'-6"	"	24.78	24.8
F64	4	"	6'-0"	1'-6" 1/2"	9.01	36.0
F83	1	"	16'-9"	Straight	25.16	25.2
F84	2	"	17'-3"	"	25.91	51.8
F86	2	"	18'-0"	"	27.04	54.1
F87	2	"	17'-6"	"	26.29	52.6
F88	2	"	17'-9"	"	26.66	53.3
F89	5	"	18'-3"	"	27.41	137.1

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 5 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN

APPROVED: [signature] CHIEF OF ENGINEERS, OHIO RIVER DIVISION

DR. BY R.S. TR. BY R.S. CK. BY F.B.F.

"BELIEVED AS BUILT" 933-141/5

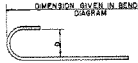
782

147

REINFORCEMENT SCHEDULE

SIZE	D
1/2	10"
1 1/8	9"
1	8"
7/8	7"
3/4 OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM



MONOLITH NO. 275 (CONT'D.)

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G28	20	3/4	14'-2"	13'-6"	14.78	295.6
G36	10	"	8'-8"	7'-10"	9.87	98.7
G37	16	"	6'-0"	5'-4"	6.26	100.2
G38	9	"	12'-6"	11'-10"	13.04	117.4
G39	10	"	14'-10"	13'-6"	15.47	154.7
G51	12	"	17'-3"	Straight	17.99	215.9
G52	12	"	17'-0"	"	17.73	212.8
J23	16	5/8	5'-9"	"	3.84	61.4
J25	19	"	9'-2"	"	6.35	120.7
J43	6	"	9'-0"	8'-2"	6.01	36.1
				TOTAL		2163*

SHEET 933-12.3/52 MONOLITH NO. 271

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	20	1 1/4	6'-3"	Straight	16.69	333.8
E11	12	3/4	14'-3"	13'-6"	29.13	349.6
E12	7	"	14'-3"	13'-6"	29.13	203.9
E13	2	"	12'-1"	11'-3"	24.70	49.4
E14	8	"	8'-1"	7'-3"	16.52	132.2
F1	11	3/4	14'-0"	13'-6"	21.03	231.3
F38	17	"	15'-6"	Straight	23.28	395.8
G23	10	3/4	15'-6"	"	16.17	161.7
G35	8	"	12'-6"	11'-10"	13.04	104.3
G39	8	"	14'-10"	13'-6"	15.47	123.8
G50	28	"	5'-2"	3'-6"	5.39	150.9
J23	15	5/8	5'-9"	Straight	3.84	57.6
J25	16	"	9'-8"	"	6.35	101.6
				TOTAL		2396*

MONOLITH NO. 242

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	12	1 1/4	6'-3"	Straight	16.69	200.3
F41	6	3/4	12'-8"	"	19.08	114.5
F50	4	"	11'-4"	10'-10"	17.02	68.1
F51	2	"	6'-4"	5'-10"	9.51	19.0
F52	2	"	7'-8"	5'-10"	11.52	23.0
F53	4	"	12'-8"	10'-10"	19.08	76.1
G22	20	3/4	5'-2"	3'-6"	5.39	107.8
G23	24	"	15'-6"	Straight	16.17	388.1
				TOTAL		997*

SHEET 933-12.3/53 MONOLITH NO. 274

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	13	3/4	14'-0"		21.03	273.4
F36	2	"	17'-0"	Straight	25.53	51.1
F38	1	"	16'-3"	"	24.41	24.4
F83	1	"	12'-9"	"	25.16	25.2

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F86	2	3/4	17'-3"	Straight	25.91	51.8
F86	4	"	18'-0"	"	27.04	108.2
F87	2	"	17'-6"	"	26.29	52.6
F88	1	"	17'-9"	"	26.66	26.7
F89	4	"	18'-3"	"	27.41	109.6
G28	19	3/4	14'-2"	13'-6"	14.78	280.8
G36	8	"	8'-8"	7'-10"	8.87	71.0
G37	17	"	6'-0"	5'-4"	6.26	106.4
G38	9	"	12'-6"	11'-10"	13.04	117.4
G39	10	"	14'-10"	13'-6"	15.47	154.7
G51	12	"	17'-3"	Straight	17.99	215.9
G52	12	"	17'-0"	"	17.73	212.8
J23	18	5/8	5'-9"	"	3.84	69.1
J25	19	"	9'-8"	"	6.35	120.7
				TOTAL		2072*

SHEET 933-12.3/54 MONOLITH NO. 20

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E6	7	3/4	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	11	"	7'-2"	6'-4"	14.65	161.2
F8	15	3/4	19'-9"	Straight	29.66	444.9
F18	7	"	15'-3"	14'-7"	22.91	160.4
G2	26	3/4	19'-9"	Straight	20.60	535.6
G9	15	"	5'-3"	"	5.48	82.2
G10	15	"	9'-6"	"	9.91	148.7
G11	15	"	15'-10"	14'-6"	16.51	247.7
G12	15	"	12'-9"	12'-1"	13.30	199.5
G34	30	"	14'-9"		15.38	461.4
				TOTAL		2776*

SHEET 933-12.3/55 MONOLITHS NOS. 21, 22 & 23

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E6	8	3/4	15'-4"	14'-6"	31.34	250.7
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	3/4	15'-3"	14'-7"	22.91	183.3
F19	15	"	21'-9"	Straight	32.67	490.1
G9	16	3/4	5'-3"	"	5.48	87.7
G10	17	"	9'-6"	"	9.91	168.5
G11	17	"	15'-10"	14'-6"	16.51	280.7
G12	16	"	12'-9"	12'-1"	13.30	212.8
G13	26	"	21'-9"	Straight	22.69	589.9
G34	33	"	14'-9"		15.38	507.5
				TOTAL 1		3062*
				TOTAL 3		9165*

SHEET 933-12.3/56 MONOLITH NO. 85

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D24	2	1 1/4	16'-4"	14'-6"	43.91	87.2
E6	7	3/4	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F8	1	3/4	19'-9"	Straight	29.66	29.7

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F18	8	3/4	15'-3"	14'-7"	22.91	183.3
F19	2	"	21'-9"	Straight	32.67	65.3
F25	19	"	6'-8"	3'-0"	10.14	131.8
F87	2	"	21'-5"	Straight	32.29	64.6
F70	2	"	21'-0"	"	31.54	63.1
F71	2	"	20'-9"	"	31.17	62.3
F73	1	"	20'-0"	"	30.04	30.0
F74	2	"	20'-6"	"	30.79	61.6
F77	3	"	22'-0"	"	33.04	99.1
G9	15	3/4	5'-3"	"	5.48	82.2
G10	17	"	9'-6"	"	9.91	168.5
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	17	"	12'-9"	12'-1"	13.30	226.1
G25	19	"	20'-6"	Straight	21.38	277.9
G26	13	"	20'-9"	"	21.64	281.3
G34	33	"	14'-9"		15.38	507.5
				TOTAL		3198*

MONOLITH NO. 86

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E6	7	3/4	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F8	1	3/4	19'-9"	Straight	29.66	29.7
F18	8	"	15'-3"	14'-7"	22.91	183.3
F19	2	"	21'-9"	Straight	32.67	65.3
F87	2	"	21'-5"	"	32.29	64.6
F70	2	"	21'-0"	"	31.54	63.1
F71	2	"	20'-9"	"	31.17	62.3
F73	1	"	20'-0"	"	30.04	30.0
F74	2	"	20'-6"	"	30.79	61.6
F77	3	"	22'-0"	"	33.04	99.1
G9	15	3/4	5'-3"	"	5.48	82.2
G10	17	"	9'-6"	"	9.91	168.5
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	17	"	12'-9"	12'-1"	13.30	226.1
G25	19	"	20'-6"	Straight	21.38	277.9
G26	13	"	20'-9"	"	21.64	281.3
G34	33	"	14'-9"		15.38	507.5
				TOTAL		2976*

MONOLITHS NOS. 90 & 91

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E6	7	3/4	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	3/4	15'-3"	14'-7"	22.91	183.3
F68	4	"	21'-3"	Straight	31.92	127.7
F70	3	"	21'-0"	"	31.54	94.6
F71	4	"	20'-9"	"	31.17	124.7
F72	1	"	20'-3"	"	30.42	30.4
F74	3	"	20'-6"	"	30.79	92.4

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G9	15	3/4	5'-3"	Straight	5.48	82.2
G10	17	"	9'-6"	"	9.91	168.5
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	17	"	12'-9"	12'-1"	13.30	226.1
G25	26	"	20'-6"	Straight	21.38	555.9
G34	33	"	14'-9"		15.38	507.5
				TOTAL 1		2967*
				TOTAL 2		5934*

SHEET 933-12.3/57 MONOLITHS NOS. 87 TO 89 & 92 TO 94

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E6	7	3/4	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	3/4	15'-3"	14'-7"	22.91	183.3
F71	15	"	20'-9"	Straight	31.17	467.6
G9	15	3/4	5'-3"	"	5.48	82.2
G10	16	"	9'-6"	"	9.91	158.6
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	15	"	12'-9"	12'-1"	13.30	199.5
G26	26	"	20'-9"	Straight	21.64	562.6
G34	31	"	14'-9"		15.38	476.8
				TOTAL 1		2905*
				TOTAL 6		17,427*

SHEET 933-12.3/58 MONOLITH NO. 95

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E6	7	3/4	15'-4"	14'-6"	31.34	219.4
E7	7	"	9'-4"	8'-6"	19.08	133.6
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	3/4	15'-3"	14'-7"	22.91	183.3
F68	6	"	21'-3"	Straight	31.92	191.5
F76	5	"	23'-0"	"	34.55	172.8
F77	2	"	22'-0"	"	33.04	66.1
F107	2	"	22'-9"	"	34.17	68.3
G9	16	3/4	5'-3"	"	5.48	87.7
G10	18	"	9'-6"	"	9.91	178.4
G11	17	"	15'-10"	14'-6"	16.51	280.7
G12	18	"	12'-9"	12'-1"	13.30	239.4

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 6 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, SECT. OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, SECT. OF FLOOD CONTROL DESIGN

APPROVED: [signature] U. S. ENGINEER DISTRICT ENGINEER

DR. BY P.S. TR. BY P.S. CK. BY E.B.F.

"BELIEVED AS BUILT" 933-14.1/6

783

REINFORCEMENT SCHEDULE

SIZE	D
1½"	10"
1¼"	9"
1	8"
⅞"	7"
⅝" OR 4 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

MONOLITH NO. 95 (CONT'D)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G27	26	⅝"φ	21'-3"	Straight	22.16	576.2
G34	35	"	14'-9"	14'-9" R=4'-0"	15.38	538.3
				TOTAL		3112 #

SHEET 933-12.3/59 MONOLITHS NOS. 25 TO 26 44 TO 68, 70, 72 TO 74 & 77

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D2	7	1"φ	17'-5"	16'-6"	46.50	325.5
D3	8	"	10'-8"	9'-9"	28.48	227.8
D4	12	"	8'-2"	7'-3"	21.81	261.7
E9	14	⅞"φ	12'-3"	Straight	25.04	350.6
E10	13	"	7'-3"	"	14.82	192.7
F8	17	¾"φ	19'-9"	"	29.66	504.2
F18	13	"	15'-3"	14'-7"	22.91	297.8
F20	7	"	17'-2"	16'-6"	25.78	180.5
F21	14	"	18'-10"	17'-6"	28.29	396.1
F22	20	"	16'-6"	15'-7" R=4'-0"	24.78	495.6
G2	30	⅝"φ	19'-9"	Straight	20.60	618.0
				TOTAL 1		3651 #
				TOTAL 32		123,232 #

MONOLITH NO. 24

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D2	7	1"φ	17'-5"	16'-6"	46.50	325.5
D3	8	"	10'-8"	9'-9"	28.48	227.8
D4	12	"	8'-2"	7'-3"	21.81	261.7
E9	14	⅞"φ	12'-3"	Straight	25.04	350.6
E10	13	"	7'-3"	"	14.82	192.7
F8	2	¾"φ	19'-9"	"	29.66	59.3
F18	13	"	15'-3"	14'-7"	22.91	297.8
F20	7	"	17'-2"	16'-6"	25.78	180.5
F21	14	"	18'-10"	17'-6"	28.29	396.1
F22	21	"	16'-6"	15'-7" R=4'-0"	24.78	520.4
G69	2	"	19'-6"	Straight	29.29	58.6
F70	5	"	21'-0"	"	31.54	157.7
F73	2	"	20'-0"	"	30.04	60.1
F74	4	"	20'-6"	"	30.79	123.2
F106	1	"	19'-9"	"	28.16	28.2
F108	1	"	19'-0"	"	28.54	28.5
G2	30	⅝"φ	19'-9"	"	20.60	618.0
				TOTAL		3087 #

SHEET 933-12.3/60 MONOLITH NO. 69

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D2	6	1"φ	17'-5"	16'-6"	46.50	279.0
D3	4	"	10'-8"	9'-9"	28.48	113.9
D4	7	"	8'-2"	7'-3"	21.81	152.7

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E9	10	⅞"φ	12'-3"	Straight	25.04	250.4
E10	9	"	7'-3"	"	14.82	133.4
F18	9	¾"φ	15'-3"	14'-7"	22.91	206.2
F20	5	"	17'-2"	16'-6"	25.78	128.9
F21	10	"	18'-10"	17'-6"	28.29	282.9
F22	14	"	16'-6"	15'-7" R=4'-0"	24.78	346.9
F31	17	"	13'-9"	Straight	20.68	351.1
G14	28	⅝"φ	13'-9"	"	14.34	401.5
V7	16	⅝"φ	3'-0"	"	2.00	32.0
				TOTAL		2679 #

MONOLITH NO. 78

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D2	6	1"φ	17'-5"	16'-6"	46.50	279.0
D3	5	"	10'-8"	9'-9"	28.48	142.4
D4	8	"	8'-2"	7'-3"	21.81	174.5
E9	10	⅞"φ	12'-3"	Straight	25.04	250.4
E10	9	"	7'-3"	"	14.82	133.4
F18	9	¾"φ	15'-3"	14'-7"	22.91	206.2
F20	5	"	17'-2"	16'-6"	25.78	128.9
F21	10	"	18'-10"	17'-6"	28.29	282.9
F22	14	"	16'-6"	15'-7" R=4'-0"	24.78	346.9
F31	17	"	13'-9"	Straight	20.65	351.1
G14	30	⅝"φ	13'-9"	"	14.34	430.2
				TOTAL		2726 #

SHEET 933-12.3/61 MONOLITHS NOS. 75 & 76

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D2	6	1"φ	17'-5"	16'-6"	46.50	279.0
D3	4	"	10'-8"	9'-9"	28.48	113.9
D4	8	"	8'-2"	7'-3"	21.81	174.5
E9	11	⅞"φ	12'-3"	Straight	25.04	275.4
E10	10	"	7'-3"	"	14.82	148.2
F20	5	¾"φ	17'-2"	16'-6"	25.78	128.9
F21	7	"	18'-10"	17'-6"	28.29	198.0
F22	17	"	16'-6"	15'-7" R=4'-0"	24.78	421.3
F39	1	"	19'-3"	17'-11"	28.91	28.9
F34	2	"	19'-9"	18'-5"	29.66	59.3
F35	8	"	16'-3"	15'-7"	24.41	195.3
F36	3	"	17'-0"	Straight	25.53	76.6
F37	1	"	16'-6"	"	24.78	24.8
F38	1	"	15'-6"	"	23.28	23.3
F39	2	"	14'-6"	"	21.78	43.6
F40	2	"	13'-6"	"	20.28	40.6
F41	2	"	12'-8"	"	19.03	38.1
F42	1	"	11'-6"	"	17.27	17.3
F43	1	"	10'-3"	"	15.40	15.4
F57	1	¾"φ	15'-3"	"	22.91	22.9
F58	1	"	16'-3"	"	24.41	24.4
F60	1	"	16'-0"	"	24.03	24.0
F89	1	"	16'-9"	"	25.16	25.2
G16	15	⅝"φ	12'-9"	"	13.30	199.5

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G17	15	⅝"φ	19'-9"	Straight	13.82	207.3
				TOTAL 1		2688 #
				TOTAL 2		5611 #

SHEET 933-12.3/62 MONOLITH NO. 71

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
B2	4	⅞"φ	10'-11"	9'-10"	46.97	187.9
B6	8	"	17'-7"	16'-6"	73.66	605.3
B7	8	"	8'-4"	7'-3"	35.86	286.9
D1	20	1"φ	8'-3"	Straight	16.68	333.6
D13	8	"	12'-5"	11'-7"	33.15	265.2
E9	14	⅞"φ	12'-3"	Straight	25.04	350.6
E10	13	"	7'-3"	"	14.82	192.7
F8	17	¾"φ	19'-9"	"	29.66	504.2
F18	18	"	15'-3"	14'-7"	22.91	297.8
F20	6	"	17'-2"	16'-6"	25.78	154.7
F21	14	"	18'-10"	17'-6"	28.29	396.1
F22	21	"	16'-6"	15'-7" R=4'-0"	24.78	520.4
F32	2	"	5'-8"	Straight	5.51	11.0
G2	16	⅝"φ	19'-9"	"	20.60	329.6
G15	28	"	7'-10"	6'-6"	8.17	228.8
				TOTAL		4665 #

SHEET 933-12.3/63 MONOLITHS NOS. 79 TO 84

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D2	8	1"φ	17'-5"	16'-6"	46.50	372.0
D3	6	"	10'-8"	9'-9"	28.48	170.9
D4	14	"	8'-2"	7'-3"	21.81	305.3
E9	14	⅞"φ	12'-3"	Straight	25.04	350.6
E10	14	"	7'-3"	"	14.82	207.5
F18	14	¾"φ	15'-3"	14'-7"	22.91	320.7
F20	8	"	17'-2"	16'-6"	25.78	206.2
F21	14	"	18'-10"	17'-6"	28.29	396.1
F22	21	"	16'-6"	15'-7" R=4'-0"	24.78	520.4
F71	17	"	20'-9"	Straight	31.17	529.9
G26	30	⅝"φ	20'-9"	"	21.64	649.2
				TOTAL 1		4029 #
				TOTAL 6		24,173 #

SHEET 933-12.3/64 MONOLITHS NOS. 27 TO 30

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
B1	7	⅞"φ	18'-7"	17'-6"	79.96	559.7
B2	12	"	10'-11"	9'-10"	46.97	563.6
D5	11	1"φ	13'-3"	Straight	35.38	389.2
D6	9	"	8'-1"	"	21.58	194.2
D7	11	"	20'-4"	19'-3"	54.29	597.2
D8	9	"	16'-11"	16'-0"	45.17	406.5
E16	20	¾"φ	17'-9"	16'-6" R=4'-0"	36.28	725.6
F8	17	¾"φ	19'-9"	Straight	29.66	504.2
F29	7	"	18'-2"	17'-6"	27.29	191.0
G2	32	⅝"φ	19'-9"	Straight	20.60	659.2
				TOTAL 1		4790 #
				TOTAL 4		19,162 #

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
B1	7	⅞"φ	18'-7"	17'-6"	79.96	559.7
B2	12	"	10'-11"	9'-10"	46.97	563.6
D5	10	1"φ	13'-3"	Straight	35.38	353.8
D6	9	"	8'-1"	"	21.58	194.2
D7	13	"	20'-4"	19'-3"	54.29	705.8
D8	9	"	16'-11"	16'-0"	45.17	406.5
E16	20	¾"φ	17'-9"	16'-6" R=4'-0"	36.28	725.6
F8	17	¾"φ	19'-9"	Straight	29.66	504.2
F29	7	"	18'-2"	17'-6"	27.29	191.0
G2	32	⅝"φ	19'-9"	Straight	20.60	659.2
				TOTAL		5046 #

SHEET 933-12.3/65 MONOLITHS NOS. 32, & 35 TO 42

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
B3	8	⅞"φ	20'-7"	19'-6"	88.57	708.6
B4	8	"	11'-9"	10'-8"	50.56	404.5
B5	14	"	8'-9"	7'-8"	37.65	527.1
D9	13	1"φ	8'-0"	Straight	21.36	277.7
D10	14	"	14'-0"	"	37.38	523.3
D11	14	"	22'-4"	20'-6"	59.63	834.8
D12	13	"	19'-0"	18'-1"	50.79	659.5
D16	2	"	4'-0"	3'-1"	10.68	21.4
				TOTAL 1		6350 #
				TOTAL 9		58,952 #

MONOLITH NO. 43

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
B3	8	⅞"φ	20'-7"	19'-6"	88.57	708.6
B4	8	"	11'-9"	10'-8"	50.56	404.5
B5	14	"	8'-9"	7'-8"	37.65	527.1
D9	13	1"φ	8'-0"	Straight	21.36	277.7
D10	14	"	14'-0"	"	37.38	523.3
D11	14	"	22'-4"	20'-6"	59.63	834.8
D12	13	"	19'-0"	18'-1"	50.79	659.5
D16	2	"	4'-0"	3'-1"	10.68	21.4

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 7 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: J. L. Shomaker ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: S. D. Lee GENERAL DESIGN CHIEF OF FLOOD CONTROL DIVISION

APPROVED: H. Wilbur Hall LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY R.S. TR. BY R.S. CK. BY E.B.F.

"BELIEVED AS BUILT"

933-14.1/7

REINFORCEMENT SCHEDULE

SIZE	D
1 1/2"	10"
1 1/4"	9"
1"	8"
7/8"	7"
3/4" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

MONOLITH NO. 43 (CONT'D.)

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E15	27	3/4" ϕ	19'-4"	3'-6" 4'-6"	39.52	1067.0
F8	20	3/4" ϕ	19'-9"	Straight	29.66	593.2
F29	7	"	20'-3"	19'-7"	30.42	212.9
F54	2	"	17'-4"	4'-2"	17.02	34.0
G2	36	3/4" ϕ	19'-9"	Straight	20.60	741.6
				TOTAL		6606#

SHEET 933-12.3/66 MONOLITHS NOS. 33 & 34

B3	7	1 1/4" ϕ	20'-7"	18'-6"	88.57	620.0
B4	6	"	17'-9"	10'-4"	50.56	303.4
B5	11	"	18'-9"	7'-6"	37.65	414.2
D9	11	1" ϕ	8'-0"	Straight	21.56	237.0
D10	12	"	14'-0"	"	37.38	448.6
D11	12	"	22'-4"	20'-6"	59.63	715.6
D12	11	"	19'-0"	16'-1"	50.73	558.0
E15	22	3/4" ϕ	19'-4"	3'-6" 4'-6"	39.52	869.4
F29	6	3/4" ϕ	20'-3"	19'-7"	30.42	182.5
F39	2	"	15'-6"	Straight	23.28	46.6
F55	1	"	16'-9"	"	22.15	22.2
F56	1	"	15'-0"	"	22.53	22.5
F57	3	"	15'-3"	"	22.91	68.7
F58	4	"	16'-3"	"	24.41	97.6
F59	4	"	15'-9"	"	23.66	94.6
F60	5	"	16'-0"	"	24.03	120.2
G23	18	3/4" ϕ	15'-6"	"	16.17	291.1
G29	15	"	15'-3"	"	15.91	238.6
				TOTAL 1		5397#
				TOTAL 2		10,794#

SHEET 933-12.3/70 MOVABLE CLOSURE STA. 4+49.5

SILL

F1	39	3/4" ϕ	18'-4"	Straight	27.79	1083.3
F2	19	"	16'-3"	16'-11"	24.41	463.8
G1	19	3/4" ϕ	17'-3"	17'-3"	17.99	341.8
G2	16	"	3'-9"	Straight	3.91	62.6
J1	2	3/4" ϕ	15'-0"	"	10.02	20.0
J2	17	"	17'-4"	3'-6" 3'-6" 10'-0"	11.58	196.9
				TOTAL		2168#

TWO ABUTMENTS

F3	8	3/4" ϕ	15'-9"	Straight	23.66	189.3
F4	18	"	14'-3"	"	21.40	385.2
F5	2	"	15'-7"	3'-6" 3'-6" 7'-7"	23.41	46.8
G3	24	3/4" ϕ	11'-5"	Straight	11.91	285.8

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G4	22	3/4" ϕ	4'-3"	Straight	4.43	97.5
G5	2	"	4'-0"	3'-3"	5.13	10.3
G6	1	"	5'-6"	3'-10"	5.74	5.7
G7	2	"	6'-1"	4'-5"	6.34	12.7
G8	2	"	6'-7"	4'-11"	6.87	13.7
G9	2	"	7'-1"	5'-5"	7.39	14.8
G10	1	"	7'-6"	5'-10"	7.82	7.8
G11	1	"	8'-2"	6'-6"	8.52	8.5
G12	1	"	8'-8"	7'-0"	9.04	9.0
G13	1	"	9'-2"	7'-6"	9.56	9.6
G14	1	"	9'-9"	8'-1"	10.17	10.2
G15	1	"	10'-2"	8'-5"	10.60	10.6
G16	1	"	10'-8"	9'-0"	11.13	11.1
G17	1	"	3'-0"	1'-4"	3.13	3.1
G18	1	"	3'-5"	1'-9"	3.56	3.6
G19	1	"	4'-0"	2'-4"	4.17	4.2
G20	1	"	4'-6"	2'-10"	4.69	4.7
G21	1	"	5'-0"	3'-4"	5.22	5.2
G22	1	"	5'-8"	3'-10"	5.91	5.9
G23	1	"	5'-8"	4'-0"	5.91	5.9
G24	3	"	5'-9"	3'-7"	5.48	16.4
G25	2	"	5'-11"	4'-3"	6.17	12.3
G26	2	"	6'-4"	4'-8"	6.61	13.2
G27	2	"	6'-10"	5'-2"	7.13	14.3
G28	2	"	7'-3"	5'-7"	7.56	15.1
G29	2	"	7'-11"	6'-3"	8.26	16.5
G30	1	"	8'-5"	6'-9"	8.78	8.8
G31	1	"	8'-11"	7'-3"	9.30	9.3
G32	1	"	9'-6"	7'-10"	9.91	9.9
G33	1	"	9'-11"	8'-3"	10.34	10.3
G34	1	"	10'-6"	8'-10"	10.95	11.0
G35	1	"	3'-3"	1'-7"	3.39	3.4
G36	1	"	3'-8"	2'-0"	3.82	3.8
G37	1	"	4'-3"	2'-7"	4.43	4.4
G38	2	"	4'-9"	3'-11"	4.95	9.9
G39	2	"	6'-3"	6'-7"	6.60	17.2
G40	1	"	6'-9"	6'-10" 3'-3"	7.04	7.0
G41	1	"	7'-0"	6'-10" 3'-10"	7.30	7.3
				TOTAL		1353#

MOVABLE CLOSURE STA. 5+34.5

SILL

F1	39	3/4" ϕ	18'-4"	Straight	27.79	1083.8
F2	18	"	16'-3"	16'-11"	24.41	439.4
F6	3	"	15'-0"	Straight	22.53	67.6
G1	19	3/4" ϕ	17'-3"	17'-3"	17.99	341.8
G2	16	"	3'-9"	Straight	3.91	62.6
G46	7	"	9'-9"	7'-6" 1'-6"	10.17	71.2
J1	2	3/4" ϕ	15'-0"	Straight	10.02	20.0

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J2	17	3/4" ϕ	17'-4"	3'-6" 3'-6" 10'-0"	11.58	196.9
				TOTAL		2263#

TWO ABUTMENTS

F3	8	3/4" ϕ	15'-9"	Straight	23.66	189.3
F4	18	"	14'-3"	"	21.40	385.2
F5	2	"	15'-7"	3'-6" 3'-6" 7'-7"	23.41	46.8
G3	24	3/4" ϕ	11'-5"	Straight	11.91	285.8
G4	22	"	4'-3"	"	4.43	97.5
G5	2	"	4'-11"	3'-3"	5.13	10.3
G6	1	"	5'-6"	3'-10"	5.74	5.7
G7	2	"	6'-1"	4'-5"	6.34	12.7
G8	2	"	6'-7"	4'-11"	6.87	13.7
G9	2	"	7'-1"	5'-5"	7.39	14.8
G10	1	"	7'-6"	5'-10"	7.82	7.8
G11	1	"	8'-2"	6'-6"	8.52	8.5
G12	1	"	8'-8"	7'-0"	9.04	9.0
G13	1	"	9'-2"	7'-6"	9.56	9.6
G14	1	"	9'-9"	8'-1"	10.17	10.2
G15	1	"	10'-2"	8'-5"	10.60	10.6
G16	1	"	10'-8"	9'-0"	11.13	11.1
G17	1	"	3'-0"	1'-4"	3.13	3.1
G18	1	"	3'-5"	1'-9"	3.56	3.6
G19	1	"	4'-0"	2'-4"	4.17	4.2
G20	1	"	4'-6"	2'-10"	4.69	4.7
G21	1	"	5'-0"	3'-4"	5.22	5.2
G22	1	"	5'-8"	3'-10"	5.91	5.9
G23	1	"	5'-8"	4'-0"	5.91	5.9
G24	3	"	5'-9"	3'-7"	5.48	16.4
G25	2	"	5'-11"	4'-3"	6.17	12.3
G26	2	"	6'-4"	4'-8"	6.61	13.2
G27	2	"	6'-10"	5'-2"	7.13	14.3
G28	2	"	7'-3"	5'-7"	7.56	15.1
G29	2	"	7'-11"	6'-3"	8.26	16.5
G30	1	"	8'-5"	6'-9"	8.78	8.8
G31	1	"	8'-11"	7'-3"	9.30	9.3
G32	1	"	9'-6"	7'-10"	9.91	9.9
G33	1	"	9'-11"	8'-3"	10.34	10.3
G34	1	"	10'-6"	8'-10"	10.95	11.0
G35	1	"	3'-3"	1'-7"	3.39	3.4
G36	1	"	3'-8"	2'-0"	3.82	3.8
G37	1	"	4'-3"	2'-7"	4.43	4.4
G38	2	"	4'-9"	3'-11"	4.95	9.9
G39	2	"	6'-3"	6'-7"	6.60	17.2
G40	1	"	6'-9"	6'-10" 3'-3"	7.04	7.0
G41	1	"	7'-0"	6'-10" 3'-10"	7.30	7.3
				TOTAL		1353#

SHEET 933-12.3/71

STORAGE VAULT STA. 83+28.1

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E7	29	3/4" ϕ	15'-6"	12'-8"	31.68	918.7
F9	6	3/4" ϕ	12'-0"	Straight	18.02	108.1
F10	2	"	14'-8"	"	22.03	44.1
G32	8	3/4" ϕ	4'-0"	"	4.17	33.4
J2	48	3/4" ϕ	13'-9"	"	9.18	440.6
J4	22	"	12'-3"	"	8.18	180.0
J5	3	"	13'-3"	"	8.85	26.6
J6	6	"	13'-9"	"	9.18	55.1
J7	62	"	19'-8"	9'-8" 9'-8" 13'-3"	13.14	814.7
J8	22	"	23'-0"	19'-7"	15.36	337.9
J9	42	"	12'-0"	Straight	8.02	336.8
J10	18	"	13'-1"	11'-3"	8.74	157.3
J11	18	"	15'-10"	14'-6"	10.58	190.4
J12	7	"	5'-5"	2'-7"	3.64	26.9
J13	4	"	10'-9"	5'-1"	7.18	28.7
J14	20	"	16'-2"	6'-11"	10.80	216.0
J15	5	"	14'-8"	Straight	9.80	48.4
J17	3	"	10'-5"	7'-11"	6.96	20.9
J19	12	"	7'-2"	2'-11"	4.79	57.5
				TOTAL		4072#

STORAGE VAULT STA. 4+00

E7	29	3/4" ϕ	15'-6"	12'-8"	31.68	918.7
F9	6	3/4" ϕ	12'-0"	Straight	18.02	108.1
F10	2	"	14'-8"	"	22.03	44.1
G32	8	3/4" ϕ	4'-0"	"	4.17	33.4
J2	48	3/4" ϕ	13'-9"	"	9.18	440.6
J4	22	"	12'-3"	"	8.18	180.0
J5	3	"	13'-3"	"	8.85	26.6
J6	6	"	13'-9"	"	9.18	55.1
J7	62	"	19'-8"	9'-8" 9'-8" 13'-3"	13.14	814.7
J8	22	"	23'-0"	19'-7"	15.36	337.9
J9	42	"	12'-0"	Straight	8.02	336.8
J10	18	"	13'-1"	11'-3"	8.74	157.3
J11	18	"	15'-10"	14'-6"	10.58	190.4
J12	7	"	5'-9"	2'-7"	3.84	26.9
J13	4	"	10'-9"	5'-1"	7.18	28.7

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 8 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ASSISTANT, CHIEF OF STAFF

APPROVAL RECOMMENDED: [signature] PRINCIPAL DESIGNER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] CHIEF OF ENGINEERS, DIRECT DESIGNER

DR. BY R.S. TR. BY R.S. CK. BY J.B.F.

"BELIEVED AS BUILT" 933-14.1/8

785

132

REINFORCEMENT SCHEDULE

SIZE	D
1/2"	10"
1/8"	9"
1"	8"
1"	7"
3" OR 4 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

STORAGE VAULT STA. 4+00 (CONT'D)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J14	26	3/4"φ	16'-2"	16'-0"	10.80	280.8
J15	8	"	14'-5"	Straight	9.80	78.4
J17	3	"	10'-5"	10'-0"	6.96	20.9
J18	4	"	6'-9"	Straight	4.51	18.0
J19	7	"	7'-2"	7'-0"	4.79	33.5
				TOTAL		4131 #

SHEET 933-12.3/73 MOVABLE CLOSURE STA. 9+44

SILL

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	3/4"φ	19'-0"	17'-8"	28.54	456.6
F2	20	"	17'-6"	Straight	26.29	525.8
F3	22	"	15'-6"	"	23.28	512.2
F4	26	"	17'-0"	15'-8"	25.53	663.8
F5	16	"	11'-1"	11'-0"	16.65	266.4
G1	16	3/4"φ	18'-10"	17'-7"	17.56	281.0
J1	14	3/4"φ	7'-3"	2'-0" 4'-6" 2'-0"	4.84	67.8
J2	14	"	11'-4"	4'-6" 2'-0"	7.57	106.0
J3	2	"	15'-6"	6'-6"	10.35	20.7
J4	15	"	3'-4"	2'-6"	2.23	33.5
				TOTAL		2952 #

MOVABLE CLOSURE STA. 10+40

SILL

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	3/4"φ	19'-0"	17'-8"	28.54	456.6
F2	16	"	17'-6"	Straight	26.29	420.6
F3	22	"	15'-6"	"	23.28	512.2
F4	26	"	17'-0"	15'-8"	25.53	663.8
G1	16	3/4"φ	18'-10"	17'-7"	17.56	281.0
J1	14	3/4"φ	7'-3"	2'-0" 4'-6" 2'-0"	4.84	67.8
J2	14	"	11'-4"	4'-6" 2'-0"	7.57	106.0
J3	2	"	15'-6"	6'-6"	10.35	20.7
J4	15	"	3'-4"	2'-6"	2.23	33.5
				TOTAL		2562 #

MOVABLE CLOSURES STATIONS 9+44 & 10+40

EAST & WEST ABUTMENTS

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F6	6	3/4"φ	14'-4"	Straight	21.53	129.2
F7	2	"	14'-9"	"	22.15	44.3
F8	2	"	14'-9"	13'-5"	22.15	44.3
G2	12	3/4"φ	4'-4"	Straight	4.52	54.2
G3	12	"	10'-0"	9'-8"	10.43	125.2
G4	1	"	5'-1"	4'-9"	5.30	5.3
G5	2	"	5'-4"	2'-0"	5.56	11.1
G6	2	"	5'-8"	2'-6"	5.91	11.8

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G7	2	"	5'-10"	2'-6"	6.08	12.2
G8	2	"	6'-1"	2'-9"	6.34	12.7
G9	2	"	6'-4"	3'-0"	6.61	13.2
G10	2	"	6'-7"	3'-3"	6.87	13.7
G11	2	"	6'-10"	3'-6"	7.13	14.3
G12	1	"	7'-0"	3'-8"	7.30	7.3
G13	1	"	7'-4"	4'-0"	7.65	7.7
G14	1	"	7'-9"	4'-3"	7.82	7.8
G15	1	"	7'-10"	4'-6"	8.17	8.2
G16	1	"	5'-2"	11'-0"	5.39	5.4
G17	1	"	4'-11"	1'-7"	5.13	5.1
G18	1	"	4'-8"	1'-4"	4.87	4.9
G19	1	"	4'-5"	1'-8"	4.61	4.6
G20	1	"	4'-1"	9"	4.26	4.3
				TOTAL 1		547 #
				TOTAL 4		2188 #

SHEET 933-12.3/74 STORAGE VAULT STA. 10+40

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	10	1"φ	12'-9"	Straight	34.04	340.4
D2	10	"	7'-9"	"	20.69	206.9
F9	29	3/4"φ	19'-6"	"	29.29	673.7
F10	4	"	15'-0"	"	19.53	78.1
F11	4	"	10'-0"	"	15.06	60.1
F12	16	"	17'-2"	16'-6"	25.78	412.5
F13	12	"	8'-3"	7'-7"	12.39	148.7
G1	20	3/4"φ	18'-10"	17'-7"	17.56	351.2
G11	30	"	19'-9"	Straight	20.60	618.0
G12	20	"	9'-6"	"	9.91	198.2
G23	20	"	20'-9"	19'-5"	21.64	432.8
G24	8	"	4'-0"	3'-0"	4.17	33.4
J5	40	3/4"φ	13'-0"	Straight	8.68	347.2
J6	49	"	18'-9"	"	13.19	567.2
J7	40	"	10'-2"	"	6.79	271.6
J8	12	"	10'-8"	10'-0"	7.13	85.6
J9	7	"	12'-5"	9'-11"	8.29	58.0
J10	9	"	12'-7"	10'-7"	8.41	75.7
J11	7	"	4'-1"	2'-7" 1'-6"	2.73	19.1
J12	7	"	12'-7"	7'-5" 5'-2"	8.41	58.9
J13	20	"	10'-0"	Straight	6.68	133.6
				TOTAL		5171 #

SHEET 933-12.3/76 MOVABLE CLOSURE STA. 25+15.4

SILL

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	32	3/4"φ	20'-8"	20'-0"	31.04	993.3
F2	17	"	17'-0"	15'-8"	25.53	434.0
F3	2	"	18'-6"	18'-0"	29.29	58.6
F4	5	"	20'-0"	18'-0" 1'-0"	30.04	150.2
F5	2	"	16'-6"	15'-2"	24.78	49.6
F6	2	"	16'-3"	14'-11"	24.41	48.8
F7	1	"	20'-10"	19'-5" 1'-5"	31.29	31.3

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	17	3/4"φ	3'-0"	Straight	2.00	34.0
J2	17	"	17'-11"	3'-0" 14'-11" 3'-0"	11.97	203.5
J3	2	"	15'-3"	Straight	10.19	20.4
J4	1	"	14'-9"	"	9.85	9.9
J5	1	"	17'-9"	3'-0" 14'-9" 3'-0"	11.86	11.9
J6	19	"	14'-1"	13'-5"	9.41	178.8
				TOTAL		2,224 #

NORTH SEAL BLOCK

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
B2	1	1"φ	10'-9"	3'-0" 4'-9" 3'-0"	28.70	28.7
D3	1	"	11'-4"	3'-0" 5'-4" 3'-0"	30.26	30.3
J1	2	3/4"φ	3'-0"	Straight	2.00	4.0
J7	2	"	5'-9"	"	3.84	7.7
J8	4	"	7'-9"	"	5.18	20.7
J9	2	"	9'-9"	"	6.51	13.0
J10	4	"	12'-3"	"	8.18	32.7
J11	4	"	13'-0"	"	8.68	34.7
J12	2	"	14'-6"	"	9.69	19.4
J13	2	"	7'-0"	"	4.68	9.4
J14	2	"	5'-0"	"	3.34	6.7
J15	2	"	5'-6"	"	3.67	7.3
J16	3	"	5'-3"	3'-3"	3.51	10.5
J17	3	"	5'-9"	2'-6"	3.84	11.5
J18	6	"	3'-6"	Straight	2.34	14.0
J19	2	"	4'-0"	"	2.67	5.3
J20	2	"	8'-9"	"	5.84	11.7
J21	2	"	8'-3"	"	5.51	11.0
J22	1	"	6'-3"	2'-9"	4.17	4.2
J23	12	"	12'-0"	3'-9"	8.02	96.2
J24	2	"	6'-0"	Straight	4.01	8.0
J25	2	"	7'-6"	"	5.01	10.0
J26	2	"	6'-5"	"	4.34	8.7
				TOTAL		406 #

NORTH ABUTMENT

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E1	7	3/4"φ	14'-6"	Straight	29.64	207.5
E2	9	"	7'-6"	"	15.33	46.0
F8	4	3/4"φ	16'-3"	"	24.41	97.6
F9	1	"	15'-9"	6'-3" 9'-6"	23.66	23.7
F12	1	"	4'-9"	Straight	7.13	7.1
F13	3	"	14'-6"	"	21.78	65.3
G2	1	3/4"φ	5'-11"	4'-3"	6.17	6.2
G3	2	"	6'-7"	4'-0"	6.87	13.7
G4	1	"	7'-2"	5'-6"	7.47	7.5
G5	2	"	7'-8"	6'-0"	8.00	16.0
G6	1	"	8'-2"	6'-6"	8.52	8.5
G7	1	"	8'-8"	7'-0"	9.04	9.0
G8	1	"	9'-2"	7'-6"	9.56	9.6
G9	1	"	9'-8"	8'-0"	10.08	10.1
G10	1	"	10'-2"	8'-6"	10.60	10.6

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G11	1	3/4"φ	10'-10"	9'-2"	11.30	11.3
G12	1	"	11'-2"	9'-6"	11.65	11.7
G13	1	"	11'-6"	10'-0"	12.17	12.2
G14	1	"	8'-3"	6'-7"	8.60	8.6
G15	1	"	7'-0"	5'-4"	7.30	7.3
G16	1	"	6'-0"	4'-4"	6.26	6.3
G17	1	"	5'-6"	3'-10"	5.74	5.7
G18	1	"	5'-0"	3'-4"	5.22	5.2
G19	1	"	4'-6"	2'-10"	4.69	4.7
G20	1	"	4'-0"	2'-4"	4.17	4.2
G21	1	"	3'-3"	1'-9"	3.39	3.4
G22	1	"	3'-0"	1'-4"	3.13	3.1
G23	1	"	2'-6"	1'-0"	2.61	2.6
G24	11	"	4'-3"	Straight	4.43	48.7
G25	12	"	11'-5"	"	11.91	142.9
				TOTAL		817 #

SOUTH ABUTMENT

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	4	1"φ	16'-3"	Straight	43.39	173.6
E3	10	3/4"φ	7'-6"	"	15.33	153.3
E4	1	"	4'-3"	"	8.69	8.7
E5	5	"	14'-7"	"	29.81	149.1
F10	1	3/4"φ	15'-9"	3'-0" 6'-6" 3'-3" 2'-6"	23.66	23.7
F11	1	"	15'-9"	6'-6" 3'-3" 2'-6"	23.66	23.7
F13	6	"	14'-6"	Straight	21.78	130.7
G1	1	3/4"φ	6'-9"	5'-3"	4.95	5.0
G3	1	"	6'-7"	4'-11"	6.87	6.9
G16	1	"	6'-0"	4'-4"	6.26	6.3
G24	12	"	4'-3"	Straight	4.43	53.2
G26	1	"	11'-6"	9'-10"	11.99	12.0
G27	1	"	11'-0"	9'-4"	11.47	11.5
G28	1	"	10'-6"	8'-10"	10.95	11.0
G29	1	"	10'-0"	8'-4"	10.43	10.4
G30	1	"	9'-6"	7'-10"	9.91	9.9
G31	1	"	9'-1"	7'-5"	9.47	9.5
G32	1	"	8'-7"	6'-11"	8.95	9.0
G33	1	"	8'-4"	6'-5"	8.43	8.4

* J6 Shown as J16 in Sec. A-A

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 9 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN

APPROVED: [signature] J. C. CHAMBERLIN, LT. COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY P.S. TR. BY P.S. CK. BY P.S.

"BELIEVED AS BUILT" 933-14.1/9

786

REINFORCEMENT SCHEDULE

SIZE	D
1/2"	10"
5/8"	9"
1"	8"
1 1/4"	7"
1 3/8" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

SOUTH ABUTMENT (CONT'D)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G34	1	3/4"	7'-7"	5'11"	7.91	7.9
G35	1	"	6'-11"	5'3"	7.21	7.2
G38	1	"	6'-10	3'2"	5.04	5.0
G39	1	"	5'-6"	3'-6"	5.56	5.6
G40	1	"	5'10"	4'2"	6.08	6.1
G41	1	"	6'-6"	4'-3"	6.61	6.6
G42	1	"	6'10"	5'2"	7.13	7.1
G43	1	"	7'-3"	5'7"	7.56	7.6
G44	1	"	7'-9"	6'1"	8.08	8.1
G45	1	"	8'-3	6'7"	8.50	8.5
G46	1	"	8'-8"	7'1"	9.13	9.1
G47	1	"	9'-5"	7'9"	9.82	9.8
G48	1	"	9'-9"	8'1"	10.17	10.2
G49	1	"	10'-4"	8'-8"	10.78	10.8
G50	12	"	14'-3"	Straight	14.86	178.3
				TOTAL		1104 #

SHEET 933-12.3/78 STORAGE VAULT STA. 26+02.29

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F5	6	3/4"	15'-6"	Straight	20.28	122.2
F9	31	"	14'-2"	13'-6"	21.28	659.7
F10	15	"	7'-5"	6'7"	11.14	167.1
F12	16	"	32'-6"	Straight	48.82	781.1
F13	8	"	8'-6"	"	12.77	102.2
F14	33	"	16'-5"	15'-3"	24.66	813.8
F15	32	"	5'-6"	Straight	8.26	264.3
G2	16	3/4"	4'0"	"	4.17	66.7
G3	24	"	32'-6"	"	33.90	813.6
G6	44	"	9'0"	8'-4"	9.39	413.2
J36	93	1/2"	8'-6"	Straight	5.68	528.2
J37	10	"	10'-10"	8'-4"	7.26	72.6
J38	49	"	13'-6"	Straight	9.02	442.0
J39	16	"	6'-6"	3'-4" 3'-4"	4.34	69.4
J40	16	"	5'-0"	2'-6" 2'-6"	3.34	53.4
J41	28	"	9'-9"	8'-5"	6.51	182.3
J42	31	"	10'-0"	8'-8"	6.68	207.1
J43	6	"	11'-0"	9'-6"	7.35	44.1
J44	41	"	32'-9"	Straight	21.88	897.1
J45	33	"	13'-10"	12'-9"	9.24	304.9
				TOTAL		7045 #

SHEET 933-12.3/80 MOVABLE CLOSURE STA. 26+90.3

SILL

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	27	3/4"	28'-0"	22'8"	36.05	973.4

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F2	14	3/4"	6'-0"	1'6" 3'6"	9.01	126.1
F3	23	"	13'-8"	12'4"	20.53	472.2
F11	6	"	4'-6"	Straight	6.76	40.6
G1	9	3/4"	9'-3"	3'-5"	9.65	86.9
G4	4	"	7'-9"	6'6"	8.08	32.3
G5	4	"	6'-0"	5'4"	6.26	25.0
J1	22	3/4"	14'-6"	2'8" 3'-3" 5'11" 2'8"	9.69	213.2
J2	2	"	12'-3"	Straight	8.12	16.4
J3	21	"	3'-3"	"	2.17	45.6
				TOTAL		2032 #

EAST ABUTMENT

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	2	1/4"	13'-3"	12'4"	35.38	70.8
D2	1	"	7'-0"	6'1"	18.69	18.7
F4	7	3/4"	12'-3"	Straight	18.40	128.8
F5	4	"	13'-6"	"	20.28	81.1
F6	4	"	6'-0"	"	9.01	36.0
F7	1	"	13'-8"	9'-4" 2'-8" 1'-8" 2'-8"	20.53	20.5
J4	1	3/4"	7'-0"	5'10"	4.68	4.7
J5	1	"	6'-6"	5'4"	4.36	4.3
J6	1	"	6'-0"	4'10"	4.01	4.0
J7	1	"	5'-6"	4'4"	3.67	3.7
J8	1	"	5'-0"	3'10"	3.34	3.3
J9	1	"	4'-7"	3'5"	3.06	3.1
J10	1	"	4'-0"	2'10"	2.67	2.7
J11	1	"	3'-7"	2'5"	2.39	2.4
J12	1	"	3'-3"	2'1"	2.17	2.2
J13	1	"	2'-7"	1'5"	1.73	1.7
J14	1	"	4'-5"	3'3"	2.95	3.0
J15	1	"	4'11"	3'9"	3.28	3.3
J16	1	"	5'-5"	4'3"	3.62	3.6
J17	1	"	5'11"	4'9"	3.95	4.0
J18	1	"	6'5"	5'3"	4.29	4.3
J19	1	"	6'11"	5'8"	4.62	4.6
J20	1	"	7'-6"	6'4"	5.01	5.0
J21	1	"	7'11"	6'9"	5.29	5.3
J22	1	"	8'-4"	7'2"	5.57	5.6
J23	1	"	8'11"	7'9"	5.96	6.0
J24	10	"	10'-6"	Straight	7.01	70.1
J25	10	"	3'-9"	Straight	2.50	25.0
				TOTAL		526 #

WEST ABUTMENT

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	2	1/4"	13'-3"	12'4"	35.38	70.8
D2	1	"	7'-0"	6'1"	18.69	18.7
F4	7	3/4"	12'-3"	Straight	18.40	128.8
F5	4	"	13'-6"	"	20.28	81.1
F6	4	"	6'-0"	"	9.01	36.0
F8	1	"	13'-8"	9'-4" 2'-8" 1'-8" 2'-8"	20.53	36.0
J4	2	3/4"	7'-0"	5'10"	4.68	9.4

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J5	1	3/4"	6'-6"	5'4"	4.45	4.5
J6	1	"	6'-2"	5'0"	4.12	4.1
J7	1	"	5'-8"	4'-6"	3.79	3.8
J14	2	"	4'-5"	3'3"	2.95	5.9
J15	1	"	4'-10"	3'-8"	3.23	3.2
J16	1	"	5'3"	4'1"	3.51	3.5
J17	1	"	5'9"	4'7"	3.84	3.8
J24	10	"	10'-7"	Straight	7.07	70.7
J25	1	"	5'-0"	3'10"	3.34	3.3
J26	1	"	7'-8"	6'-6"	5.12	5.1
J27	1	"	8'-1"	6'11"	5.40	5.4
J28	1	"	8'-6"	7'4"	5.68	5.7
J29	1	"	9'2"	8'0"	6.12	6.1
J30	1	"	9'-10"	8'8"	2.56	2.6
J31	1	"	3'-5"	2'3"	2.28	2.3
J32	1	"	3'-0"	1'10"	2.00	2.0
J33	1	"	2'-5"	1'3"	1.61	1.6
J34	1	"	6'-6"	5'2"	4.23	4.2
J35	10	"	3'-9"	Straight	2.50	25.0
				TOTAL		544 #

SHEET 933-12.3/82 MOVABLE CLOSURES STATIONS 29+80.3, 31+01.3 & 36+84.5

SILL

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	24	3/4"	15'-11"	14'-6"	23.78	570.7
F2	13	"	15'-10"	14'-5"	23.78	309.1
F3	15	"	14'-10"	13'-6"	22.28	334.2
G1	15	3/4"	14'-5"	8'1"	15.30	229.5
J1	2	3/4"	13'-6"	Straight	9.02	18.0
J2	13	"	13'-9"	2'-9" 2'-9" 2'-9" 2'-9" 2'-9"	9.18	119.3
J3	12	"	5'-3"	4'-3" 3'-6" 3'-6" 4'-3"	3.51	42.1
J4	12	"	5'-3"	4'-3" 3'-6" 3'-6" 4'-3"	3.51	42.1
J5	12	"	2'-6"	Straight	1.67	20.0
				TOTAL 1		1655 #
				TOTAL 3		5055 #

ABUTMENTS

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F4	22	3/4"	14'-6"	13'10"	21.78	479.2
J6	24	3/4"	8'-0"	Straight	5.34	128.2
J7	2	"	4'-4"	3'2"	2.89	5.8
J8	2	"	4'-7"	3'5"	3.06	6.1
J9	2	"	4'-11"	3'9"	3.28	6.6
J10	2	"	5'2"	4'0"	3.45	6.9
J11	2	"	5'-5"	4'3"	3.62	7.2
J12	2	"	5'-8"	4'6"	3.79	7.6
J13	2	"	6'-0"	4'10"	4.01	8.0
J14	2	"	6'-2"	5'0"	4.12	8.2
J15	2	"	6'-4"	5'2"	4.23	8.5
J16	2	"	6'-8"	5'6"	4.45	8.9
J17	2	"	6'-11"	5'9"	4.62	9.2

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J18	2	3/4"	7'-2"	6'0"	4.79	9.6
J19	2	"	4'-6"	3'4"	3.01	6.0
J20	2	"	4'-2"	3'0"	2.78	5.6
J21	2	"	3'-11"	2'9"	2.62	5.2
J22	2	"	3'-8"	2'6"	2.45	4.9
J23	2	"	3'-5"	2'3"	2.28	4.6
J26	2	"	2'-8"	1'6"	1.78	3.6
J27	2	"	2'-2"	1'0"	1.45	2.9
J28	2	"	1'-11"	9"	1.28	2.6
J36	24	"	3'-6"	Straight	2.34	56.2

For additional bars and totals see sheet No. 19

SHEET 933-12.3/83 STORAGE VAULTS STATIONS 30+32.8 & 36+40.0

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F5	6	3/4"	7'-9"	7'1"	11.64	69.8
F6	18	"	15'-6"	Straight	23.28	419.0
F7	4	"	13'-6"	"	20.28	81.1
F8	14	"	14'-2"	13'6"	21.28	297.9
F9	2	"	11'-0"	8'8"	16.52	33.0
F10	2	"	8'-0"	Straight	12.02	24.0
F11	15	"	16'-5"	15'3"	24.66	369.9
F12	15	"	5'-6"	Straight	8.26	123.9
G2	6	3/4"	4'0"	"	4.17	33.4
G3	24	"	15'-6"	"	16.17	388.1
G4	22	"	9'0"	8'4"	9.39	206.6
J1	34	3/4"	13'-6"	Straight	9.02	306.7
J27	6	"	5'-3"	4'-3" 3'-6" 3'-6" 4'-3"	3.51	21.1
J28	15	"	13'-10"	5'3"	9.24	138.6
J29	39	"	15'-6"	Straight	10.35	403.7
J30	14	"	10'-0"	8'-4"	6.68	93.5
J31	59	"	8'-6"	Straight	5.68	501.0
J32	18	"	11'-0"	8'8"	7.35	132.3
J33	9	"	9'-9"	8'5"	6.51	58.6
J34	6	"	6'-5"	5'4" 5'4"	5.62	33.7
				TOTAL 1		3536 #
				TOTAL 2		7062 #

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 10 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PERSONAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY P.B. TR. BY P.B. CK. BY F.S.F.

"BELIEVED AS BUILT"

933-14.1/10

787

REINFORCEMENT SCHEDULE

SIZE	D
1/2"	10"
5/8"	5"
1"	8"
1 1/4"	7"
3" OR 4 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

SHEET 933-12.3/85 MOVABLE CLOSURE

STATIONS 31+51.4, 71+74.5 AND 75+85.1

SILL

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	35	3/4"φ	20'-8"	19'-6"	31.04	1024.3
F4	2	"	17'-3"	Straight	25.91	51.8
F5	18	"	13'-0"	12'-6"	20.53	369.5
F6	1	"	8'-2"	Straight	12.27	12.3
F7	1	"	10'-7"	8'-1"	15.90	15.9
J1	17	3/4"φ	14'-8"	8'-11" 1'-9" 12'-3"	9.80	166.6
J2	17	"	3'-0"	Straight	2.00	34.0
J3	See Note	"	12'-3"	"	8.18	See Note
J4	30	"	15'-8"	"	10.47	314.1
J5	25	"	8'-9"	8'-1"	5.84	146.0
J6	2	"	8'-9"	7'-6"	5.84	11.7
J7	See Note	"	10'-7"	8'-1"	7.07	See Note
J8	11	"	8'-2"	Straight	5.46	60.1
J33	20	"	14'-3"	1'-6 1/2"	9.52	190.4
J34	9	"	18'-3"	1'-6 1/2"	12.19	36.6
J35	1	"	19'-3"	13'-0" 1'-3"	6.85	See Note
J36	6	"	5'-6"	4'-0" 1'-6"	3.67	See Note
				TOTAL Sta. 31+51.4		2547*
				TOTAL Sta. 71+74.5 Sta. 75+85.1		2418* 2412*

Note: 1-J5 for stations 31+74.5 & 75+85.1
1-J5 & 1-J6 for station 31+51.4 only
12-J5 & 1-J36 for station 31+51.4 only
1-J5 for station 31+51.4 & 75+85.1
1-J5 & 1-J6 for station 31+74.5

ABUTMENTS

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F3	1	3/4"φ	19'-2"	3'-2" 5'-6" 3'-10"	19.18	19.5
F8	9	"	11'-10"	Straight	17.77	159.9
F9	3	"	9'-0"	"	9.01	27.0
F10	4	"	12'-10"	"	19.28	77.1
G1	10	3/4"φ	11'-8"	Straight	11.82	118.2
G2	10	"	4'-3"	"	4.43	44.3
G3	1	"	4'-6"	3'-3"	4.69	4.7
G4	1	"	5'-1"	3'-10"	5.30	5.3
G5	1	"	5'-9"	4'-6"	6.00	6.0
G6	1	"	6'-2"	4'-10"	6.43	6.4
G7	1	"	6'-8"	5'-3"	6.95	7.0
G8	1	"	7'-1"	5'-10"	7.39	7.4
G9	1	"	7'-7"	6'-4"	7.91	7.9
G10	1	"	8'-0"	6'-8"	8.34	8.3
G11	1	"	8'-5"	7'-2"	8.78	8.8
G12	1	"	9'-0"	7'-9"	9.39	9.4
G13	1	"	7'-9"	6'-6"	8.08	8.1
G14	1	"	7'-2"	5'-11"	7.47	7.5
G15	1	"	6'-6"	5'-3"	6.78	6.8
G16	1	"	6'-1"	4'-10"	6.34	6.3

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G17	1	3/4"φ	5'-7"	4'-6"	5.82	5.8
G18	1	"	5'-2"	3'-11"	5.39	5.4
G19	1	"	4'-8"	3'-5"	4.87	4.9
G20	1	"	4'-3"	3'-0"	4.43	4.4
G21	1	"	3'-10"	2'-7"	4.00	4.0
G22	1	"	3'-3"	2'-0"	3.39	3.4
				TOTAL 1		574*
				TOTAL 3		1,722*

SHEET 933-12.3/86 STATION 31+51.4

VAULT & ABUTMENT

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F2	2	3/4"φ	17'-0"	7'-6" 0'-4" 9'-2"	25.53	51.1
F6	1	"	8'-2"	Straight	12.27	12.3
F7	1	"	10'-7"	8'-1"	15.90	15.9
F10	4	"	12'-10"	Straight	19.28	77.1
F12	2	"	17'-0"	"	25.53	51.1
G23	12	3/4"φ	12'-0"	"	12.52	150.2
G24	1	"	9'-9"	"	10.17	10.2
G25	1	"	13'-4"	1'-5" 5'-6" 5'-3"	13.91	13.9
G26	1	"	12'-8"	5'-10" 6'-8"	13.21	13.2
G27	4	"	4'-0"	Straight	4.17	16.7
G28	4	"	4'-0"	3'-8" 0'-4"	4.17	16.7
J4	24	3/4"φ	15'-8"	Straight	10.47	251.3
J5	8	"	8'-9"	8'-1"	5.84	46.7
J7	9	"	10'-7"	8'-1"	7.07	63.6
J8	17	"	8'-2"	Straight	5.46	92.8
J9	14	"	6'-5"	1'-2" 3'-1"	4.29	60.1
J11	1	"	8'-8"	7'-4"	5.79	5.8
J12	8	"	16'-4"	15'-8"	10.91	87.3
J13	10	"	3'-9"	Straight	2.50	25.0
J14	1	"	10'-10"	9'-10"	7.24	7.2
J15	1	"	10'-7"	9'-7"	7.07	7.1
J16	1	"	9'-10"	8'-10"	6.57	6.6
J17	1	"	9'-5"	8'-5"	6.29	6.3
J18	1	"	9'-0"	8'-0"	6.01	6.0
J19	1	"	8'-7"	7'-7"	5.73	5.7
J20	1	"	7'-11"	6'-11"	5.29	5.3
J37	8	"	17'-0"	2'-3" 8'-9"	11.36	90.9
J38	19	"	17'-0"	Straight	11.36	215.8
J39	7	"	13'-6"	"	9.02	63.1

See Sheet No.13 for additional bars and total

STATIONS 71+74.5 & 75+85.4

VAULTS & ABUTMENTS

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F2	2	3/4"φ	17'-0"	7'-6" 0'-4" 9'-2"	25.53	51.1
F6	1	"	8'-2"	Straight	12.27	12.3
F7	1	"	10'-7"	8'-1"	15.90	15.9
F10	4	"	12'-10"	Straight	19.28	77.1
F12	2	"	17'-0"	"	25.53	51.1
G23	12	3/4"φ	12'-0"	"	12.52	150.2

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G24	1	3/4"φ	9'-9"	Straight	10.17	10.2
G25	1	"	13'-4"	1'-5" 5'-6" 5'-3"	13.91	13.9
G26	1	"	12'-8"	1'-5" 5'-10" 6'-8"	13.21	13.2
G27	4	"	4'-0"	Straight	4.17	16.7
G28	4	"	4'-0"	3'-8" 0'-4"	4.17	16.7
J4	24	3/4"φ	15'-8"	Straight	10.47	251.3
J5	8	"	8'-9"	8'-1"	5.84	46.7
J7	9	"	10'-7"	8'-1"	7.07	63.6
J8	17	"	8'-2"	Straight	5.46	92.8
J9	14	"	6'-5"	1'-2" 3'-1"	4.29	60.1
J11	1	"	8'-8"	7'-4"	5.79	5.8
J12	8	"	16'-4"	15'-8"	10.91	87.3
J13	10	"	3'-9"	Straight	2.50	25.0
J14	1	"	10'-10"	9'-10"	7.24	7.2
J15	1	"	10'-7"	9'-7"	7.07	7.1
J16	1	"	9'-10"	8'-10"	6.57	6.6
J17	1	"	9'-5"	8'-5"	6.29	6.3
J18	1	"	9'-0"	8'-0"	6.01	6.0
J19	1	"	8'-7"	7'-7"	5.73	5.7
J20	1	"	7'-11"	6'-11"	5.29	5.3
J37	8	"	17'-0"	2'-3" 8'-9"	11.36	90.9
J38	19	"	17'-0"	Straight	11.36	215.8

See Sheet No.13 for additional bars and total

SHEET 933-12.3/88 MOVABLE CLOSURE

STATIONS 54+37.6 & 51+87.3

SILL

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	13	3/4"φ	19'-0"	Straight	28.54	371.0
F2	3	"	8'-0"	"	12.02	36.1
F3	12	"	10'-9"	8'-7"	16.15	193.8
J1	18	3/4"φ	5'-6"	3'-9"	3.67	66.1
J2	18	"	6'-4"	4'-7"	4.23	76.1
J3	17	"	3'-3"	Straight	2.17	36.9
J4	2	"	5'-8"	"	5.68	11.4
J5	21	"	11'-0"	"	7.35	154.4
J6	2	"	5'-0"	"	5.34	10.7
J7	2	"	7'-0"	"	4.68	9.4
J8	16	"	8'-9"	8'-1"	5.84	93.4
				TOTAL 1		1059*
				TOTAL 2		2118*

ABUTMENTS

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F4	19	3/4"φ	8'-9"	Straight	13.14	249.7
J3	14	3/4"φ	3'-9"	"	2.17	30.4
J6	14	"	5'-0"	"	5.34	74.8
J9	4	"	4'-11"	3'-9"	3.28	13.1
J10	4	"	4'-9"	3'-7"	3.17	12.7
J11	4	"	4'-7"	3'-5"	3.06	12.2
J12	4	"	4'-5"	3'-3"	2.95	11.8

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J13	4	3/4"φ	4'-3"	3'-1"	2.84	11.4
J14	2	"	4'-1"	2'-11"	2.73	5.5
J15	2	"	3'-10"	2'-9"	2.62	5.2
J16	2	"	5'-3"	4'-1"	3.51	7.0
J17	2	"	5'-1"	3'-11"	3.40	6.8
				TOTAL 1		441*
				TOTAL 2		882*

STORAGE VAULT

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F2	2	3/4"φ	8'-0"	Straight	12.02	24.0
F5	6	"	8'-0"	"	13.52	81.1
F6	3	"	10'-0"	8'-2"	15.02	45.1
F7	3	"	10'-1"	6'-6" 0'-4" 3'-1"	15.15	45.5
J5	33	"	11'-0"	Straight	7.35	242.6
J6	4	"	8'-0"	"	5.34	21.4
J8	5	"	8'-9"	8'-1"	5.84	29.2
J19	6	"	7'-6"	Straight	5.01	30.1
J20	4	"	4'-10"	1'-11 1/2" 1'-6 1/2"	3.23	12.9
J21	4	"	4'-6"	1'-11 1/2" 1'-6 1/2"	3.01	12.0
J22	13	"	9'-0"	Straight	6.01	78.1
				TOTAL 1		622*
				TOTAL 2		1244*

SHEET 933-12.3/90 MOVABLE CLOSURE STA. 62+84.3

SILL

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	31	3/4"φ	20'-9"	19'-5"	31.17	966.3
F2	7	"	6'-9"	1'-6" 1'-6" 3'-9"	10.14	71.0
F4	20	"	13'-6"	12'-2"	20.28	405.6
F5	2	"	19'-6"	Straight	29.29	58.6
J1	17	3/4"φ	14'-7"	1'-2" 1'-6" 8'-3"	9.74	165.6
J2	18	"	3'-3"	Straight	2.17	39.1
J3	2	"	12'-4"	"	8.24	16.5
J4	20	"	13'-11"	2'-6" 1'-5"	9.30	186.0
				TOTAL		1909*

WEST ABUTMENT

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F7	1	3/4"φ	10'-11"	8'-6"	16.40	16.4
F8	1	"	7'-0"	5'-9"	10.51	10.5
F9	4	"	12'-0"	Straight	18.02	72.1

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 11 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, DIST. OF REGIM

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, DIST. OF FLOOD CONTROL ENGINEER

APPROVED: [signature] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY R.S. TR. BY R.S. CK. BY E.B.F.

"BELIEVED AS BUILT" 933-14.1/11

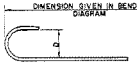
788

135

REINFORCEMENT SCHEDULE

SIZE	D
1¼"	10"
1⅛"	9"
1"	8"
⅞"	7"
¾" OR 4 LEGS	6"

DIMENSION GIVEN IN BENDING DIAGRAM



WEST ABUTMENT (CONT'D)

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F11	4	¾"φ	12'-9"	Straight	19.15	76.6
G1	11	¾"φ	12'-0"	"	12.52	137.7
G2	1	"	9'-3"	"	9.65	9.7
G3	1	"	13'-6"	6'-7" 3'-7" 3'-12"	14.08	14.1
G4	1	"	13'-6"	6'-6" 3'-7" 3'-12"	14.08	14.1
G5	2	"	4'-0"	2'-3"	4.17	16.7
G6	4	"	4'-0"	Straight	4.17	16.7
J4	1	⅞"φ	5'-5"	4'-3"	3.62	3.6
J5	1	"	6'-5"	5'-3"	4.29	4.3
J6	1	"	6'-8"	5'-6"	4.85	4.5
J7	1	"	7'-2"	6'-0"	4.79	4.8
J8	1	"	7'-8"	6'-6"	5.12	5.1
J9	1	"	8'-2"	7'-0"	5.46	5.5
J10	1	"	8'-8"	7'-6"	5.79	5.8
J11	1	"	8'-11"	7'-9"	5.96	6.0
J12	1	"	9'-8"	8'-6"	6.46	6.5
J13	1	"	9'-2"	8'-0"	3.45	3.5
J14	1	"	4'-8"	3'-6"	3.12	3.1
J15	1	"	4'-5"	3'-3"	2.95	3.0
J16	1	"	3'-11"	2'-9"	2.62	2.6
J17	1	"	3'-5"	2'-3"	2.28	2.3
J18	1	"	2'-11"	1'-9"	1.95	2.0
J19	1	"	2'-3"	1'-6"	1.78	1.8
J20	6	"	12'-7"	9'-0"	8.41	50.5
J21	7	"	15'-9"	Straight	10.52	73.6
J22	9	"	3'-3"	"	2.50	22.5
				TOTAL		536*

EAST ABUTMENT

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F10	10	¾"φ	11'-9"	Straight	17.65	176.5
* F11	4	"	12'-9"	"	19.15	76.6
F12	1	"	13'-1"	4'-9" 3'-7" 3'-12"	19.65	19.7
F13	3	"	9'-0"	Straight	9.01	27.0
G7	10	¾"φ	4'-3"	"	4.43	44.3
G8	9	"	11'-10"	"	12.34	111.1
G9	2	"	7'-8"	6'-0"	8.00	16.0
G10	2	"	7'-3"	5'-5"	7.39	14.8
G11	2	"	6'-6"	4'-10"	6.78	13.6
G12	2	"	5'-11"	4'-3"	6.17	12.3
G13	1	"	5'-6"	3'-10"	5.74	5.7
G14	1	"	5'-0"	3'-4"	5.39	5.4
G15	1	"	4'-4"	2'-10"	4.69	4.7

* Bar shown as F6 on Plan.

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G16	1	¾"φ	4'-2"	2'-6"	4.35	4.4
G17	1	"	3'-10	2'-2"	4.00	4.0
G18	1	"	3'-2"	1'-6"	3.30	3.3
G19	1	"	8'-7"	6'-5"	8.43	8.4
G20	1	"	8'-5"	6'-3"	8.78	8.8
G21	1	"	9'-1"	7'-5"	9.47	9.5
G22	1	"	9'-5"	7'-9"	9.82	9.8
G23	1	"	9'-9"	8'-1"	10.17	10.2
G24	1	"	10'-5"	8'-9"	10.86	10.9
				TOTAL		597*

SHEET 933-12.3/91 STATION 62+84.3
BUTTRESSED "T" WALL

BASE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F6	3	¾"φ	8'-0"	7'-4"	12.02	36.1
F13	2	"	6'-0"	Straight	9.01	18.0
F14	3	"	21'-6"	20'-2"	32.29	96.9
F15	5	"	20'-9"	Straight	30.48	152.1
F16	3	"	22'-6"	21'-2"	33.54	100.6
F17	14	"	23'-6"	Straight	35.30	494.2
F19	11	"	15'-0"	13'-6"	22.53	247.8
F20	10	"	8'-6"	7'-10"	12.77	127.7
F21	3	"	7'-3"	Straight	10.89	32.7
G27	11	¾"φ	14'-6"	13'-3"	14.95	164.5
G28	14	"	10'-3"	9'-11"	10.89	149.7
J41	24	⅞"φ	12'-11"	11'-4"	8.63	207.1
				TOTAL		1836*

COUNTERFORTS

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G29	4	¾"φ	12'-6"	Straight	13.04	52.2
G30	2	"	12'-9"	"	13.30	26.6
J33	2	⅞"φ	6'-9"	1'-5"	3.17	6.3
J34	3	"	5'-7"	1'-10"	3.73	11.2
J35	3	"	6'-3"	2'-12"	4.17	12.5
J36	3	"	7'-1"	2'-10"	4.73	14.2
J37	3	"	7'-7"	3'-10"	5.07	15.2
J38	3	"	8'-7"	3'-4"	5.73	17.2
J39	1	"	4'-5"	1'-5"	2.95	3.0
J40	1	"	5'-1"	1'-7"	3.40	3.4
				TOTAL		162*

STEM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F20	20	¾"φ	13'-2"	12'-6"	19.78	395.6
F21	9	"	8'-6"	7'-10"	12.77	114.9
G31	6	¾"φ	22'-8"	21'-2"	23.64	141.8
G32	8	"	21'-6"	20'-2"	22.42	179.4
G33	8	"	20'-2"	Straight	21.03	168.2
				TOTAL		1000*

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
SHEET 933-12.3/93 STATION 62+84.3						
STORAGE VAULT (LESS W. ABUT)						
G25	27	¾"φ	11'-9"	10'-5"	12.26	331.0
J21	41	⅞"φ	15'-9"	Straight	10.52	431.3
J23	8	"	11'-3"	10'-7"	7.51	60.1
J24	9	"	9'-0"	Straight	6.01	54.1
J25	22	"	10'-6"	"	7.01	154.2
J26	14	"	12'-10"	11'-4"	8.57	120.0
J27	7	"	15'-3"	14'-7" 10'-4"	10.19	71.3
J28	19	"	12'-0"	Straight	8.02	104.3
J29	17	"	11'-0"	"	7.35	125.0
J30	19	"	11'-3"	"	7.51	97.6
				TOTAL		1549*
STATION 68+61.0 STORAGE VAULT						
F6	4	¾"φ	11'-8"	Straight	17.52	70.1
F7	4	"	8'-0"	"	12.02	48.1
F8	13	"	15'-6"	"	23.28	302.6
G1	8	¾"φ	4'-0"	"	4.17	33.4
G2	14	"	12'-9"	11'-3"	12.78	178.9
G3	7	"	7'-6"	6'-10"	7.02	54.7
J24	32	⅞"φ	11'-6"	Straight	7.68	245.8
J25	16	"	11'-6"	1'-4" 1'-7"	7.68	122.9
J26	53	"	15'-9"	Straight	10.52	557.6
J27	14	"	9'-3"	8'-0"	6.18	86.5
J28	31	"	8'-0"	Straight	5.34	165.5
J29	8	"	9'-3"	7'-10"	6.18	49.4
J30	16	"	7'-3"	6'-7"	4.84	77.4
J31	7	"	6'-0"	2'-10" 2'-2"	4.01	28.1
J32	7	"	5'-3"	1'-11" 1'-4"	3.51	24.6
J33	16	"	14'-3"	13'-7"	9.52	152.3
				TOTAL		2198*
SHEET 933-12.3/95 MOVABLE CLOSURES STATION 67+73.5 & 69+64.3						
SILL						
E1	4	¾"φ	14'-6"	Straight	29.64	118.6
F1	15	¾"φ	10'-9"	9'-5"	16.15	242.3
F2	24	"	14'-6"	Straight	21.78	522.7
J1	14	⅞"φ	4'-6"	3'-10" 3'-10"	3.01	42.1
J2	14	"	5'-3"	4'-7" 3'-10"	3.51	49.1
J3	15	"	9'-3"	Straight	6.18	92.7
J14	15	"	12'-6"	1'-9" 1'-9"	8.35	125.3
				TOTAL 1		1193*
				TOTAL 2		2386*
ABUTMENT						
F4	4	¾"φ	10'-9"	Straight	21.97	87.9
F5	5	"	11'-3"	10'-7"	22.99	115.0
J4	9	⅞"φ	3'-6"	Straight	2.34	21.1
J5	10	"	5'-8"	"	3.79	37.9

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J6	1	⅞"φ	4'-9"	3'-6"	3.17	3.2
J7	1	"	4'-6"	3'-3"	3.12	3.1
J8	1	"	4'-3"	3'-0"	2.84	2.8
J9	1	"	4'-0"	2'-9"	2.67	2.7
J10	1	"	3'-9"	2'-6"	2.50	2.5
J11	1	"	3'-6"	2'-3"	2.34	2.3
J12	1	"	3'-3"	2'-0"	2.17	2.2
J13	1	"	3'-0"	1'-9"	2.00	2.0
J17	1	"	4'-6"	3'-3"	3.01	3.0
J18	1	"	4'-9"	3'-6"	3.17	3.2
J22	1	"	5'-9"	4'-6"	3.84	3.8
J23	1	"	6'-0"	4'-9"	4.01	4.0
J33	1	"	3'-11"	1'-8"	2.62	2.6
J34	1	"	4'-2"	2'-11"	2.78	2.8
J35	1	"	4'-11"	3'-6"	3.28	3.3
J36	1	"	5'-2"	3'-11"	3.45	3.5
J37	1	"	5'-5"	4'-2"	3.62	3.6
				TOTAL 1		313*
				TOTAL 4		1252*
SHEET 933-12.3/97 MOVABLE CLOSURE SILL & ABUTMENT STATION 83+92.1						
D1	20	1⅛"	35'-6"	34'-6"	102.80	2056.0
D2	1	"	38'-0"	36'-6"	101.46	101.5
D3	1	"	37'-3"	35'-3"	99.46	99.5
D4	10	"	16'-3"	Straight	43.39	433.9
D5	2	"	15'-9"	14'-4"	40.72	81.4
D6	2	"	7'-9"	6'-10"	20.69	41.4
D7	1	"	9'-3"	8'-4"	24.70	24.7
E1	7	¾"φ	14'-6"	Straight	29.64	207.5
E2	14	"	8'-0"	"	16.35	228.9
E3	1	"	4'-9"	"	9.71	9.7
E4	1	"	5'-3"	"	10.73	10.7
E5	2	"	15'-10"	7'-4" 3'-2" 3'-2" 2'-10"	32.36	64.7
E6	2	"	15'-10"	6'-8" 3'-2" 3'-2" 2'-10"	32.36	64.7
F1	11	¾"φ	14'-3"	Straight	21.40	235.4
F2	2	"	5'-0"	3'-6"	7.51	15.0

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 12 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: DIVISION ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN

APPROVED: COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY P.S. TR. BY R.S. CH. BY S.S.F.

"BELIEVED AS BUILT"

933-14.1/12

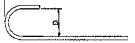
789

136

REINFORCEMENT SCHEDULE

SIZE	D
#4 OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM



BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
SILL & ABUTMENT (CONT'D.)						
F3	13	1¼"φ	38'-0"	38'-0"	57.08	742.0
F4	2	"	35'-0"	35'-0"	52.57	105.1
F5	1	"	36'-6"	35'-0"	54.82	54.8
F6	20	"	7'-0"	1'-6" 5'-0" 1'-6"	10.51	210.2
F7	35	"	16'-3"	14'-0"	24.41	854.4
F8	1	"	13'-6"	13'-0"	20.53	20.5
F11	1	"	14'-9"	14'-0"	22.15	22.2
G1	34	1¼"φ	3'-9"	Straight	3.91	132.9
G2	21	"	9'-3"	5'-5"	9.65	202.7
G3	12	"	14'-0"	Straight	14.60	175.2
G4	12	"	11'-5"	"	11.91	142.9
G5	23	"	4'-3"	"	4.43	101.9
G6	1	"	10'-10"	9'-2"	11.30	11.3
G7	1	"	10'-3"	8'-7"	10.69	10.7
G8	3	"	9'-7"	7'-11"	10.00	30.0
G9	2	"	9'-2"	7'-8"	9.56	19.1
G10	2	"	8'-8"	7'-0"	9.04	18.1
G11	3	"	8'-3"	6'-7"	8.60	25.8
G12	2	"	7'-7"	5'-11"	7.91	15.8
G13	3	"	7'-1"	5'-5"	7.39	22.2
G14	3	"	6'-7"	4'-11"	6.87	20.6
G15	3	"	5'-10"	4'-2"	6.08	18.2
G16	2	"	5'-1"	3'-5"	5.30	10.6
G17	2	"	4'-11"	3'-3"	5.13	10.3
G18	1	"	5'-7"	3'-11"	5.82	5.8
G19	2	"	6'-2"	4'-6"	6.43	12.9
G20	3	"	9'-11"	8'-5"	10.34	31.0
G21	2	"	10'-8"	9'-0"	11.13	22.3
G22	1	"	4'-1"	2'-3"	4.26	4.3
G23	1	"	4'-10"	3'-2"	5.04	10.1
G24	1	"	5'-3"	3'-7"	5.48	5.5
G25	1	"	6'-4"	4'-8"	6.61	6.6
G26	1	"	6'-10"	5'-2"	7.13	7.1
G27	1	"	7'-9"	6'-1"	8.08	8.1
G28	1	"	7'-5"	5'-9"	7.74	7.7
G29	2	"	8'-11"	7'-3"	9.30	18.6
G30	1	"	7'-11"	6'-3"	8.26	8.3
G31	1	"	8'-5"	6'-9"	8.78	8.8
J1	34	1¼"φ	17'-4"	3'-0" 5'-0" 3'-0"	11.58	393.7
J3	1	"	15'-0"	Straight	10.02	10.0

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J16	1	½"φ	12'-9"	Straight	8.52	8.5
J20	16	"	4'-7"	1'-6"	3.06	49.0
J21	2	"	15'-6"	Straight	10.35	20.7
J22	1	"	16'-9"	2'-0" 1'-6" 1'-6"	11.19	11.2
				TOTAL		730.3 #
SHEET 933-12.3/86 STA. 31+51.4, 71+74.5 & 75+85.1						
VAULT & ABUTMENT (CONT'D. FROM SHEET 11)						
J10	1	½"φ	9'-6"	8'-6"	6.35	6.4
J21	1	"	7'-7"	6'-7"	5.07	5.1
J22	1	"	7'-3"	6'-3"	4.84	4.8
J23	1	"	6'-7"	5'-7"	4.40	4.4
J24	1	"	5'-3"	4'-3"	3.51	3.5
J25	1	"	5'-6"	4'-6"	3.67	3.7
J26	1	"	6'-3"	5'-3"	4.17	4.2
J27	1	"	6'-8"	5'-8"	4.45	4.5
J28	1	"	7'-1"	6'-1"	4.73	4.7
J29	1	"	7'-6"	6'-6"	5.01	5.0
J30	1	"	8'-2"	7'-2"	5.46	5.5
J31	1	"	8'-6"	7'-6"	5.68	5.7
J32	1	"	8'-10"	7'-10"	5.90	5.9
TOTAL FOR CLOSURE AT STATION 31+51.4						15.98 #
TOTAL FOR CLOSURE AT STATION 71+74.5						15.96 #
TOTAL FOR CLOSURE AT STATION 75+85.1						15.98 #
SHEET 933-12.3/82 MOVABLE CLOSURES						
STATIONS 29+80.3, 31+01.3 & 36+84.5						
ABUTMENTS (CONT'D. FROM SHEET 10)						
J37	2	½"φ	3'-2"	2'-0"	2.12	4.2
J38	2	"	2'-11"	1'-9"	1.95	3.9
J39	2	"	2'-5"	1'-3"	1.61	3.2
TOTAL 2						603 #
TOTAL 3						2408 #

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 13 OF 13 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] DIVISION, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

CK. BY P.S. TR. BY P.S.

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, DIST. DIST ENGINEER

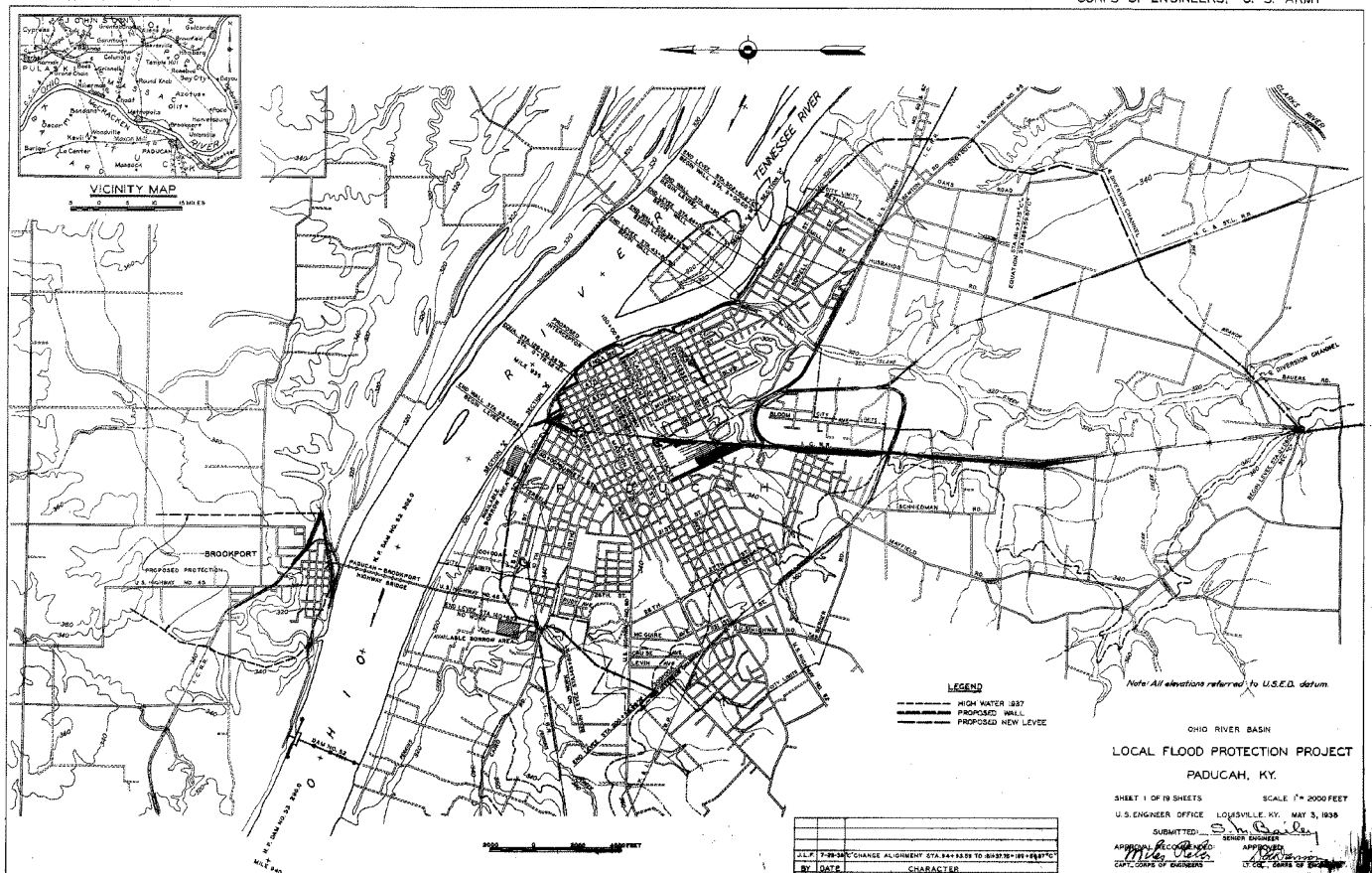
CK. BY F.E.B.

"BELIEVED AS BUILT" 933-14.1/13

137

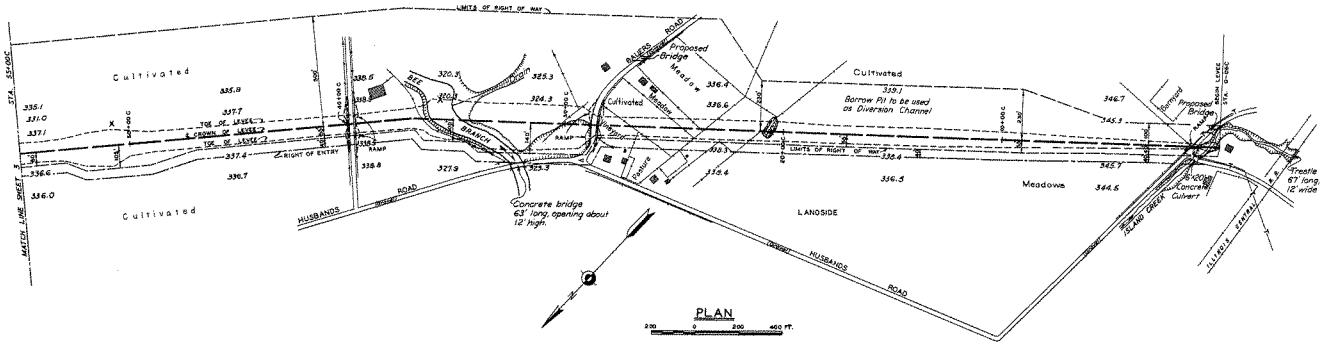
WAR DEPARTMENT

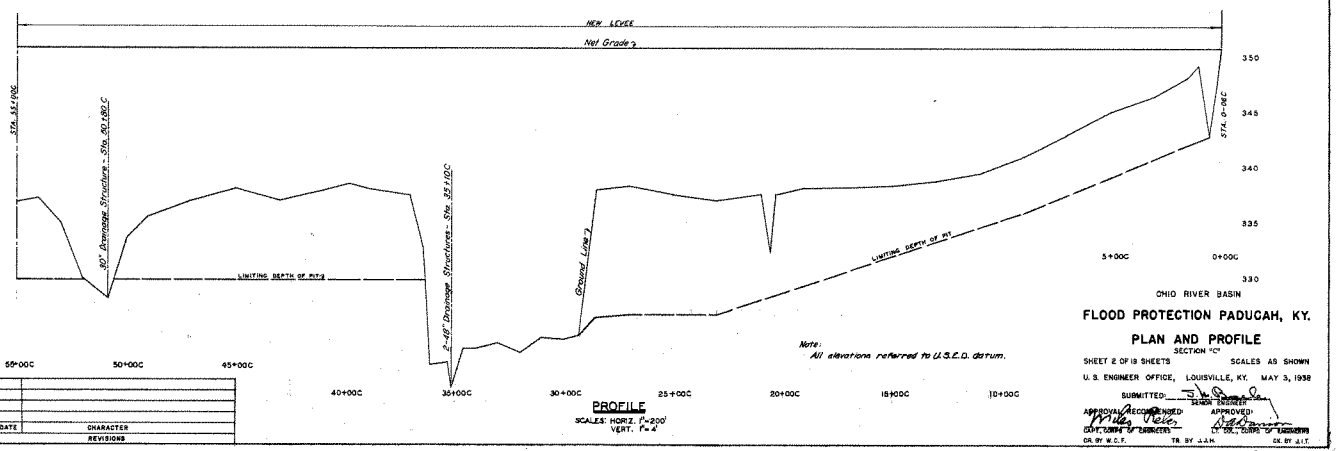
CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





Note:
All elevations referred to U.S.E.D. datum.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "C"

SHEET 2 OF 19 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: J. W. Bowen, SENIOR ENGINEER

APPROVAL RECOMMENDED: Willis Vetter, CAPT., CORPS OF ENGINEERS

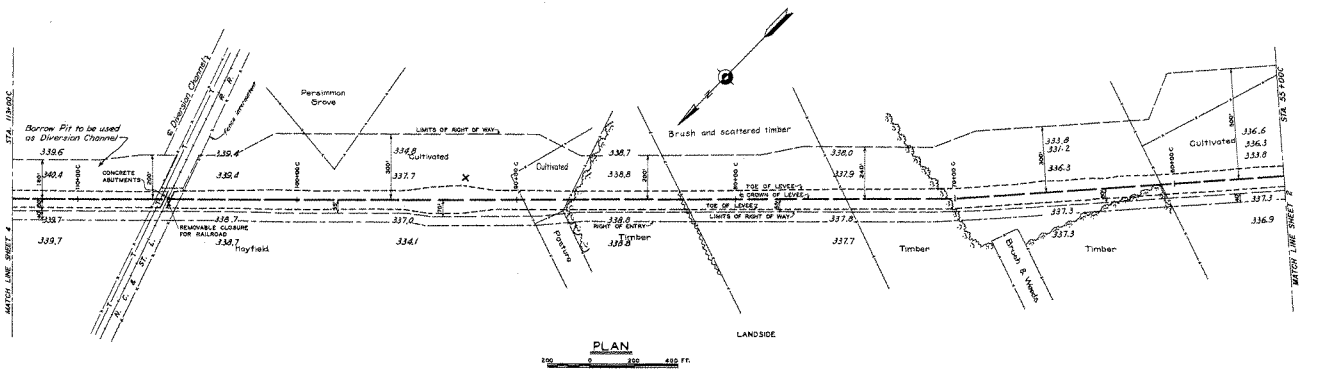
APPROVED: R. E. Jenkins, LT. COL., CORPS OF ENGINEERS

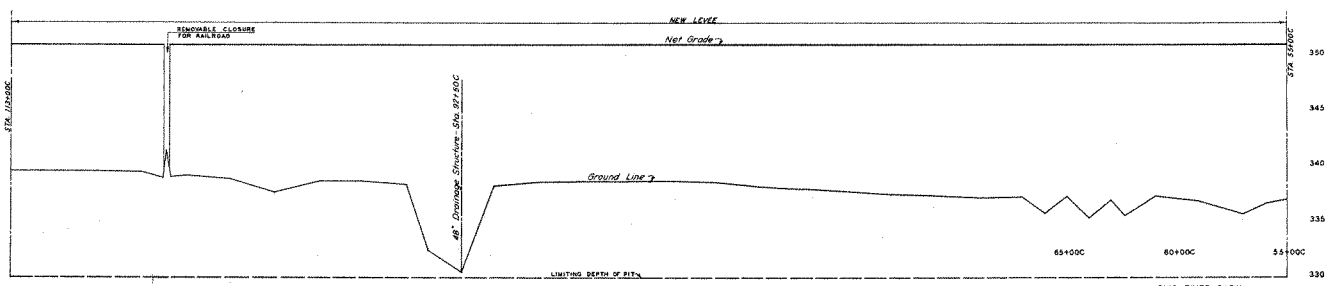
DR. BY W.C.F. TR. BY J.J.H. CK. BY J.I.T.

EXHIBIT 2 934-12.1/2P

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "C"

SHEET 3 OF 19 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: _____ SENIOR ENGINEER

APPROVAL RECOMMENDED: _____ CAPT., CORPS OF ENGINEERS

APPROVED: _____ LT. COL., CORPS OF ENGINEERS

DR. BY W.C.F. TR. BY J.J.M. CK. BY J.L.C.

Note:
All elevations referred to U.S.E.D. datum.

110+00C 105+00C 100+00C 95+00C 90+00C 85+00C 80+00C 75+00C 70+00C

PROFILE

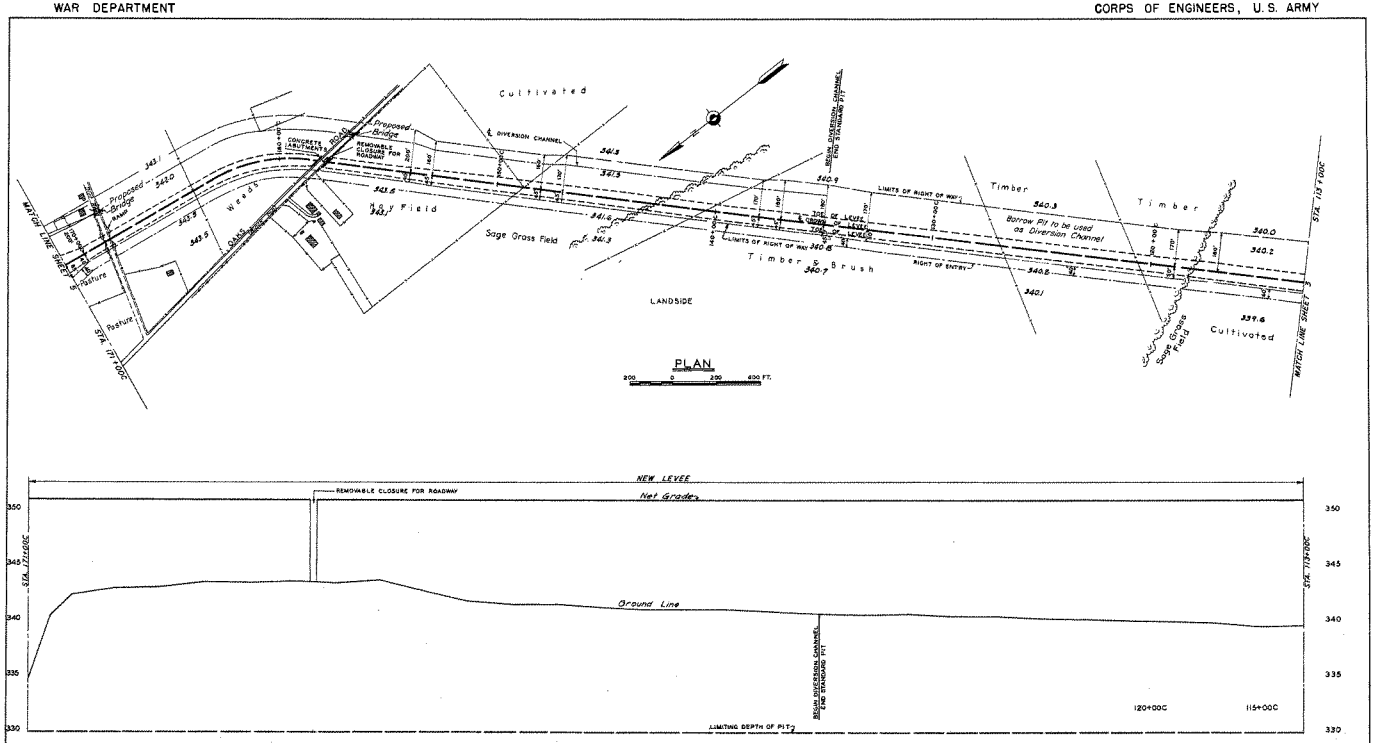
SCALES: HORIZ. 1" = 200'
VERT. 1" = 4'

BY	DATE	CHARACTER
		REVISIONS

EXHIBIT 3 934-12.1/3P

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



Note:
All elevations referred to U.S.E.D. datum.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "D"

SHEET 4 OF 19 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: J. H. Bell
SENIOR ENGINEER

APPROVAL RECOMMENDED: Paul Vebe
CAPT., CORPS OF ENGINEERS

APPROVED: Anderson
LT. COL., CORPS OF ENGINEERS

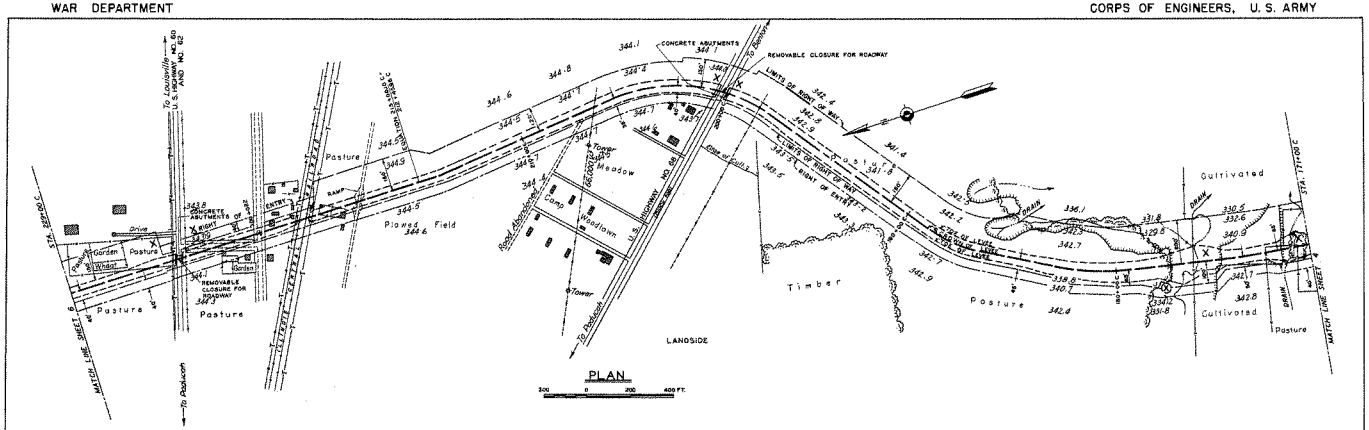
DR. BY W.G.P. TR. BY J.J.H. CK. BY J.L.T.

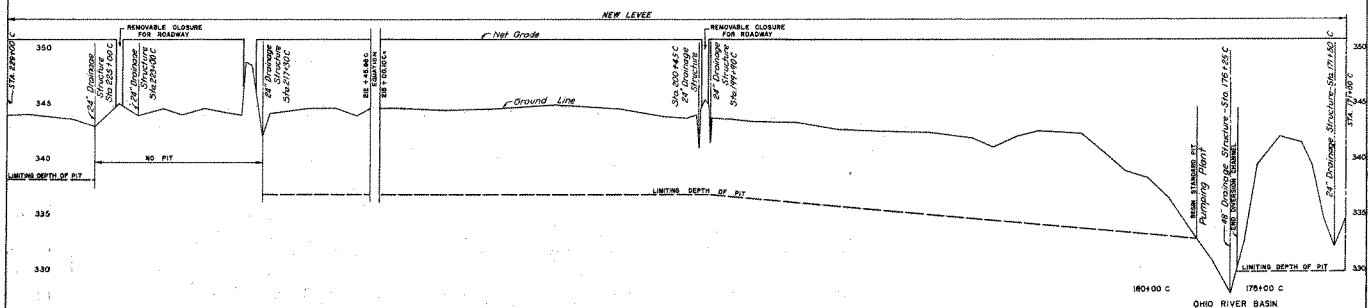
EXHIBIT 4 934-12.1/4P

049

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





Note:
All elevations referred to U.S.E.D. datum.

BY	DATE	CHARACTER
		REVISIONS

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "C"

SHEET 5 OF 19 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: [illegible] 22 MAY 1938

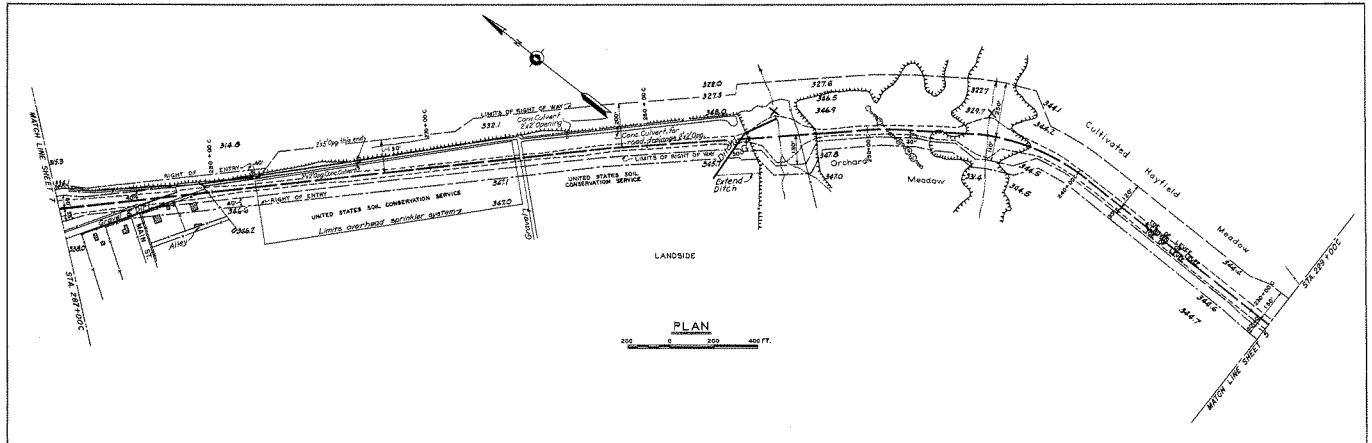
APPROVAL RECOMMENDED: [illegible] CAPT., CORPS OF ENGINEERS — DR. BY. M.G.F.

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS — TR. BY. J.J.H. — CK. BY. J.I.T.

EXHIBIT 5 934-12.1/5P

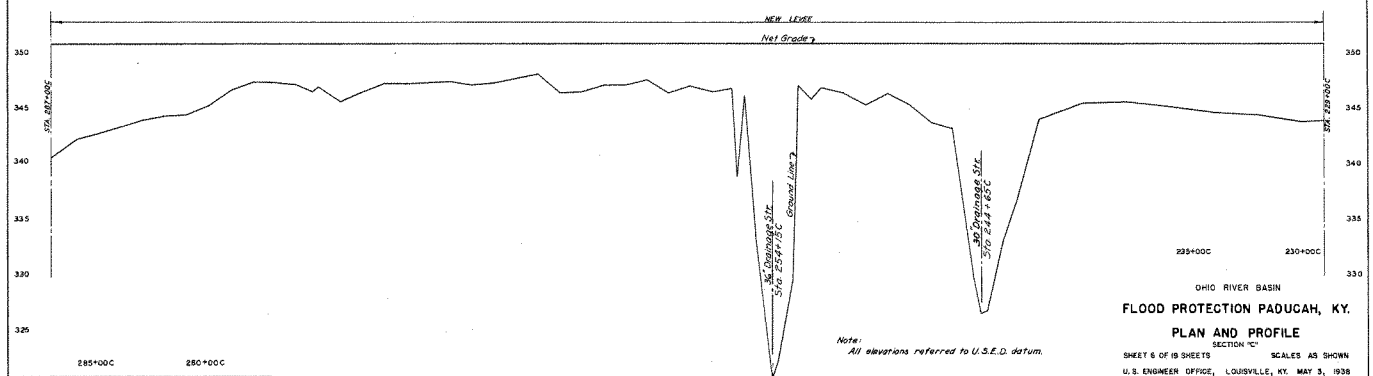
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

200 0 200 400 FT.



PROFILE

SCALES: HORIZ. 1"=200'
VERT. 1"=4'

Note:
All elevations referred to U.S.E.D. datum.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "C"

SHEET 6 OF 19 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: CAPT., CORPS OF ENGINEERS

APPROVED: LT. COL., CORPS OF ENGINEERS

DR. BY W.C.F. TR. BY J.J.H. CK. BY J.I.T.

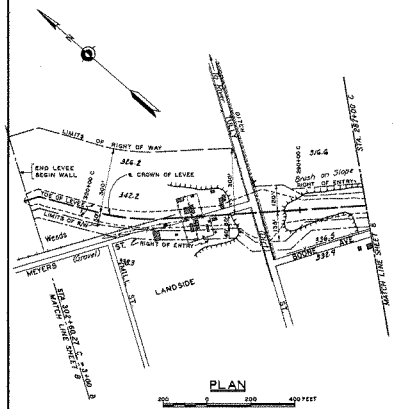
BY	DATE	CHARACTER
		REVISIONS

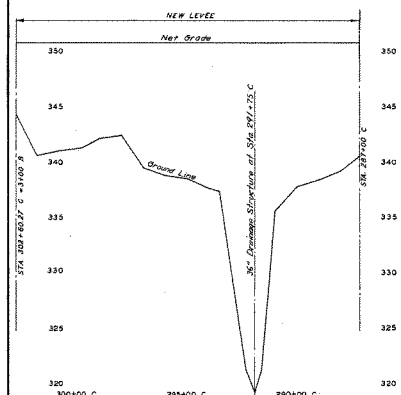
EXHIBIT 6 934-12.1/6P

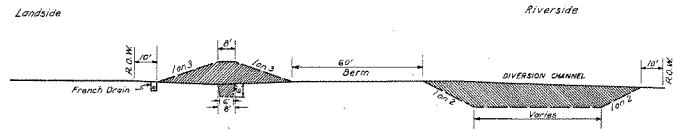
C51

WAR DEPARTMENT

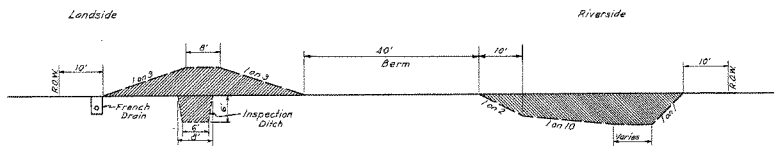
CORPS OF ENGINEERS, U.S. ARMY



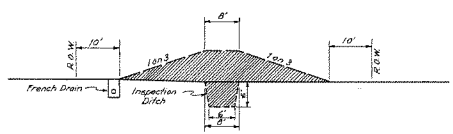




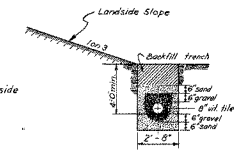
NEW LEVEE
STA. 170+00 C
SCALE: 1" = 20'



NEW LEVEE
STA. 204+00 C
SCALE: 1" = 10'



NEW LEVEE
STA. 221+00 C
SCALE: 1" = 10'



FRENCH DRAIN

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

TYPICAL SECTIONS

SECTION "C"

SHEET 7 OF 19 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: Senior Engineer

APPROVED: Lt. Col., Corps of Engineers

APPROVAL RECOMMENDED: Capt., Corps of Engineers

DR. BY E.B. — TR. BY J.C.M. — CK. BY J.I.T.

BY	DATE	CHARACTER

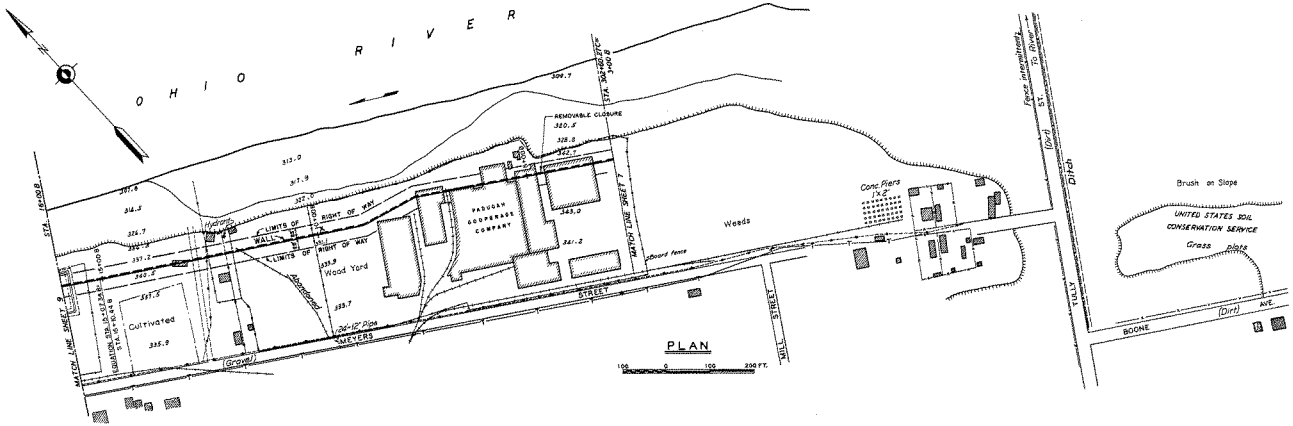
REVISIONS

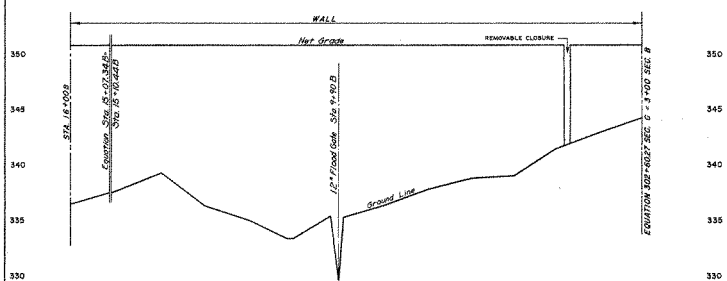
EXHIBIT 7 — 934 - 12.1/7P

C52

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





PROFILE

SCALES HORIZ. 1"=100'
VERT. 1"=4'

Note:
All elevations referred to U.S.E.D. datum

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 8 OF 19 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: CAPT., CORPS OF ENGINEERS

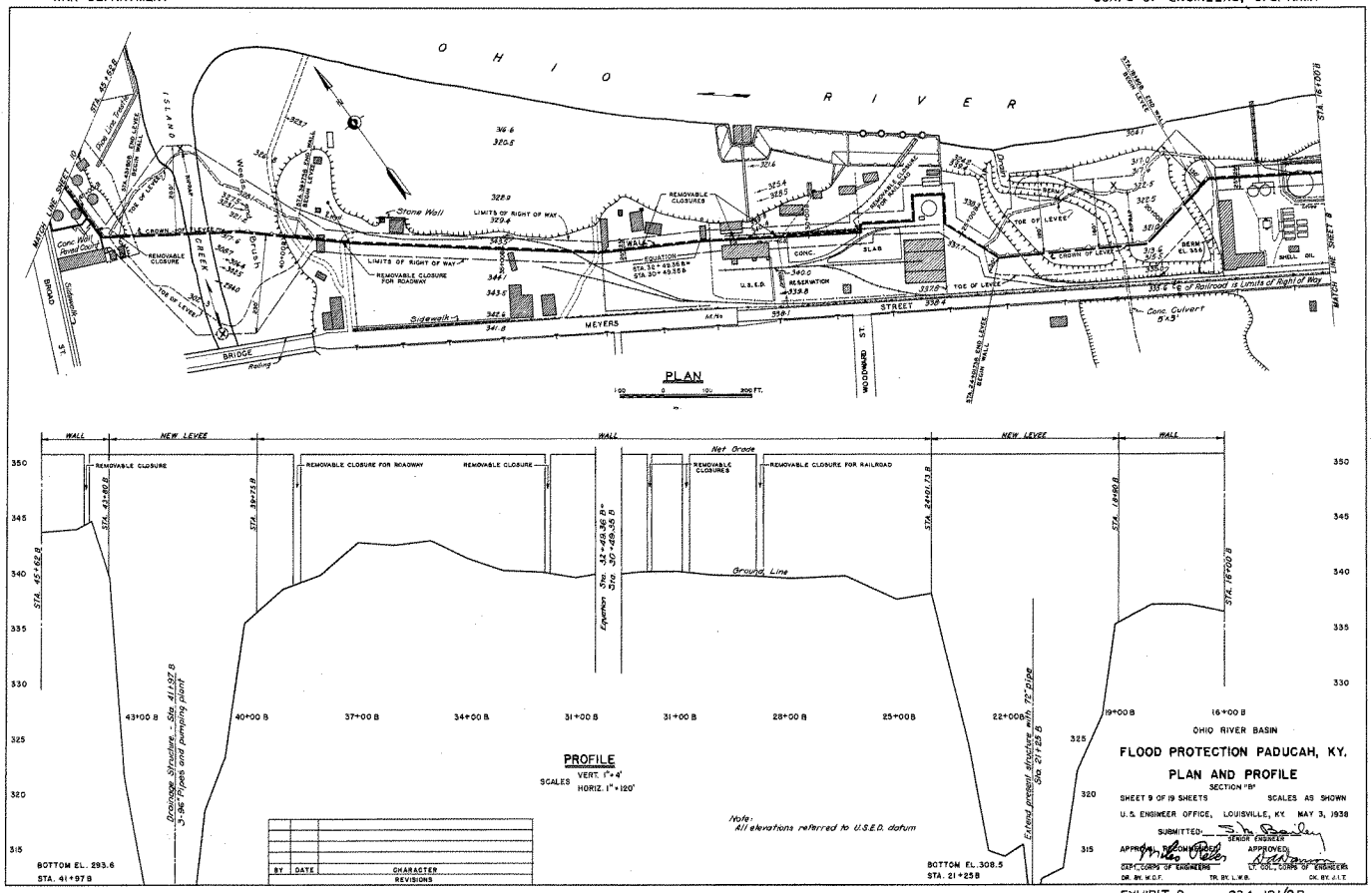
APPROVED: LT. COL., CORPS OF ENGINEERS

DR. BY W.C.F. TR. BY C.G.B. CK. BY J.I.T.

EXHIBIT 8 934-12.1/8P

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 9 OF 19 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY MAY 3, 1938

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: APPROVED:

CAPT., CORPS OF ENGINEERS LT. COL., CORPS OF ENGINEERS

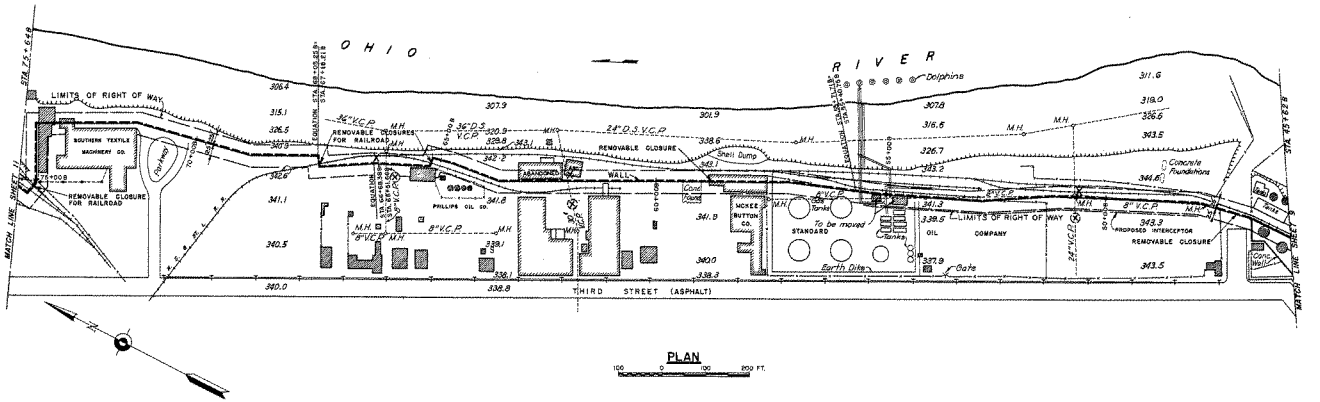
DR. BY. W.O.F. TR. BY. L.W.B. CK. BY. J.I.T.

EXHIBIT 9 934-12/9P

799

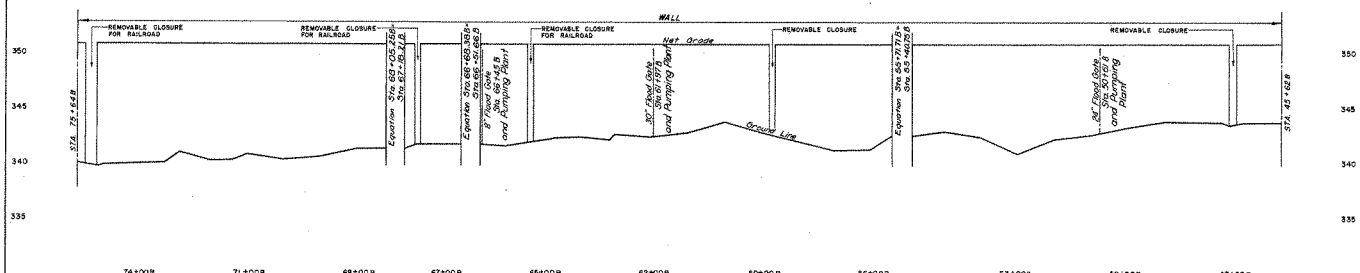
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

100 0 100 200 FT.



PROFILE

SCALES HORIZ. 1"=120'
VERT. 1"=4'

Note:
All elevations referred to U.S.E.D. datum.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 10 OF 19 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: _____ SENIOR ENGINEER

APPROVAL RECOMMENDED: _____ CAPT., CORPS OF ENGINEERS

APPROVED: _____ LT. COL., CORPS OF ENGINEERS

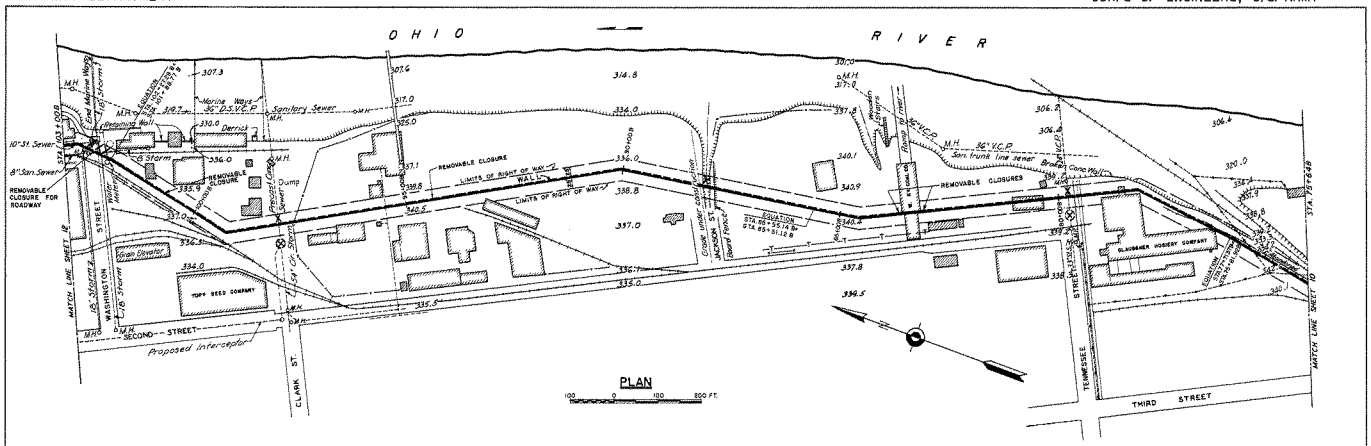
DR. BY W.G.F. TR. BY L.W.B. CK. BY J.L.T.

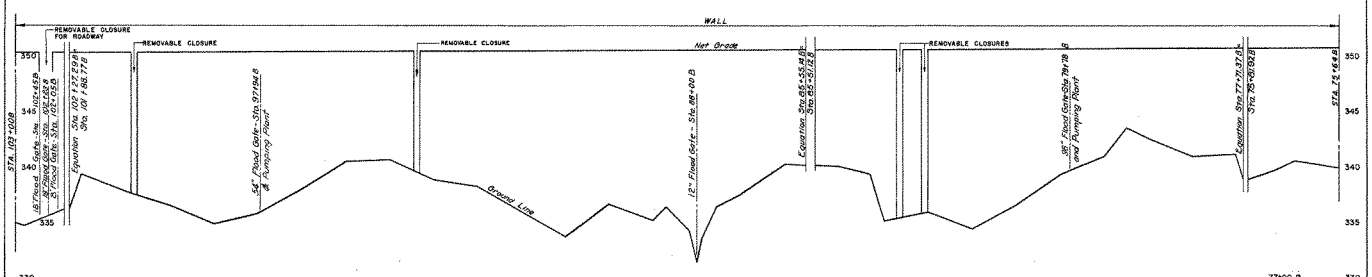
BY	DATE	CHARACTER
		REVISIONS

EXHIBIT 10 934-12.1/10P

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY





PROFILE

SCALES VERT. 1" = 4'
HORIZ. 1" = 100'

Note:
All elevations referred to U.S.E.D. datum

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 11 OF 19 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: J. H. Bryden
SENIOR ENGINEER

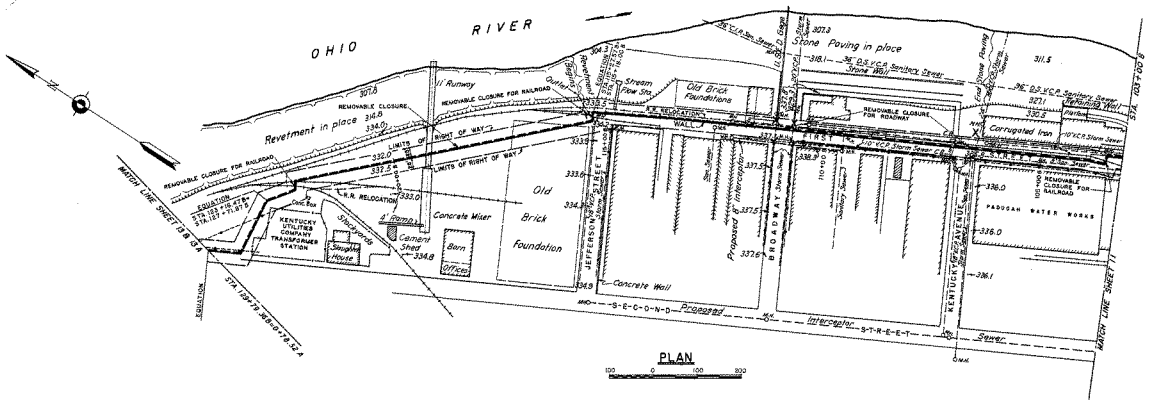
APPROVAL RECOMMENDED: Miles Vater
CAPT., CORPS OF ENGINEERS

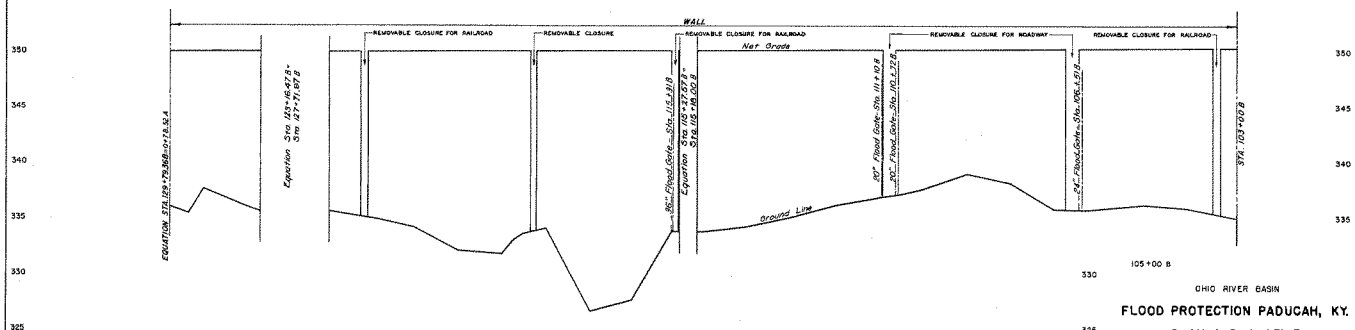
APPROVED: Rahanson
LT. COL., CORPS OF ENGINEERS

DR. BY W.C.F. TR. BY L.W.B. CK. BY J.J.C.

EXHIBIT 11 934-12/11P

801





Note: All elevations referred to U.S.E.D. datum

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 12 OF 19 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: SENIOR ENGINEER

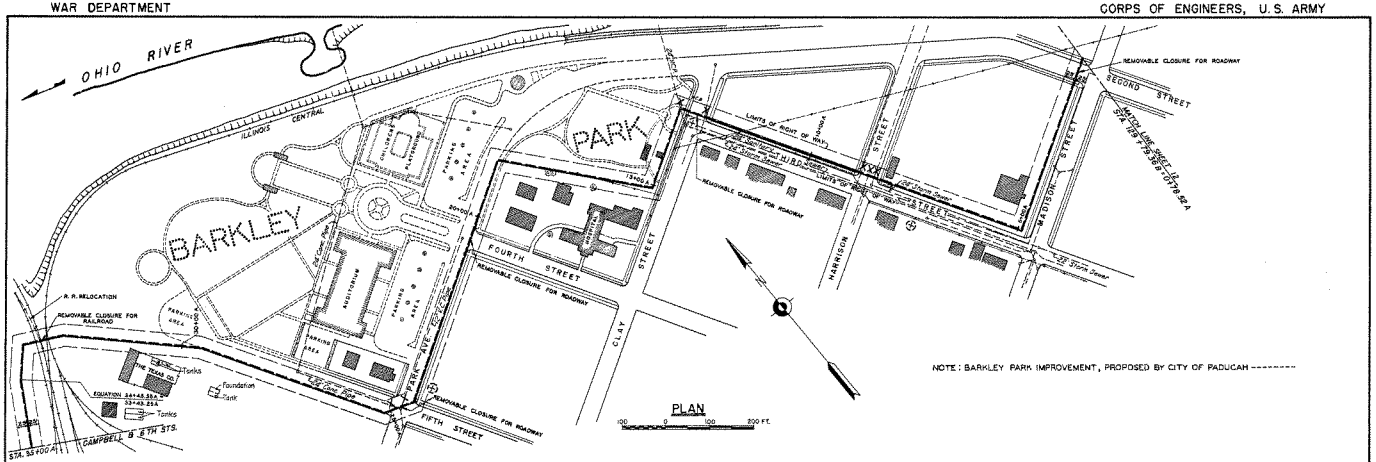
APPROVAL RECOMMENDED: CAPT., CORPS OF ENGINEERS APPROVED: LT. COL., CORPS OF ENGINEERS

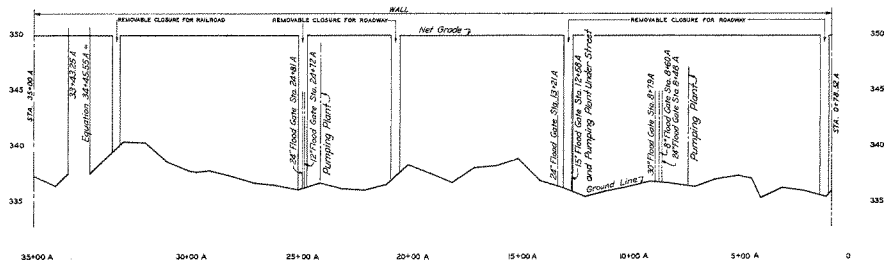
DR. BY W.G.F. TR. BY L.W.B. CK. BY J.L.T.

EXHIBIT 12 934-12.1/12P

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





PROFILE

SCALES: HORIZ. 1"=200'
VERT. 1"= 4'

Note: All elevations referred to U.S.E.D. datum.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 13A OF 19 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: CHIEF ENGINEER

APPROVAL RECOMMENDED: CAPT. CORPS OF ENGINEERS

APPROVED: LT. COL., CORPS OF ENGINEERS

DR. BY W.C.F. TR. BY L.W.B.-A.J.H. CK. BY J.L.T.

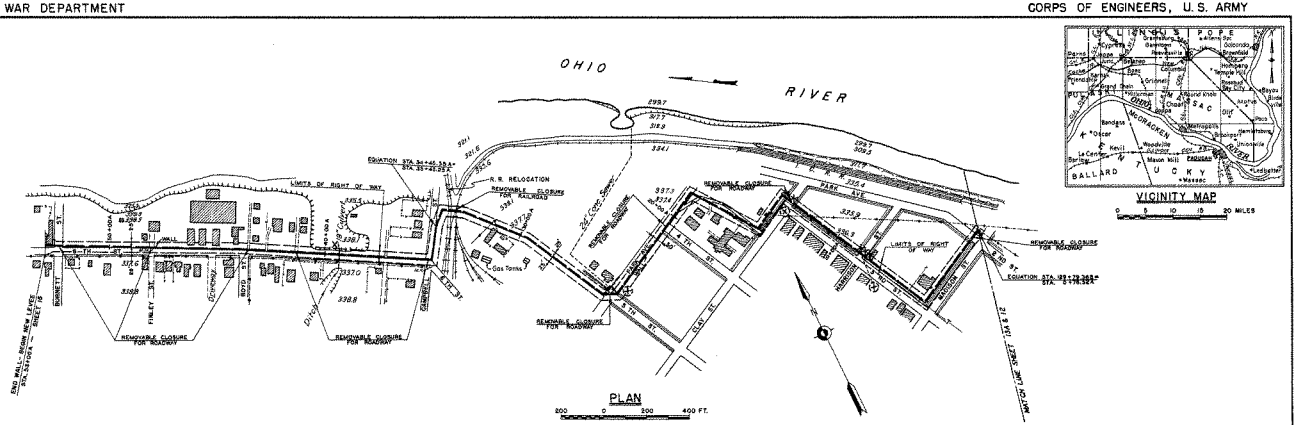
BY	DATE	CHARACTER
		REVISIONS

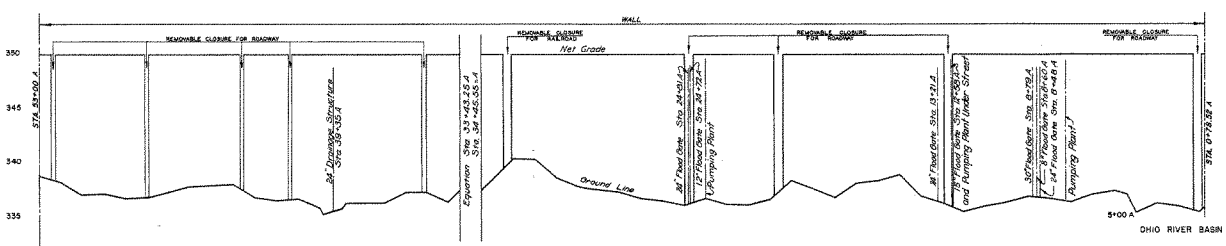
EXHIBIT 13A 934-12.1/13A-P

803

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY





PROFILE

SCALES: HORIZ. 1"=200'
VERT. 1"=4'

Note: All elevations referred to U.S.E.D. datum.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 13 OF 19 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: SENIOR ENGINEER

APPROVED: LT. COL., CORPS OF ENGINEERS

RECOMMENDED: CAPT., CORPS OF ENGINEERS

DR. BY S.G.R. TR. BY L.W.B. CK. BY J.L.T.

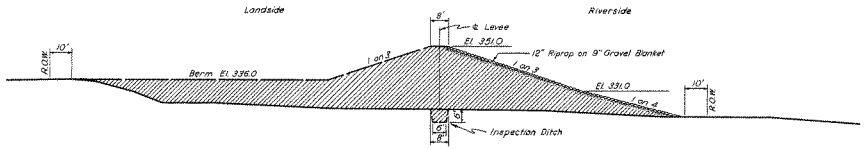
BY	DATE	CHARACTER
		REVISIONS

EXHIBIT 13 934-121/13P

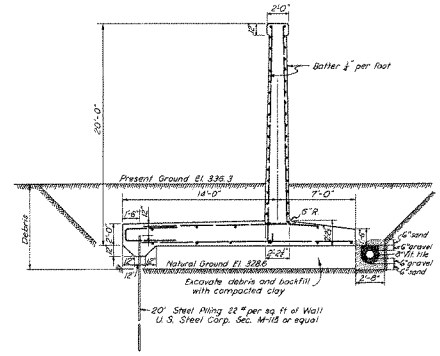
804

WAR DEPARTMENT

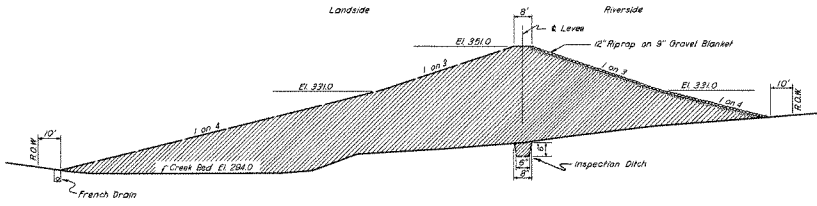
CORPS OF ENGINEERS, U. S. ARMY



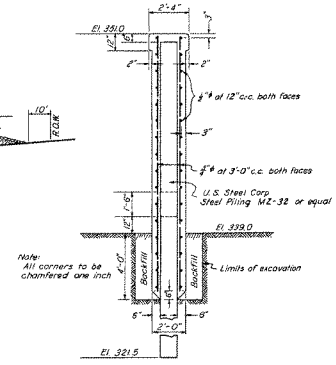
NEW LEVEE
STA. 20+00 B
SCALE: 1"=20'



NEW WALL
SCALE: 1/8"=1'-0"
STA. 92+00 B



NEW LEVEE
STA. 41+50 B
SCALE: 1"=20'



NEW WALL
SCALE: 3/8"=1'-0"
STA. 74+00 B

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PAOUCAH, KY.
TYPICAL SECTIONS
SECTION "B"

SHEET 14 OF 19 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: _____ SENIOR ENGINEER

APPROVAL RECOMMENDED: _____ CAPT. CORPS OF ENGINEERS

APPROVED: _____ LT. COL. CORPS OF ENGINEERS

DR. BY N.H. TR. BY L.W.B. CK. BY J.L.T.

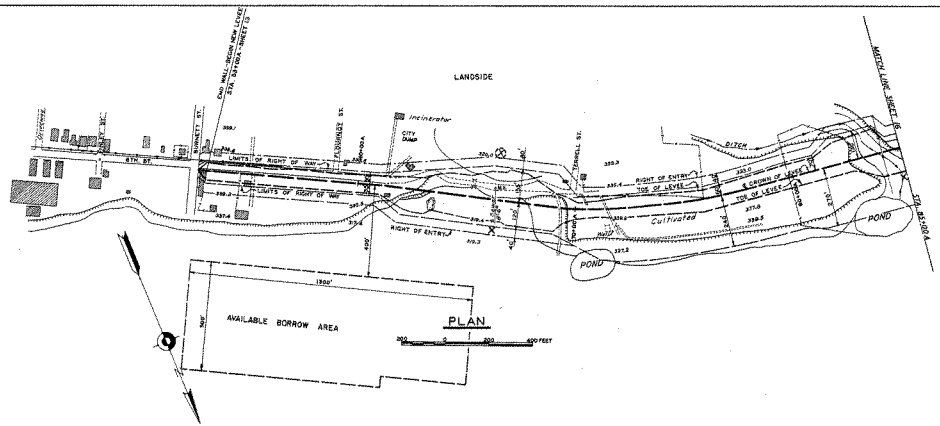
EXHIBIT 14 934-12.1/14 P

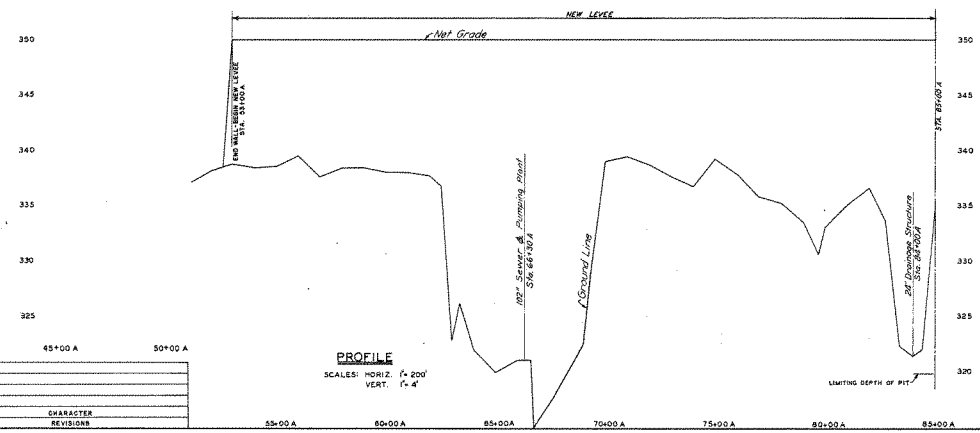
805

010

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





PROFILE

SCALES: HORIZ. 1" = 200'
VERT. 1" = 4'

BY	DATE	CHARACTER REVISIONS

Note:
All elevations referred to U.S.E.D. datum.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE
SECTION "A"

SHEET 15 OF 19 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: CAPT., CORPS OF ENGINEERS

APPROVED: LT. COL., CORPS OF ENGINEERS

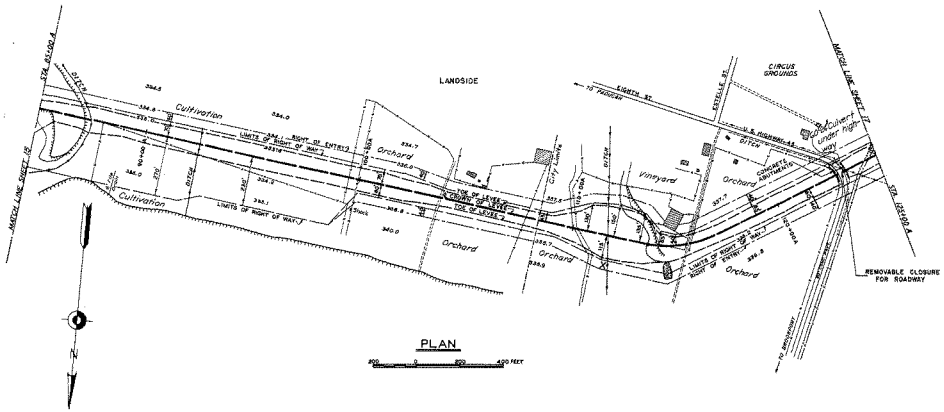
DR. BY. C.G.B. TR. BY. W.J.B. CK. BY. J.L.T.

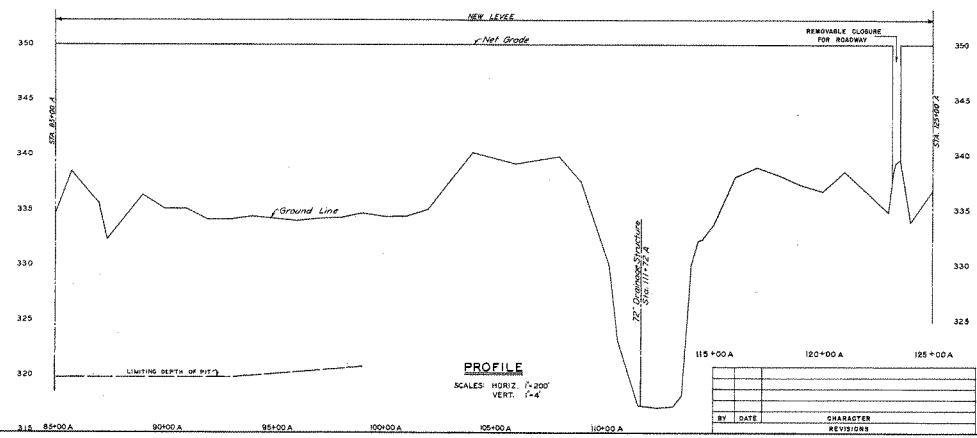
EXHIBIT 15 934-12.1/15 P

806

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





BY	DATE	CHARACTER
		REVISIONS

Note:
All elevations referred to U.S.E.D. datum.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE
SECTION "X"

SHEET 16 OF 19 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: J. H. Gaston, SENIOR ENGINEER

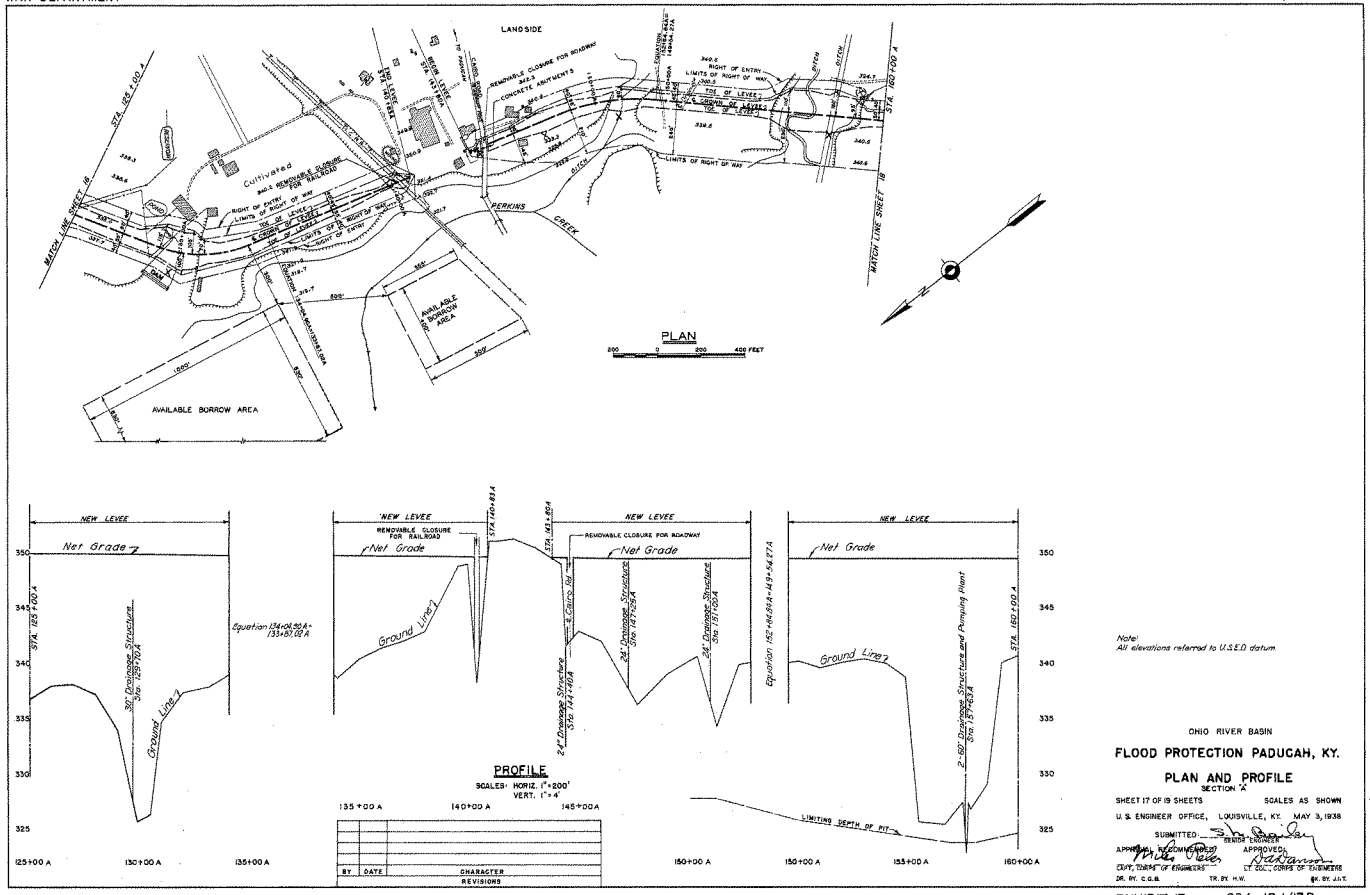
APPROVAL RECOMMENDED: Philip Weber, CAPT., CORPS OF ENGINEERS, DR. BY C.G.S.

APPROVED: E. A. Garner, LT. COL., CORPS OF ENGINEERS, TR. BY J.C.M. — CK. BY J.L.T.

EXHIBIT 16 — 934-12.1/16P

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note:
All elevations referred to U.S.E.D. datum

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE
SECTION "A"

SHEET 17 OF 19 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: [signature] SENIOR ENGINEER

APPROVAL RECOMMENDED: [signature] CAPT., CORPS OF ENGINEERS

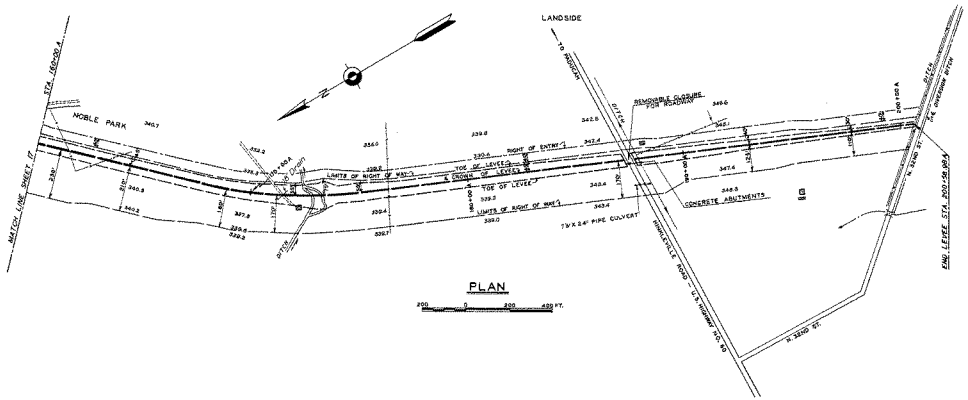
APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

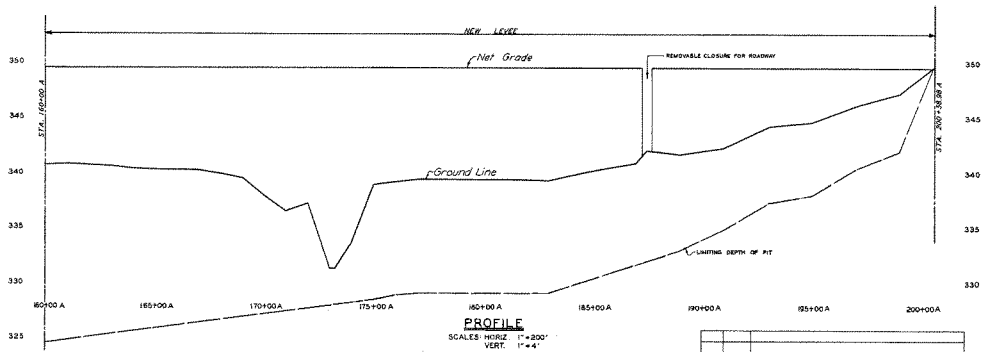
DR. BY. C.G.B. TR. BY. H.W. CK. BY. J.J.T.

EXHIBIT 17 934-12.1/17 P

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





Note:
All elevations referred to U.S.E.D. datum.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "X"

SHEET 18 OF 19 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: [illegible] SENIOR ENGINEER

APPROVED: [illegible] CAPT., CORPS OF ENGINEERS

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS

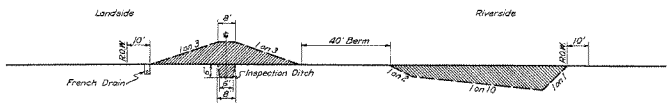
DR. BY. C.G.B. TR. BY. L.B. CK. BY. J.L.Y.

EXHIBIT 18 934-12.1/18P

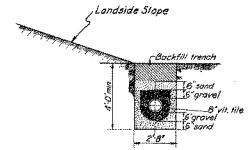
A 70

WAR DEPARTMENT

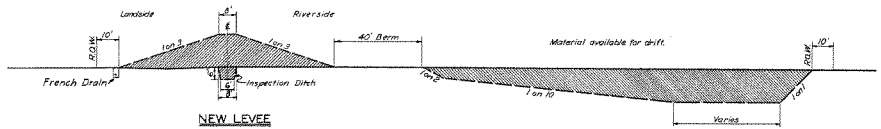
CORPS OF ENGINEERS, U. S. ARMY



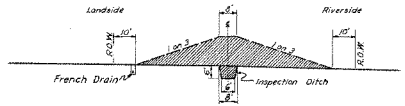
NEW LEVEE
STA. 181+00 A
SCALE: 1" = 20'



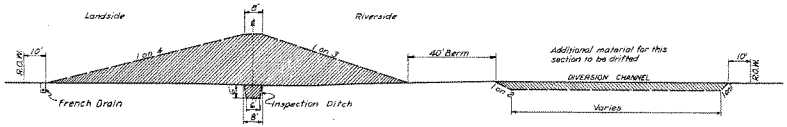
FRENCH DRAIN
SCALE: 3/8" = 1'-0"



NEW LEVEE
STA. 90+00 A
SCALE: 1" = 20'



NEW LEVEE
STA. 120+00 A
SCALE: 1" = 20'



NEW LEVEE
STA. 157+64 A
SCALE: 1" = 20'

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

TYPICAL SECTIONS

SECTION "A"

SHEET 19 OF 19 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: [illegible] SENIOR ENGINEER

APPROVAL RECOMMENDED: [illegible] CAPT. CORPS OF ENGINEERS

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS

DR. BY J.J.H. TR. BY J.C.M. CK. BY J.J.T.

EXHIBIT 19 934-12.1/19 P

810

045

AS BUILT DRAWINGS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KENTUCKY

SECTION "A"

IN 21 SHEETS

TITLE SHEET

CONTENTS

934-12.2/1 PADUCAH, KY. GENERAL MAP

934-12.2/2 PLAN AND PROFILE

(R2) 934-12.2/3 PLAN AND PROFILE

(R2) 934-C1/1 " "

934-12.2/4.1 PLAN AND PROFILE

934-12.2/5 PLAN AND PROFILE

934-12.2/6 TYPICAL SECTIONS

934-12.2/7 DRAINAGE STRUCTURE STA. 84+00

934-12.2/8 DRAINAGE STRUCTURE STA. 111+67

934-12.2/9 REINFORCING DETAILS STA. 111+67

934-12.2/10 DRAINAGE STRUCTURE STA. 130+00

934-12.2/11 DRAINAGE STRUCTURE STA. 147+25

934-12.2/12 DRAINAGE STRUCTURE STA. 151+25

934-12.2/13 DRAINAGE STRUCTURE STA. 157+63

934-12.2/14 REINFORCING DETAILS STA. 157+63

(R2) 934-12.2/15 BORINGS "DELETED"

(R2) 934-12.2/16 BORINGS "DELETED"

934-12.2/17.1 HIGHWAY RAMP DETAILS

(R1) 934-C1/2 " " "

(R1) 934-12.2/18 DESIGN DATA STA. 122+84.7

(R1) 934-12.2/19 MOVABLE CLOSURE STA. 122+84.7 MASONRY DETAILS

(R1) 934-12.2/20 REINFORCING DETAILS STA. 122+84.7 SILL

(R1) 934-12.2/21 REINFORCING DETAILS STA. 122+84.7 WEST ABUTMENT & VAULT

(R1) 934-12.2/22 REINFORCING DETAILS STA. 122+84.7 E. ABUT. & E. RIVERSIDE WING WALL

(R1) 934-12.2/23 REINFORCING DETAILS STA. 122+84.7 WEST LANDSIDE WING WALL

(R1) 934-12.2/24 REINFORCING DETAILS STA. 122+84.7 E. LANDSIDE & W. RIVERSIDE WING WALLS

934-12.2/25 MOVABLE CLOSURE STA. 140+45.8 MASONRY DETAILS

934-12.2/26 REINFORCING DETAILS STA. 140+45.8 SILL & ABUTMENT WALLS

934-12.2/27 REINFORCING DETAILS STA. 140+45.8 WINGWALLS & SEEPAGE CUT-OFF WALLS

934-12.2/28 REINFORCING DETAILS STA. 140+45.8 STORAGE VAULT

(R1) 934-12.2/29 MISCELLANEOUS DETAILS

(R1) 934-C1/3 " "

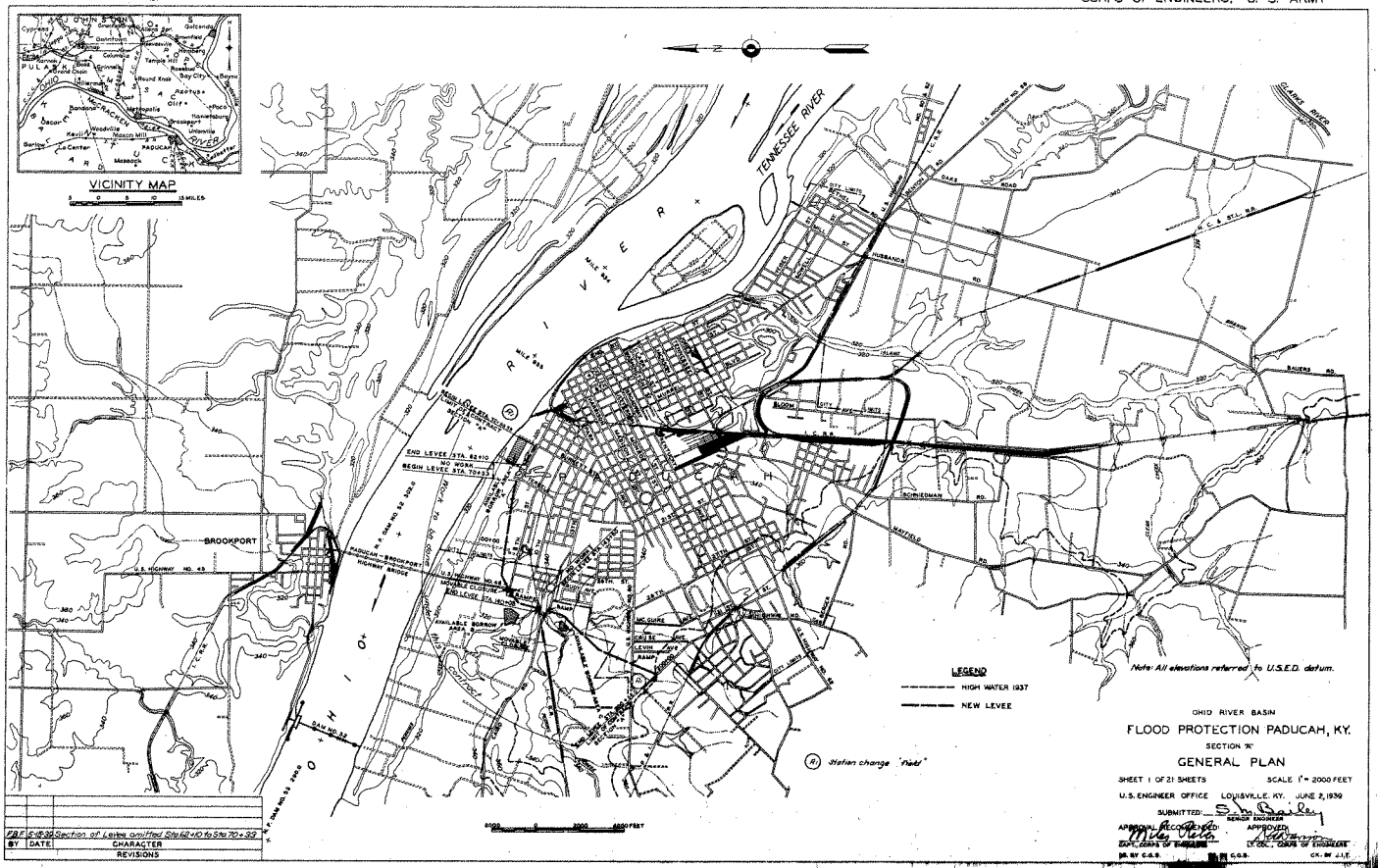
U. S. ENGINEER OFFICE, LOUISVILLE, KY.

MK	DATE	AUTHORITY	REVISION
R2	9-25-63	C.O. #1	Sheet added
R2		D.O.	Sheets deleted
R1	9-25-61	C.O. #1	Sheets withdrawn, movable closure eliminated, ramp substituted.

AS BUILT REVISIONS

WAR DEPARTMENT

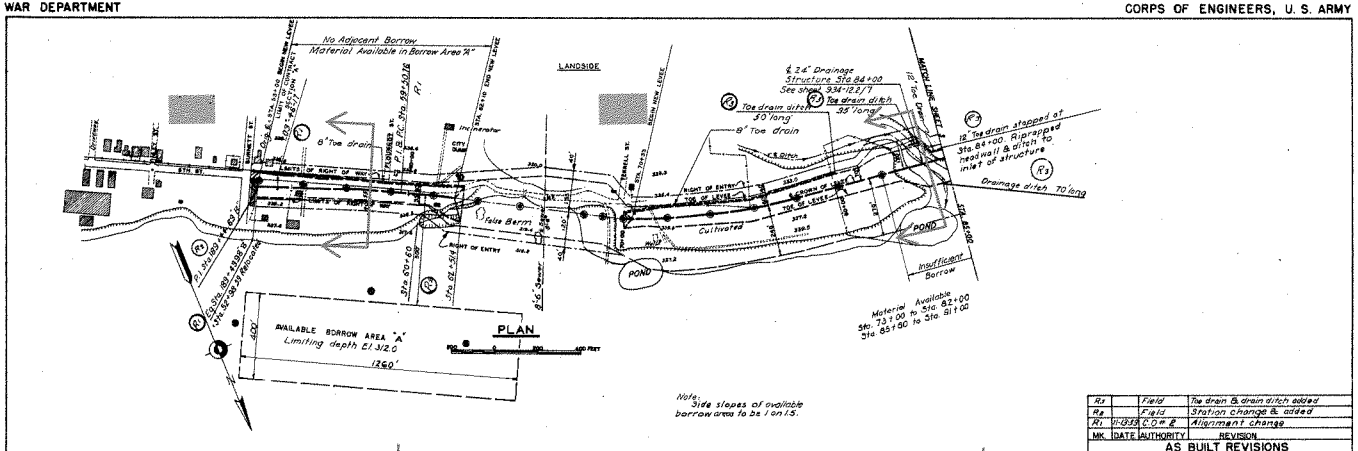
CORPS OF ENGINEERS, U. S. ARMY



812

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	AUTHORITY	REVISION
R1		Field	Toe drain & drain ditch added
R2		Field	Station change & added
R3	11-19-38	C.O. # 2	Alignment change

AS BUILT REVISIONS

BY	DATE	CHARACTER
E.B.F.	9-15-39	Section Levee omitted Sta 62+10 to Sta. 70+33.
		Minor revisions and corrections.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "A"

SHEET 2 OF 21 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: _____ SENIOR ENGINEER

APPROVAL RECOMMENDED: Miles Fitz — CAPT., CORPS OF ENGINEERS

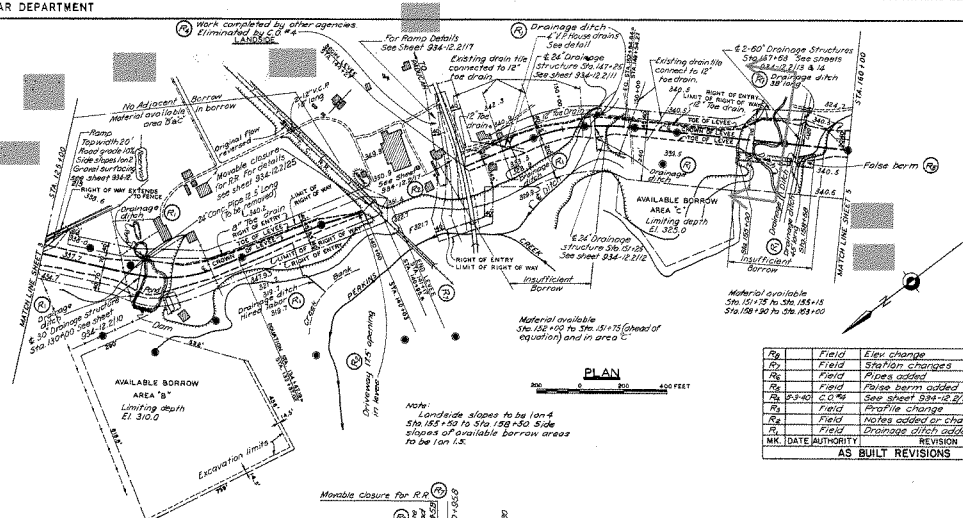
APPROVED: N. Harrison — LT. COL., CORPS OF ENGINEERS

DR. BY C.E.B. — TR. BY W.J.S. — CK. BY J.L.T.

AS BUILT 934-12.2/2

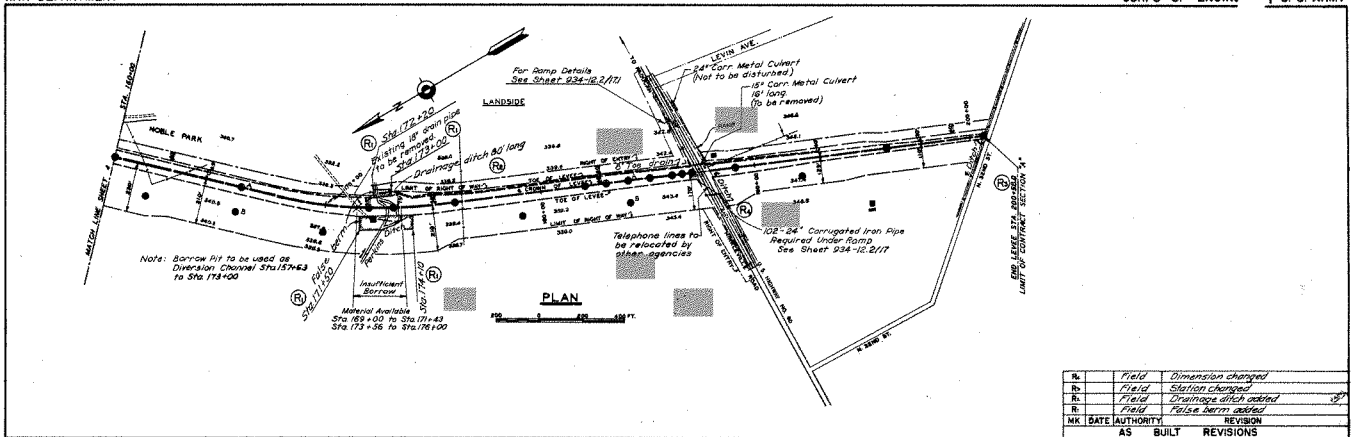
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY


Work completed by other agencies Eliminated by C.O. #4 LANDSIDE
For Ramp Details See Sheet 934-12.2/17
Drainage ditch 4" V.P. House drains See detail
Existing drain tile connected to 12" toe drain
Existing drain tile connect to 12" toe drain
Drainage ditch 38' long
No Adjacent Material available in borrow area "B"
Borrow
Ramp Top width 20' Road grade +0.5 Side slopes 1on2 Gravel surfacing See sheet 934-8
Movable closure for R.R. See details See sheet 934-12.2/25
Stop 6 Stop 7
Drainage ditch
Dam
Pond
Creek
Bank
Drainage structure Sta. 150+00 See sheet 934-12.2/10
Drainage ditch
Drainage structure Sta. 151+00 See sheet 934-12.2/11
Drainage structure Sta. 147+25 See sheet 934-12.2/11
Drainage structure Sta. 147+68 See sheets 934-12.2/15 & 16
Drainage structure Sta. 147+25 See sheet 934-12.2/11
Drainage structure Sta. 151+25 See sheet 934-12.2/12
Drainage structure Sta. 151+75 See sheet 934-12.2/12
Drainage structure Sta. 152+50 See sheet 934-12.2/12
Drainage structure Sta. 153+00 See sheet 934-12.2/12
Drainage structure Sta. 153+50 See sheet 934-12.2/12
Drainage structure Sta. 154+00 See sheet 934-12.2/12
Drainage structure Sta. 154+50 See sheet 934-12.2/12
Drainage structure Sta. 155+00 See sheet 934-12.2/12
Drainage structure Sta.

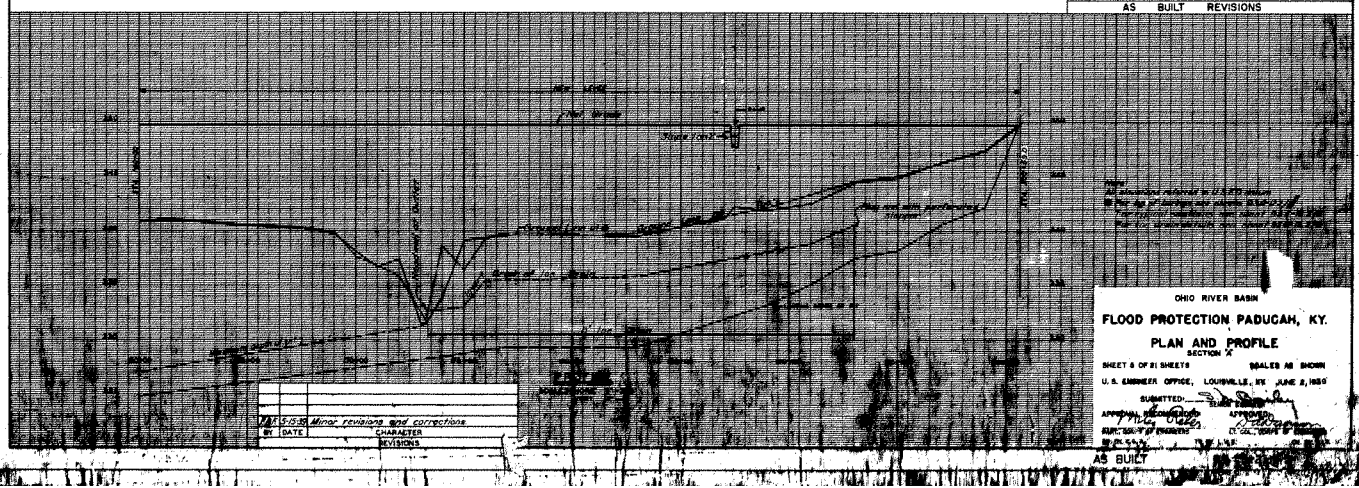
WAR DEPARTMENT

CORPS OF ENGINE , U. S. ARMY



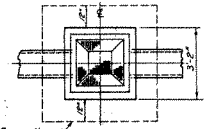
R₄		Field	Dimension changed
R₃		Field	Station changed
R₂		Field	Drainage ditch added
R₁		Field	False berm added
NK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

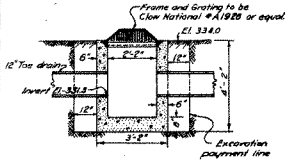


WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



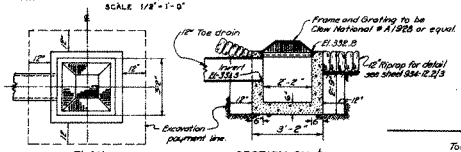
PLAN



SECTION ON ℄

CATCH BASIN DETAIL STA. 122+77

SCALE 1/2" = 1'-0"

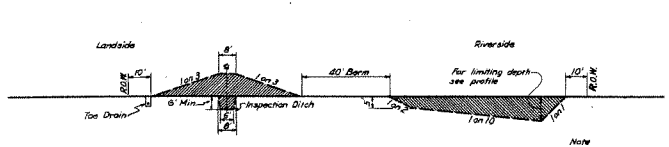


PLAN

SECTION ON ℄

CATCH BASIN DETAIL STA. 124+06

SCALE 1/2" = 1'-0"

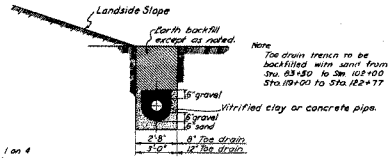


NEW LEVEE

STA. 181+00

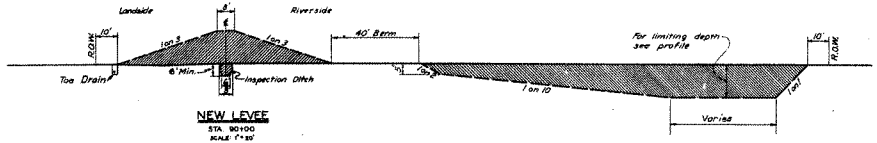
SCALE: 1" = 20'

Note
Landside slope to be 1 on 4
Sta. 110+80 to Sta. 113+00
Sta. 155+50 to Sta. 158+50



TOE DRAIN

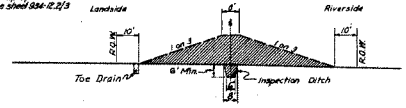
SCALE: 3/8" = 1'-0"



NEW LEVEE

STA. 90+00

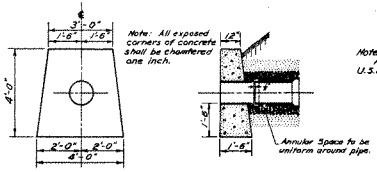
SCALE: 1" = 20'



NEW LEVEE

STA. 120+00

SCALE: 1" = 20'

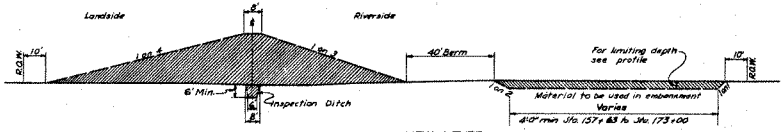


FRONT ELEVATION

SECTION ON ℄

HEADWALL FOR TOE DRAIN OUTLETS

SCALE 1/2" = 1'-0"



NEW LEVEE

STA. 197+84

SCALE: 1" = 20'

Note:-
Borrow pit to be used as diversion channel from Sta. 172+83 to Sta. 173+00 and [illegible] excavated to not less than [illegible] shown on profile.

FIX	6-18-39	Minor revisions and corrections
TAF	2-10-39	Minor revisions and [illegible]
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

TYPICAL SECTIONS

SECTION "A"

SHEET 8 OF 21 SHEETS

SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [illegible] MAJOR ENGINEER

APPROVAL RECOMMENDED: [illegible] CAPT. CORPS OF ENGINEERS

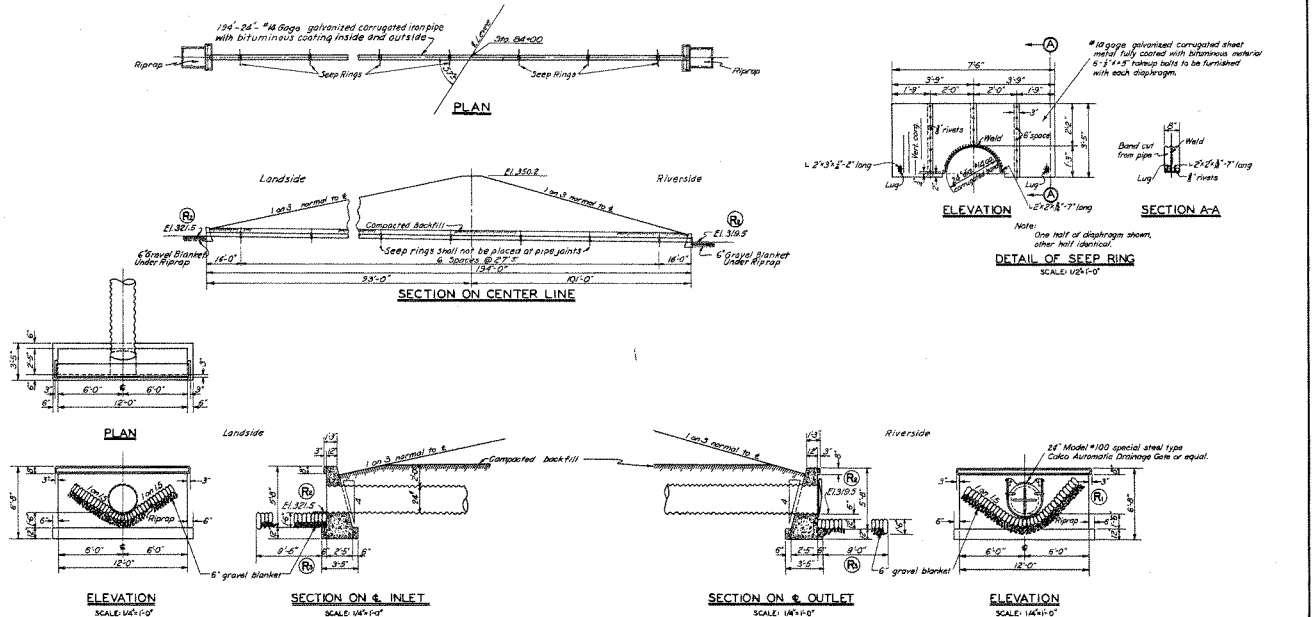
APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS

DR. BY J.J.K. TR. BY J.C.M. CK. BY J.I.T.

AS BUILT 934-122.8

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



General Notes:
All exposed corners of concrete shall be chamfered one inch

Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed.
Pipe six inch gravel blanket under all riprap.

BY	DATE	CHARACTER
F.B.F.	5-10-39	Landside Levee Slopes Revised and Pipe Lengthened

REVISIONS

MK	DATE	AUTHORITY	REVISION
Rv		Field	Dimensions changed
Rv		Field	Elevations changed
Rv		Field	Riprap changed

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 84+00

SECTION 'X'

SHEET 7 OF 21 SHEETS

SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: Jno Bowler, SENIOR ENGINEER

APPROVED: RECOMMENDED: Miles Weber, CAPT., CORPS OF ENGINEERS

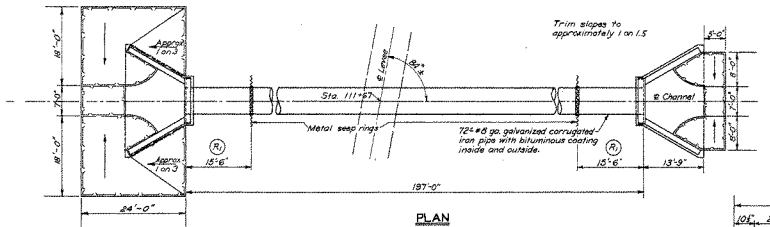
APPROVED: Robert Lawson, LT. COL., CORPS OF ENGINEERS

DR. BY W.J.B. TR. BY J.J.H. CK. BY J.L.T.

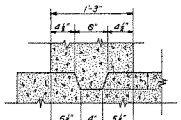
AS BUILT 934-12.2/7

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

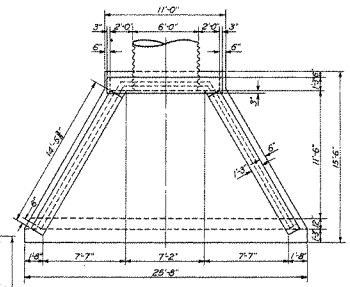


PLAN



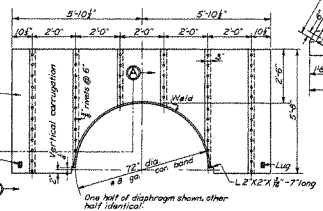
DETAIL OF KEYWAY

SCALE: 1½" = 1'-0"



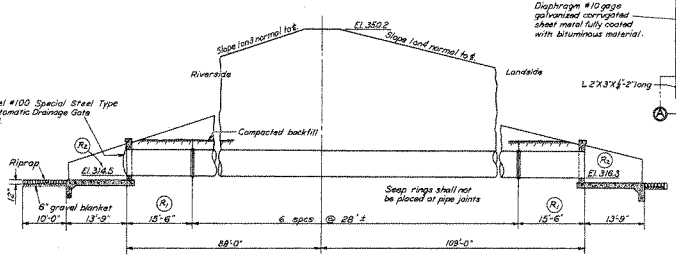
PLAN

SCALE: ¼" = 1'-0"

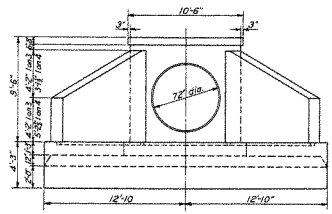


DETAIL OF SEEP RING

SCALE: ½" = 1'-0"

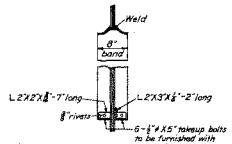


SECTION ON CENTER LINE



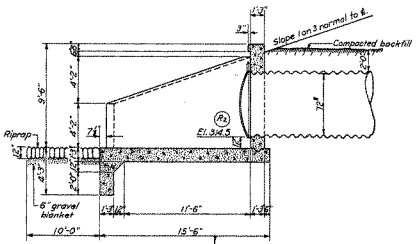
ELEVATION

SCALE: ¼" = 1'-0"

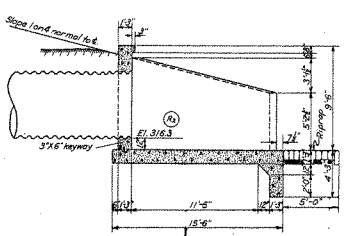


SECTION A-A

SCALE: 1" = 1'-0"



SECTION ON ℄ OUTLET



SECTION ON ℄ INLET

SCALE: ¼" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Place six inch gravel blanket under all riprap.

For reinforcing steel details see sheet 934-12.2/9

MK	DATE	AUTHORITY	REVISION
		F.B.F. 5-10-39	Riprap revised at Landside inlet
BY	DATE	CHARACTER	REVISIONS

MK	DATE	AUTHORITY	REVISION
R_2		Field	Elevation changed
R_1		Field	Dimension changed

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 111+67

SECTION "A"

SHEET 8 OF 28 SHEETS

SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1938

SUBMITTED: [illegible] SENIOR ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF, CORPS OF ENGINEERS

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS

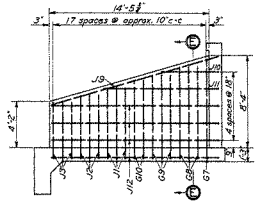
DR. BY W.C.N.-J.J.H. TR. BY J.J.H. CK. BY J.L.T.

AS BUILT

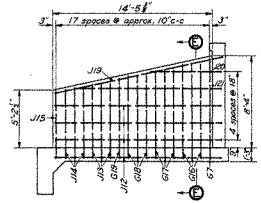
934-12.2/8

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	6	#9	7'-0"	5'-3" 6"	4.66	28.1
J2	6	"	6'-3"	5'-8"	4.18	25.1
J3	6	"	5'-7"	5'-11"	3.73	22.4
J4	2	"	18'-0"	8'-10" 3'-10"	12.00	24.0
J5	2	"	6'-3"	Straight	4.29	8.6
J6	2	"	9'-9"	"	6.51	13.0
J7	2	"	13'-4"	"	8.91	17.8
J8	18	"	14'-9"	"	9.85	177.3
J9	2	"	16'-9"	13'-9" 3'-10"	11.19	22.4
J10	2	"	6'-3"	5'-3"	4.18	8.4
J11	2	"	11'-6"	10'-6"	7.68	15.4
J12	16	"	16'-3"	15'-3"	10.86	173.8
J13	6	"	7'-5"	6'-11" 6"	4.96	29.8
J14	6	"	6'-9"	6'-3"	4.51	27.1
J15	2	"	6'-6"	6'-0"	4.34	8.7
J16	2	"	17'-8"	13'-8" 3'-10"	11.81	23.6
J17	2	"	8'-0"	Straight	5.34	10.7
J18	2	"	12'-9"	"	8.52	17.0
J19	2	"	16'-6"	15'-6" 3'-10"	11.02	22.0
J20	6	"	9'-6"	8'-6"	6.01	10.0
J21	2	"	14'-6"	13'-6"	9.69	19.4
J22	4	"	10'-6"	Straight	7.01	28.0
J23	2	"	11'-3"	"	7.52	15.0
J24	4	"	12'-3"	"	8.18	32.7
J25	2	"	13'-6"	"	9.02	18.0
J26	4	"	14'-9"	"	9.85	39.4
J27	2	"	15'-9"	"	10.52	21.0
J28	4	"	17'-0"	"	11.35	45.4
J29	2	"	18'-3"	"	12.19	24.4
J30	4	"	19'-3"	"	12.86	51.4
J31	2	"	20'-6"	"	13.69	27.4
J32	4	"	21'-9"	"	14.53	58.1
J33	2	"	23'-0"	"	15.36	30.7
J34	4	"	24'-3"	"	16.20	64.8
J35	20	"	25'-3"	"	16.87	337.4
J36	22	"	18'-9"	15'-6" 1'-9"	12.53	275.6
J37	4	"	16'-0"	10'-6"	10.69	42.8
J38	4	"	14'-3"	10'-6"	9.52	38.1
J39	4	"	12'-6"	8'-9"	8.35	33.4
J40	4	"	10'-9"	7'-3"	7.18	28.7
J41	4	"	9'-0"	6'-3"	6.01	24.0
J42	4	"	7'-3"	5'-6"	4.84	19.4
J43	4	"	5'-6"	4'-9"	3.67	14.7
J44	8	"	11'-7"	10'-8" 1'-4"	7.74	61.9
J45	14	"	9'-6"	Straight	6.35	88.9
E1	16	#8	7'-6"	"	11.37	180.3
G1	4	#8	8'-1"	"	8.23	33.7
G2	2	"	7'-4"	"	7.58	15.3
G3	2	"	6'-6"	"	6.38	13.6
G4	2	"	5'-8"	"	5.91	11.8
G5	2	"	4'-10"	"	5.04	10.1
G6	2	"	4'-0"	"	4.17	8.3
G7	4	"	9'-7"	8'-4" 1'-7"	10.00	40.0
G8	6	"	8'-10"	8'-3"	9.21	55.3
G9	6	"	8'-1"	7'-6"	8.43	50.6
G10	4	"	7'-9"	7'-3"	8.06	32.3
G11	2	"	7'-7"	Straight	7.91	15.8
G12	2	"	7'-0"	"	7.30	14.6
G13	2	"	6'-4"	"	6.61	13.2
G14	2	"	5'-8"	"	5.91	11.8
G15	2	"	5'-1"	"	5.30	10.6
G16	6	"	9'-1"	8'-4" 1'-7"	9.47	56.9
G17	6	"	8'-6"	7'-11"	8.87	53.2
G18	6	"	8'-0"	7'-5"	8.34	50.0
G19	2	"	7'-10"	7'-3"	8.17	16.3
E1	12	#8	11'-5"	10'-3" 1'-2"	23.56	282.7
D1	8	1"	9'-3"	7'-6" 1'-9"	24.70	197.6
D2	4	"	9'-6"	Straight	20.03	80.1
D3	10	"	17'-9"	1'-9" 14'-0" 1'-9"	47.39	473.9
D4	4	"	13'-10"	10'-5" 3'-5"	36.94	147.8
D5	4	"	10'-5"	7'-5"	27.81	111.3
D6	4	"	6'-11"	5'-6"	18.47	73.9
D7	4	"	3'-8"	2'-3"	9.79	39.2
				TOTAL		4223#

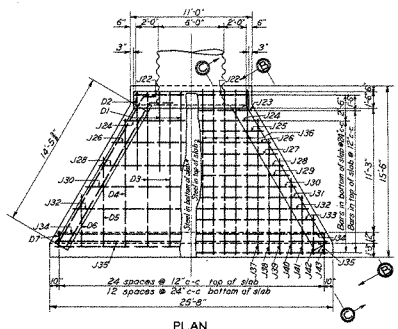


SECTION B-B
(RIVERSIDE)

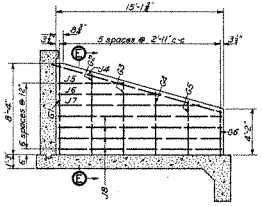


SECTION B-B
(LANDSIDE)

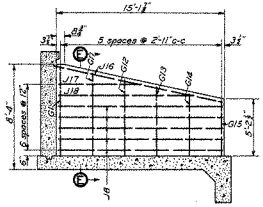
SHOWING REINFORCING STEEL ON FILL SIDE OF WING WALL
SCALE: 1/4"=1'-0"



PLAN
SCALE: 1/4"=1'-0"

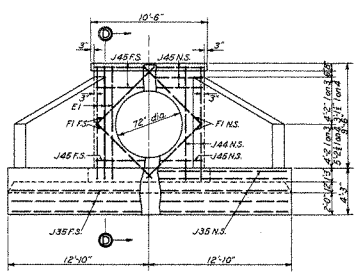


SECTION C-C
(RIVERSIDE)

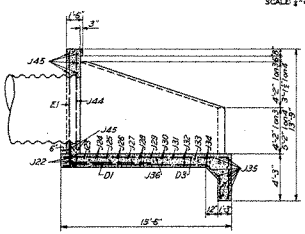


SECTION C-C
(LANDSIDE)

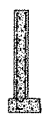
SHOWING REINFORCING STEEL ON CHANNEL SIDE OF WING WALL
SCALE: 1/4"=1'-0"



ELEVATION
SCALE: 1/4"=1'-0"



SECTION D-D
SCALE: 1/4"=1'-0"



SECTION E-E
SCALE: 1/4"=1'-0"

General Notes:
Reinforcement schedule includes reinforcing steel for two headwalls.
The distance from face of concrete to reinforcing steel shall not be less than two and one-half inches.
Landside wing walls for levee slope 1 on 4 and riverside wing walls for levee slope 1 on 3.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH. KY.

REINFORCING DETAILS STA. 111+67
SECTION "A"

SHEET 9 OF 21 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] SENIOR ENGINEER

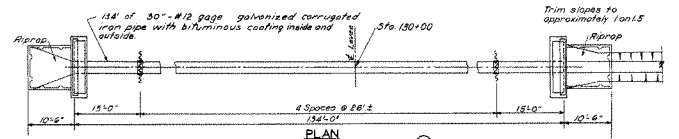
APPROVAL RECOMMENDED: [signature] CAPT., CORPS OF ENGINEERS — DR. BY H.W.J.-J.H. TR. BY J.J.K.

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS — DR. BY J.L.T.

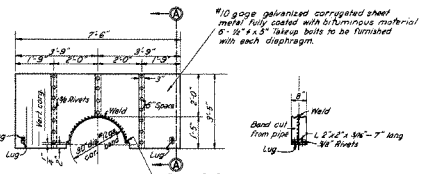
AS BUILT 934-12.2/9

819

455



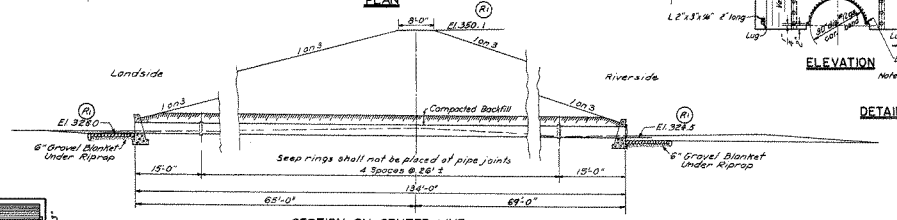
PLAN



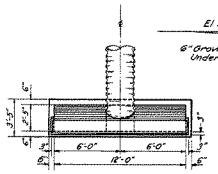
ELEVATION SECTION A-A

DETAIL OF SEEP RING

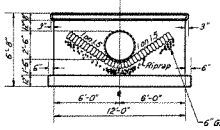
SCALE: 1/2"=1'-0"



SECTION ON CENTER LINE

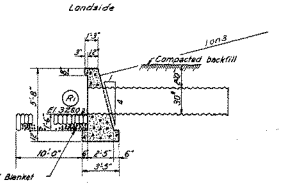


PLAN



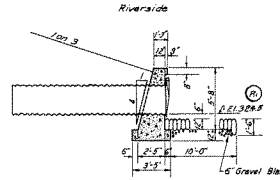
ELEVATION

SCALE: 1/4"=1'-0"



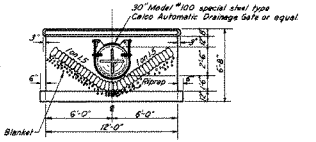
SECTION ON ℄ INLET

SCALE: 1/4"=1'-0"



SECTION ON ℄ OUTLET

SCALE: 1/4"=1'-0"



ELEVATION

SCALE: 1/4"=1'-0"

(R1) Elevation change "Field"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable

Excavation will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed.
Place six inch gravel blanket under all riprap.

F.B.T.	5-10-39	Landside Levee Slopes Revised and Pipe Lengthened
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 130+00

SECTION "A"

SHEET 10 OF 21 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] SENIOR ENGINEER

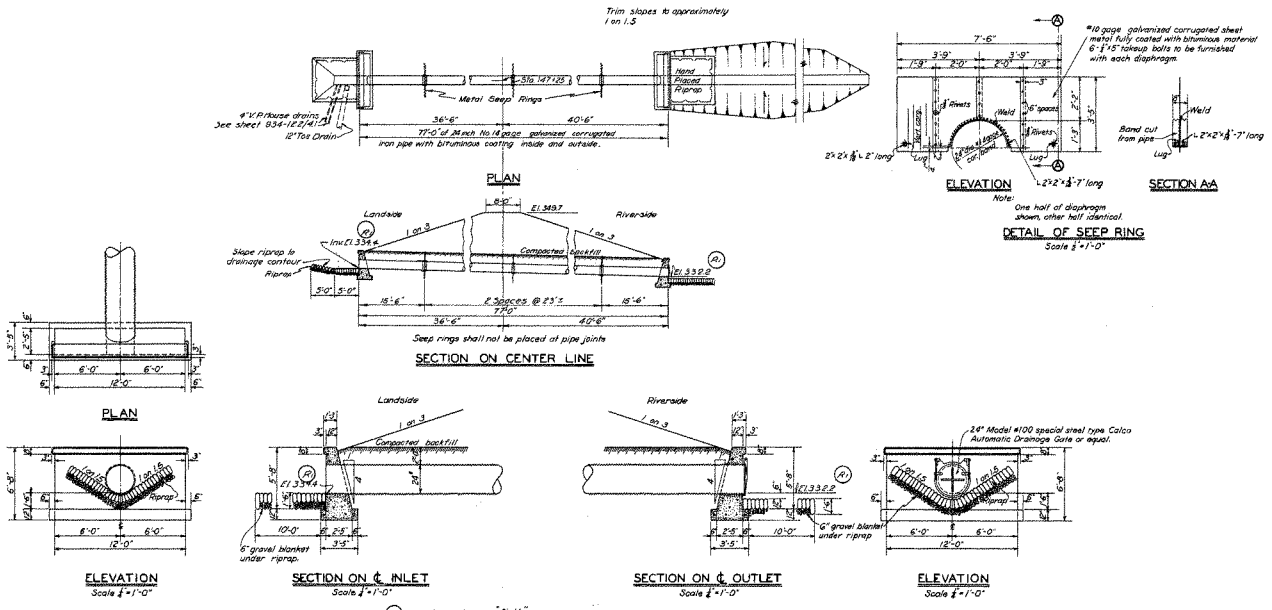
APPROVAL RECOMMENDED: [signature] CAPT., CORPS OF ENGINEERS

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

DR. BY L.W.D. TR. BY L.W.D.-W.J.B. CK. BY J.L.T.

AS BUILT 934 - 12.2/10

820



General Notes:

All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation.

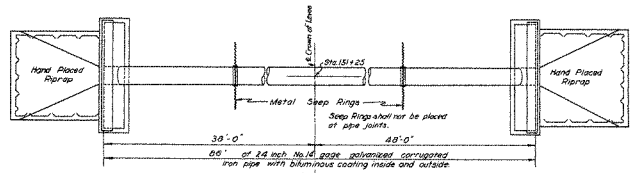
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed.

Place six inch gravel blanket under all riprap.

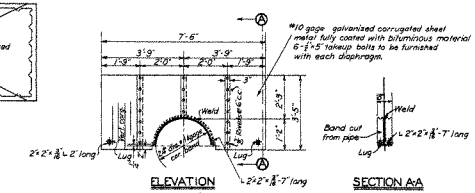
BY	DATE	CHARACTER

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

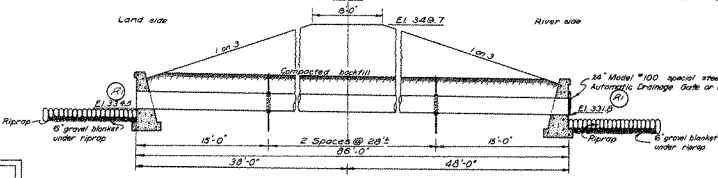


PLAN

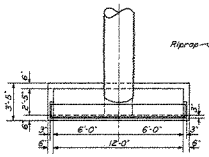


DETAIL OF SEEP RING

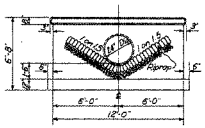
Scale 3/8" = 1'-0"



SECTION ON CENTER LINE

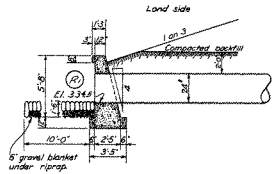


PLAN



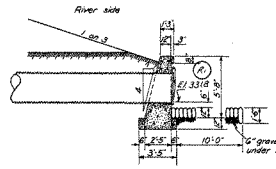
ELEVATION

Scale 1/4" = 1'-0"



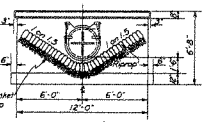
SECTION ON ℄ INLET

Scale 1/4" = 1'-0"



SECTION ON ℄ OUTLET

Scale 1/4" = 1'-0"



ELEVATION

Scale 1/4" = 1'-0"

(R) Elevation change "Weld"

General Notes:
All exposed corners of concrete shall be chamfered one inch.
All riprap shall be hand placed.
Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed.
Place six inch gravel blanket under all riprap.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 151+25

SECTION "X"

SHEET 12 OF 21 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] SENIOR ENGINEER

APPROVAL RECOMMENDED: [signature] ASST. CORPS OF ENGINEERS

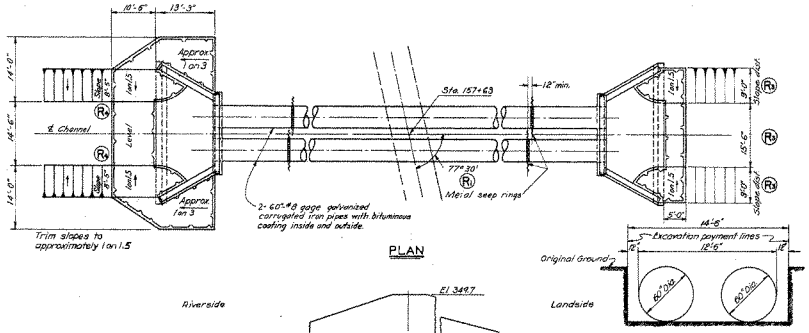
APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

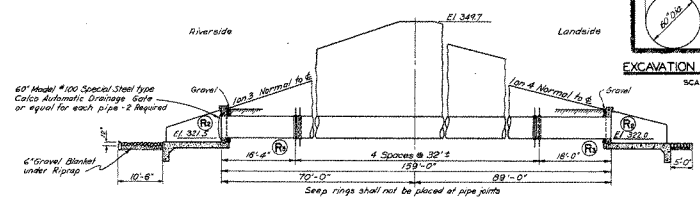
DR. BY H.W. TR. BY J.J.H. CK. BY J.L.T.

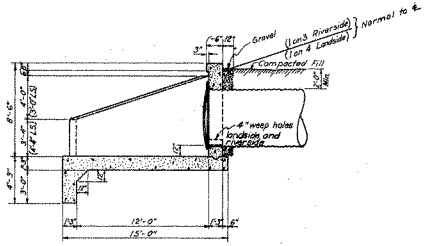
BY	DATE	CHARACTER
F.B.T.	5-10-39	Minor Corrections

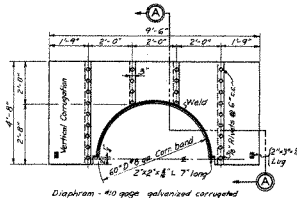
REVISIONS

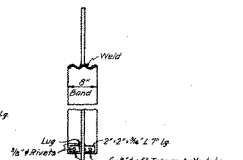
AS BUILT 934-12.2/12

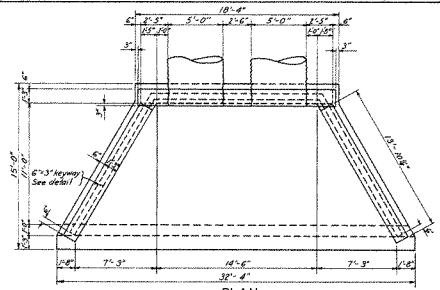


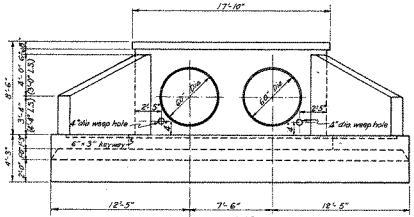












General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside the required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipes with a minimum top cover of two feet before embankment is placed.
Place six inch gravel blanket under all riprap.
Place twelve inch gravel drain back of wings & headwalls.
For reinforcing steel details see sheet 934-12.2/14.

MK	DATE	AUTHORITY	REVISION
R		Field	Notes added
R		Field	Dimension changed
R		Field	Elevation changed
R		Field	Change of angle

AS BUILT REVISIONS

BY	DATE	CHARACTER
F.B.K.	5-1939	Minor Corrections
J.H.G.	6-1-39	Location, Length pipe, Seep Rings

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 157+63
SECTION "A"

SHEET 13 OF 21 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: APPROVED:

CAPT. CORPS OF ENGINEERS — LT. COL. CORPS OF ENGINEERS

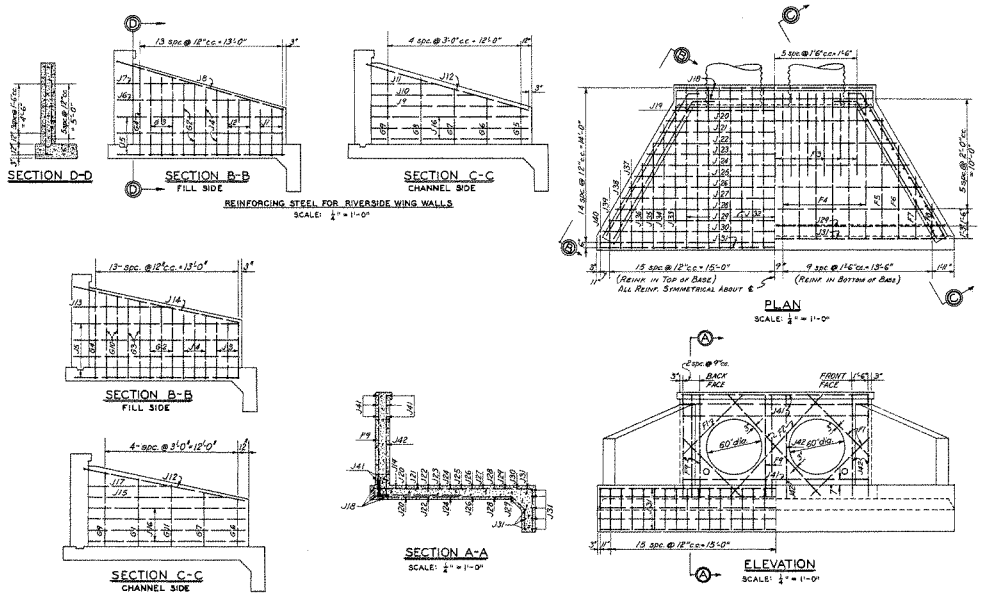
DR. BY J.H.G. — TR. BY E.S. — CK. BY J.L.T.

AS BUILT

934-12.2/13

REINFORCEMENT SCHEDULE

BAR	SIZE	NO. REQ'D	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	1/2"ø	6	4'-9"	4'-3" 6"	3.17	19.0
J2	"	6	5'-7"	5'-1" 6"	3.73	22.4
J3	"	6	5'-9"	5'-3" 6"	3.84	23.0
J4	"	10	6'-4"	5'-10" 6"	4.23	42.3
J5	"	14	16'-0"	15'-8" 12"	10.69	149.7
J6	"	2	13'-9"	12'-3" 12"	8.85	17.7
J7	"	2	8'-3"	7'-3" 12"	5.51	11.0
J8	"	2	16'-9"	15'-9" 12"	11.19	22.4
J9	"	2	13'-3"	Straight	8.85	17.7
J10	"	2	10'-0"	"	6.68	13.4
J11	"	2	6'-6"	"	4.34	8.7
J12	"	4	17'-0"	15'-0" 2'-0"	11.36	45.4
J13	"	2	10'-0"	9'-0" 12"	6.68	13.4
J14	"	2	16'-6"	15'-6" 12"	11.02	22.0
J15	"	2	13'-9"	Straight	9.18	18.4
J16	"	14	14'-3"	"	9.52	133.3
J17	"	2	8'-0"	"	5.34	10.7
J18	"	6	17'-11"	"	11.97	71.8
J19	"	2	18'-8"	"	12.47	24.9
J20	"	4	19'-9"	"	13.19	52.8
J21	"	2	21'-0"	"	14.03	28.1
J22	"	4	22'-3"	Straight	14.87	59.5
J23	"	2	23'-3"	"	15.53	31.1
J24	"	4	24'-6"	"	16.36	65.5
J25	"	2	25'-6"	"	17.03	34.1
J26	"	4	26'-9"	"	17.87	71.5
J27	"	2	28'-0"	"	18.70	37.4
J28	"	4	29'-0"	"	19.37	77.5
J29	"	4	30'-3"	"	20.21	80.8
J30	"	2	31'-6"	"	21.04	42.1
J31	"	18	32'-0"	"	21.38	384.8
J32	"	34	18'-3"	17'-9" 3'-9"	12.19	414.5
J33	"	4	16'-6"	15'-9" 3'-9"	11.02	44.1
J34	"	4	14'-9"	13'-9" 3'-9"	9.85	39.4
J35	"	4	13'-3"	9'-6" 3'-9"	8.85	35.4
J36	"	4	11'-6"	7'-9" 3'-9"	7.68	30.7
J37	"	4	9'-9"	6'-0" 3'-9"	6.51	26.0
J38	"	4	8'-0"	4'-3" 3'-9"	5.34	21.4
J39	"	4	6'-3"	2'-6" 3'-9"	4.18	16.7
J40	"	4	5'-0"	1'-3" 3'-9"	3.34	13.4
J41	"	16	18'-11"	Straight	11.30	180.8
J42	"	12	10'-6"	9'-3" 1'-3"	7.01	84.1
G1	5/8"ø	2	6'-3"	Straight	6.52	13.0
G2	"	10	7'-2"	6'-7" 7"	7.47	74.7
G3	"	10	7'-9"	7'-2" 7"	8.08	80.8
G4	"	4	8'-7"	8'-0" 7"	8.95	35.8
G5	"	2	3'-4"	Straight	3.48	7.0
G6	"	4	4'-3"	"	4.43	17.7
G7	"	4	5'-0"	"	5.22	20.9
G8	"	2	6'-0"	"	6.26	12.5
G9	"	4	6'-9"	"	7.04	28.2
G10	"	4	8'-2"	7'-7" 7"	8.52	34.1
G11	"	2	5'-6"	Straight	5.74	11.5
F1	3/4"ø	16	8'-0"	"	12.02	192.3
F2	"	6	12'-6"	"	18.78	150.2
F3	"	22	9'-3"	7'-6" 1'-9"	13.89	305.6
F4	"	24	17'-5"	15'-8" 1'-9" 1'-9" 2'-11"	26.16	627.8
F5	"	4	13'-4"	9'-9" 1'-9" 1'-9"	20.03	80.1
F6	"	4	10'-10"	7'-3" 1'-9" 1'-9"	16.27	65.1
F7	"	4	8'-1"	4'-6" 1'-9" 1'-9"	12.14	48.6
F8	"	4	5'-7"	2'-10" 1'-9" 1'-9"	8.37	33.5
F9	"	20	10'-3	9'-3" 1'-9"	15.40	308.0
				TOTAL		4706



General Notes:

Reinforcement schedule includes reinforcing steel for two headwalls.

The distance from face of concrete to reinforcing steel shall not be less than two and one-half inches.

Landside wing walls for levee slope 1 on 4 and riverside wing walls for levee slope 1 on 3

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 157+63
SECTION "A"

SHEET 14 OF 21 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: CAPT., CORPS OF ENGINEERS — DR. BY K.S.P.

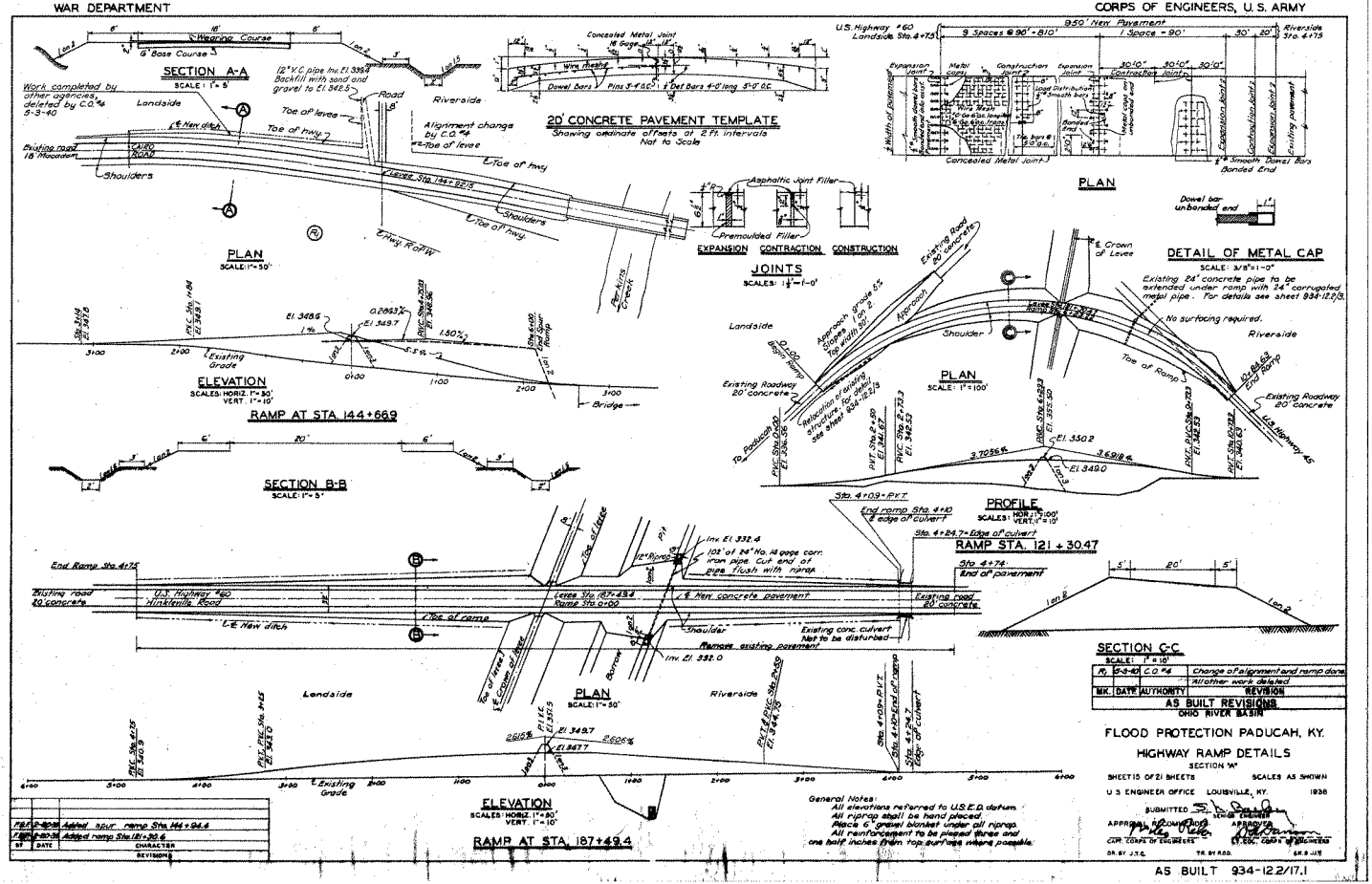
APPROVED: LT. COL., CORPS OF ENGINEERS — TR. BY E.S. — CK. BY J.I.T.

AS BUILT 934-12.2/14

824

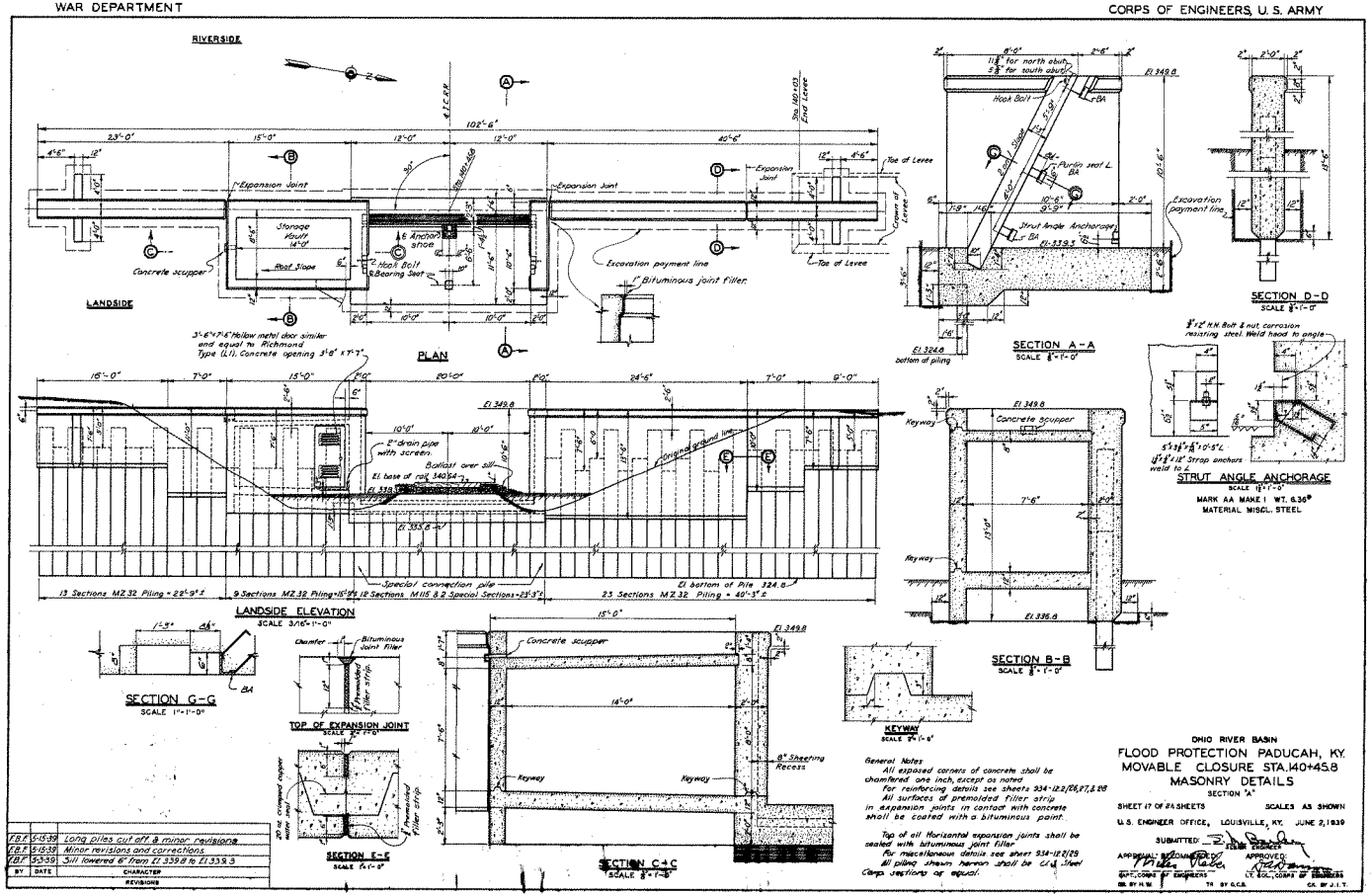
WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



General Notes

All exposed corners of concrete shall be chamfered one inch, except as noted

For reinforcing details see sheets 934-12.2/26,27,& 28

All surfaces of premolded filler strip in expansion joints in contact with concrete shall be coated with a bituminous paint.

Top of all Horizontal expansion joints shall be sealed with bituminous joint filler

For miscellaneous details see sheet 934-12.2/29

All piling shown hereon shall be ⊏ & ⊥ Steel Corps sections or equal.

BY	DATE	CHARACTER
F.B.T.	6-15-39	Long piles cut off & minor revisions
F.B.T.	5-15-39	Minor revisions and corrections
F.B.T.	5-3-39	Sill lowered 6" from El 339.8 to El 339.3

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MOVABLE CLOSURE STA. 140+45.8

MASONRY DETAILS

SECTION "A"

SHEET 17 OF 24 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature] MAJ., CORPS OF ENGINEERS — APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

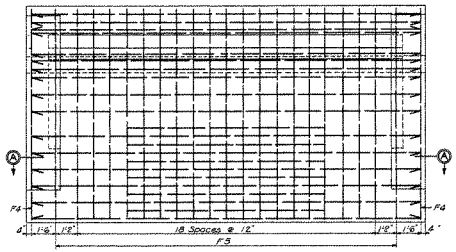
DR. BY H.W. — TR. BY G.C.S. — CK. BY J.I.T.

AS BUILT 934-12.2/25

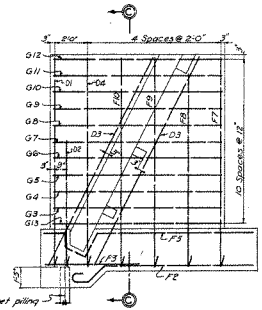
826

WAR DEPARTMENT

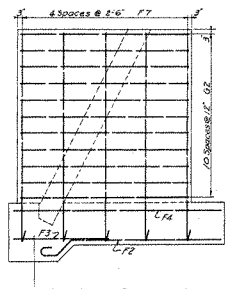
CORPS OF ENGINEERS. U. S. ARMY



REINFORCING TOP OF SILL
SCALE: 3/8"=1'-0"



REINFORCING FRONT FACE ABUTMENT WALL
SCALE: 3/8"=1'-0"



REINFORCING BACK FACE ABUTMENT WALL
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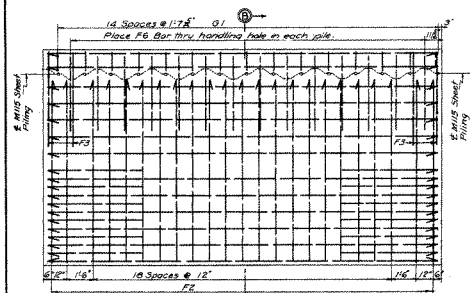
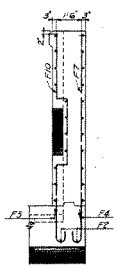
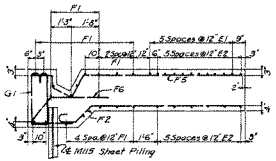


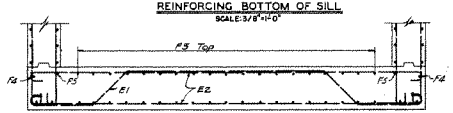
REINFORCING BOTTOM OF SILL
SCALE: 3/8"=1'-0"



SECTION G-G
SCALE: 3/8"=1'-0"



SECTION B-B
SCALE: 3/8"=1'-0"



SECTION A-A
SCALE: 3/8"=1'-0"

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	18	1⅛" ϕ	23'-0"	23'-0"	37.55	675.9
F2	23	"	12'-1"	12" 3'-0"	18.15	417.5
F3	4	"	5'-9"	Straight	8.64	34.6
F4	2	"	12'-8"	12'-1"	19.03	38.1
F5	21	"	18'-6"	14'-7" 3'-6" 9'-5"	21.78	457.4
F6	14	"	7'-10"	3'-4" 3'-6" 1⅛"	11.77	164.8
F7	12	"	13'-4"	12'-8"	20.03	240.4
F8	2	"	18'-2"	11'-6"	18.27	36.5
F9	2	"	14'-2"	8'-0" 3'-4"	21.28	42.6
F10	2	"	18'-8"	9'-10" 6" 8'-10"	22.03	44.1
D1	2	1" ϕ	19'-7"	12'-8"	36.27	72.5
D2	2	"	8'-7"	7'-8"	22.92	45.8
D3	4	"	14'-0"	Straight	37.38	149.5
G1	19	⅞" ϕ	6'-6"	12" 3'-0"	6.69	130.4
G2	22	"	10'-5"	Straight	10.60	233.2
G3	2	"	11'-6"	1'-6" 2'-6" 2'-0"	11.99	24.0
G4	2	"	11'-6"	2'-0" 2'-6" 2'-3½"	11.99	24.0
G5	2	"	11'-6"	3'-6" 2'-6" 3'-0"	11.99	24.0
G6	2	"	11'-6"	3'-0" 2'-6" 2'-6"	11.99	24.0
G7	2	"	11'-6"	3'-6" 2'-6" 2'-0"	11.99	24.0
G8	2	"	11'-6"	4'-0" 2'-6" 3'-3½"	11.99	24.0
G9	2	"	11'-6"	4'-6" 2'-6" 3'-0"	11.99	24.0
G10	2	"	11'-6"	5'-0" 2'-6" 2'-6"	11.99	24.0
G11	2	"	11'-6"	5'-6" 2'-6" 2'-0"	11.99	24.0
G12	2	"	11'-6"	6'-0" 2'-6" 1'-6"	11.99	24.0
E1	6	⅞" ϕ	27'-2"	1'-6" 9'-10" 9'-10"	35.52	213.1
E2	12	"	25'-6"	23'-6"	52.12	625.4
D4	2	1" ϕ	14'-3"	6'-6" 3'-9"	38.05	76.1
G13	2	⅞" ϕ	11'-6"	7'-6" 2'-6" 2'-0"	11.99	24.0
					TOTAL	4082 #

DETAIL OF HOOK

General Notes:
All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of two and one half inches of concrete covering unless otherwise specified.
For masonry details see sheet 934-12.2/25.
For reinforcing details see sheets 934-12.2/27 & 28

BY	DATE	CHARACTER
F.B.K.	5-3-39	Reinf. revised for lowering sill 6"

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 140+45.8
SILL & ABUTMENT WALLS

SECTION "A"

SHEET 18 OF 21 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: S. L. Bates, SENIOR ENGINEER

APPROVAL RECOMMENDED: [illegible], CAPT. CORPS OF ENGINEERS

APPROVED: R. E. Jamison, LT. COL., CORPS OF ENGINEERS

DR. BY W.J.B. TR. BY R.O.D. CK. BY J.I.T.

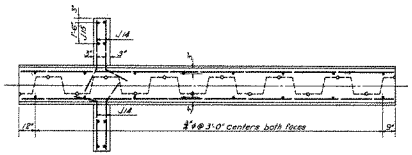
AS BUILT 934-12.2/26

827

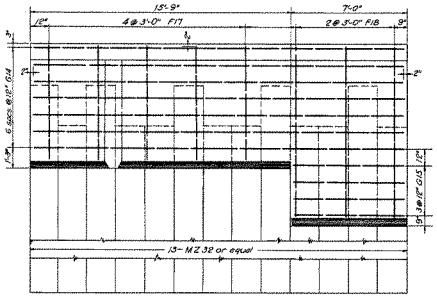
454

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



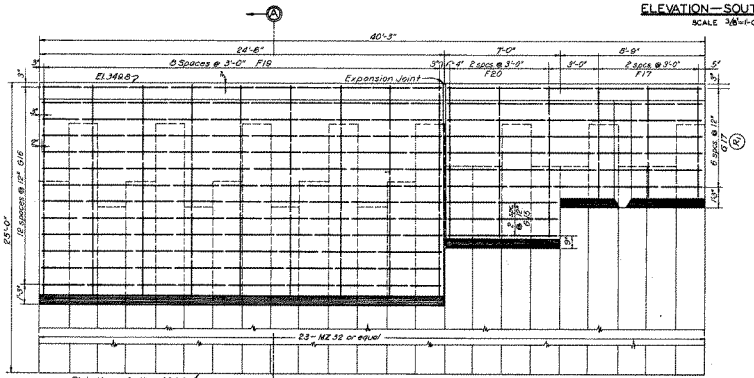
PLAN—SOUTH WALL
SCALE 3/8"=1'-0"



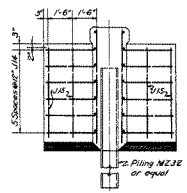
ELEVATION—SOUTH WALL
SCALE 3/8"=1'-0"

REINFORCEMENT SCHEDULE						
BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J14	48	3/4"ϕ	4'-3"	Field Bend	2.64	136.3
J15	16	"	5'-6"	Straight	3.67	58.7
G14	14	5/8"ϕ	22'-5"	"	23.38	327.3
G15	14	"	6'-8"	"	6.95	97.3
G16	26	"	24'-2"	"	25.21	655.5
G17	14	"	15'-7"	"	16.20	226.8
F17	16	3/4"ϕ	6'-10"	"	10.26	164.2
F18	6	"	10'-4"	"	15.52	93.1
F19	18	"	12'-10"	"	19.28	347.0
F20	6	"	9'-4"	"	14.02	84.1
					TOTAL	2190#

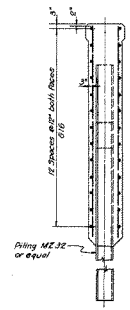
(R1)



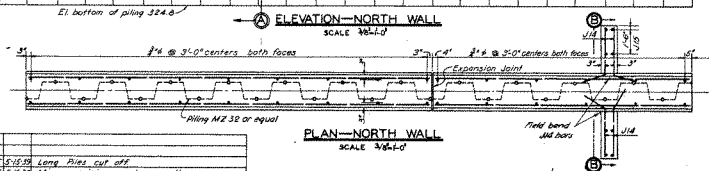
A ELEVATION—NORTH WALL
SCALE 3/8"=1'-0"



SECTION B-B
SCALE 3/8"=1'-0"



SECTION A-A
SCALE 3/8"=1'-0"



PLAN—NORTH WALL
SCALE 3/8"=1'-0"

R1		Field	Bar schedule changed.
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

General Notes:

All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of two and one half inches of concrete covering, unless otherwise specified.

For masonry details see sheet 934-12.2/16

For reinforcing details of sill and abutment walls see sheet 934-12.2/19

For reinforcing details of storage vault see sheet 934-12.2/21

FBF	5-15-39	Long Piles cut off.
FBF	5-10-39	Minor revisions and corrections.
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 140+45.8
WING WALLS & SEEPAGE CUT-OFF WALLS

SHEET 18 OF 29 SHEETS SECTION "A" SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: CAPT., CORPS OF ENGINEERS

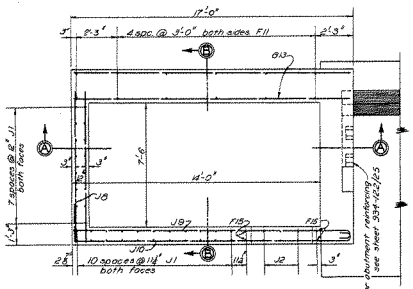
APPROVED: LT. COL., CORPS OF ENGINEERS

DR. BY R.M.R. TR. BY E.C. CK. BY J.L.T.

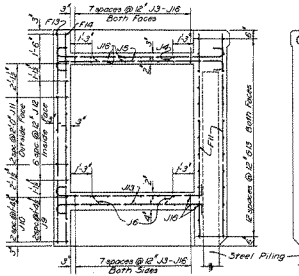
AS BUILT 934-12.2/27

828

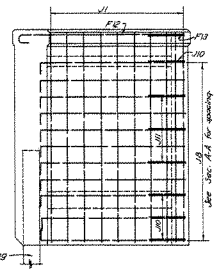
065



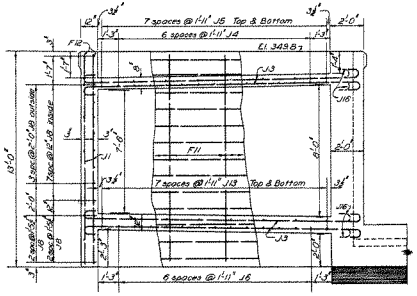
SECTIONAL PLAN C-C
SCALE 3/8"=1'-0"



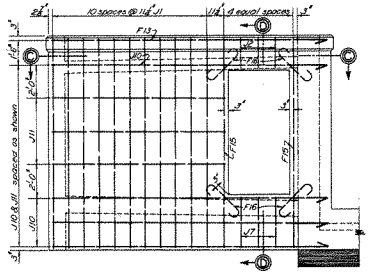
SECTION B-B
SCALE 3/8"=1'-0"



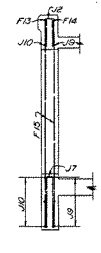
END ELEVATION
SCALE 3/8"=1'-0"



SECTION A-A
SCALE 3/8"=1'-0"



FRONT ELEVATION
SCALE 3/8"=1'-0"



SECTION D-D
SCALE 3/8"=1'-0"

REINFORCEMENT SCHEDULE

	BAR	SIZE	NO. REQ'D	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
	J1	½"	38	12'-8"	Straight	8.46	321.5
	J2	"	3	3'-10"	1½" 6"	2.56	7.7
	J3	"	25	17'-11"	6" 9½" 6"	11.97	299.3
	J4	"	7	11'-6"	6" 9½" 6"	7.66	53.6
	J5	"	16	11'-2"	6" 9½" 6"	7.57	121.1
	J6	"	7	10'-6"	6" 9½" 6"	7.01	49.1
	J7	"	3	6'-2"	6" 9½"	4.12	12.4
	J8	"	19	3'-4"	6" 9½"	2.23	42.1
	J9	"	4	17'-3"	9½" 6"	11.52	46.1
	J10	"	4	19'-6"	6" 9½" 6"	13.03	52.1
	J11	"	3	12'-6"	6" 9½"	8.46	25.4
	J12	"	7	10'-5"	Straight	6.96	48.7
	F11	½"	12	12'-5"	Straight	10.65	223.8
	F12	"	2	10'-8"	9½" 6"	16.02	32.0
	F13	"	1	18'-8"	6" 9½" 6"	29.29	29.3
	F14	"	1	17'-9"	9½" 6"	25.91	25.9
R1	F15	"	4	12'-8"	Straight	19.03	76.2
	F16	"	8	3'-10"	6" 9½" 6"	5.78	46.1
	D13	½"	25	16'-8"	Straight	17.36	434.5
	J13	½"	16	10'-1"	6" 9½" 6"	6.74	107.8
	J16	"	7	16'-3"	6" 9½" 6"	10.85	76.0
						TOTAL	2201#

MK	DATE	AUTHORITY	REVISION
R1		Field	Bar schedule changed

AS BUILT REVISIONS

General Notes:

All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of two and one half inches of concrete covering unless otherwise specified.

For masonry details see sheet 934-12.2/18

For reinforcing details of wing walls and seepage cut-off walls see sheet 934-12.2/20

For reinforcing details of sill and abutment walls see sheet 934-12.2/19

BY	DATE	CHARACTER
F.B.F.	5-3-39	Reinf revised for lowering sill 6"

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 140+45.8
STORAGE VAULT

SECTION "A"

SHEET 200 OF 21 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: APPROVED:

CHIEF, DIV. OF ENGINEERS LT. COL., CORPS OF ENGINEERS

DR. BY F.H.C. TR. BY A.E.L. CK. BY J.L.T.

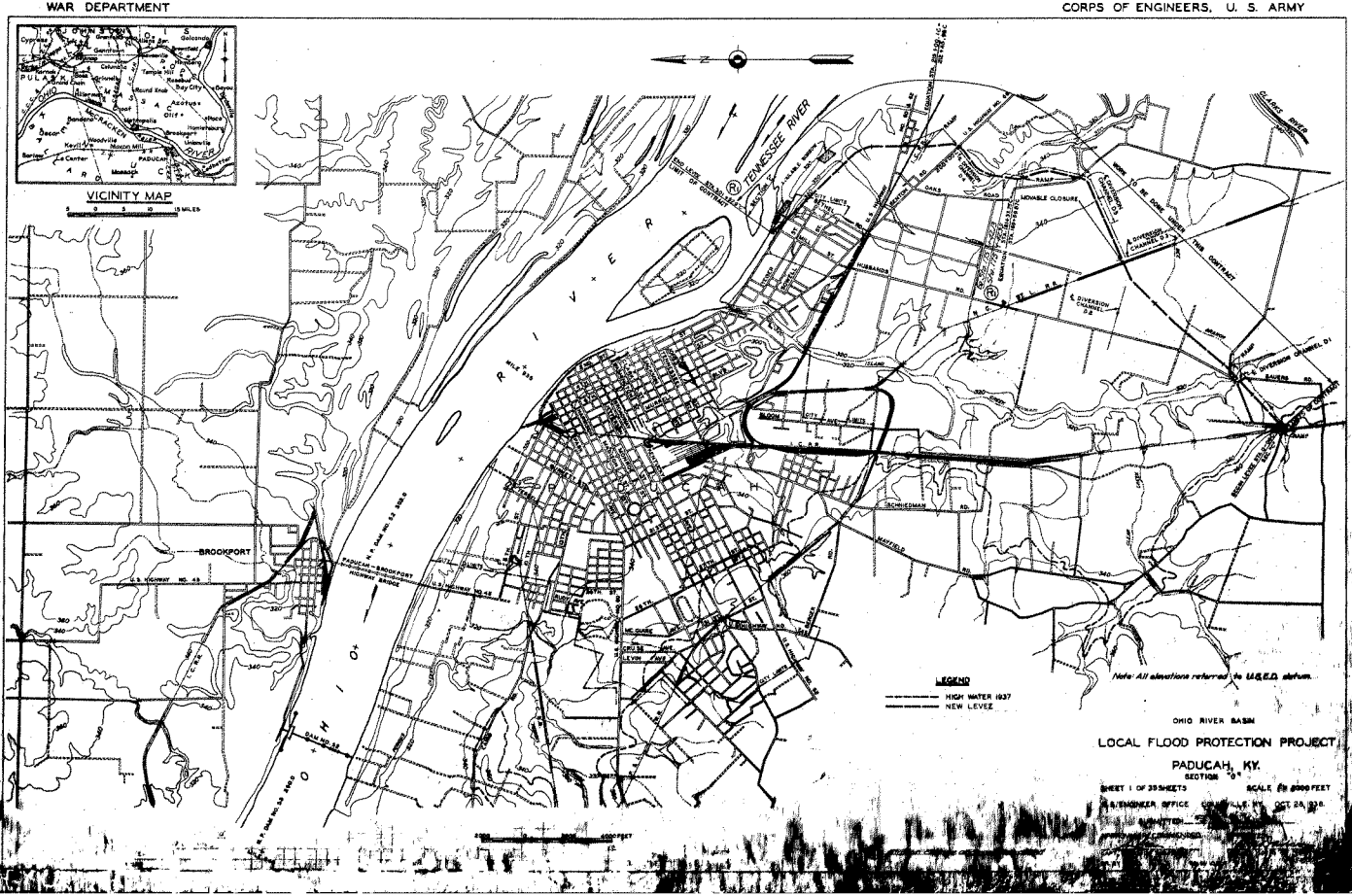
AS BUILT 934-12.2/28

829

990

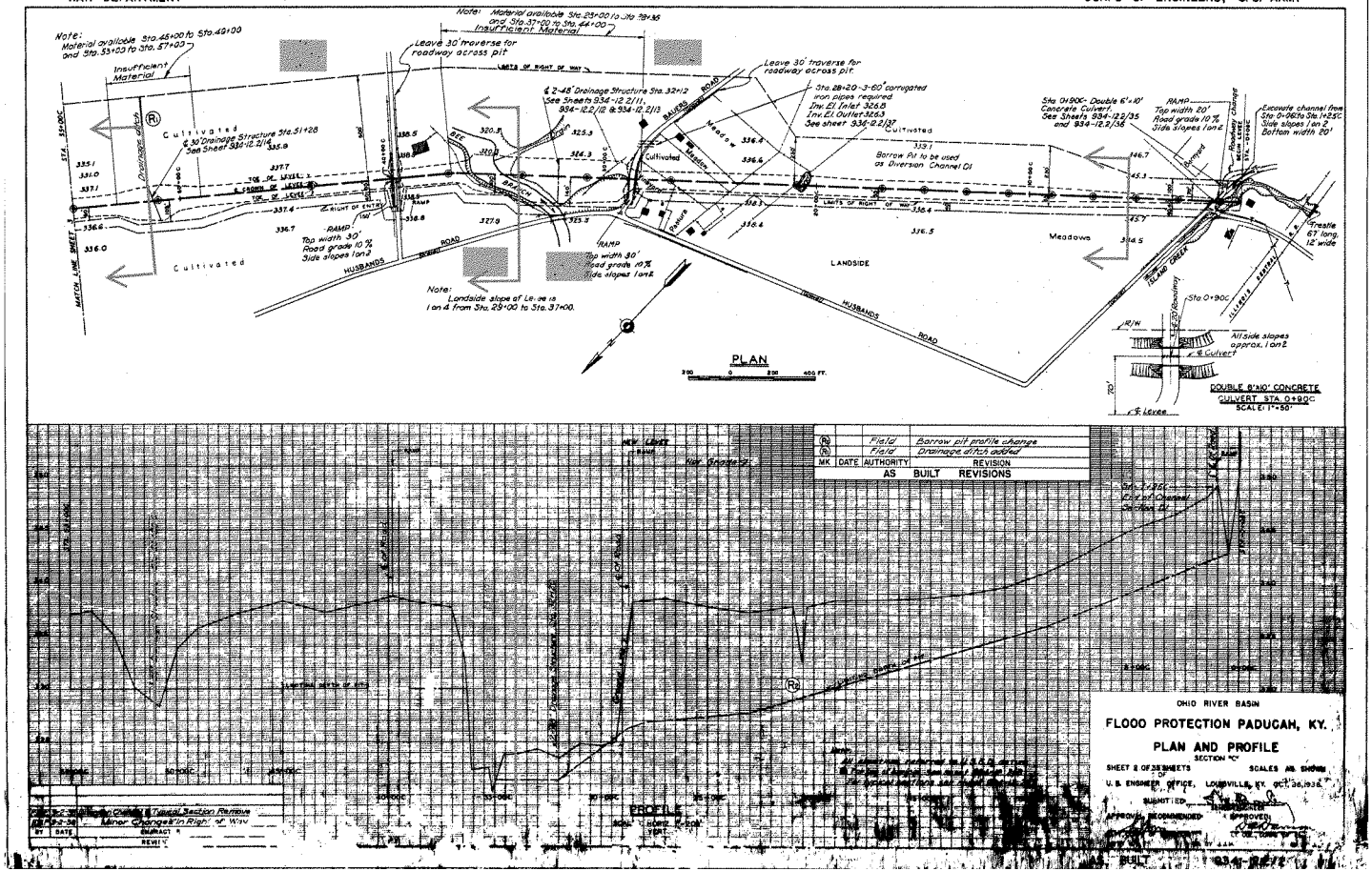
WAR DEPARTMENT

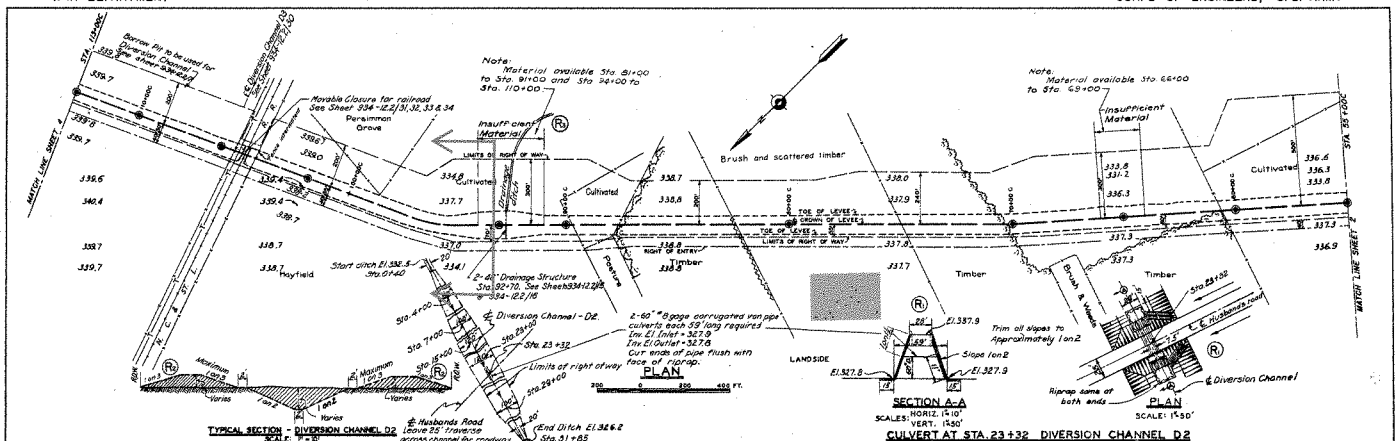
CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "C"

SHEET 3 35 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1936.

SUBMITTED: _____ DISTRICT ENGINEER

APPROVAL RECOMMENDED: _____ CHIEF, BRANCH OF ENGINEERING

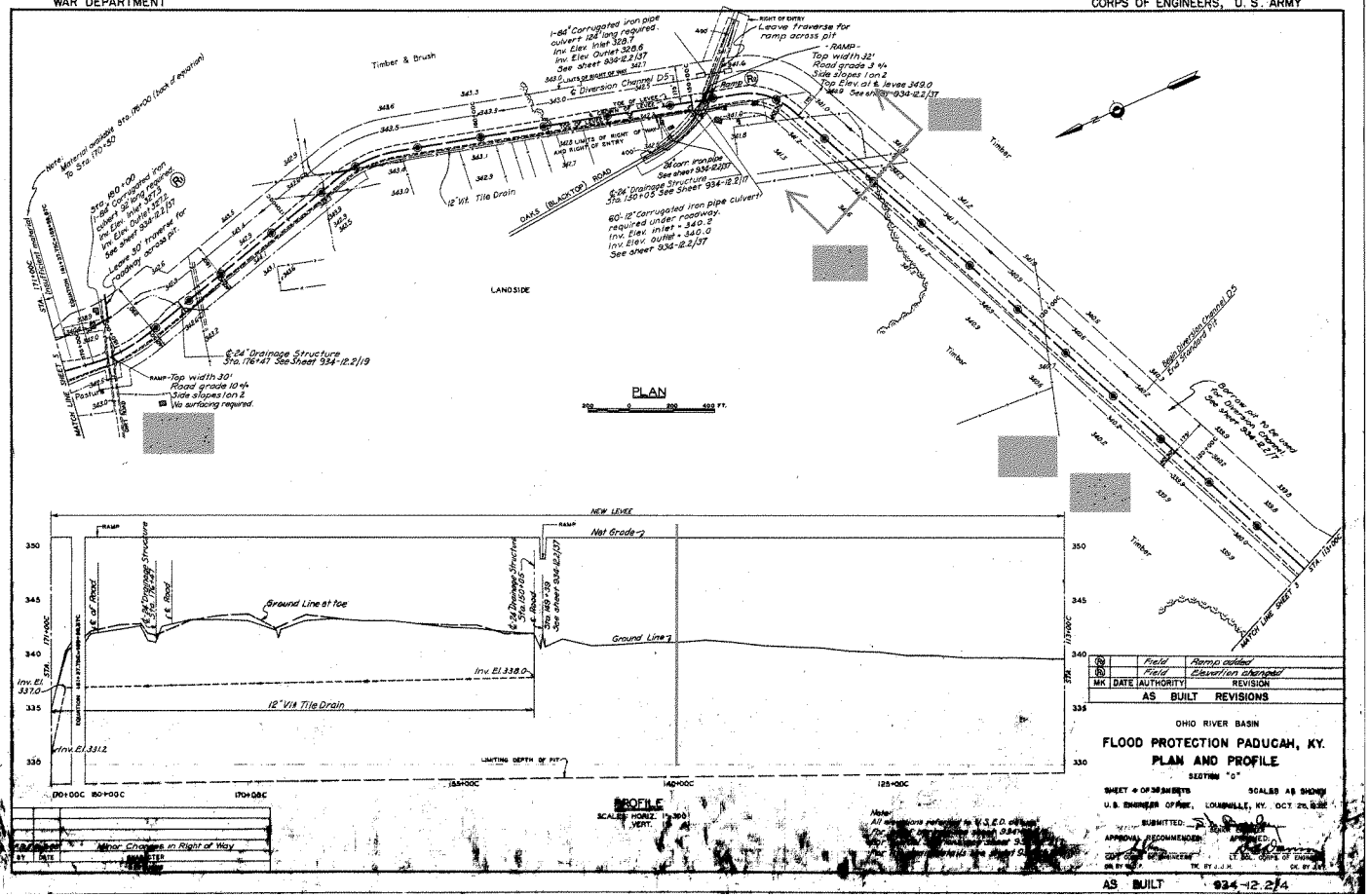
APPROVED: _____ LT. COL., CORPS OF ENGINEERS

DR. BY W.E.F. TR. BY J.A.H. CK. BY J.S.T.

AS BUILT 934-12.2/3

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	AUTHORITY	REVISION
		Field	Ramp added
		Field	Elevation changed

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "O"

SHEET 4 OF 38 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1942

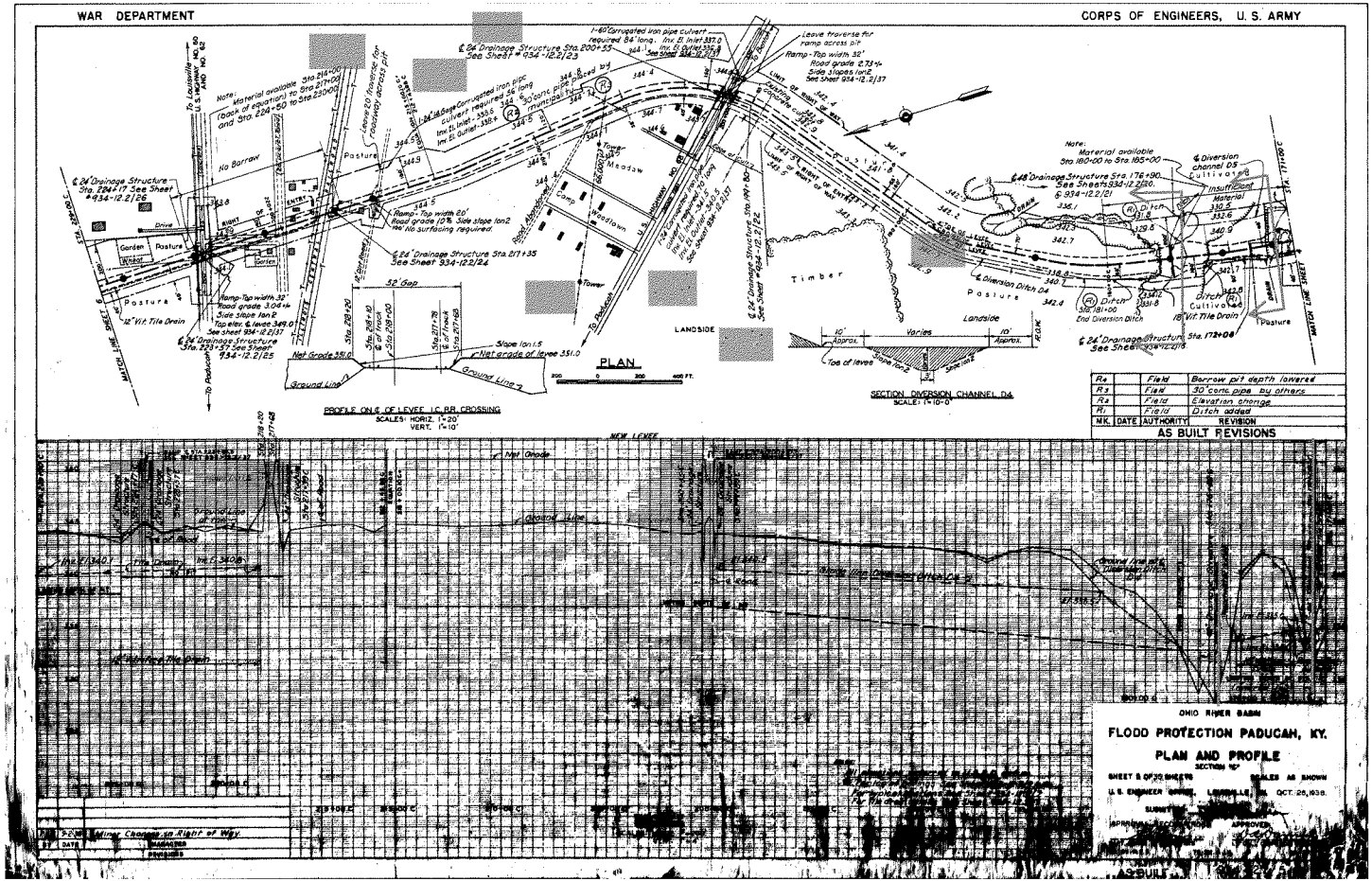
SUBMITTED: APPROVAL RECOMMENDED: APPROVED:

COL. CORPS OF ENGINEERS LT. COL. CORPS OF ENGINEERS

DR. BY W.P. TR. BY J.J.H. CK. BY J.V.T.

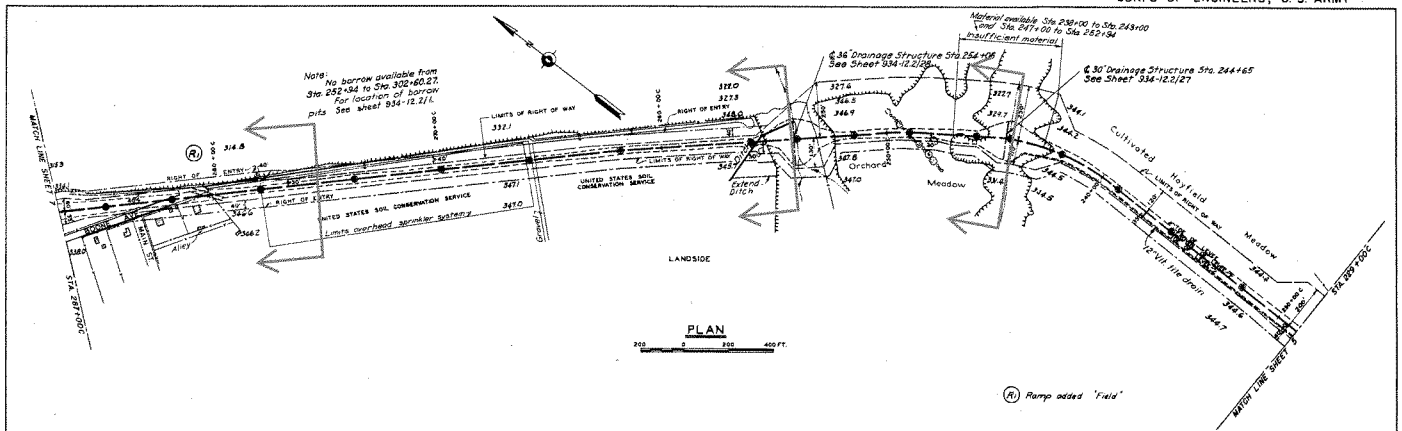
WAR DEPARTMENT

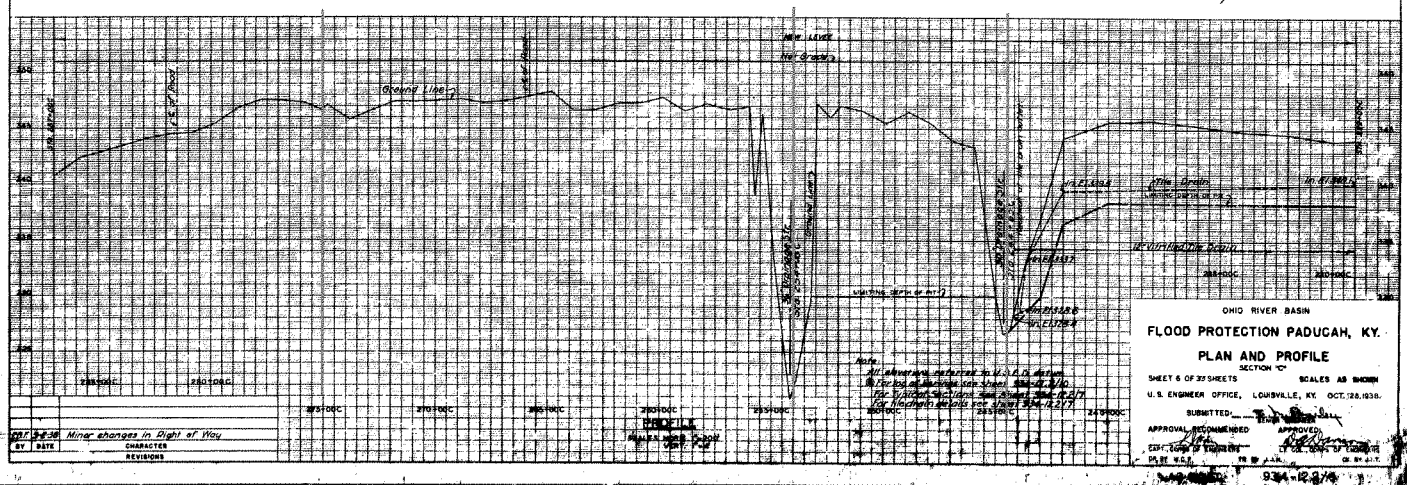
CORPS OF ENGINEERS, U. S. ARMY


PLAN
PROFILE ON ℄ OF LEVEE I.C.RR. CROSSING
SCALES: HORIZ. 1"=20'
VERT. 1"=10'
SECTION DIVERSION CHANNEL D4
SCALE: 1"=10'-0"
NEW LEVEE
Pasture
Garden
Meadow
Timber
Landside
Ground Line
Net Grade
Ramp-Top width 32'
Road grade 3.0d w
Side slope 1on 2
Top elev. ℄ levee 349.0
See sheet 934-12.2/37
℄ 24" Drainage Structure
Sta. 223+37 See Sheet
934-12.2/25
12" Vit. Tile Drain
Ramp-Top width 20'
Road grade 10% Side slope 1on2
No surfacing required.
℄ 24" Drainage Structure Sta. 217+35
See Sheet 934-12.2/24
52' Gap
Slope 1on 1.5
Net grade of levee 351.0
℄ 24" Drainage Structure Sta. 200+55
See Sheet 934-12.2/23
1-60" Corrugated iron pipe culvert
required 84' long. Inv. ℄ Inlet 337.0
Inv. ℄ Outlet 335.8
See Sheet 934-12.2/23
Leave traverse for
ramp across pit
Ramp-Top width 32'
Road grade 2.73%
Side slopes 1on2
See Sheet 934-12.2/37
Note:
Material available
Sta. 180+00 to Sta. 185+00
See Sheet 934-12.2/20
℄ 48" Drainage Structure Sta. 176+90
See Sheet 934-12.2/20
℄ 934-12.2/21
℄ Diversion
channel D5
Cultivated
Insufficient Borrow
Material
Diversion Ditch D4
End Diversion Ditch
Ditch
Cultivated
18" Vit. Tile Drain
℄ 24" Drainage Structure Sta. 173+08
See Sheet 934-12.2/18
Toe of levee
Varies
10' Approx.
Slope 1on 2
R.O.W.
Note:
Material available
(back of equation) to Sta. 217+00
and Sta. 224+50 to Sta. 230+00
℄ 24" Drainage Structure Sta. 228+17 See Sheet
934-12.2/26
No Borrow
℄ 24" Corrugated iron pipe
Culvert required 56' long
Inv. ℄ Inlet - 338.6
Inv. ℄ Outlet - 338.4
℄ 30" conc. pipe placed by
municipal forces
Leave 20' traverse for
roadway across pit
To Louisville
To Paducah
U.S. Highway
Road Abandoned
Tower
Camp
Meadow
Pasture
Garden
Drive
Barn
Stock Yard
Ditch
Cultivated
Material
Ditch
Sta. 181+00
End Diversion Ditch
Ditch
Sta. 173+08
Pasture
Landside
Timber
Pasture
Pasture
Pasture

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "C"

SHEET 6 OF 33 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED

APPROVAL RECOMMENDED — APPROVED

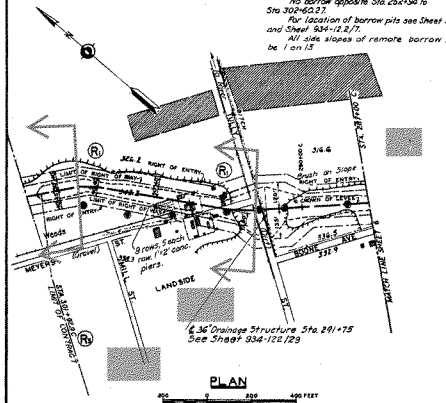
934-12.2/6

835

WAR DEPARTMENT

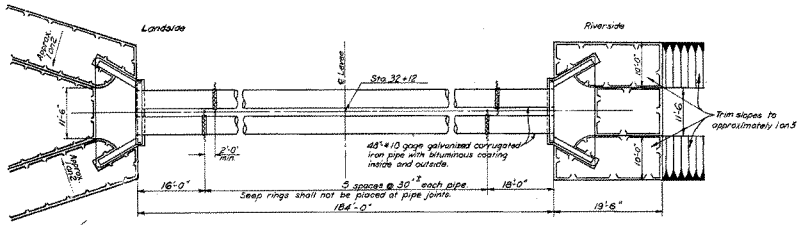
CORPS OF ENGINEERS, U. S. ARMY

Note:
No borrow opposite Sta. 252+94 to Sta. 302+60.27.
For location of borrow pits see Sheet 934-12.2/1 and Sheet 934-12.2/7.
All side slopes of remote borrow pits to be 1 on 1.5

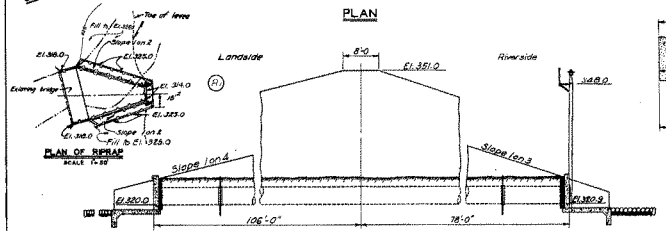

Right of Entry
Limits of Right of Entry
Right of Way
Limits of Right of Way
Brush on Slope
Right of Way
Limits of Right of Way
Cabin by Levee
Woods
Meyers
Forward
9 rows, 5 each row, 1/2" conc. piers.
Landside
Boone
Boone St.
Levee
Right of Way
Limits of Right of Way
Levee
Right of Way
Limits of Right of Way
Cabin by Levee
Brush on Slope

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

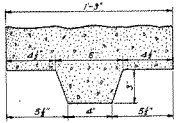


PLAN

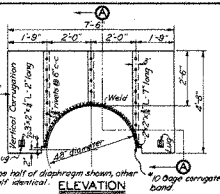


SECTION ON CENTER LINE

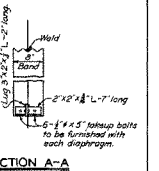
PLAN OF RIPRAP
SCALE: 1"=50'



DETAIL OF KEYWAY
SCALE: 3"=1'-0"

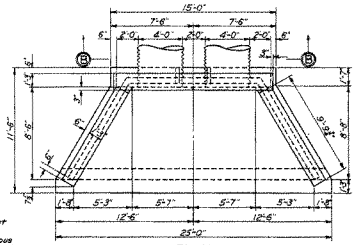


ELEVATION
SCALE: 1/4"=1'-0"



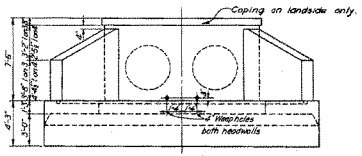
SECTION A-A
SCALE: 1"=1'-0"

DETAIL OF SEEP RING

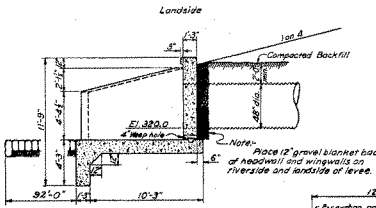


PLAN
SCALE: 1/4"=1'-0"

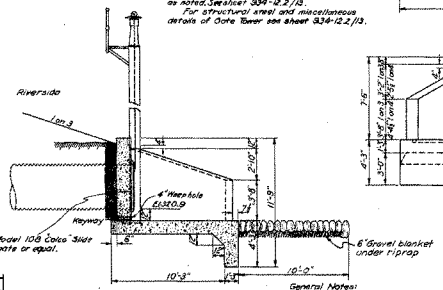
Masonry details of Riverside Headwall and Landside Headwall are identical, except as noted. See sheet 934-12.2/13.
For structural steel and miscellaneous details of Gate Tower see sheet 934-12.2/13.



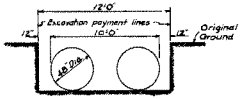
ELEVATION
SCALE: 1/4"=1'-0"



SECTION ON ℄ OUTLET
SCALE: 1/4"=1'-0"



SECTION ON ℄ INLET
SCALE: 1/4"=1'-0"



SECTION B-B
SCALE: 1/8"=1'-0"

(A) Elevation change "Field"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Excavation, for payment, will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipes with a minimum top cover of two feet before embankment is placed.
Place six inch gravel blanket under all riprap.
For reinforcing steel details see sheet 934-12.2/12
Stage culvert to fit bottom of ditch where suitable.
All riprap shall be hand placed.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE DETAILS
STATION 32+12
SECTION "C"

SHEET 8 OF 28 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.

SUBMITTED: [illegible] DISTRICT ENGINEER

APPROVED: RECOMMENDED: [illegible] DIVISION ENGINEER

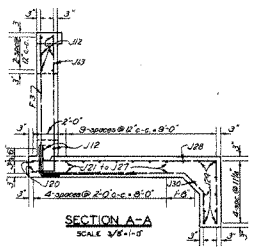
APPROVED: [illegible] CHIEF OF ENGINEERS

DR. BY M.C.P. A.L.K. — TR. BY J.L.K. — CK. BY J.T.

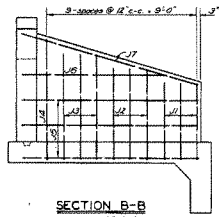
AS BUILT 934-12.2/31

REINFORCEMENT SCHEDULE

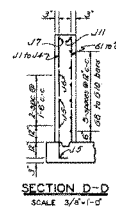
BAR	NO REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	6	¾"	5'-1"	4'-1" 6"	3.80	20.4
J2	6	"	6'-0"	5'-6" 6"	4.01	24.1
J3	6	"	6'-10"	6'-4" 6"	4.57	27.4
J4	4	"	7'-9"	7'-3" 6"	5.18	20.7
J5	14	"	11'-3"	10'-6" 45°	7.51	105.1
J6	2	"	9'-8"	8'-9" 45°	6.35	12.7
J7	2	"	11'-9"	11'-0" 45°	7.85	15.7
J8	16	"	9'-11"	Straight	6.62	105.9
J9	2	"	6'-6"	"	4.34	8.7
J10	2	"	3'-2"	"	2.14	4.2
J11	2	"	12'-6"	10'-0" 45°	8.46	16.9
J12	16	"	13'-9"	Straight	9.13	146.1
J13	12	"	9'-8"	8'-4" 1'-4"	6.47	77.6
J14	30	"	15'-0"	11'-2" 3'-10"	10.02	300.6
J15	4	"	12'-1"	8'-3" 3'-10"	8.07	32.3
J16	4	"	10'-4"	6'-6" 3'-10"	6.90	27.6
J17	4	"	8'-7"	4'-9" 3'-10"	5.73	22.9
J18	4	"	6'-10"	2'-0" 3'-10"	4.56	18.2
J19	4	"	5'-1"	1'-3" 3'-10"	3.40	13.6
J20	4	"	14'-6"	Straight	9.69	38.8
J21	4	"	15'-3"	"	10.19	40.8
J22	2	"	16'-6"	"	11.02	22.0
J23	4	"	17'-6"	"	11.69	46.8
J24	2	"	18'-9"	"	12.52	25.0
J25	4	"	20'-0"	"	13.36	53.4
J26	2	"	21'-0"	"	14.03	28.1
J27	4	"	22'-3"	"	14.87	59.5
J28	2	"	23'-3"	"	15.53	31.1
J29	18	"	24'-6"	"	16.48	296.6
J30	2	"	24'-0"	"	16.03	32.1
J31	6	"	5'-9"	5'-3" 6"	3.84	23.0
J32	6	"	6'-5"	5'-11" 6"	4.29	25.7
J33	6	"	7'-1"	6'-7" 6"	4.74	28.4
J34	2	"	11'-8"	10'-11" 45°	7.79	15.6
J35	2	"	9'-0"	Straight	6.01	12.0
J36	2	"	4'-0"	"	2.67	5.3
J37	2	"	12'-6"	10'-6" 45°	8.35	16.7
G1	2	⅝"	3'-8"	Straight	3.82	7.6
G2	2	"	4'-6"	"	4.69	9.4
G3	2	"	5'-3"	"	5.48	11.0
G4	4	"	6'-2"	"	6.43	25.7
G5	2	"	4'-3"	"	4.43	8.9
G6	2	"	5'-0"	"	5.22	10.4
G7	2	"	5'-6"	"	5.74	11.5
F1	8	¾"	11'-0"	"	16.52	132.2
F2	16	"	7'-0"	"	10.51	168.2
F3	18	"	9'-2"	8'-6" 1'-4"	13.77	247.9
F4	14	"	7'-6"	6'-6" 1'-6"	11.27	157.8
F5	12	"	13'-11"	13'-2" 10'-4" 1'-4"	20.90	250.8
F6	4	"	12'-9"	9'-3" 1'-6" 1'-6"	19.15	76.6
F7	4	"	8'-1"	4'-6" 1'-6" 1'-6"	12.14	48.6
F8	4	"	4'-8"	1'-6" 1'-6"	7.01	28.0
					TOTAL	2095#



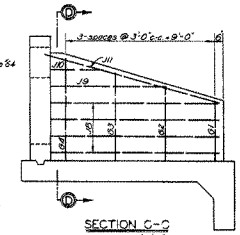
SECTION A-A
SCALE 3/8"=1'-0"



SECTION B-B
SCALE 3/8"=1'-0"

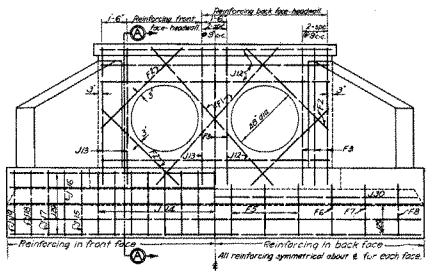


SECTION D-D
SCALE 3/8"=1'-0"

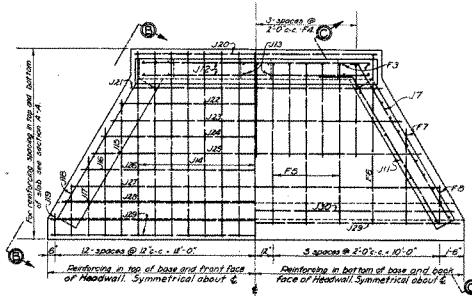


SECTION C-C
SCALE 3/8"=1'-0"

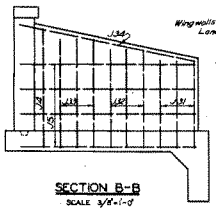
Wingwalls slope 1 on 3 - Riverside.



FRONT ELEVATION
SCALE 3/8"=1'-0"

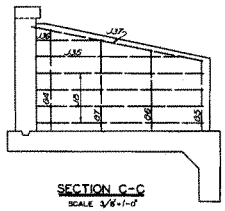


PLAN
SCALE 3/8"=1'-0"



Wingwalls slope 1 on 4 Landside

SECTION B-B
SCALE 3/8"=1'-0"



SECTION C-C
SCALE 3/8"=1'-0"

General Notes:
Reinforcement schedule includes reinforcing steel for two headwalls
The distance from face of concrete to reinforcing steel shall not be less than two and one-half inches.
Landside wingwalls slope 1 on 4 and riverside wingwalls slope 1 on 3.
For concrete details, dimensions, see sheet 934-12.2/11
For gate operating tower details, see sheet 934-12.2/13

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS
STATION 32+12
SECTION "C"

SHEET 9 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED: [signature] SENIOR ENGINEER

APPROVAL RECOMMENDED: [signature] CAPT. CORPS OF ENGINEERS — DR. BY F.B.K.

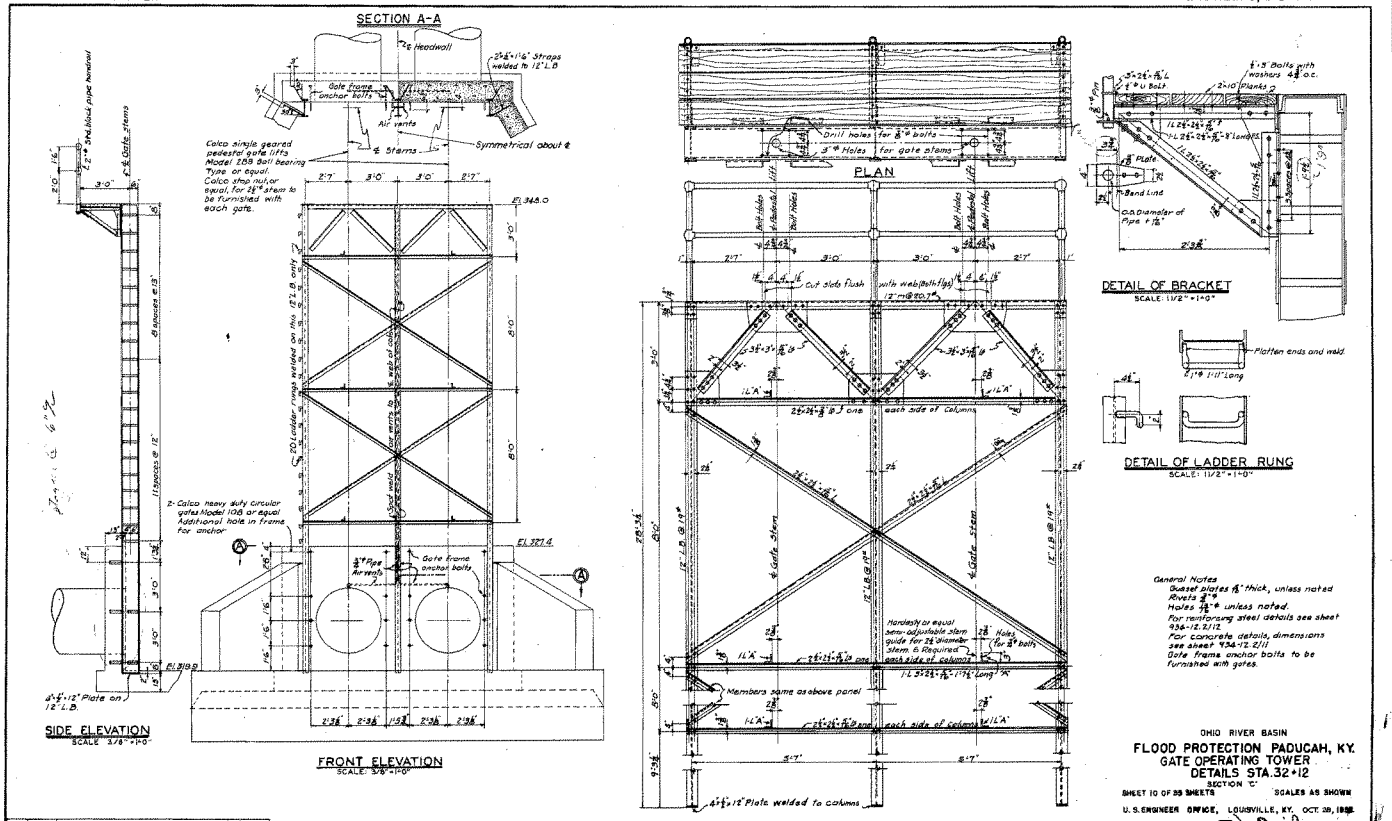
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS — TR. BY A.R.L. — CK. BY J.L.Y.

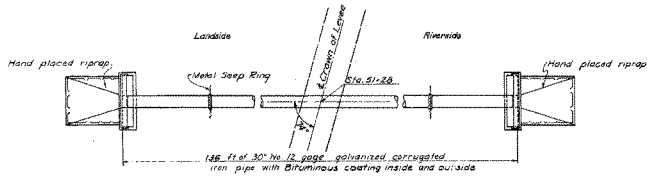
AS BUILT 934-12.2/12

BY	DATE	CHARACTER
		REVISIONS

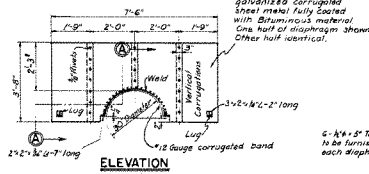
838

070

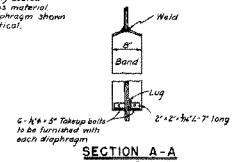

SECTION A-A
Headwall
Gate frame anchor bolts
Air vents
℄ Stems
Symmetrical about ℄
Calco single geared pedestal gate lifts Model 188 Ball bearing Type or equal. Calco strap nut or equal, for 2½" stem to be furnished with each gate.
SIDE ELEVATION
SCALE 3/8"=1'-0"
FRONT ELEVATION
SCALE: 3/8"=1'-0"
PLAN
FRAMING DETAILS
SCALE 3/4"=1'-0"
DETAIL OF BRACKET
SCALE: 1 1/2"=1'-0"
DETAIL OF LADDER RUNG
SCALE: 1 1/2"=1'-0"
Platten ends and weld.
General Notes
Gusset plates ⅜" thick, unless noted
Rivets ¾"ø
Holes 13/16"ø unless noted.
For reinforcing steel details see sheet 934-12.2/12
For concrete details, dimensions see sheet 934-12.2/11
Gate frame anchor bolts to be furnished with gates.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
GATE OPERATING TOWER
DETAILS STA.32+12
SECTION "C"
SHEET 10 OF 35 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 20, 1938
SUBMITTED:
APPROVED RECOMMENDED
APPROVED:
CHIEF, CORPS OF ENGINEERS
DR. BY R.B.D.
CK. BY B.O.D.
CK. J.I.T.
AS BUILT
934-12.2/13
Ladder rungs revised and minor corrections
BY
DATE
CHARACTER
REVISIONS



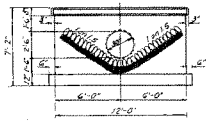
PLAN



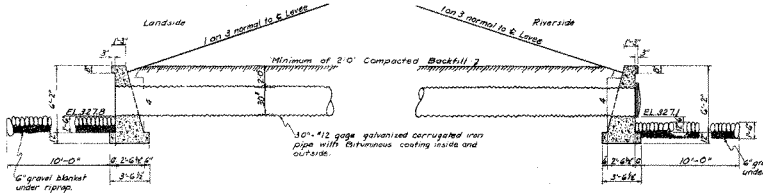
ELEVATION
SCALE: 1/2" = 1'-0"



SECTION A-A
SCALE: 1" = 1'-0"

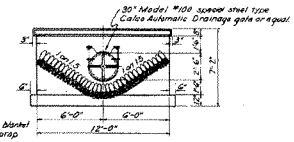


ELEVATION
SCALE: 1/4" = 1'-0"

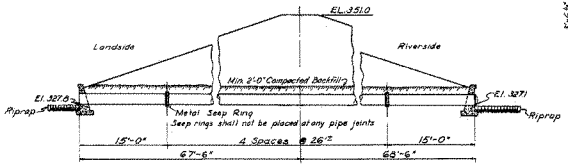


SECTION ON ℄ INLET
SCALE 1/4" = 1'-0"

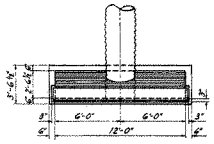
SECTION ON ℄ OUTLET
SCALE: 1/4" = 1'-0"



ELEVATION
SCALE: 1/4" = 1'-0"



SECTION ON CENTER LINE



PLAN
SCALE: 1/4" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered 1 inch.

Slope culvert to fit bottom of ditch where suitable.
All riprap to be hand placed.
Excavation for payment will be measured between vertical planes one foot outside required limits of foundation.
Backfill will be hand placed and thoroughly tamped around sides of pipe, with a minimum top cover of two feet, before embankment is placed.
Place six inch gravel blanket under all riprap.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE DETAILS
STATION 51+28
SECTION "C"

SHEET 17 OF 33 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 193

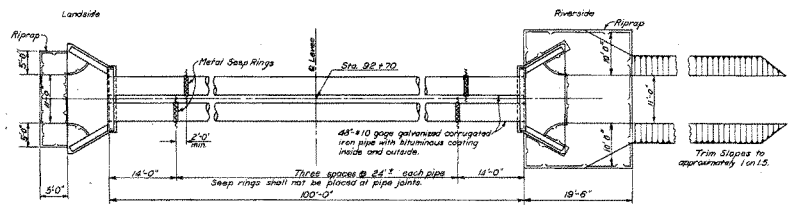
SUBMITTED: [illegible] SENIOR ENGINEER

APPROVAL RECOMMENDED: [illegible] CAPT. CORPS OF ENGINEERS

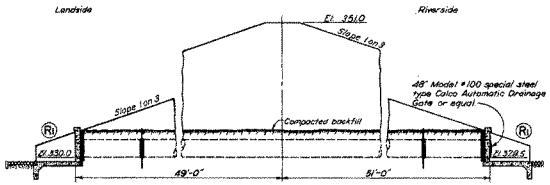
APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS

DR. BY: G.R. TR. BY: H.W. CK. BY: J.J.T.

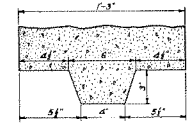
AS BUILT 934-12.2/14



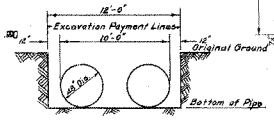
PLAN



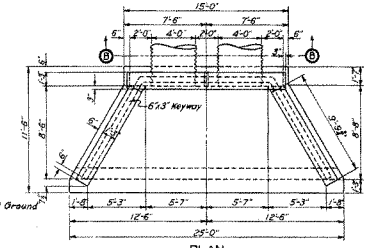
SECTION ON CENTER LINE



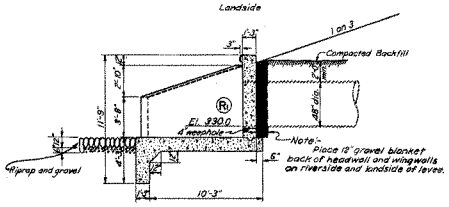
DETAIL OF KEYWAY
SCALE: 3" = 1'-0"



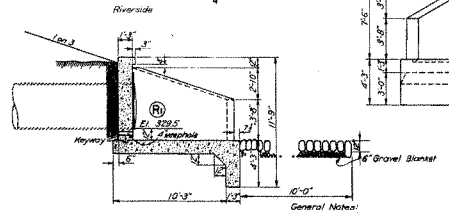
SECTION B-B
SCALE: ¼" = 1'-0"



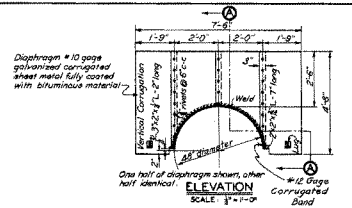
PLAN
SCALE: ¼" = 1'-0"



SECTION ON ℄ INLET
SCALE: ¼" = 1'-0"



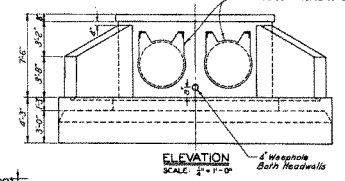
SECTION ON ℄ OUTLET
SCALE: ¼" = 1'-0"



ELEVATION
SCALE: ¼" = 1'-0"

DETAIL OF SEEP RING

SECTION A-A
SCALE: 1" = 1'-0"



ELEVATION
SCALE: ¼" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Excavation, for payment, will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipes with a minimum top cover of two feet before embankment is placed.
Place six inch gravel blanket under all riprap.
For reinforcing steel details see sheet 934-12.2/15
Slope culvert to fit bottom of ditch where suitable
All riprap shall be hand placed

Ⓡ Elevation change "field"

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 92+70

SECTION "C"

SHEET 12 OF 35 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: APPROVED:

CAPT., CORPS OF ENGINEERS LT. COL., CORPS OF ENGINEERS

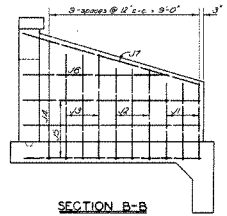
DR. BY W.C.A.-J.J.H. TR. BY J.J.H. CK. BY J.L.T.

AS BUILT 934-12.2/15

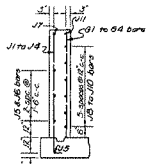
842

REINFORCEMENT SCHEDULE

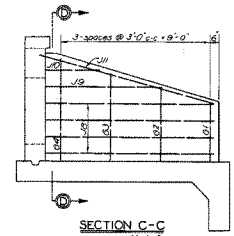
BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT EACH	TOTAL WT.
J1	12	1/2"	5'-7"	4'-7" 8"	3.40	40.8
J2	12	"	6'-0"	3'-4" 8"	4.01	48.1
J3	12	"	6'-10"	5'-4" 8"	4.57	54.9
J4	4	"	7'-9"	7'-3" 8"	5.18	20.7
J5	12	"	11'-3"	10'-6" 4½" 9"	7.51	90.1
J6	4	"	9'-6"	8'-9" 4½" 8"	6.35	25.4
J7	4	"	11'-8"	11'-0" 4½" 8"	7.85	31.4
J8	16	"	9'-11"	Straight	6.62	105.9
J9	4	"	6'-6"	"	4.34	17.4
J10	4	"	3'-2"	"	2.12	8.5
J11	4	"	12'-8"	12'-2" 4½" 8" 10"	8.46	33.8
J12	16	"	13'-8"	Straight	9.13	146.1
J13	12	"	9'-8"	8'-4" 1'-4"	6.47	77.6
J14	30	"	15'-0"	15'-2" 3'-10"	10.02	300.6
J15	4	"	12'-1"	8'-3" 3'-10"	8.07	32.3
J16	4	"	10'-4"	6'-8" 3'-10"	6.90	27.6
J17	4	"	8'-7"	4'-11" 3'-10"	5.73	22.9
J18	4	"	6'-10"	3'-0" 3'-10"	4.56	18.2
J19	4	"	5'-1"	1'-3" 3'-10"	3.40	13.6
J20	4	"	14'-6"	Straight	9.69	38.8
J21	4	"	15'-3"	"	10.19	40.8
J22	2	"	16'-6"	"	11.02	22.0
J23	4	"	17'-6"	"	11.69	46.8
J24	2	"	18'-9"	"	12.52	25.0
J25	4	"	20'-0"	"	13.36	53.4
J26	2	"	21'-0"	"	14.03	28.1
J27	4	"	22'-3"	"	14.87	59.5
J28	2	"	23'-3"	"	15.53	31.1
J29	18	"	24'-8"	"	16.48	296.6
J30	2	"	24'-0"	"	16.03	32.1
G1	4	3/8"φ	3'-8"	"	3.82	15.3
G2	4	"	4'-6"	"	4.69	18.8
G3	4	"	5'-3"	"	5.48	21.9
G4	4	"	6'-2"	"	6.43	25.7
F1	8	3/4"φ	11'-0"	"	16.52	132.2
F2	16	"	7'-0"	"	10.51	168.2
F3	19	"	9'-2"	6'-2" 1'-0"	13.77	261.9
F4	14	"	7'-6"	3'-9" 1'-5"	11.27	157.8
F5	12	"	13'-11"	4'-7" 4'-11" 1'-5" 3'-7" 4'-11" 1'-5"	20.90	250.8
F6	4	"	12'-9"	3'-7" 4'-11" 1'-5" 3'-7" 4'-11" 1'-5"	19.15	76.6
F7	4	"	8'-1"	4'-6" 4'-11" 1'-5" 4'-6" 4'-11" 1'-5"	12.14	48.6
F8	4	"	4'-8"	0'-8" 3'-7" 0'-8"	7.01	28.0
				TOTAL		2982#



SECTION B-B
SCALE 3/8"=1'-0"

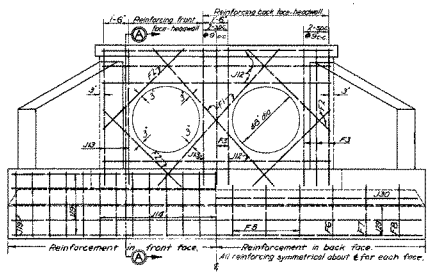


SECTION D-D
SCALE 3/8"=1'-0"

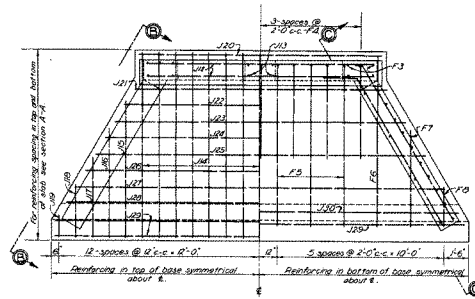


SECTION C-C
SCALE 3/8"=1'-0"

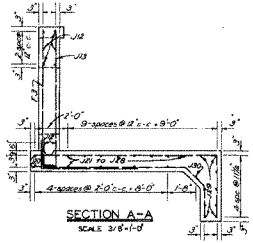
Wingwalls slope 1 on 3



FRONT ELEVATION
SCALE 3/8"=1'-0"



PLAN
SCALE 3/8"=1'-0"



SECTION A-A
SCALE 3/8"=1'-0"

General Notes:
Reinforcement schedule includes reinforcing steel for two headwalls.
The distance from face of concrete to reinforcing steel shall not be less than two and one-half inches.
For concrete detail, dimensions, see sheet 934-12.2/15

BY	DATE	CHARACTER
		REVISED

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

REINFORCING DETAILS

STATION 92+70

SECTION "C"

SHEET 13 OF 33 SHEETS — SCALES AS SHOWN

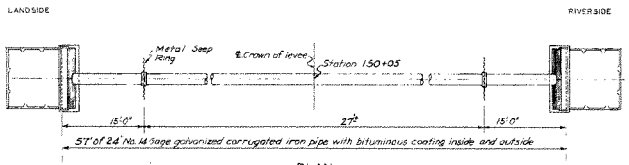
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938

SUBMITTED: [signature] SENIOR ENGINEER

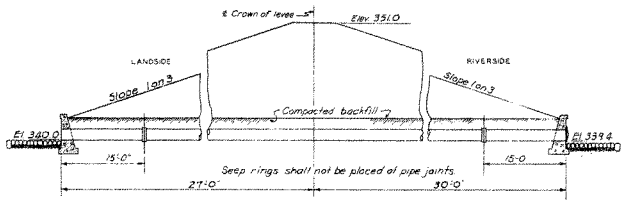
APPROVED: RECOMMENDED: [signature] COL., CORPS OF ENGINEERS — APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

DR. BY F.B.F. TR. BY A.E.L. CK. BY J.L.T.

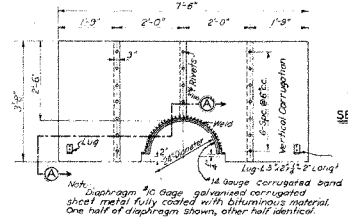
AS BUILT 934-12.2/16



PLAN

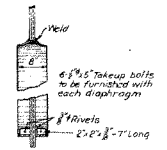


SECTION ON CENTER LINE

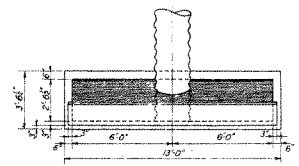


ELEVATION
SCALE: 3/8" = 1'-0"

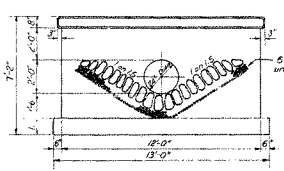
DETAIL OF SEEP RING



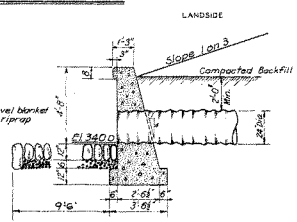
SECTION A-A
SCALE: 1" = 1'-0"



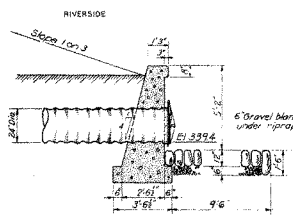
PLAN
SCALE: 3/8" = 1'-0"



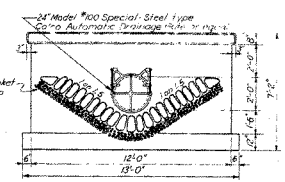
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 150+05

SECTION "C"

SHEET 14 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.

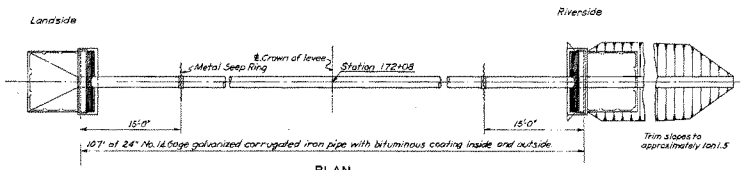
SUBMITTED: _____ SENIOR ENGINEER

APPROVED RECOMMENDED: APPROVED:

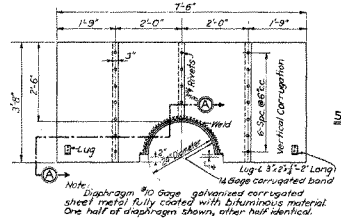
CAPT. CORPS OF ENGINEERS, DR. BY R.O.D. — LT. COL. CORPS OF ENGINEERS, TR. BY A.E.L. — COL. CORPS OF ENGINEERS, OK. BY J.L.T.

DATE	CHARACTER REVISIONS

AS BUILT 934-12.2/17

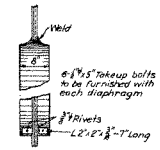


PLAN

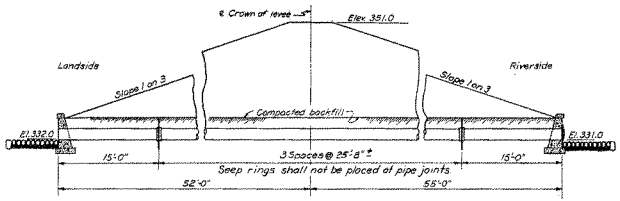


ELEVATION
SCALE: 3/4" = 1'-0"

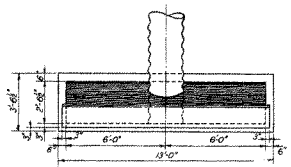
DETAIL OF SEEP RING



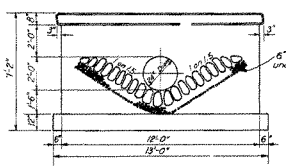
SECTION A-A
SCALE: 1" = 1'-0"



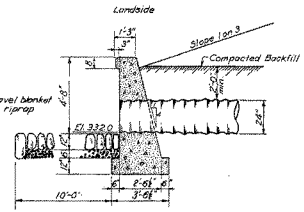
SECTION ON CENTER LINE



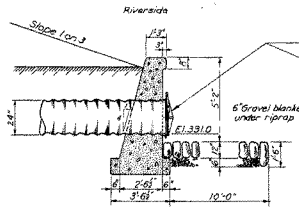
PLAN
SCALE: 3/8" = 1'-0"



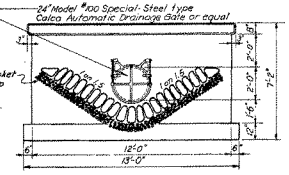
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

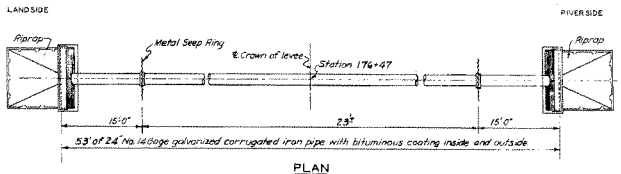
Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 172+08
SECTION "C"

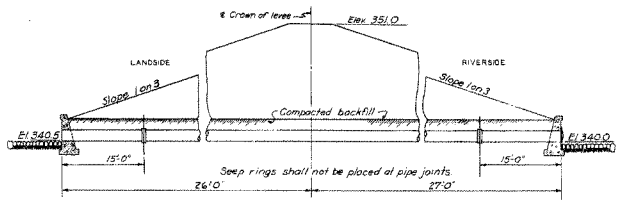
SHEET 15 OF 35 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.
SUBMITTED: 22 NOV 1938
APPROVAL RECOMMENDED: APPROVED:
CAPT. CORPS OF ENGINEERS LT. COL. CORPS OF ENGINEERS
DR. BY E.S. + D.W.S. TR. BY J.J.L. CK. BY J.J.C.

BY	DATE	CHARACTER REVISIONS

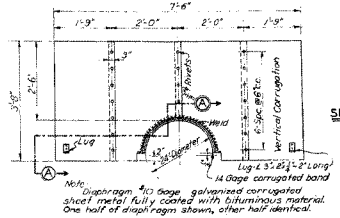
AS BUILT 934-12.2/18



PLAN

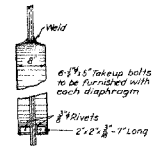


SECTION ON CENTER LINE

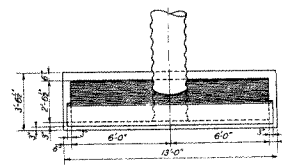


ELEVATION
SCALE: 3/4" = 1'-0"

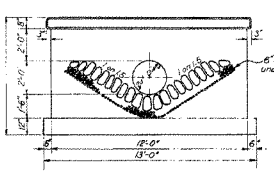
DETAIL OF SEEP RING



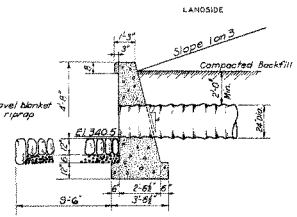
SECTION A-A
SCALE: 1" = 1'-0"



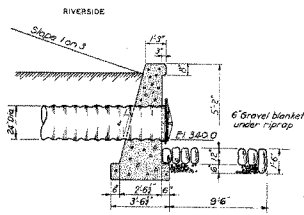
PLAN
SCALE: 3/8" = 1'-0"



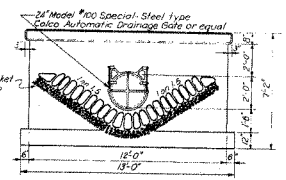
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:

All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe, with a minimum top cover of two feet before embankment is placed.

Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 176+47

SECTION "C"

SHEET 16 OF 35 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938

SUBMITTED: [illegible] DIST. ENGINEER

APPROVAL RECOMMENDED: APPROVED: [illegible]

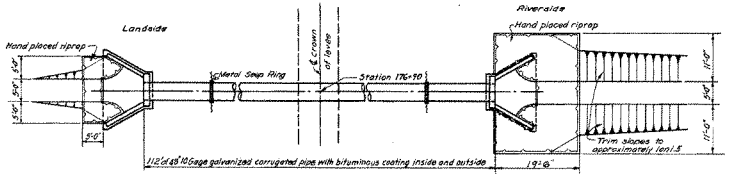
CAPT. CORPS OF ENGINEERS LT. COL. CORPS OF ENGINEERS

DR. BY F.B.F. - E.S. TR. BY R.D.D. CK. BY J.L.T.

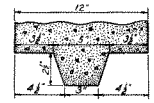
CHARACTER
REVISIONS

AS BUILT: 934-12.2/19

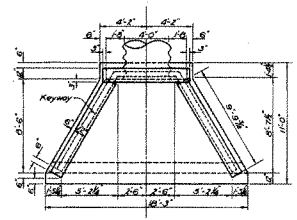
845



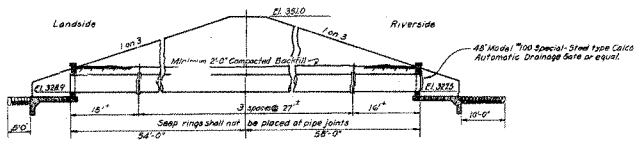
PLAN



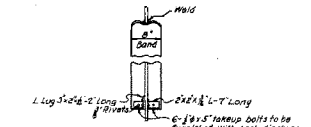
DETAIL OF KEYWAY
SCALE 3" = 1'-0"



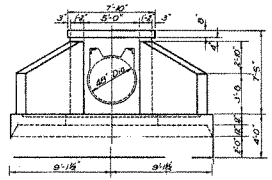
PLAN
SCALE: 1/4" = 1'-0"



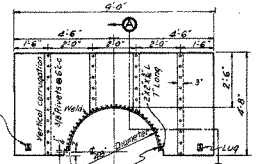
SECTION ON CENTER LINE



SECTION A-A
SCALE: 1" = 1'-0"



ELEVATION
SCALE: 1/4" = 1'-0"



Diaphragm "10 Gage galvanized corrugated sheet metal. Fully coated with bituminous material. One half of diaphragm shown, other half identical

ELEVATION
SCALE: 1/2" = 1'-0"

DETAIL OF SEEP RING

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culverts to fit bottom of ditch where suitable.

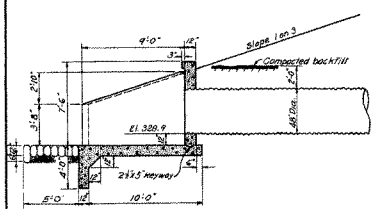
Excavation, for payment, will be measured between vertical planes one foot outside required limits of foundation.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

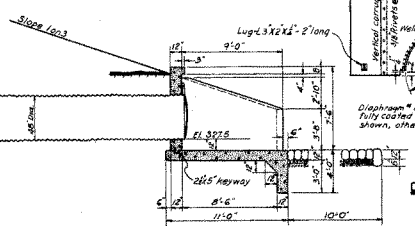
Place six inch gravel blanket under all riprap

For reinforcing details see sheet 934-12.2/2

All riprap shall be hand placed.



SECTION ON ℄ INLET
SCALE: 1/4" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 176+90

SECTION "C"

SHEET 17 OF 35 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUB: SENIOR ENGINEER

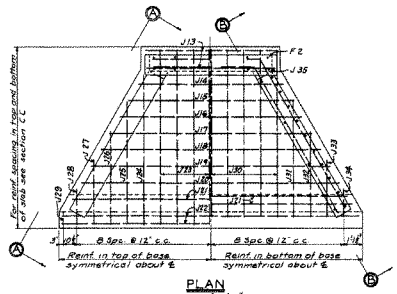
APPROVAL RE: CAPT., CORPS OF ENGINEERS — DR. BY E.S.

APPROVED: LT. COL., CORPS OF ENGINEERS — BY E.S. — CK. BY J.L.T.

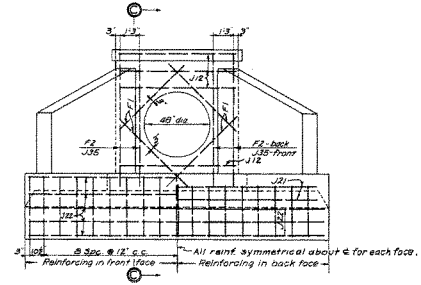
AS BUILT 934-12.2/120

REINFORCEMENT SCHEDULE

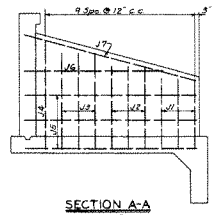
BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	12	1 3/8"	4'-8"	4'-2" 6"	3.12	37.4
J2	12	"	5'-7"	5'-1" 6"	3.73	44.8
J3	12	"	6'-5"	5'-11" 6"	4.29	51.5
J4	4	"	7'-4"	6'-10" 6"	4.90	19.6
J5	12	"	11'-3"	10'-6" 10½"	7.51	90.1
J6	4	"	9'-6"	8'-8" 1'-9"	6.35	25.4
J7	4	"	11'-9"	11'-0" 9"	7.85	31.4
J8	16	"	9'-11"	Straight	6.62	105.9
J9	4	"	6'-6"	"	4.34	17.4
J10	4	"	3'-2"	"	2.12	8.5
J11	4	"	13'-8"	10'-8" 2'-0"	8.46	33.8
J12	16	"	7'-2"	Straight	4.79	76.6
J13	8	"	8'-0"	"	5.34	42.7
J14	4	"	9'-0"	"	6.01	24.0
J15	4	"	10'-0"	"	6.68	26.7
J16	4	"	11'-0"	"	7.35	29.4
J17	4	"	12'-4"	"	8.24	33.0
J18	4	"	13'-6"	"	8.91	35.6
J19	4	"	14'-6"	"	9.69	38.8
J20	4	"	15'-8"	"	10.47	41.9
J21	6	"	16'-8"	"	11.13	66.8
J22	18	"	18'-0"	Straight	12.02	216.4
J23	14	"	16'-6"	10'-8" 3'-8"	9.57	134.0
J24	4	"	12'-10"	9'-2" 3'-8"	8.57	34.3
J25	4	"	11'-2"	7'-6" 3'-8"	7.46	29.8
J26	4	"	9'-5"	5'-9" 3'-8"	6.29	25.2
J27	4	"	7'-8"	4'-0" 3'-8"	5.12	20.5
J28	4	"	5'-11"	2'-3" 3'-8"	3.95	15.8
J29	4	"	4'-5"	0'-9" 3'-8"	2.95	11.8
J30	18	"	12'-6"	8'-11" 3'-7" 11½"	8.35	150.3
J31	4	"	9'-3"	5'-8" 1'-8" 1'-7"	6.18	24.7
J32	4	"	7'-7"	4'-0" 1'-8"	5.07	20.3
J33	4	"	5'-9"	3'-1" 1'-8" 11½"	3.84	15.4
J34	4	"	4'-1"	0'-8" 1'-8"	2.73	10.9
J35	8	"	8'-8"	6'-5" 1'-8" 6"	5.79	46.3
G1	4	5/8"	3'-8"	Straight	3.82	15.3
G2	4	"	4'-6"	"	4.69	18.8
G3	4	"	5'-3"	"	5.48	21.9
G4	4	"	6'-2"	"	6.43	25.7
F1	16	5/8"	5'-6"	"	8.26	132.2
F2	8	"	9'-1"	8'-2" 11"	13.66	109.1
					TOTAL	1960#



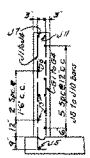
PLAN
SCALE: 1/4" = 1'-0"



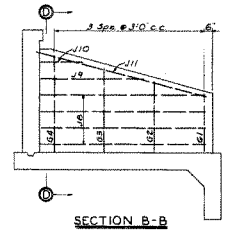
FRONT ELEVATION
SCALE: 1/4" = 1'-0"



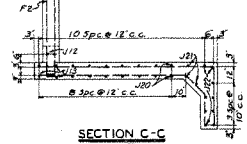
SECTION A-A
SCALE: 1/4" = 1'-0"



SECTION D-D
SCALE: 1/4" = 1'-0"



SECTION B-B
SCALE: 1/4" = 1'-0"



SECTION C-C
SCALE: 1/4" = 1'-0"

General Notes:
For concrete detail, dimensions, see sheet 934-12.2/10
Lonaside wing walls slope 1 on 3. riverside wing walls slope 1 on 3.
Reinforcement Schedule includes reinforcing steel for two headwalls
The distance from face of concrete to reinforcing steel shall not be less than two and one half inches

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

REINFORCING DETAILS STA. 176+90

SECTION "C"

SHEETIG OF 35SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED: SENIOR ENGINEER

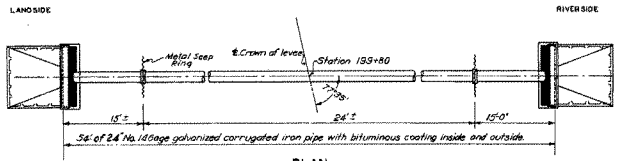
APPROVAL RECOMMENDED: CAPT. CORPS OF ENGINEERS — APPROVED: LT. COL. CORPS OF ENGINEERS

DR. BY R.O.D. TR. BY R.O.D. CK. BY J.I.T.

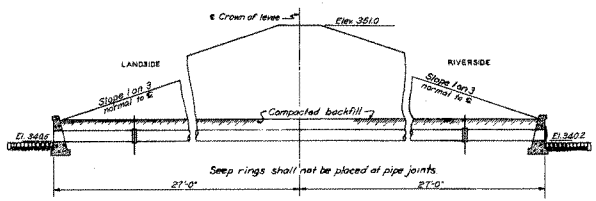
BY	DATE	CHARACTER REVISIONS

AS BUILT 934-12.2/21

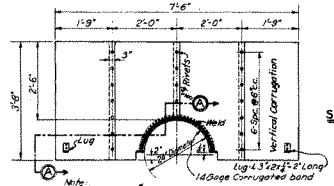
WAR DEPARTMENT — CORPS OF ENGINEERS, U. S. ARMY



PLAN

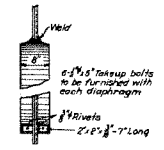


SECTION ON CENTER LINE

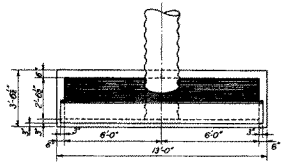


ELEVATION
SCALE: 3/8" = 1'-0"

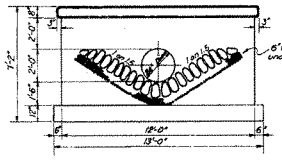
DETAIL OF SEEP RING



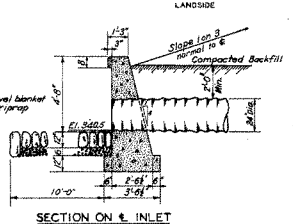
SECTION A-A
SCALE: 1" = 1'-0"



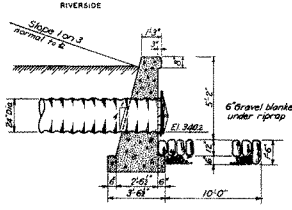
PLAN
SCALE: 3/8" = 1'-0"



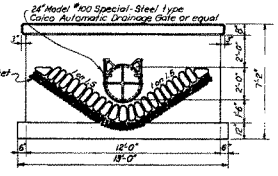
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation, for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 199+80
SECTION "C"

SHEET 19 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.

SUBMITTED: _____ DISTRICT ENGINEER

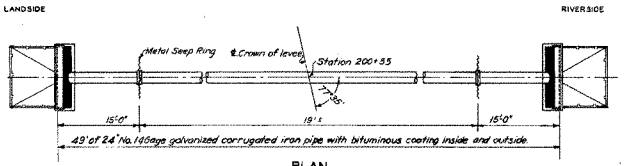
APPROVED: RECOMMENDED: _____ CAPT. CORPS OF ENGINEERS — APPROVED: _____ LT. COL. CORPS OF ENGINEERS

DR. BY F.B.F. TR. BY J.J.H. CK. BY J.L.T.

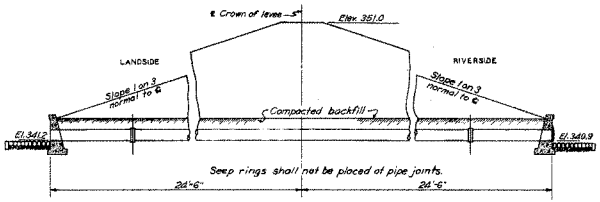
AS BUILT 934-12.2/22

WAR DEPARTMENT

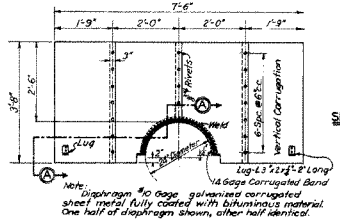
CORPS OF ENGINEERS, U. S. ARMY



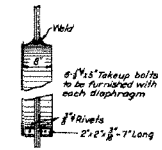
PLAN



SECTION ON CENTER LINE

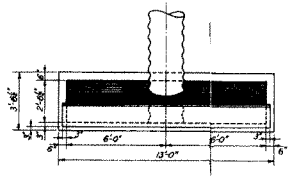


ELEVATION
SCALE: 3/4" = 1'-0"

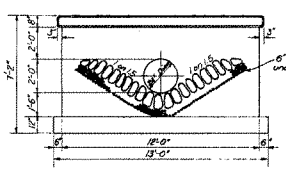


DETAIL OF SEEP RING

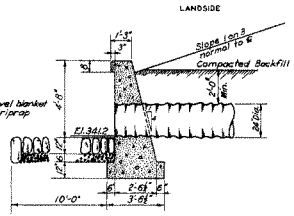
SECTION A-A
SCALE: 1" = 1'-0"



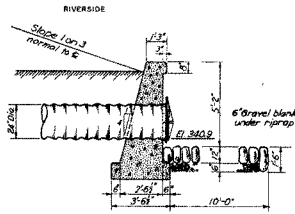
PLAN
SCALE: 3/8" = 1'-0"



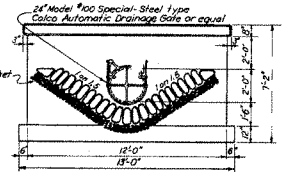
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 200+55
SECTION "C"

SHEET 20 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 25, 1938.

SUBMITTED: [signature] DIST. ENGINEER

APPROVAL RECOMMENDED: [signature] CAPT. CORPS OF ENGINEERS

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS

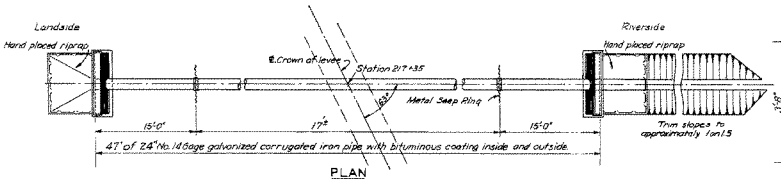
DR. BY H.W. TR. BY J.J.K. CK. BY G.L.T.

AS BUILT 934-12.2/23

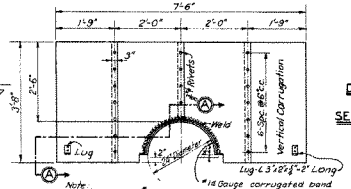
20

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

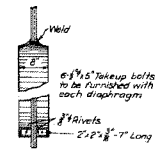


PLAN

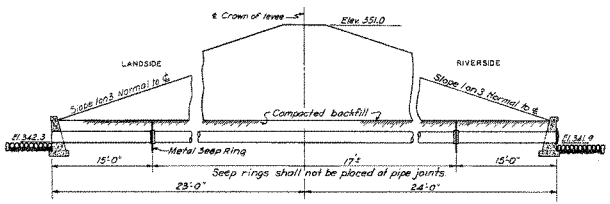


ELEVATION
SCALE: 3/8" = 1'-0"

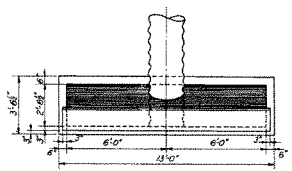
DETAIL OF SEEP RING



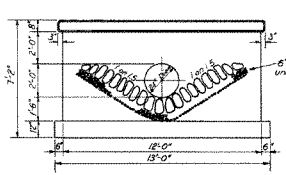
SECTION A-A
SCALE: 1" = 1'-0"



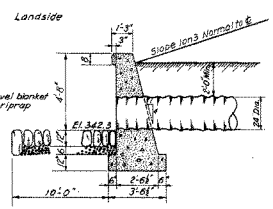
SECTION ON CENTER LINE



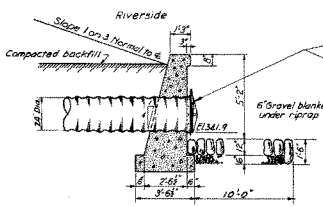
PLAN
SCALE: 3/8" = 1'-0"



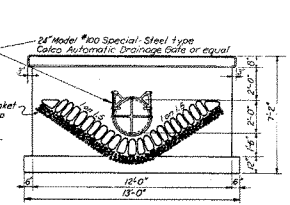
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:

All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE, STA. 217+35
SECTION "C"

SHEET 21 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.

SUBMITTED: [illegible] DIVISION ENGINEER

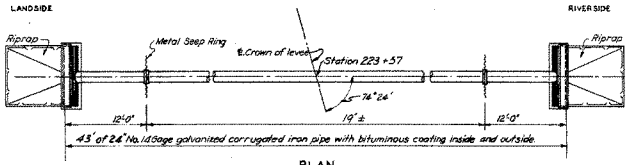
APPROVAL RECOMMENDED: [illegible] CAPT. CORPS OF ENGINEERS — DR. BY E.A.-D.H.S.

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS — TR. BY W.J.B. — CK. BY J.L.T.

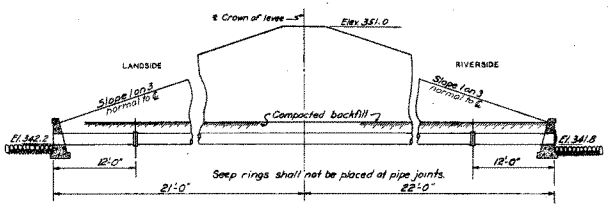
BY	DATE	CHARACTER REVISIONS

AS BUILT 934-12.2/24

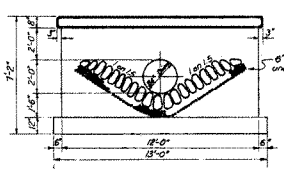
880



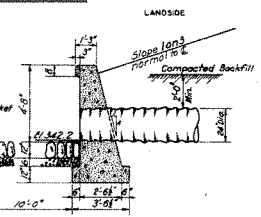
PLAN



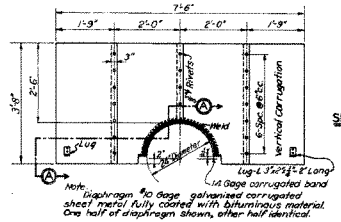
SECTION ON CENTER LINE



ELEVATION
SCALE: 3/8" = 1'-0"

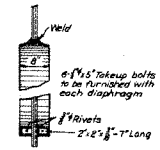


SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"

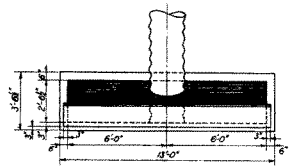


ELEVATION
SCALE: 3/4" = 1'-0"

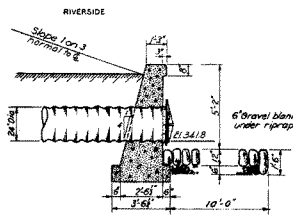
DETAIL OF SEEP RING



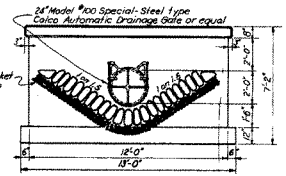
SECTION A-A
SCALE: 1" = 1'-0"



PLAN
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY
DRAINAGE STRUCTURE STA. 223+57
SECTION "C"

SHEET 22 OF 33 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED: [signature] CHIEF ENGINEER

APPROVAL RECOMMENDED: [signature] CAPT. CORPS OF ENGINEERS — DR. BY W.J.B.

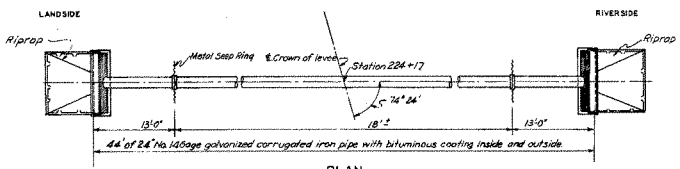
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS — DR. BY J.J.F.

TR. BY W.J.B.

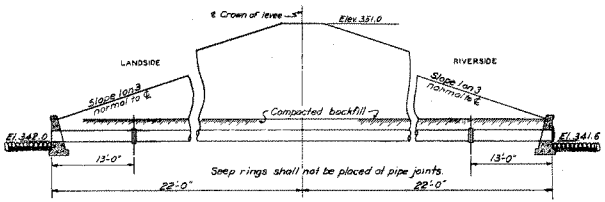
AS BUILT

934-12.2/25

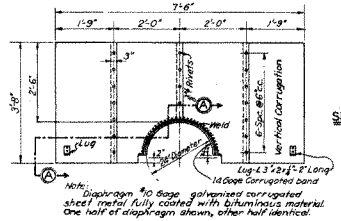
WAR DEPARTMENT — CORPS OF ENGINEERS, U. S. ARMY



PLAN

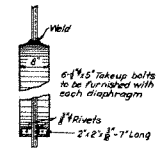


SECTION ON CENTER LINE

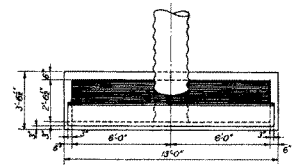


ELEVATION
SCALE: 3/4" = 1'-0"

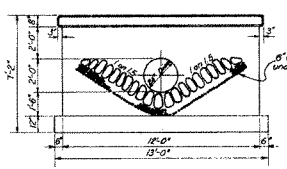
DETAIL OF SEEP RING



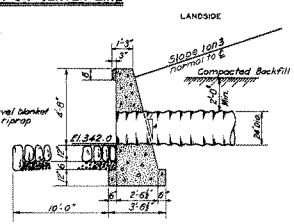
SECTION A-A
SCALE: 1" = 1'-0"



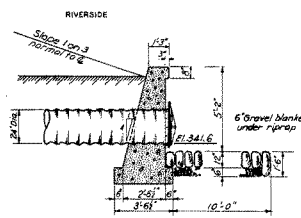
PLAN
SCALE: 3/8" = 1'-0"



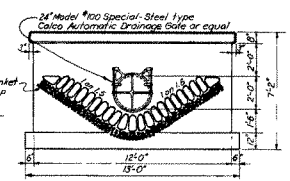
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation, for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

"FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 224+17
SECTION "C"

SHEET 23 OF 39 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

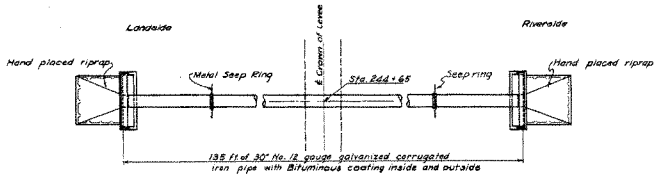
SUBMITTED: [illegible] — DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible] — CAPT. CORPS OF ENGINEERS — OR. BY F.B.P.

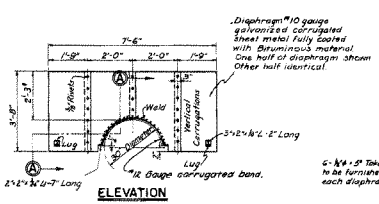
APPROVED: [illegible] — LT. COL. CORPS OF ENGINEERS — TR. BY W.J.B. — OR. BY J.L.T.

AS BUILT 934-12.2/26

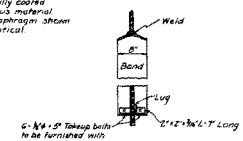
WAR DEPARTMENT — CORPS OF ENGINEERS U.S. ARMY



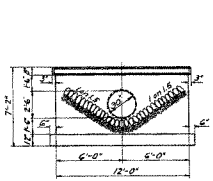
PLAN



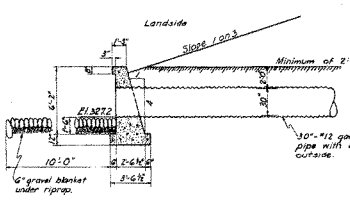
ELEVATION
SCALE: 1/2" = 1'-0"



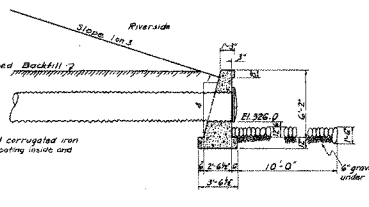
SECTION A-A
SCALE: 1" = 1'-0"



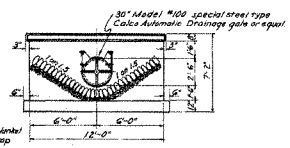
ELEVATION
SCALE: 1/4" = 1'-0"



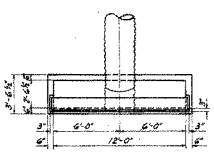
SECTION ON ℄ INLET
SCALE 1/4" = 1'-0"



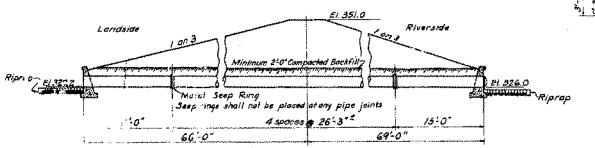
SECTION ON ℄ OUTLET
SCALE: 1/4" = 1'-0"



ELEVATION
SCALE: 1/4" = 1'-0"



PLAN
SCALE: 1/4" = 1'-0"



SECTION ON CENTER LINE

General Notes:
All exposed corners of concrete shall be chamfered 1 inch.

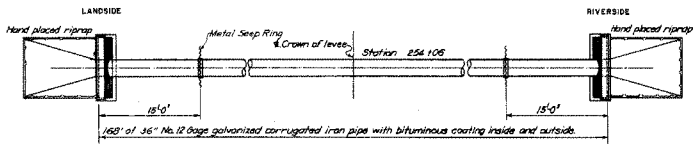
Slope culvert to fit ballast of ditch where suitable.
All riprap shall be hand placed.
Excavation, for payment, will be measured between vertical planes one foot outside required limits of structures.
Backfill will be hand placed and thoroughly tamped or hand sides of pipe with minimum top cover of two feet, before embankment is placed.
Place six inch gravel blanket under all riprap.

BY	DATE	CHARACTER REVISIONS

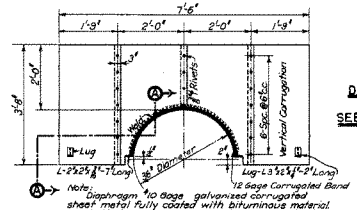
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
DRAINAGE STRUCTURE DETAILS
STATION 244+65 SECTION "C"
SHEET 34 OF 38 SHEETS SCALES AS SHOWN
U.S. RIVER WATER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.
SUBMITTED: DISTRICT ENGINEER
APPROVAL RECOMMENDED: CAPT. CORPS OF ENGINEERS
APPROVED: LT. COL. CORPS OF ENGINEERS
DR. BY: C.R. TR. BY: H.W. CK. BY: J.L.T.

AS BUILT 934-12.2/27

WAR DEPARTMENT — CORPS OF ENGINEERS, U. S. ARMY

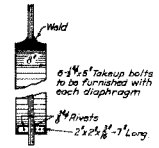


PLAN

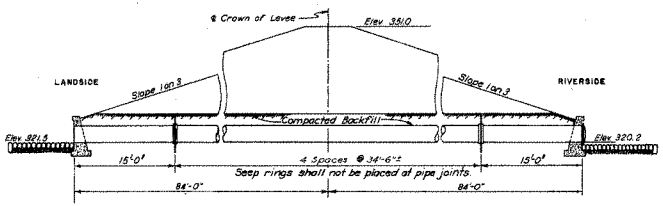


ELEVATION
SCALE 3/4" = 1'-0"

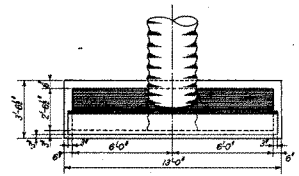
DETAIL OF SEEP RING



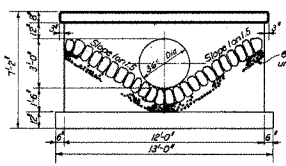
SECTION A-A
SCALE 1" = 1'-0"



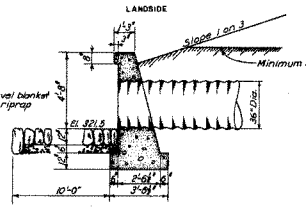
SECTION ON CENTER LINE



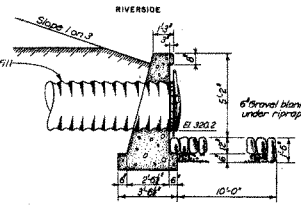
PLAN
SCALE 3/8" = 1'-0"



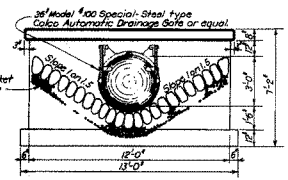
ELEVATION
SCALE 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE 3/8" = 1'-0"



ELEVATION
SCALE 3/8" = 1'-0"

General Notes:

All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Excavation, for payment, will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed.

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 254+06

SECTION "C"

SHEET 25 OF 36 SHEETS — SCALES AS SHOWN

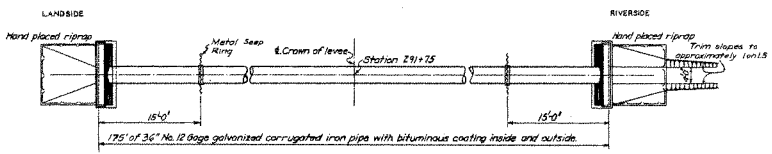
U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938

SUBMITTED: _____ DISTRICT ENGINEER

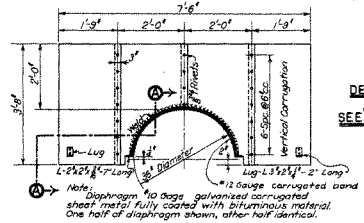
APPROVAL RECOMMENDED: _____ CAPT. CORPS OF ENGINEERS — DR. BY F.R.P.

APPROVED: _____ LT. COL. CORPS OF ENGINEERS — TR. BY L.W.S. — CK. BY J.L.T.

AS BUILT 934-12.2/28

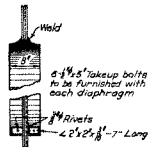


PLAN

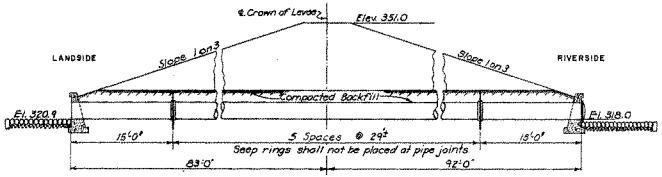


ELEVATION
SCALE 3/4" = 1'-0"

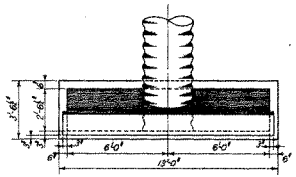
DETAIL OF SEEP RING



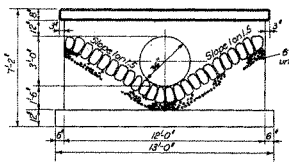
SECTION A-A
SCALE 1" = 1'-0"



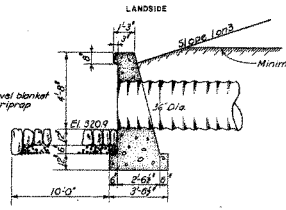
SECTION ON CENTER LINE



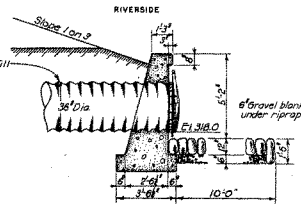
PLAN
SCALE 3/8" = 1'-0"



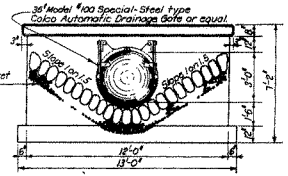
ELEVATION
SCALE 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALE 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE 3/8" = 1'-0"



ELEVATION
SCALE 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Excavation, for payment, will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 291+75

SECTION "C"

SHEET 28 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 25, 1938

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: APPROVED:

CAPT. CORPS OF ENGINEERS — LT. COL. CORPS OF ENGINEERS

DR. BY O.M.A. — TR. BY R.G.D. — CK. BY J.L.T.

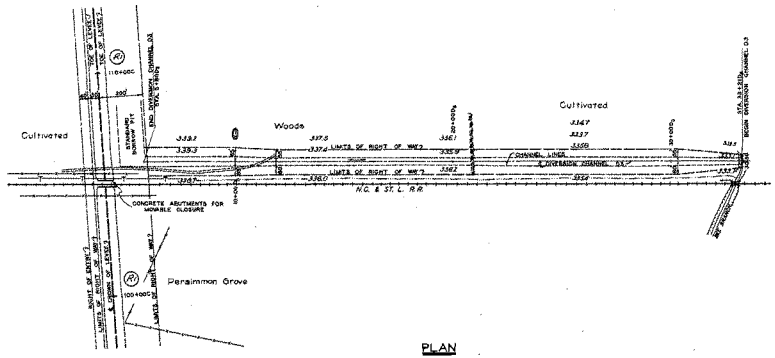
BY	DATE	CHARACTER OF REVISIONS

AS BUILT 934-12.2/29

855

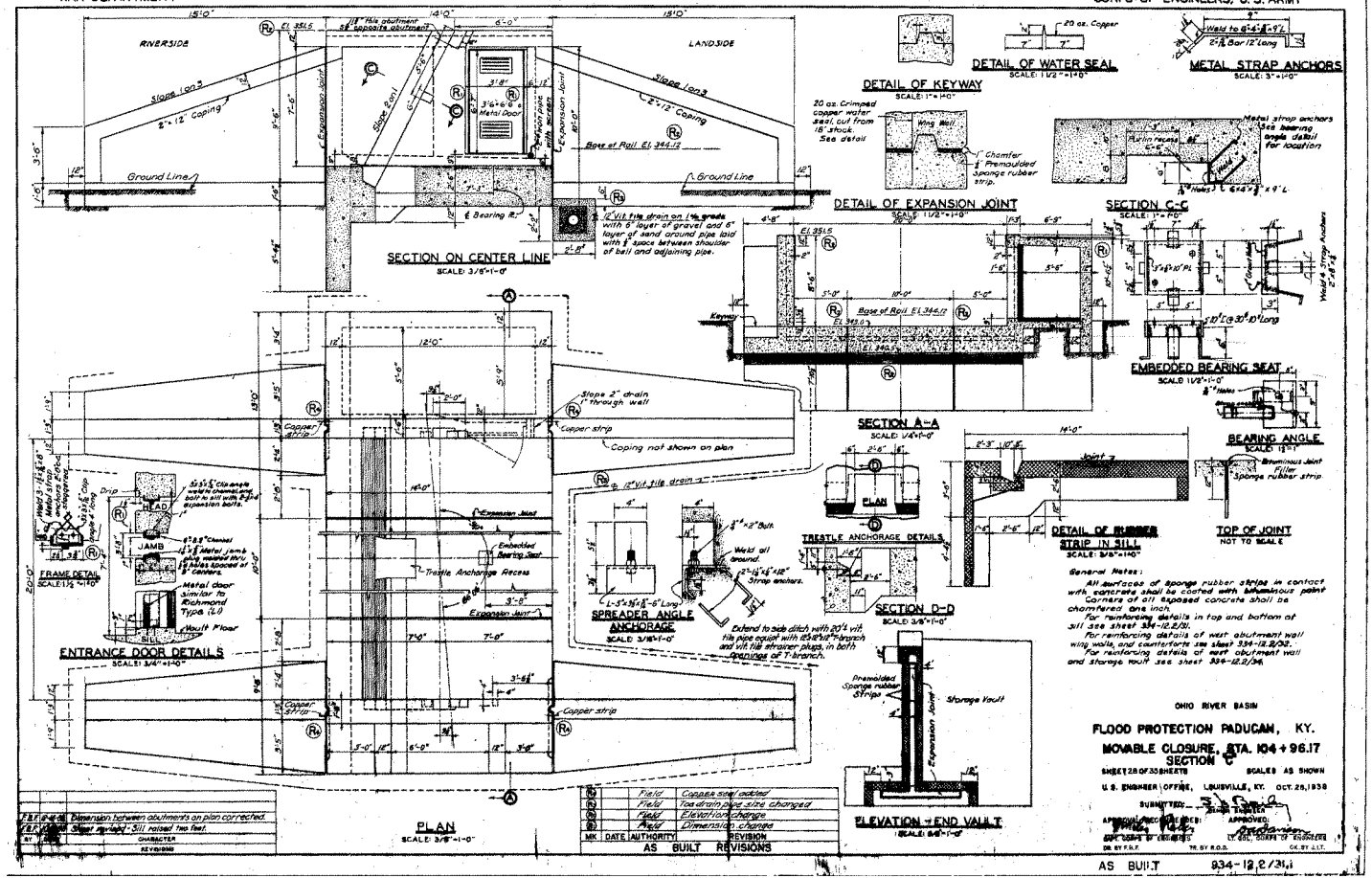
WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

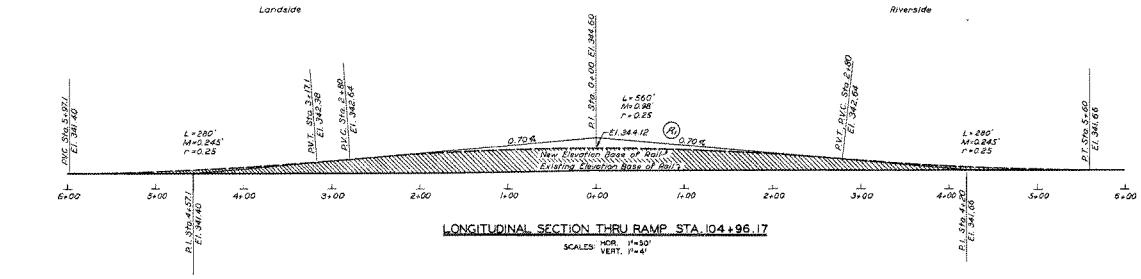


WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

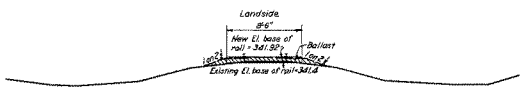


857



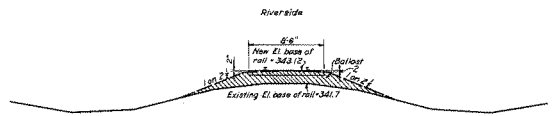
LONGITUDINAL SECTION THRU RAMP STA. 104+96.17

SCALES: HOR. 1"=50'
VERT. 1"=4'



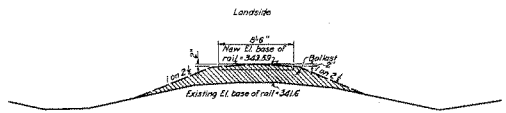
SECTION AT STA. 4+00

SCALE: 1"=5'



SECTION AT STA. 2+00

SCALE: 1"=5'



SECTION AT STA. 0+50

SCALE: 1"=5'

(A) Elevation change "Field"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

RAILROAD RAMP STA. 104+96.17

SECTION C

SHEET 29 OF 36 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE LOUISVILLE, KY. OCT. 28, 1938

SUBMITTED: S. H. Bailey
SENIOR ENGINEER

APPROVED: Miles Vesper
CAPT. CORPS OF ENGINEERS

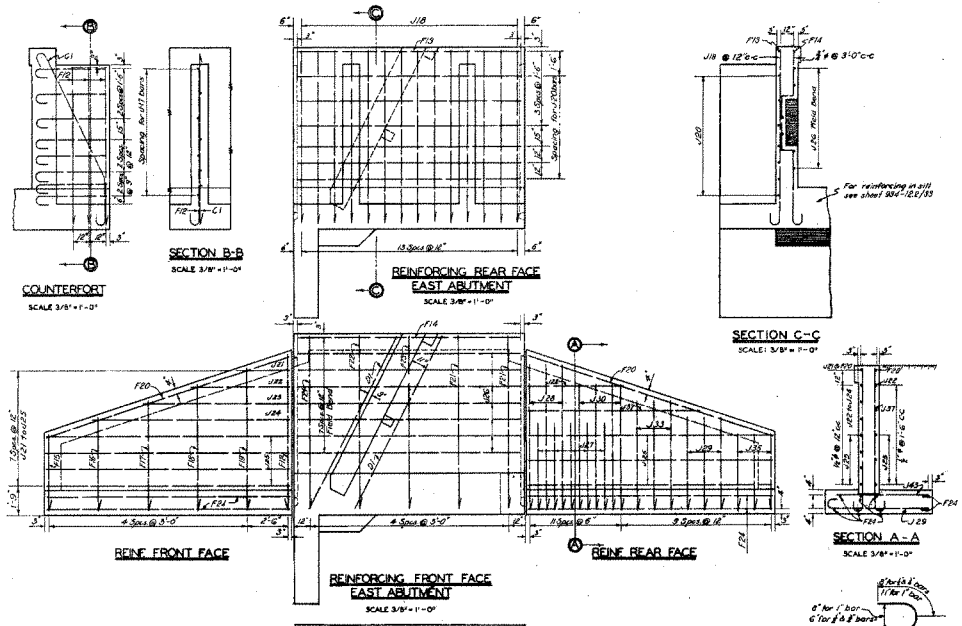
APPROVED: [illegible]
LT. COL., CORPS OF ENGINEERS

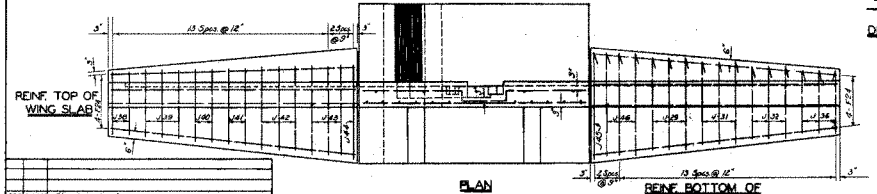
DR. BY J.L.M. TR. BY W.R.S. CK. BY J.L.T.

AS BUILT 934-12.2/31.1A

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY





REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
C1	2	1" ⊘	13'-1"	2'-6"	44.48	89.0
F12	10	3/4" ⊘	10'-2"	2'-6"	15.27	152.7
F13	1	"	13'-6"	Straight	20.28	20.3
F14	1	"	14'-10"	8'-0" 2'-6" 4'-10"	21.28	21.3
F15	4	"	5'-3"	2'-7"	7.89	31.6
F16	4	"	6'-3"	2'-7"	9.39	37.6
F17	4	"	7'-3"	2'-7"	10.89	43.6
F18	4	"	8'-3"	2'-7"	12.39	49.6
F19	4	"	9'-3"	2'-7"	13.89	55.6
F20	8	"	13'-3"	Straight	19.94	159.5
F21	3	"	11'-2"	10'-2"	16.77	50.3
F22	1	"	12'-7"	2'-6" 2'-6" 2'-6"	18.90	18.9
F23	1	"	11'-11"	2'-6" 2'-3"	17.90	17.9
F24	32	"	14'-3"	Straight	22.15	708.8
J17	16	3/4" ⊘	4'-11"	2'-6"	3.68	58.9
J18	14	"	11'-8"	10'-8"	7.46	104.4
J20	7	"	13'-6"	Straight	9.00	63.1
J21	4	"	2'-8"	Straight	1.78	7.1
J22	8	"	5'-8"	"	3.79	30.3
J23	4	"	5'-8"	"	3.79	15.2
J24	4	"	17'-8"	"	11.8	47.2
J25	28	"	14'-8"	"	9.80	274.4
J26	7	"	14'-10"	Varies 1'-0" to 2'-6" Varies	9.91	69.4
J27	20	"	6'-0"	1'-6"	4.01	80.2
J28	12	"	9'-6"	2'-10"	6.35	76.2
J29	26	"	6'-3"	1'-7"	4.17	108.4
J30	16	"	8'-3"	1'-7"	5.51	88.2
J31	12	"	5'-8"	2'-0"	3.79	45.5
J32	12	"	5'-7"	2'-3"	3.40	40.8
J33	12	"	7'-3"	2'-7"	4.84	58.1
J35	12	"	5'-3"	2'-7"	3.51	42.1
J36	12	"	4'-3"	2'-3"	2.95	35.4
J37	4	"	10'-2"	Straight	6.78	27.2
J38	8	"	3'-8"	"	2.45	19.6
J39	12	"	4'-0"	"	2.67	32.0
J40	8	"	4'-5"	"	2.95	23.6
J41	8	"	4'-7"	"	3.06	24.5
J42	12	"	5'-0"	"	3.34	40.1
J43	12	"	5'-6"	"	3.67	44.0
J44	4	"	5'-8"	"	3.84	15.4
J45	4	"	7'-2"	2'-6"	4.79	19.2
J46	12	"	6'-11"	2'-3"	4.62	55.4
D1	2	1" ⊘	11'-10"	Straight	31.60	63.2
					TOTAL	3006 #

General Notes:
All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of 2½ inches covering, unless otherwise specified.
For masonry details see sheet 934-12.2/31
For reinforcing in top and bottom of sill see sheet 934-12.2/33
For reinforcing in east abutment wall and storage vault see sheet 934-12.2/34

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "C"
REINFORCING DETAILS - WING WALLS AND WEST ABUTMENT WALL STA. 104+96.17

SHEET 30 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1936.

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: Miles Reber, CAPT. CORPS OF ENGINEERS

APPROVED: LT. COL. CORPS OF ENGINEERS

DR. BY J.N.K. J.J.H. — TR. BY J.A.R. E.B. — CK. BY J.L.T.

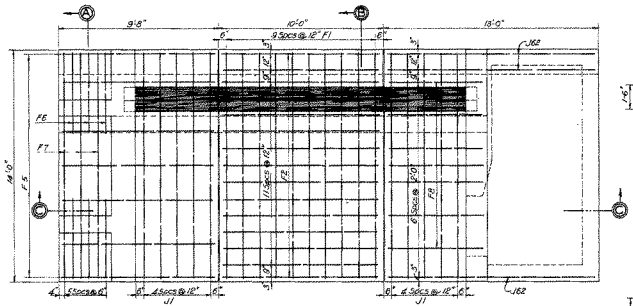
BY	DATE	CHARACTER
		REVISIONS

Sheet revised

AS BUILT 934-12.2/32.1

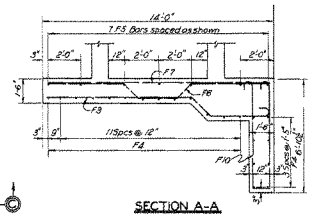
859

859



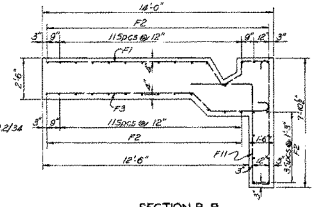
PLAN-REINFORCING TOP OF SILL

SCALE: 3/8"=1'-0"



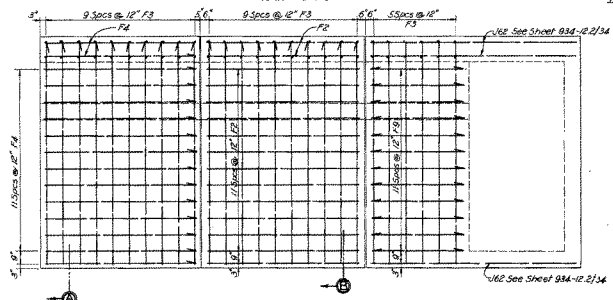
SECTION A-A

SCALE: 3/8"=1'-0"



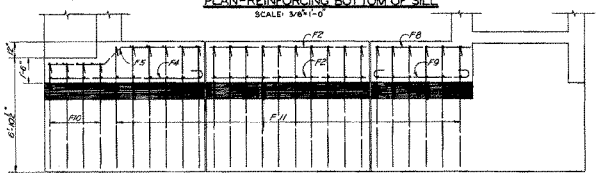
SECTION B-B

SCALE: 3/8"=1'-0"



PLAN-REINFORCING BOTTOM OF SILL

SCALE: 3/8"=1'-0"



SECTION C-C

SCALE: 3/8"=1'-0"

REINFORCEMENT SCHEDULE

BAR	NO. REQD	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	10	5/8" ϕ	15'-4"	3'-6" 11'-8" 1'-6" 1'-6" 1'-6"	10.24	102.4
F1	10	3/4" ϕ	15'-4"	3'-6" 11'-8" 1'-6" 1'-6"	23.03	230.3
F2	36	"	9'-8"	Straight	14.27	513.7
F3	26	"	15'-7"	1'-6" 12" 12" 9"	23.41	608.7
F4	21	"	9'-11"	9'-2" 9"	14.90	312.9
F5	7	"	9'-8"	4'-6" 1'-6" 2'-6" 4'-6" 1'-6" 2'-6"	14.52	101.6
F6	3	"	14'-8"	4'-6" 3'-6" 4'-6" 3'-6"	22.03	66.1
F7	3	"	13'-6"	Straight	20.28	60.8
F8	6	"	5'-6"	Straight	8.26	49.6
F9	12	"	6'-10"	6" 5'-6" 9"	10.26	123.1
F10	4	"	18'-2"	5/8" ϕ 8'-6" 12"	22.78	91.1
F11	22	"	17'-10"	12" 6'-10" 3'-6" 1'-6" 9"	26.79	589.4
					TOTAL	2850#

General Notes:-

All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of two and one half inches of concrete covering, unless otherwise specified.

For masonry details see sheet 934-12.2/1

For reinforcing details of wingwalls and abutments see sheet 934-12.2/32

For reinforcing details of vault see sheet 934-12.2/34

BY	DATE	CHARACTER REVISIONS
F.B.F.	1/29/38	Sheet revised

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS, SILL AND COUNTERFORTS, -- STA. 104+96.17

SECTION "C"

SHEET 31 OF 353 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE LOUISVILLE KY. OCT. 28, 1938

SUBMITTED: S. H. Bailey, SENIOR ENGINEER

APPROVED: RECOMMENDED: [illegible], CAPT. CORPS OF ENGINEERS

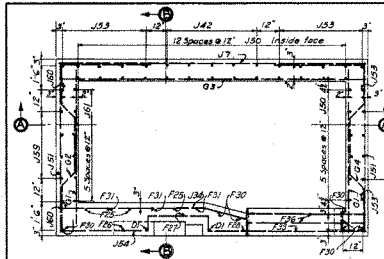
APPROVED: R. E. Larson, LT. COL. CORPS OF ENGINEERS

DR. BY G.C.B. TR. BY W.J.B. CK. BY J.L.T.

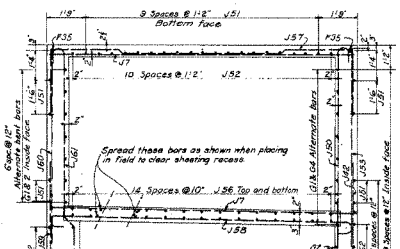
AS BUILT 934-12.2/33.1

WAR DEPARTMENT

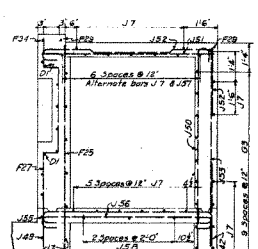
CORPS OF ENGINEERS, U.S. ARMY



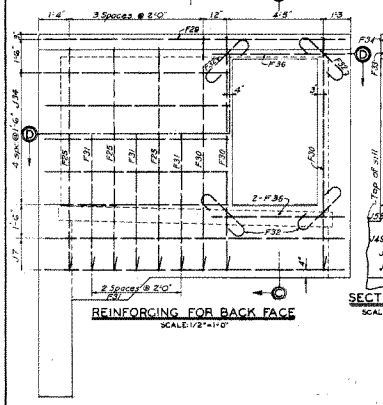
SECTIONAL PLAN D-D
SCALE: 1/2" = 1'-0"



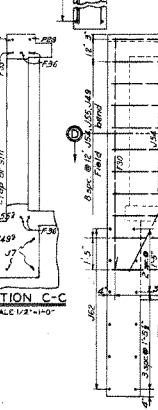
SECTION A-A
SCALE: 1/2" = 1'-0"



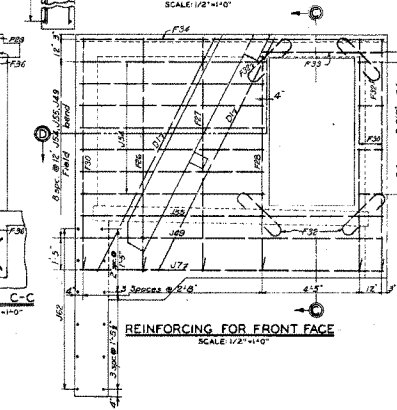
SECTION B-B
SCALE: 1/2" = 1'-0"



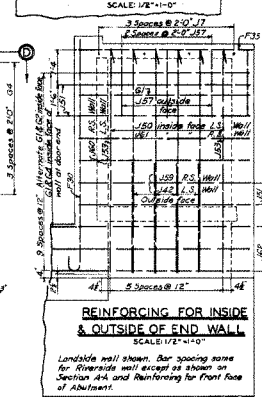
REINFORCING FOR BACK FACE
SCALE: 1/2" = 1'-0"



SECTION C-C
SCALE: 1/2" = 1'-0"



REINFORCING FOR FRONT FACE
SCALE: 1/2" = 1'-0"



REINFORCING FOR INSIDE & OUTSIDE OF END WALL
SCALE: 1/2" = 1'-0"

Landside wall shown. Bar spacing same for Riverside wall except as shown on Section A-A and Reinforcing for Front face of Abutment.

REINFORCEMENT SCHEDULE

BAR	SIZE	NO. REQ'D	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F25	3/4" ϕ	3	10'-10"	10'-2" 4" 6"	16.27	48.8
F26	"	1	11'-11"	2'-6" 8" 9'-11" 8"	17.90	17.9
F27	"	1	12'-7"	1'-8" 8" 4'-6"	18.90	18.9
F28	"	1	10'-5"	3'-9" 3'-9"	15.65	15.7
F29	"	2	13'-8"	Straight	20.53	41.1
J62	1/2" ϕ	15	12'-8"	"	8.46	126.9
F30	3/4" ϕ	4	11'-3"	10'-7" 6"	16.90	67.6
F31	"	3	6'-10"	3'-4" 3'-6"	10.26	30.8
J59	5/8" ϕ	4	10'-4"	Straight	6.90	27.6
J60	"	2	15'-4"	"	10.24	20.5
F32	"	8	3'-10"	8" 2'-6" 3'-6"	5.76	46.1
F33	"	1	5'-3"	Straight	8.14	8.1
F34	"	1	15'-0"	6'-8" 2'-4 1/2"	22.33	22.3
F35	"	2	7'-9"	Straight	11.64	23.3
F36	"	3	6'-0"	"	9.01	27.0
G1	5/8" ϕ	8	7'-0"	"	7.30	58.4
G2	"	5	12'-10"	6" 10" 1'-2" 1'-6" 1'-8" 8"	13.39	67.0
G3	"	10	13'-6"	Straight	14.08	140.8
G4	"	4	14'-0"	12" 2'-6" 1'-2" 1'-6" 8"	14.60	58.4
J50	3/4" ϕ	13	10'-11"	10'-3" 4" 6"	7.29	138.5
J51	"	18	7'-8"	Straight	5.12	92.2
J52	"	11	12'-2"	8" 4" 3" 3'-6" 1'-9" 8"	8.13	89.4
J53	"	12	10'-2"	Straight	6.78	81.5
J54	"	5	8'-5"	6'-6" 1'-11"	5.62	28.1
J42	"	9	5'-0"	Straight	3.34	30.1
J56	"	30	8'-10"	8" 7'-6" 4" 6"	5.90	177.0
J57	"	3	13'-8"	3'-0" 3'-0" 1'-12" 3'-0" 3'-0"	13.14	39.4
J55	"	3	14'-10"	8" 13'-6" 4" 8"	9.91	29.7
J54	"	7	9'-3"	Varies 8" 2'-8" 8" Typical	6.51	45.6
J55	"	1	15'-0"	4'-1" 8" 2'-8" 8" 8'-11"	10.02	10.0
J7	"	22	13'-8"	Straight	9.13	200.9
J49	"	1	15'-0"	1'-11" 8" 1'-8" 8" 10'-1"	10.02	10.0
D1	1" ϕ	2	11'-10"	Straight	3.60	6.2
J61	1/2" ϕ	6	16'-4"	7'-4" 4" 7'-8" 8" (typ.)	10.91	65.5
					TOTAL	2239#

General Notes:
All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of two and one half inches of concrete covering, unless otherwise specified.
For masonry details see sheet 934-12.2/31.
For reinforcing details of sill see sheet 934-12.2/33.
For reinforcing details of west abutment, wing walls, and counterforts see sheet 934-12.2/32.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS OF STORAGE VAULT STA. 104+96.17

SECTION "D"

SHEET 32 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature] DIV. ENGR.

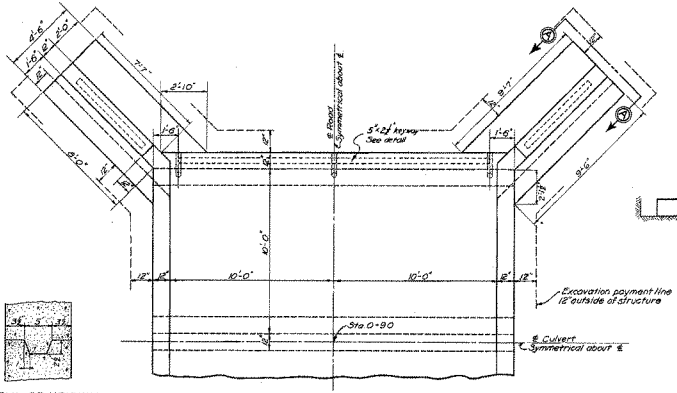
APPROVED: [signature] CHIEF OF ENGINEERS

CAPT. CORPS OF ENGINEERS — LT. COL. CORPS OF ENGINEERS

DR. BY L.W.B. — TR. BY J.J.A.-R.D.P.-E.S. — CK. BY J.T.

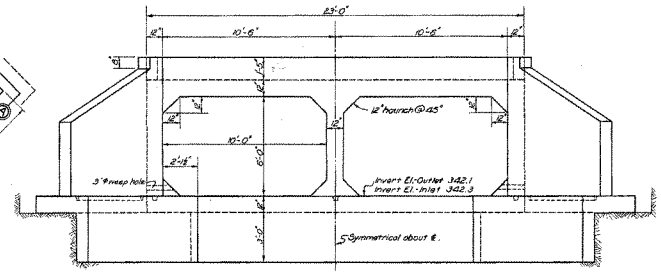
AS BUILT 934-12.2/34

BY	DATE	CHAR-ACTER	REVISIONS
F.B.K.	11-26-38	Sheet revised	

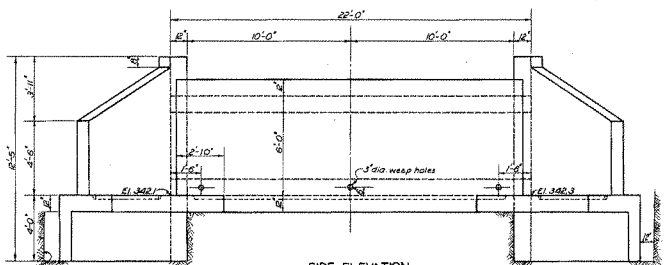


PLAN
SCALE 3/8" = 1'-0"

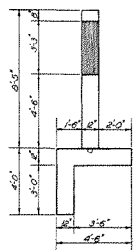
DETAIL OF KEYWAY



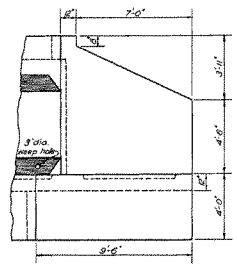
FRONT ELEVATION
SCALE 3/8" = 1'-0"



SIDE ELEVATION
SCALE 3/8" = 1'-0"



END ELEVATION A-A
SCALE 3/8" = 1'-0"



FRONT ELEVATION OF WING
SCALE 3/8" = 1'-0"

General Notes:-
For reinforcing details see sheet 934-12.2/36.
All exposed corners of concrete shall be chamfered one inch.
For location plan and channel details see sheet 934-12.2/2

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

CONCRETE CULVERT STA. 0+90

SECTION "C"

SHEET 33 OF 35 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

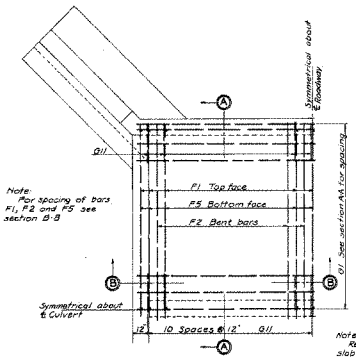
SUBMITTED: L. S. M. Shaller
SENIOR ENGINEER

APPROVED: [illegible]
COL. CORPS OF ENGINEERS

RECOMMENDED: [illegible]
LT. COL. CORPS OF ENGINEERS

DR. BY F.B.F. TR. BY A.E.L. CK. BY J.L.T.

AS BUILT 934-12.2/35

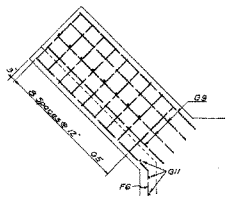


Note: For spacing of bars F1, F2 and F5 see section B-B

PLAN

Showing reinforcing in top & bottom faces of roof slab.

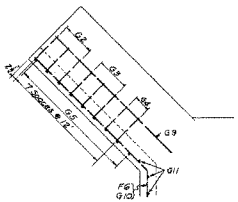
SCALE: 3/8" = 1'-0"



PLAN

Showing reinforcing in top of base of wing walls.

SCALE: 3/8" = 1'-0"

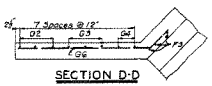


PLAN

Showing reinforcing in bottom of base of wing walls.

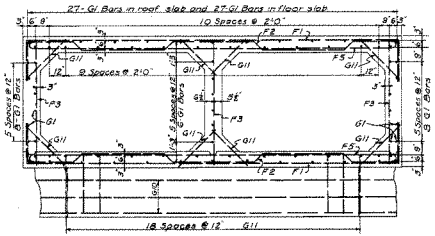
SCALE: 3/8" = 1'-0"

Note: Reinforcing in floor slab identical to that in roof slab except reversed in top and bottom faces.



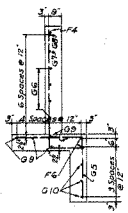
SECTION D-D

SCALE: 3/8" = 1'-0"



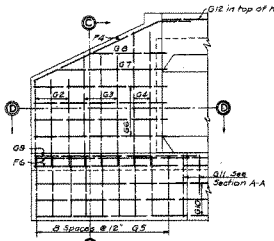
SECTION A-A

SCALE: 3/8" = 1'-0"



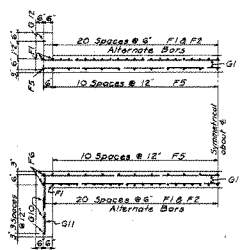
SECTION C-C

SCALE: 3/8" = 1'-0"



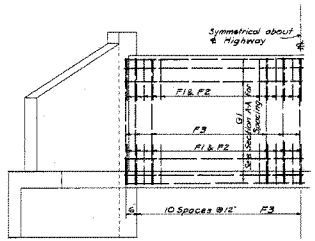
ELEVATION OF WING WALLS

SCALE: 3/8" = 1'-0"



SECTION B-B

SCALE: 3/8" = 1'-0"



SIDE ELEVATION

SCALE: 3/8" = 1'-0"

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G1	76	3/8"	21'-6"	Straight	22.42	1703.9
G2	12	"	7'-4"	5'-4" 2'-0"	7.65	91.8
G3	12	"	8'-9"	6'-9" 2'-0"	9.13	108.6
G4	8	"	10'-1"	8'-1" 2'-0"	10.52	84.2
G5	36	"	7'-6"	4'-0" 3'-6"	7.82	250.2
G6	16	"	9'-6"	8'-0" 1'-6"	7.04	112.6
G7	4	"	8'-3"	6'-3" 1'-6"	8.60	34.4
G8	4	"	6'-3"	4'-3" 1'-6"	6.52	26.1
G9	20	"	10'-0"	Straight	10.43	208.6
G10	6	"	36'-2"	9'-9" 16'-8" 9'-9"	37.72	226.3
G11	206	"	3'-6"	Straight	3.65	751.9
G12	2	"	21'-0"	"	21.90	43.8
F1	44	3/8"	28'-0"	2'-9" 22'-6" 3'-9"	42.06	1850.6
F2	40	"	28'-10"	2'-9" 22'-6" 3'-9" 2'-9" 22'-6" 3'-9"	43.31	1732.4
F3	68	"	7'-6"	Straight	11.27	777.6
F4	4	"	10'-6"	8'-6" 2'-0"	15.77	63.1
F5	44	"	23'-10"	8" 22'-6" 8"	35.80	1575.2
F6	4	"	36'-2"	9'-9" 16'-8" 9'-9"	54.32	217.3
					TOTAL	9860.0

General Notes:
All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of two and one half inches of concrete covering unless otherwise noted.
For masonry details see sheet 934-12.2/35

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS
CONCRETE CULVERT STA. 0+90

SECTION "C"

SHEET 34 OF 38 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED: [illegible] SENIOR ENGINEER

APPROVAL RECOMMENDED: [illegible] CAPT. CORPS OF ENGINEERS

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS

DR. BY W.J.B. TR. BY R.G.D. CK. BY J.L.P.

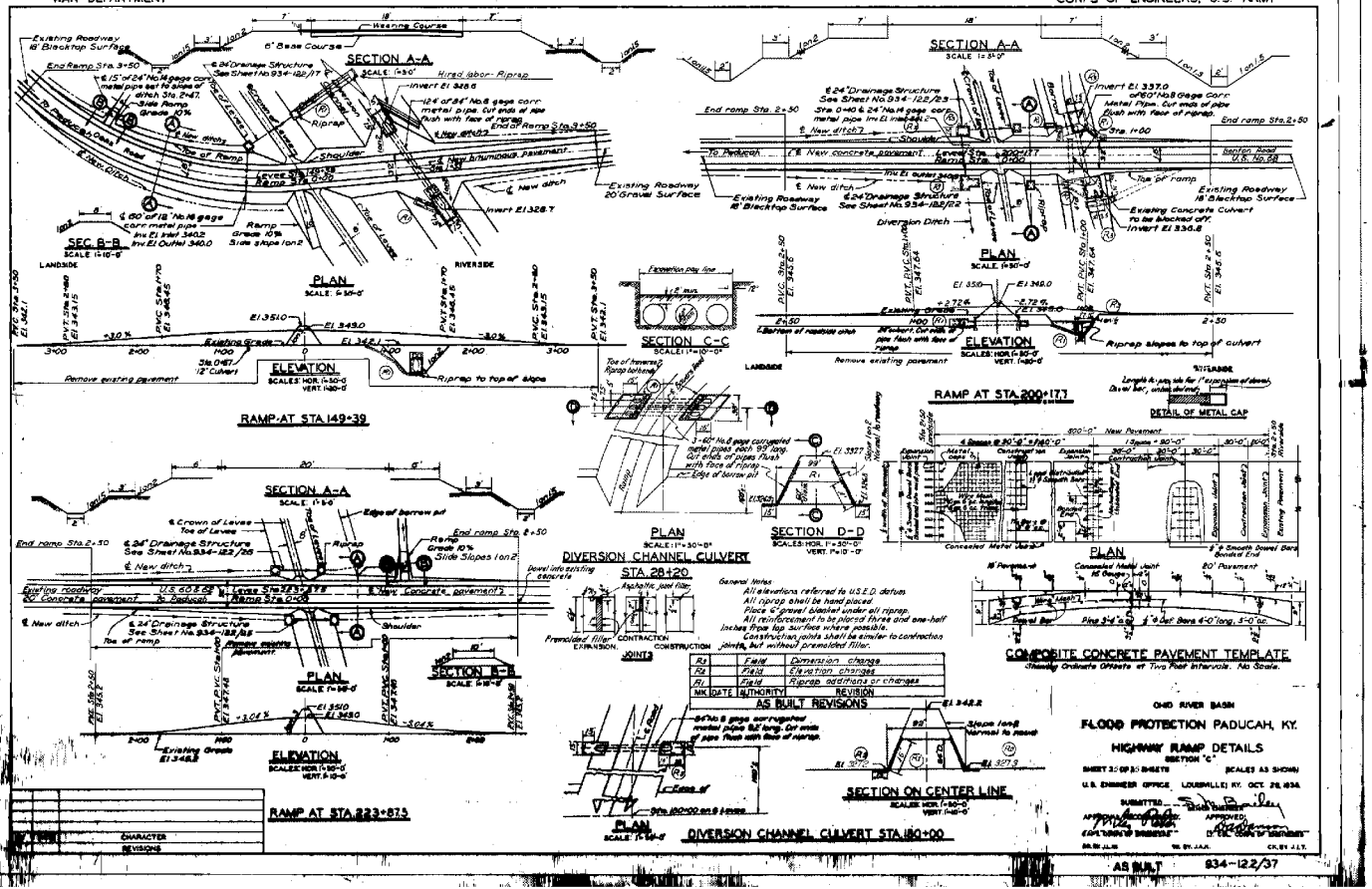
AS BUILT 934-12.2/36

863

102

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 1, 2, 3, 5, 6, 7 & 12

IN 108 SHEETS

TITLE SHEET

CONTENTS

934-12.3/ 1 GENERAL PLAN PUMPING PLANTS NOS. 1,2,3,5,6,7, & 12

PUMPING PLANT NO. 1

934-12.3/ 2 GENERAL LAYOUT
934-12.3/ 3 MASONRY DETAILS PLANS & SECTIONS
934-12.3/ 4 MASONRY DETAILS ELEVATIONS
934-12.3/ 5 REINFORCING DETAILS BASE SLAB, LOADING PLATFORM & STAIRS
934-12.3/ 6 REINFORCING DETAILS ROOF SLAB & MOTOR FLOOR
934-12.3/ 7 REINFORCING DETAILS NORTH & SOUTH WALLS
934-12.3/ 8 REINFORCING DETAILS EAST, SOUTH & WEST WALLS
934-12.3/ 9 PUMPING PLANTS NOS. 1, 5, & 7 WIRING DIAGRAMS
934-12.3/10 PUMPING PLANTS NOS. 1, 5 & 6 SUBSTATION
934-12.3/11 PUMPING PLANTS NOS. 1, 2, 5 & 6 MASONRY & REINFORCING DETAILS SUBSTATION PLATFORMS
934-12.3/12 PUMPING PLANTS NOS. 1, 2, 5 & 6 SUBSTATION FENCE LOCATIONS PLANS & DETAIL
934-12.3/13 LIGHTING & POWER SYSTEM
934-12.3/14 MASONRY & REINFORCING DETAILS DISCHARGE HEADWALL

PUMPING PLANT NO. 2

934-12.3/15 GENERAL LAYOUT
934-12.3/16 MASONRY DETAILS-PLANS
934-12.3/17 MASONRY DETAILS-SECTIONS
934-12.3/18 MASONRY DETAILS-ELEVATIONS
934-12.3/19 REINFORCING DETAILS BOTTOM BASE, WEIR & LOADING PLATFORM STEPS
934-12.3/20 REINFORCING DETAILS-BASE, TOP REINFORCING & PIERS
934-12.3/21 REINFORCING DETAILS-MOTOR FLOOR
934-12.3/22 REINFORCING DETAILS NORTH WALL
934-12.3/23 REINFORCING DETAILS SOUTH WALL & INTAKE CHAMBER WALL
934-12.3/24 REINFORCING DETAILS EAST WALL
934-12.3/25 REINFORCING DETAILS WEST WALL
934-12.3/26 REINFORCING DETAILS ROOF SLAB, INTAKE & LOADING PLATFORMS
934-12.3/27 WIRING DIAGRAM
934-12.3/28 SUBSTATION
934-12.3/29 LIGHTING & POWER SYSTEMS
934-12.3/30 MASONRY DETAILS DISCHARGE HEADWALL
934-12.3/31 REINFORCING DETAILS DISCHARGE HEADWALL

PUMPING PLANT NO. 3

934-12.3/32 GENERAL LAYOUT
934-12.3/33 MASONRY DETAILS PLANS & ELEVATIONS
934-12.3/34 MASONRY DETAILS ELEVATIONS
934-12.3/35 REINFORCING DETAILS MOTOR FLOOR, ROOF, TRASH RACK WALKWAY & BASE SLAB
934-12.3/36 REINFORCING DETAILS NORTH, SOUTH & WEST WALLS
934-12.3/37 REINFORCING DETAILS EAST WALL, SURGE CHAMBER & WEST WALL, TRASH RACK
934-12.3/38 PUMPING PLANTS NOS. 3 & 12 WIRING DIAGRAMS
934-12.3/39 PUMPING PLANTS NOS. 3, 7 & 12 TWO-POLE TRANSFORMER SUBSTATION
934-12.3/40 LIGHTING & POWER SYSTEMS

PUMPING PLANT NO. 5

934-12.3/41 GENERAL LAYOUT
934-12.3/42 MASONRY DETAILS PLAN & SECTIONS
934-12.3/43 MASONRY DETAILS PLAN & SECTIONS
934-12.3/44 MASONRY DETAILS ELEVATIONS
934-12.3/45 REINFORCING DETAILS SUPER AND SUB-STRUCTURE
934-12.3/46 REINFORCING DETAILS EAST WALL & SEWER OPENINGS
934-12.3/47 LIGHTING & POWER SYSTEMS
(R) 934-A1/1 MASONRY & REINFORCING DETAILS MANHOLES NOS. 12 & 13

PUMPING PLANT NO. 6

934-12.3/49 GENERAL LAYOUT
934-12.3/50 MASONRY DETAILS PLAN & SECTIONS
934-12.3/51 MASONRY DETAILS ELEVATIONS
934-12.3/52 MASONRY DETAILS ROOF PLAN & SECTIONS
934-12.3/53 REINFORCING DETAILS BASE SLAB
934-12.3/54 REINFORCING DETAILS NORTH WALL
934-12.3/55 REINFORCING DETAILS SOUTH WALL
934-12.3/56 REINFORCING DETAILS EAST WALL
934-12.3/57 REINFORCING DETAILS WEST WALL
934-12.3/58 REINFORCING DETAILS MOTOR FLOOR
934-12.3/59 REINFORCING DETAILS ROOF SLAB, PURLIN, PIER & NORTH WALL TRASH CHAMBER
934-12.3/60 REINFORCING DETAILS DISCHARGE CHAMBER WALL, FLOOR AND WEST WALL TRASH CHAMBER
934-12.3/61 LIGHTING & POWER SYSTEMS
934-12.3/62 MASONRY DETAILS CLARK STREET OUTFALL HEADWALL
934-12.3/63 REINFORCING DETAILS CLARK STREET OUTFALL HEADWALL

PUMPING PLANT NO. 7

934-12.3/64 GENERAL LAYOUT
934-12.3/65 MASONRY DETAILS BASE PLAN & SECTION
934-12.3/66 MASONRY DETAILS PLAN & SECTION
934-12.3/67 MASONRY DETAILS ELEVATIONS
934-12.3/68 MASONRY DETAILS ROOF PLAN & ELEVATIONS
934-12.3/69 REINFORCING DETAILS BASE SLAB
934-12.3/70 REINFORCING DETAILS EAST WALL, DISCHARGE CHAMBER WALL & FLOOR
934-12.3/71 REINFORCING DETAILS DISCHARGE CHAMBER END WALLS, NORTH, SOUTH & TRASH CHAMBER WALLS
934-12.3/72 REINFORCING DETAILS ROOF SLAB, TRASH CHAMBER ROOF SLAB, TRASH CHAMBER WALKWAY & PURLINS
934-12.3/73 REINFORCING DETAILS WEST WALL & MOTOR FLOOR
934-12.3/74 LIGHTING & POWER SYSTEMS

PUMPING PLANT NO. 12

934-12.3/75 GENERAL LAYOUT
934-12.3/76 MASONRY DETAILS PLAN & SECTIONS
934-12.3/77 MASONRY DETAILS ROOF PLAN & ELEVATIONS

PUMPING PLANT NO. 12

934-12.3/78 REINFORCING DETAILS BASE SLAB & WING WALLS
934-12.3/79 REINFORCING DETAILS SUPERSTRUCTURE WALLS
934-12.3/80 REINFORCING DETAILS SUBSTRUCTURE WALLS & LOADING PLATFORM
934-12.3/81 REINFORCING DETAILS MOTOR FLOOR & ROOF SLAB
934-12.3/82 LIGHTING & POWER SYSTEMS
934-12.3/83 MASONRY & REINFORCING DETAILS DISCHARGE HEADWALL

MISCELLANEOUS DETAILS

934-12.3/84 MISCELLANEOUS DETAILS
934-12.3/85 MISCELLANEOUS DETAILS
934-12.3/86 MISCELLANEOUS DETAILS
934-12.3/87 MISCELLANEOUS DETAILS
934-12.3/88 MISCELLANEOUS DETAILS
934-12.3/89 MASONRY & REINFORCING T-WALL MONOLITHS

MOVABLE CLOSURE & STORAGE VAULTS

934-12.3/90 MASONRY DETAILS MOVABLE CLOSURE STA. 90+38.17B
934-12.3/91 REINFORCING DETAILS STA. 90+38.17B SILL & ABUTMENTS
934-12.3/92 REINFORCING DETAILS STA. 90+10.00 & STORAGE VAULT
934-12.3/93 MASONRY & REINFORCING DETAILS STA. 108+63.17B STORAGE VAULT
934-12.3/94 MASONRY DETAILS STA. 162+01.57B STORAGE VAULT
934-12.3/95 REINFORCING DETAILS STA. 162+01.57B STORAGE VAULT

INTERCEPTING SEWER & MANHOLES

934-12.3/96 INTERCEPTING SEWER PLAN & PROFILE
934-12.3/97 INTERCEPTING SEWER PLAN & PROFILE
934-12.3/98 INTERCEPTING SEWER PLAN & PROFILE
934-12.3/99 MASONRY & REINFORCING DETAILS MONOLITHIC CONCRETE SEWERS
934-12.3/100 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 1 & 2
934-12.3/101 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 3 & 4
934-12.3/102 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 5 & 6
934-12.3/103 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 7 & 8
934-12.3/104 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLE NO. 9
934-12.3/105 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLE NO. 10
934-12.3/106 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLE NO. 11
(R) 934-A1/2 MANHOLE NO. 14
(R) 934-12.3/116 PUMPING PLANTS NOS. 2, 3, 5, & 6 PIPING REVISIONS

No	DATE	AUTHORITY	REVISIONS
		Add #2	Sheets added.
R	Nov 1945	Add #2	Sh. #4 superceded by Dwg. No. 934-A1/1

AS BUILT REVISIONS

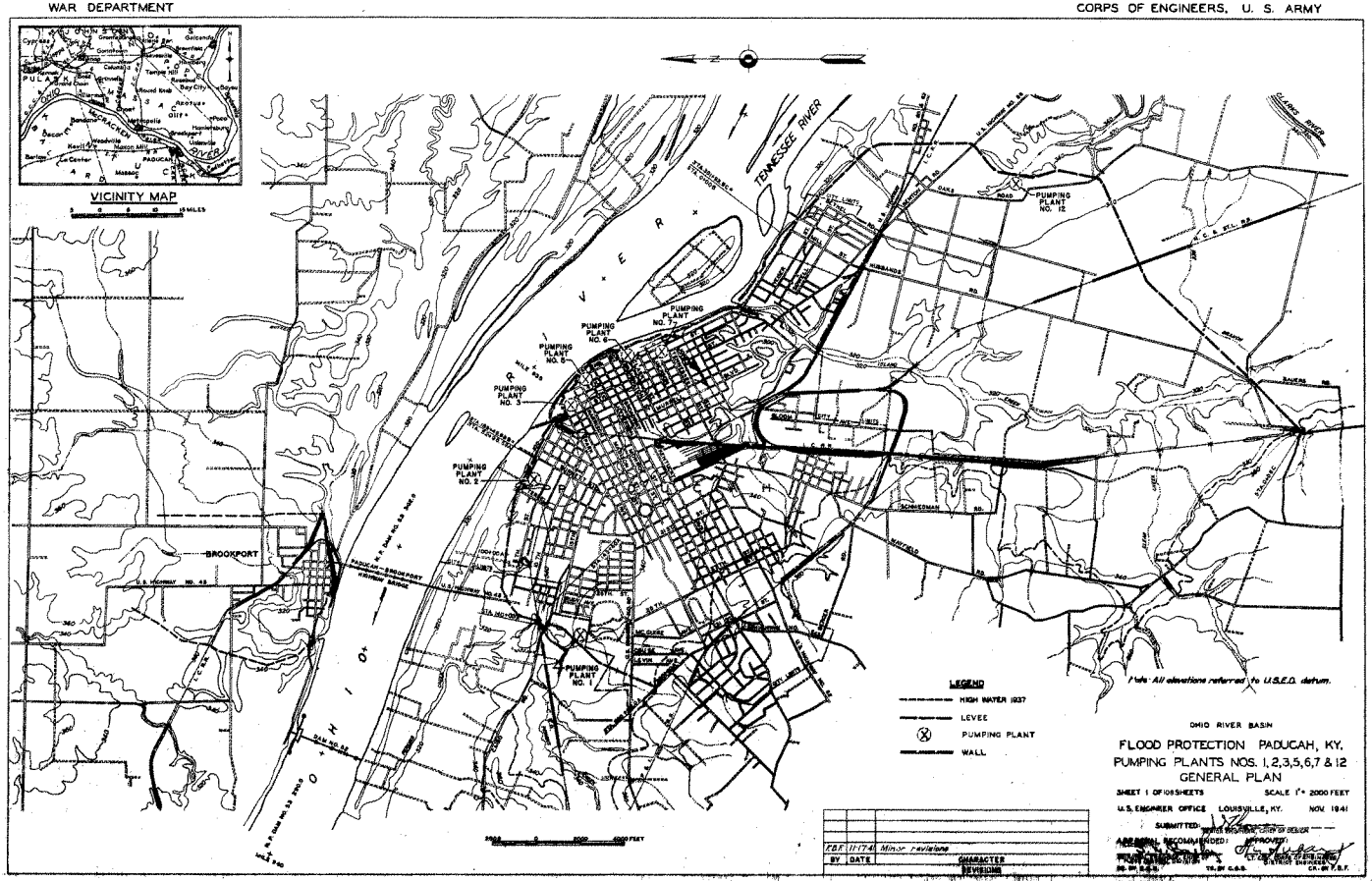
U. S. ENGINEER OFFICE, LOUISVILLE, KY.

AS BUILT

865

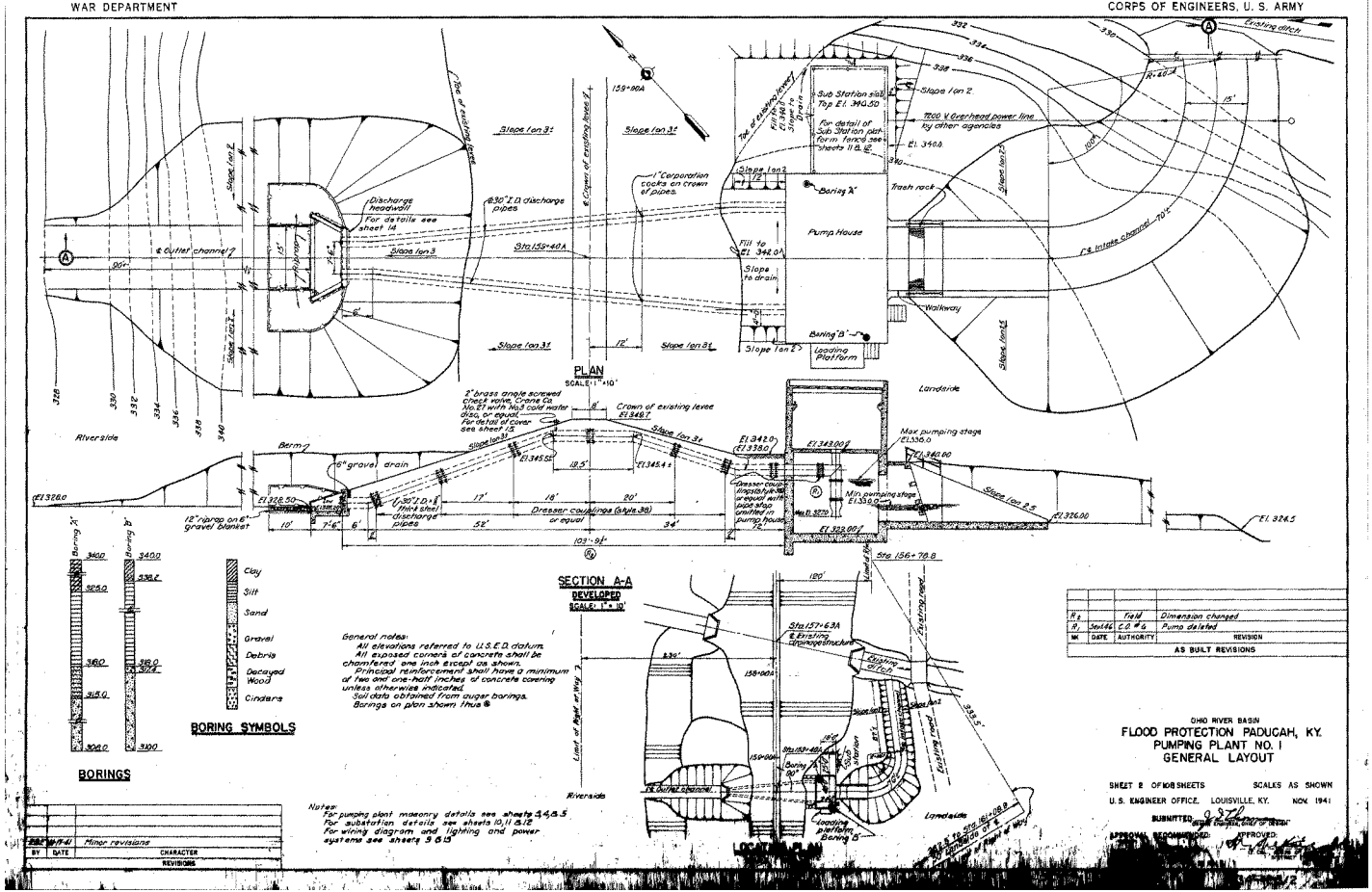
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY


PLAN
SCALE: 1" = 10'
SECTION A-A
DEVELOPED
SCALE: 1" = 10'
BORINGS
BORING SYMBOLS
Clay
Silt
Sand
Gravel
Debris
Decayed Wood
Cinders
General notes:
All elevations referred to U.S.E.D. datum.
All exposed corners of concrete shall be chamfered one inch except as shown.
Principal reinforcement shall have a minimum of two and one-half inches of concrete covering unless otherwise indicated.
Soil data obtained from auger borings.
Borings on plan shown thus ⊗
Notes:
For pumping plant masonry details see sheets 3,4,5,6,5
For substation details see sheets 10,11,6,12
For wiring diagram and lighting and power systems see sheets 5,6,15
Pump House
Trash rack
Walkway
Loading Platform
Riverside
Landside
Existing ditch
Discharge headwall
Outlet channel
Intake channel
Sub Station site
Top El. 340.50
For detail of Sub Station platform fence see sheets 11 & 12
11000 V Overhead power line by other agencies
Max pumping stage El. 336.0
Min pumping stage El. 330.0
Dresser couplings (Style 38) or equal
12" riprap on 6" gravel blanket
6" gravel drain
Berm
Crown of existing levee
Limit of Right of Way
Sta 156+78.8
Sta 157+63.8
Existing Underpass bridge
Existing office
Loading platform
Boring 'B'
Boring 'A'
Boring 'C'
Slope 1 on 2
Slope 1 on 3
Slope 1 on 3½
Slope 1 on 2½
Slope 1 on 3½
Slope to drain
Fill to El. 342.0
Fill to slope to drain
Tie of existing levee
Sta 159+90A
Sta 159+40A
Sta 159+00A
Sta 159+40A
Sta 159+00A
Sta 159+60A
Sta 159+80A
Sta 160+00A
Sta 160+20A
Sta 160+40A
Sta 160+60A
Sta 160+80A
Sta 161+00A
Sta 161+20A
Sta 161+40A
Sta 161+60A
Sta 161+80A
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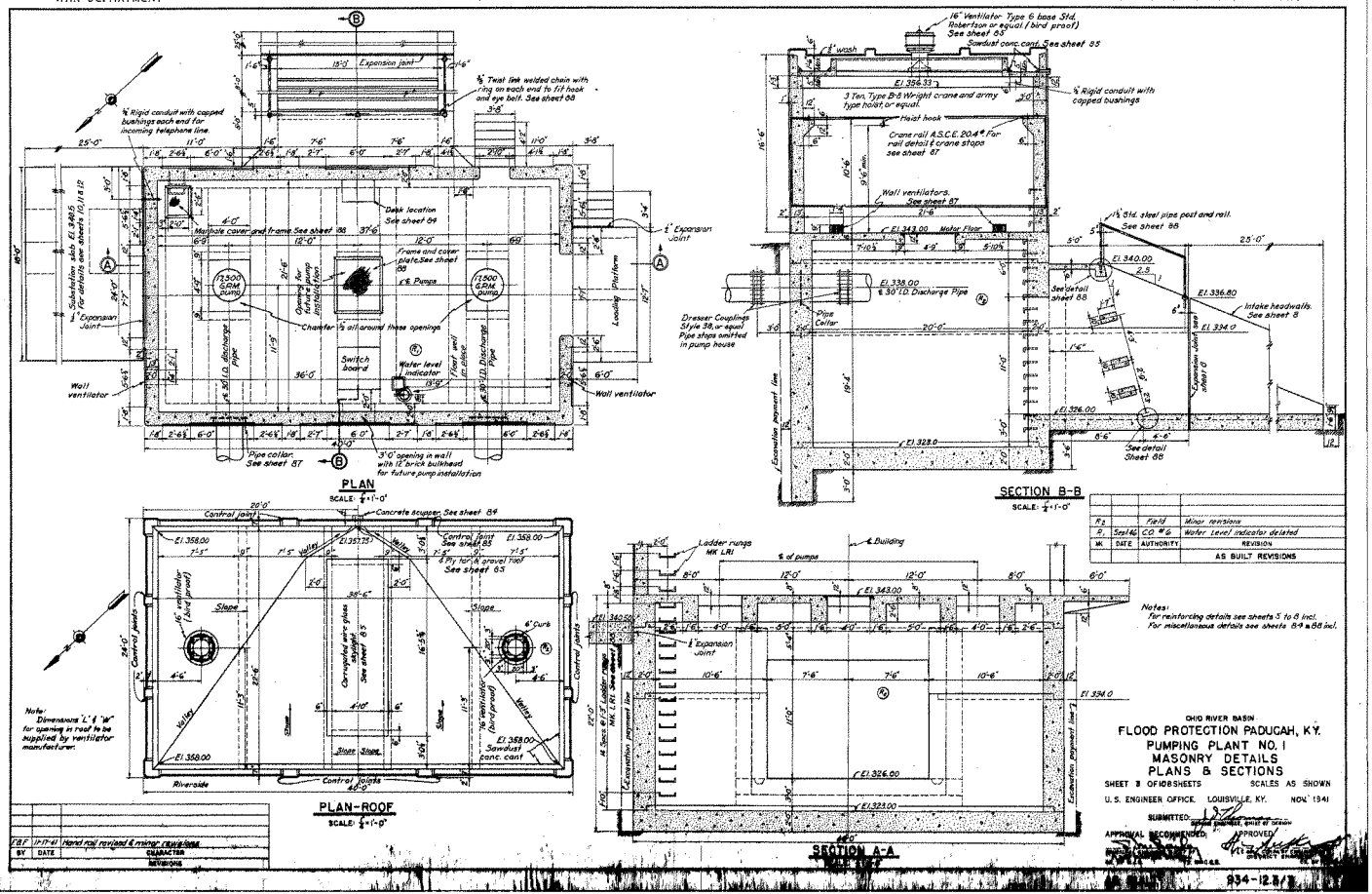
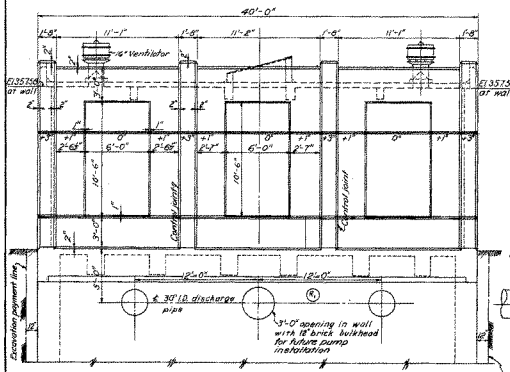
Sta 162+80A
Sta 163+00A
Sta 163+20A
Sta 163+40A
Sta

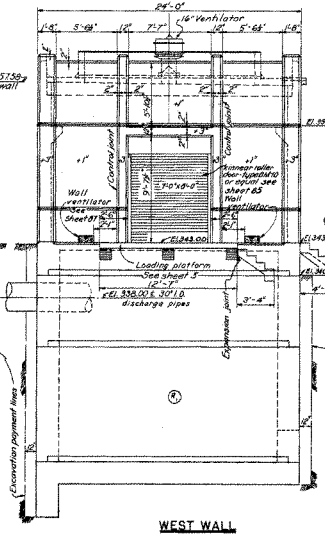

PLAN
SCALE: 1/4"=1'-0"
SECTION B-B
SCALE: 1/4"=1'-0"
PLAN-ROOF
SCALE: 1/4"=1'-0"
SECTION A-A
SCALE: 1/4"=1'-0"
Expansion joint
Rigid conduit with capped bushings each end for incoming telephone line.
Twist link welded chain with ring on each end to fit hook and eye bolt. See sheet 68
Substation slab El. 346.5 For details see sheets 10, 11 & 12
Manhole cover and frame See sheet 68
Desk location See sheet 69
Frame and cover plate. See sheet 68
Chamfer 1/2" all around these openings
12,500 G.P.M. pump
Opening pump installation
Switch board
Water level indicator
Floor well in place
30" I.D. Discharge Pipe
Loading Platform
Wall ventilator
Pipe collar. See sheet 67
3'-0" opening in wall with 12" brick bulkhead for future pump installation
Concrete scupper. See sheet 69
Control joint
Control joint See sheet 65
8 Ply 1ST & gravel roof See sheet 65
16" ventilator (bird proof)
Corrugated wire glass skylight See sheet 65
Slope
Valley
Riverside
Control joints
Sandust conc. cant
Ladder rungs MK LR1
Building
Notes: Dimensions "L" & "W" for opening in roof to be supplied by ventilator manufacturer.
Notes: For reinforcing details see sheets 5 to 8 incl. For miscellaneous details see sheets 69 & 88 incl.
16" Ventilator Type 6 base Std. Robertson or equal (bird proof) See sheet 65
Sandust conc. cant. See sheet 65
3 Ton, Type B-8 Wright crane and army type hoist or equal.
Hoist hook
Crane rail A.S.C.E. 20.4# For rail detail & crane stops see sheet 67
Wall ventilators. See sheet 67
Motor Floor
Dresser Couplings Style 38, or equal Pipe stops omitted in pump house
Pipe Cellar
1 1/2" Std. steel pipe post and rail. See sheet 88
See detail sheet 68
Intake headwalls. See sheet 8
Expansion joint see sheet 10
Excavation payment line
See detail Sheet 68
Rigid conduit with capped bushings
Expansion joint
Excavation payment line
Minor revisions
Water Level indicator deleted
AS BUILT REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
MASONRY DETAILS
PLANS & SECTIONS
SHEET 3 OF 10 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
934-12.3/1

WAR DEPARTMENT

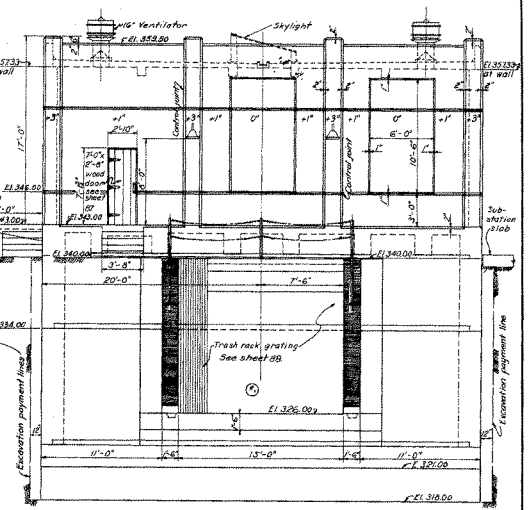
CORPS OF ENGINEERS, U. S. ARMY



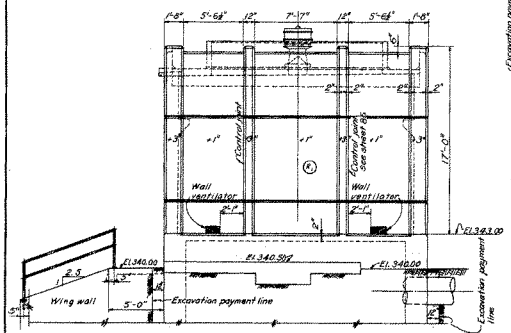
NORTH WALL



WEST WALL



SOUTH WALL



EAST WALL

Note:
The outside of 12" panel is used as 0" surface. Other surfaces projecting from 12" panel are shown thus (+) inches.
Reinforcing in East and West wall superstructure ⅝" @ 12" centers each way both faces. For reinforcing details around doors and in pilasters see sheet 79

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
MASONRY DETAILS
ELEVATIONS

SHEET 4 OF 108 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] ENGINEER ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PUMPING EQUIPMENT, CHIEF OF DESIGN, CHIEF, MECHANICAL DESIGN BRANCH, TR. BY A.H.J.

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER, TR. BY C.R.O.

CE. M.P.B.P.

BY	DATE	CHARACTER
K.B.F.	11-17-41	Pipe rail added & minor revisions

REVISIONS

BY	DATE	AUTHORITY	REVISION
K.		Field	Minor Revisions

AS BUILT REVISIONS

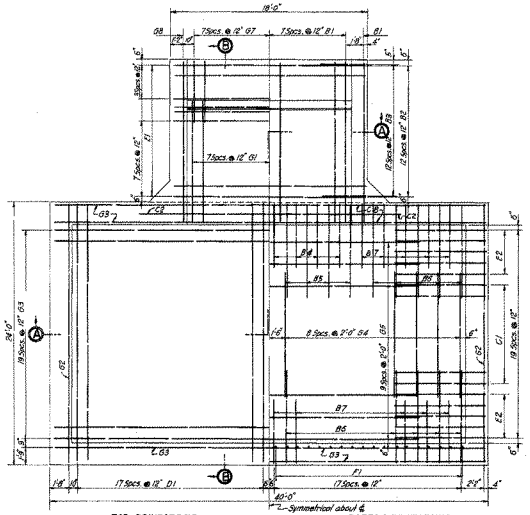
AS BUILT

934-12.3/4

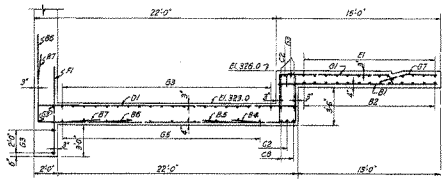
868

WAR DEPARTMENT

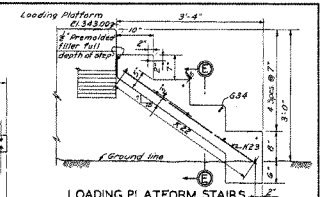
CORPS OF ENGINEERS, U. S. ARMY



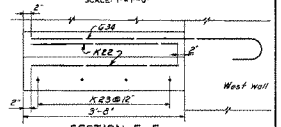
PLAN-BASE
SCALE: 1/4" = 1'-0"



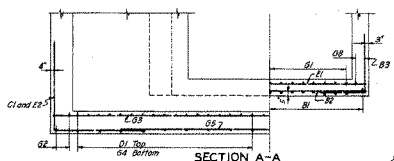
SECTION B-B
SCALE: 1/4" = 1'-0"



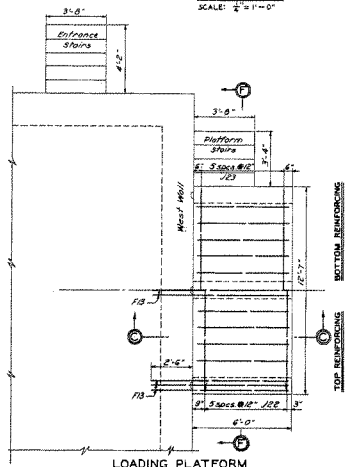
LOADING PLATFORM STAIRS
SCALE: 1" = 1'-0"



SECTION E-E
SCALE: 1" = 1'-0"



SECTION A-A
SCALE: 1/4" = 1'-0"



LOADING PLATFORM
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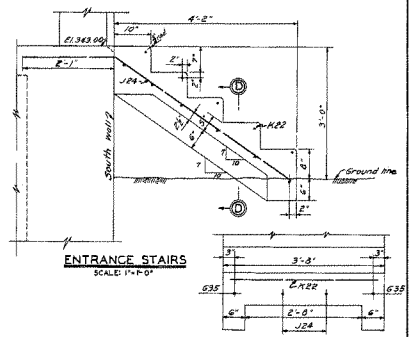
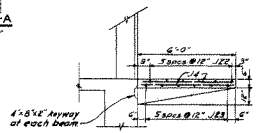
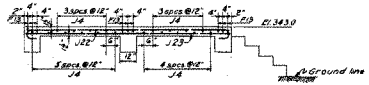


ENTRANCE STAIRS
SCALE: 1" = 1'-0"

SECTION D-D
SCALE: 1" = 1'-0"



SECTION C-C
SCALE: 1/4" = 1'-0"



SECTION F-F
SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER REVISIONS
F.B.F.	11-17-41	Minor revisions

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
REINFORCING DETAILS
BASE SLAB, LOADING PLATFORM & STAIRS

SHEET 5 OF 10 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: DIVISION ENGINEER, CHIEF OF DESIGN

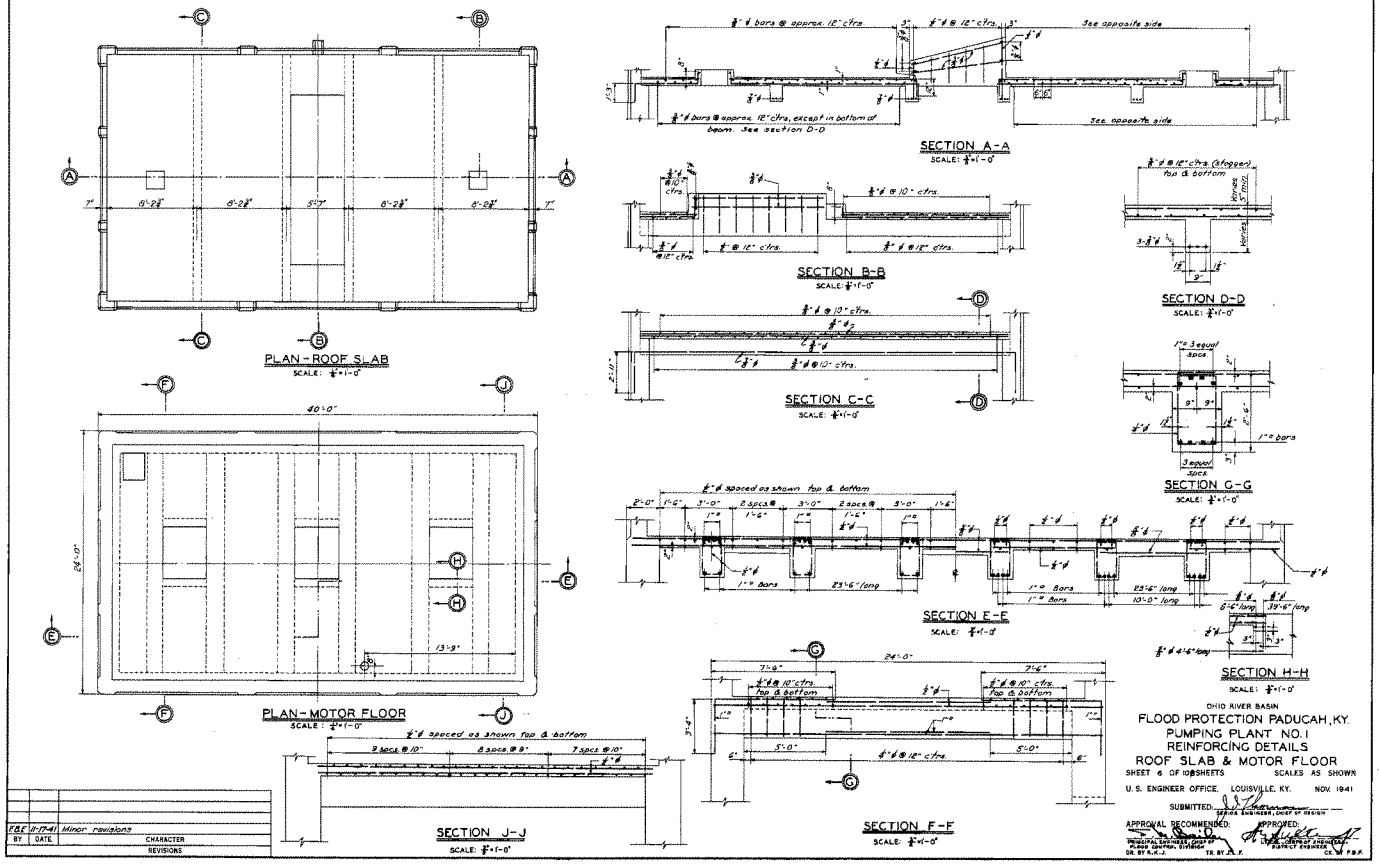
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF DESIGN, CONTROL DIVISION

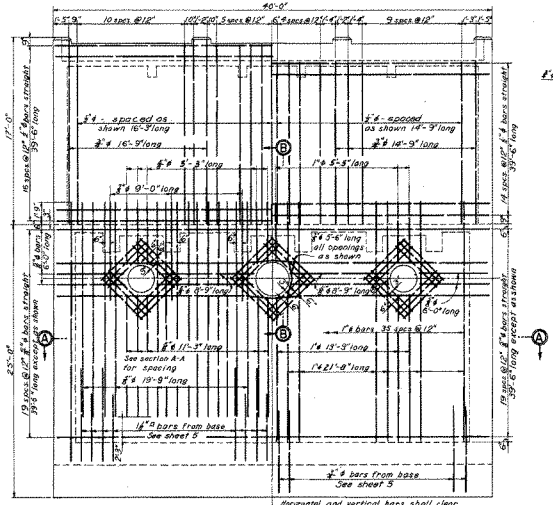
APPROVED: CHIEF, DESIGN BRANCH, CONTROL DIVISION

AS BUILT

934-12.3/5

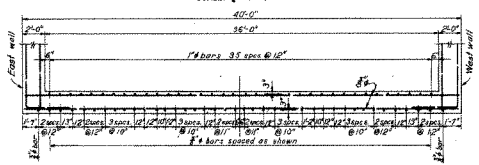
870


PLAN - ROOF SLAB
SCALE: 1/4"=1'-0"
PLAN - MOTOR FLOOR
SCALE: 1/4"=1'-0"
SECTION A-A
SCALE: 1/4"=1'-0"
SECTION B-B
SCALE: 1/4"=1'-0"
SECTION C-C
SCALE: 1/4"=1'-0"
SECTION D-D
SCALE: 1/4"=1'-0"
SECTION E-E
SCALE: 1/4"=1'-0"
SECTION F-F
SCALE: 1/4"=1'-0"
SECTION G-G
SCALE: 1/4"=1'-0"
SECTION H-H
SCALE: 1/4"=1'-0"
SECTION J-J
SCALE: 1/4"=1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
REINFORCING DETAILS
ROOF SLAB & MOTOR FLOOR
SHEET 6 OF 10 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
SENIOR ENGINEER, GROUP OF DESIGN
APPROVED:
PRINCIPAL ENGINEER, GROUP OF PLANS CONTROL DIVISION
DISTRICT ENGINEER
DR. BY R.K.J.
TR. BY J.A.F.
CK. BY F.B.F.
F.B.E. 11-17-41 Minor revisions
BY DATE CHARACTER REVISIONS
AS BUILT
934-12.3/6



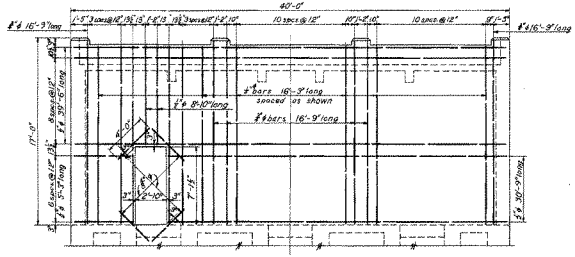
ELEVATION NORTH WALL

SCALE: 1/4" = 1'-0"

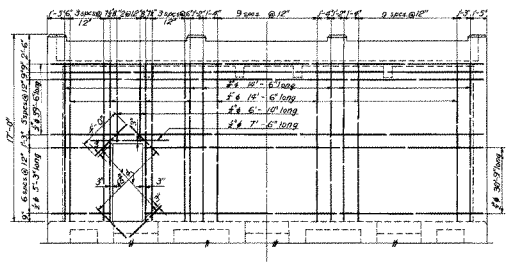


SECTION A-A

SCALE: 1/4" = 1'-0"



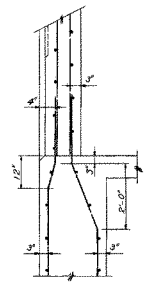
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

SOUTH WALL

SCALE: 1/4" = 1'-0"



For location of Section see sheet 8.

SECTION B-B

SCALE: 1/4" = 1'-0"

Note:
For reinforcing at corners, around door openings and at pilasters see detail sheet 79.
For reinforcing in south wall sub structure see sheet 8.
For masonry details see sheets 3 & 4.

F.B.F.	11-17-41	Minor corrections
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
REINFORCING DETAILS
NORTH & SOUTH WALLS

SHEET 7 OF 10 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [signature] DISTRICT ENGINEER, CHIEF OF BRANCH

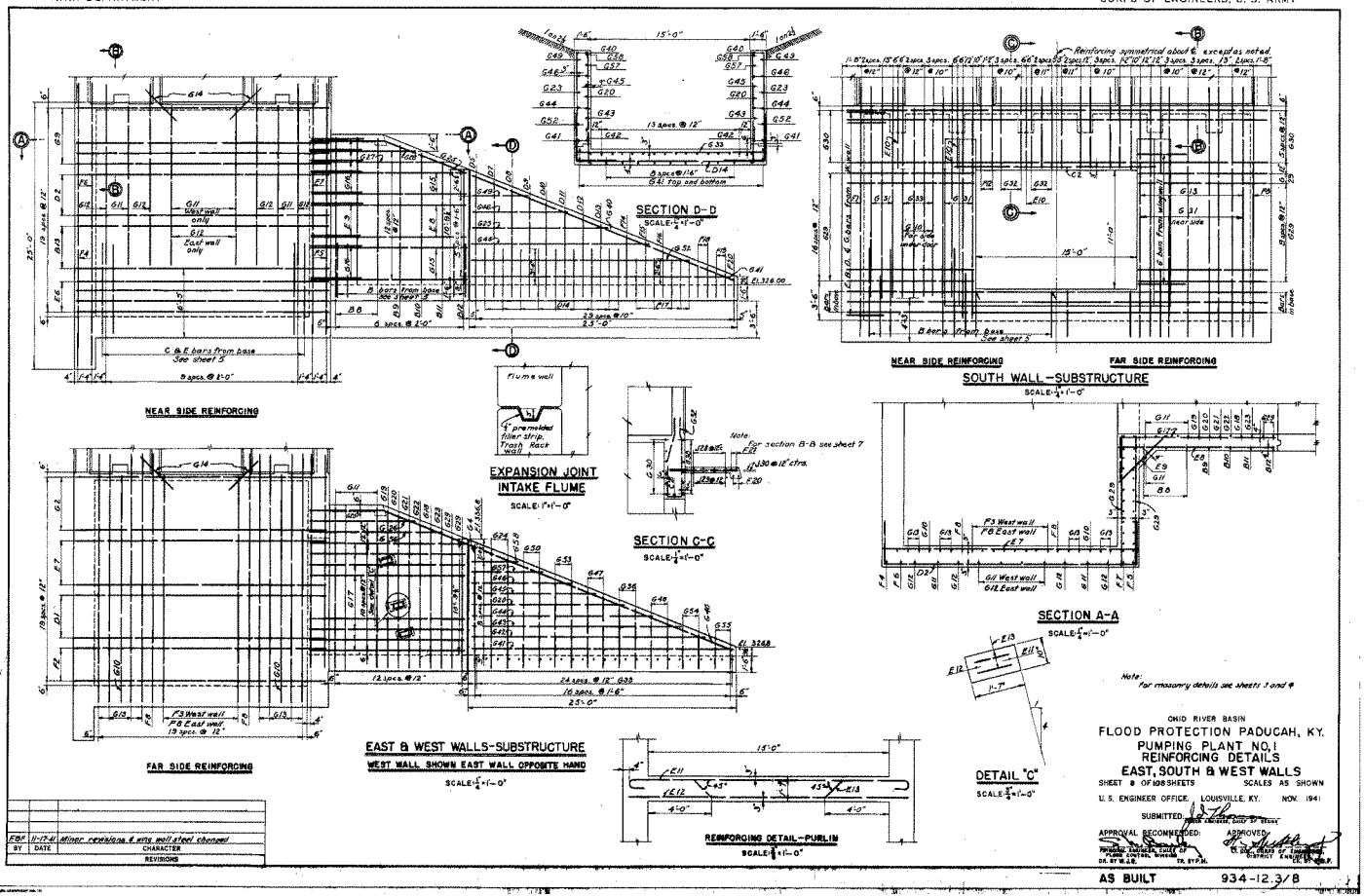
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL BRANCH — DR. BY W.L.B.

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER — TR. BY C.R.G. — CK. BY F.B.F.

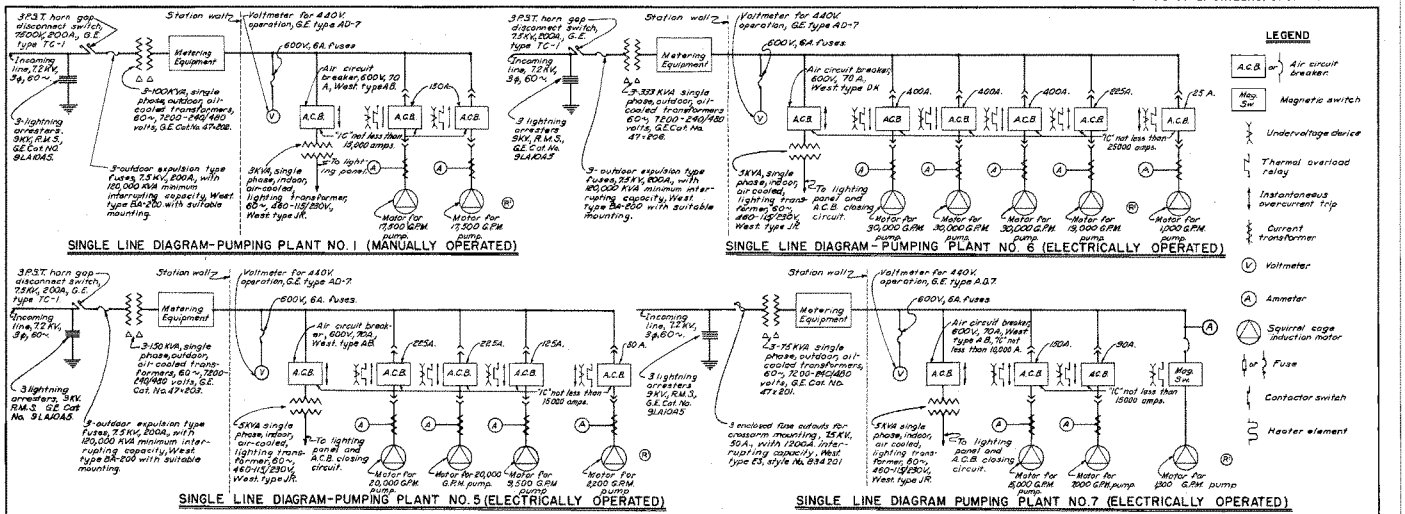
AS BUILT

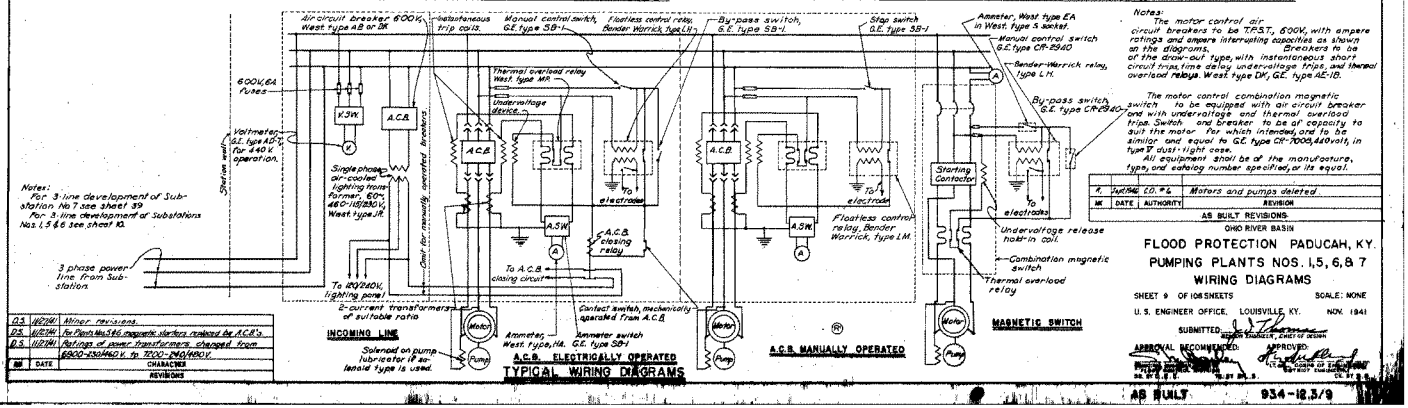
934-12.3/7

872



BY	DATE	CHARACTER REVISIONS
FBF	11-17-41	Minor revisions & mtg. wall steel channel

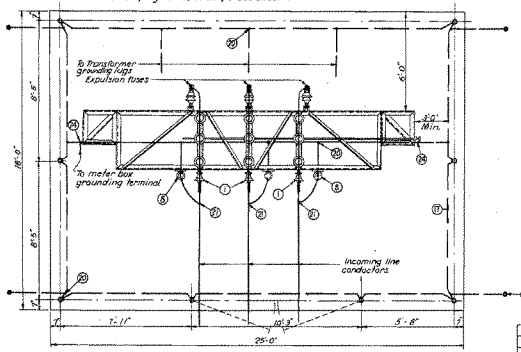

SINGLE LINE DIAGRAM-PUMPING PLANT NO. 1 (MANUALLY OPERATED)
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 6 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 5 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM PUMPING PLANT NO. 7 (ELECTRICALLY OPERATED)
LEGEND
Air circuit breaker
Magnetic switch
Undervoltage device
Thermal overload relay
Instantaneous overcurrent trip
Current transformer
Voltmeter
Ammeter
Squirrel cage induction motor
Fuse
Contactor switch
Heater element


INCOMING LINE
A.C.B. ELECTRICALLY OPERATED
A.C.B. MANUALLY OPERATED
MAGNETIC SWITCH
TYPICAL WIRING DIAGRAMS
Notes:
The motor control air circuit breakers to be T.P.S.T., 600V, with ampere ratings and ampere interrupting capacities as shown on the diagrams. Breakers to be of the draw-out type, with instantaneous short circuit trips, time delay undervoltage trips, and thermal overload relays. West type DK, G.E. type AE-18.
The motor control combination magnetic switch to be equipped with air circuit breaker and with undervoltage and thermal overload trips. Switch and breaker to be of capacity to suit the motor for which intended, and to be similar and equal to G.E. type CR-7000, 440 volt, in type "T" dust-tight case.
All equipment shall be of the manufacture, type, and catalog number specified, or its equal.
Notes:
For 3-line development of Substation No 7 see sheet 39
For 3-line development of Substations Nos. 1, 5 & 6 see sheet 10.
AS BUILT REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1,5,6,8 7
WIRING DIAGRAMS
SHEET 9 OF 108 SHEETS
SCALE: NONE
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/9

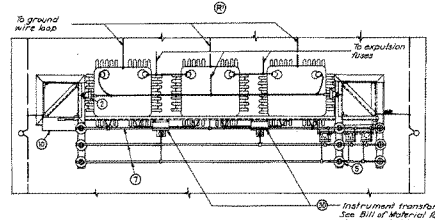
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

Arrangement of gate and fence posts on slab is typical for Pumping Plant No.6. For gate and fence arrangement of Pumping Plants Nos. 1 & 5 see sheet 12



PLAN

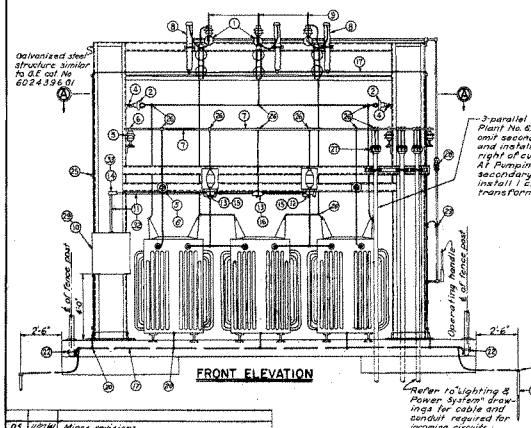


SECTION PLAN A-A

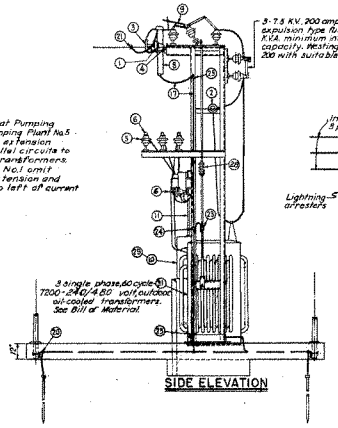
26	T connectors for 1" IPS Main to 350 MCM cable	G.E.	6009421992	3	
26	" " " " " 300 " "	G.E.	6009421991		6
26	" " 1½" " " 500 " "	G.E.	6009421006		18

Note:
Power connections from transformer secondaries to the 440 volt buses shall be as indicated in the following table.

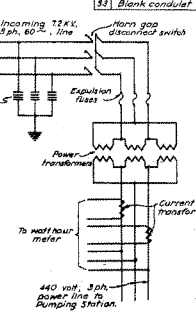
P.P. No.	conductors carrying line currents	conductors carrying phase currents
1	400 MCM rubber insulated copper cable	#3/0 rubber insulated copper cable
5	350 " " " " "	250 MCM rubber insulated copper cable
6	(1½" IPS copper tubing (extra heavy)	(1" IPS copper tubing



FRONT ELEVATION



SIDE ELEVATION



WIRING DIAGRAM

Notes:
Figures in circles refer to part numbers on the Bill of Material.
Small electrical fittings, power connectors, etc., not called for shall be furnished as required.
7200 volt buses and connections to be #2/0 bare, solid, copper conductor.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
For substation slab and fence details see sheets 11 & 12.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY R'	QUANTITY R2	QUANTITY R3
1	6" strain insulators	Locke	16383	3	3	3
2	6" strain insulators	Locke	18062	2	2	2
3	Strain clamps	Locke	20087	3	3	3
4	Hooks	Locke	2869	5	5	5
5	Insulator units	G.E.	6009910D1	8	8	11
6	Bus supports (sizes to suit horizontal buses)	G.E.	6026206	6	6	9
7	Bus supports (sizes to suit vertical phase conductors)	G.E.	6026206	2	2	2
	1" IPS copper tubing buses, ea. 13'-1" long			3	3	
	1½" extra heavy IPS copper tubing buses, ea. 19' long					3
8	Lightning arresters	G.E.	9LA1045	3	3	3
9	3 P.S.T. horn gap disconnect switch G.E. type TQ1	G.E.	6003298G1	1	1	1
10	Meter box	Superior	RDJ-7780	1	1	1
11	1" rigid electrical conduit			15'	15'	15'
12	Conduit outlet	Crouse-Hinds	E37	1	1	1
13	Conduit outlet	"	C37	2	2	2
14	Conduit outlet	"	LB37	1	1	1
15	3-hole composition cover	"	3773	2	2	2
16	1-hole composition cover	"	3771	1	1	1
17	#2/0 bare stranded copper cable			200'	200'	200'
18	Ground rod ¾"x8'	Copperweld		4	4	4
19	Connector for ¾" rod and #2/0 cable	Burndy	GK6426	4	4	4
20	"T" connector for #2/0 cable	"	NT2626	12	12	12
21	Disconnecting clamp	G.E.	6021459G1	3	3	3
22	Connector for #2/0 cable and fence posts	Burndy	Type GD	9	9	9
23	Connector for #2/0 cable and ½" pipe	"	GD1626	1	1	1
24	Connector for #2/0 cable to structural framework	"	GC2626	2	2	2
25	" " " " " "	"	GB26	6	6	6
26	"T" connectors for 1" IPS copper tubing (sizes to suit)	G.E.	6005421			6
	"T" connectors for 1" IPS main to cable branch (sizes to suit)	"	6005421	5	5	1
	"T" connections for cable (sizes to suit)	"	6005422	2	2	
	"T" connectors for #2/0 bare solid copper conductor	"	6005422	5	5	5
27	¾" service entrance fitting	Crouse-Hinds	F963	1	2	
	4" " " " "	"	F1063			4
28	Operating rod insulator	Lapp	6993	1	1	1
29	Watthour meter	G.E.	77-511	1	1	1
30	Current transformer, 500/5 A.	"	94-512	2		
	" " 800/5 A	"	94-514		2	
	" " 1,500/5 A.	"	93-607			5
31	Power transformer, 7200-240/480/1000 KVA.	"	47-203	3		
	" " 7200-240/480 V. 150 KVA.	"	47-203		3	
	" " 7200-240/480 V. 333 KVA.	"	47-206			3
32	#12 insulated copper wire			900'	900'	900'
33	Blank conduit cover	Crouse-Hinds	3770	1	1	1

R'		Field	Bill of material changed
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

BY	DATE	CHARACTER
D.S.	1/27/41	Minor revisions
D.S.	11/27/41	Secondary bus for Plant No.5 changed to 2 parallel circuits.
D.S.	11/27/41	Phase feed sizes noted.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1, 5, & 6
SUBSTATION

SHEET 10 OF 108 SHEETS

SCALE: ¼"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

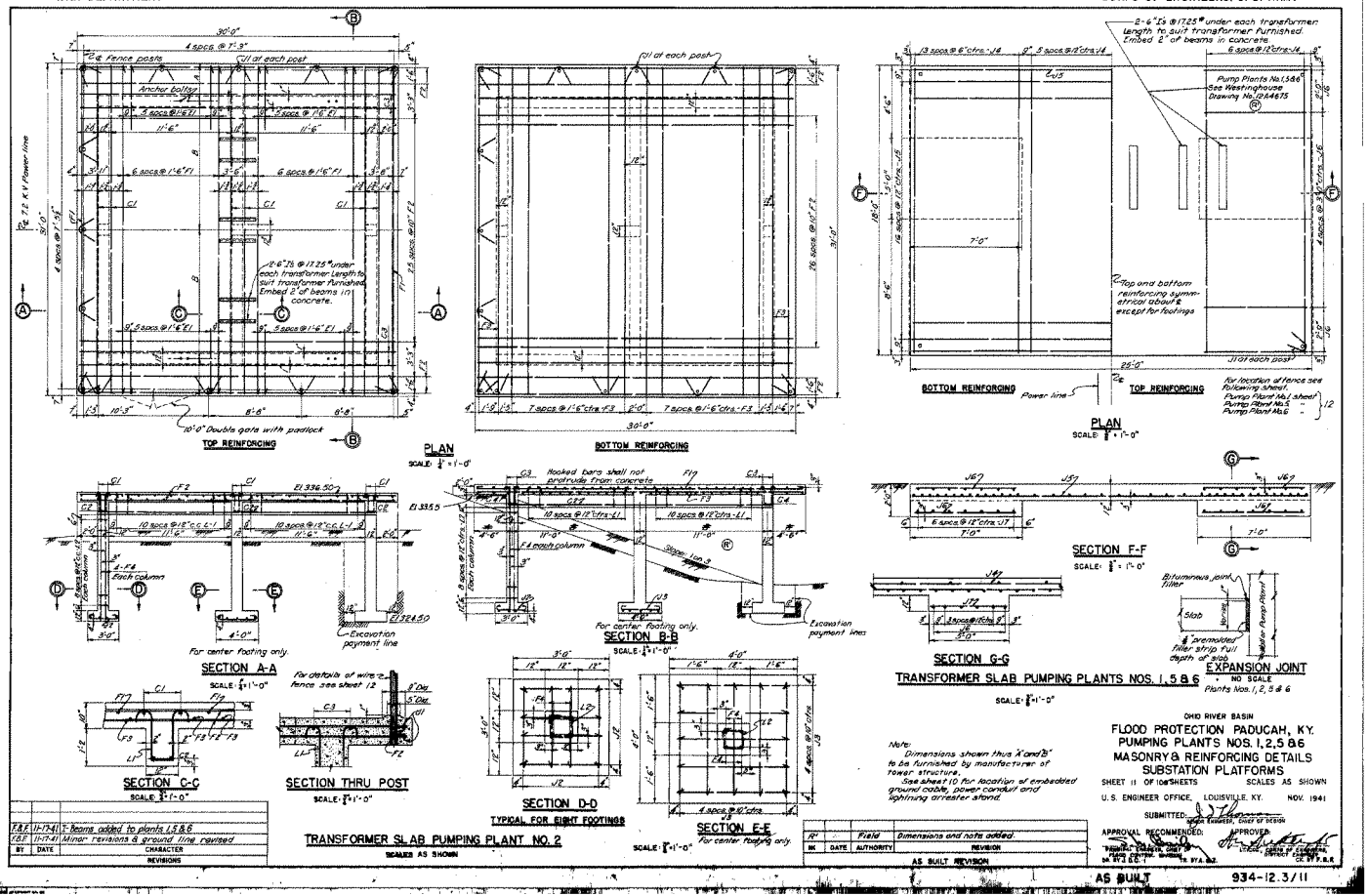
SUBMITTED: [illegible] SENIOR ENGINEER, CHIEF OF DESIGN

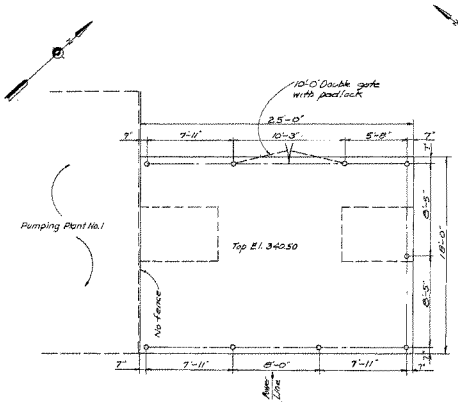
APPROVAL RECOMMENDED: [illegible] DISTRICT ENGINEER

APPROVED: [illegible] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

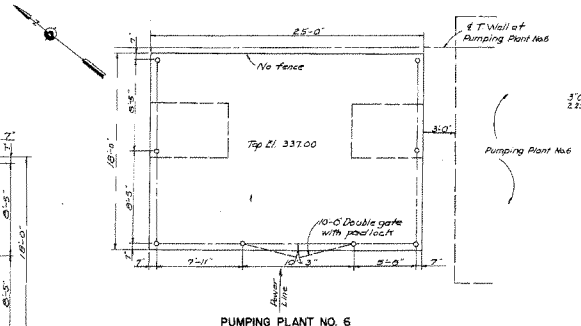
AS BUILT

D-3-10.3/10

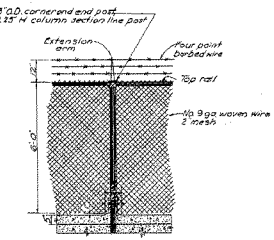

TOP REINFORCING
BOTTOM REINFORCING
PLAN
SCALE: 1/4" = 1'-0"
SECTION A-A
SCALE: 1/4" = 1'-0"
SECTION B-B
SCALE: 1/4" = 1'-0"
SECTION C-C
SCALE: 1/4" = 1'-0"
SECTION THRU POST
SCALE: 1/4" = 1'-0"
SECTION D-D
TYPICAL FOR EIGHT FOOTINGS
SECTION E-E
For center footing only.
SECTION F-F
SCALE: 1/4" = 1'-0"
SECTION G-G
EXPANSION JOINT
NO SCALE
Plants Nos. 1, 2, 5 & 6
TRANSFORMER SLAB PUMPING PLANTS NO. 1, 5 & 6
SCALE: 1/4" = 1'-0"
TRANSFORMER SLAB PUMPING PLANT NO. 2
SCALES AS SHOWN
Note:
Dimensions shown thus "X and 3" to be furnished by manufacturer of tower structure.
See sheet 10 for location of embedded ground cable, power conduit and lightning arrester stand.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1, 2, 5 & 6
MASONRY & REINFORCING DETAILS
SUBSTATION PLATFORMS
SHEET 11 OF 106 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
REVISIONS
BY | DATE | CHARACTER
F.B.F. 11-17-41 | Beams added to plants 1,5 & 6
F.B.F. 11-17-41 | Minor revisions & ground line revised
12 | Field | Dimensions and note added.
BY | DATE | AUTHORITY | REVISION
AS BUILT REVISION
AS BUILT
934-12.3/11



PUMPING PLANT NO. 1

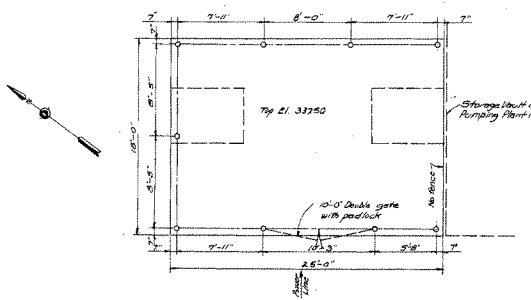


PUMPING PLANT NO. 6

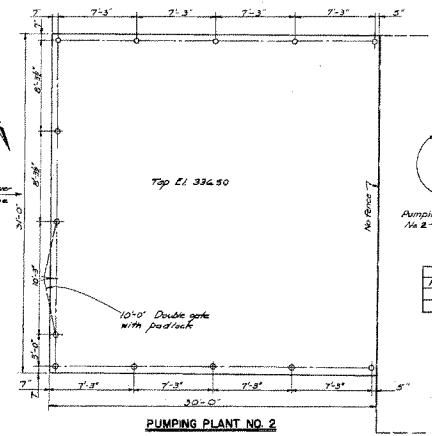


WIRE FENCE DETAIL

SCALE: ½" = 1'-0"



PUMPING PLANT NO. 5



PUMPING PLANT NO. 2

PLANS

SCALE: ½" = 1'-0"

Note:
Corner posts used in all cases, fence not connected to adjacent structures

R'	Field	Dimensions changed, gate moved

FBE	11-17-41	Title changed & minor revisions
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1,2,5,& 6
SUBSTATION FENCE LOCATIONS
PLANS AND DETAIL

SHEET 12 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: SENIOR ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

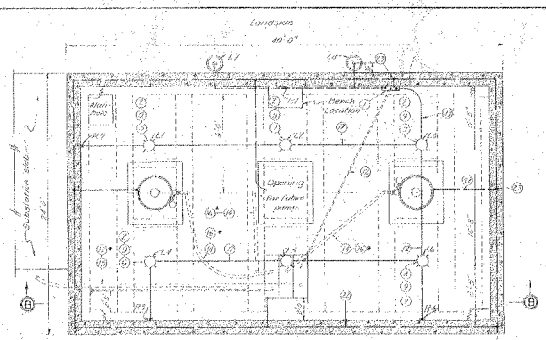
APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY: W. A.B. TR. BY: T. H. CK. BY: C.R.F.

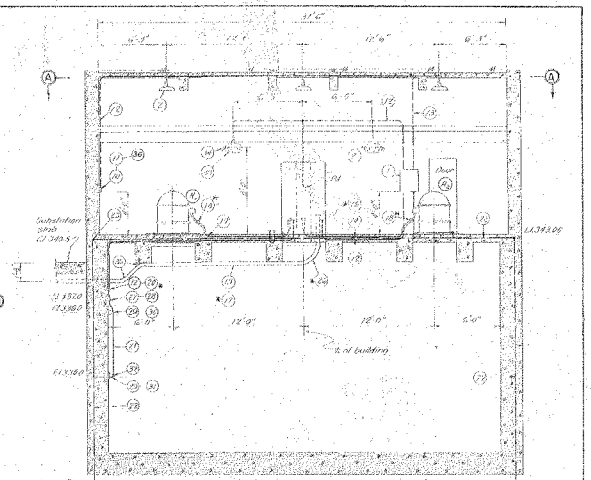
AS BUILT 934-12.3/12

116

877



SECTION A-A



SECTION B-B

BILL OF MATERIAL

PART NO	DESCRIPTION	MFR.	CAT. OR NO.	QUAN
1	4 Circuit light distribution panel (Surface type)			1
2	10" Al chrome reflector & socket	Westl.	3493-13	7
3	Conduit outlet	Crouse Hinds	SK-T22	1
4	" "	"	SK-T12	1
5	" "	"	SKC-17	1
6	" "	"	SKLR	1
7	" "	"	1431	7
8	" Cover	"	1515	7
9	" "	"	SK-B4	4
10	" outlet	"	1751	4
11	Duplex wing receptacle			4
12	1" Rigid electrical conduit			200'
13	1" " "			70'
14	1½" " "			15'
15	3/8" " "			50'
16*	#2/0 Tern cable, R.C.B. 600 volt, with 60% rubber jacket			165'
17*	400 MCM Bare cable, R.C. 600 volt, with 60% rubber jacket			150'
18*	1" Erickson coupling			2
19	1" Standard 90° elbow			6
20*	#12 Insulated copper wire			340'
21	#6 H.D. bare solid wire			10'
22	#10 Bare stranded copper wire			160'
23	T connector for #10 stranded cable	Burndy	YT1867G	8
24	Connector for #10 stranded cable to 1/2" rod	"	GBS428	4
25	Ground rod 1/2" x 8'-6" long	Copper Weld		3
26	Special long radius 90° elbow, 2½" x 45° taping			7
27	Conduit outlet	Crouse Hinds	A17	1
28	" cover	"	1731	1
29	3" bolt circle type insulator	Locke	13761	3
30	Bus support fitting (bolt to channel) for bare solid wire	Locke	2653	1
31	" " " " 5/8 dia. electrode	"	2033	1
32	Drops electrode (See part No. 29) sheet			
33	Wire guard for reflector	Westl.	33487	7
34	Padlock	"	331434	6
35	3/4" Standard radius 45° elbow	C.O. No. 7		2
36	Wall reflex plate			4

(13) 1/18/38 Future sump opening noted

BY	DATE	CHARACTER OF REVISIONS

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

(16) * Denotes materials deleted.

Notes:
Figures in circles refer to part number on bill of material.
All material shall be of the manufacture, type and catalog number specified or of equal. All conduit to be at expense for pump furnished.
Small fittings, coupling etc. not listed shall be furnished as required.
All conduit in floor shall be placed as near the center of slab as possible.
100 watt bulbs shall be furnished and installed in all lights.

WIRING DIAGRAM
LIGHTING CIRCUIT

No.	DATE	AUTHORITY	REVISIONS
4	Feb 37	C.O. # 7	Materials deleted or changed
3	Sept 40	C.O. # 6	Motors deleted

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
LIGHTING & POWER SYSTEM

SHEET 13 OF 103 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941

SUBMITTED [redacted]

APPROVAL RECOMMENDED: [redacted]

[redacted]

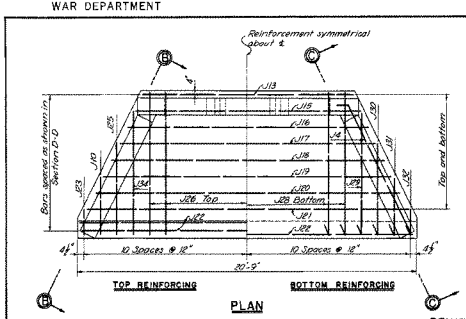
AS BUILT [redacted] 934 [redacted] 13

117

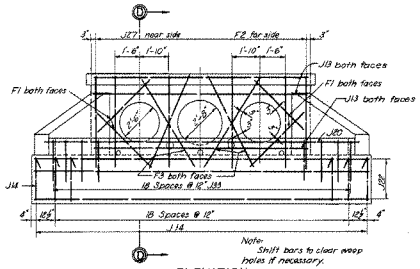
878

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

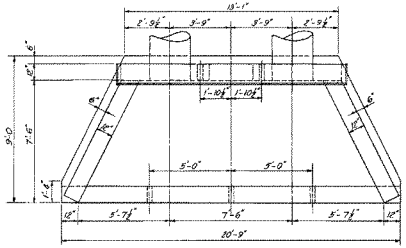


PLAN

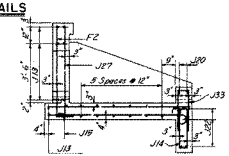


ELEVATION

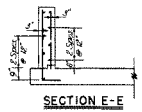
REINFORCING DETAILS



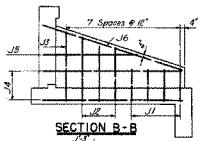
PLAN



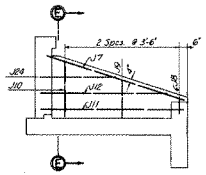
SECTION D-D



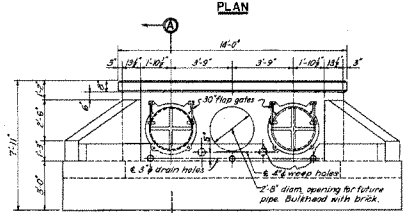
SECTION E-E



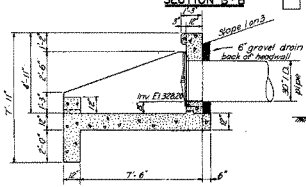
SECTION B-B



SECTION C-C

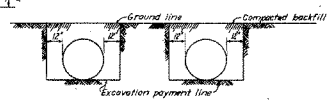


ELEVATION



SECTION A-A

MASONRY DETAILS



EXCAVATION PAYMENT LINES

REINFORCEMENT SCHEDULE

SIZE	D	DIMENSION GIVEN IN BENDING DIAGRAM
# OR ϕ LESS	6"	d

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	8	5/8 ϕ	4'-6"	Straight	6.76	54.1
F2	6	"	6'-6"	5'-6" | 12"	9.76	58.6
F3	8	"	6'-3"	Straight	9.39	75.1
J1	8	5/8 ϕ	2'-10"	1'-10" | 12"	1.69	13.1
J2	6	"	4'-1"	3'-1" | 12"	2.73	16.4
J3	2	"	5'-0"	4'-0" | 12"	3.34	6.7
J4	4	"	9'-3"	8'-6" 5/8 ϕ	6.18	24.7
J5	2	"	6'-6"	5'-9" 5/8 ϕ	4.34	8.7
J6	2	"	9'-6"	8'-9" 5/8 ϕ	6.33	12.7
J7	2	"	11'-0"	9'-0" 5/8 ϕ	7.35	14.7
J8	2	"	1'-3"	Straight	0.83	1.7
J9	2	"	2'-3"	"	1.50	3.0
J10	4	"	3'-6"	"	2.34	9.4
J11	2	"	8'-9"	"	5.84	11.7
J12	2	"	8'-0"	"	5.34	10.7
J13	8	"	13'-0"	"	8.68	69.4
J14	21	"	6'-10"	[redacted] 6"	4.56	95.8
J15	2	"	14'-0"	Straight	9.33	18.7
J16	2	"	15'-0"	"	10.02	20.0
J17	2	"	16'-0"	"	10.69	21.4
J18	2	"	17'-0"	"	11.36	22.7
J19	2	"	18'-0"	"	12.02	24.0
J20	4	"	19'-0"	"	12.69	50.8
J21	2	"	20'-0"	"	13.36	26.7
J22	5	"	20'-3"	"	13.53	67.7
J23	2	"	1'-6"	"	1.00	2.0
J24	2	"	4'-10"	"	3.23	6.5
J25	2	"	5'-6"	"	3.67	7.3
J26	13	"	6'-6"	"	5.68	73.8
J27	6	"	6'-0"	5'-6" | 6"	4.01	24.1
J28	13	"	9'-2"	8'-6"	6.12	79.6
J29	2	"	8'-3"	7'-7"	5.51	11.0
J30	2	"	6'-3"	5'-7"	4.17	8.3
J31	2	"	4'-6"	3'-7"	2.84	5.7
J32	2	"	2'-3"	1'-7"	1.50	3.0
J33	19	"	5'-6"	4'-6" | 6"	3.67	69.7
J34	2	"	7'-6"	Straight	5.01	10.0
				TOTAL		1042#

BY	DATE	CHARACTER REVISIONS
FBP	1-17-41	Minor revisions.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
MASONRY & REINFORCING DETAILS
DISCHARGE HEADWALL

SHEET 14 OF 108 SHEETS — SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [redacted] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [redacted] CHIEF, DESIGN BRANCH — APPROVED: [redacted] DISTRICT ENGINEER

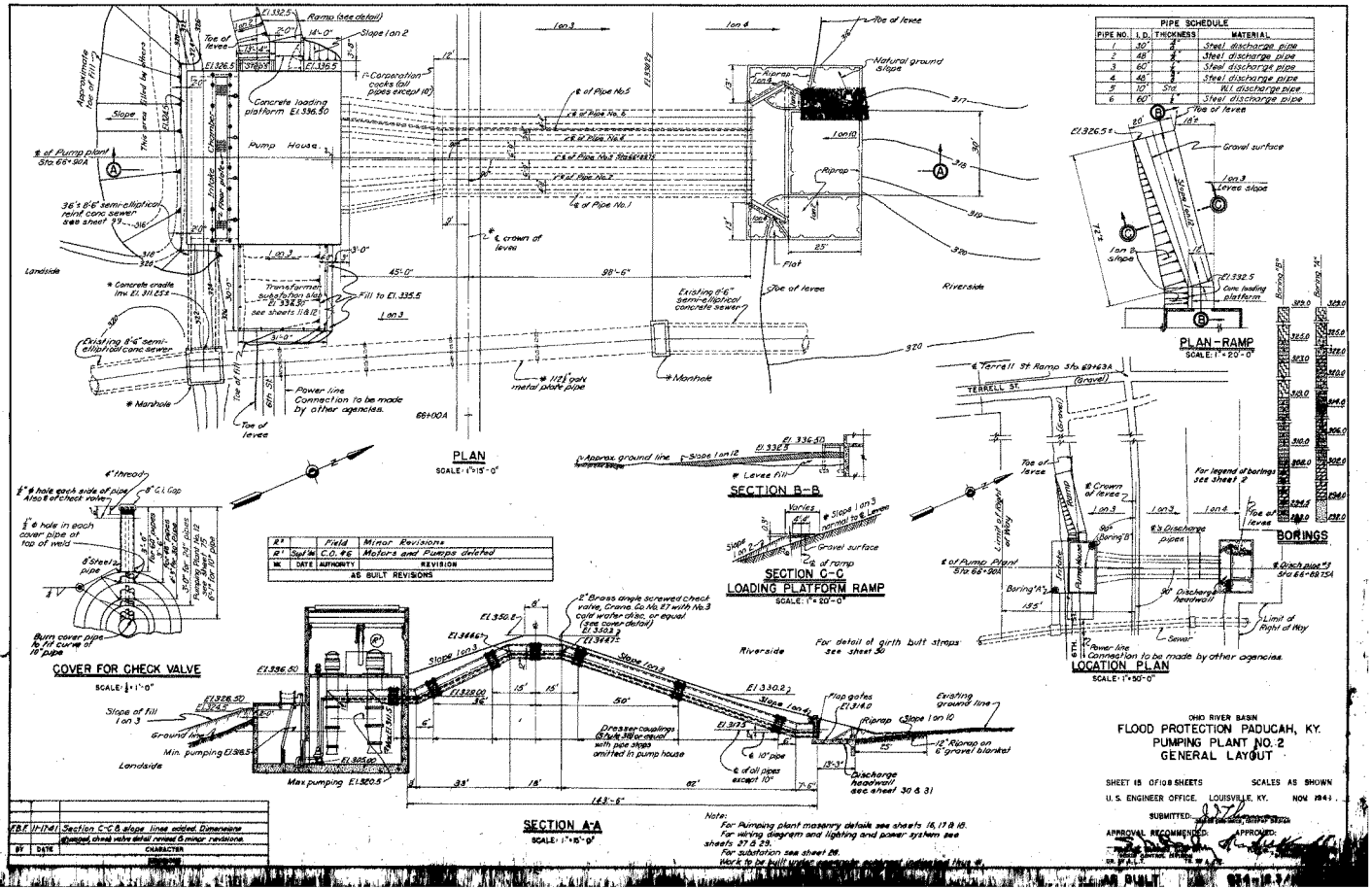
DR. BY G.R.G. — TR. BY F.B.P. — CK. BY G.E.P.

AS BUILT — 834-12.3-14

879

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PIPE SCHEDULE			
PIPE NO.	I. D.	THICKNESS	MATERIAL
1	30"	3/8"	Steel discharge pipe
2	48"	3/8"	Steel discharge pipe
3	60"	3/8"	Steel discharge pipe
4	48"	3/8"	Steel discharge pipe
5	10"	Std.	W.I. discharge pipe
6	60"	3/8"	Steel discharge pipe

NO.	DATE	AUTHORITY	REVISION
2"		Field	Minor Revisions
2"	Sept '44	C.O. #6	Motors and Pumps deleted

AS BUILT REVISIONS

BY	DATE	CHARACTER
FBF	1-17-41	Section C-C & slope lines added. Dimensions
		Changed shed valve detail revised & minor revisions.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

GENERAL LAYOUT

SHEET 15 OF 108 SHEETS — SCALES AS SHOWN

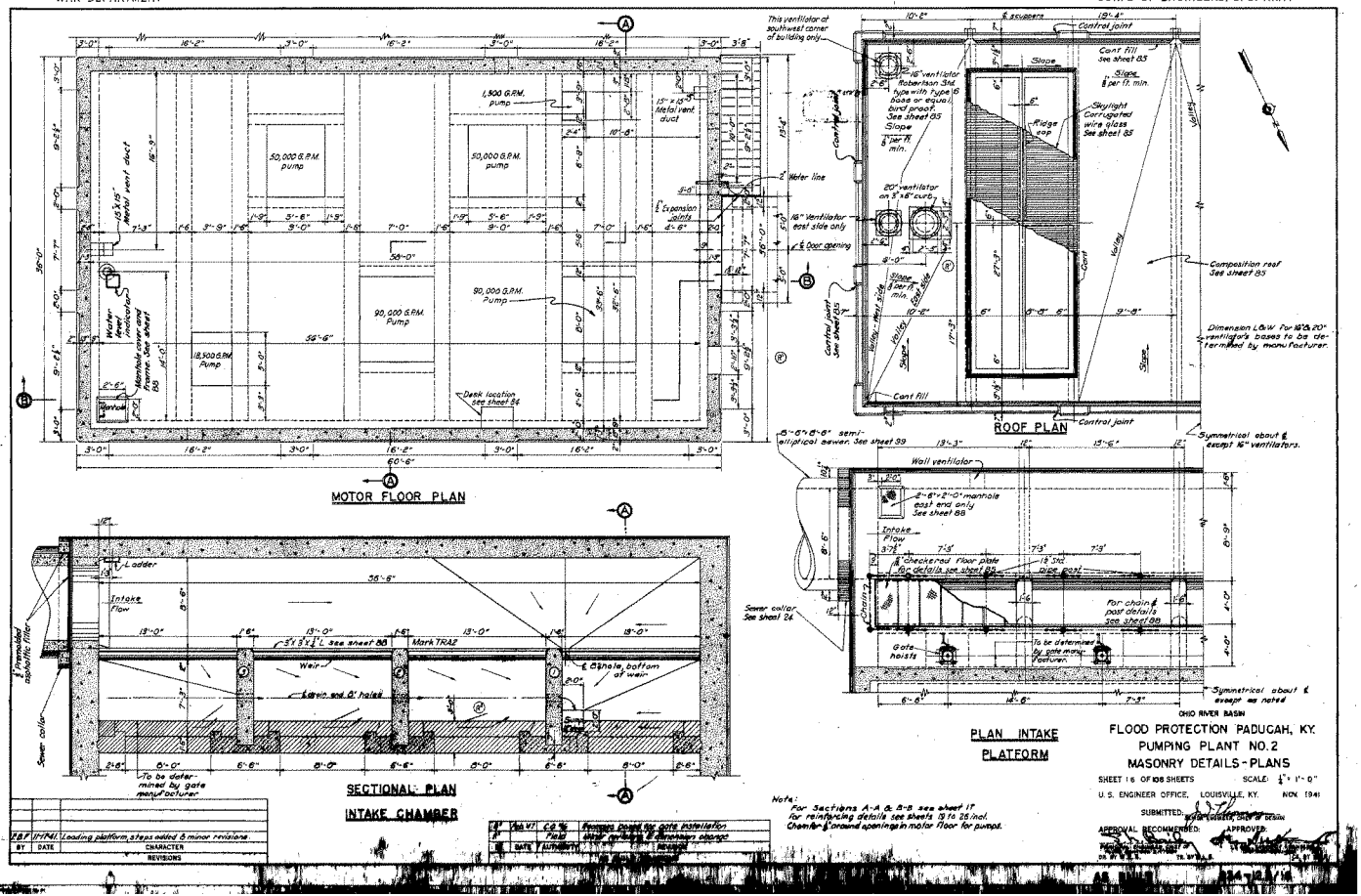
U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [illegible] Corps of Engrs.

APPROVAL RECOMMENDED: [illegible] — APPROVED: [illegible]

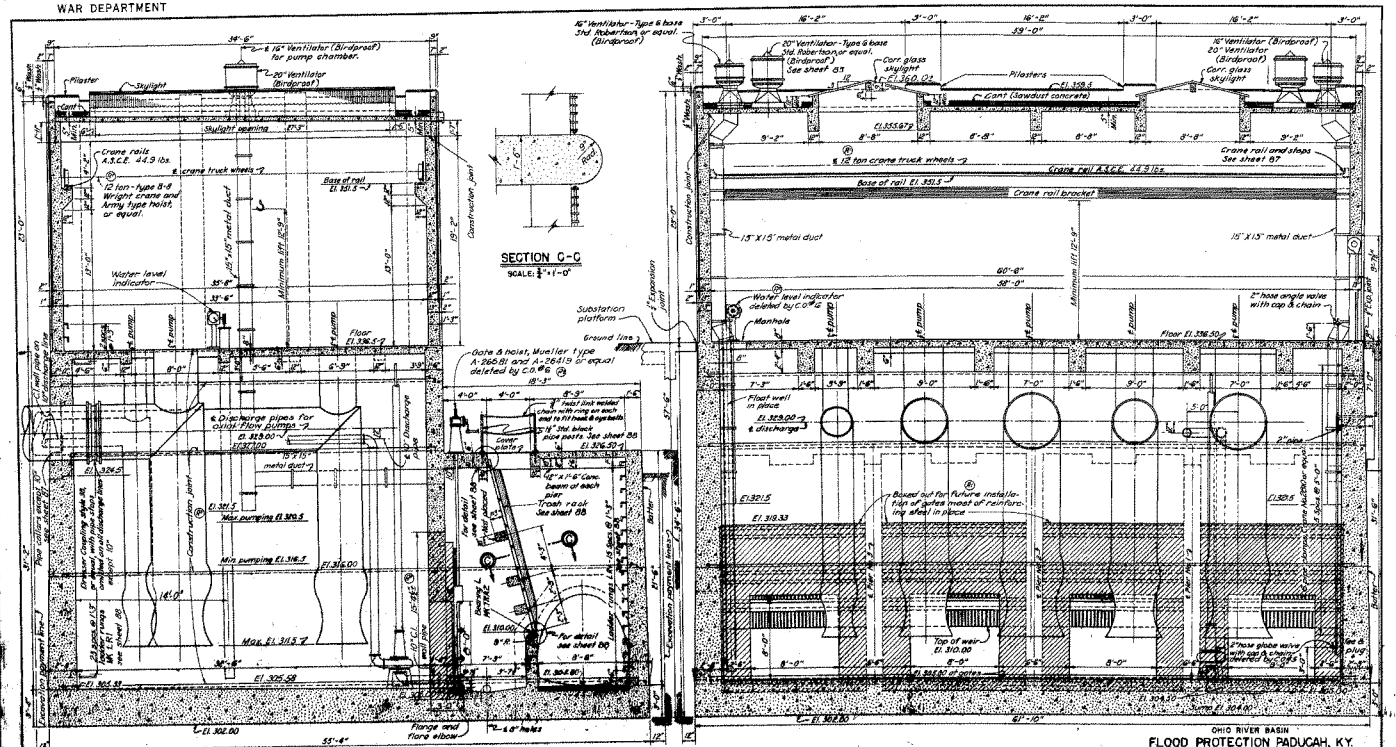
AS BUILT

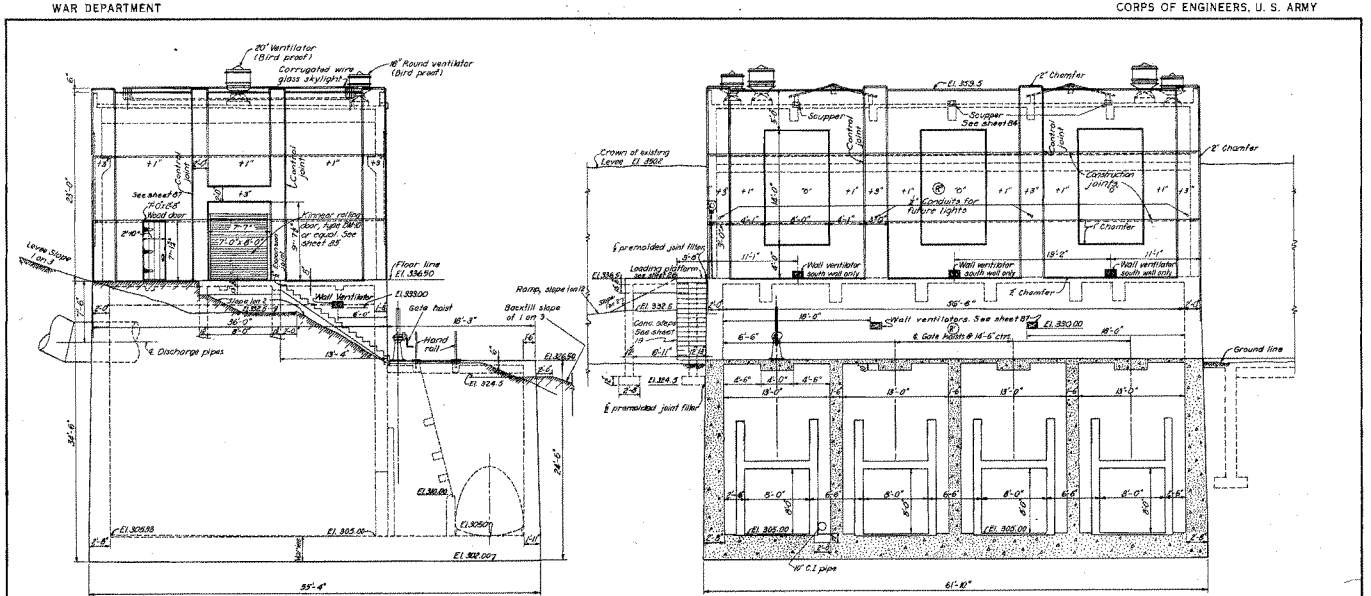
088


MOTOR FLOOR PLAN
ROOF PLAN
SECTIONAL PLAN
INTAKE CHAMBER
PLAN INTAKE
PLATFORM
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
MASONRY DETAILS - PLANS
SHEET 16 OF 108 SHEETS
SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
Note:
For Sections A-A & B-B see sheet 17
For reinforcing details see sheets 13 to 26 incl.
Chamfer & round openings in motor floor for pumps.
7-8-47 Loading platform steps added & minor revisions
BY DATE CHARACTER
REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



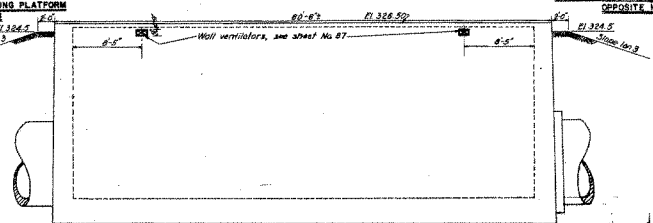


WEST ELEVATION

EAST ELEVATION OPPOSITE HAND
OMIT DOORS, LOADING PLATFORM AND STEPS

SECTIONAL ELEVATION SOUTH WALL

NORTH ELEVATION SUPERSTRUCTURE OPPOSITE HAND



ELEVATION — SOUTH WALL INTAKE CHAMBER

Note: The outside face of 12" concrete wall is used as 0" surface. Other surfaces projecting out are shown thus (+).

R²		Field	Minor revisions
R¹	7-9-46	CO ⁴⁶G	Gates and equipment deleted
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISION

FBF	11-17-41	Ground line & backfill revised, intake chamber elevation, platform & steps added & minor revisions.
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
MASONRY DETAILS — ELEVATIONS

SHEET 18 OF 108 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. . . . NOV. 1941

SUBMITTED: [signature] Senior Engineer, Civil & Design

APPROVAL RECOMMENDED: [signature] Principal Civil Engineer, Civil Design

APPROVED: [signature] Supervisory Engineer

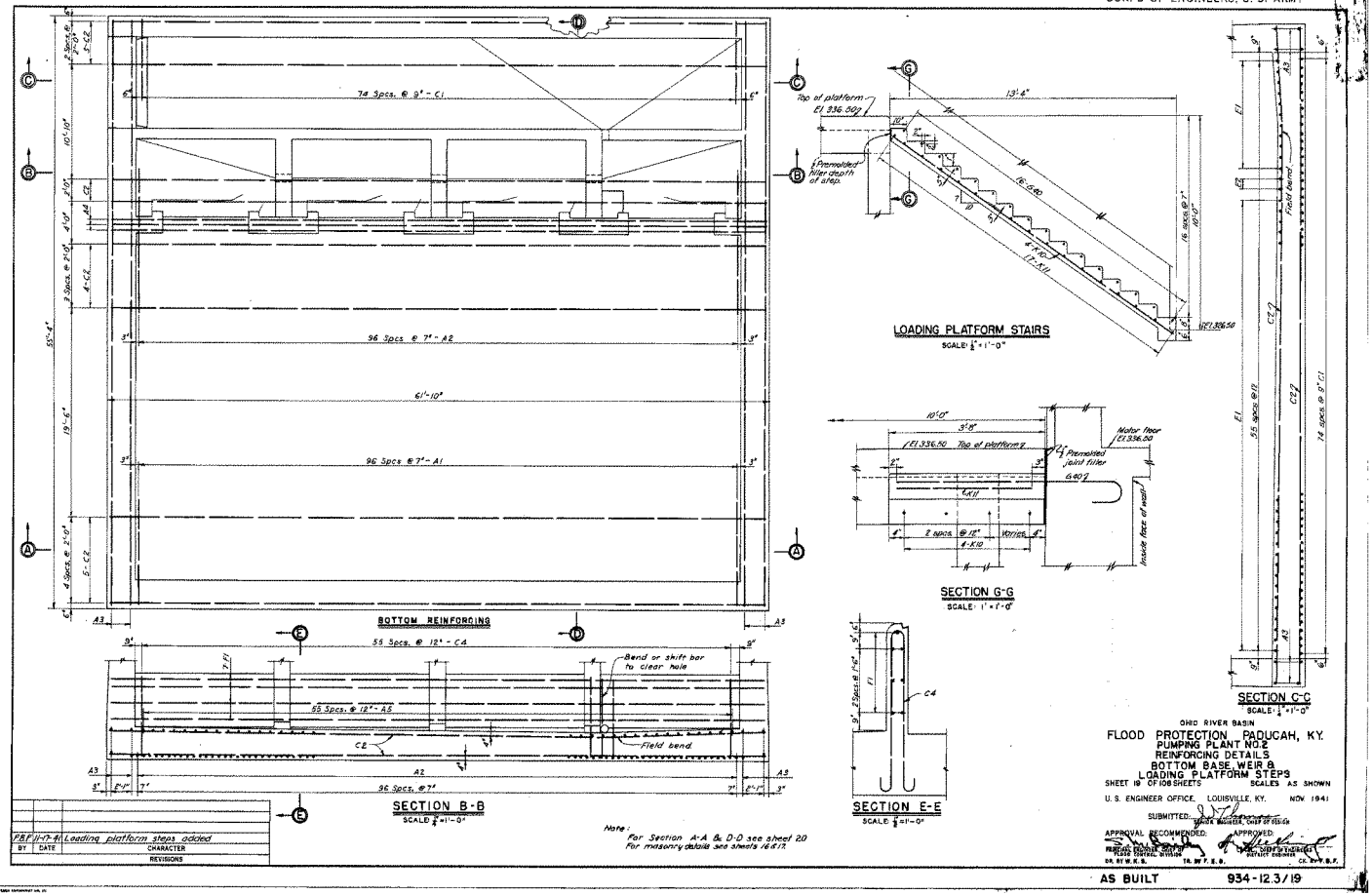
AS BUILT 834-12.3/18

122

883

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

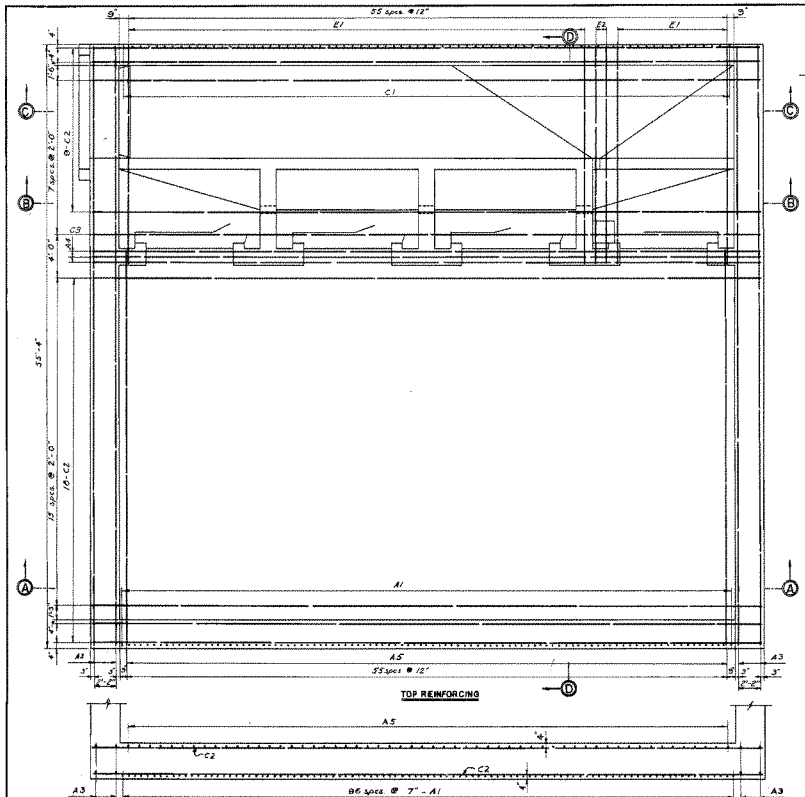


884

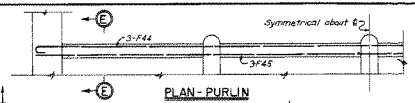
123

WAR DEPARTMENT

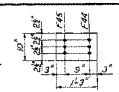
CORPS OF ENGINEERS, U. S. ARMY



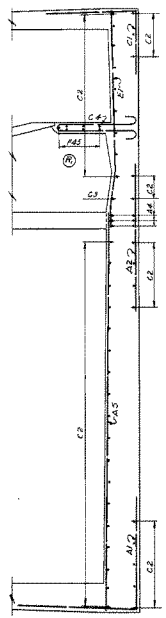
SECTION A-A



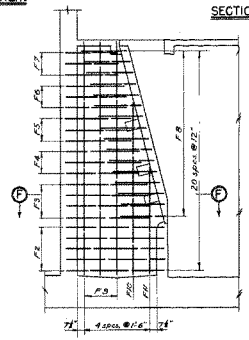
PLAN - PURLIN



SECTION E-E

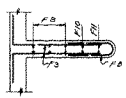


SECTION D-D



PIER REINFORCING

3 required



SECTION F-F

F.E.E. 11-17-41	Purlin reinforcing added	
BY	DATE	CHARACTER
		REVISIONS

Note:
For section BB & C-C see sheet 13
For masonry details see sheets 16 & 17

R.		Field	Minor revision
NK	DATE	AUTHORITY	REVISION
			AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

REINFORCING DETAILS - BASE, TOP REINFORCING & PIERS

SHEET 20 OF 108 SHEETS

SCALE: ¼"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] SENIOR ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH, FLOOD CONTROL DIVISION

APPROVED: [illegible] CHIEF, DIVISION OF ENGINEERING, DISTRICT ENGINEER

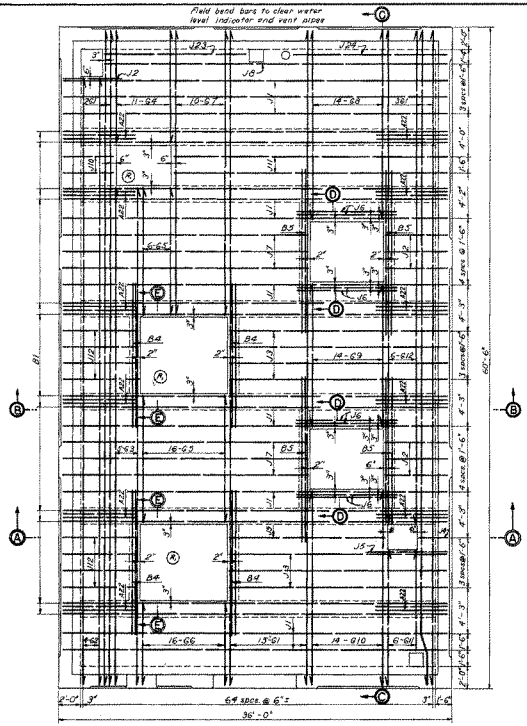
DR. BY W.K.S. TR. BY P.H.S. CK. BY P.B.F.

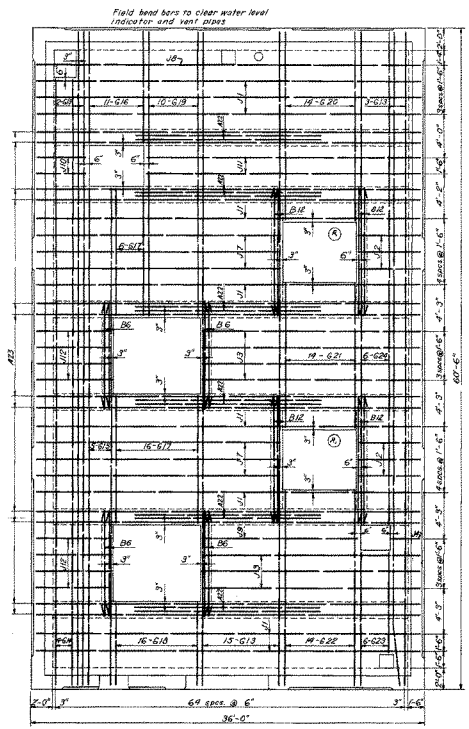
AS BUILT

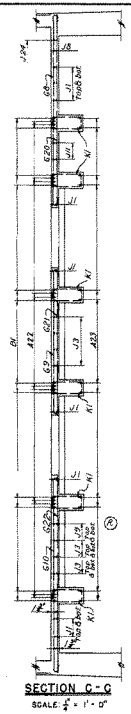
934-12.3/20

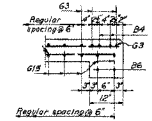
124

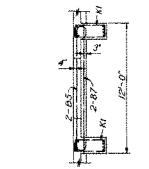
885

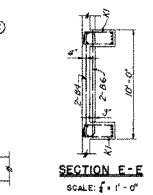


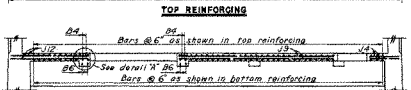












PLAN
SCALE: 1/4" = 1'-0"

SECTION A-A
SCALE: 1/4" = 1'-0"

Note:
For masonry details see sheets 16 & 17

BEAM-ELEVATION B-B
SCALE: 1/4" = 1'-0"

F.B.F.	11-13-41	Minor revisions, Reinf. bars in beam changed		Field	Minor revisions
BY	DATE	CHARACTER	No.	DATE	AUTHORITY	REVISION
REVISIONS			AS BUILT REVISIONS			

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

REINFORCING DETAILS - MOTOR FLOOR

SHEET 21 OF 108 SHEETS — SCALE: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE KY. — NOV. 1941

SUBMITTED: 12/5/41 — Senior Engineer, Chief of Design

APPROVAL RECOMMENDED: — APPROVED:

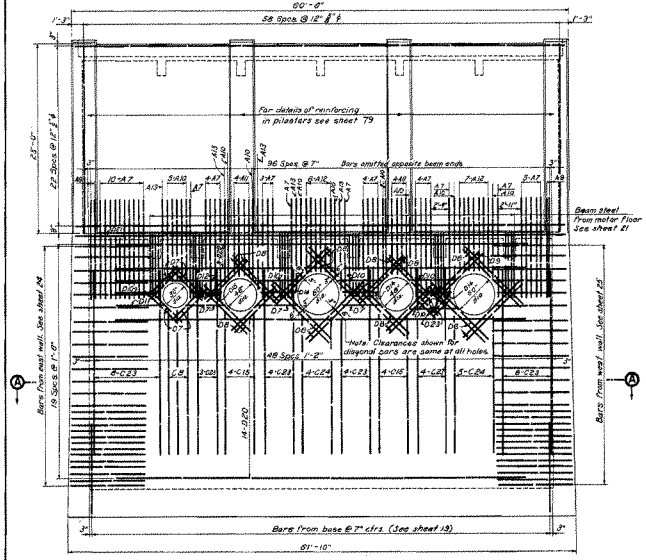
Principal Engineer, Chief of Flood Control Division — Colonel, Corps of Engineers, District Engineer

DR. BY W.K.B. — TR. BY C.B.D. — CK. BY F.B.F.

AS BUILT — 934-12.3/21

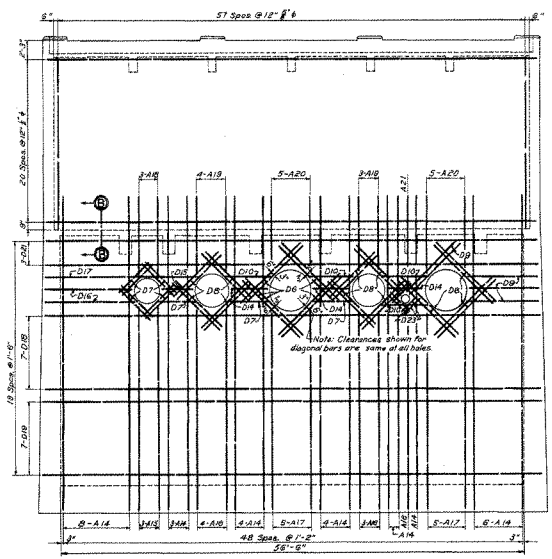
125

988



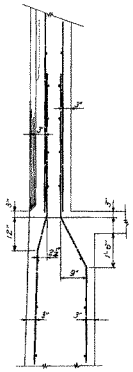
NEAR SIDE REINFORCING

SCALE: 1/16"=1'-0"



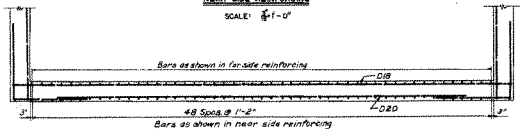
FAR SIDE REINFORCING

SCALE: 1/16"=1'-0"



SECTION B-B

SCALE: 1/4"=1'-0"



SECTION A-A

SCALE: 1/16"=1'-0"

Note:
For masonry details see sheets 16, 17 and 18.

BY	DATE	CHARACTER REVISIONS
F.B.F.	1/11/41	Note added & minor corrections

OHIO RIVER

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

REINFORCING DETAILS

NORTH WALL

SHEET 22 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

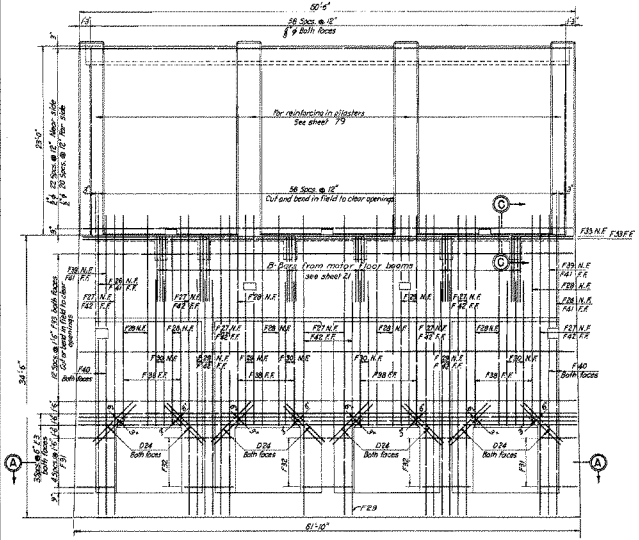
SUBMITTED: [signature] SENIOR ENGINEER, DIVISION OF DESIGN

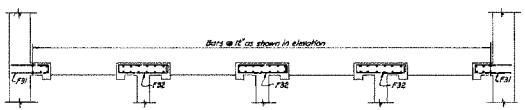
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, DIVISION OF FLOOD CONTROL DIVISION — DR. BY W.K.S. TR. BY E.R.S.

APPROVED: [signature] CHIEF OF DIVISION OF DESIGN — DR. BY F.B.F.

AS BUILT

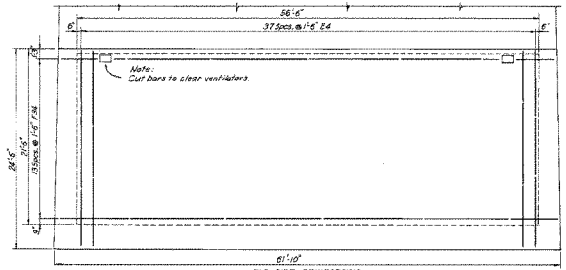
934-12.3/22





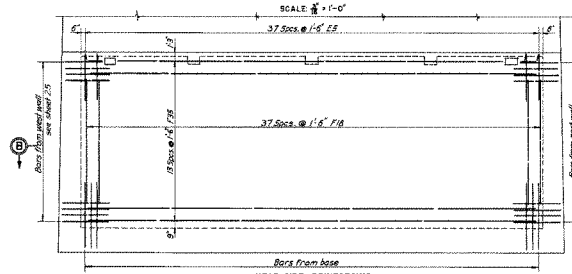
SECTION A-A

SCALE: 1/16" = 1'-0"



FAR SIDE REINFORCING

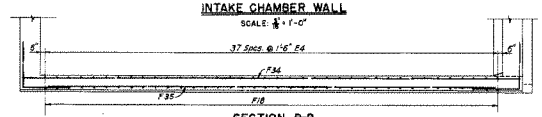
SCALE: 1/16" = 1'-0"



NEAR SIDE REINFORCING

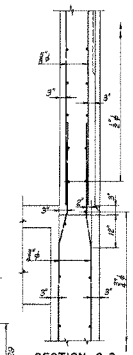
INTAKE CHAMBER WALL

SCALE: 1/16" = 1'-0"



SECTION B-B

SCALE: 1/16" = 1'-0"



SECTION C-C

SCALE: 1/16" = 1'-0"

Note:
For masonry details see sheets 16, 17 & 18.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

REINFORCING DETAILS

SOUTH WALL & INTAKE CHAMBER WALL

SHEET 23 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: CHIEF DESIGNER

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

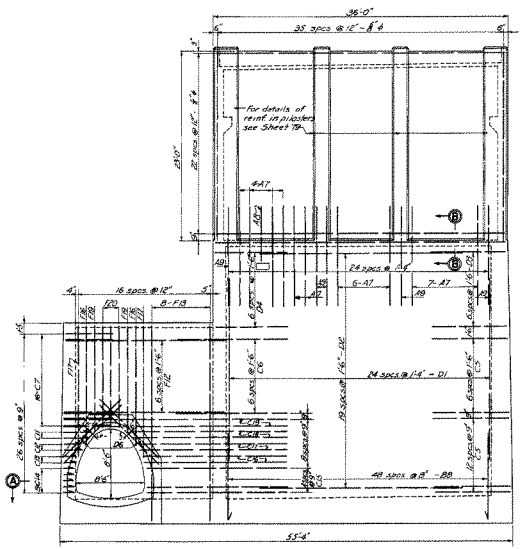
APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

BY	DATE	CHARACTER REVISIONS
F.B.F.	11-17-41	Minor revisions.

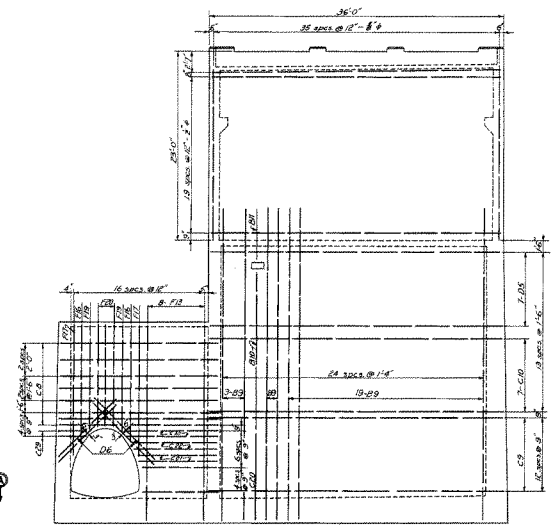
AS BUILT 934-123/23

888

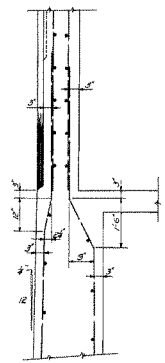
12.7



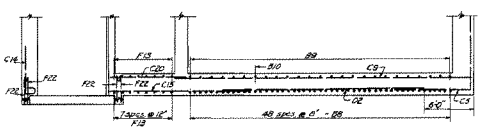
NEAR SIDE REINFORCING
SCALE: 1/16" = 1'-0"



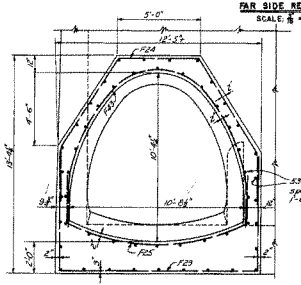
FAR SIDE REINFORCING
SCALE: 1/16" = 1'-0"



SECTION B-B
SCALE: 1/4" = 1'-0"



SECTION A-A
SCALE: 1/16" = 1'-0"



8'-6" SEWER COLLAR REINFORCING
SCALE: 1/4" = 1'-0"

Note:
For masonry details see sheets 16, 17 & 18

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
EAST WALL

SHEET 24 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: J. H. Hall, Assistant Engineer, Chief of Design

APPROVAL RECOMMENDED: Frank Tarzwell, Principal Engineer, Flood Control Division — Dr. BY: W. K. S.

APPROVED: C. H. Ketchum, Lt. Colonel, Corps of Engineers, District Engineer — Yr. BY: P.C. E.E. — CK. BY: F.B.F.

BY	DATE	CHARACTER	REVISIONS
T.B.F.	11/7/41	Minor revisions.	

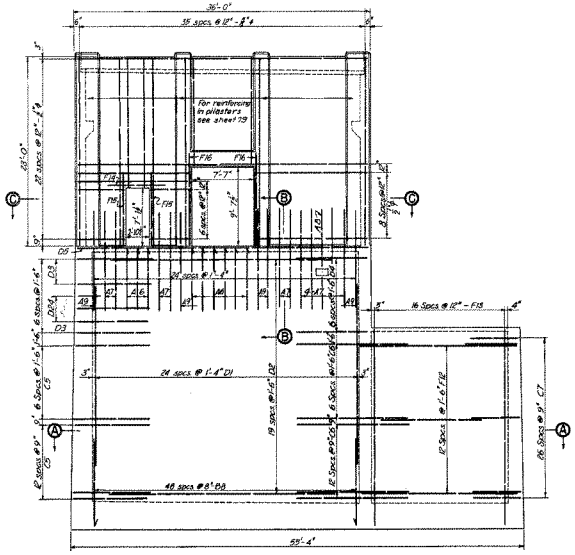
MK	DATE	AUTHORITY	REVISION
		Field	Minor revision.

AS BUILT REVISIONS

AS BUILT 934-12.3/24

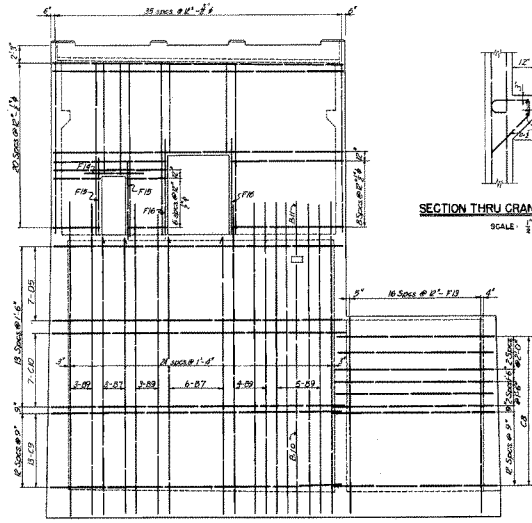
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



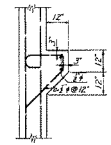
NEAR SIDE REINFORCING

SCALE 1/4" = 1'-0"



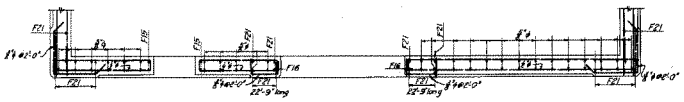
FAR SIDE REINFORCING

SCALE 1/4" = 1'-0"



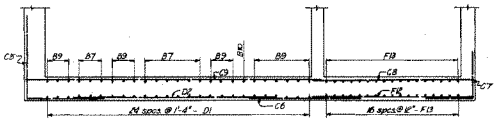
SECTION THRU CRANE RAIL SUPPORT

SCALE 1/2" = 1'-0"



SECTION C-C

SCALE 1/4" = 1'-0"



SECTION A-A

SCALE 1/4" = 1'-0"

Note:
For section B-B, see sheet 24.
For masonry details see sheets 16, 17 and 18.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

REINFORCING DETAILS

WEST WALL

SHEET 25 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: Chief, Design Section

APPROVAL RECOMMENDED: Chief, Design Section

APPROVED: Lt. Colonel, Corps of Engineers, District Engineer

DR. BY M.K.S. TR. BY F.H.S. CK. BY E.K.

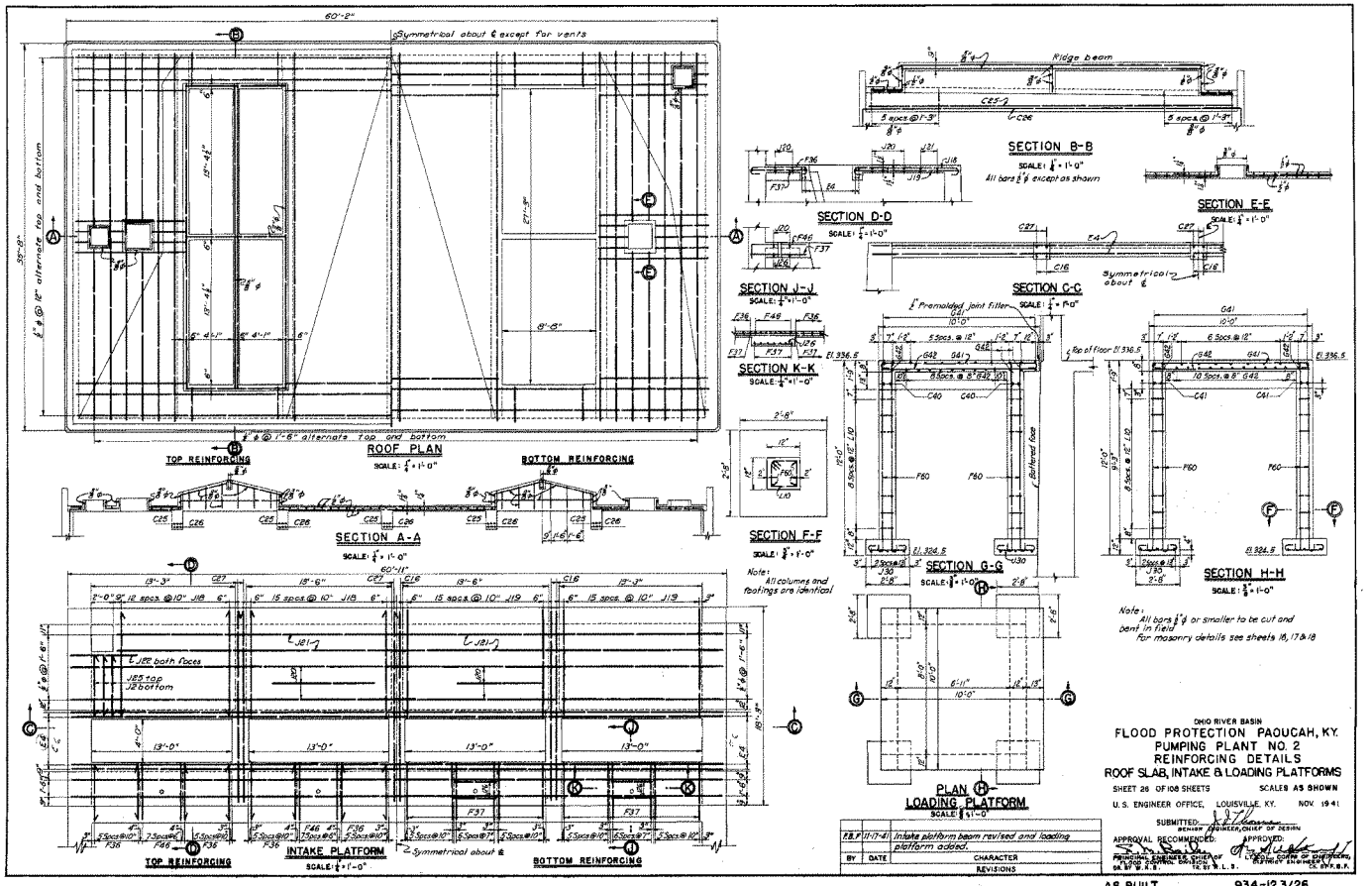
BY	DATE	CHARACTER
F.B.K.	11-17-41	Substructure vents relocated

REVISIONS

AS BUILT

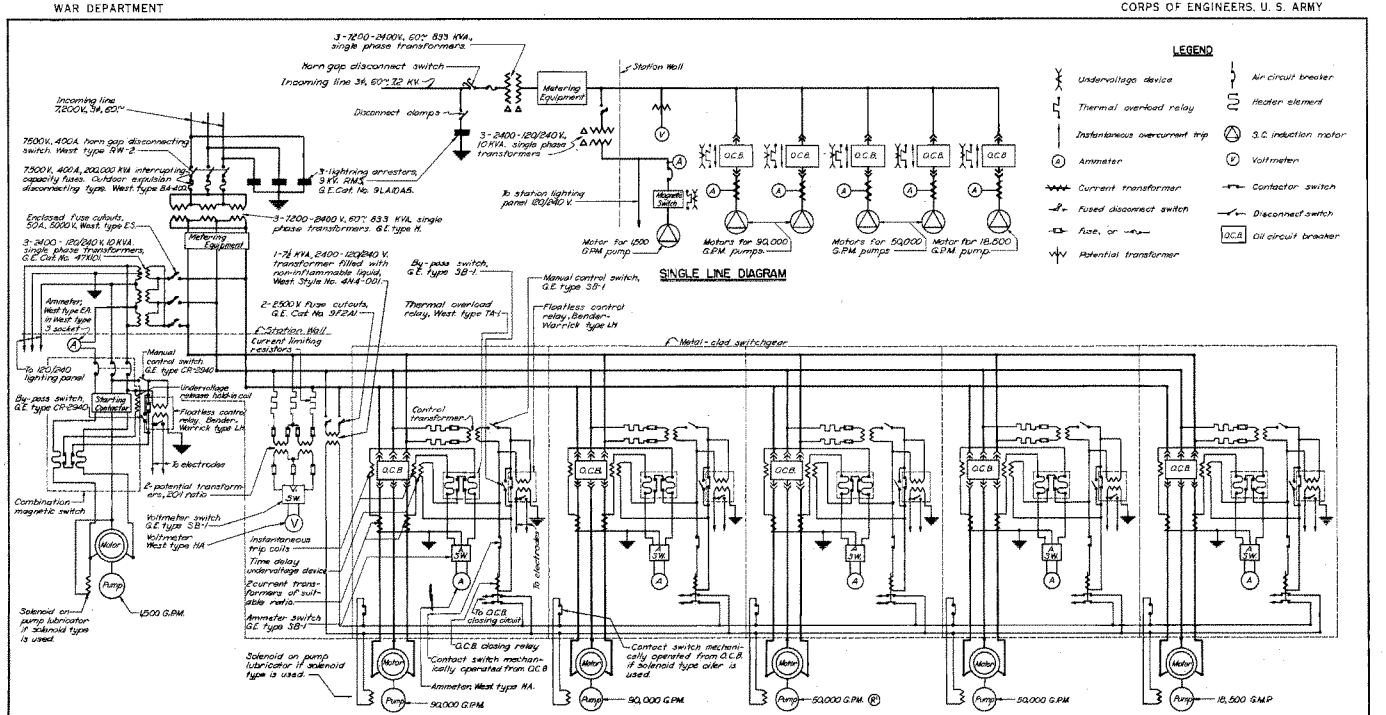
934-12.3/25

068


ROOF PLAN
SCALE: 1/8" = 1'-0"
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
SCALE: 1/8" = 1'-0"
INTAKE PLATFORM
SCALE: 1/8" = 1'-0"
Symmetrical about ℄
SECTION B-B
SCALE: 1/8" = 1'-0"
All bars 5/8"ϕ except as shown
SECTION C-C
SCALE: 1/8" = 1'-0"
SECTION D-D
SECTION E-E
SECTION F-F
Note: All columns and footings are identical
SECTION G-G
SECTION H-H
Note: All bars 5/8"ϕ or smaller to be cut and bent in field
For masonry details see sheets 16, 17 & 18
PLAN
LOADING PLATFORM
SCALE: 1/8" = 1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
ROOF SLAB, INTAKE & LOADING PLATFORMS
SHEET 26 OF 108 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
DESIGN ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED:
PRINCIPAL ENGINEER, CHIEF OF DESIGN
APPROVED:
CHIEF, CORPS OF ENGINEERS, DEPUTY CHIEF ENGINEER
REVISIONS
BY
DATE
CHARACTER
AS BUILT
934-12.3/26

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SINGLE LINE DIAGRAM

(R) Note:
A 220 volt, 3-phase circuit shall be run from the secondary circuit of the 2400-120/240 volt power transformers, along the outside of the pump house, to the deleted electric motor-operated gate hoists on the intake chamber.

Notes:
The electrically operated motor control oil circuit breakers to be 1200 T, 600A., 50,000 KVA. interrupting capacity with thermal overload relays, time delay undervoltage, and instantaneous short circuit trips. They shall be of metal-clad construction, G.E. type FK143, West. type F-184.
The motor control combination magnetic switch to be equipped with air circuit breaker and with thermal overload and undervoltage trips. Starter and breaker to be of capacity to suit motor and to be similar and equal to G.E. Type CR 7003, 220 V. in type 2 dust tight case.
All equipment shall be of manufacture, type, and catalog number specified, or its equal.

BY	DATE	CHARACTER
D.S.	11/27/41	Minor revisions
D.S.	1/5/41	Rating of power transformers changed from 6900-2400 V. to 7200-2400 V.

REVISIONS

NO.	DATE	AUTHORITY	
R'		Field	Note added
R	Sept 44	C.O. 4-8	All Pumps, Motors & Electrically Operated Hoists Deleted

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

WIRING DIAGRAM

SHEET 27 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

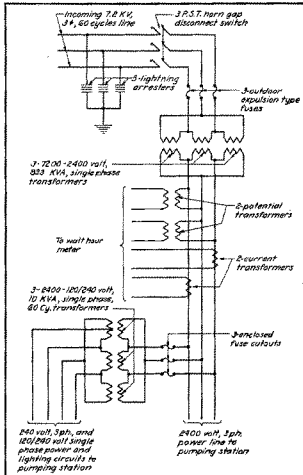
SUBMITTED: [illegible] CHIEF ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF OF DESIGN — APPROVED: [illegible] CHIEF ENGINEER

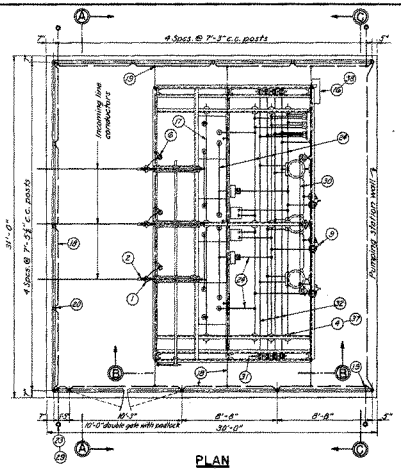
DR. BY D.S. — TR. BY G.R.S. — CK. BY G.R.

AS BUILT

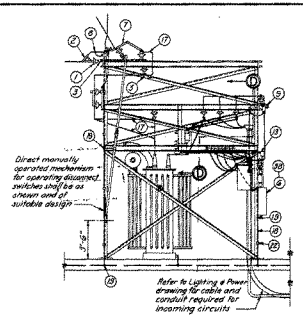
934-12.3/27



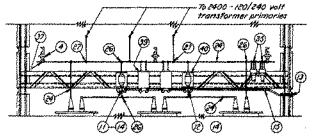
WIRING DIAGRAM



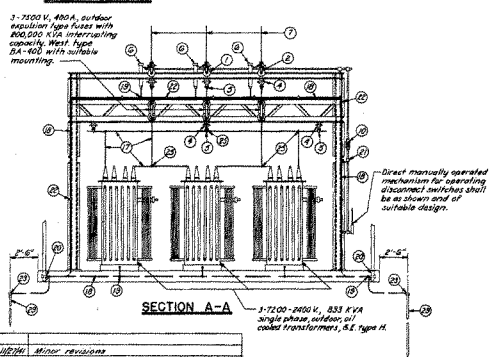
PLAN



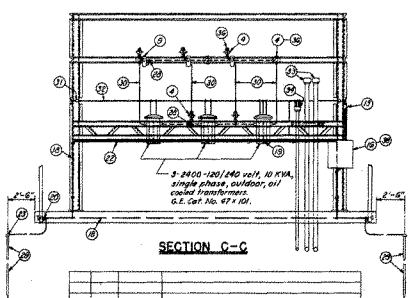
SECTION B-B



SECTION D-D



SECTION A-A



SECTION C-C

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	6" strain insulators	Locke	16383	3
2	Strain clamps	Locke	12926	3
3	Hooks	Locke	2563	3
4	Insulator units	G.E.	60089JUP1	23
5	Bus supports	G.E.	60960G6U1	8
6	Lightning arresters	G.E.	9LA10A5	3
7	3 P.S.T. horn gap disconnect switch, 7200 V, 400A	West.	Type RW-2	1
8	Disconnecting clamp	G.E.	60P14596-2	3
9	Enclosed fuse cutouts, 5000 V, 50 A.	West.	Type E3	3
10	Operating rod insulator	Lapp	6593	1
11	Conduiet outlet	Crouse-Hinds	E37	1
12	Conduiet outlet	Crouse-Hinds	C37	3
13	Conduiet outlet	Crouse-Hinds	LB37	2
14	2-hole composition cover	Crouse-Hinds	3772	4
15	1" rigid electrical conduit			30'±
16	Meter box	Superior	FSU-2730	1
17	¾" Std. iron pipe size copper tubing			100'±
18	#210 bare stranded copper cable			250'±
19	"T" connector for #210 stranded cable	Burndy	HT12626	21±
20	Connector for #210 cable and fence posts	Burndy	Type GD	15
21	Connector for #210 cable and ½" pipe	Burndy	GD1624	1
22	Connector for #210 cable to structural framework	Burndy	GB26	838
23	Connector for #210 cable to ¾" ground rod	Burndy	GRE4626	4
24	1" Std. iron pipe size copper tubing			110'±
25	"T" connector for ¾" iron pipe size copper tubing	G.E.	60D34210J	5
26	"T" connector for 1" iron pipe size copper tubing	G.E.	60D34410P	6
27	"T" connector for 1" iron pipe size tubing to #210 solid wire	G.E.	60D34210S8	3
28	"T" connector for #210 bare copper wire	G.E.	60D34210D3	3
29	Ground rod, ¾" x 8'	Copperweld		4
30	#210 hard drawn bare copper wire			70'±
31	Secondary rack	Joslyn	J1170	2
32	#6 AWG bare solid copper wire			125'±
33	3" service entrance fitting	Crouse-Hinds	F963	3
34	1" service entrance fitting	Crouse-Hinds	F384	1
35	"T" connector for 1" iron pipe size tubing to 350 MCM cable	G.E.	60D34210B8	9
36	Bus supports	G.E.	60960G6U1	8
37	Bus supports	G.E.	60960G6U1	9
38	Watthour meter	G.E.	77X305	1
39	Potential transformer	G.E.	70X182	2
40	Current transformer, 1000/5A	G.E.	94X518	2

Notes:

Figures in circles refer to part numbers on the bill of material.

All material shall be of the manufacture, type and catalog number specified, or its equal.

Small fittings, electric power connections, wire, etc, not called for, shall be furnished as required.

A 230 volt, 3 phase circuit shall be run from the secondary circuit of the 2400 - 120/240 volt power transformer, along the outside of the pumphouse to the electric motor-operated gate hoists on the intake chamber. The circuit shall be provided with suitable outlets for connections to the hoists motors.

BY	DATE	CHARACTER
D.S.	11/27/41	Minor revisions
D.S.	11/27/41	Ratings of power transformers changed from 6900-2300 V. to 7200-2400 V.

REVISIONS

NO.	DATE	AUTHORITY	REVISION
A		Field	Bill of material changed, note added

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

SUBSTATION

SHEET 28 OF 108 SHEETS SCALE: ¼" = 1'-0"

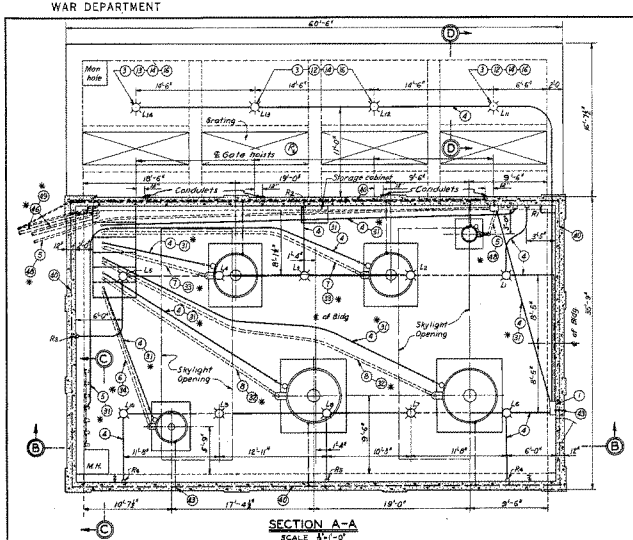
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: J. J. Thomson, DESIGN ENGINEER, CHIEF OF DESIGN

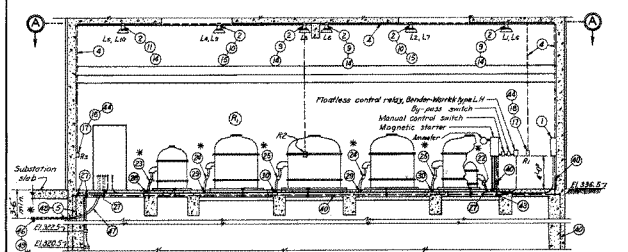
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF DESIGN, DESIGN DIVISION, DR. BY C.E.E. TR. BY M.M.L.

APPROVED: LT. COLONEL ENGINEER, DISTRICT ENGINEER, CR. M. D.S.

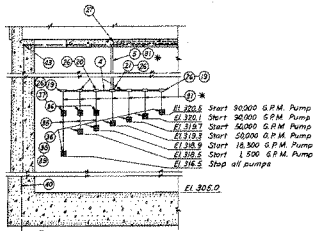
AS BUILT 934-12.3/28



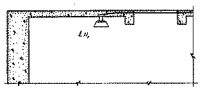
SECTION A-A
SCALE 1/8"=1'-0"



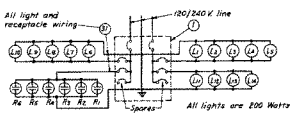
SECTION B-B
SCALE 1/8"=1'-0"



SECTION C-C
SCALE 1/8"=1'-0"



SECTION D-D
SCALE 1/8"=1'-0"



WIRING DIAGRAM, LIGHTING CIRCUITS

LEGEND

Embedded Conduit
Exposed Conduit
Ground Wire

Notes:

Figures in circles refer to Part No. in Bill of Material

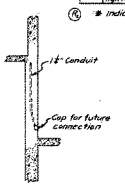
All material shall be of the manufacture, type, and catalog number specified or its equal.

All conduit to clear opening for pump removal.

Small fittings, conduits, etc., not listed shall be furnished as required.

All conduit in floor shall be placed as near the center of same as possible.

200 watt bulbs shall be furnished and installed in all lights



BILL OF MATERIAL

	PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY
	1	Line distribution panel (surface type) 115/230 V. 6 circuit			1
	2	R.L.M. dome reflector and socket	West.	349 S 73	10
	3	Vapartite conduit with reflector and socket	Crouse-Hinds	VMDA1959	4
	4	¾" rigid electrical conduit			700'±
	5	1" " " "			103'±
	6	1¼" " " "			29'±
	7	1½" " " "			62'±
	8	2" " " "			86'±
	9	Conduit outlet	Crouse-Hinds	SKT 12	4
	10	" "	" "	GIS 1	4
	11	" "	" "	SKL 12	2
	12	" "	" "	SKC-12	3
	13	" "	" "	SK-12	1
	14	Conduit cover	" "	SK-84	10
	15	" "	" "	H-516	4
	16	Cover gasket	" "	Gask 208	4
	17	Conduit outlet	" "	FS 1	6
	18	Duplex plug receptacle			6
	19	Conduit outlet	Crouse-Hinds	E17	2
	20	" "	" "	C17	4
	21	" "	" "	TB 187	1
	22*	1" Erickson coupling			1
	23*	1¼" " "			1
	24*	1½" " "			2
	25*	2" " "			2
	26	Conduit cover	Crouse-Hinds	1771	7
	27	1" Standard 90° elbow			4
	28	1¼" " " "			2
	29	1½" " " "			4
	30	2" " " "			4
	31*	#12 A.W.G. insulated copper wire			1820'±
(R)	32*	#3/0, 1 cond. cable, R.C., 3000 V. ins. with 60% rubber jacket			260'±
	33*	#2, 1 " " " " " " "			185'±
	34*	#6, 1 " " " " " " "			75'±
	35	#6, H.D. bare copper wire			10'±
	36	3" bolt circle type insulators	Loop	13761	10
	37	Bus support fitting, drill to clamp #6 bare solid wire	Locke	9853	3
	38	Bus support fitting, drill to clamp ¾" electrode	"	9853	7
	39	Electrode (See Part No. 25 sheet			7
	40	#2/0 bare copper stranded cable			410'±
	41	¾"x8' copperweld ground rod			4
	42	Connector for #2/0 ground cable to ¾"x rod	Burndy	GA 6426	4
	43	"Y" connector for #2/0 ground cable	"	NT 2626	13
	44	Duplex surface plates			6
	45				
	46	3½" rigid electrical conduit			85'±
	47	Special long radius 90° elbow, 3½"x142" radius	G.E.		6
(R)	48*	#8, A.W.G. 1 cond. cable, R.C. 600V. ins. with 60% rubber jacket			235'±
	49*	350 MCM, 1 cond. cable, R.C., 3000V. ins. with 60% rubber jacket			170'±
	27A	Spec. long rad. 90° Elbow 1" x 12" rad.			4
		8 Weatherproof 200 w. R.L.M. lights with guard & hooks. Connect lights to spare circuits in lighting distribution on panel.			

(R) * Indicates items deleted

BY	DATE	CHARACTER	REVISIONS
D.S.	(8/14)	Ammeter added to magnetic starters	

BY	DATE	AUTHORITY	REVISION
R₂	Feb 41	C.O. #7	Materials deleted & minor changes
R₁	Sept 40	C.O. #6	Pumps & motors deleted

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
LIGHTING & POWER SYSTEMS

SHEET 29 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [illegible] — ASST. ENGINEER, CHIEF OF DESIGN

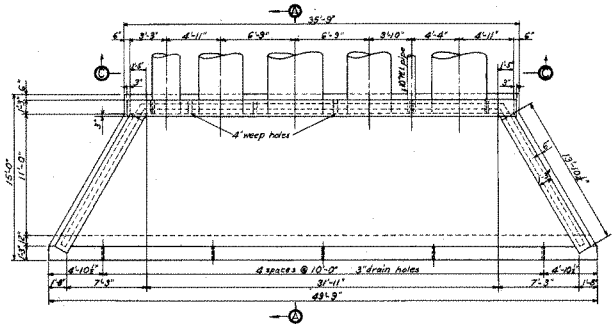
APPROVAL RECOMMENDED: [illegible] — PRINCIPAL CONSTRUCTION CHIEF ELECTRICAL ENGINEER

APPROVED: [illegible] — CHIEF, CORPS OF ENGINEERS DISTRICT ENGINEER

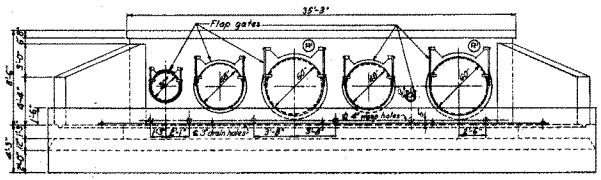
DR. BY S.B. — TR. BY S.C.B. — CK. BY D.S.

AS BUILT — 934-12.3/29

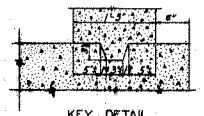
894



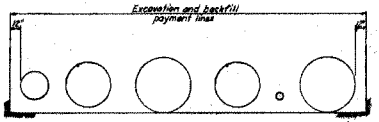
PLAN
SCALE: 1/4" = 1'-0"



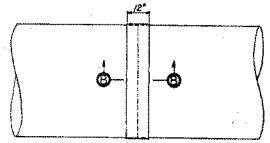
ELEVATION
SCALE: 1/4" = 1'-0"



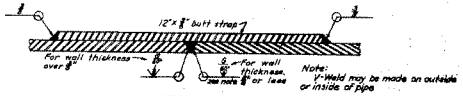
KEY DETAIL
SCALE: 1 1/2" = 1'-0"



SECTION C-C
SCALE: 1/4" = 1'-0"

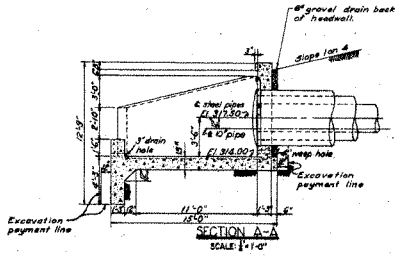


PLAN
SCALE: 1/4" = 1'-0"



SECTION B-B

PIPE JOINT
SCALE: HALF SIZE



SECTION A-A
SCALE: 1/4" = 1'-0"

Note: For reinforcing details see sheet 39

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
MASONRY DETAILS
DISCHARGE HEADWALL

SHEET 30 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAR 1941

SUBMITTED: CHIEF ENGINEER, CORPS OF ENGINEERS

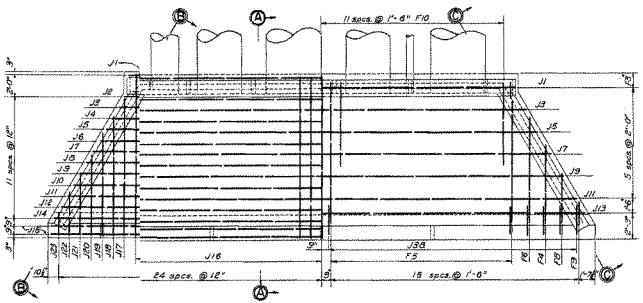
APPROVAL RECOMMENDED: APPROVED

1	10-8-41	Minor revisions
No.	DATE	CHARACTER OF REVISION

2	10-8-41	Cp. "A"	60" Corr. Metal Conc. Concrete changed to Steel modification of action

WAR DEPARTMENT

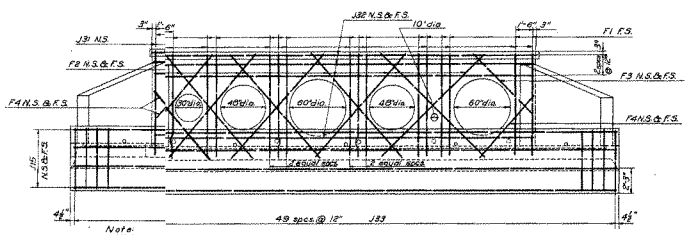
CORPS OF ENGINEERS, U. S. ARMY



TOP REINFORCING

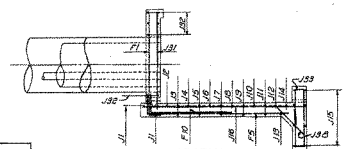
BOTTOM REINFORCING

PLAN



Note:
All bars next to pipes are to clear pipes by 3".

ELEVATION



SECTION A-A

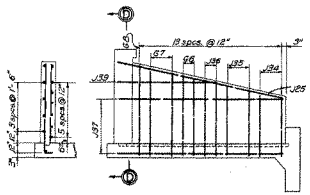
REINFORCEMENT SCHEDULE

SIZE	D
9" OR & LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

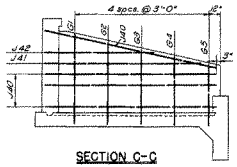
BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	5/8" ϕ	10'-3"	3'-3" / 12"	15.40	246.4
F2	16	"	12'-3"	Straight	18.40	294.4
F3	2	"	8'-0"	"	12.02	24.0
F4	8	"	7'-6"	"	11.27	90.2
F5	24	"	14'-9"	8'-0" / 1'-9"	22.15	531.6
F6	2	"	10'-0"	Straight	15.02	30.0
F9	2	"	5'-0"	"	7.51	15.0
F9	2	"	2'-6"	"	3.76	7.5
F10	23	"	9'-3"	7'-6" / 1'-9"	13.89	319.5
G1	2	5/8" ϕ	8'-0"	Straight	8.34	16.7
G2	2	"	7'-3"	"	7.56	15.1
G3	2	"	6'-6"	"	6.78	13.6
G4	2	"	6'-0"	"	6.26	12.5
G5	2	"	5'-3"	"	5.48	11.0
G6	4	"	7'-3"	6'-8" / 7"	7.56	30.2
G7	6	"	7'-9"	7'-2" / 7"	8.08	48.5
G8	2	"	8'-6"	7'-11" / 7"	8.87	17.7
J1	2	1/4" ϕ	35'-3"	Straight	23.55	47.1
J2	1	"	36'-0"	"	24.05	24.1
J3	2	"	37'-0"	"	24.72	49.4
J4	1	"	38'-3"	"	25.55	25.6
J5	2	"	39'-3"	"	26.22	52.4
J6	1	"	40'-6"	"	27.05	27.1
J7	2	"	41'-6"	"	27.72	55.4
J8	1	"	42'-9"	"	28.56	28.6

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J9	2	1/4" ϕ	44'-0"	Straight	29.39	58.8
J10	1	"	45'-3"	"	30.23	30.2
J11	2	"	46'-6"	"	31.06	62.1
J12	1	"	47'-6"	"	31.73	31.7
J13	1	"	48'-0"	"	32.06	32.1
J14	1	"	49'-9"	"	32.56	32.0
J15	8	"	49'-3"	"	32.90	263.2
J16	35	"	14'-6"	"	9.69	339.2
J17	2	"	12'-3"	"	8.18	16.4
J18	2	"	10'-9"	"	7.18	14.4
J19	2	"	9'-0"	"	6.01	12.0
J20	2	"	7'-3"	"	4.84	9.7
J21	2	"	5'-9"	"	3.84	7.7
J22	2	"	4'-0"	"	2.67	5.3
J23	2	"	2'-3"	"	1.50	3.0
J25	2	"	16'-3"	4'-3" / 1/2"	10.85	21.7
J31	11	"	9'-3"	Straight	6.18	68.0
J32	8	"	32'-3"	"	21.52	172.0
J33	50	"	13'-0"	9" / 3'-6" / 3'-6" / 9"	8.68	434.0
J34	6	"	5'-6"	3'-0" / 6"	3.67	22.0
J35	6	"	6'-3"	3'-3" / 6"	4.17	25.0
J36	4	"	6'-9"	6'-1" / 6"	4.51	18.0
J37	8	"	16'-0"	8'-0" / 1/2"	10.69	85.5
J38	32	"	3'-6"	Straight	2.34	74.9
J39	2	"	9'-0"	6'-0" / 1/2"	6.01	12.0
J40	10	"	15'-6"	Straight	10.35	103.5
J41	2	"	14'-0"	"	9.35	18.7
J42	2	"	9'-9"	"	6.18	12.4
				TOTAL		4,031 #



SECTION D-D

SECTION B-B



SECTION C-C

General notes:
For masonry details see sheet 30.
Bend bars in field to clear weep holes.
N.S. indicates near side.
F.S. indicates far side.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
DISCHARGE HEADWALL

SHEET 31 OF 135 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH

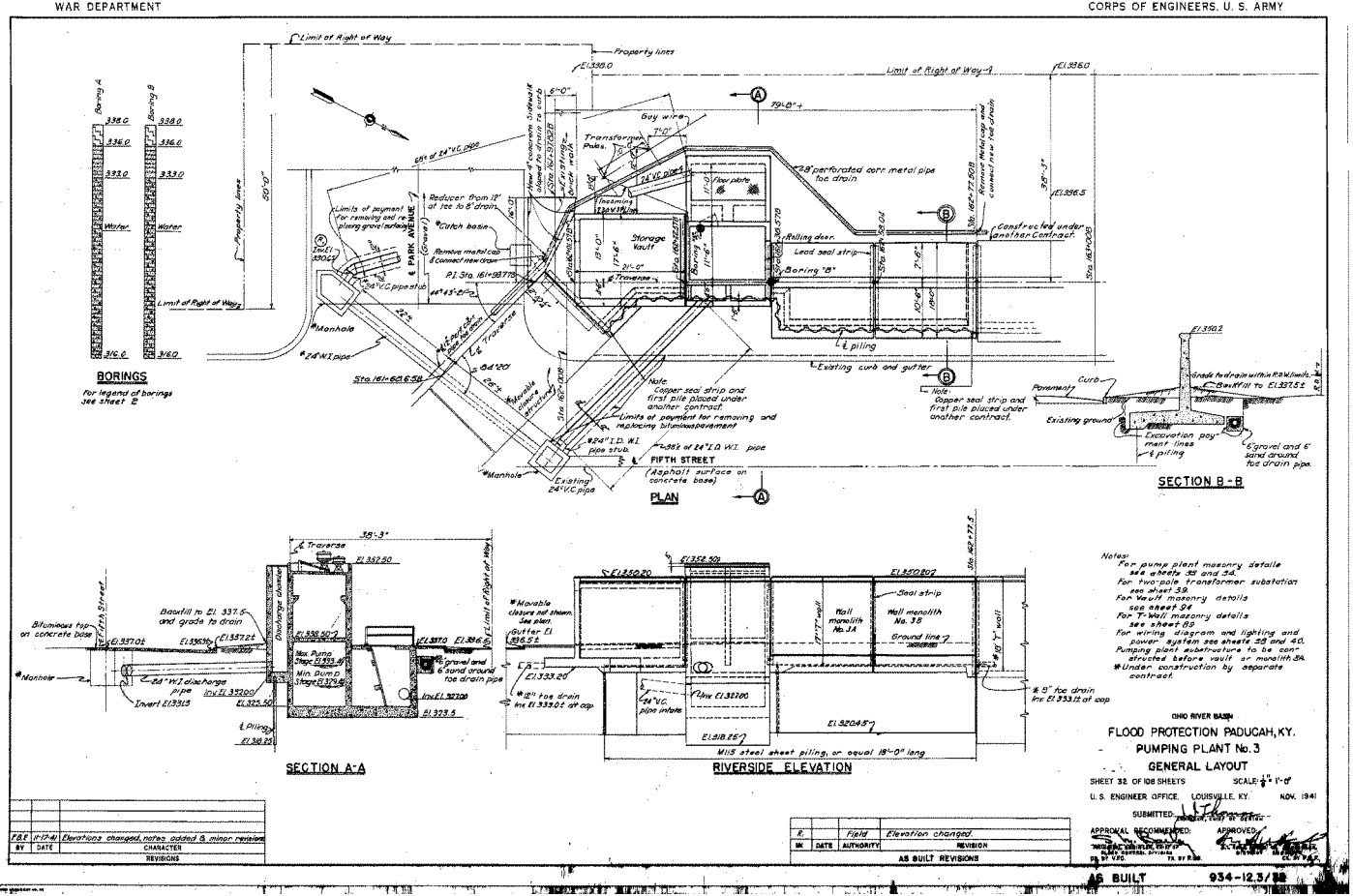
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY A.L.F. TR. BY H.L.S. CK. BY G.H.A.

AS BUILT

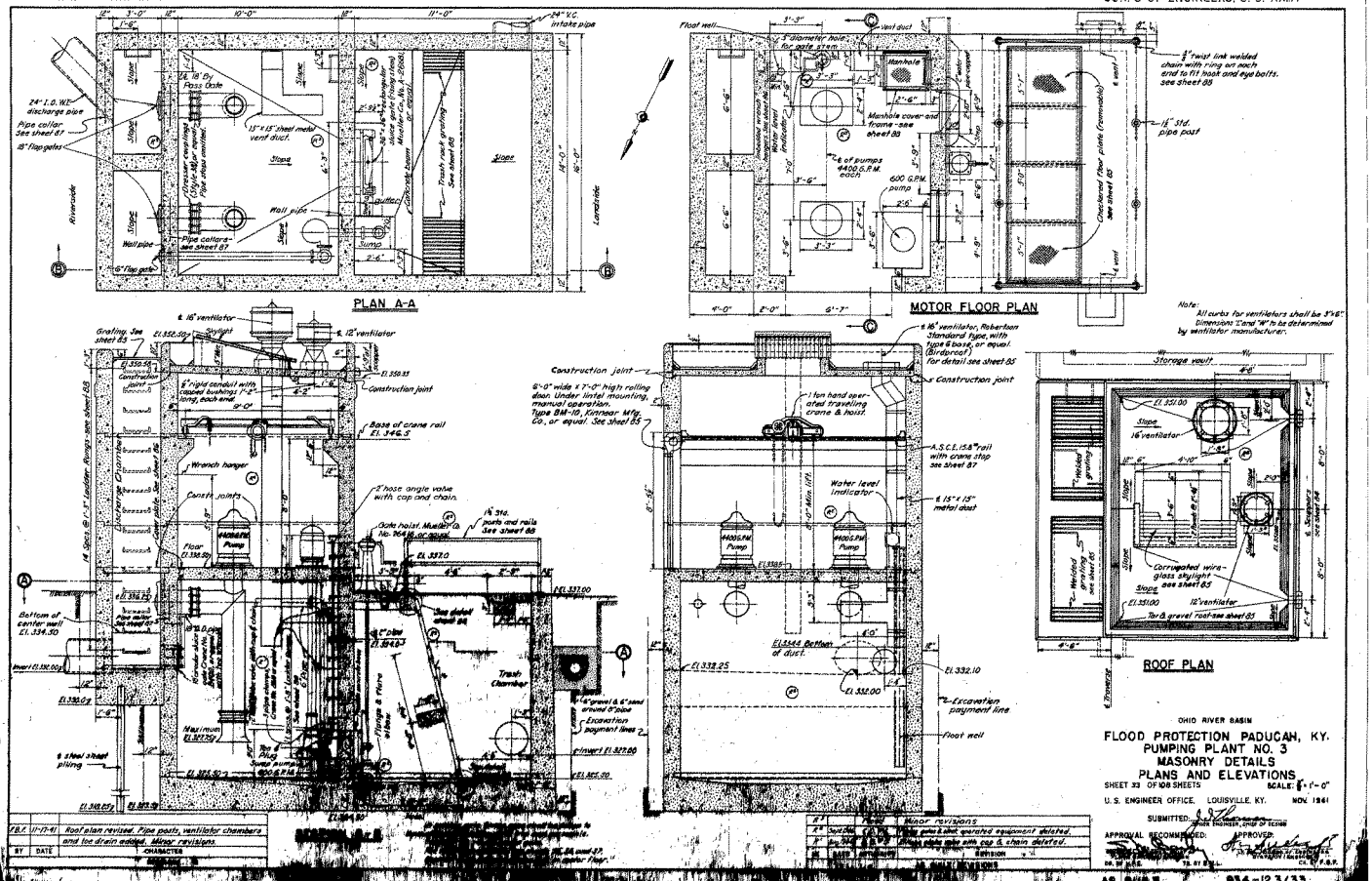
934-12.3/31

968


BORINGS
For legend of borings see sheet 2
PLAN
SECTION B-B
SECTION A-A
RIVERSIDE ELEVATION
PARK AVENUE
FIFTH STREET
Storage Vault
Limit of Right of Way
Property lines
Manhole
Existing curb and gutter
Existing ground
Excavation payment lines
Grade to drain within R.O.W. limits
Backfill to El. 337.5±
Pavement
Curb
Traverse
Guy wire
Transformer Poles
Rolling door
Lead seal strip
Boring "B"
Note: Copper seal strip and first pile placed under another contract.
Limits of payment for removing and replacing bituminous pavement
Existing 24" V.C. pipe
Bituminous top on concrete base
Backfill to El. 337.5 and grade to drain
24" W.I. discharge pipe
Invert El. 319.5
Max. Pump Stage El. 333.4
Min. Pump Stage El. 329.6
Discharge channel
6" gravel and 6" sand around toe drain pipe
Movable closure not shown. See plan.
Gutter El. 336.5±
Wall monolith No. 3A
Wall monolith No. 3B
Ground line
Seal strip
Mill steel sheet piling, or equal 18'-0" long
Notes:
For pump plant masonry details see sheets 33 and 34.
For two-pole transformer substation see sheet 39.
For Vault masonry details see sheet 34.
For T-Wall masonry details see sheet 89.
For wiring diagram and lighting and power system see sheets 38 and 40.
Pumping plant substructure to be constructed before vault or monolith 3A.
* Under construction by separate contract.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT No. 3
GENERAL LAYOUT
SHEET 32 OF 108 SHEETS
SCALE: 1/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
T.B.E. 11-17-41 Elevations changed, notes added & minor revisions
BY DATE CHARACTER
REVISIONS
K. Field Elevation changed.
MK DATE AUTHORITY REVISION
AS BUILT REVISIONS
AS BUILT
934-12.3/32

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
MASONRY DETAILS
PLANS AND ELEVATIONS

SHEET 33 OF 108 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] DIVISION ENGINEER, CHIEF OF TECHNIC

APPROVAL RECOMMENDED: [illegible] DR. OF D.E.S.

APPROVED: [illegible] CHIEF OF ENGINEERS, WASHINGTON, D.C. CH. OF P.D.D.

AS BUILT

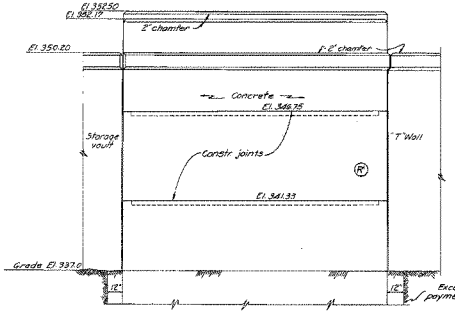
934-12.3/33

BY	DATE	CHANGES
F.B.C.	11-17-41	Roof plan revised. Pipe posts, ventilator chambers and ice drain added. Minor revisions.

BY	DATE	REVISION
F.B.C.	[illegible]	Minor revisions.
F.B.C.	[illegible]	Gate & shaft operated equipment deleted.
F.B.C.	[illegible]	Trash rack gate with cap & chain deleted.

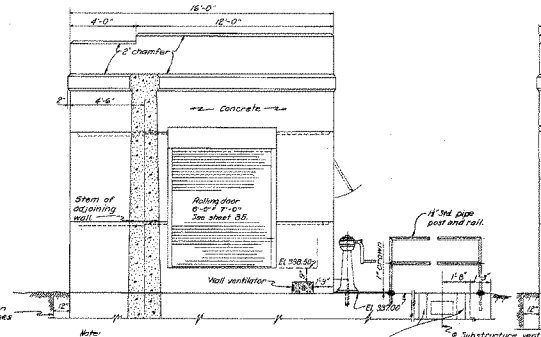
AS BUILT REVISIONS

868



EAST ELEVATION

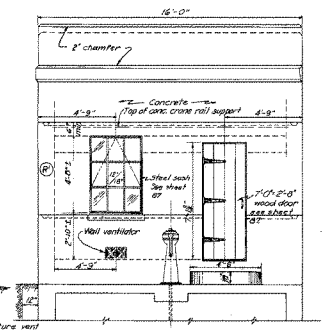
SCALE: $\frac{1}{8}$" = 1'-0"



NORTH ELEVATION

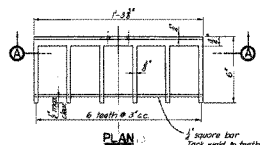
SOUTH ELEVATION OPPOSITE HAND EXCEPT AS NOTED

SCALE: $\frac{1}{8}$" = 1'-0"



WEST ELEVATION

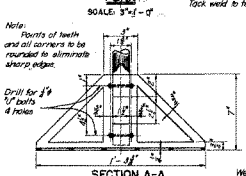
SCALE: $\frac{1}{8}$" = 1'-0"



PLAN

SCALE: 3" = 1'-0"

RAKE HANDLE SCHEDULE	
PUMPING PLANT	LENGTH
No. 1	17'-0"
No. 2	19'-0"
No. 3	18'-0"
No. 5	15'-0"
No. 6	19'-0"
No. 7	18'-0"
No. 12	19'-0"



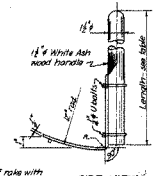
SECTION A-A

HAND RAKE

MAKE 1 FOR EACH PUMPING PLANT

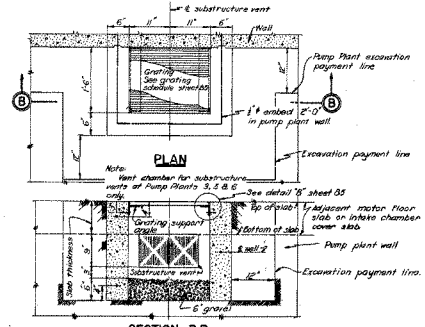
MATERIAL: STRUCTURAL STEEL WT. 4.7 LBS.

8" "U" BOLTS WT. 0.26 LBS.



Weight of rake with 19'-0" handle = 13 lbs.

SIDE VIEW



PLAN

SECTION B-B

TYPICAL DETAIL

SUBSTRUCTURE VENT CHAMBER

SCALE: 1" = 1'-0"

Note: For reinforcing details see sheets 36 & 37

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 3

MASONRY DETAILS

ELEVATIONS

SHEET 34 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: Chief, Design Section

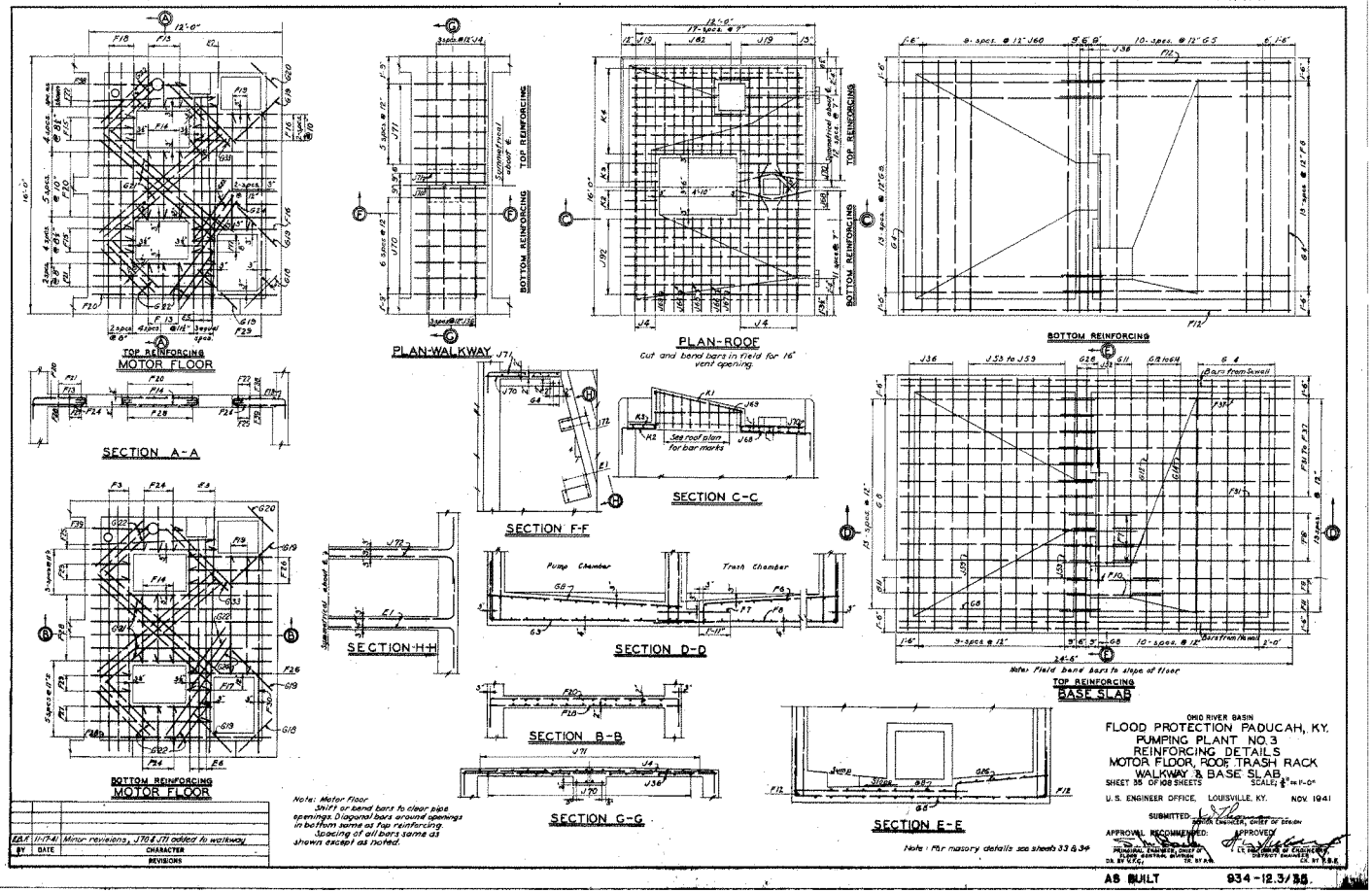
APPROVAL RECOMMENDED: — APPROVED:

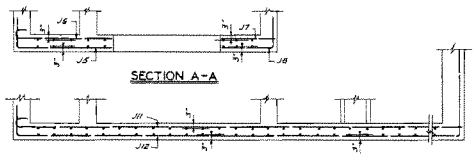
7	8-17-41	Hand rake detail and vent chamber added.
BY	DATE	CHARACTER
REVISIONS		

1			Minor Revisions
NO.	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS			

AS BUILT

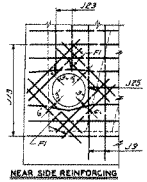
934-12.3/34


TOP REINFORCING
MOTOR FLOOR
SECTION A-A
BOTTOM REINFORCING
MOTOR FLOOR
PLAN-WALKWAY
TOP REINFORCING
BOTTOM REINFORCING
PLAN-ROOF
Cut and bend bars in field for 16" vent opening.
See roof plan for bar marks
SECTION C-C
SECTION F-F
SECTION H-H
Pump Chamber
Trash Chamber
SECTION D-D
SECTION B-B
SECTION G-G
SECTION E-E
Note: Pier masonry details see sheets 33 & 34
Note: Motor Floor
Shift or bend bars to clear pipe openings. Diagonal bars around openings in bottom same as top reinforcing.
Spacing of all bars same as shown except as noted.
BOTTOM REINFORCING
TOP REINFORCING
BASE SLAB
Note: Field bend bars to slope of floor
EAF 11-17-41 Minor revisions, J70 & J71 added to walkway.
BY DATE CHARACTER
REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
REINFORCING DETAILS
MOTOR FLOOR, ROOF, TRASH RACK
WALKWAY & BASE SLAB
SHEET 35 OF 108 SHEETS
SCALE: 3/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
SENIOR ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED:
PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL BRANCH
DR. BY K.F.C. TR. BY A.M.
APPROVED:
LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER
CK. BY R.B.E.
AS BUILT
934-12.3/35



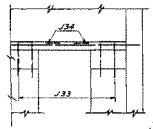
SECTION A-A

SECTION B-B

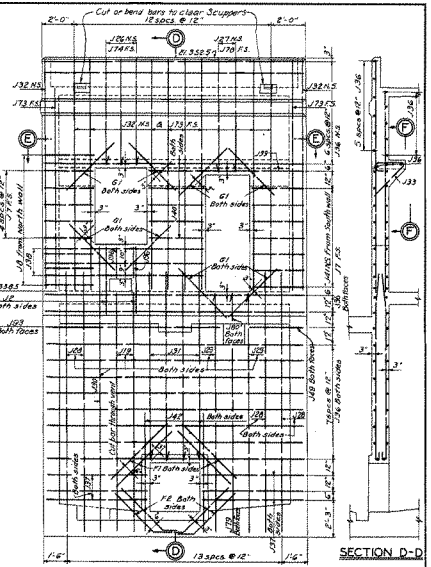


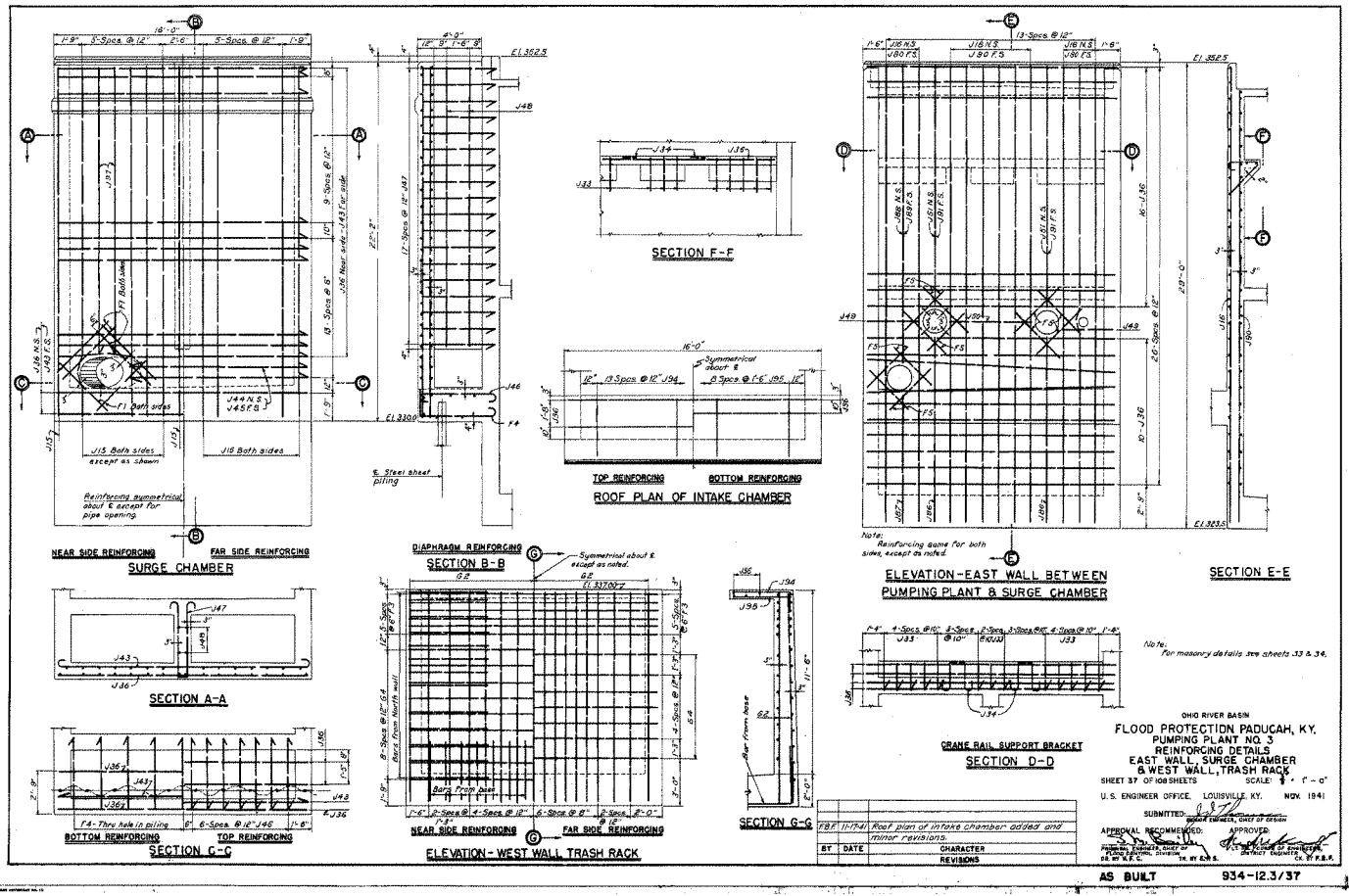
NEAR SIDE REINFORCING

ELEVATION INTAKE OPENING SOUTH WALL



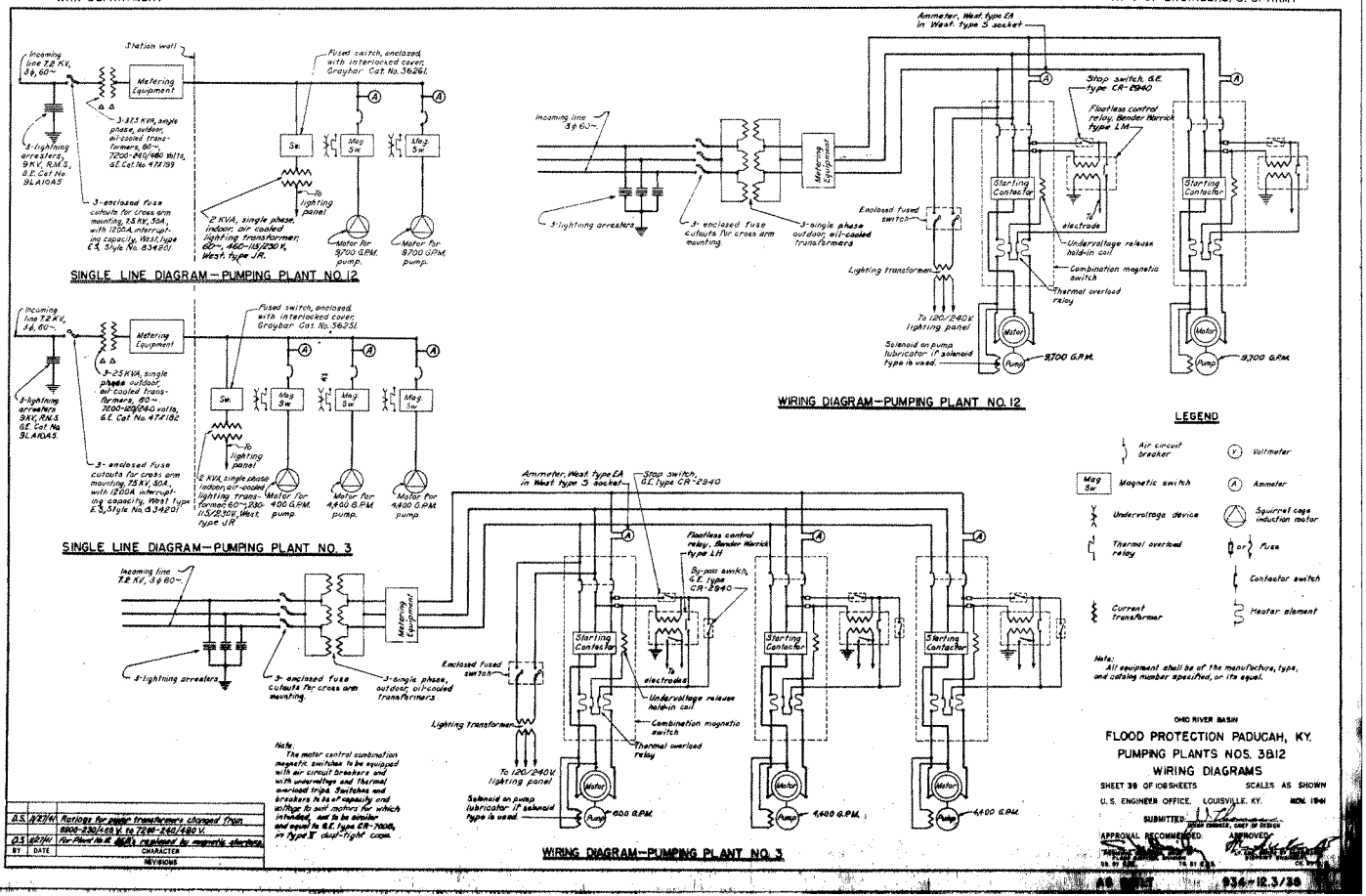
SECTION F-F

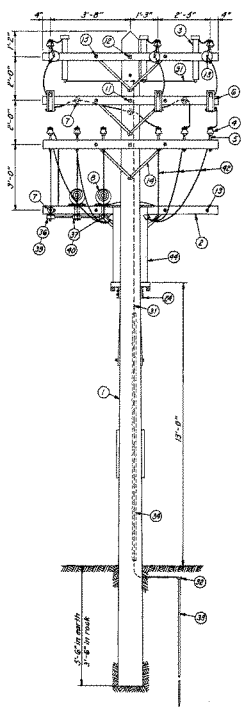

Cut or bend bars to clear Scuppers
12 spcs. @ 12"
2'-0"
J16 N.S.
J14 F.S.
J27 N.S.
J70 F.S.
El. 352.5
J32 N.S.
J73 F.S.
J32 N.S. & J75 F.S.
G1 Both sides
J18 Both sides
J69 Both faces
J68 Both faces
J49 Both sides
J46 Both sides
J45 Both sides
F1 Both sides
F2 Both sides
J78 Both sides
J79 Both sides
13 spcs. @ 12"
1'-6"
J36 N.S.
J17 F.S.
J36 N.S.
J17 F.S.
J36 N.S.
J17 F.S.


SURGE CHAMBER
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION A-A
SECTION C-C
BOTTOM REINFORCING
TOP REINFORCING
SECTION B-B
DIAPHRAGM REINFORCING
ELEVATION - WEST WALL TRASH RACK
SECTION F-F
ROOF PLAN OF INTAKE CHAMBER
TOP REINFORCING
BOTTOM REINFORCING
SECTION G-G
ELEVATION - EAST WALL BETWEEN PUMPING PLANT & SURGE CHAMBER
SECTION E-E
CRANE RAIL SUPPORT BRACKET
SECTION D-D
Note: For masonry details see sheets 33 & 34.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
REINFORCING DETAILS
EAST WALL, SURGE CHAMBER & WEST WALL, TRASH RACK
SHEET 37 OF 108 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/37

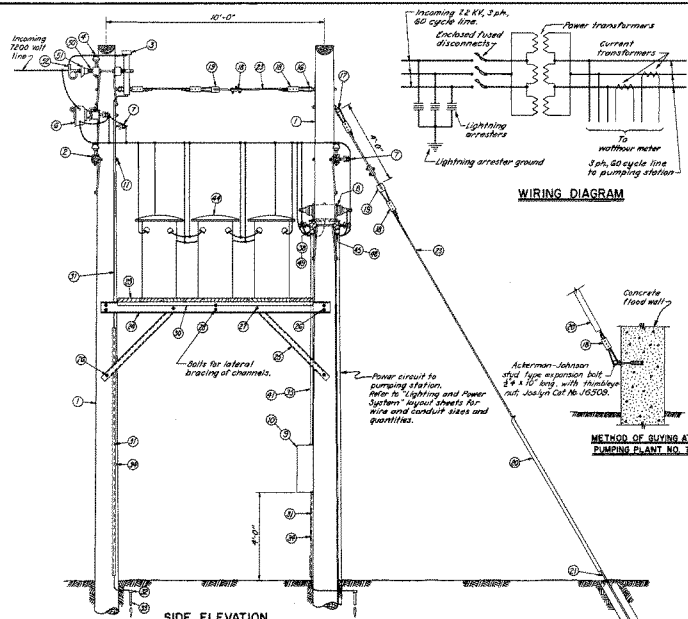
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

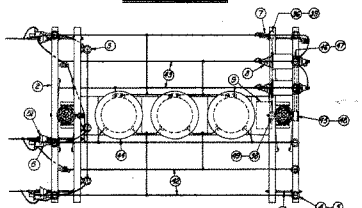




END ELEVATION



SIDE ELEVATION



PLAN

WIRING DIAGRAM

Notes

All material shall be of the manufacture, type, & catalog number specified or its equal.

Solderless connectors shall be used for making splices and taps to bus.

Figures in circles refer to part numbers on the bill of material.

Small parts, fittings, etc., not called for shall be furnished as required.

All bolts and lag screws to be furnished with a full complement of washers in accordance with best practice.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY REQD. PP NO. 3	PP NO. 7	PP NO. 12
1	Wood pole, 30', class 1			2	2	2
2	Crossarm, Douglas fir, 3"x4"x5'-6"			7	7	7
3	Lightning arrester	G.E.	9LA10A5	3	3	3
4	Pin type insulator	Joslyn	L401	18	18	18
5	Steel pin for insulator	Joslyn	J210A	18	18	18
6	Enclosed fused cutout	West.	932201	3	3	3
7	Primary lead wire holder	Hubbard	1460	6	6	6
8	Current transformer, 200/5A	G.E.	94x508	2		
	Current transformer, 300/5A	G.E.	94x510		2	
	Current transformer, 150/5A	G.E.	94x507			2
9	Watt hour meter	G.E.	77x405	1		
	Watt hour meter	G.E.	77x311		1	1
10	Meter enclosure	Superior	P311-1256	1	1	1
11	Machine bolt, galvanized, 3/4"x16"	Joslyn	J8016	3	3	3
12	Machine bolt, galvanized, 3/4"x20"	Joslyn	J8020	2	2	2
13	Double arming bolt, 3/4"x20"	Joslyn	J8020	6	6	6
14	Crossarm brace	Joslyn	J7159	14	14	14
15	Carriage bolt, 3/8"x5"	Joslyn	J8635	14	14	14
16	Thimble eye bolt, shoulder type, 12"	Joslyn	J8612	2	2	2
17	Thimble eye bolt, shoulder type, 12", 45° angle	Joslyn	J8012	1	1	1
18	Guy wire clamp, 3 bolt	Joslyn	J1121	6	6	6
19	Guy strain insulator	Joslyn	L1224	2	2	2
20	Guy guard	Joslyn	J1612	1	1	1
21	Anchor rod, thimbleye, 3/4"x8'	Joslyn	J7428	1		1
22	Guy anchor, exp., 2 hole, 6" for 3/4" rod	Everstick	636	1		1
23	Guy wire, 3/8", Siemens-Martin double galv.			40'	40'	40'
24	Channel iron, galv, 6"x3"x8#/6'-6" @ 8.2#/ft.			2	2	2
25	Channel iron, galv, 3"x1 5/8"x4#/6'-6" @ 5.0#/ft.			4	4	4
26	Machine bolt, galvanized, 3/4"x14"	Joslyn	J8914	6	6	6
27	Machine bolt, galvanized, 3/4"x18"	Joslyn	J8918	4	4	4
28	Double arming bolt, 3/4"x16"	Joslyn	J8916	2	2	2
29	Treated yellow pine boards, 2"x12"x13'			9	9	9
30	Treated yellow pine strips, 2"x2"x4'-5"			4	4	4
31	Ground wire, #2 bare copper			45'	45'	45'
32	Ground wire clamp	Joslyn	J8495	2	2	2
33	Copperweld ground rod, 3/4"x8'			2	2	2
34	Wood moulding	Joslyn	Size #1	20'	20'	20'
35	1" rigid electrical conduit			15'	15'	15'
36	Condulet outlet	Crouse-Hinds	LB7	1	1	1
37	Condulet outlet	Crouse-Hinds	LB7	2	2	2
38	Condulet outlet	Crouse-Hinds	LL37	1	1	1
39	1-hole composition cover	Crouse-Hinds	3771	1	1	1
40	3-hole composition cover	Crouse-Hinds	3773	2	2	2
41	No. 12 insulated copper wire			110'	110'	110'
42	No. 6 solid H.D. triple braid W.P. wire			90'	90'	90'
43	No. 1 solid H.D. triple braid W.P. wire			55'		
	No. 2/0 solid H.D. triple braid W.P. wire				55'	
	No. 1 solid H.D. triple braid W.P. wire					55'
44	Power transformer, 7200-240/480V, 25 KVA	G.E.	47x186	3		
	Power transformer, 7200-240/480V, 75 KVA	G.E.	47x201		3	
	Power transformer, 7200-240/480V, 225 KVA	G.E.	47x189			3
45	Condulet outlet	Crouse-Hinds	LB37	1		1
	Condulet outlet	Crouse-Hinds	LR37		1	
46	Condulet outlet	Crouse-Hinds	LB7	1		1
	Condulet outlet	Crouse-Hinds	LR7	1	1	
47	3-hole composition cover	Crouse-Hinds	3773			1
	3-hole composition cover	Crouse-Hinds	3773	1	1	
48	Blank composition cover	Crouse-Hinds	3770			1
	Blank composition cover	Crouse-Hinds	3770	1	1	
49	Blank composition cover	Crouse-Hinds	3770	1	1	

BILL OF MATERIAL (CON'TD.)

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY REQD. PP NO. 3	PP NO. 7	PP NO. 12
50	Drop forged eyenut	Joslyn	J1092	3	3	3
51	6" strain insulator	Locke	16583	3	3	3
52	Strain clamp	"	20087	3	3	3

R'		Field	Bill of Materials change
MK	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS			

BY	DATE	CHARACTER
D.S.	11/27/41	Minor revisions
D.S.	1/27/41	Dead ending of incoming line changed
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 3, 7 & 12
TWO-POLE TRANSFORMER SUBSTATION

SHEET 39 OF 108 SHEETS

SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

NOV. 1941

SUBMITTED: [signature] CHIEF, DESIGN SECTION, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, CONSTRUCTION DIVISION, CHIEF, DESIGN DIVISION

APPROVED: [signature] CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY D.S.E. CK. BY R.W.S. CK. BY D.S.

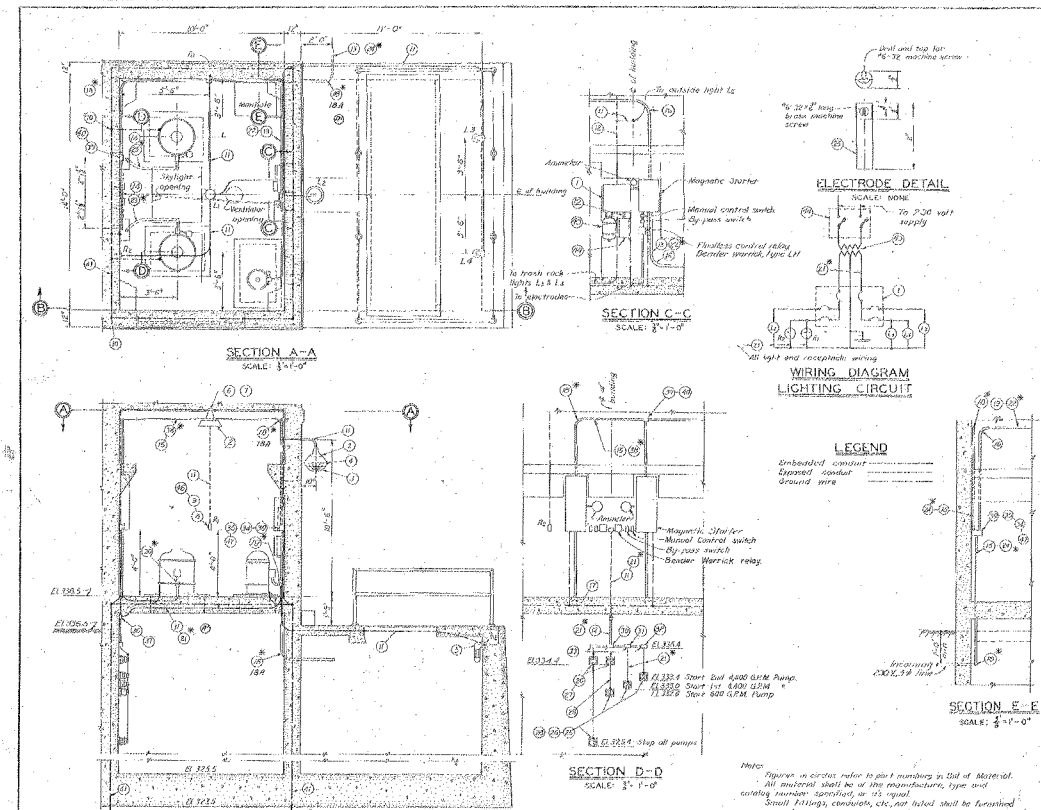
AS BUILT

934-12.3/39

904

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note:
Figures in circles refer to part numbers in Bill of Material.
All material shall be of the manufacture, type and catalog number specified, or its equal.
Small fittings, conduits, etc., not listed shall be furnished as required.
All conduit in floor shall be placed as near the center of same as possible and shall clear openings for pump removal.
200 watt bulbs shall be furnished and installed in all lights.

U.S.	10/24/41	Ammeters added to magnetic starters	
U.S.	10/24/41	Minor revisions	
BY	DATE	CHARACTER	
		REVISIONS	

1	7/6/42	C.O.#	Bill of materials changed in accord with change order
BY	DATE	AUTHORITY	REVISION
			AS BUILT REVISIONS

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY
1	4" Crouse Hind distribution panel (Surface type)			1
2	R.L.B. dome reflector and socket	Wheat	M9573	2
3	Wire guard	"	35491	1
4	Wire guard padlock	"	35492	1
5	Vapor-tite light	Crouse-Hinds	VMG105	2
6	Conduit outlet	"	SAC12	1
7	Conduit cover	"	SB64	1
8	Conduit outlet	"	FS1	2
9	Duplex plug receptacle			2
10	Connectors for #2/0 stranded cable	Burndy	NT2-70	12
11	3/4" rigid electrical conduit			105
12	1" " " "			45
13	1 1/4" " " "			30
14	1 1/2" " " "			17
15	2" " " "			30
16	1" standard 90° elbow			4
17	1 1/4" " " "			4
18	1 1/2" " " "			6
19A	1" Erickson coupling			1
20A	2" Erickson coupling			2
23A	#10 AWG insulated copper wire			2100
27A	4 C.I. cond. cable, RC-600V. ins. with 60% rubber jacket			60
29A	#6 3-cond. cable, RC-600V. ins. with 60% rubber jacket			50
30A	#1 3-cond. cable, RC-600V. ins. with 60% rubber jacket			100
35	Brass electrode 3/4" x 8' long (See detail)			4
36	3" bell circle type insulator			6
37	Bus support fitting. Drill to clamp 1/4" bus and mount	Locke	9651	1
38	Bus support fitting. Drill to clamp 3/4" electrode			4
39	#6 AWG bare drawn copper wire			100
40	Conduit outlet	Crouse-Hinds	FS107	1
41	" "	" "	C-10	1
42	" "	" "	E-17	7
43	Conduit outlet cover	" "	1171	4
44	Conduit hub plate	" "	RSH10	1
45	" "	" "	RSH53	1
46	Conduit	" "	T211	1
47	Conduit cover	" "	3170	1
48	#2 3-cond. cable, RC-600V. ins. with 60% rubber jacket			100
49	Junction box	Crouse-Hinds	RSM7	1
50	Conduit outlet cover	" "	5120	1
51	#2/0 bare stranded copper cable			150
52	Connector for #2/0 stranded cable to 3/8" ground rod	Burndy	GR6626	4
53	Ground rod, 3/8" x 8'	Copperweld		4
54	Enclosed fused switch, 2 pole, cover interlocked	Graybar	35251	1
55	Transformer, 2.3 KV/230 volts, 1Ø/1A, dry type	Wheat	91H3	1
56	Wall surface plate			2
57	Junction box plate	Crouse-Hinds	RSM40	2
59A	2 1/2" rigid electrical conduit			50
60A	Spc. long rad 90° elbow 2 1/2" x 24" rad			3

* Indicates items deleted

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
LIGHTING & POWER SYSTEMS

SHEET 40 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [signature] — Assistant Engineer, Chief of Design

APPROVED: [signature] — Lt. Col., Corps of Engineers, Assistant Engineer, Chief of Design

APPROVED RECOMMENDED: [signature] — Colonel, Corps of Engineers, District Engineer

Ed. 01 D.S. — Dr. BY L.C.B. — Ck. BY J.S.

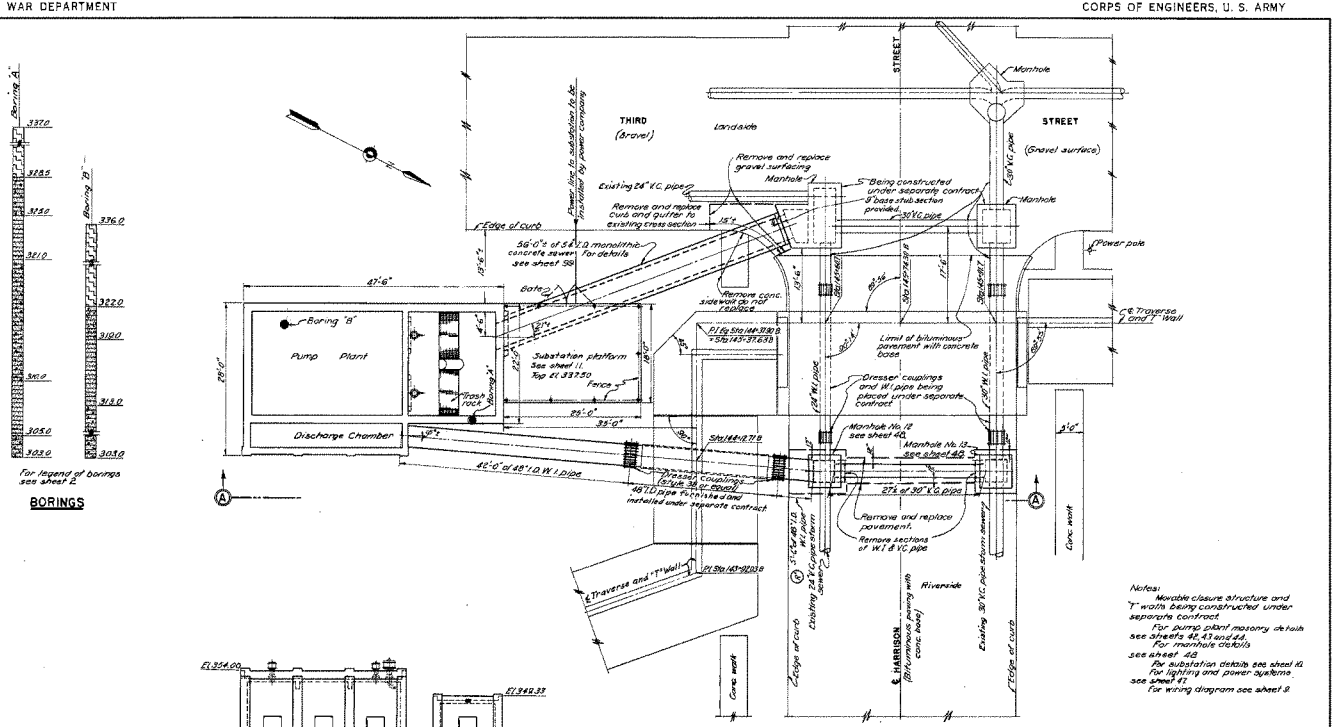
AS BUILT

934-12.3/40

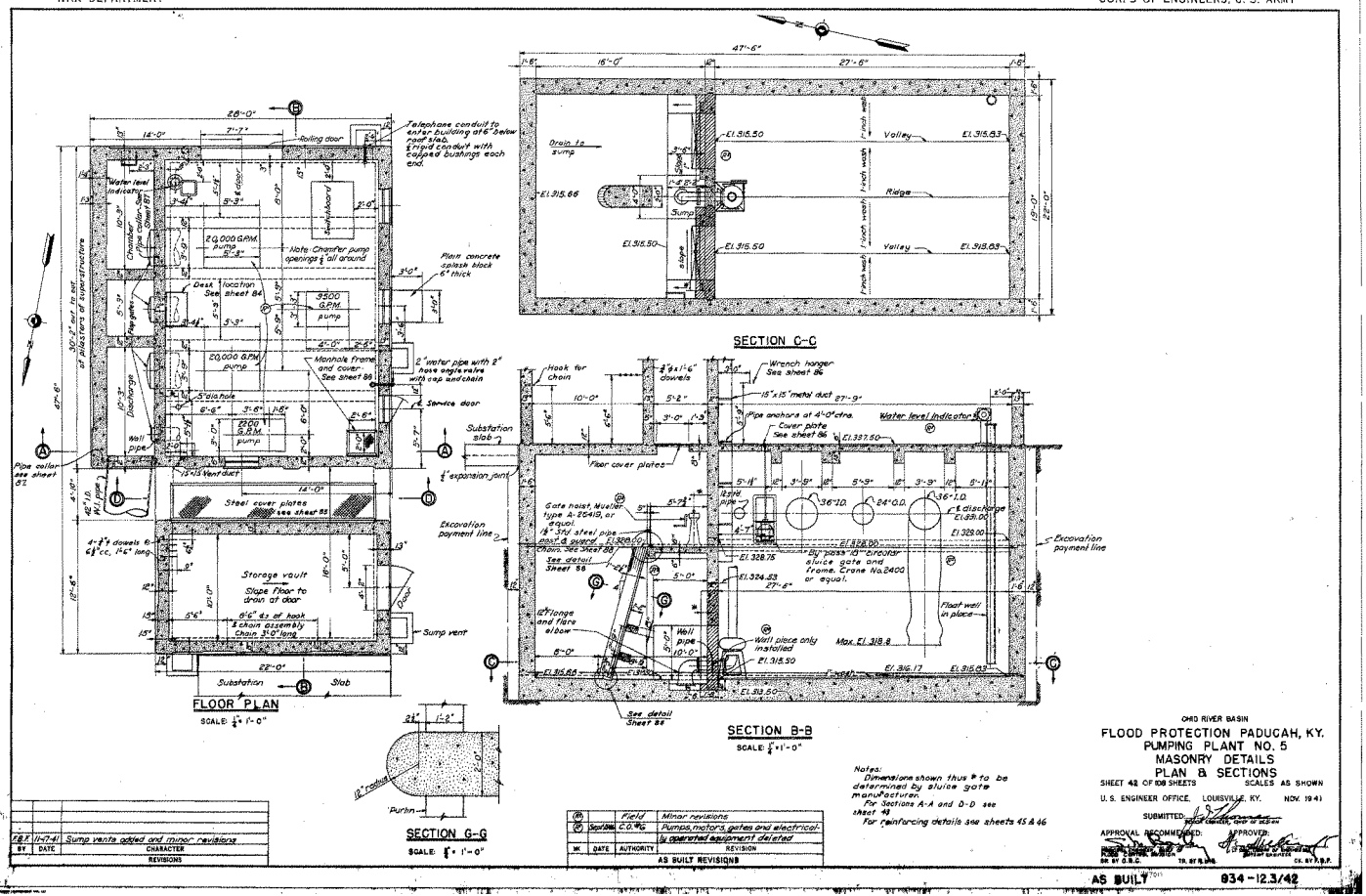
905

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R'		Field	Minor dimension change
NO.	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS			
F.B.F.	11-17-41	Boring locations revised and minor revisions	
BY	DATE	CHARACTER	
REVISIONS			



7-8-7	11-17-41	Sump vents added and minor revisions	
BY	DATE	CHARACTER	
		REVISIONS	

(B)		Field	Minor revisions
(A)	Sept 1946	C.O. #6	Pumps, motors, gates and electrically operated equipment deleted
MK	DATE	AUTHORITY	REVISION
		AS BUILT REVISIONS	

Notes:
Dimensions shown thus * to be determined by sluice gate manufacturer.
For Sections A-A and D-D see sheet 49
For reinforcing details see sheets 45 & 46

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
MASONRY DETAILS
PLAN & SECTIONS

SHEET 42 OF 100 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

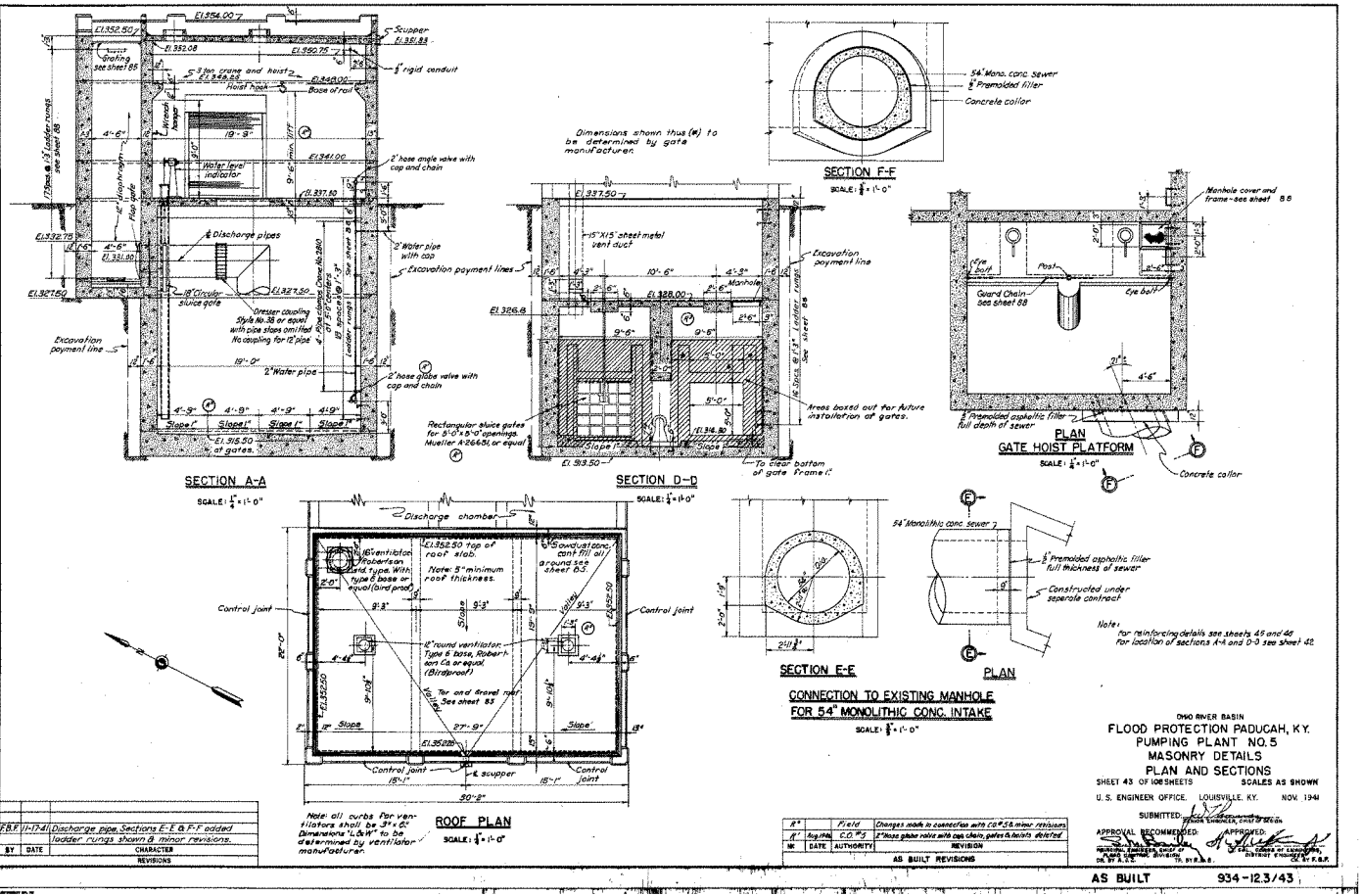
SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] — APPROVED: [illegible]

AS BUILT

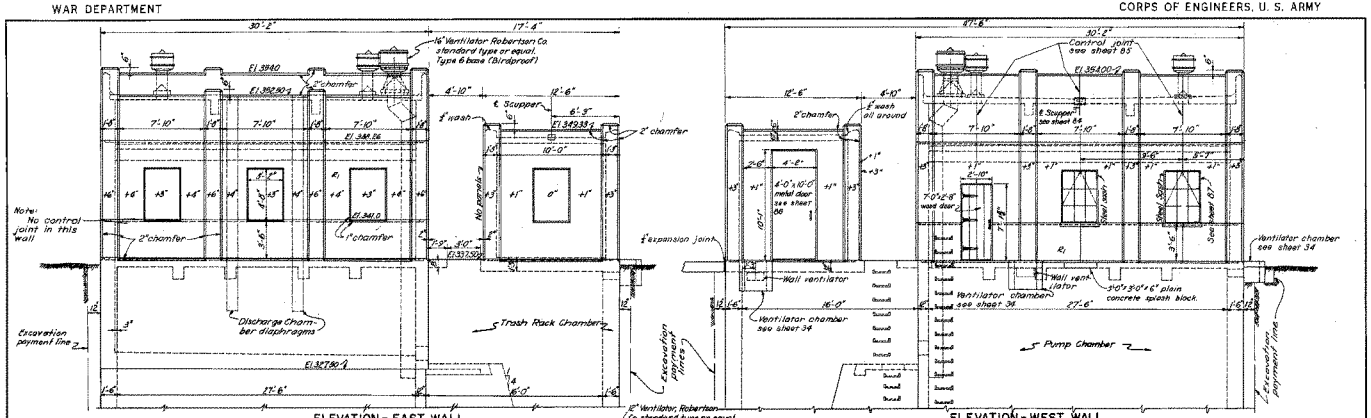
934-12.3/42

907


SECTION A-A
SCALE: 1/4" = 1'-0"
SECTION D-D
SCALE: 1/4" = 1'-0"
SECTION F-F
SCALE: 1/4" = 1'-0"
PLAN
GATE HOIST PLATFORM
SCALE: 1/4" = 1'-0"
SECTION E-E
CONNECTION TO EXISTING MANHOLE FOR 54" MONOLITHIC CONC. INTAKE
SCALE: 1/4" = 1'-0"
PLAN
ROOF PLAN
SCALE: 1/4" = 1'-0"
Dimensions shown thus (*) to be determined by gate manufacturer.
Note: all curbs for ventilators shall be 3" x 6". Dimensions "L & W" to be determined by ventilator manufacturer.
Note: For reinforcing details see sheets 45 and 46. For location of sections A-A and D-D see sheet 42.
Excavation payment line
Excavation payment lines
Control joint
Discharge chamber
Discharge pipes
Manhole
Concrete collar
Constructed under separate contract
Slope
Valley
Scupper
Water level indicator
Hoist hook
Base of rail
Grating see sheet 85
Manhole cover and frame - see sheet 86
Guard Chain - see sheet 88
Eye bolt
Post
Areas based out for future installation of gates.
To clear bottom of gate frame
Rectangular sluice gates for 3'-0" x 5'-0" openings. Mueller A-2646-51, or equal
Tar and gravel roof. See sheet 85
54" Mono. conc. sewer
54" Monolithic conc. sewer
1/2" Premolded asphaltic filler full thickness of sewer
1/2" Premolded asphaltic filler full depth of sewer
15" X 15" sheet metal vent duct
2" hose angle valve with cap and chain
2" Water pipe with cap
2" hose globe valve with cap and chain
2" Water pipe
18" Circular sluice gate
Dresser coupling Style No. 38 or equal with pipe stops omitted. No coupling for 12" pipe
Pipe column Crane No. 2840 of 3'-0" standard
Ladder rungs - see sheet 88
Hoist gate
Diaphragm
Ventilator Robertson and type 6 base or equal (bird proof)
12" round ventilator Type 6 base, Robertson Co. or equal (Birdproof)
54" conduit conc. fill all ground see sheet 63
Note: 5" minimum roof thickness.
Elevation of top of roof slab
Control joint
Control joint
Control joint
℄ scupper
Slope
Slope
Slope

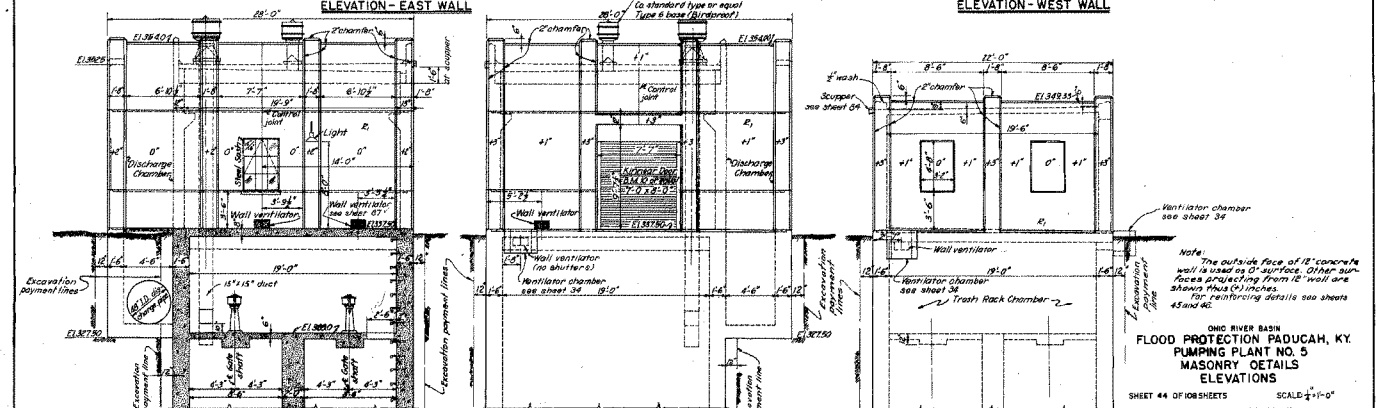
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



ELEVATION - EAST WALL

ELEVATION - WEST WALL



ELEVATION NORTH WALL

ELEVATION - SOUTH WALL

ELEVATION - NORTH WALL STORAGE VAULT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
MASONRY DETAILS
ELEVATIONS

SHEET 44 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: Chief, Design Section, Chief of Design

APPROVAL RECOMMENDED: Chief, Design Section, Chief of Design

APPROVED: District Engineer

DR. BY H.R. TR. BY D.R.S. CK. BY R.B.R.

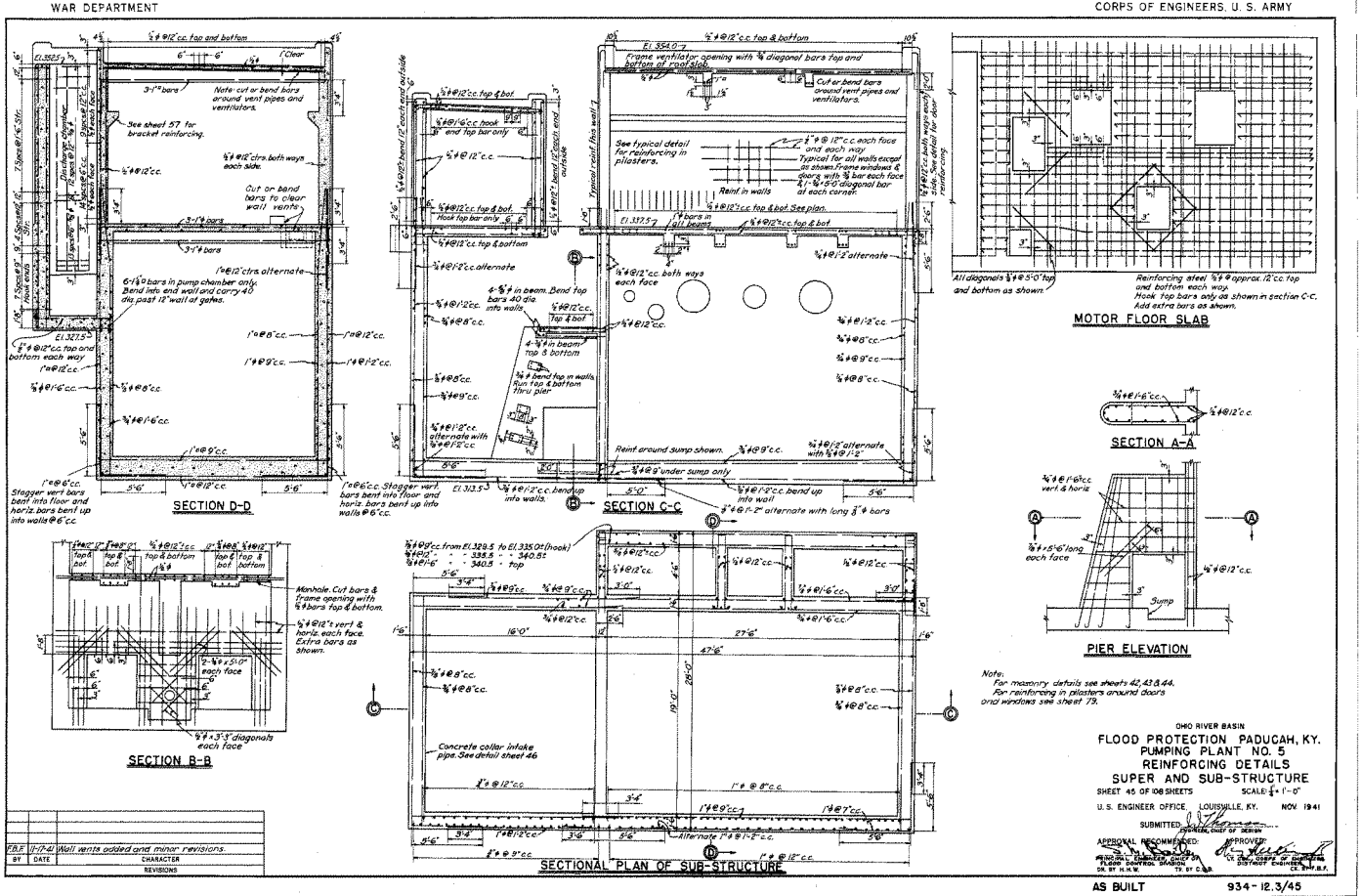
1	11-17-41	Ventilator chambers added, roof slab revised and minor changes
NO	DATE	CHARACTER
		REVISIONS

E1		Field	Minor Revisions
NO	DATE	AUTHORITY	REVISION
			AS BUILT REVISIONS

AS BUILT

934-12.3/44

606



Note:
For masonry details see sheets 42, 43 & 44.
For reinforcing in pilasters around doors and windows see sheet 79.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
REINFORCING DETAILS
SUPER AND SUB-STRUCTURE

SHEET 45 OF 108 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941

SUBMITTED: [illegible] GENERAL CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY H.R.W. TR. BY C.B.B. CK. BY H.B.F.

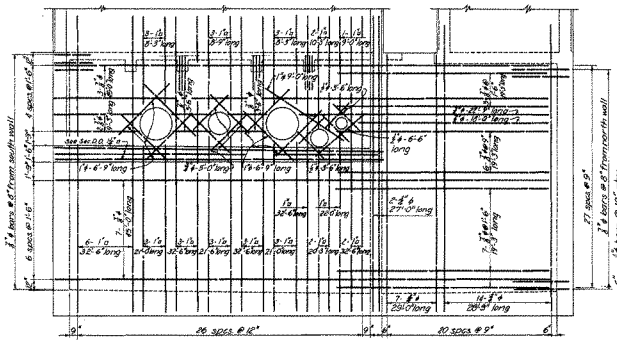
BY	DATE	CHARACTER
F.B.F.	11-17-41	Wall vents added and minor revisions.

REVISIONS

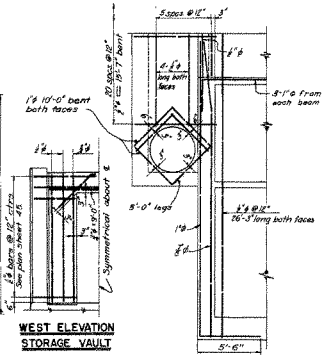
AS BUILT

934-12.3/45

910

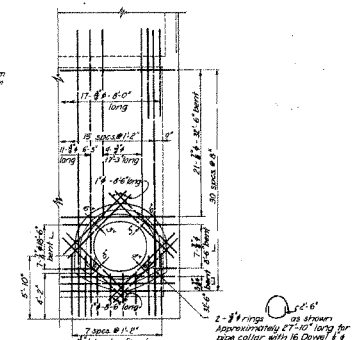


NEAR SIDE REINFORCING

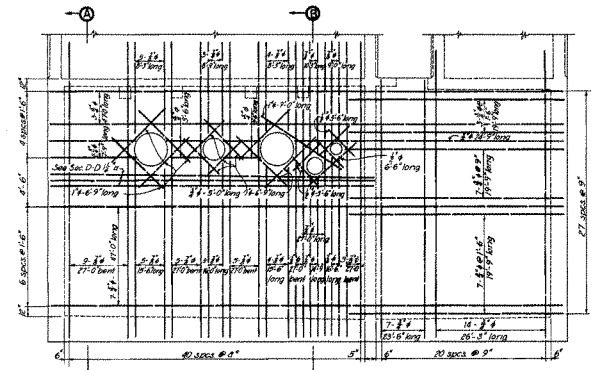


WEST ELEVATION
STORAGE VAULT

DISCHARGE OPENING
END OF DISCHARGE CHAMBER

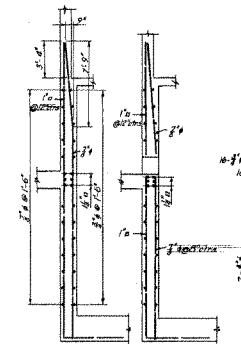


NEAR SIDE REINFORCING

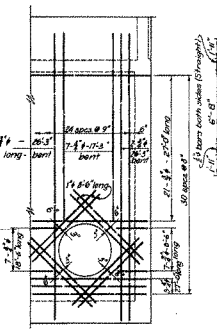


FAR SIDE REINFORCING

EAST WALL

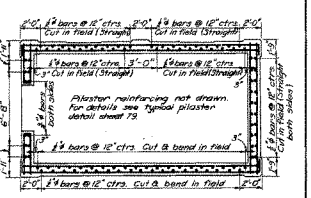


SECTION A-A SECTION B-B



FAR SIDE REINFORCING

INTAKE OPENING
OUTSIDE NORTH WALL



SECTION THRU STORAGE VAULT

Note:
For masonry details see sheet 42, 43 and 44

BY	DATE	CHARACTER REVISIONS
F.B.E.	11-17-41	Title changed & bars lengthened

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
REINFORCING DETAILS
EAST WALL & SEWER OPENINGS

SHEET 46 OF 108 SHEETS SCALE: ¼" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] DISTRICT ENGINEER

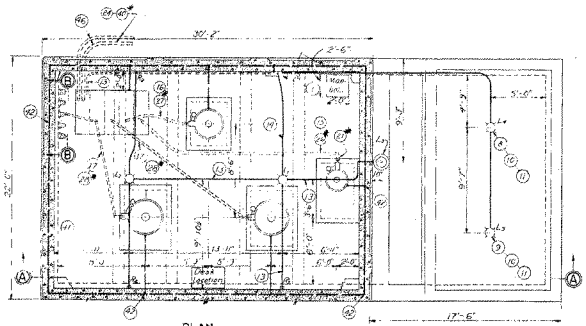
APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION
DR. BY M.K.B. TR. BY H.S.

APPROVED: [illegible] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER
CK. BY B.E.

AS BUILT 934-12.3/46

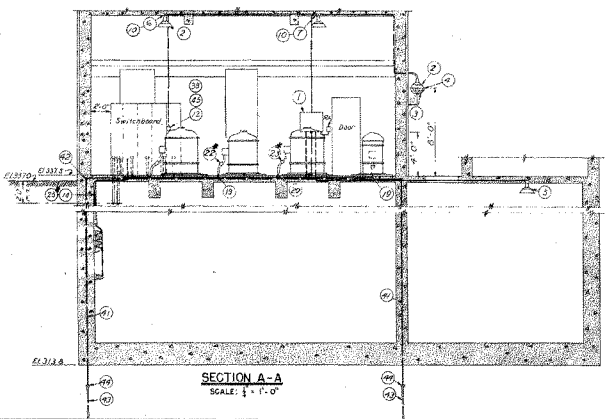
150

911



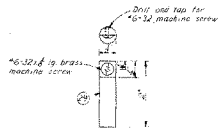
PLAN

SCALE: $\frac{1}{4}$ = 1'-0"



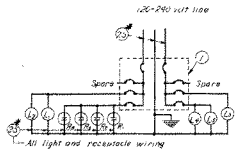
SECTION A-A

SCALE: $\frac{1}{4}$ = 1'-0"



ELECTRODE DETAIL

SCALE. NONE

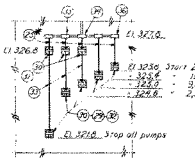


WIRING DIAGRAM

LIGHTING CIRCUIT

Concealed conduit
Embedded conduit
Exposed conduit
Ground wire

LEGEND



SECTION B-B

SCALE: $\frac{1}{4}$ = 1'-0"

Notes:

Figures in circles refer to part numbers in bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

Small fittings, conduits, etc. not listed shall be furnished as required.

All conduit in floor shall be placed as near the center of same as possible and shall clear openings for pump removal.

200 watt bulbs shall be furnished and installed in all lights.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CAT. NO.	QUAN.
1	6 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West	349371	3
3	Wire guard	"	351497	3
4	Wire guard pedicle	"	351489	1
5	Vapertite conduilet with reflector and socket	Crouse-Hinds	VNDA1359	2
6	Conduilet outlet	"	SKT12	1
7	" "	"	SKX12	1
8	" "	"	SKC12	1
9	" "	"	SKT12	1
10	" cover	"	SK84	4
11	" gasket	"	Gask208	2
12	Duplex plug receptacle			4
13	$\frac{1}{2}$" rigid electrical conduit			160'±
14	$\frac{3}{4}$" " " "			35'±
15	1" " " "			25'±
16	1½" " " "			15'±
17	2" " " "			40'±
18	1" standard 90° elbow			2
19	1" " " "			2
20	2" " " "			4
21 *	1" Erickson coupling			1
22 *	1½" " "			1
23 *	2" " "			2
24	$\frac{3}{4}$" rigid electrical conduit			140'±
25 *	#12 insulated copper wire			510'±
26 *	#6 1 cond. cable, R.C. 600V. ins. with 60% rubber jacket			80'±
27 *	#4 1 cond. cable, R.C. 600V. ins. with " " " "			40'±
28 *	#10 1 cond. cable, R.C. 600V. ins. with " " " "			120'±
29	Brass electrode, $\frac{3}{4}$" x 2" lg. (see detail)			5
30	3" bolt circle type insulator	Lapp	13761	8
31	Bus support fitting. Drill to clamp #6 bare solid wire	Locke	9853	3
32	Bus support fitting. Drill to clamp $\frac{3}{4}$" x electrode	"	"	3
33	#6 hard drawn copper wire			1,5'±
34	Conduilet outlet	Crouse-Hinds	TB-127	1
35	" " "	" "	C-17	2
36	" " "	" "	E-17	2
37	Conduilet outlet covers	" "	1771	3
38	Wall surface plate			4
40 *	#10 M.C.M. 1 cond. cable R.C. 600V. ins. with 60% rubber jacket			440'±
41	#2/0 bare stranded copper cable			240'±
42	"T" connectors for #2/0 stranded cable	Burndy	N72686	10
43	Ground rod, $\frac{3}{4}$" x 8'	Copperweld		4
44	Connector for #2/0 stranded cable to $\frac{3}{4}$" ground rod	Burndy	GA6426	4
45	Conduilet outlet	Crouse-Hinds	FS1	4
46	Special long radius 90° elbow, $\frac{3}{4}$" x 36" radius	GE		8

* indicates item deleted.

BY	DATE	CHARACTER
03	1/27/41	Minor revisions
03	1/27/41	Magnetic starter replaced by motor control MCB

REVISIONS

BY	DATE	AUTHORITY	REVISION
R	10-1-42	C.O. #7	Materials deleted or changed

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 5

LIGHTING & POWER SYSTEMS

SHEET 47 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] ASSIST. ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, ELECTRICAL DESIGN, DIV. OF DESIGN

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DIVISION ENGINEER

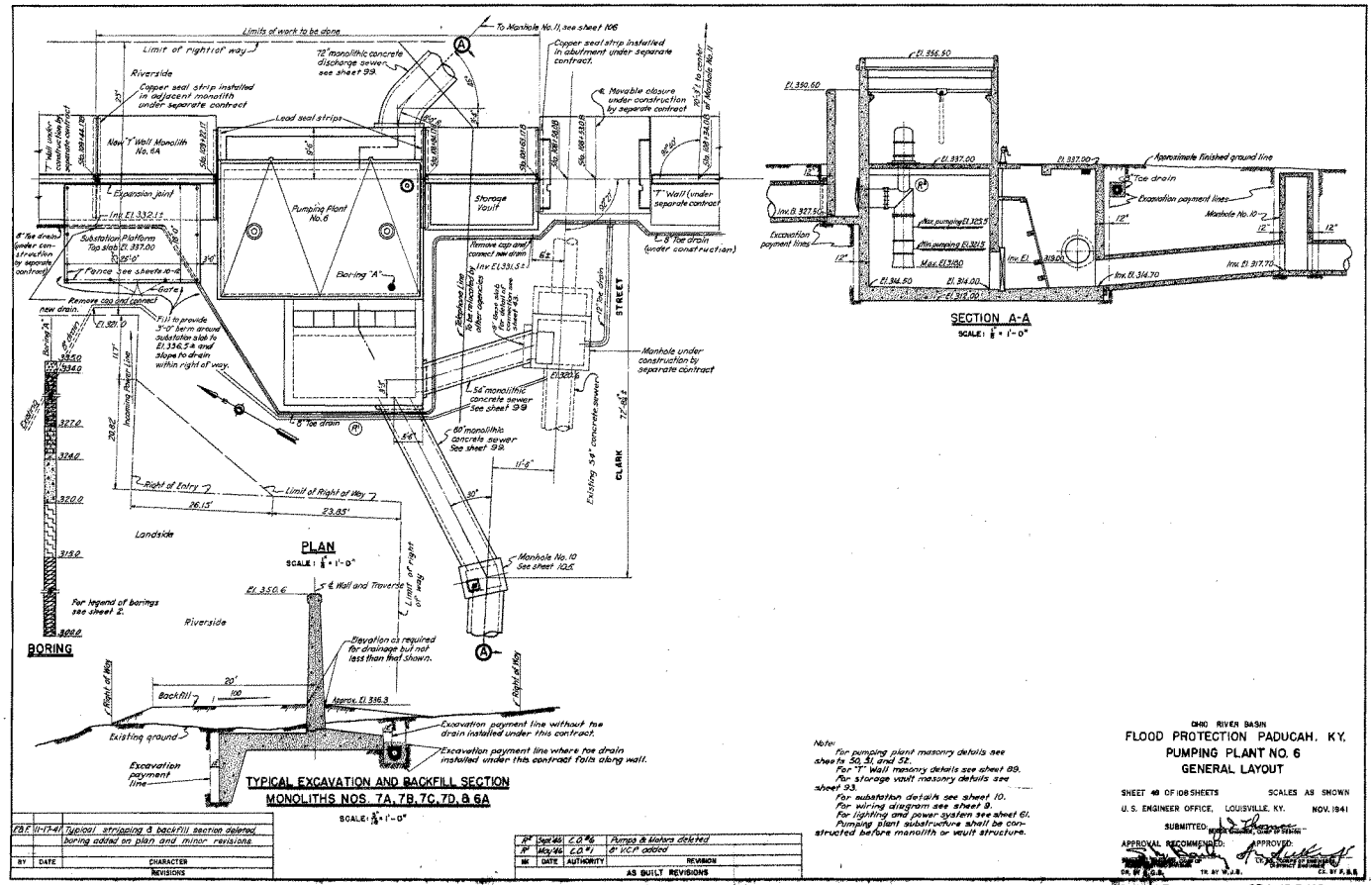
TR. BY E.R.G.

AS BUILT

934-12.3

912

151



Note:
For pumping plant masonry details see sheets 50, 51, and 52.
For "T" Wall masonry details see sheet 89.
For storage vault masonry details see sheet 93.
For substation details see sheet 10.
For wiring diagram see sheet 9.
For lighting and power system see sheet 61.
Pumping plant substructure shall be constructed before manolith or vault structure.

BY	DATE	CHARACTER REVISIONS
F.B.F.	VI-17-41	Typical stripping & backfill section deleted, boring added on plan and minor revisions.

BY	DATE	AUTHORITY	REVISION AS BUILT REVISIONS
R*	Sept. 46	C.O. #6	Pumps & Motors deleted
R*	May 46	C.O. #1	8" V.C.P. added

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 6

GENERAL LAYOUT

SHEET 49 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [illegible] Chief, Design Branch

APPROVAL RECOMMENDED: [illegible] Chief, Engineering Division

APPROVED: [illegible] District Engineer

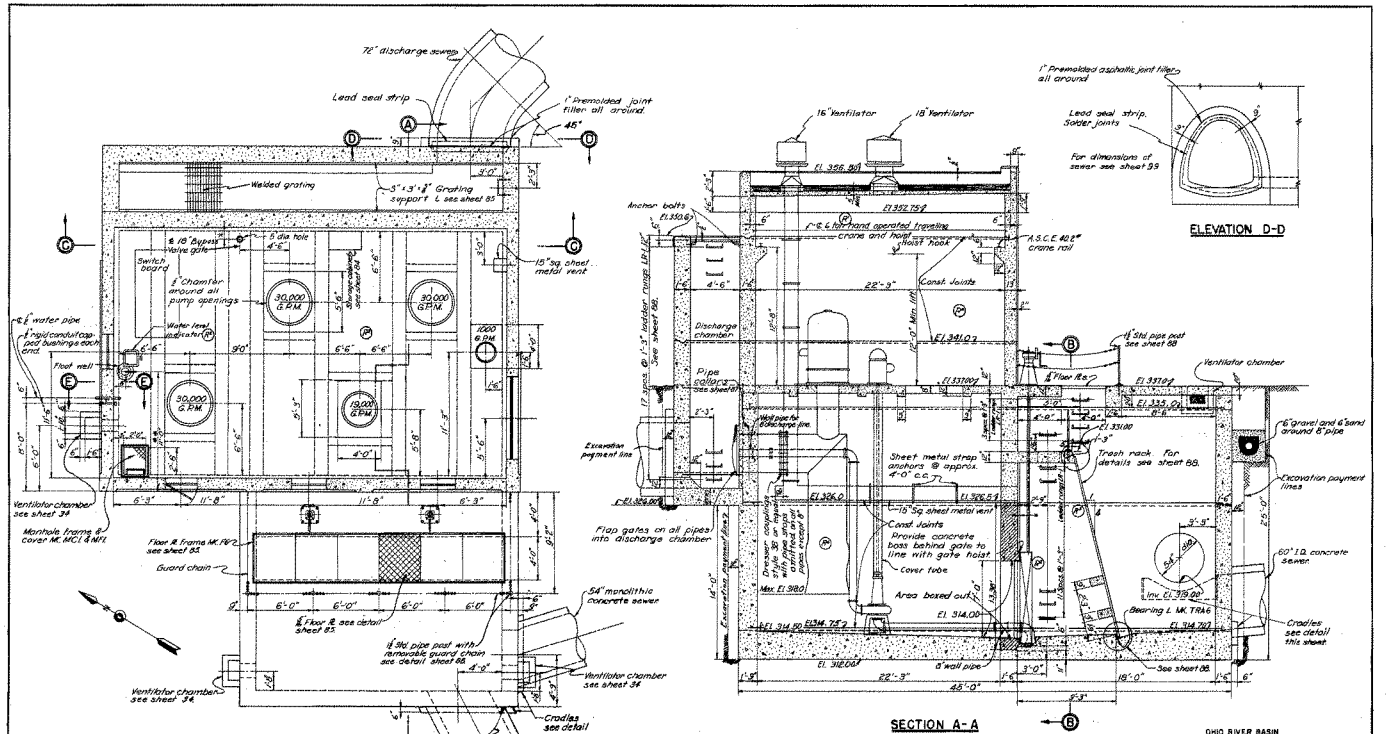
DR. BY [illegible] TR. BY W.J.B. CK. BY F.B.S.

AS BUILT

934-12.3/49

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R⁴		Field	Minor revisions
R³	Jun 1940	C.O. #12	Concrete Purlin deleted
R²	Sept 46	C.O. #6	Gates, Pumps, Motors & Electrically operated Equip deleted
R¹	Mar 46	C.O. #1	Crane size changed
M.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

F-6F	11-17-41	Gate hoist relocated, walkway slab revised and minor revisions
BY	DATE	CHARACTER

REVISIONS

Note:
For sections G-G, C-C, & E-E see sheet 52.
Dimensions shown thus (8) to be furnished by gate Manufacturer.
For details of concrete sewer see sheet 99.
For additional masonry details see sheet D 851.
For reinforcing details see sheet 33 to 60 inclusive.
Dimensions shown thus 8 ⅜ to be determined from level indicator furnished to provide access to wall ventilator.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 6

MASONRY DETAILS PLAN & SECTIONS

SHEET 50 OF 108 SHEETS SCALE: 3/8" x 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] CHIEF ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF ENGINEER, CHIEF OF DESIGN

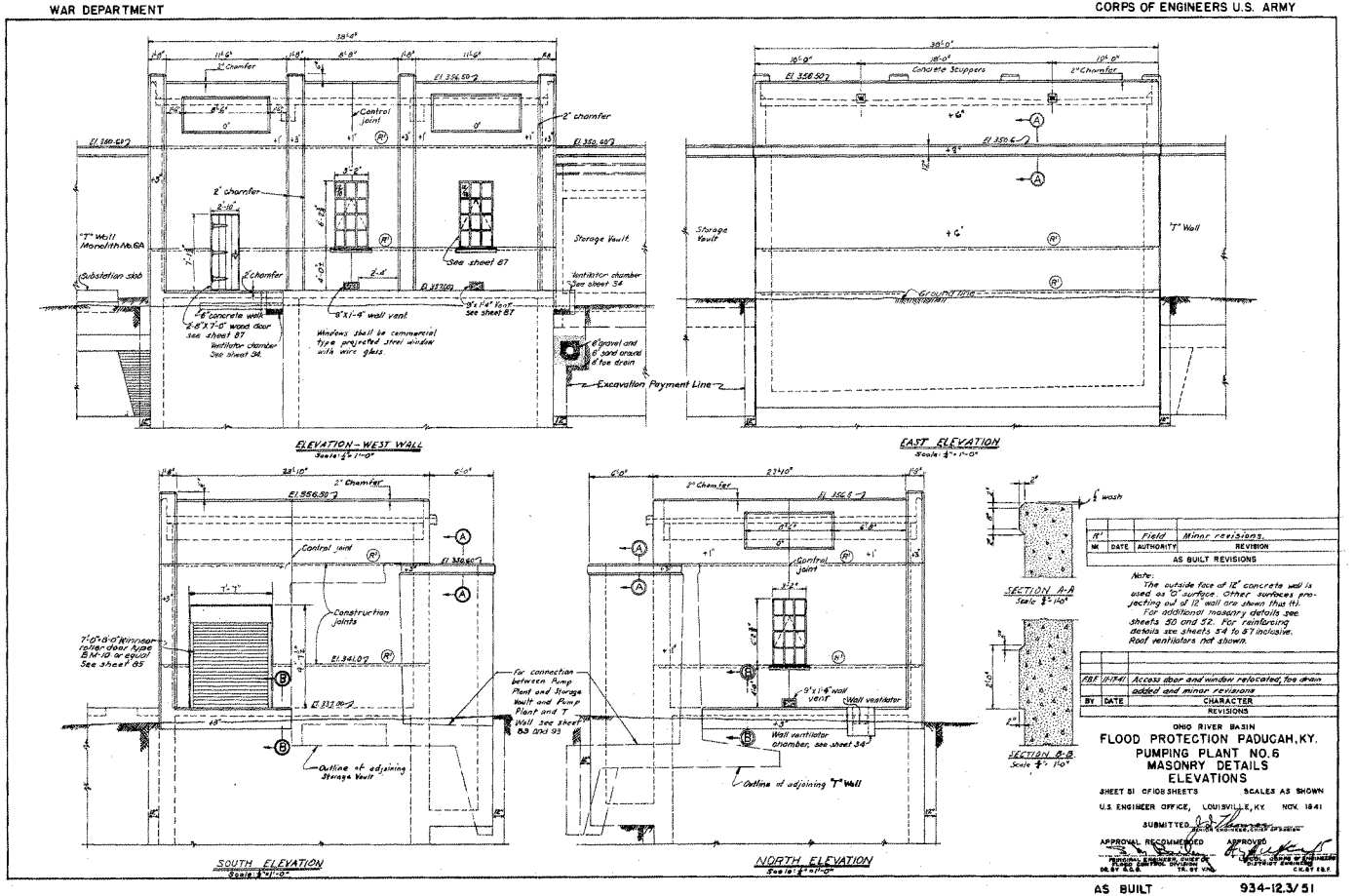
APPROVED: [signature] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.E.A. TR. BY [illegible] CK. BY R.D.K.

AS BUILT 934-12.3/50

WAR DEPARTMENT

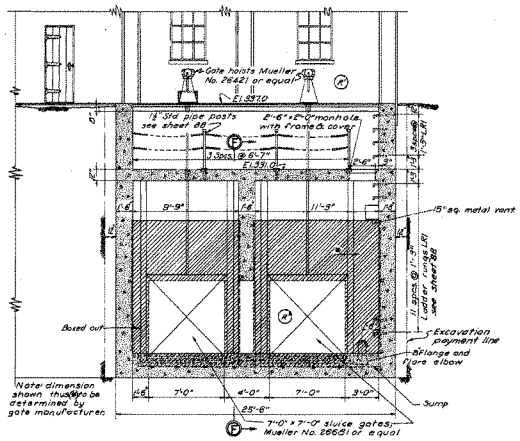
CORPS OF ENGINEERS U.S. ARMY



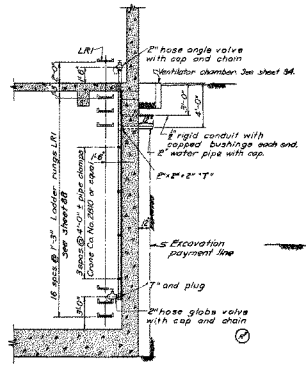
AS BUILT

934-12.3/51

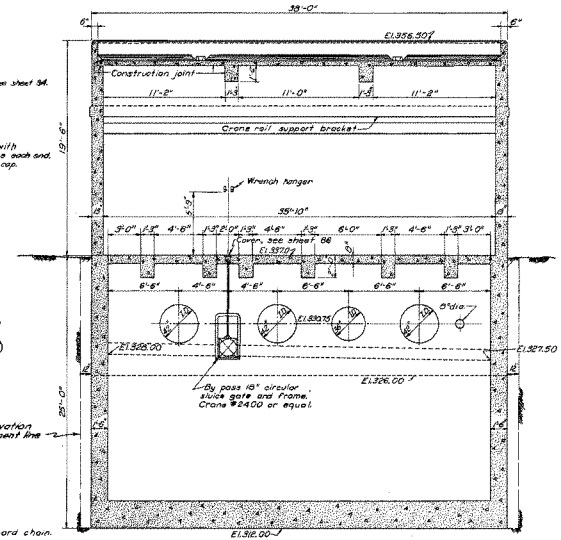
155



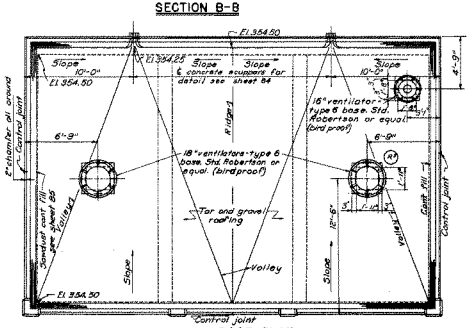
SECTION B-B



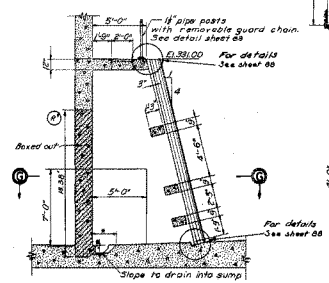
SECTION E-E



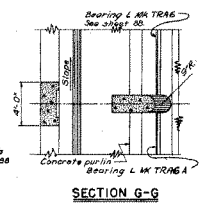
SECTION C-C



ROOF PLAN



SECTION F-F



SECTION G-G

Note:
In setting gate frame, care shall be taken to leave all wedge ports free and accessible.
For location of sections B-B, C-C, & E-E see sheet 50
For additional masonry details see sheets 50 & 51.
For reinforcing details see sheets 53 to 60 inclusive.
All curbs for ventilators shall be 3"x8". Dimensions "L" & "W" to be determined by ventilator manufacturer.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
MASONRY DETAILS
ROOF PLAN & SECTIONS

SHEET 52 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] Chief, Design Section

APPROVAL RECOMMENDED: [illegible] Chief, Design Section

APPROVED: [illegible] Colonel, Corps of Engineers, District Engineer

DR. BY & CD. TR. BY R.L.S. CK. BY F.B.F.

AS BUILT 934-12.3/52

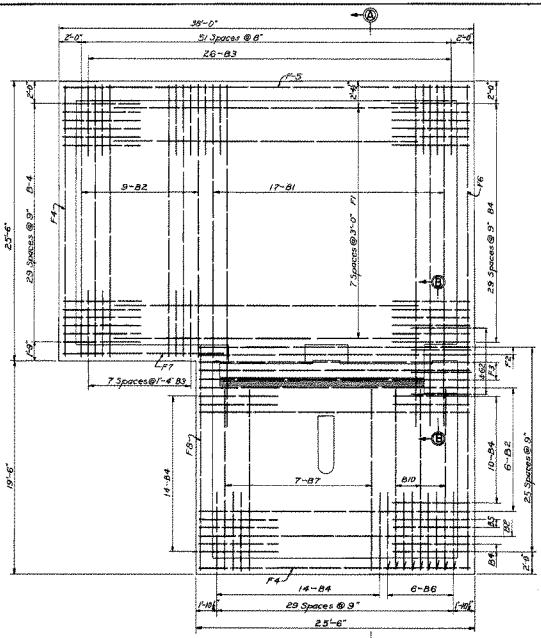
BY	DATE	CHARACTER REVISIONS
F.B.F.	11-17-41	Gate hoist relocated, door moved, pipe posts added and minor revisions.

NO	DATE	AUTHORITY	REVISION
4"		Field	Changes made in connection with C.O. #6. Minor revisions.
3"	Feb. 1948	C.O. # 6	2" hose globe valve with cap & chain deleted.
2"	Sept. 1946	C.O. # 4	Gates & hoists deleted.

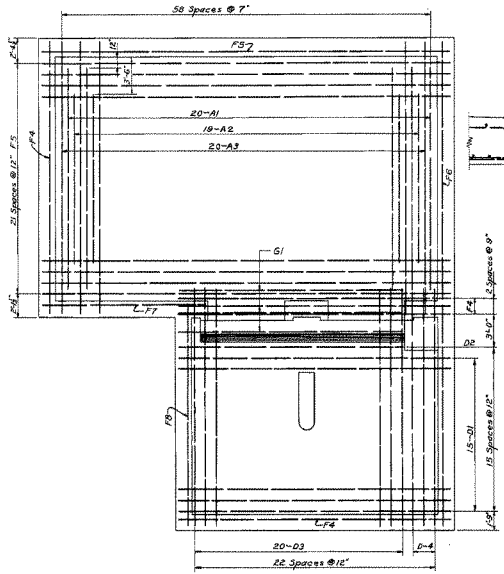
AS BUILT REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



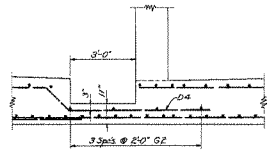
BOTTOM REINFORCING



TOP REINFORCING

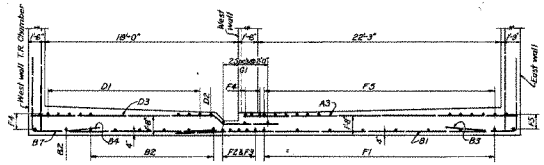
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION B-B

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"

Note:
For masonry details see sheets 50 and 52

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 6

REINFORCING DETAILS

BASE SLAB

SHEET 53 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: JOHN SHANETT, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PHILIP G. SCHERER, CHIEF, PROJECTS CONTROL BRANCH

APPROVED: W. M. GRAY, CHIEF, DISTRICT ENGINEER

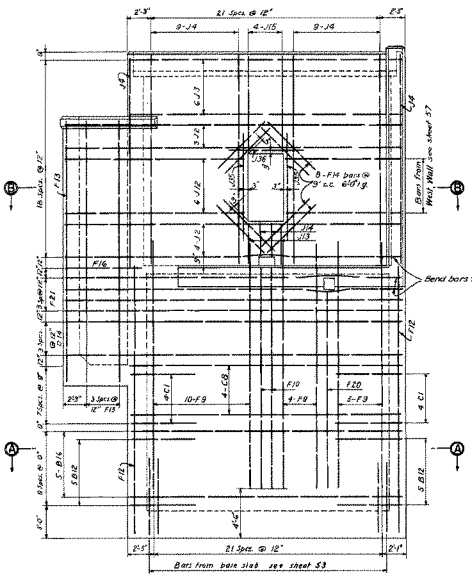
DR. BY S. C. B. TR. BY H. W. M. CK. BY P. G. S.

BY	DATE	CHARACTER REVISIONS
T.E.F.	11-17-41	Minor revisions.

AS BUILT

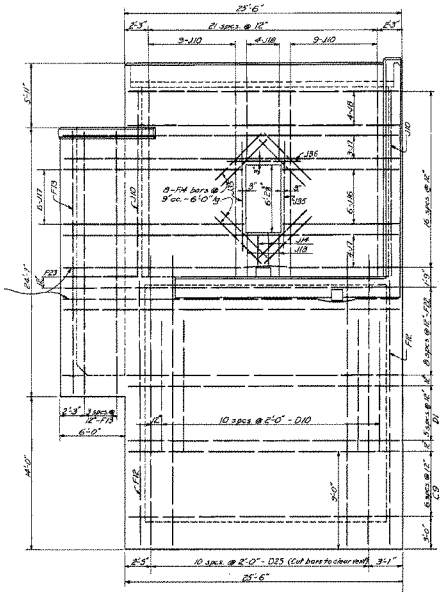
934-12.3/53

157



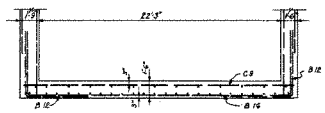
MEAR SIDE REINFORCING

ELEVATION- NORTH WALL

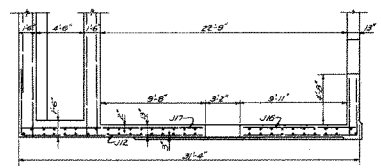


FAR SIDE REINFORCING

Note:
For masonry details see sheets 50, 51 and 52.



SECTION A-A



SECTION B-B

BY	DATE	CHARACTER REVISIONS
KBR	11-19-6	Minor revisions.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
NORTH WALL

SHEET 54 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] CHIEF ENGINEER, CHIEF OF DESIGN

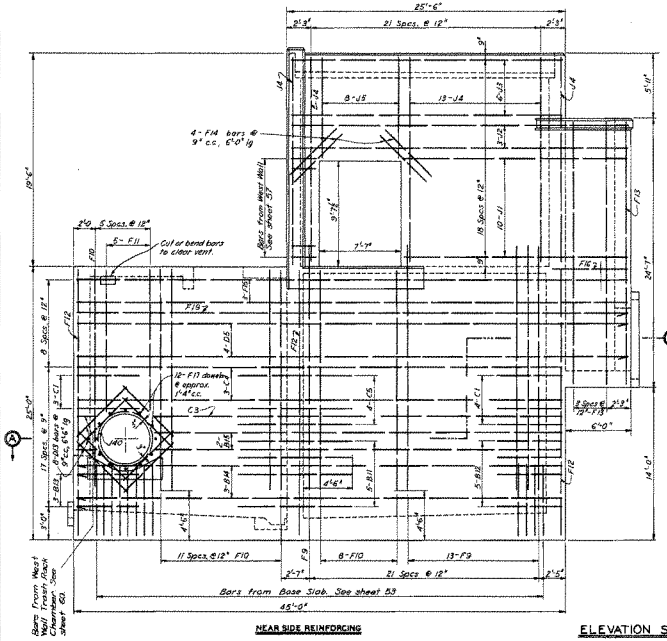
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

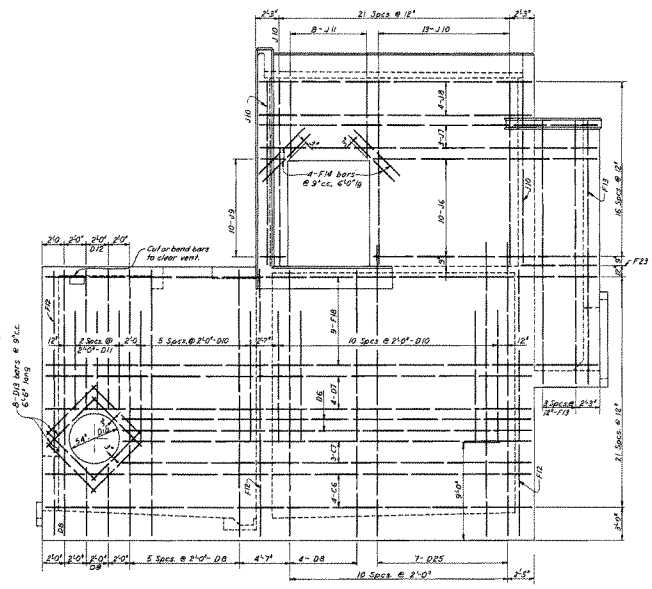
DR. BY G.C.B. TR. BY W.T.-G.E.B. CK. BY K.B.R.

AS BUILT

933-12.3/54



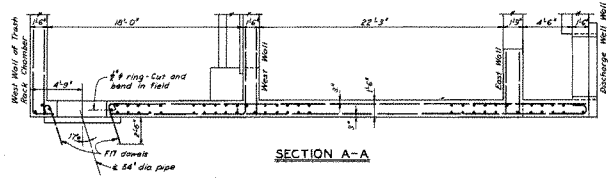
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

ELEVATION SOUTH WALL

Note:
For masonry details see sheets 51, 51 and 52
For reinforcing at pilasters see sheet 78



SECTION A-A

FDE	11-17-41	Wall ventilators added and minor revisions.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
SOUTH WALL

SHEET 55 OF 108 SHEETS SCALE ¼" = 1'-0"

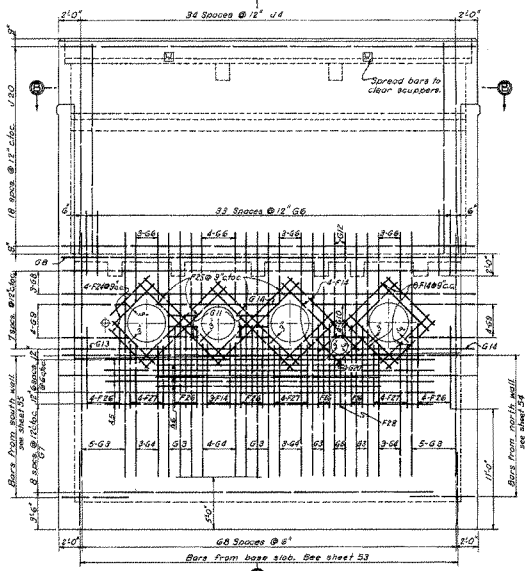
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: DISTRICT ENGINEER, CHIEF OF DESIGN

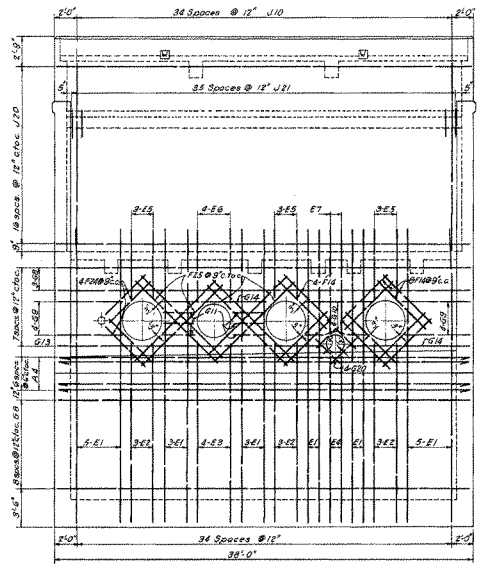
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION DR. BY G.C.B. TR. BY G.C.B.

APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER CH. BY W.J.K.

AS BUILT 934-12.3/55

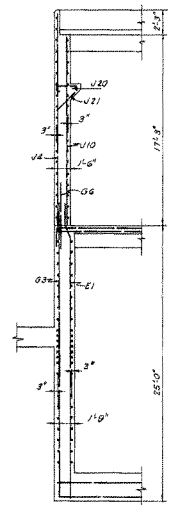


NEAR SIDE REINFORCING



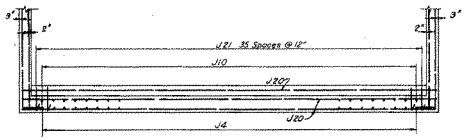
FAR SIDE REINFORCING

ELEVATION EAST WALL



SECTION A-A

Note:
For masonry details see sheets 50 and 51.



SECTION B-B

BY	DATE	CHARACTER REVISIONS
F.B.F.	11-17-41	Minor revisions.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
EAST WALL

SHEET 56 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

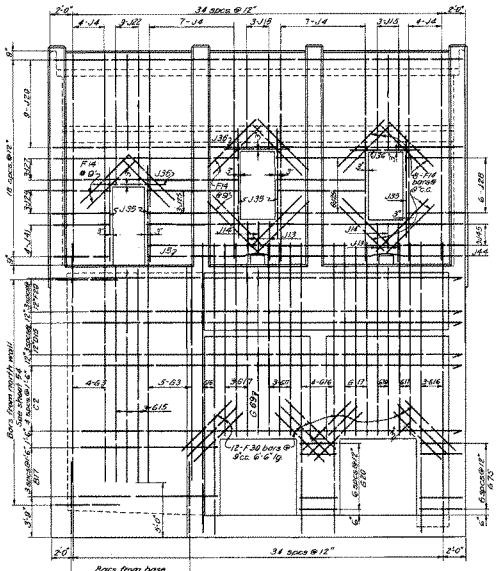
SUBMITTED: [signature] SENIOR ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

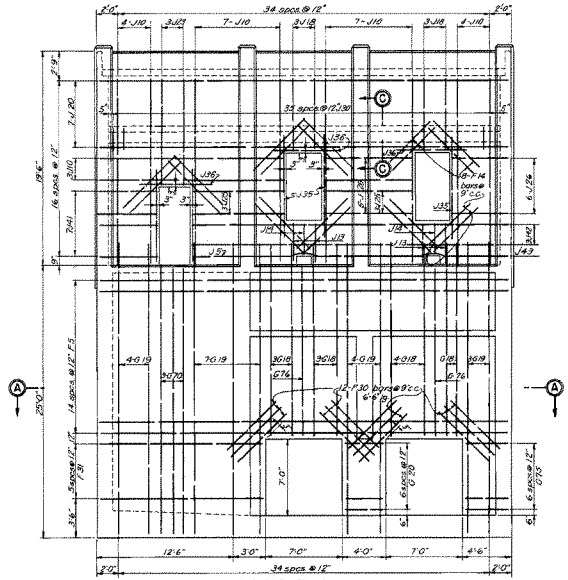
APPROVED: [signature] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.C.B. TR. BY J.Bc. CK. BY F.B.F.

AS BUILT 934-12.3/56



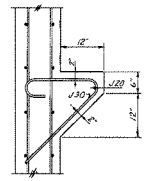
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

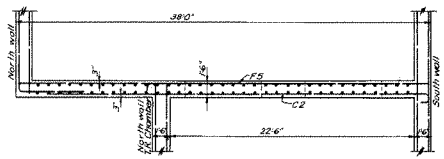
ELEVATION WEST WALL

SCALE: 1/4" = 1'-0"



SECTION C-C

SCALE: 1" = 1'-0"



SECTION A-A

SCALE: 1/4" = 1'-0"

Note:
For pilaster reinforcing see sheet 79
For masonry details see sheets 50, 51 and 52

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
WEST WALL

SHEET 57 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: SENIOR ENGINEER, DIST. OF PLAN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

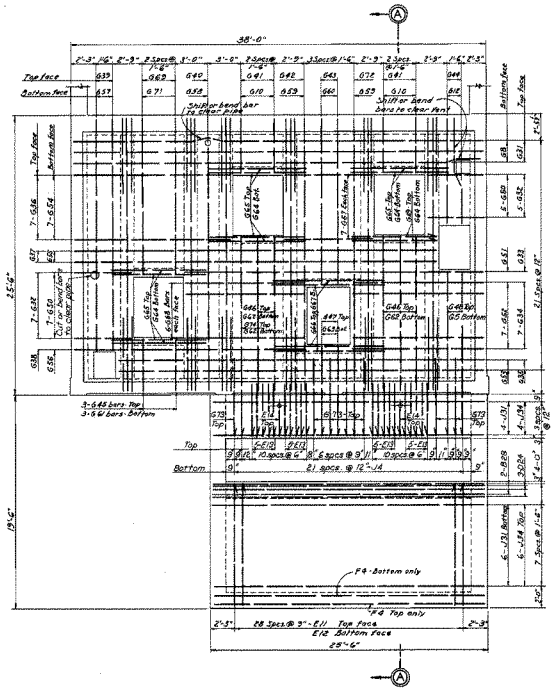
APPROVED: CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY: G.C.B. TR. BY: C.E. CK. BY F.B.F.

BY	DATE	CHARACTER
FBF	11-17-41	G69 Bars added, Window & Door revised

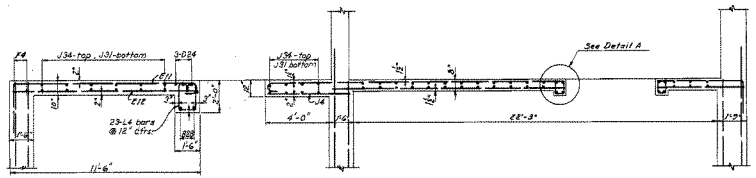
REVISIONS

AS BUILT 934-12.3/57



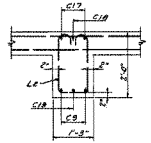
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



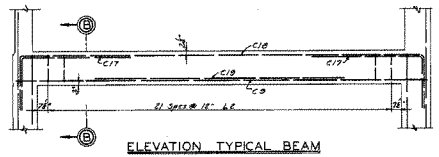
SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION B-B

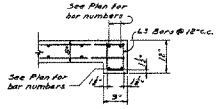
SCALE: $\frac{1}{4}$" = 1'-0"



ELEVATION TYPICAL BEAM

6 REQUIRED

SCALE: $\frac{1}{4}$" = 1'-0"



DETAIL A

SCALE: $\frac{1}{4}$" = 1'-0"

Note
For masonry details see sheets 50 and 52

BY	DATE	CHARACTER
KAF	11-17-41	Bars in walkway revised and minor revisions

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
MOTOR FLOOR

SHEET 58 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [signature] — CHIEF, DESIGN SECTION, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] — PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] — COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

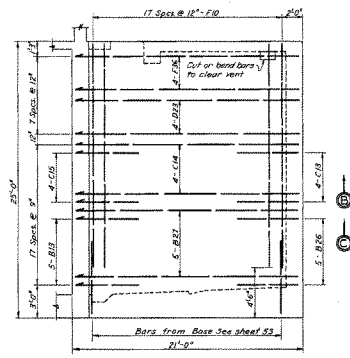
DR. BY: G.C.B. — TR. BY: V.F.C. — CK. BY: M.K.S.

AS BUILT

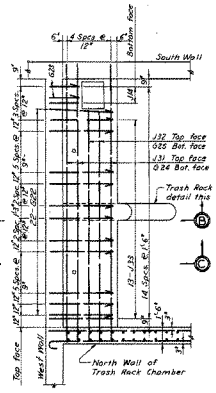
934-12.3/58

162

922

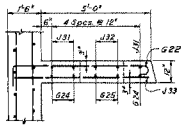


NEAR SIDE REINFORCING



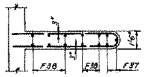
SECTION A-A

SCALE: 1/4" = 1'-0"



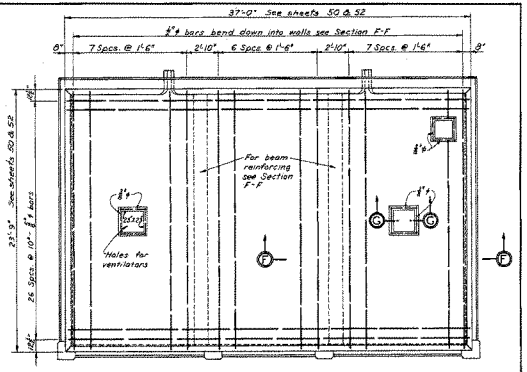
SECTION B-B

SCALE: 1/4" = 1'-0"



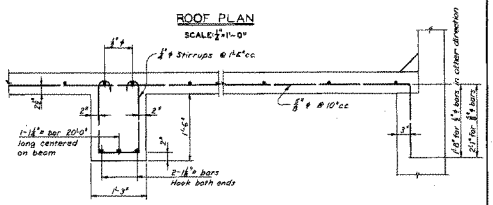
SECTION D-D

SCALE: 1/4" = 1'-0"



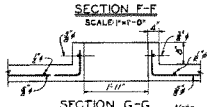
ROOF PLAN

SCALE: 1/4" = 1'-0"



SECTION F-F

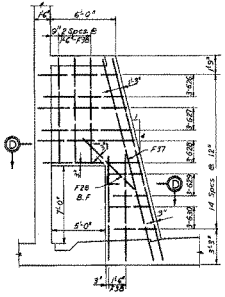
SCALE: 1" = 1'-0"



SECTION G-G

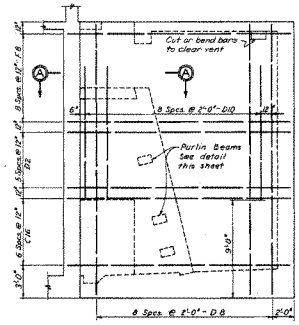
SCALE: 3/4" = 1'-0"

Note
For masonry details see sheets 39 and 52



ELEVATION C-C
TRASH RACK PIER

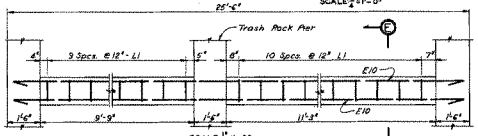
SCALE: 1/4" = 1'-0"



FAR SIDE REINFORCING

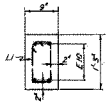
SCALE: 1/4" = 1'-0"

ELEVATION NORTH WALL OF TRASH RACK CHAMBER



SCALE: 1/4" = 1'-0"

PURLIN BEAM
3 REQD.



SECTION E-E

SCALE: 1" = 1'-0"

F.B.F.	11-1-94	Minor revisions & Section A-A changed.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 6

REINFORCING DETAILS ROOF SLAB, PURLIN, PIER & NORTH WALL TRASH CHAMBER

SHEET 59 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

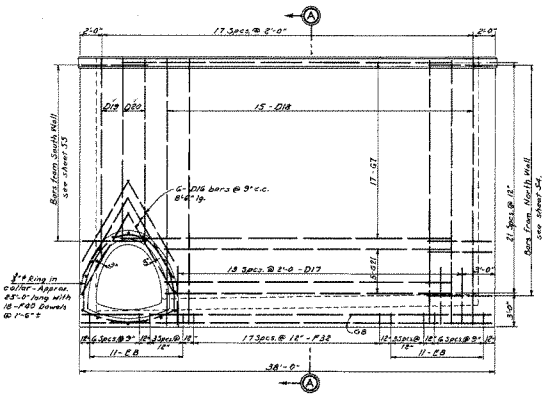
SUBMITTED: [illegible] — MAJOR, CORPS OF ENGINEERS, DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible] — CHIEF, STRUCTURAL DESIGN SECTION, DIV. ENGINEER

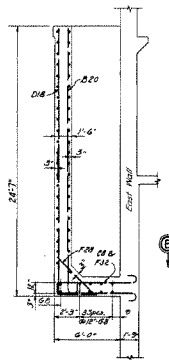
APPROVED: [illegible] — COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.S.B. — TR. BY G.S.B. — CK. BY F.B.F.

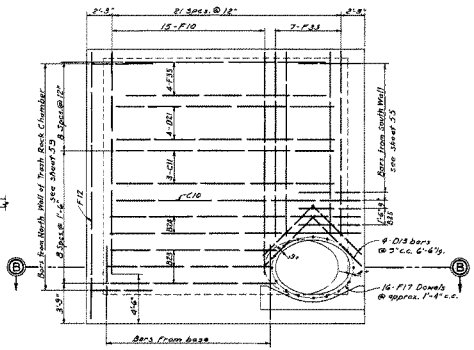
AS BUILT 934-12.3/59



NEAR SIDE REINFORCING



SECTION A-A



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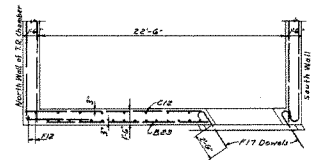
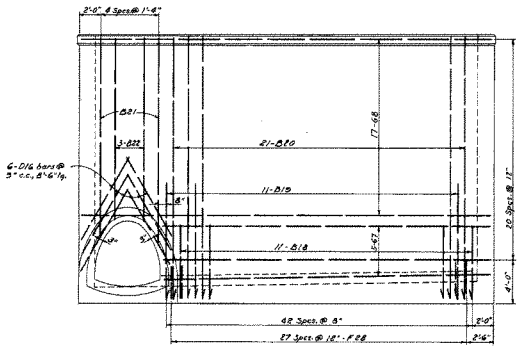
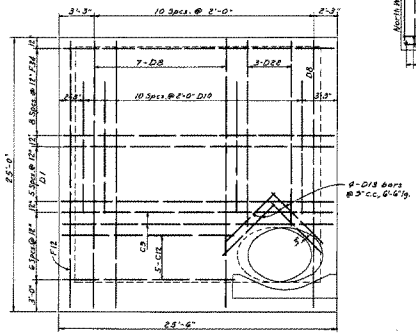


SECTION B-B



FAR SIDE REINFORCING

ELEVATION - DISCHARGE WELL WALL



FAR SIDE REINFORCING

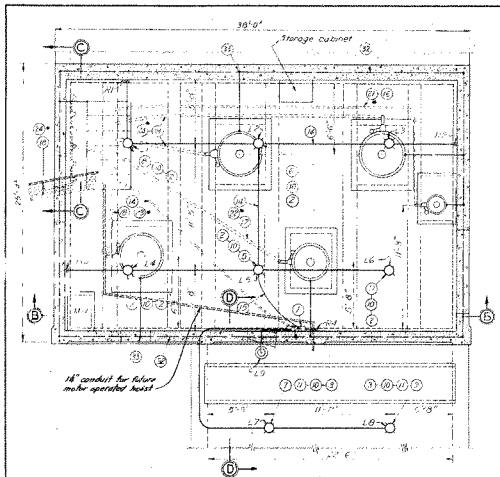
ELEVATION - WEST WALL TRASH CHAMBER

Note:
For masonry details see sheets 50 and 51

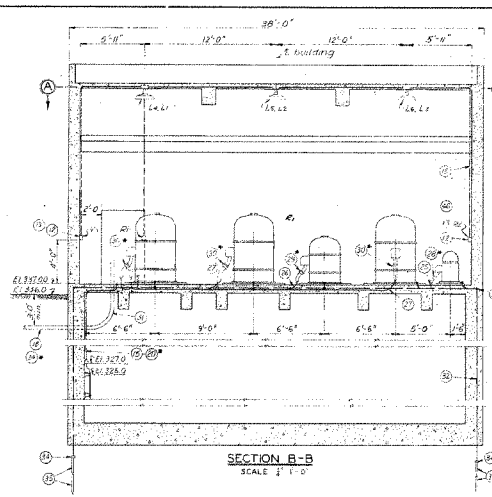
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
DISCHARGE CHAMBER WALL, FLOOR AND WEST WALL TRASH CHAMBER
SHEET 60 OF 108 SHEETS SCALE 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED: DIVISION ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: APPROVED:
CHIEF, DESIGN BRANCH
CHIEF, ENGINEERING DIVISION
CHIEF, DESIGN DIVISION
CHIEF ENGINEER
SUBCHIEF ENGINEER
DR. BY: G.C.B. TR. BY: E.F.C. CK. BY: F.R.F.

BY	DATE	CHARACTER REVISIONS
F.R.F.	11-17-41	Minor revisions

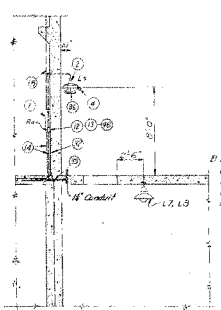
AS BUILT 934-12.3/60



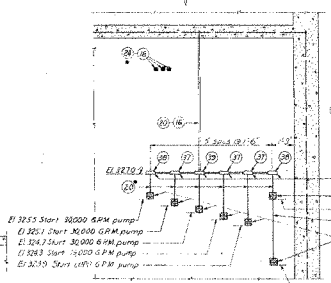
SECTION A-A
SCALE: 1/4" = 1'-0"



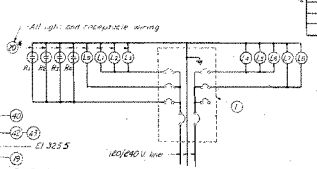
SECTION B-B
SCALE: 1/4" = 1'-0"



SECTION D-D
SCALE: 1/4" = 1'-0"



SECTION C-C
SCALE: 1/4" = 1'-0"



WIRING DIAGRAM
LIGHTING CIRCUIT

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUAN-TITY
1	4 circuit light distribution panel (Surface type)			
2	R.L.M. damp reflector and socket	Wirt	740-573	7
3	Incandescent conduit with reflector and socket	Crouse-Hinds	VR1241054	2
4	Padlock	Yale	3514B42	1
5	Conduit outlet	Crouse-Hinds	STK 22	1
6	" " "	" "	STK 12	1
7	" " "	" "	STK 12	3
8	" " "	" "	STK 12	1
9	" " "	" "	STK 12	2
10	Conduit cover	" "	S-4 B4	8
11	Gasket	" "	Gasket BOB	2
12	Conduit outlet	" "	FD 1	4
13	Duplex plug receptacle			4
14	1/2" rigid electrical conduit			240'±
15	1" " " "			20'±
16	1" " " "			5'±
17	2" " " "			30'±
18	3" " " "			60'±
19	#6 hard drawn bareshield wire			300'±
20*	#12 AWG insulated copper wire			650'±
21*	#8 cond cable, #1,000V min. with 60% rubber jacket			50'±
22*	#10 " " " " "			60'±
23*	400 MCM cond cable, #1,000V min. with 60% rubber jacket			100'±
24*	450 " " " " " with 60% rubber jacket			54'±
25	1" standard 90° elbow			6
26	2" " " "			2
27	3" " " "			6
28*	1" Erickson coupling			1
29*	2" " "			1
30*	3" " "			3
31	Special long radius 90° elbow, 4" & 48" radius	G.E.		8
32	#250 bare stranded copper wire			250'±
33	T connector for #1/0 stranded cable	Burndy	UT24-26	11
34	Connector for #1/0 stranded cable to 1/2" rod		YA 4-47A	4
35	Ground rod, 1/2" x 8'-0" long	Copperweld		4
36	Wire guard for reflector	Wirt	351-1407	1
37	Conduit outlet	Crouse-Hinds	CT	3
38	" " "	" "	CT	2
39	" " "	" "	T8237	2
40	Conduit cover	" "	T71	6
41	" " "	" "	T170	
42	3" bolt circle type insulator	Lapp	197-C	7
43	Bus support fitting bolt to clamp & bare solid wire	Locke	9853	7
44	" " " " " 1/2" dia electrode	"	9858	6
45	Brass electrode (See Part No. 35 sheet 4.)			6
46	Wall surface plate			4
R₆ 18A	4" rigid electrical conduit			130'±

Notes:

Figures in circles refer to Part numbers on Bill of Material.

All material shall be of the manufacture, type and catalog number specified, or its equal.

All conduit in floor shall be placed as near the center of same as possible and shall clear opening for pump removal.

Small fittings, conduits, etc., not listed shall be furnished as required.

200 watt bulbs shall be furnished and installed in all lights.

* Indicated items Deleted.

LEGEND

Embedded Conduit
Exposed Conduit
Concealed Conduit
Ground Wire

R₂		Field	Bill of Material Changed & Minor Revisions.
R₁	Feb. 27,	C.O. No. 7	Materials Deleted
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

D3	11/27/61	Magnetic starter replaced by motor control A.C.B.
D2	11/2/61	Minor revisions
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
LIGHTING & POWER SYSTEMS

SHEET 61 OF 108 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [signature] — CHIEF, ELECTRICAL DESIGN

APPROVAL RECOMMENDED: [signature] — CHIEF, ELECTRICAL DESIGN, FLOOD CONTROL DIVISION, OFFICE OF DIV. ENGR. OR BY D.E.-C.E.E.

APPROVED: [signature] — CHIEF, FLOOD CONTROL DIVISION, OFFICE OF DIV. ENGR. OR BY D.E.

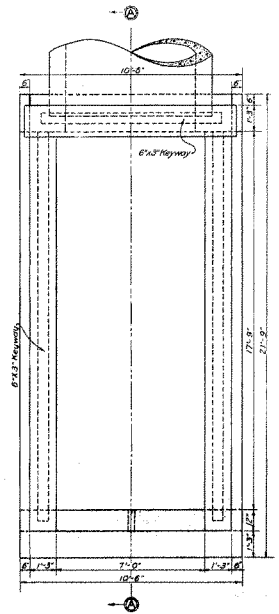
AS BUILT — 934-12.3/61

925

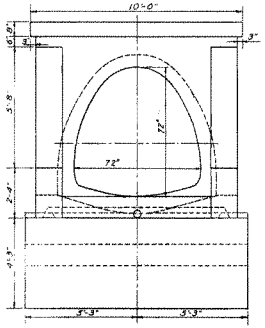
165

WAR DEPARTMENT

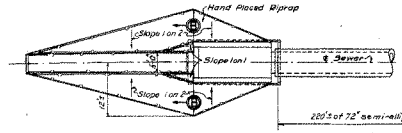
CORPS OF ENGINEERS, U. S. ARMY



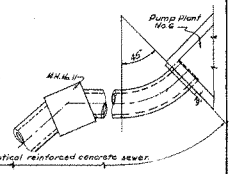
PLAN
SCALE: 1/4" = 1'-0"



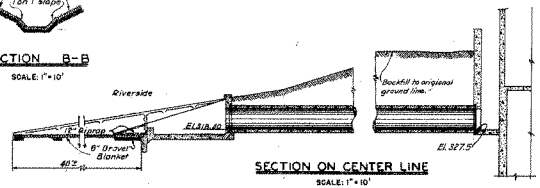
ELEVATION
SCALE: 1/4" = 1'-0"



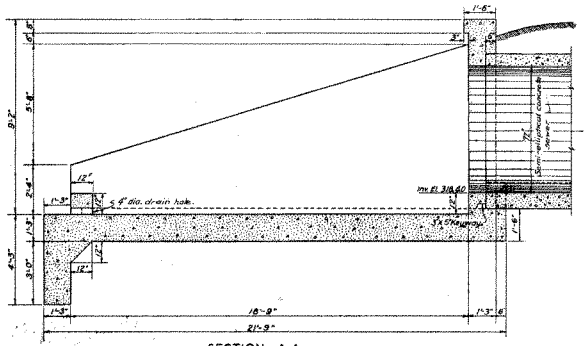
PLAN
SCALE: 1" = 10'



SECTION B-B
SCALE: 1" = 10'



SECTION ON CENTER LINE
SCALE: 1" = 10'



SECTION A-A
SCALE: 1/4" = 1'-0"

General Notes:
For reinforcing details see sheet 63
For location see sheet 38.
For sewer details see sheet 39.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
MASONRY DETAILS
CLARK STREET OUTFALL HEADWALL

SHEET 62 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, FLOOD CONTROL DIVISION, OR. BY W.S.

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER, CE. BY F.B.F.

BY	DATE	CHARACTER OF REVISION
EBF	11-17-61	Minor revisions

AS BUILT

934-12.3/62

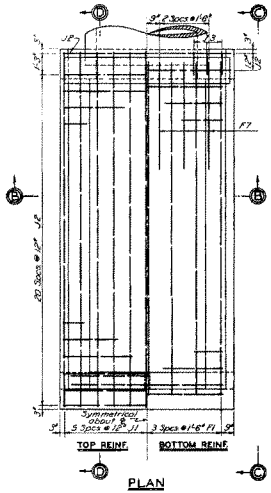
REINFORCEMENT SCHEDULE

SIZE	D
3/4" OR LESS	6"

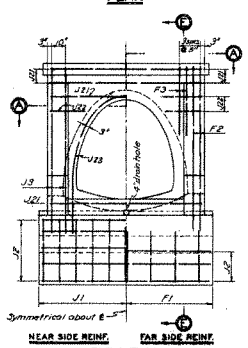
BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	7	3/4" ϕ	28'-9"	1'-9" 18" 18" 1'-9" (11'-6" Total)	36.42	254.9
F2	4	"	11'-2"	18" 10'-2"	16.77	67.1
F3	4	3/8" ϕ	4'-3"	Straight	6.38	25.5
F4	3	"	22'-8"	6'-10" 9'-0" 6'-10"	34.05	102.2
F5	3	"	24'-6"	7'-9" 7'-9"	36.80	110.4
F6	1	"	26'-4"	8'-8" 9'-0" 8'-8"	39.53	39.6
F7	6	"	8'-3"	1'-9" 6'-6"	12.39	74.3
G1	2	3/8" ϕ	2'-3"	Straight	2.35	4.7
G2	2	"	3'-2"	"	3.30	6.6
G3	2	"	4'-1"	"	4.26	8.5
G4	2	"	5'-0"	"	5.22	10.4
G5	2	"	5'-11"	"	6.17	12.3
G6	2	"	6'-10"	"	7.13	14.3
G7	2	"	7'-9"	"	8.08	16.2
J1	11	3/4" ϕ	23'-2"	5'-11" 11'-4"	16.81	184.9
J2	31	"	10'-2"	Straight	6.79	210.5
J3	6	"	11'-6"	1'-4" 10'-2"	7.68	46.1
J4	1	"	16'-10"	3'-11" 8'-0" 3'-11"	11.24	11.2
J5	2	"	16'-0"	3'-6" 5'-6" 3'-6"	10.69	21.4
J6	3	"	17'-2"	4'-1" 4'-1"	11.47	34.4
J7	3	"	19'-0"	5'-0" 5'-0"	12.69	38.1
J8	3	"	20'-10"	5'-11" 9'-0" 5'-11"	13.92	41.8
J9	2	"	6'-2"	1'-2" 5'-0"	4.12	8.2
J10	2	"	11'-0"	10'-0"	7.35	14.7
J11	2	"	16'-0"	15'-0"	10.69	21.4
J12	4	"	20'-7"	1'-2" 19'-7"	13.75	55.0
J13	2	"	4'-0"	Straight	2.67	5.3
J14	2	"	7'-4"	"	4.90	9.8
J15	2	"	10'-10"	"	7.24	14.5
J16	2	"	14'-3"	"	9.52	19.0
J17	2	"	17'-3"	"	11.52	23.0
J18	4	"	18'-7"	"	12.41	49.6
J19	2	"	21'-6"	1'-2" 20'-6"	14.36	28.7
J20	2	"	20'-8"	1'-2" 19'-6"	13.81	27.6
J21	8	"	9'-2"	Straight	6.12	49.0
J22	6	1/2" ϕ	2'-3"	"	1.50	9.0
J23	1	"	19'-8"	See elevation	13.14	13.1
				Total		1683

BY	DATE	CHARACTER
F.B.F.	6-17-41	Minor revisions

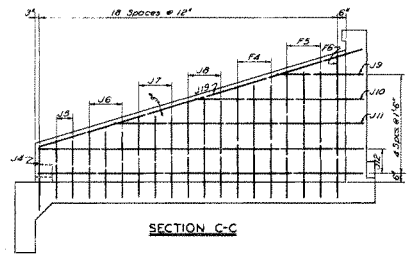
REVISIONS



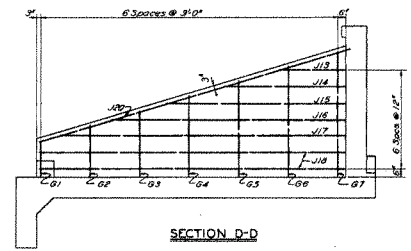
PLAN



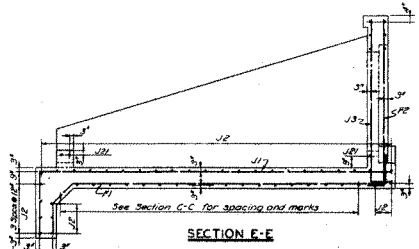
ELEVATION



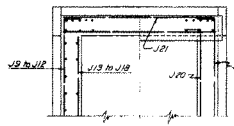
SECTION C-C



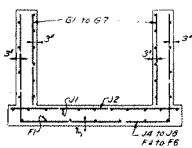
SECTION D-D



SECTION E-E



SECTION A-A



SECTION B-B

General Notes:
For masonry details see sheet 62

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
CLARK STREET OUTFALL HEADWALL

SHEET 63 OF 108 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] Chief, Design Branch

APPROVAL RECOMMENDED: APPROVED:

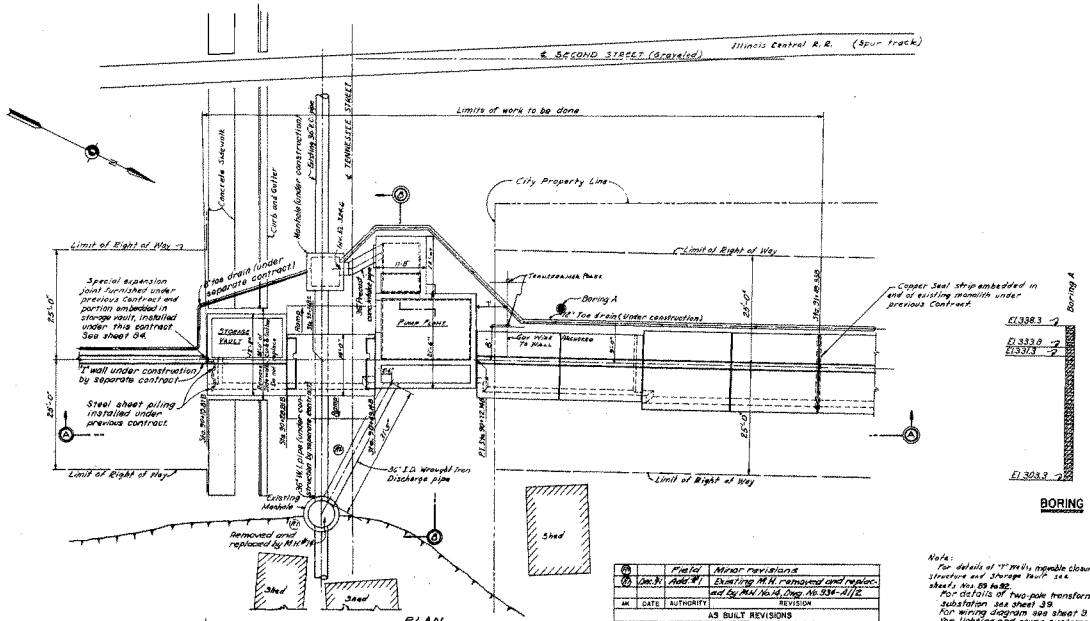
FOR: CHIEF, DESIGN BRANCH, FLOOD CONTROL DIVISION
DR. BY R.A.D. TR. BY W.A.K.

LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER
CH. BY E.B.K.

AS BUILT 934-123/63

927

167



		Filed	Minor revisions.
	Dec. 74	Add. #1	Existing MH removed and replaced by MH No. 14, Dwg. No. 934-A12.
AK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

Note:
For details of "T" walls, riprap closure structure and storage vault see sheets Nos. 59 to 62.
For details of two-pole transformer substation see sheet 39.
For wiring diagram see sheet 9.
For lighting and power systems see sheet 76.
Pumping plant substructure shall be constructed before monolith 7A.
For boring symbols see sheet 2.
For typical excavation and backfill section at wall see sheet 43.

FBF	11/74	Boring added & minor revisions
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
GENERAL LAYOUT

SHEET 64 OF 108 SHEETS — SCALE: 1" = 10'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941

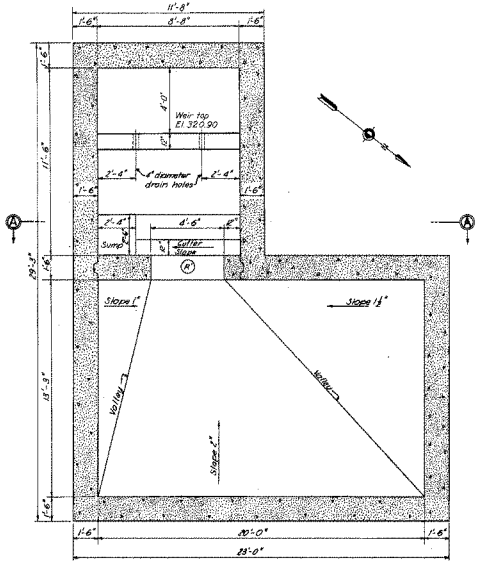
SUBMITTED: [illegible] Chief, Design Branch

APPROVAL RECOMMENDED: [illegible] Chief, Design Branch

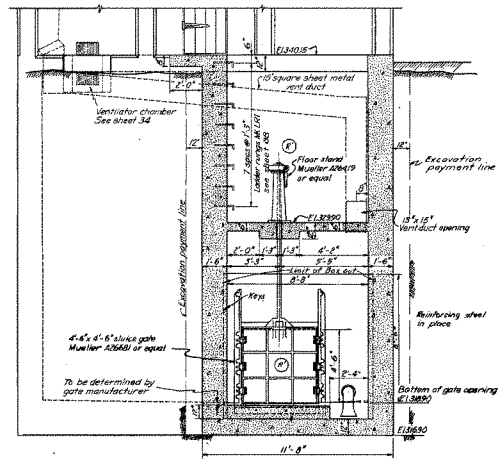
APPROVED: [illegible] Colonel, Corps of Engineers, District Engineer

AS BUILT 934-12.3/64

928



PLAN BASE



SECTION A-A

Note:
In setting gate frame, care shall be taken to leave all wedge parts free and accessible.
Provide 1½" recess under gate.
For additional masonry details see sheets 66, 67 & 68
For reinforcing details see sheets 69 to 73 inclusive

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
MASONRY DETAILS
BASE PLAN & SECTION

SHEET 85 OF 108 SHEETS — SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941

SUBMITTED: [signature] — UNIT ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] — PRINCIPAL ASSISTANT ENGINEER, CONTROL WORKS DIV. ST. W. ED.

APPROVED: [signature] — LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER, TR. W. ENG. B. — CH. ST. F.B.K.

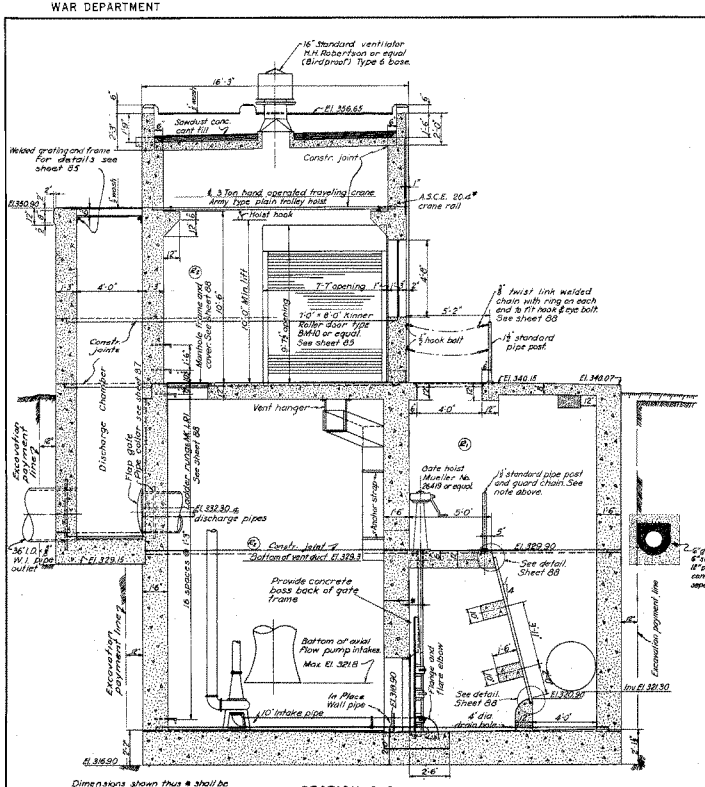
F.B.K.	11-17-41	Sump vent added, pump sump changed and minor revisions.
BY	DATE	CHARACTER REVISIONS

8"	Sept. 1946	C.O. "G" &	Gates & hoists deleted. Opening boxed.
BY	DATE	AUTHORITY	REVISION

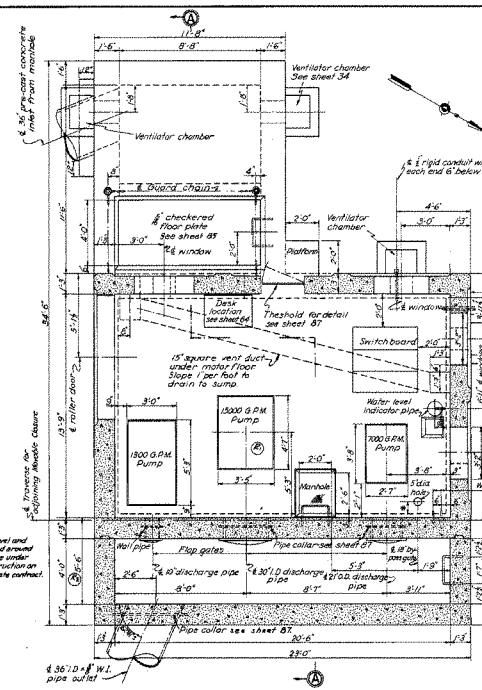
AS BUILT REVISIONS

AS BUILT

934-12.3/65



SECTION A-A



PLAN

Note:
For additional masonry details see sheets 65, 67 and 68.
For reinforcing details see sheets 69 to 73 inclusive.
Chamber pump openings in motor floor 1/2" all around.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
MASONRY DETAILS
PLAN & SECTION

SHEET 66 OF 108 SHEETS — SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [illegible] — ASSOC. ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] — PRINCIPAL ENGINEER, CHIEF OF DESIGN, DIVISION — DR. BY R.F.T. — TR. BY K.E.B.

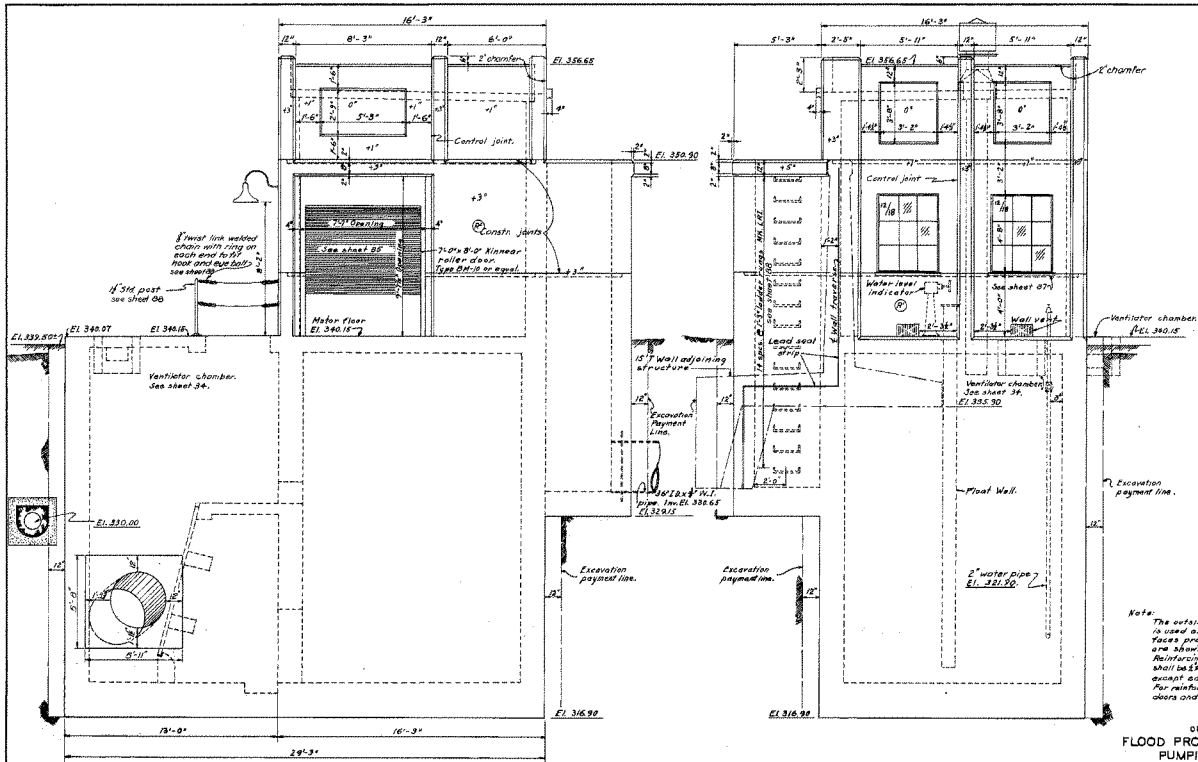
APPROVED: [illegible] — LT. COL., C.E. CHIEF OF DESIGN, DISTRICT ENGINEER — CK. BY R.W.F.

BY	DATE	CHARACTER OF REVISIONS
F.B.F.	11-17-41	Ventilator chambers & the drain added. Minor revisions.

No.	Date	Authority	Revision
		Field	Minor Revisions
41	Sept 46	C.O.No. 6	Pumps, Motors, Gates & Hoists Deleted

AS BUILT REVISIONS

AS BUILT — 934-12.3/66



SOUTH ELEVATION

NORTH ELEVATION

Note:
The outside face of 12" Conc. wall is used as "0" surface. Other surfaces projecting out of 12" wall are shown thus (+) inches. Reinforcing in superstructure walls shall be 3/4" ⌀ each way, both faces, except east wall, see sheet 70. For reinforcing in pilasters and around doors and windows, see sheet 72.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
PUMPING PLANT NO. 7
MASONRY DETAILS
ELEVATIONS

SHEET 67 OF 108 SHEETS SCALE 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] CHIEF, DESIGN BRANCH

APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

PRINCIPAL ENGINEER, DESIGN BRANCH — CHIEF, ENGINEERING DIVISION

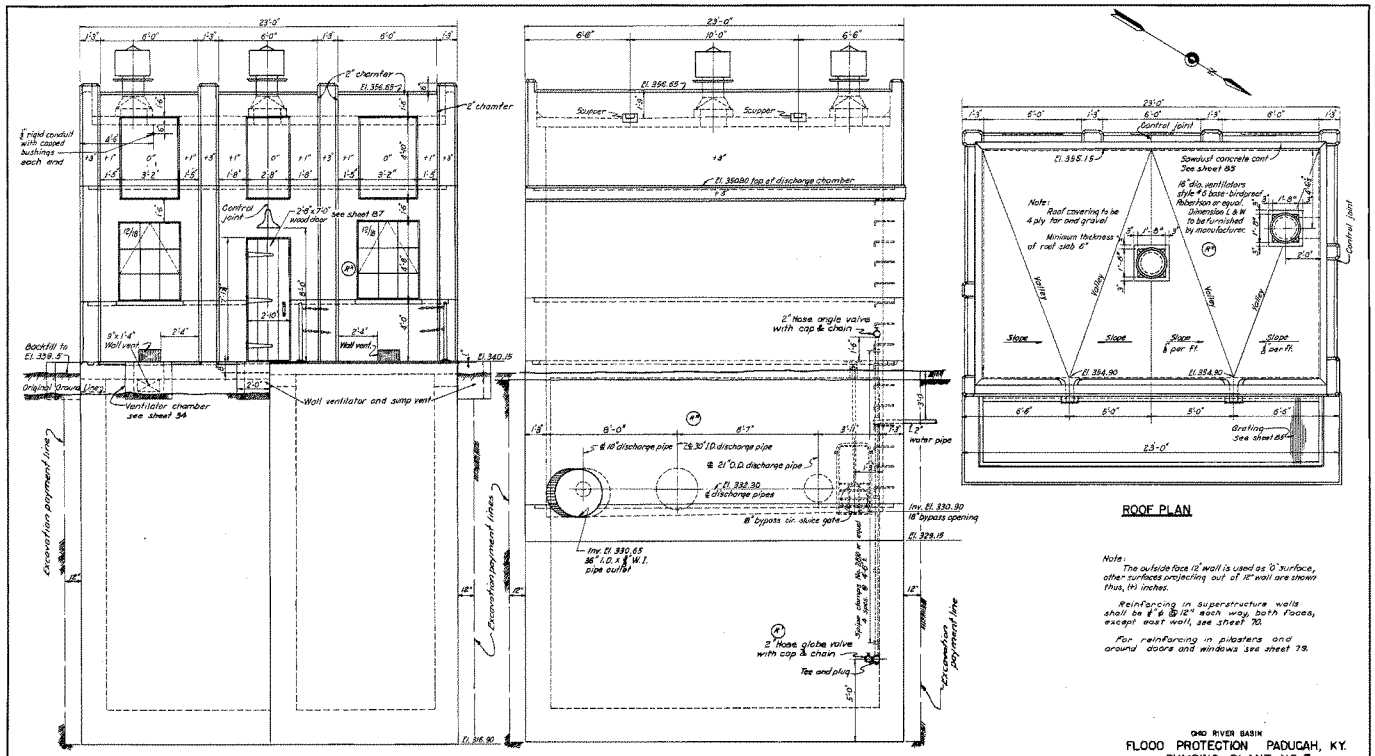
DR. BY M.P.F. TR. BY [illegible] CK. BY [illegible]

BY	DATE	CHARACTER REVISIONS
RMF	11-7-41	Ventilator chamber and tie drain added.
		Minor revisions.

MK	DATE	AUTHORITY	REVISION
R2		Field	Minor Changes
R1	Sep 1946	C.O. # 6	Water Level indicator deleted

AS BUILT REVISIONS

AS BUILT 934-123/67



WEST ELEVATION

EAST ELEVATION

ROOF PLAN

Note:
The outside face 12" wall is used as "0" surface, other surfaces projecting out of 12" wall are shown thus, (+) inches.

Reinforcing in superstructure walls shall be 1" ⊕ @ 12" each way, both faces, except west wall, see sheet 70.

For reinforcing in pilasters and around doors and windows see sheet 79.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
MASONRY DETAILS
ROOF PLAN AND ELEVATIONS

SHEET 68 OF 108 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] MAJOR, ENGINEERS, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH, FLOOD CONTROL DIVISION

APPROVED: [signature] DISTRICT ENGINEER

DR. BY M.F.F. TR. BY L.J.B. CK. BY F.S.F.

BY	DATE	CHARACTER
FSF	11-17-41	Ventilator chambers added, ground line corrected & minor revisions.

REVISIONS

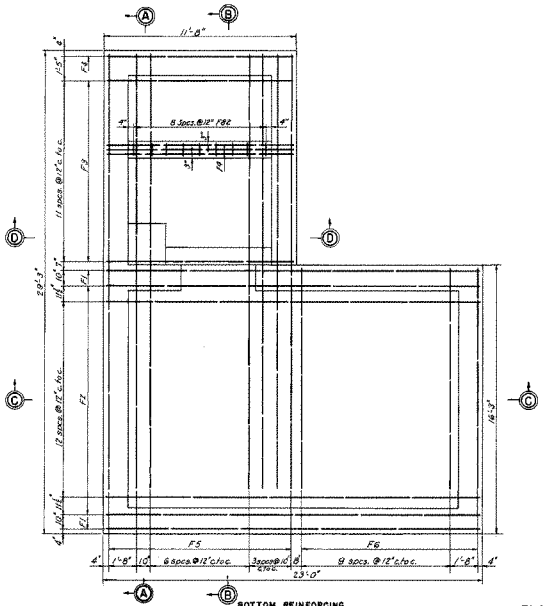
NR	DATE	AUTHORITY	REVISION
R*		Field	Minor revisions.
R'	Aug 1944	C.O. #5	2" Hose globe valve with cap & chain deleted.

AS BUILT REVISIONS

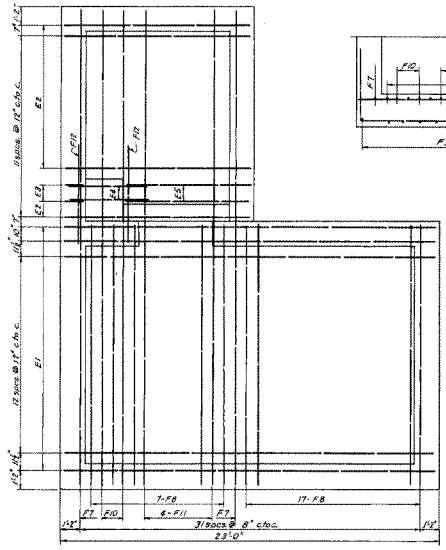
AS BUILT 934-12.3/68

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

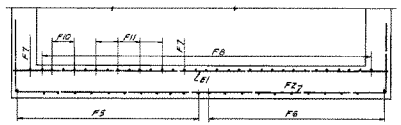


BOTTOM REINFORCING

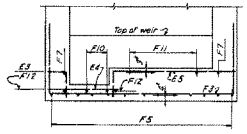


TOP REINFORCING

PLAN
BASE SLAB

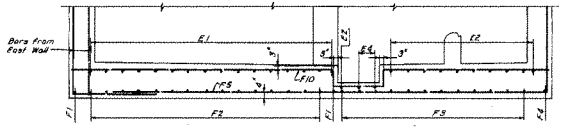


SECTION C-C

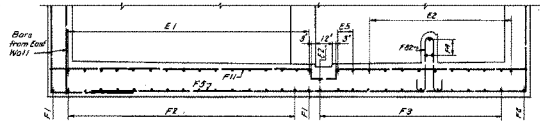


SECTION D-D

Note:
For masonry details see sheets 65 and 66



SECTION A-A



SECTION B-B

F.B.F.	11-1-41	F10 bar revised and weir reinforcing added.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.7
REINFORCING DETAILS
BASE SLAB

SHEET 69 OF 108 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: SENIOR ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: REGIONAL ENGINEER, CHIEF OF DESIGN, MISS. RIVER COMMISSION, VICKSBURG, MISS. DR. BY M.F.F. TR. BY J.B.S.

APPROVED: CHIEF OF ENGINEERS, DISTRICT ENGINEER CK. BY F.B.F.

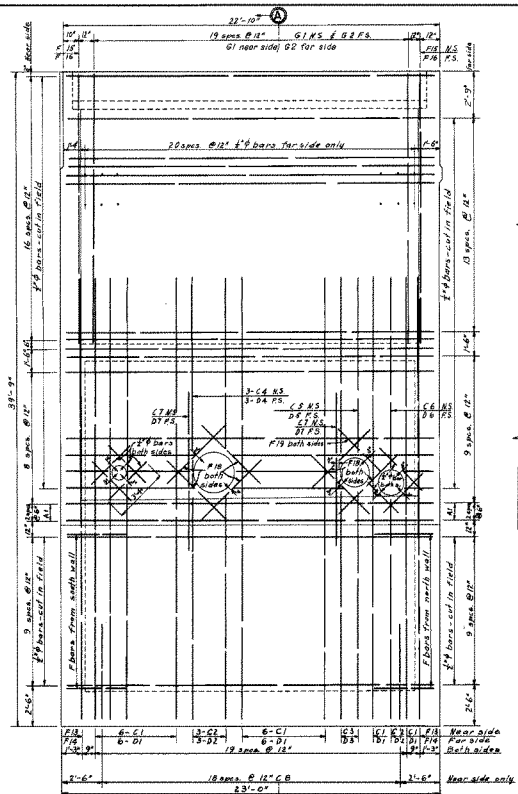
AS BUILT

934-12.3/69

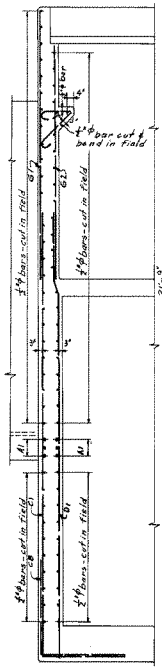
173

WAR DEPARTMENT

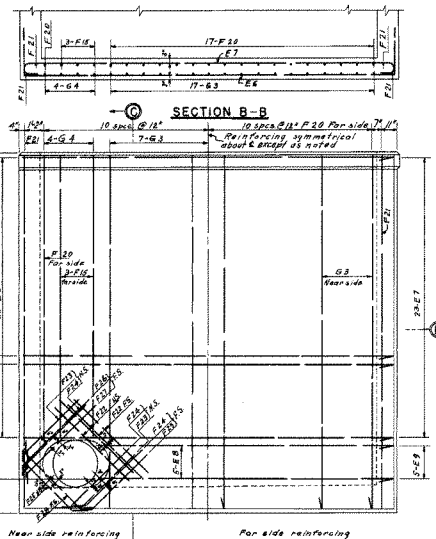
CORPS OF ENGINEERS, U. S. ARMY



ELEVATION EAST WALL

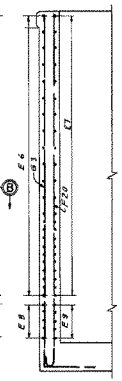


SECTION A-A

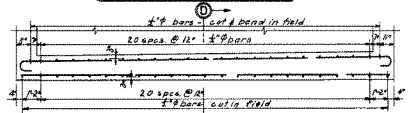


SECTION B-B

ELEVATION DISCHARGE CHAMBER WALL

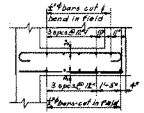


SECTION C-C



SECTION THRU DISCHARGE CHAMBER FLOOR

Note:
For masonry details see sheets 66, 67 & 68
For discharge chamber end wall reinforcing see sheet 71



SECTION D-D

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
REINFORCING DETAILS
EAST WALL, DISCHARGE CHAMBER
WALL & FLOOR

SHEET 70 OF 108 SHEETS — SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [signature] — SENIOR ENGINEER, CORPS OF ENGINEERS

APPROVAL RECOMMENDED: [signature] — DIVISION ENGINEER, CORPS OF ENGINEERS, PRESIDENT, PADUCAH, KY. DIVISION ENGINEER, OHIO RIVER DIV.

APPROVED: [signature] — COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER, OHIO RIVER DIST.

DS. BY W.S.F. — TR. BY D.S. — CK. BY F.B.F.

BY	DATE	CHARACTER
F.B.F.	11-17-41	Notes added

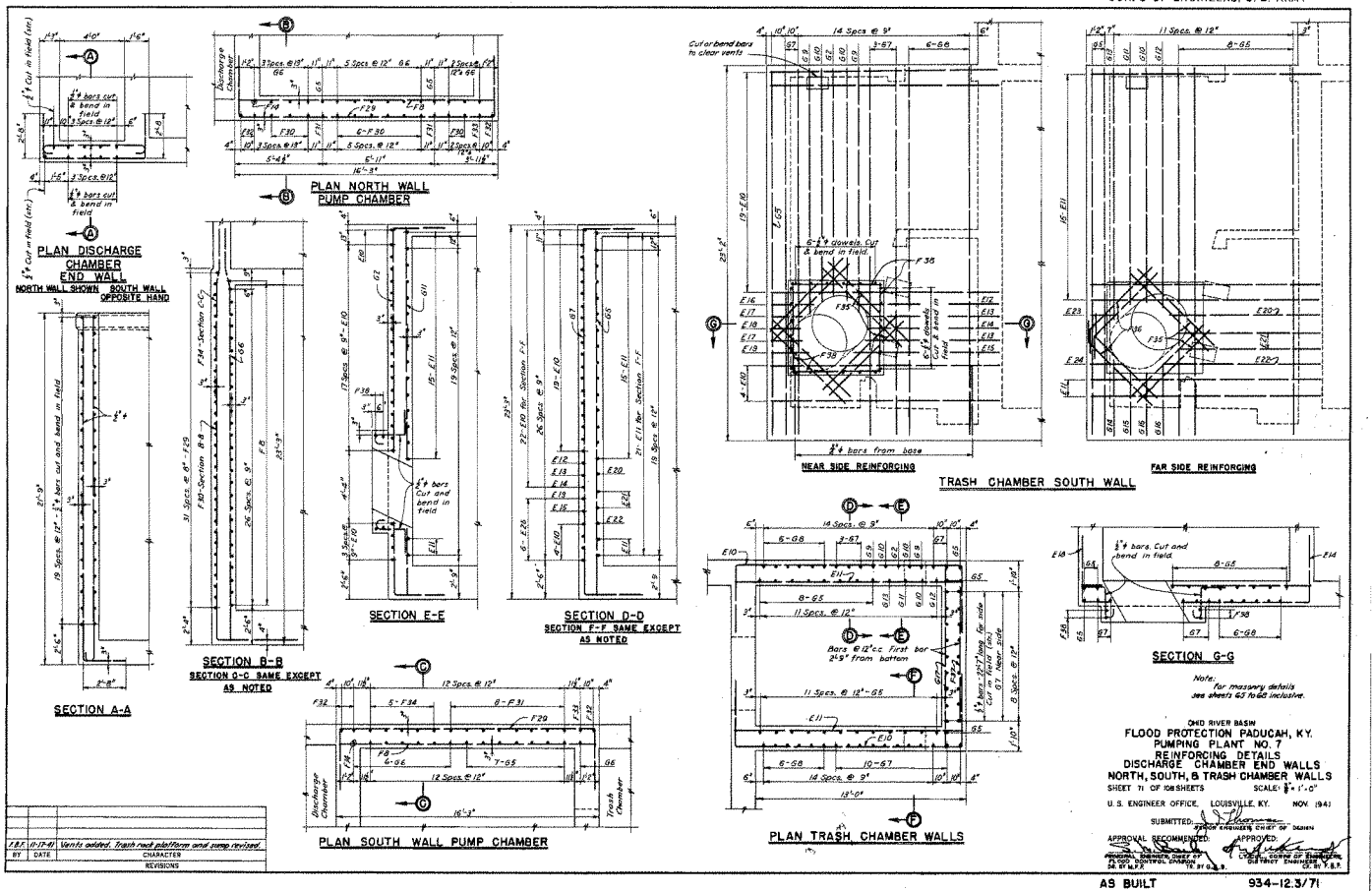
REVISIONS

AS BUILT

934-12.3/70

WAR DEPARTMENT

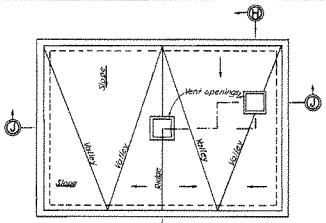
CORPS OF ENGINEERS, U. S. ARMY



175

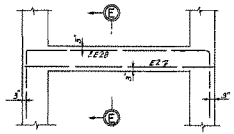
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

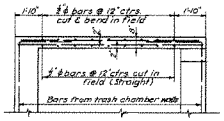


ROOF PLAN
SCALE 1/4"=1'-0"

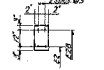
SECTION A-A



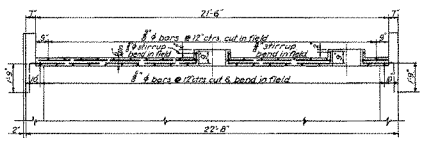
SECTION THRU PURLIN



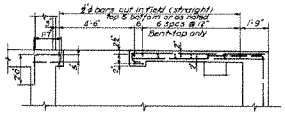
SECTION B-B



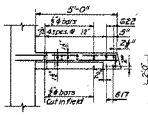
SECTION E-E



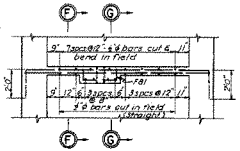
SECTION J-J



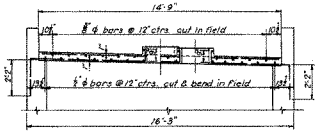
SECTION C-C



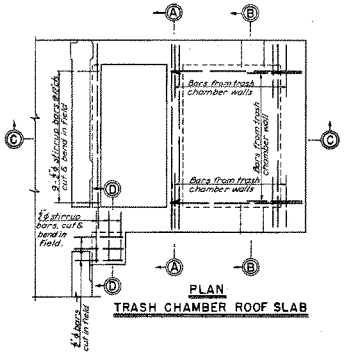
SECTION F-F



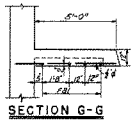
SECTION THRU TRASH CHAMBER WALKWAY



SECTION H-H

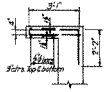


PLAN
TRASH CHAMBER ROOF SLAB



SECTION G-G

Note:
For masonry details, see sheets 67, 66 and 68



SECTION D-D

BY	DATE	CHARACTER
CSF	11-17-41	Walkway slab and ventilator opening revised

REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
REINFORCING DETAILS
ROOF SLAB, TRASH CHAMBER ROOF SLAB,
TRASH CHAMBER WALKWAY & PURLINS

SHEET 72 OF 108 SHEETS SCALE: 1/4"=1'-0" EXCEPT AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

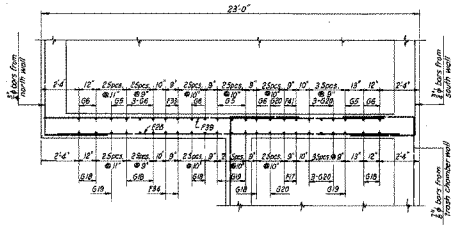
SUBMITTED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

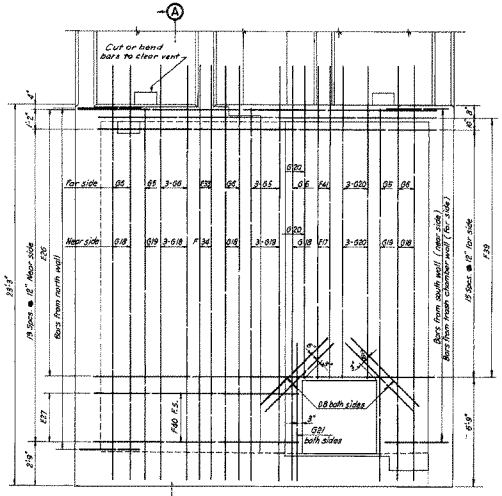
APPROVED: [illegible] DISTRICT ENGINEER

DR. BY M.R.R. TR. BY F.E.B. CK. BY F.E.B.

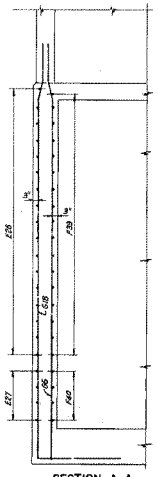
AS BUILT 934-12.3/72



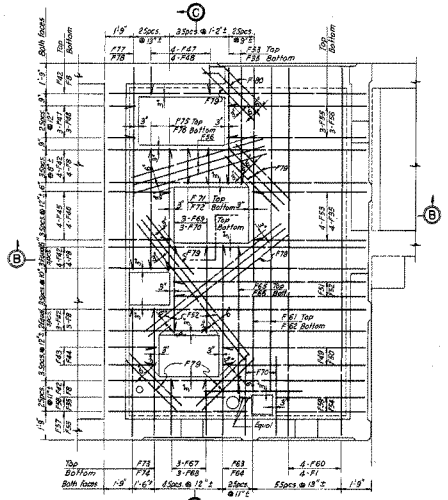
PLAN
WEST WALL PUMP CHAMBER



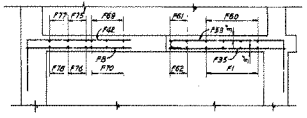
ELEVATION
WEST WALL



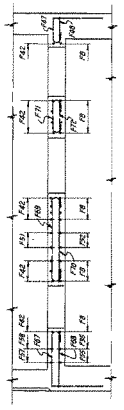
SECTION A-A



PLAN - MOTOR FLOOR



SECTION B-B



SECTION C-C

Note:
For masonry details see sheets 65, 66 and 68

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
REINFORCING DETAILS
WEST WALL & MOTOR FLOOR

SHEET 73 OF 108 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] CHIEF, DESIGN BRANCH, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY W.P.P. TR. BY W.J.B. CK. BY F.B.R.

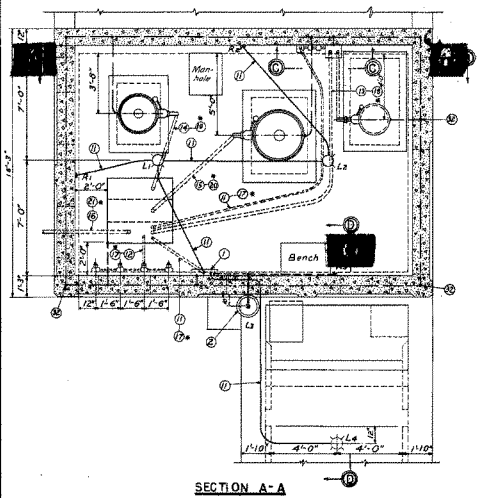
BY	DATE	CHARACTER
FBR	1/17/41	Vent added and minor revisions.

REVISIONS

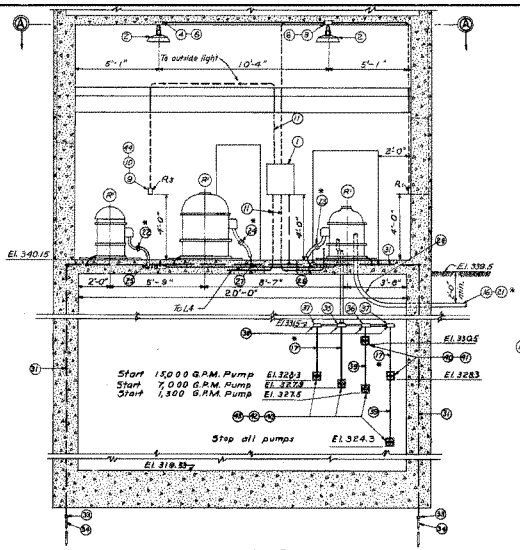
AS BUILT 934-12.3/73

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SECTION A-A



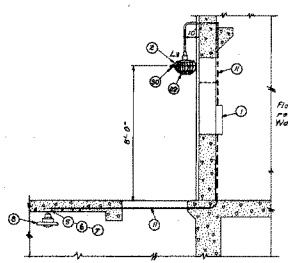
SECTION B-B

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUAN'TITY
1	4 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West.	349373	3
3	Conduit outlet	Crouse-Hinds	SKT 12	1
4	" " "	" "	SKL 12	1
5	" " "	" "	JK 12	1
6	Condulet cover	" "	SK 84	3
7	Condulet gasket	" "	Gask 208	1
8	Vaporite condulet with reflector and socket	" "	WIDA 1519	1
9	Condulet outlet	" "	FS1	3
10	Duplex plug receptacle			3
11	1½" Rigid electrical conduit			135'±
12	¾" " " "			20'±
13	1" " " "			40'±
14	1¼" " " "			15'±
15	1½" " " "			15'±
16	3" " " "			40'±
17*	#12 A.W.G. insulated copper wire			380'±
18*	#8 A.W.G. flond. cable R.C. 600V. as. with 60% rubber jacket			120'±
19*	#6 A.W.G. 1 " " " " " " " "			40'±
20*	#2 A.W.G. 1 " " " " " " " "			45'±
21*	#3/0 A.W.G. " " " " " " " "			120'±
22*	1" Erickson coupling			1
23*	1¼" " "			1
24*	1½" " "			1
25	1" Std. 90° Elbow			4
26	1¼" " " "			2
27	1½" " " "			2
28	Special long radius 90° elbow, 3¾ x 36" rad.	G.E.		2
29	Wire guard for reflector	West	351497	1
30	Padlock	"	351484	1
31	#2/0 bare stranded copper cable			200'±
32	T connector for #2/0 copper cable	Burndy	NT 2626	10
33	Connector for #2/0 str. cable to ⅝" grad. rod	"	GA 6926	4
34	Ground rod ⅝" ø, 8' long	Copperweld		4
35	Condulet outlet	Crouse-Hinds	TB 127	1
36	" "	" "	C 17	1
37	" "	" "	E 17	2
38	Condulet cover	" "	TT 71	4
39	#6 A.W.G. hard drawn copper wire			10'±
40	3" bolt circle type insulators	Lapp	13761	6
41	Bus support fitting. Drill to clame ⅝" bore inclosure	Locke	9853	2
42	" " " " " " " ⅝" electrode	"	"	4
43	Brass electrode (See part No. 25, sheet 40)			4
44	Wall surface plate			3

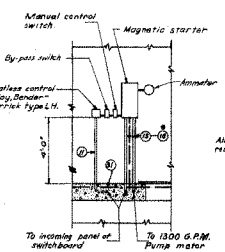
BILL OF MATERIAL

Notes:-

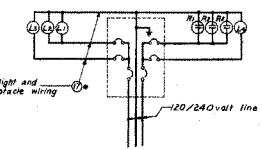
Figures in circles refer to part Nos. in Bill of Material.
All material shall be of the manufacture, type and catalog number specified or its equal.
All conduits to clear openings for pump removal.
Small fittings, conduits, etc., not listed, shall be furnished as required.
All conduits in floor shall be placed as near the center of same as possible.
200 watt bulbs shall be furnished and installed in all lights.
(R) * Indicates items deleted.



SECTION D-D



SECTION C-C



WIRING DIAGRAM
LIGHTING CIRCUIT

LEGEND

Embedded Conduit
Exposed Conduit
Ground Wire
Concealed Conduit

BY	DATE	CHARACTER
DS	11/27/41	Ammeter added to magnetic starter

REVISIONS

BY	DATE	AUTHORITY	REVISION
R2	7/8/47	C.O. #7	Materials deleted or changed.
R1	5/27/48	C.O. #8	Pumps and motors deleted.

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 7

LIGHTING & POWER SYSTEMS

SHEET 74 OF 108 SHEETS SCALE ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: (Signature of Chief of Section)

APPROVAL RECOMMENDED: (Signature of Principal Engineer Dr. St. L.)

APPROVED: (Signature of Lt. Col., Corps of Engineers, District Engineer)

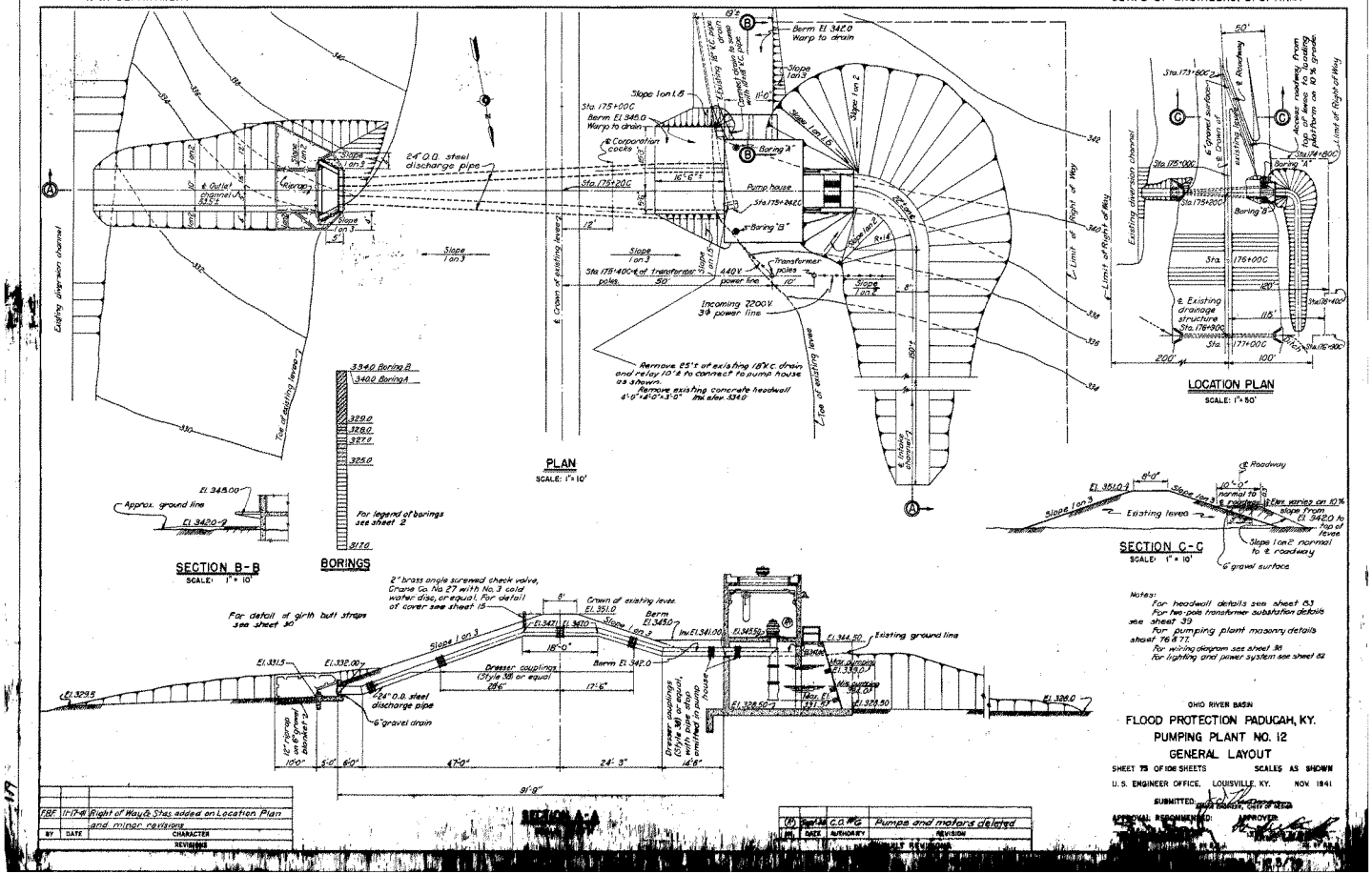
AS BUILT 934-12.3/74

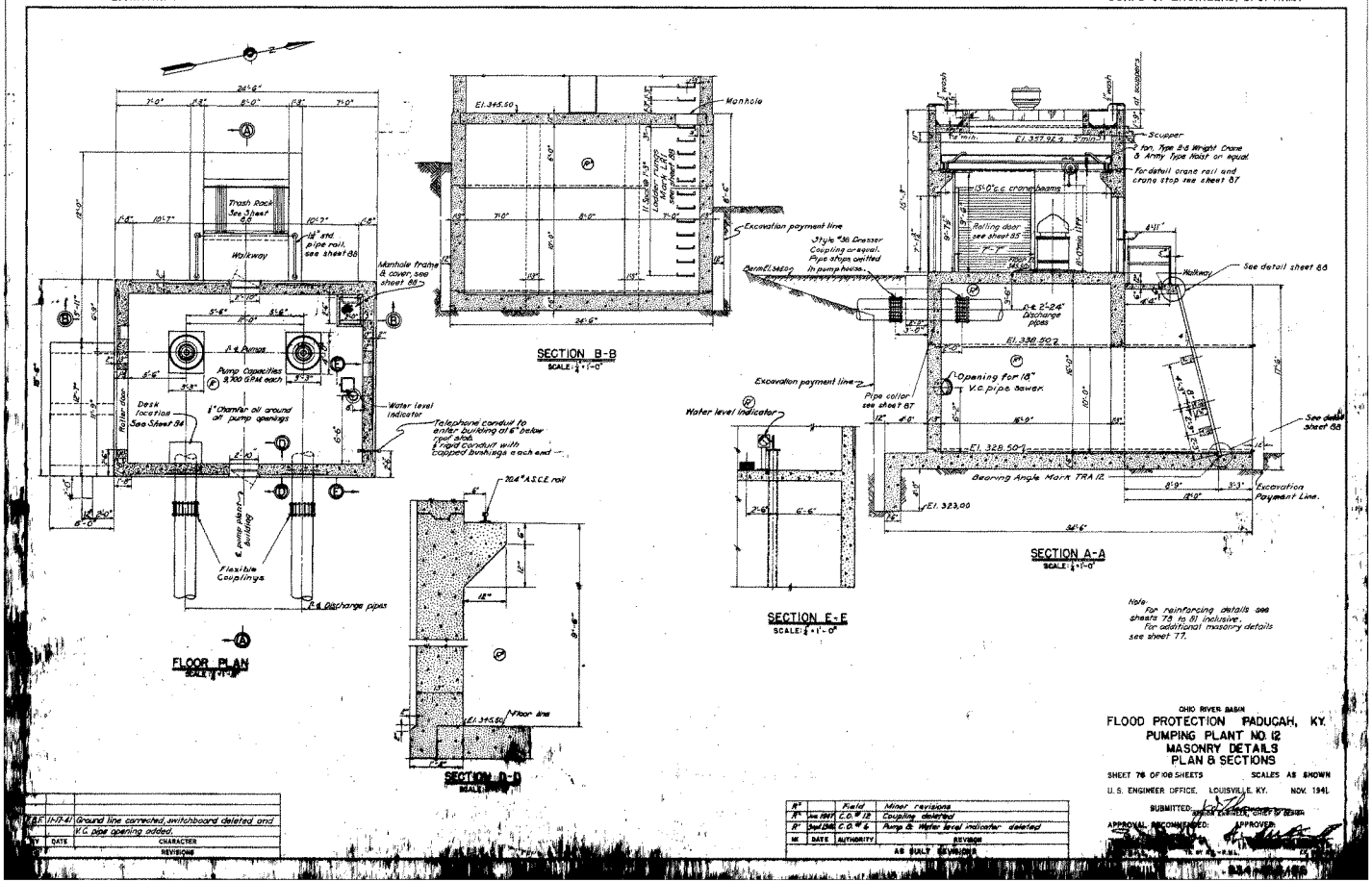
938

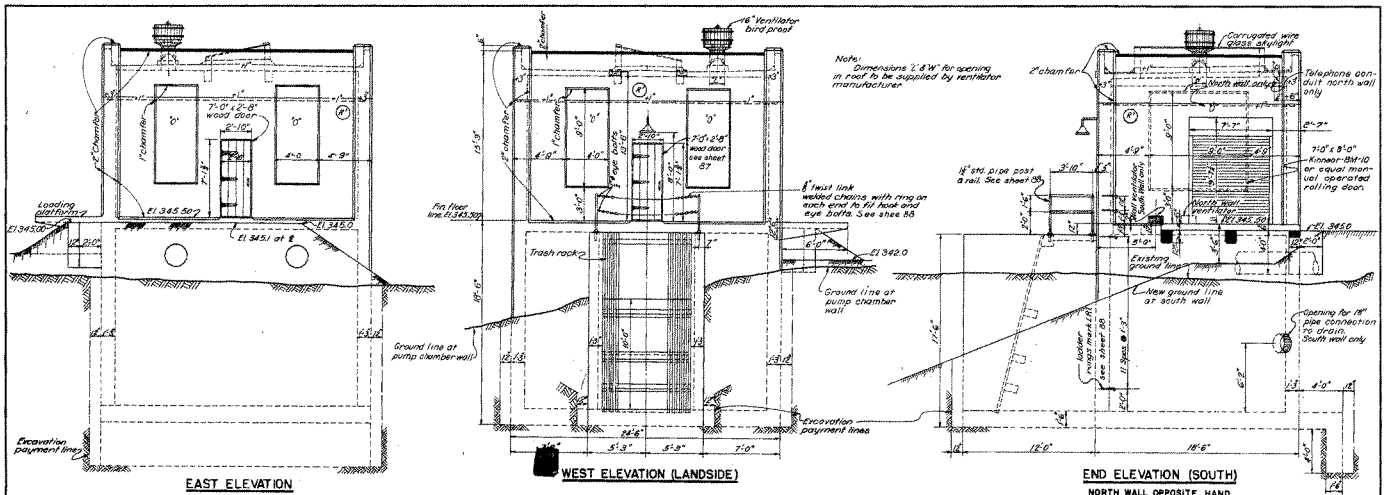
778

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY




FLOOR PLAN
SCALE: 1/4" = 1'-0"
Trash Rack See Sheet
Walkway
14" std. pipe rail, see sheet 88
Manhole frame & cover, see sheet 88
A & Pumps
Pump Capacities 8,700 GPM each
Desk location See Sheet 84
Roller door
1/4" Chamfer all around at pump openings
Water level indicator
Telephone conduit to boiler building at 6" below roof slab. 1" rigid conduit with capped bushings each end
Flexible Couplings
A & Discharge pipes
SECTION B-B
SCALE: 1/4" = 1'-0"
El. 345.50
Manhole
Excavation payment line
SECTION A-A
SCALE: 1/4" = 1'-0"
Scupper
2 ton Type 86 Wright Crane & Army Type Hoist or equal.
For detail crane rail and crane stop see sheet 87
Rolling door see sheet 85
See detail sheet 88
Walkway
Style #38 Dresser Coupling or equal. Pipe stops omitted in pump holes.
Perm. El. 340.00
Discharge pipes
Opening for 18" V.C. pipe sewer.
Pipe collar see sheet 87
Bearing Angle Mark TRA 12
Excavation Payment Line.
SECTION E-E
SCALE: 1/4" = 1'-0"
Water level indicator
SECTION D-D
SCALE: 1/4" = 1'-0"
20.4# A.S.C.E. rail
Floor line
Note: For reinforcing details see sheets 78 to 81 inclusive. For additional masonry details see sheet 77.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
MASONRY DETAILS
PLAN & SECTIONS
SHEET 76 OF 108 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
Ground line corrected, switchboard deleted and V.C. pipe opening added.
DATE
CHARACTER
REVISIONS
Field
Minor revisions
Coupling deleted
Pump & Water level indicator deleted
DATE
AUTHORITY
REVISION
AS BUILT REVISIONS



OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
MASONRY DETAILS
ROOF PLAN & ELEVATIONS

SHEET 77 OF 108 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] DIST. ENGINEER, DIST. OF ENGR.

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH, DIST. ENGR. APPROVED: [illegible] DISTRICT ENGINEER

DR. BY C.R.E. TR. BY A.J.E. CK. BY A.B.

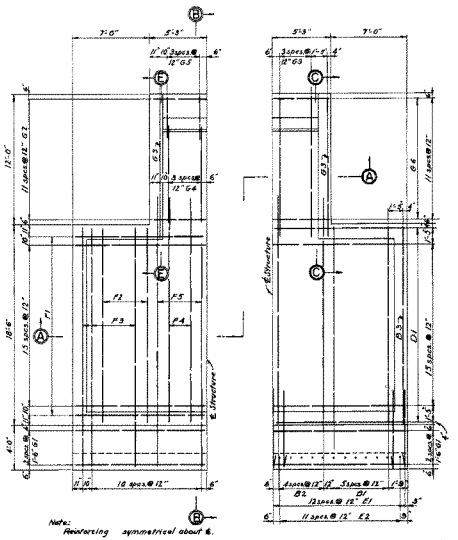
BY	DATE	CHARACTER REVISIONS
T.A.F.	1-17-42	Ground Line Revised & Minor Corrections.

NO	DATE	AUTHORITY	REVISION
R'		Field	Minor revisions

AS BUILT REVISIONS

AS BUILT 934-12.3/77

941



TOP REINFORCING

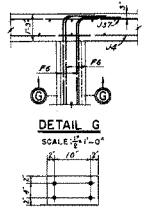
HALF PLAN

SCALE: $\frac{1}{4}$"=1'-0"

BOTTOM REINFORCING

HALF PLAN

SCALE: $\frac{1}{4}$"=1'-0"

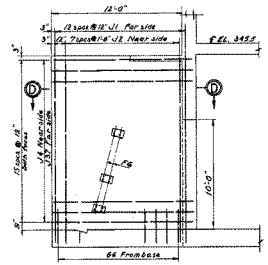


DETAIL G

SCALE: $\frac{1}{2}$"=1'-0"

SECTION G-G

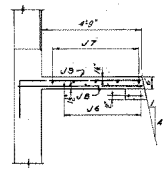
SCALE: 1"=1'-0"



ELEVATION C-C

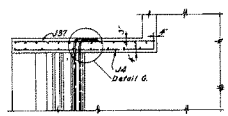
ELEVATION E-E OPPOSITE HAND

SCALE: $\frac{1}{4}$"=1'-0"



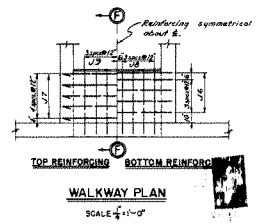
SECTION F-F

SCALE $\frac{1}{2}$"=1'-0"



SECTION D-D

SCALE: $\frac{1}{2}$"=1'-0"

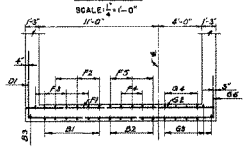


TOP REINFORCING BOTTOM REINFORCING

WALKWAY PLAN

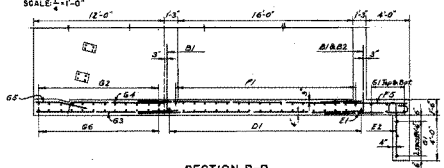
SCALE: $\frac{1}{4}$"=1'-0"

Note:
For masonry details see sheets 76 & 77



SECTION A-A

SCALE: $\frac{1}{4}$"=1'-0"



SECTION B-B

SCALE: $\frac{1}{4}$"=1'-0"

BY	DATE	CHARACTER OF REVISIONS
F.B.F.	1-17-41	Section F-F revised

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
REINFORCING DETAILS
BASE SLAB & WING WALLS

SHEET 78 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941.

SUBMITTED: [illegible] TITLE: ENGINEER, UNITS OF DESIGN

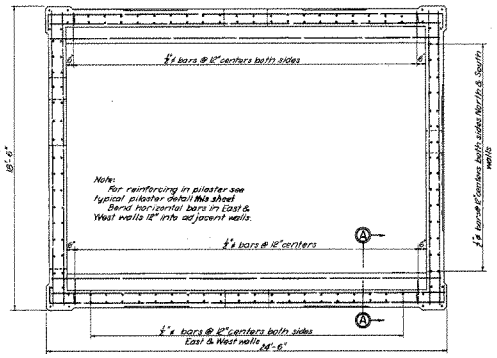
APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, FOR OF PUBLIC BUILDINGS, DESIGN DR. BY W.J.B. TR. BY R.M.

APPROVED: [illegible] CHIEF, CORPS OF ENGINEERS, DIVISION ENGINEER

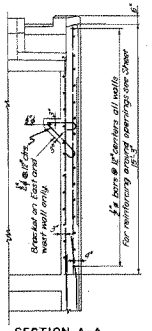
AS BUILT 934-12.3/78

182

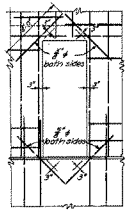
942



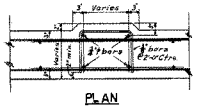
PLAN BELOW ROOF



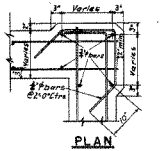
SECTION A-A



TYPICAL REINFORCING AT ACCESS DOOR OPENING



PLAN
TYPICAL WALL PILASTER DETAIL



PLAN
TYPICAL CORNER PILASTER DETAIL
SCALE: 1"=1'-0"

REINFORCEMENT BAR SCHEDULE

PUMPING PLANT NUMBER	PILASTER BARS 3/4 φ BARS					TOTAL WEIGHT	3/4 φ BARS		TOTAL WEIGHT	WINDOW SILL BARS NUMBER OF WINDOWS	WALL THICKNESS	3/4 φ BARS	UNDER WINDOWS	TOTAL WEIGHT
1	(268'-0") 1'-5" (36)	(90'-0") 1'-5" (18)	(45'-0") 1'-5" (18)	(16'-0") 1'-5" (8)	(3'-0") 1'-5" (4)	114.9	(63'-0") 14'-5" (12)	(34'-0") 14'-5" (24)	1198.1	None	13"			
2	(200'-0") 1'-5" (40)	(180'-0") 1'-5" (18)	(135'-0") 1'-5" (18)	(20'-0") 1'-5" (4)	(4'-0") 1'-5" (4) (20'-0") 1'-5" (4)	256.3	(63'-0") 33'-3" (12)	(46'-0") 33'-3" (24)	1692.2	None	13"			
3	No pilasters									1	13	(6'-0") 1'-5" (4)	(3'-0") 1'-5" (1)	2.98
5	(234'-0") 1'-5" (39)	(108'-0") 1'-5" (6)	(90'-0") 1'-5" (6)	(11'-0") 1'-5" (2)		178.2	(163'-3") 14'-5" (12) (14'-5") 14'-5" (12)	(34'-0") 14'-5" (24) (34'-3") 14'-5" (12)	1584.9	3	14"-12" 24"-13"	(11'-3") 19'-5" (4) (14'-5") 19'-5" (8)	(5'-3") 3'-3" (4)	9.15
6	(72'-0") 1'-5" (12)	(72'-0") 1'-5" (12)	(27'-0") 1'-5" (6)	(8'-0") 1'-5" (2)		43.6	(138'-6") 18'-5" (8)	(72'-6") 18'-5" (4)	524.7	3	13"	(15'-0") 18" (12)	(3'-3") 3'-3" (4)	5.31
7	(66'-0") 1'-5" (12)	(60'-0") 1'-5" (10)	(45'-0") 1'-5" (6)	(2'-0") 1'-5" (2)		40.7	(162'-0") 18'-5" (9)	(18'-0") 18'-5" (6)	921.8	2	1'-0"	(11'-6") 1'-5" (6)	(8'-3") 3'-3" (2)	6.71
12	(12'-0") 1'-5" (2)	(12'-0") 1'-5" (2)				4.3	(18'-0") 18'-5" (6)	(36'-0") 18'-5" (6)	440.6	2	13"	(10'-0") 18" (6)	(6'-3") 3'-3" (2)	6.20

Note:-
Figures shown within circles thus (6) are number of bars required. Figures shown in parenthesis are total linear feet.

Note:
For diagonal reinforcing bar details around windows see sheet 57
For diagonal reinforcing bar details around rolling doors see sheet 36

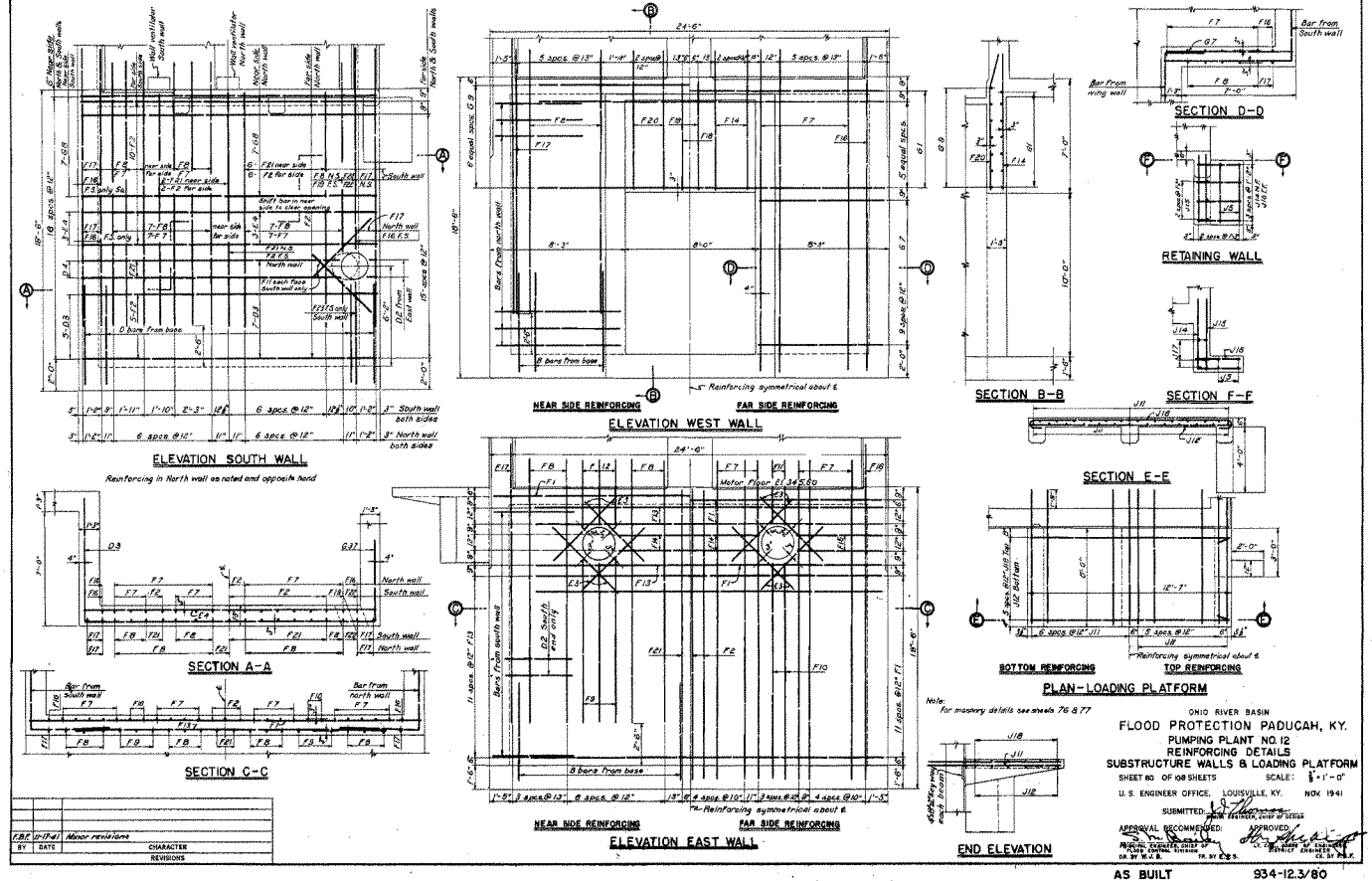
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
REINFORCING DETAILS
SUPERSTRUCTURE WALLS
SHEET 79 OF 108 SHEETS SCALE: 1/4"=1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED: CHIEF ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION, FLOOD CONTROL DIVISION
APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER
DR. BY M.F.C. TR. BY R.V.S. CK. BY F.B.F.

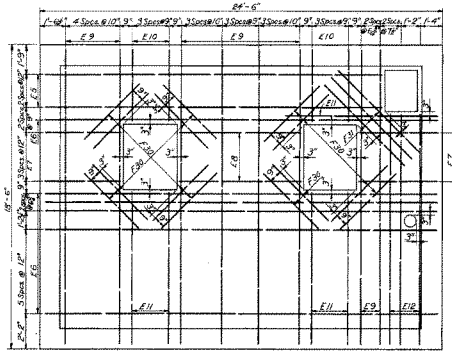
BY	DATE	CHARACTER REVISIONS
F.B.F.	11-17-41	Notes added and minor revisions

AS BUILT 934-12.3/79

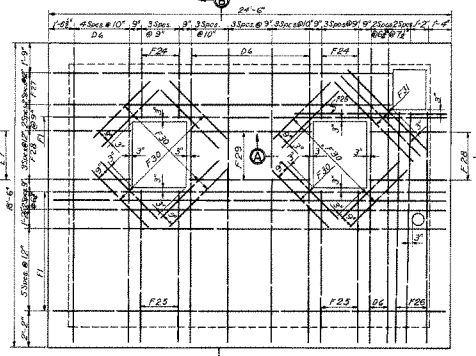
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



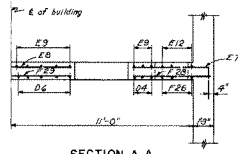


TOP REINFORCING

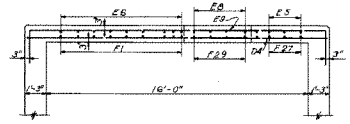


BOTTOM REINFORCING

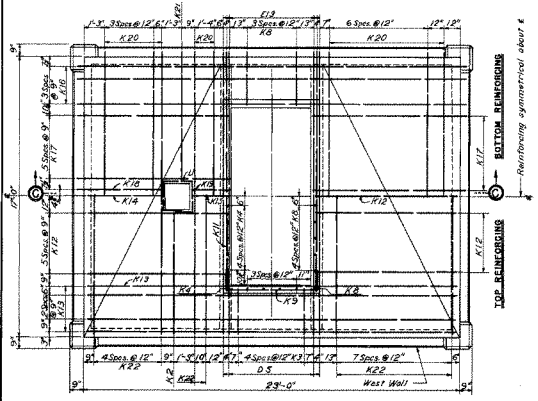
PLAN-MOTOR FLOOR



SECTION A-A



SECTION B-B

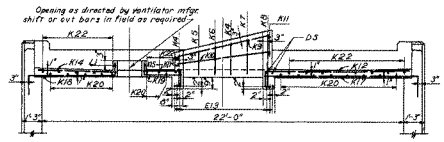


BOTTOM REINFORCING

Reinforcing symmetrical about ℄

TOP REINFORCING

PLAN-ROOF SLAB



SECTION C-C

Note: Minimum thickness of roof 5"

Note:
For masonry details see sheets 76 & 77

BY	DATE	CHARACTER REVISIONS
F.B.F.	11-11-41	K11 Bars added.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
REINFORCING DETAILS
MOTOR FLOOR & ROOF SLAB

SHEET 81 OF 108 SHEETS. SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: CHIEF ENGINEER, CHIEF OF DESIGN

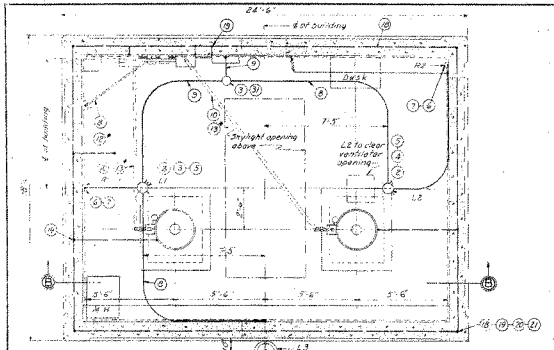
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: CHIEF OF ENGINEERS, DIRECTOR OF CIVIL WORKS

DR. BY W.J.B. TR. BY G.INC. CK. BY F.B.F.

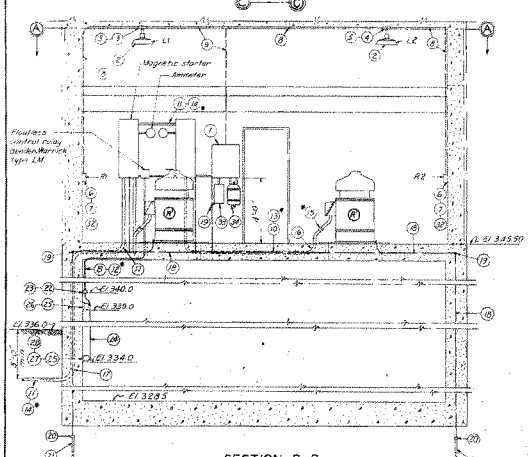
AS BUILT 934-12.3/81

185

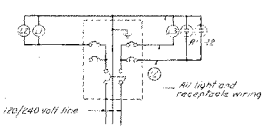


SECTION A-A

SECTION C-C



SECTION B-B



WIRING DIAGRAM OF LIGHTING CIRCUIT

BILL OF MATERIAL

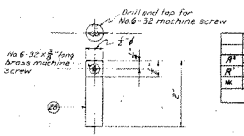
PART NO.	DESCRIPTION	MFG'R	CATALOG NO.	QUAN TITY
	4-Circuit light distribution panel (surface type)			
2	RLM dome reflector and gasket	West	34513	1
3	Conduit outlet	Crouse-Hinds	5KFIE	2
4	"		DAC-17	1
5	" cover		5KM4	2
6	" outlet		FS-1	2
7	Duplex plug receptacle			2
8	½" rigid electrical conduit			100'
9	¾" " "			50'
10	1" " "			200'
11	1½" " "			120'
12	#12 AWG insulated copper wire			3200'
13	#6 AWG, hard drawn copper wire			450'
14	#2 " " " 60% rubber, jacket			1200'
15	½" Erickson coupling			2
16	½" Std 90° elbow			2
17	½" Sper. long rad. 90° Elbow, 1½" x 18" rad.			2
18	#2/0 bare stranded copper cable			1
19	"T" connector for #2/0 stranded cable	Burndy	YT2C2C	10
20	Connector for #2/0 stranded cable to ½" ground rod		GK6426	3
21	Ground rod, ½" x 8'	Weinman		4
22	Conduit outlet	Crouse-Hinds	A-7	1
23	" cover	"	1771	1
24	#6 AWG, hard drawn copper wire			50'
25	3" bolt circle type insulator	Lapp	13161	4
26	Bus support fitting, drilled to clamp #6 bare solid wire	Ideal	9053	1
27	" " " ½" electrode			
28	Brass electrode, ½" x 12" long (see detail)			1
29	Wire guard for reflector	West	35491	1
30	Padlock		35434	1
31	Conduit cover	Crouse-Hinds	5K803	1
32	Wall surface plate			2
33	Enclosed fused switch, 2 pole, cover interlocked	Graybar	58760	1
34	Transformer, 460-115/230 V, 2 KVA, dry type	West	91415	1

(24) * Items deleted

Note:
Figures in circles refer to part numbers on bill of material.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
All conduits to clear openings for pump removal.
Small fittings, conduits, etc., not listed, shall be furnished as required.
All conduit in floor shall be placed as near the center of same as possible.
200 watt bulbs shall be furnished and installed in all lights.

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire



ELECTRODE DETAIL
SCALE: NONE

BY	DATE	CHARACTER
D.S.	10/7/81	ACB motor starters replaced by magnetic starters

REVISIONS

MK	DATE	AUTHORITY	REVISION
R'	Feb 27	C.O. #7	Materials deleted or changed
R'	Sept 86	C.O. #6	Pumps deleted

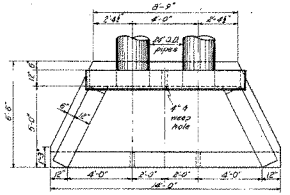
AS BUILT REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.12
LIGHTING & POWER SYSTEMS

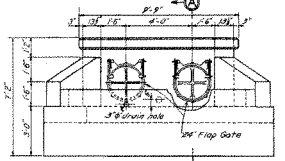
SHEET 82 OF 108 SHEETS SCALE: ½" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED: [signature] SENIOR ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH, FLOOD CONTROL DIVISION
APPROVED: [signature] LT. COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER
DR BY C.E.E. TR BY J.F. CK BY D.S.

AS BUILT 934-12.3/82

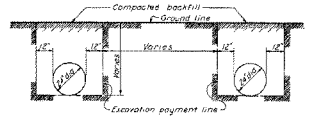
946



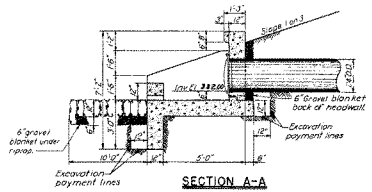
PLAN



ELEVATION

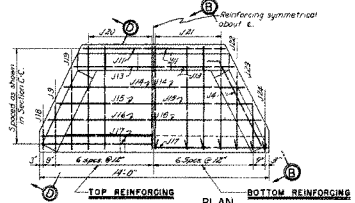


EXCAVATION PAYMENT LINES

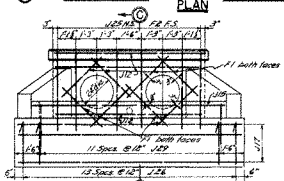


SECTION A-A

MASONRY DETAILS



PLAN



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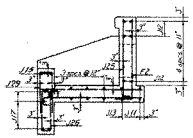
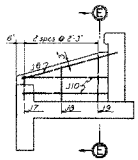
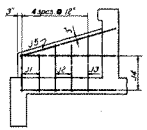


SECTION C-C



SECTION D-D



SECTION B-B

SECTION E-E

REINFORCING DETAILS

REINFORCEMENT SCHEDULE

SIZE	D
½" OR ½" LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	¾" ϕ	3'-6"	Straight	5.26	84.2
F2	6	"	5'-9"	4'-9" 12"	8.64	51.8
J1	4	⅝" ϕ	3'-3"	2'-3"	2.17	8.7
J2	4	"	3'-9"	2'-9"	2.50	10.0
J3	2	"	4'-3"	3'-3" 12"	2.84	5.7
J4	4	"	6'-6"	3'-9" 12" 9"	4.34	17.4
J5	2	"	6'-9"	6'-0" 9"	4.51	9.0
J6	2	"	8'-0"	6'-0" 12" 2'-0"	5.34	10.7
J7	2	"	1'-6"	Straight	1.00	2.0
J8	2	"	2'-0"	"	1.34	2.7
J9	4	"	2'-9"	"	1.84	7.4
J10	4	"	5'-3"	"	3.51	14.0
J11	2	"	8'-6"	"	5.68	11.4
J12	6	"	8'-9"	"	5.84	35.0
J13	2	"	9'-9"	"	6.51	13.0
J14	2	"	11'-0"	"	7.35	14.7
J15	4	"	12'-0"	"	8.02	32.1
J16	2	"	13'-0"	"	8.69	17.4
J17	5	"	13'-6"	"	9.02	45.1
J18	2	"	1'-3"	"	0.83	1.7
J19	2	"	4'-9"	"	3.17	6.3
J20	9	"	6'-3"	"	4.17	37.5
J21	9	"	6'-9"	6'-1"	4.51	40.6
J22	2	"	5'-3"	4'-7"	3.51	7.0
J23	2	"	3'-3"	2'-7"	2.17	4.3
J24	2	"	2'-0"	1'-4"	1.34	2.7
J25	6	"	5'-3"	4'-3" 9"	3.51	21.1
J26	14	"	6'-10"	2'-3" 8"	4.56	63.8
J29	12	"	5'-6"	2'-6" 3" 6"	3.67	44.0
					TOTAL	621#

Note: For general layout see sheet 15

BY	DATE	CHARACTER REVISIONS
F.B.E.	1-17-41	Minor revisions

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
MASONRY & REINFORCING DETAILS
DISCHARGE HEADWALL

SHEET 53 OF 108 SHEETS — SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [signature] — SENIOR ENGINEER, CHIEF OF DESIGN

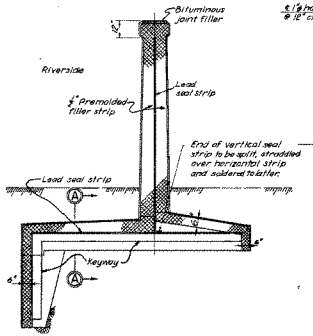
APPROVAL RECOMMENDED: [signature] — PROJECT ENGINEER, CHIEF OF FLOOD CONTROL DIVISION — DR. BY F.E.B. — TR. BY C.C.P.

APPROVED: [signature] — DISTRICT ENGINEER, ASSISTANT ENGINEER — CK. BY PRE

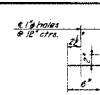
AS BUILT

934-12.3/83

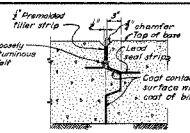
947



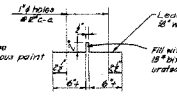
TYPICAL T-WALL EXPANSION JOINT
FOR CONCRETE CUT-OFF
SCALE: 1½" = 1'-0"



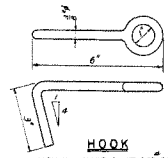
LEAD SEAL STRIP
SCALE: 1½" = 1'-0"



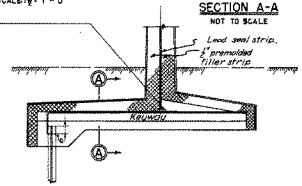
SECTION A-A
NOT TO SCALE



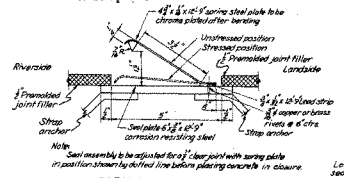
LEAD SEAL STRIP
SCALE: 1½" = 1'-0"



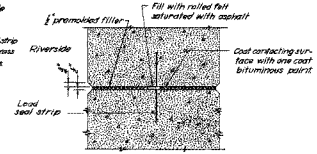
HOOK
MARK H MAKE 4 WT. 0.35 EACH
MATERIAL - WROUGHT IRON
SCALE: 6" = 1'-0"



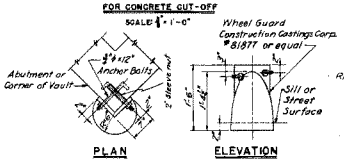
TYPICAL T-WALL EXPANSION JOINT
FOR STEEL SHEET PILING CUT-OFF



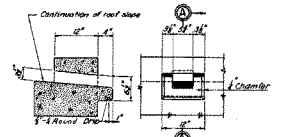
SPECIAL WATER SEAL
MATERIAL - AS SHOWN
SCALE: HALF SIZE
Furnished and installed under separate contract.



TYPICAL EXPANSION JOINT IN STEM OF WALL
SCALE: 1½" = 1'-0"

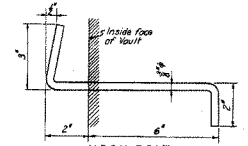


WHEEL GUARD DETAILS
SCALE: 1½" = 1'-0"

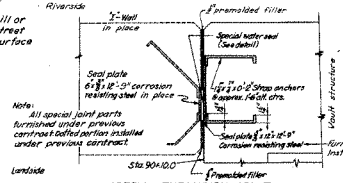


SECTION A-A
ELEVATION
CONCRETE SCUPPER
SCALE: 1" = 1'-0"

HOOK BOLT SCHEDULE		
STATION	NO. REQ'D.	REMARKS
90+12.00	2	Furnished under separate contract *
108+63.175	2	Furnish under this contract
Fracture Plate 1142	2	" " " "
112+01.575	2	" " " "



HOOK BOLT
MARK HB2 MAKE 6 WT. 0.38# EACH
MATERIAL - WROUGHT IRON
SCALE: 6" = 1'-0"



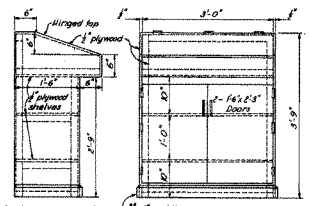
Furnished under separate contract.
Installed under this contract.

SPECIAL EXPANSION JOINT
SCALE: 1½" = 1'-0"
Furnished under separate contract

WATER SEAL STRIP SCHEDULE	
STATION	REMARKS
90+15.00	Lead seal strips - Furnish under this contract
90+48.33	" " " " " "
90+71.33	" " " " " "
90+90.25	" " " " " "
91+09.33	" " " " " "
91+28.33	" " " " " "
91+48.33	Copper seal strips - Furnished under separate contract
108+63.17	" " " " " "
108+84.17	Lead seal strips - Furnish under this contract
109+18.17	" " " " " "
109+44.17	Copper seal strips - Furnished under separate contract
161+97.82	" " " " " "
162+20.57	Lead seal strips - Furnish under this contract
162+38.57	" " " " " "
162+58.06	" " " " " "
162+77.50	Copper seal strips - Furnished under separate contract

WHEEL GUARD SCHEDULE		
STATION	NO. REQ'D.	REMARKS
90+35.175	4	Upgrade furnished under previous contract *
90+35.175	1	Frame furnished under this contract *
108+33.005	1	Furnished under this contract

* Installed under this contract



Cabinet framing to be made of 2"x4" yellow pine or fir.

One cabinet for each pump plant except No. 3.

STORAGE CABINET AND DESK
SCALE: 1" = 1'-0"
8 REQUIRED

F.B.F.	11-17-41	Toe drains deleted and minor revisions.
BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.

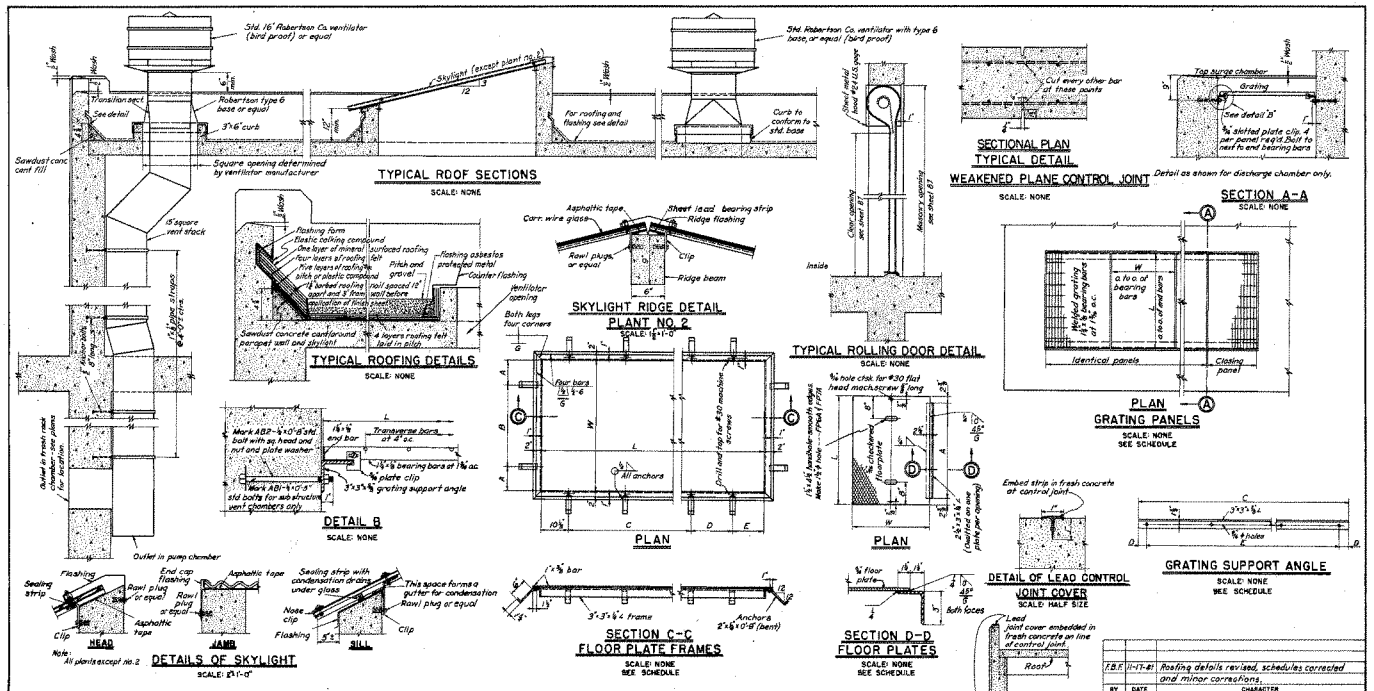
MISCELLANEOUS DETAILS

SHEET 84 OF 108 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941
SUBMITTED: [signature] FRANCIS WHITNER, CHIEF OF TECH.
APPROVAL RECOMMENDED: [signature] FRANK B. FOLSOM, CHIEF OF FLOOD CONTROL DIVISION
APPROVED: [signature] LEWIS A. PICK, COL. CORPS OF ENGINEERS, DISTRICT ENGINEER
DR. BY F.N.B. TR. BY R.M.A. CK. BY F.B.F.

AS BUILT 934-12.3/84

948

188



Pumping Plant No.	Grating Support Angles: Mark	No. Req'd.	C	D	E	Anchor Bolts Req'd.	Weight Each	Grating Panels: Mark	No. Req'd.	W	L	Clips Req'd.	Weight Each
2													
3	GA3	4	6'-6"	6"	2 Spcs. @ 2'-8"	12 (AB2)	49.6*	G3	4	33⅞"	2'-11½"	16	40.5*
	GA3B	4	1'-6"	1"	1 " " 8'-1"	8 (AB1)	11.8	G3A	4	14⅛"	2'-11½"	16	24.8
								G3B	2	14⅛"	1'-3½"	8	16.8
5	GA5	4	10'-8"	1¼"	3 Spcs. @ 2'-11"	24 (AB2)	79	G5	12	33⅞"	4'-3⅞"	48	60.7
	GA5A	2	3'-8"	1¼"	2 " " 3'-2"	6 (AB2)	5.97	G5A	1	14⅛"	4'-3⅞"	4	36.7
	GA5B	2	1'-6"	3"	1 " " 12"	12 (AB1)	11.8	G5B	1	14⅛"	2'-3⅞"	8	18.2
6	GA6	2	*35'-0"	6"	17 Spcs. @ 2'-0"	36 (AB2)	26.3	G6	11	33⅞"	2'-10⅞"	44	60
	GA6B	2	1'-6"	3"	1 " " 12"	4 (AB1)	11.8	G6A	1	14⅛"	2'-10⅞"	4	38.8
								G6B	1	14⅛"	1'-3⅞"	4	18.5
7	GA7	2	20'-6"	1¼"	10 Spcs. @ 2'-0"	22 (AB2)	154	G7	2	33⅞"	3'-11⅞"	16	33.7
	GA7B	2	1'-6"	3"	1 " " 12"	4 (AB1)	11.8	G7A	2	14⅛"	3'-11⅞"	8	32.7
								G7B	2	14⅛"	1'-3⅞"	8	16.5

* May be furnished in two equal lengths.

Floor Plate Frames: Mark	No. Req'd.	W	L	A	B	C	D	E	Weight Each	Floor Plates: Mark	No. Req'd.	W	L	A	Weight Each
F2	4	4'-0"	15'-0"	12"	2'-0"	5 Spcs. @ 2'-0½"	1'-7⅝"	5⅝"	238*	FP2	24	24"	4'-3⅝"	3'-11"	13.7*
										FP2A	6	15"	"	omit ∠	7.4
F3	1	4'-6"	14'-0"	1'-5"	2'-0"	5 Spcs. @ 2'-0½"	2'-1⅝"	11⅝"	256	FP3	6	24"	4'-9⅝"	4'-5"	15.2
										FP3A	1	27"	"	omit ∠	15.0
F5	1	3'-0"	19'-0"	6"	2'-0"	8 Spcs. @ 2'-0½"	1'-7⅝"	5⅝"	307	FP5	9	24"	5'-3⅝"	2'-11"	10.5
										FP5A	1	14⅛"	"	omit ∠	5.6
F6	11	4'-0"	22'-6"	12"	2'-0"	10 Spcs. @ 2'-0½"	1'-4⅝"	2⅝"	366	FP6	11	24"	6'-3⅝"	3'-11"	13.7
										FP6A	1	8⅝"	"	omit ∠	3.21
F7	4	4'-0"	6'-6"	12"	2'-0"	3 Spcs. @ 2'-0½"	1'-5⅝"	3⅝"	179	FP7	4	24"	6'-3⅝"	3'-11"	13.7
										FP7A	1	1⅛"	"	omit ∠	3.6

Note: FP2, FP6 and FP7 identical.

BY	DATE	CHARACTER
F.B.K.	11-17-41	Roofing details revised, schedules corrected and minor corrections.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MISCELLANEOUS DETAILS

SHEET 35 OF 108 SHEETS — SCALES AS SHOWN

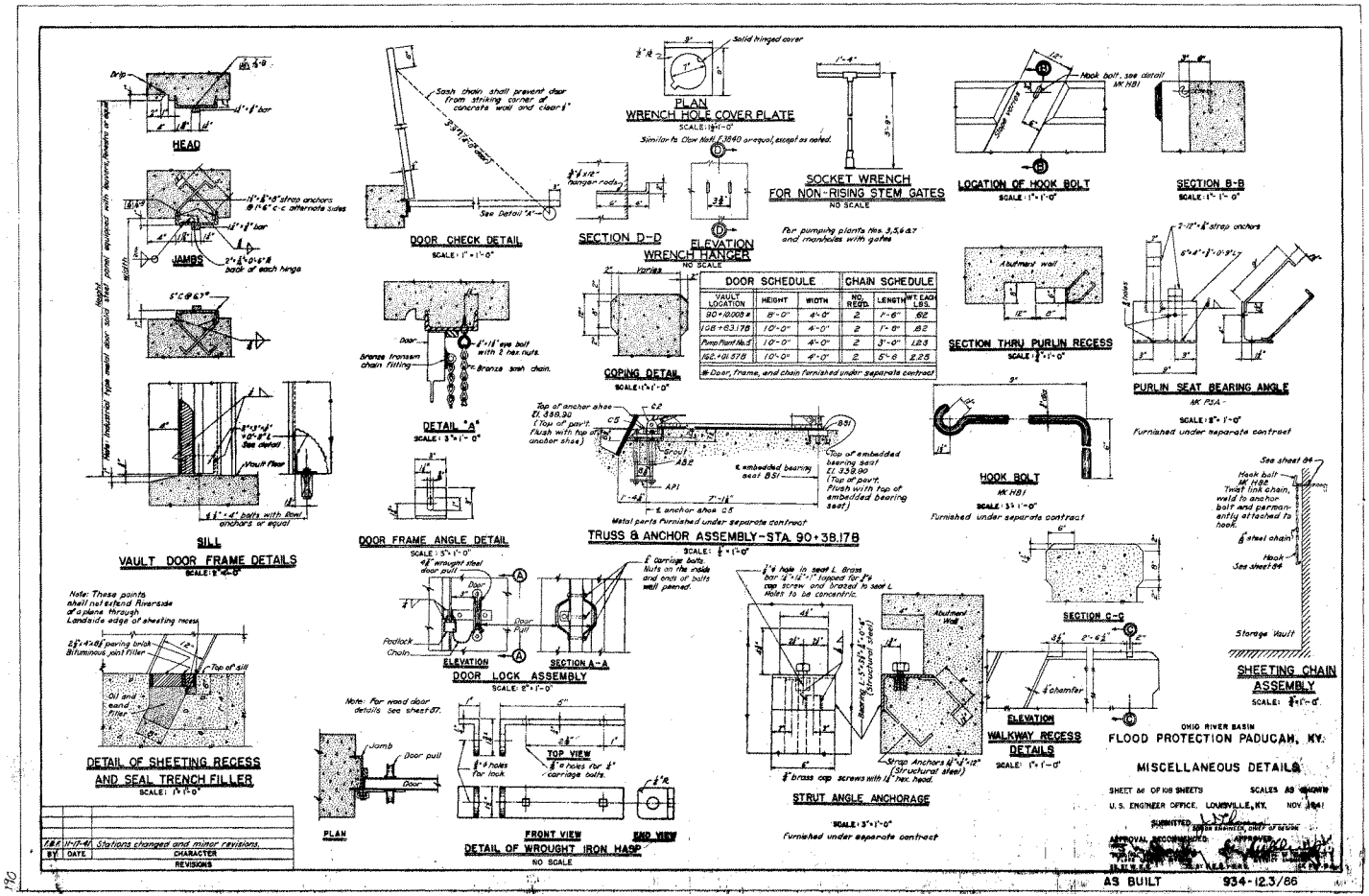
U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

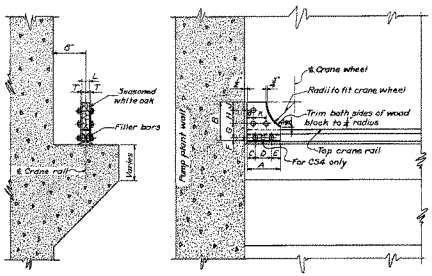
SUBMITTED: [signature] — CHIEF ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] — CHIEF, FLOOD CONTROL DIVISION — CK. BY U.A.H.

APPROVED: [signature] — COL. CORPS OF ENGINEERS, DISTRICT ENGINEER — CK. BY C.G.B. — CK. BY F.B.K.

934-12.3/85


HEAD
JAMBS
SILL
VAULT DOOR FRAME DETAILS
SCALE: 3/4"=1'-0"
DOOR CHECK DETAIL
SCALE: 1"=1'-0"
See Detail "A"
DETAIL "A"
SCALE: 3"=1'-0"
DOOR FRAME ANGLE DETAIL
SCALE: 3"=1'-0"
Bronze trunion chain fitting
Bronze sash chain.
Vault floor
Sash chain shall prevent door from striking corner of concrete wall and clear 1"
PLAN
WRENCH HOLE COVER PLATE
SCALE: 1½"=1'-0"
Solid hinged cover
Similar to Clow Nut F.1040 or equal, except as noted.
SECTION D-D
ELEVATION
WRENCH HANGER
NO SCALE
COPING DETAIL
SCALE: 1"=1'-0"
Varies
SOCKET WRENCH
FOR NON-RISING STEM GATES
NO SCALE
For pumping plants Nos. 3,5,6 & 7 and manholes with gates
LOCATION OF HOOK BOLT
SCALE: 1"=1'-0"
Hook bolt, see detail MK HB1
SECTION B-B
SCALE: 1"=1'-0"
SECTION THRU PURLIN RECESS
SCALE: 1½"=1'-0"
Abutment wall
PURLIN SEAT BEARING ANGLE
MK P3A
SCALE: 3"=1'-0"
Furnished under separate contract
HOOK BOLT
MK HB1
SCALE: 3"=1'-0"
Furnished under separate contract
TRUSS & ANCHOR ASSEMBLY-STA. 90+38.17B
SCALE: ½"=1'-0"
Top of anchor shoe El. 388.90 (Top of pavt. Flush with top of anchor shoe)
Top of embedded bearing seat El. 338.90 (Top of pavt. Flush with top of embedded bearing seat)
Metal parts furnished under separate contract
SECTION G-G
ELEVATION
WALKWAY RECESS DETAILS
SCALE: 1"=1'-0"
Abutment Wall
Strap Anchors 1½"x½"x12" (Structural steel)
STRUT ANGLE ANCHORAGE
SCALE: 3"=1'-0"
Furnished under separate contract
SHEETING CHAIN ASSEMBLY
SCALE: ½"=1'-0"
See sheet 84
Hook bolt MK HB6
Storage Vault
DETAIL OF SHEETING RECESS AND SEAL TRENCH FILLER
SCALE: 1½"=1'-0"
Note: These points shall not extend Riverside of a plane through Landside edge of sheeting recess
Top of sill
DOOR LOCK ASSEMBLY
SCALE: 6"=1'-0"
ELEVATION
SECTION A-A
Padlock
Chain
Door pull
Note: For wood door details see sheet 87.
TOP VIEW
FRONT VIEW
END VIEW
PLAN
DETAIL OF WROUGHT IRON HASP
NO SCALE
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
SHEET 86 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV 1941
7&8 11-17-41 Stations changed and minor revisions.
BY DATE CHARACTER
REVISIONS
AS BUILT
934-12.3/86

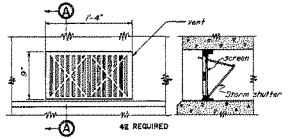


CRANE STOP DETAILS

MATERIAL: STRUCTURAL STEEL EXCEPT AS SHOWN

SCALE: NONE

CRANE STOP SCHEDULE																											
Pump plant Nos.	Crane stops required	Mark	Plates						¾" ø Hole spacing												L	Filler bars		Seasoned white oak	Bolts-hex. heads and nut	filler blocks	nuts with lock washers
			A	B	T	C	D	E	F	G	H	J	K	O													
1,2,7,8,12	4 of each	C52	6"	7"	½"	1½"	3"	½"	3"	2½"	2½"	½"	2½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"
2	4	C54	10"	11½"	¾"	2"	4½"	2"	¾"	4½"	3"	1½"	3½"	1½"	1"	2½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"
3	4	C51	5½"	5½"	½"	1½"	3"	½"	½"	2½"	2"	1"	2½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"
6	4	C53	8"	9"	¾"	2"	4"	2"	¾"	3½"	3½"	1½"	2½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"	½"



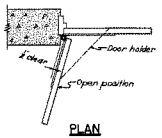
ELEVATION

SECTION A-A

TYPICAL DETAIL WALL VENTILATORS

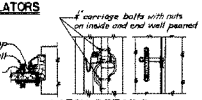
SCALE: 1½" = 1'-0"

Note: Omit shutters on substructure ventilators



PLAN

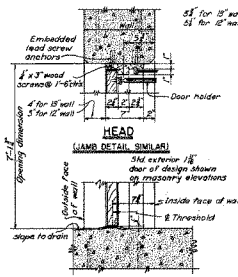
DOOR HOLDER



LATCH DETAILS

(FOR 2'-8" x 7'-0" DOOR)

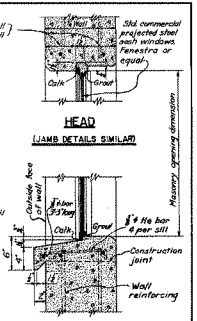
SCALE: 1" = 1'-0"



SILL

ACCESS DOOR FRAME DETAILS

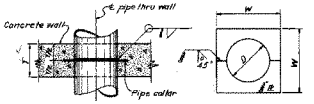
SCALE: 1½" = 1'-0"



SILL

TYPICAL WINDOW DETAILS

SCALE: 1½" = 1'-0"



PLAN

PIPE COLLAR

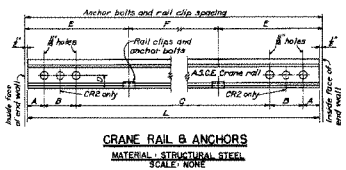
ELEVATION

MATERIAL: STRUCTURAL STEEL

SCALE: NONE

WINDOW AND DOOR SCHEDULE[1]							
	WINDOWS			ACCESS DOORS		ROLLING DOORS[1]	
Pumping plant No.	No. req'd	Masonry opening dimensions	Type Fenestra or equal	No. req'd	Masonry opening dimensions	No. req'd	Masonry opening dimensions	Door opening clear
1	—	—	—	1	2'-6"x7'-1¾"	1	7'-7"x9'-7½"	7'-0"x8'-0"
2	—	—	—	1	" "	1	" "	" "
3	1	3'-2"x4'-8"	33161	1	" "	1	6'-7"x8'-3½"	6'-0"x7'-0"
5	3	" "	" "	1	" "	1	7'-7"x9'-7½"	7'-0"x8'-0"
6	3	3'-8"x6'-2½"	34161	1	" "	1	" "	" "
7	4	3'-2"x4'-9"	33161	1	" "	1	" "	" "
12	—	—	—	2	" "	1	" "	" "

[1] Storage vault doors not included in this schedule.
[1] Rolling doors to be under linkel mounted, manually operated, Kinnear Mfg. Co. BM10 or equal. Coil to be housed in No. 24 U.S. gage sheet metal hood.



CRANE RAIL & ANCHORS

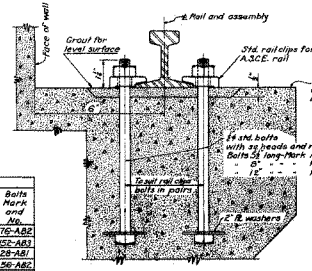
MATERIAL: STRUCTURAL STEEL

SCALE: NONE

CRANE RAIL AND ANCHOR SCHEDULE												
Pumping plant Nos.	Crane rails required	A.S.C.E. crane rail section	Mark	L *	A	B **	C	D	E	F	Rail clip No.	Bolts Mark and No.
1	2	20.4#	CR1	37'-3"	1½"	3"	26'-6"	1½"	9"	18.5pcs.@2'-6"	76	76-AB2
2	2	44.9#	CR2	57'-11"	2"	3**	56'-7"	1½"	1'-3"	37.5pcs.@1'-4"	152	152-AB3
3	2	15.9#	CR3	13'-11"	1½"	3	13'-2"	1½"	1'-2"	6.5pcs.@2'-0"	28	28-AB1
5	2	20.4#	CR4	27'-8"	1½"	3	26'-11"	1½"	10"	13.5pcs.@2'-0"	56	56-AB2
6	2	40.2#	CR5	38'-9"	2"	4	36'-9"	1½"	1'-4"	22.5pcs.@1'-8"	92	92-AB3
7	2	20.4#	CR6	20'-5"	1½"	3	19'-9"	1½"	1'-3"	10.5pcs.@2'-0"	40	40-AB2
12	2	20.4#	CR7	21'-1"	1½"	3	21'-2"	1½"	1'2"	10.5pcs.@2'-0"	44	44-AB2

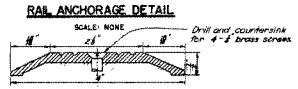
** All rails have 2 holes each end except CR2 which has 3 holes each end.

* Rails longer than 30'-0" may be furnished with std. splices.



RAIL ANCHORAGE DETAIL

SCALE: NONE

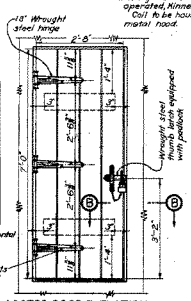


THRESHOLD FOR WOOD ACCESS DOORS

SCALE: FULL SIZE

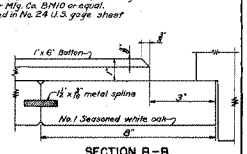
PIPE COLLAR SCHEDULE				
Pumping plant No.	No. required	W	D	Wt. each
1	2	3'-6"	2'-7"	107#
2	2	6'-2"	5'-11"	288#
	2	5'-1"	4'-7"	195#
	1	3'-6"	2'-7"	107#
3	2	2'-6"	1'-6"	68#
	1 ℄ Elliptical hole	3'-0"	2'-2"	65#
		3'-0"	2'-4½"	
5	2	4'-0"	3'-1"	131#
	1	3'-0"	2'-0½"	94#
	1	2'-0"	1'-1"	47½#
	1	3'-0"	4'-1½"	151#
6	3	4'-0"	4'-1"	167#
	1	4'-0"	3'-1"	131#
7	1	3'-6"	2'-7"	107#
	1	2'-6"	1'-8"	73#
	1 ℄ Elliptical hole	2'-7"	1'-7"	70#
		4'-5"	3'-2"	30#
12	2	3'-0"	2'-0"	89#

* Dimension w. is vertical and h. horizontal



ACCESS DOOR ELEVATION

SCALE: ½" = 1'-0"



SECTION B-B

SCALE: HALF SIZE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MISCELLANEOUS DETAILS

SHEET 87 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] CHIEF ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ASSISTANT CHIEF OF FLOOD CONTROL DIVISION OR. ST. W.A.H.

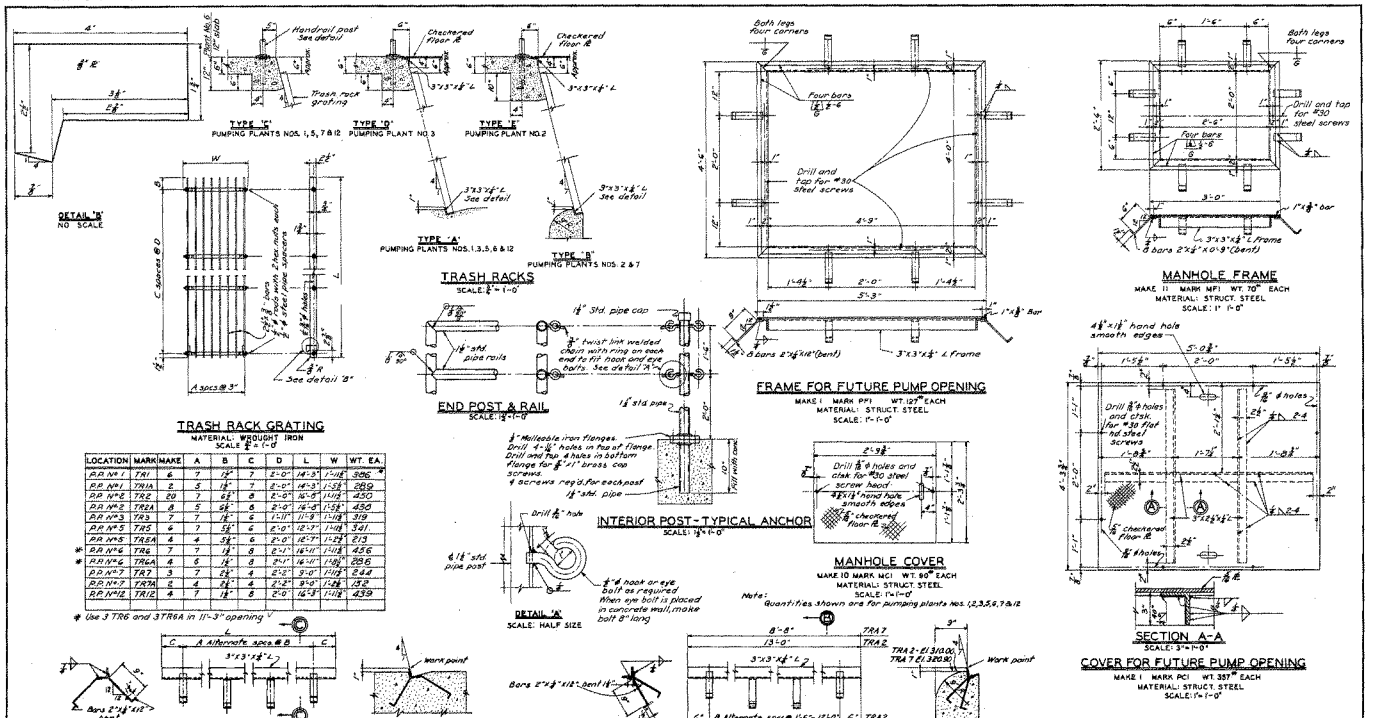
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER TR. BY HOF M. CE. BY F.B.F.

F.B.F.	11-17-41	Threshold detail added, crane rail & pipe collar schedules corrected and minor revisions.
BY	DATE	CHARACTER OF REVISIONS

AS BUILT

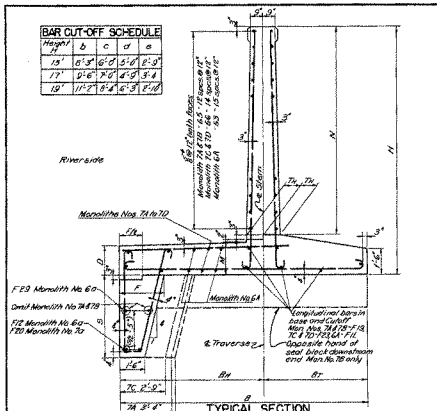
934-12.3/87

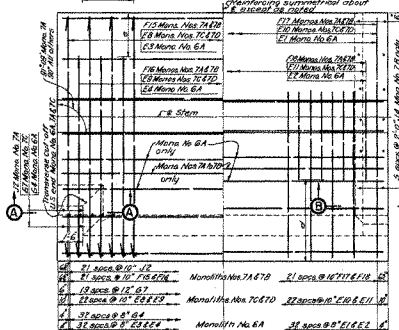
951


DETAIL "B"
NO SCALE
TYPE "C"
PUMPING PLANTS NOS. 1, 5, 7 & 12
TYPE "D"
PUMPING PLANT NO. 3
TYPE "E"
PUMPING PLANT NO. 2
TYPE "A"
PUMPING PLANTS NOS. 1, 3, 5, 6 & 12
TYPE "B"
PUMPING PLANTS NOS. 2 & 7
TRASH RACKS
SCALE: 1/2" = 1'-0"
TRASH RACK GRATING
MATERIAL: WROUGHT IRON
SCALE: 1/2" = 1'-0"
END POST & RAIL
SCALE: 1/2" = 1'-0"
INTERIOR POST - TYPICAL ANCHOR
SCALE: 1/2" = 1'-0"
DETAIL "A"
SCALE: HALF SIZE
FRAME FOR FUTURE PUMP OPENING
MAKE 1 MARK PF1 WT. 125# EACH
MATERIAL: STRUCT. STEEL
SCALE: 1" = 1'-0"
MANHOLE COVER
MAKE 10 MARK MC1 WT. 90# EACH
MATERIAL: STRUCT. STEEL
SCALE: 1" = 1'-0"
Note:
Quantities shown are for pumping plants Nos. 1, 2, 3, 5, 6, 7 & 12
MANHOLE FRAME
MAKE 11 MARK MF1 WT. 70# EACH
MATERIAL: STRUCT. STEEL
SCALE: 1" = 1'-0"
SECTION A-A
SCALE: 3" = 1'-0"
COVER FOR FUTURE PUMP OPENING
MAKE 1 MARK PC1 WT. 357# EACH
MATERIAL: STRUCT. STEEL
SCALE: 1" = 1'-0"
TRASH RACK BEARING ANGLE
MATERIAL: STRUCT. STEEL
SCALE: 1" = 1'-0"
SECTION C-C
SCALE: 1" = 1'-0"
LADDER RUNG
MAKE 215 MARK LR1 WT. 11.5# EACH
MATERIAL: WROUGHT IRON
SCALE: 1/2" = 1'-0"
Note:
Quantity shown is total number req'd for pumping plants Nos. 1, 2, 3, 5, 6, 7 & 12
TRASH RACK BEARING ANGLE
MAKE 4 MARK TRA2 WT. 78# EACH
MAKE 1 MARK TRA7 WT. 32# EACH
MATERIAL: STRUCT. STEEL
SCALE: 1" = 1'-0"
Note:
Quantities shown are for pumping plants Nos. 2 & 7
SECTION B-B
SCALE: 1" = 1'-0"
TRA2 - El 310.00
TRA7 El. 320.00
Work point
Bars 2"x1/2"x12" bent
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
SHEET 88 OF 108 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
PRINCIPAL ENGINEER, PLANS & DESIGN BRANCH
DR. 87 V.F.C.
CHIEF, DESIGN BRANCH
TN. 87 S.L.P.
CHIEF ENGINEER
CH. 87 F.R.F.
FBF 11-1941 Minor revisions
BY DATE CHARACTER
REVISIONS
AS BUILT
934-12.3/88

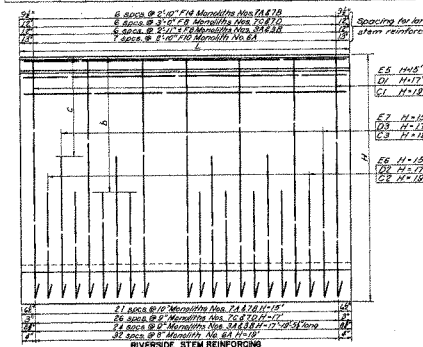
952

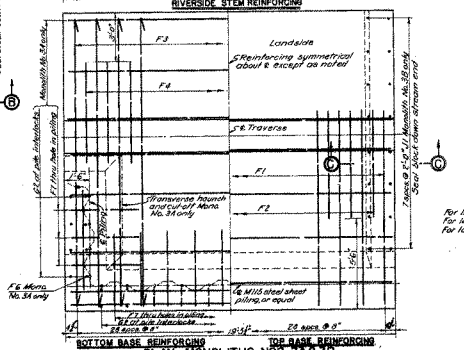
BAR CUT-OFF SCHEDULE				
Height H	b	c	d	a
15'	6'-3"	6'-0"	5'-0"	8'-9"
17'	9'-6"	7'-0"	4'-9"	9'-4"
19'	11'-7"	8'-4"	6'-3"	9'-10"

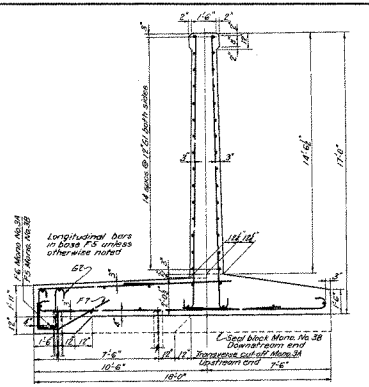


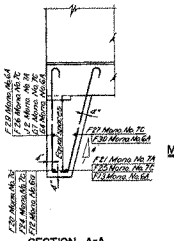


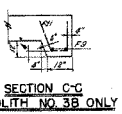
DIMENSIONS FOR MASONRY DETAILS WHEN H=15' TO H=19' CONCRETE CUT-OFF												
Monolith Nos.	H	L length on ℄	B	Bn	Br	N	M	Tn+Tr	D	F	S	Remarks
7A & 7B	15'	18'-7"	15'	8'-0"	6'-3"	12'-7½"	1'-11½"	11½"	1'-5"	2'-8"	5'-0"	Transverse Cut-off U.S. end Mono. No. 7A. Transverse seat block D.S. end Mono. No. 7B
7C & 7D	17'	20'-0"	18'	10'-6"	7'-6"	14'-6½"	2'-0½"	12½"	1'-8"	2'-8"	5'-8"	Transverse Cut-off Upstream end Monolith No. 7C
6A	19'	22'-0"	20'	11'-6"	8'-6"	16'-5½"	2'-1½"	12½"	2'-1"	3'-1"	6'-4"	Transverse Cut-off Upstream end Monolith No. 6A

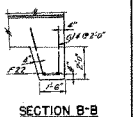












For location of Monoliths 3A & 3B see sheet 51
For location of Monolith 6A see sheet 49
For location of Monoliths 7A to 7D incl. see sheet 64

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING
T-WALL MONOLITHS

SHEET 89 OF 108 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [illegible] CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PROJECT ENGINEER, CHIEF OF DESIGN, FLOOD CONTROL DIVISION

APPROVED: [illegible] LOUISVILLE DISTRICT, CHIEF ENGINEER

DR. BY W.A.H. — TR. BY E.D.Z. — CK. BY W.S.F.

BY	DATE	CHARACTER REVISIONS

AS BUILT

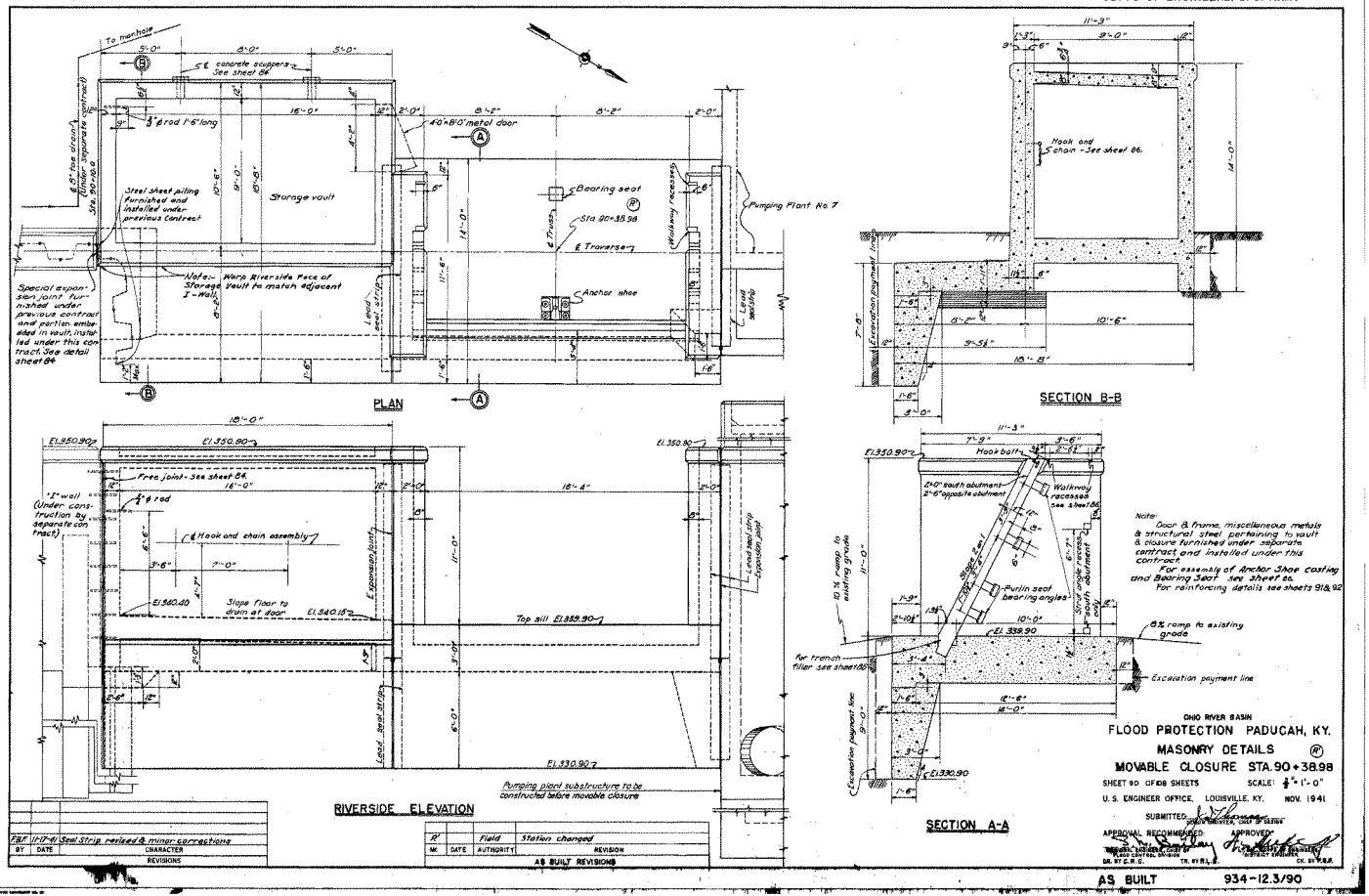
934-12.3/89

953

193

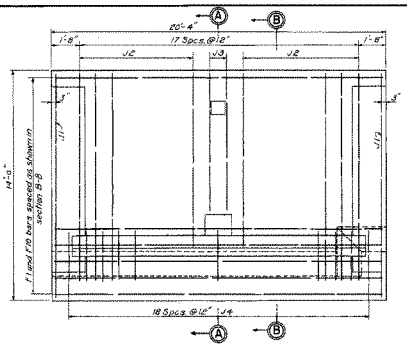
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

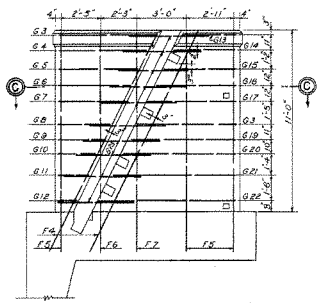


WAR DEPARTMENT

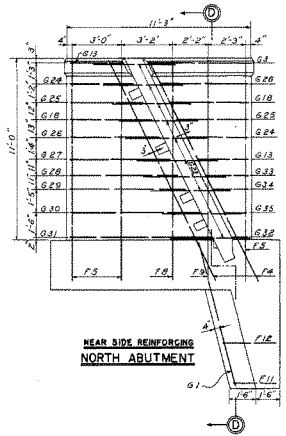
CORPS OF ENGINEERS, U. S. ARMY



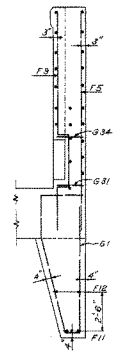
TOP REINFORCING
PLAN



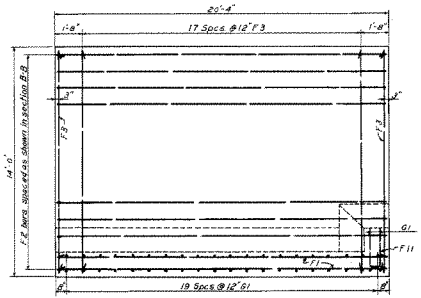
NEAR SIDE REINFORCING
SOUTH ABUTMENT



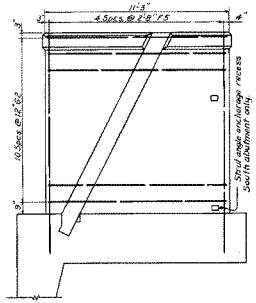
NEAR SIDE REINFORCING
NORTH ABUTMENT



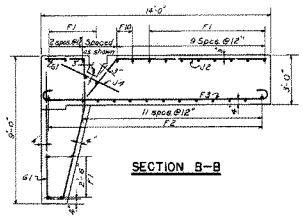
SECTION D-D



BOTTOM REINFORCING
PLAN

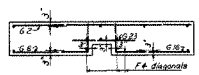


FAR SIDE REINFORCING
NORTH & SOUTH ABUTMENTS

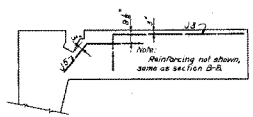


SECTION B-B

Note:
For masonry details see sheet 90.



SECTION C-C



SECTION A-A

R'		Field	Station changed.
NO.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY. (R')

REINFORCING DETAILS STA. 90+38.988

SILL & ABUTMENTS

SHEET 91 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: SENIOR ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY A.J.Z. TR. BY E.M.S. CK. BY F.B.F.

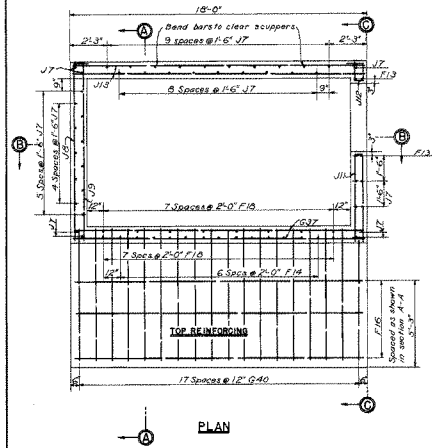
AS BUILT 934-12.3/91

955

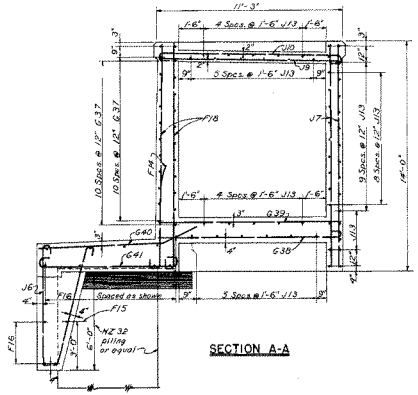
175

WAR DEPARTMENT

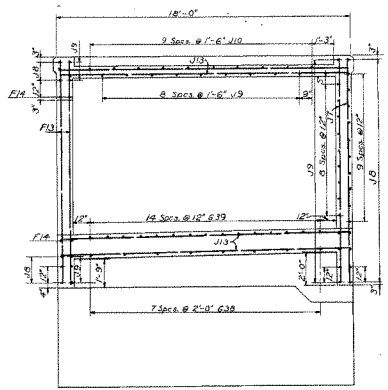
CORPS OF ENGINEERS, U. S. ARMY



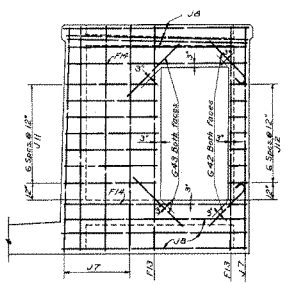
PLAN



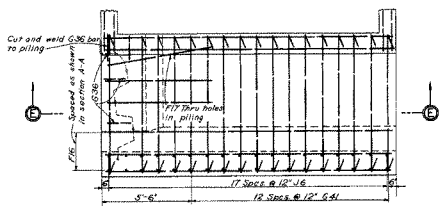
SECTION A-A



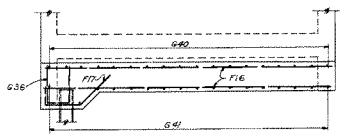
SECTION B-B



NEAR AND FAR SIDE REINFORCING
ELEVATION



BOTTOM REINFORCING
PLAN



SECTION E-E

Note:
For masonry details see sheet 90.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 90+10.81 B
STORAGE VAULT

SHEET 92 OF 108 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941

SUBMITTED: [signature] SYLVIA THERRITT, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] CHIEF, CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY A.J.Z. TR. BY D.R.C. CK. BY P.B.F.

BY	DATE	CHARACTER REVISIONS
P.B.F.	11-17-41	Bar marks & station changed. Minor revisions.

BY	DATE	AUTHORITY	REVISION
		Field	Station changed

AS BUILT REVISION

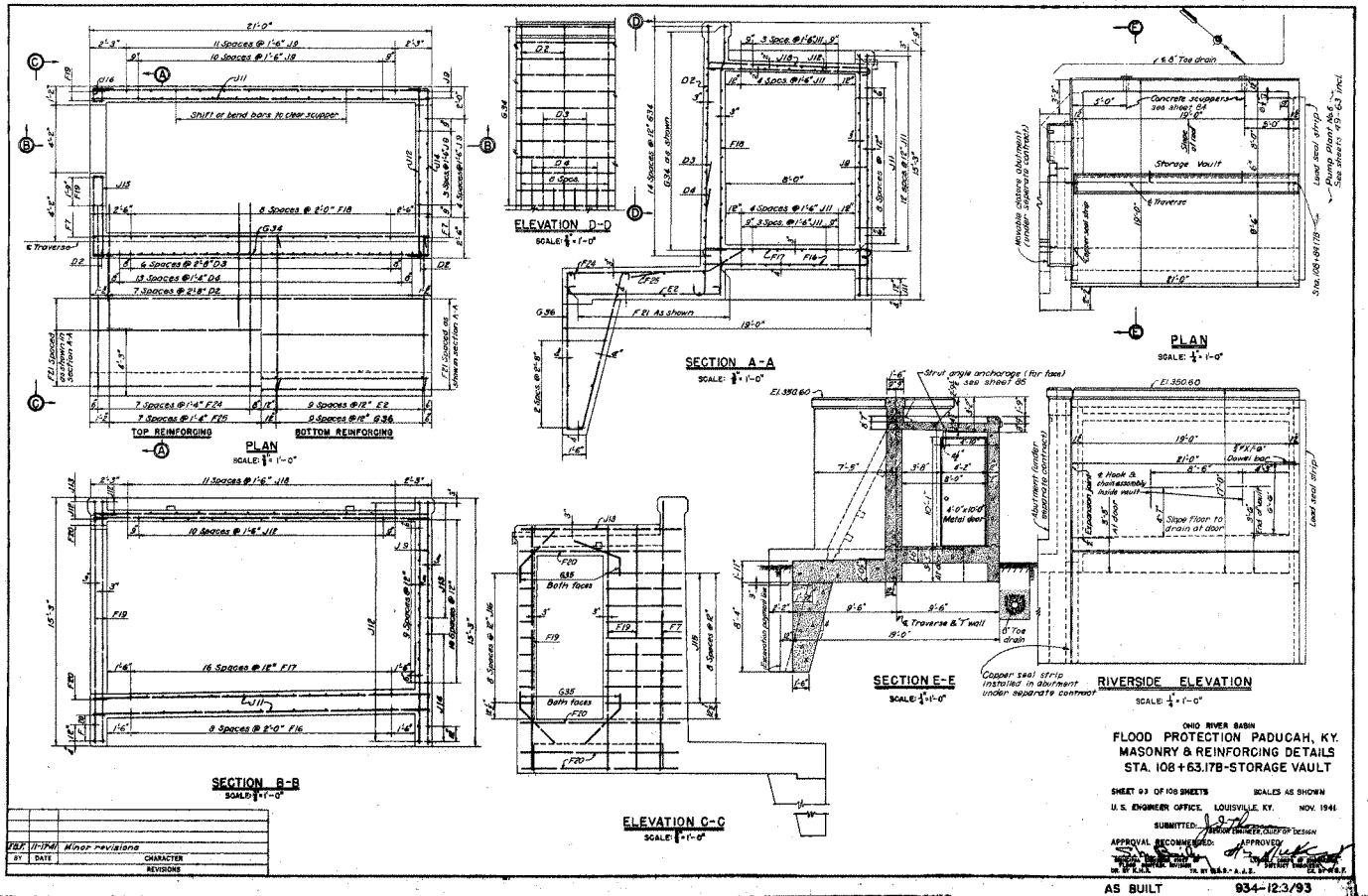
AS BUILT 934-12.3/92

196

956

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



TBF 11-1941	Minor revisions	
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
STA. 108+63.17B-STORAGE VAULT

SHEET 93 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

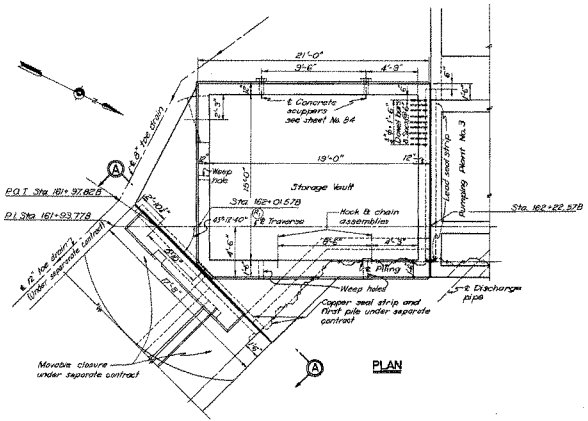
SUBMITTED: SENIOR ENGINEER, CHIEF OF DESIGN

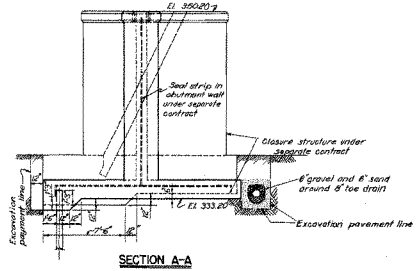
APPROVAL RECOMMENDED: APPROVED:

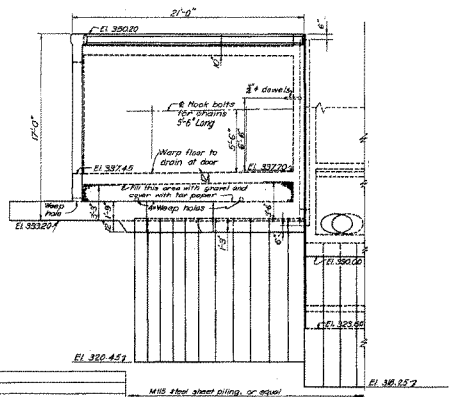
AS BUILT 934-12:3/93

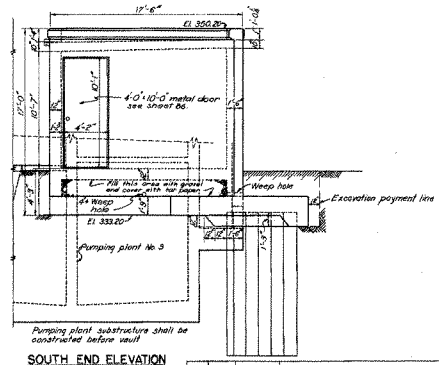
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY









Note:
For reinforcing details see sheet No. 95

BY	DATE	CHARACTER
F.B.P.	(1-13-41)	Toe drain added & minor revisions.

REVISIONS

No.	DATE	AUTHORITY	REVISION
1		Field	Angle changed

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MASONRY DETAILS STA. 162+01.578

STORAGE VAULT

SHEET 94 OF 108 SHEETS SCALE: 1/8" = 1'-0"

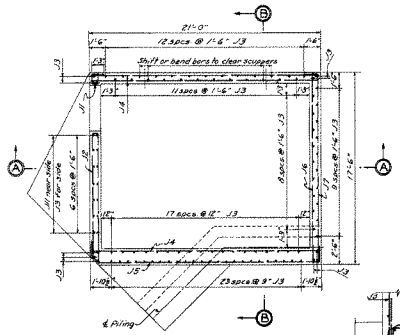
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: J. L. Thomas
LT. COL. C.E., CHIEF OF DESIGN

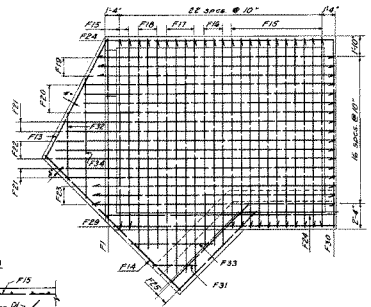
APPROVAL RECOMMENDED: APPROVED:
MAJOR, C.E., CHIEF OF FLOOD CONTROL DESIGN
DR. BY W.A.H. TR. BY O.A.S.
LT. COL. C.E., CHIEF OF ENGINEERING DIVISION
CK. BY F.B.P.

AS BUILT 934-12.3/94

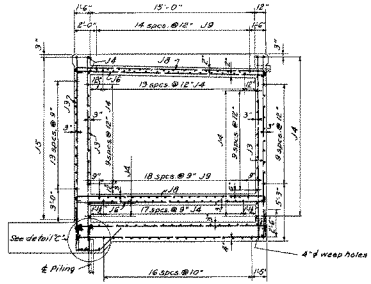
178



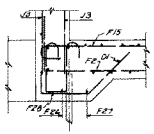
PLAN



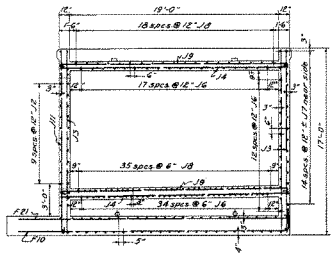
TOP REINFORCING
PLAN-BASE



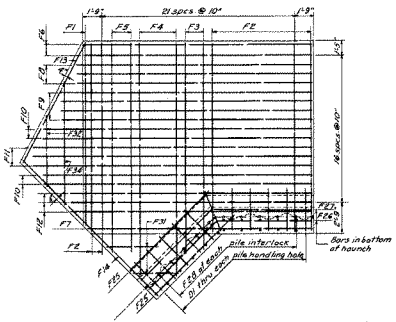
SECTION B-B



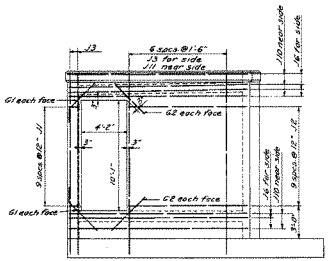
DETAIL "C"



SECTION A-A



BOTTOM REINFORCING
PLAN-BASE



DOORWAY ELEVATION

Note:
For masonry details see sheet 94

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 162+01.57B
STORAGE VAULT

SHEET 95 OF 108 SHEETS SCALE: $\frac{1}{4}$"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: CHIEF ENGINEER DIVISION

APPROVAL RECOMMENDED: APPROVED:
CHIEF, ENGINEER CORPS OF ENGINEERS, FLOOD CONTROL DIVISION
DR. BY E.B.S. TR. BY A.F.
CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER
CK. BY E.B.F.

BY	DATE	CHARACTER
FBF	11-17-41	Station changed in title

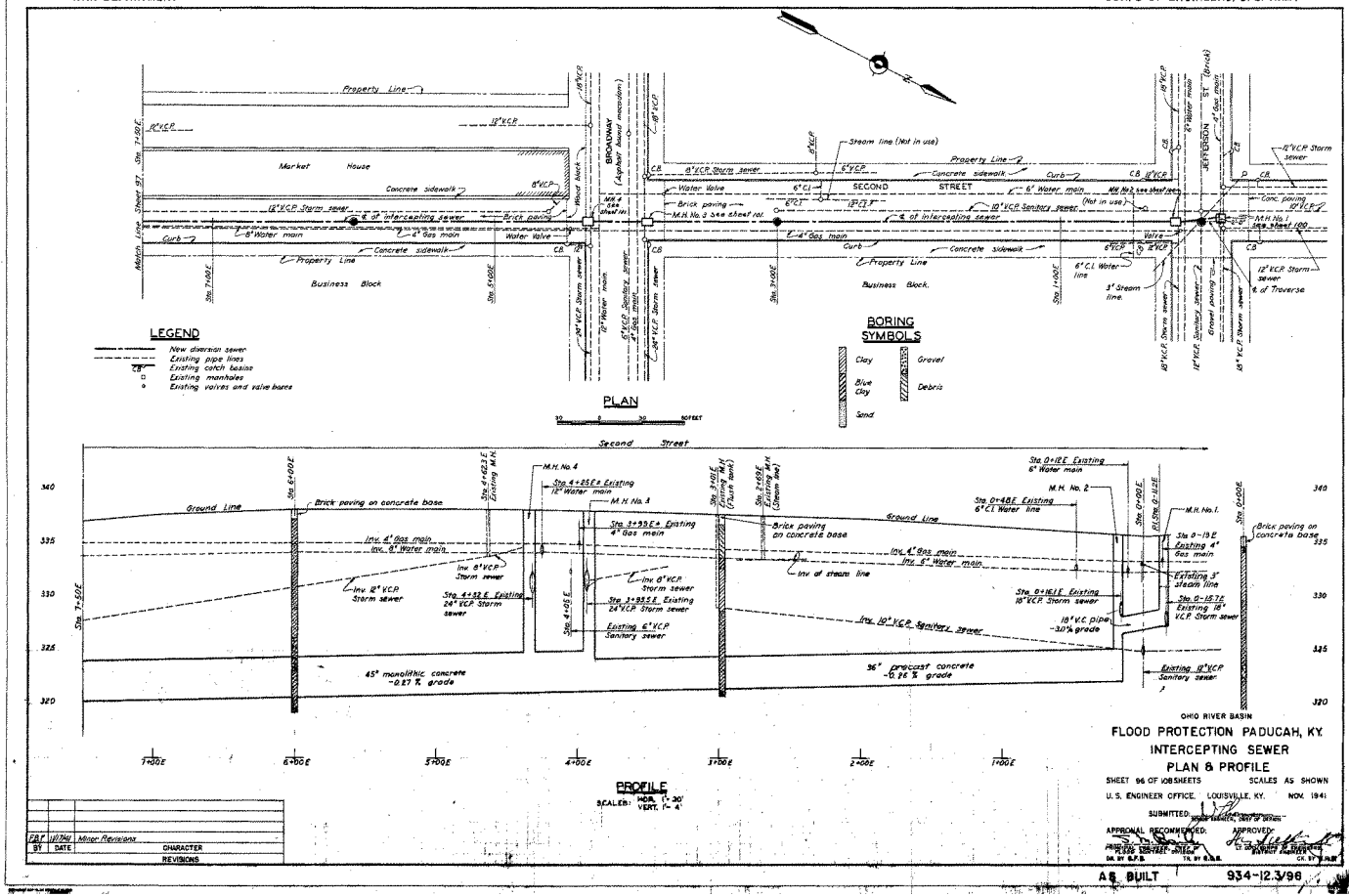
REVISIONS

AS BUILT 934-12.3/95

959

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

INTERCEPTING SEWER

PLAN & PROFILE

SHEET 96 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: (Chief, Design Section)

APPROVAL RECOMMENDED: (Principal Engineer, Flood Control Section) — APPROVED: (Chief, Engineering Division)

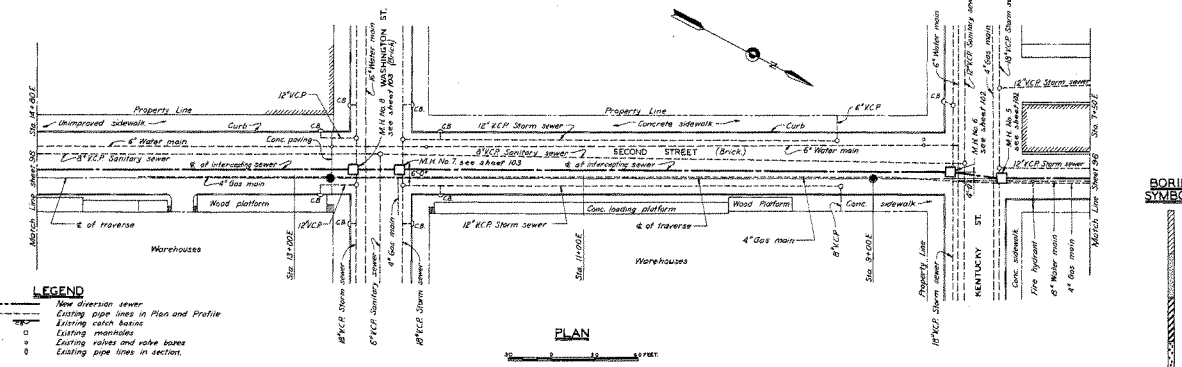
DR. BY G.P.B. — TR. BY G.S.B. — CK. BY F.J.M.

BY	DATE	CHARACTER
FBF	10/7/41	Minor Revisions

REVISIONS

AS BUILT 934-12.3/96

096



PLAN

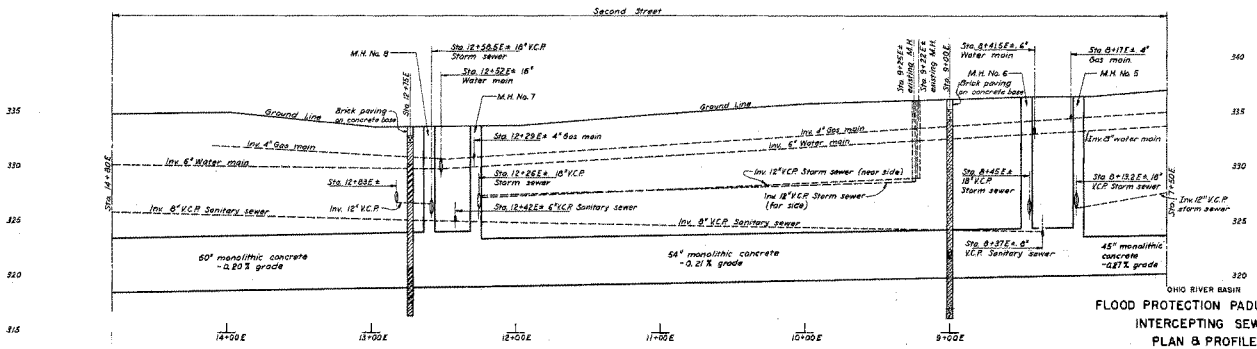
SCALE: 20 0 20 40 FEET

LEGEND

- New diversion sewer
- Existing pipe lines in Plan and Profile
- Existing catch basins
- Existing manholes
- Existing valves and valve boxes
- Existing pipe lines in section.

BORING SYMBOLS

Clay
Sand
Blue Clay
Gravel



PROFILE

SCALES: HOR. 1" = 20' VERT. 1" = 4'

BY	DATE	CHARACTER REVISIONS
FBE	11-17-41	Minor revisions

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

INTERCEPTING SEWER

PLAN & PROFILE

SHEET 97 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: J. J. Morgan, Major, Corps of Engineers, District Engineer, Chief of Design

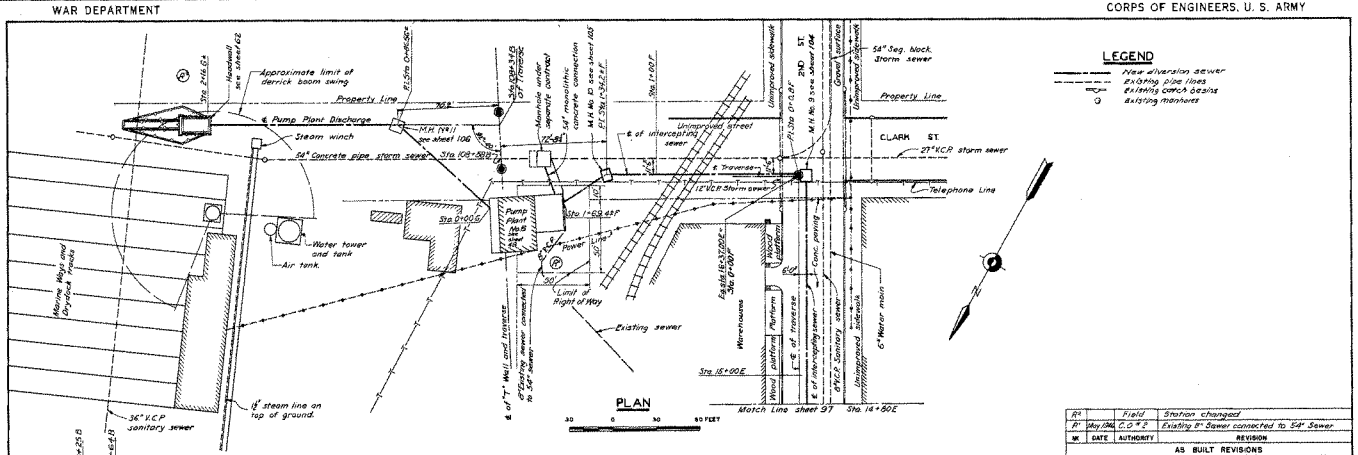
APPROVAL RECOMMENDED: Principal Assistant Engineer, Flood Control Division, DR. BY G.P.B. TR. BY O.C.A.

APPROVED: Lt. Col. Corps of Engineers, District Engineer, CK. BY W.W.D.

AS BUILT 934-12.3/97

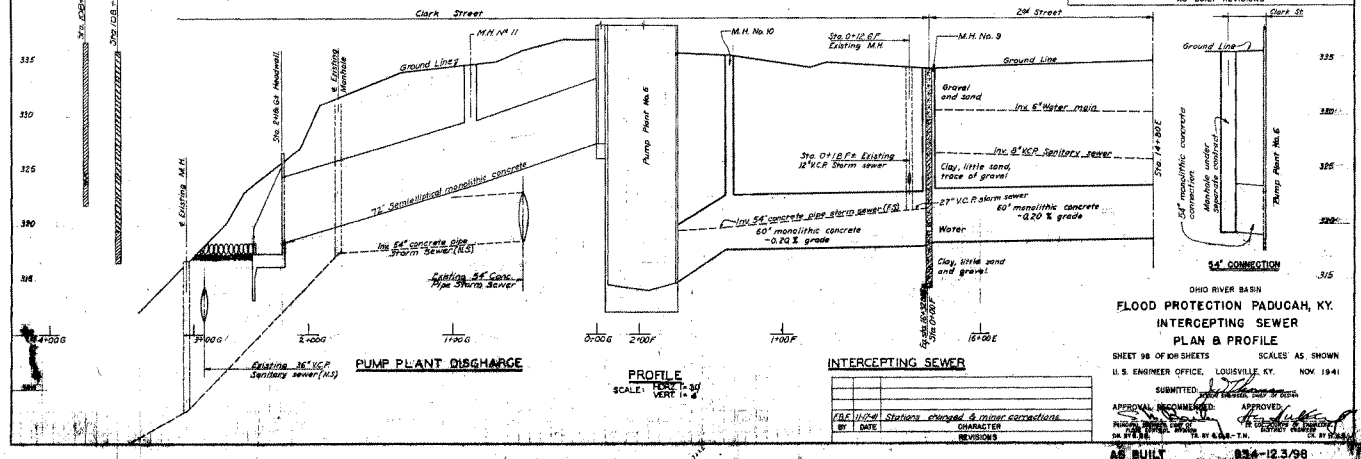
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R#		Field	Station changed
Pr	May 1946	C.O. # 2	Existing 8" Sewer connected to 54" Sewer
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS



F.D.E.	11-17-41	Stations changed & minor corrections
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

INTERCEPTING SEWER

PLAN & PROFILE

SHEET 98 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] DIVISION, CORPS OF ENGINEERS

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, ENGINEER DIVISION

APPROVED: [illegible] CHIEF OF ENGINEERS

DR. BY F.D.E. TR. BY G.A.B.-T.N. CK. BY [illegible]

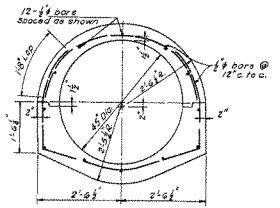
AS BUILT 834-12.3/98

962

202

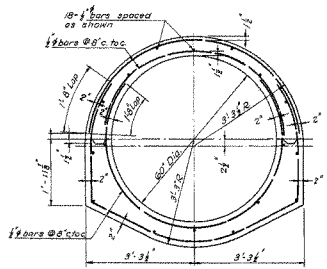
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



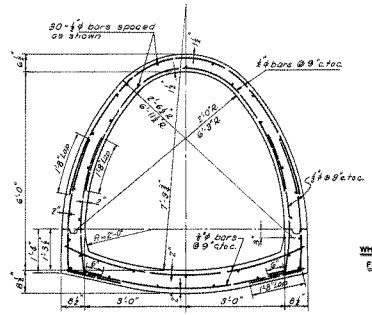
TYPICAL SECTION
45" REINFORCED CONCRETE SEWER

403' LINEAR FT. SEWER REQ'D.
12,165 LIN. FT. @ 40 LBS. STEEL REQ'D
SCALE: ¼" = 1'-0"



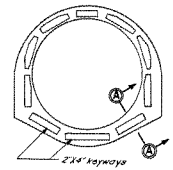
TYPICAL SECTION
60" REINFORCED CONCRETE SEWER

558' LINEAR FT. SEWER REQ'D.
43,307 LIN. FT. @ 26.29 LBS. STEEL REQ'D
SCALE: ¼" = 1'-0"



TYPICAL SECTION
72" SEMI-ELLIPTICAL SEWER

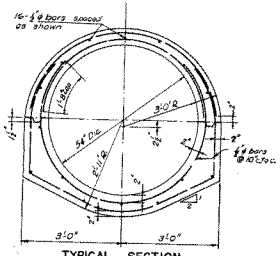
207' LINEAR FT. SEWER REQ'D.
⅝ϕ 17,784 LIN. FT. 11,866 LBS. STEEL REQ'D.
⅝ϕ 4,001 LIN. FT. @ 7.8 LBS. STEEL REQ'D.
SCALE: ¼" = 1'-0"



TYPICAL VERTICAL
CONSTRUCTION JOINT

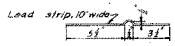
WHERE WATER TIGHT CONSTRUCTION IS NOT REQUIRED
FOR 45", 54", 60" OR 72" MONOLITHS CONCRETE SEWER

SECTION A-A

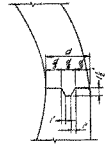


TYPICAL SECTION
54" REINFORCED CONCRETE SEWER

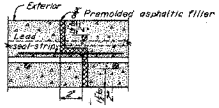
479' LINEAR FT. SEWER REQ'D
30,217 LIN. FT. @ 40 LBS. STEEL REQ'D
SCALE: ¼" = 1'-0"



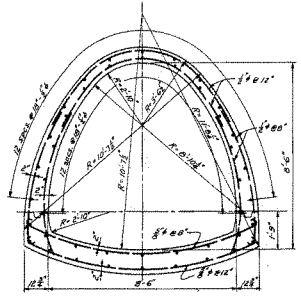
LEAD SEAL STRIP
SCALE: 3" = 1'-0"



TYPICAL HORIZONTAL
CONSTRUCTION JOINT
SCALE: 1½" = 1'-0"



TYPICAL VERTICAL CONSTRUCTION JOINT
FOR WATER TIGHT CONSTRUCTION
SCALE 3" = 1'-0"



TYPICAL SECTION 8'-6"
SEMI-ELLIPTICAL CONCRETE SEWER

363' LINEAR FT. SEWER REQ'D.
⅝ϕ 3,765 LIN. FT. 2,528 LBS. STEEL REQ'D.
1" ϕ 1,087 LIN. FT. 1,135 LBS. STEEL REQ'D.
SCALE: ¼" = 1'-0"

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY AND REINFORCING DETAILS
MONOLITHIC CONCRETE SEWERS

SHEET 99 OF 106 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: [signature] — ASST. ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] — CHIEF, DESIGN CONTROL DIVISION

APPROVED: [signature] — DISTRICT ENGINEER

DR. BY: G.T.B. — TR. BY: J.E.C. — CK. BY: R.P.B.

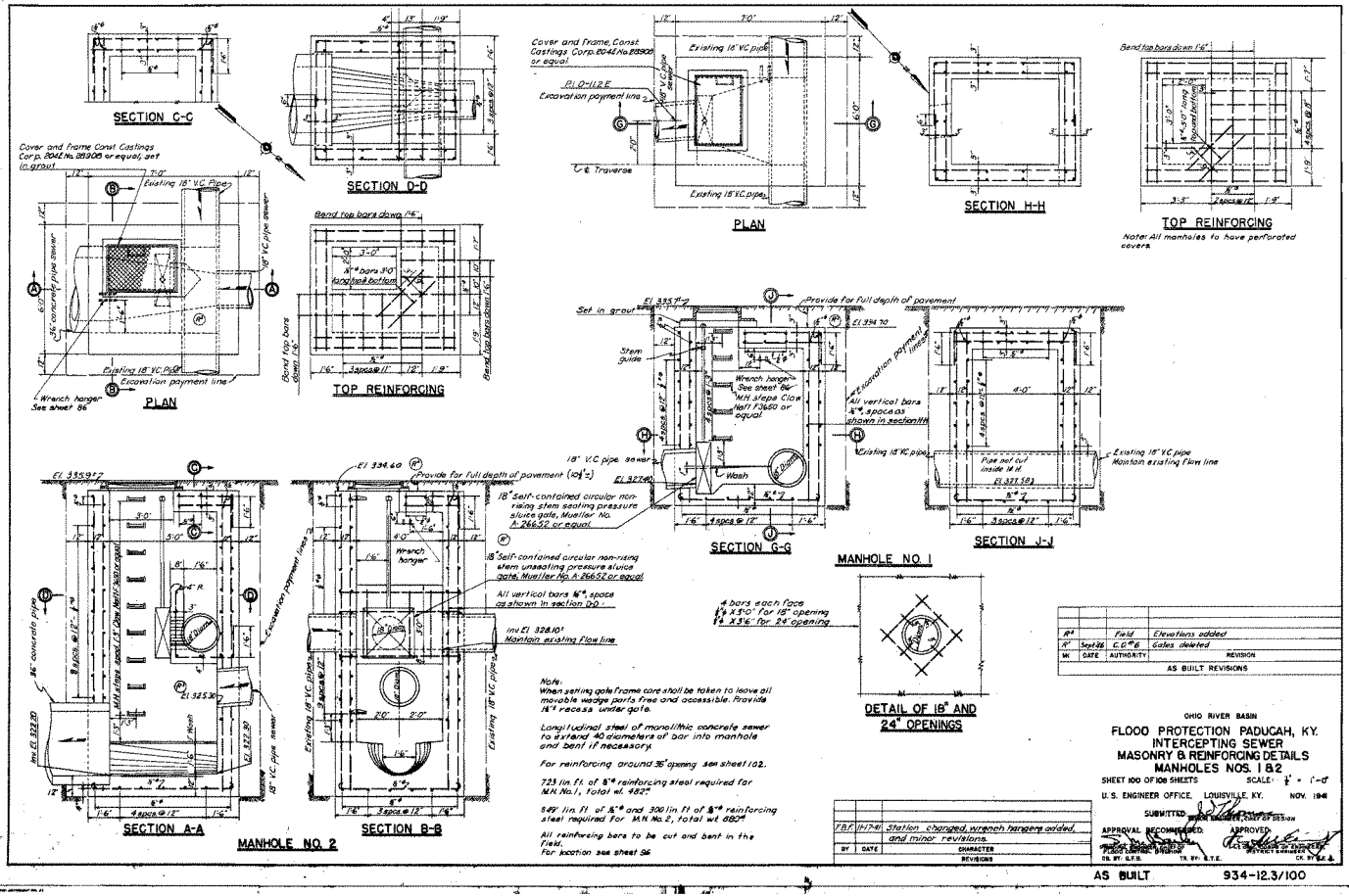
TBF	11-17-41	Title changed, reinforcing quantities and weights added.
BY	DATE	CHARACTER

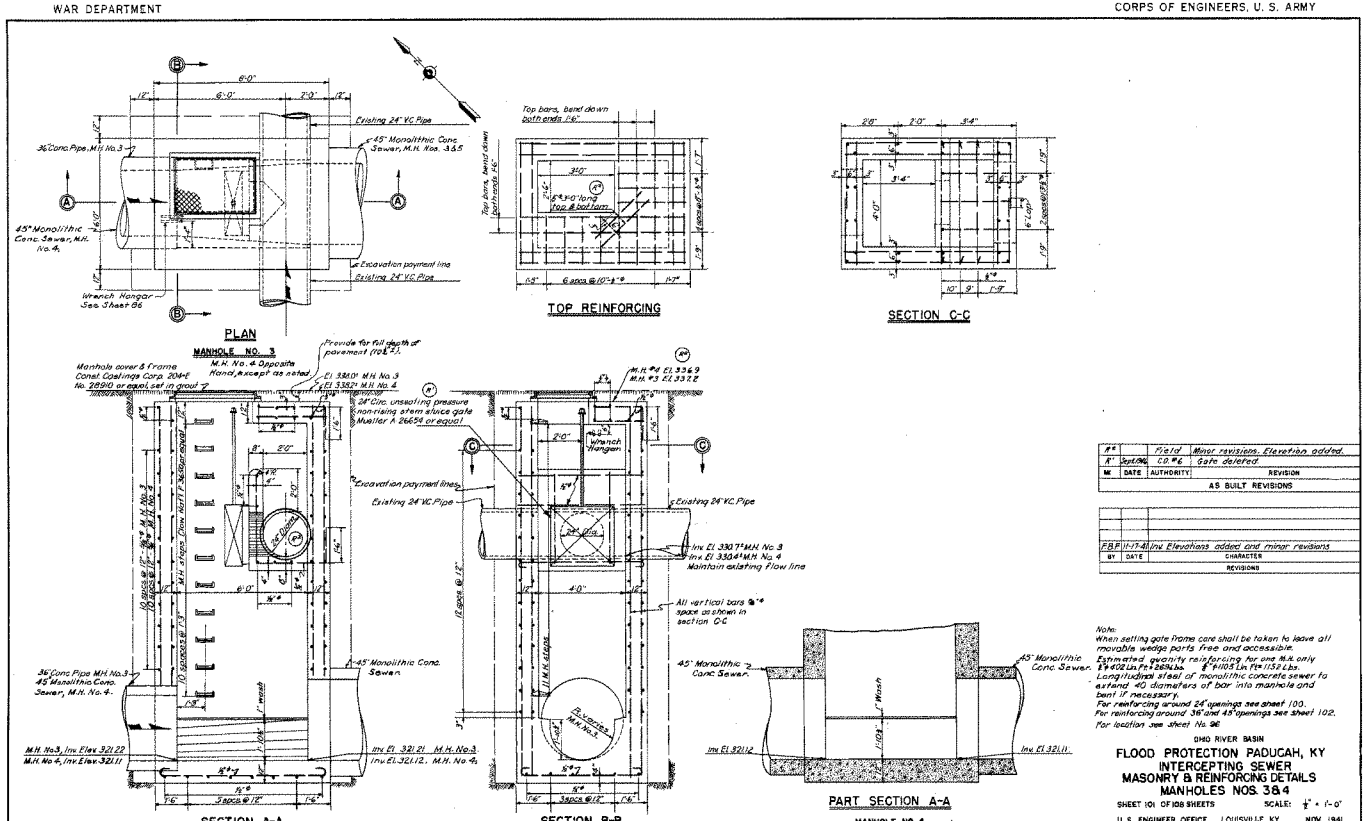
REVISIONS

AS BUILT

934-12.3/99

203


SECTION C-C
SECTION D-D
PLAN
SECTION H-H
TOP REINFORCING
Note: All manholes to have perforated covers.
Cover and Frame, Const. Castings Corp. 8041 No. 28906 or equal.
Cover and Frame Const Castings Corp. 8041 No. 28906 or equal, set in grout
Existing 18" V.C. pipe
Excavation payment line
Wrench hanger See sheet 86
Bend top bars down 1'6"
Provide for full depth of pavement
Set in grout
Stem guide
Wash
18" V.C. pipe sewer
Existing 18" V.C. pipe
Manton existing flow line
Pipe not cut inside M.H.
SECTION G-G
SECTION J-J
MANHOLE NO. 1
SECTION A-A
SECTION B-B
MANHOLE NO. 2
DETAIL OF 18" AND 24" OPENINGS
4 bars each face
1/4" X 3'0" for 18" opening
1/4" X 3'6" for 24" opening
18" self-contained circular non-rising stem sealing pressure sluice gate, Mueller No. A-26652 or equal.
18" self-contained circular non-rising stem unsealing pressure sluice gate, Mueller No. A-26652 or equal
All vertical bars 1/2" space as shown in section D-D.
Inv. El. 328.10' Manton existing flow line
Note:
When setting gate frame care shall be taken to leave all movable wedge parts free and accessible. Provide 1/4" recess under gate.
Longitudinal steel of monolithic concrete sewer to extend 40 diameters of bar into manhole and bent if necessary.
For reinforcing around 36" opening see sheet 102.
723 lin. ft. of 1/2" reinforcing steel required for M.H. No. 1, total wt. 452#.
549 lin. ft. of 1/2" and 300 lin. ft. of 3/4" reinforcing steel required for M.H. No. 2, total wt. 860#.
All reinforcing bars to be cut and bent in the field.
For location see sheet 86
R4 Field Elevations added
R3 Sept. 46 C.O. #6 Gates deleted
M GATE AUTHORITY REVISION
AS BUILT REVISIONS
F.B.F. (1-17-49) Station changed, wrench hangers added, and minor revisions.
BY DATE CHARACTER REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 1 & 2
SHEET 100 OF 108 SHEETS
SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1948
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
DR. BY: G.F.B.
TR. BY: G.T.E.
CK. BY: E.K.J.
AS BUILT
934-12.3/100



A4		Metal	Minor revision. Elevation added.
A3	Sept. 1946	CO R.E.	Gate deleted.
BY	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

F.B.F.	11-17-41	Inv. Elevations added and minor revisions
BY	DATE	CHARACTER

REVISIONS

Note:
When setting gate frame care shall be taken to leave all movable wedge parts free and accessible.
Estimated quantity reinforcing for one M.H. only
$\frac{5}{8}$" #4 Lin. Ft. = 268 Lbs. $\frac{3}{8}$" #10 Lin. Ft. = 1.158 Lbs.
Longitudinal steel of monolithic concrete sewer to extend 40 diameters of bar into manhole and bent if necessary.
For reinforcing around 24" openings see sheet 100.
For reinforcing around 36" and 45" openings see sheet 102.
For location see sheet No. 96

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 3 & 4

SHEET 101 OF 108 SHEETS SCALE: $\frac{1}{4}$" = 1'-0"

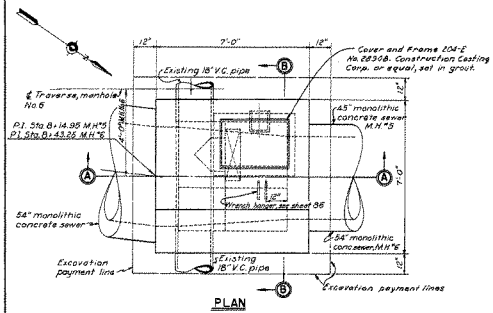
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature]
Chief Engineer, Chief of Design

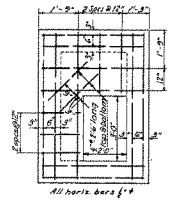
APPROVAL RECOMMENDED: [signature]
Principal Engineer, Chief of Design
Flood Control Section
Dr. BY: G.F.B. Tr. BY: G.E.

APPROVED: [signature]
Lt. Col., Corps of Engineers
District Engineer
Ck. BY: G.E.

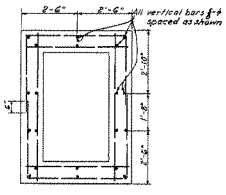
AS BUILT 934-12.3/101



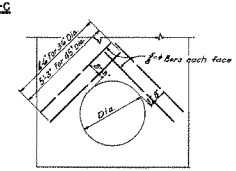
PLAN



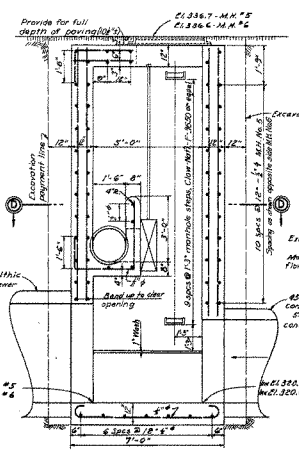
TOP REINFORCING



SECTION C-C

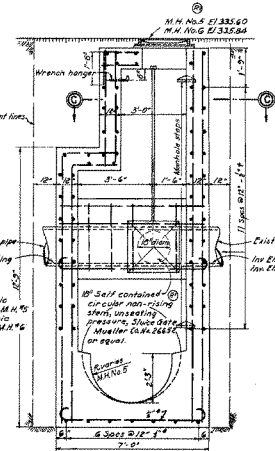


DETAIL OF 36" AND 45" OPENINGS

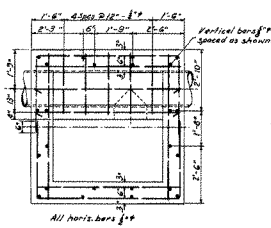


SECTION A-A

MANHOLE NO. 5



SECTION B-B



SECTION D-D

		Field	Elevations added
1	Spec. No. C.O. #6		Gate deleted
MK.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

Note:
For reinforcing around 54" openings see sheet 104.
18" " " " 100.
For location see sheet 97.

Notes:
When setting gate frame care shall be taken to leave all movable wedge parts free and accessible.

Longitudinal steel of monolithic concrete sewer to extend 40 diameters of bar into manhole and bent if necessary.
942 lin. ft. of ⅝"ϕ @ 459 lin. ft. of ⅝"ϕ reinforcing steel required for manhole No. 5 Total Wt. 1119 #
942 lin. ft. of ⅝"ϕ @ 459 lin. ft. of ⅝"ϕ reinforcing steel required for manhole No. 6 Total Wt. 1119 #

MANHOLE NO. 6 OPPOSITE HAND TO MANHOLE NO. 5 EXCEPT AS NOTED

FBF	10-17-41	Wrench hanger added & minor revisions.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 5 & 6

SHEET 102 OF 108 SHEETS SCALE ½" = 1'-0"

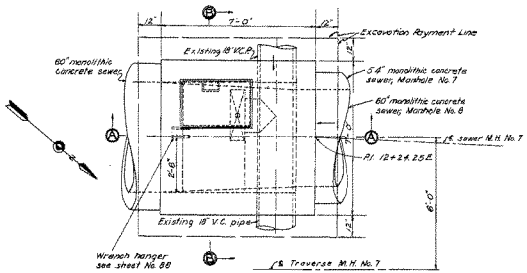
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] SENIOR ENGINEER CORPS OF ENGINEERS

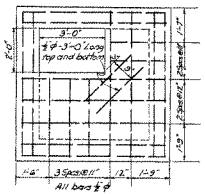
APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER CORPS OF ENGINEERS, FLOOD CONTROL DIVISION, DR. BY: G.F.S.

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER, CK. BY: R.R.R.

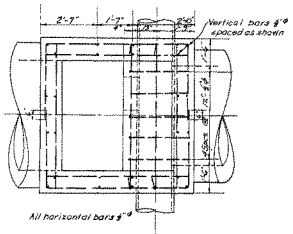
AS BUILT 934-12.3/102



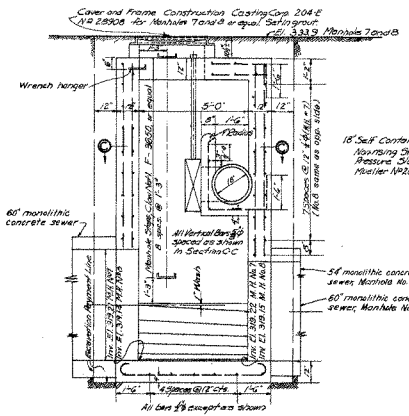
PLAN.



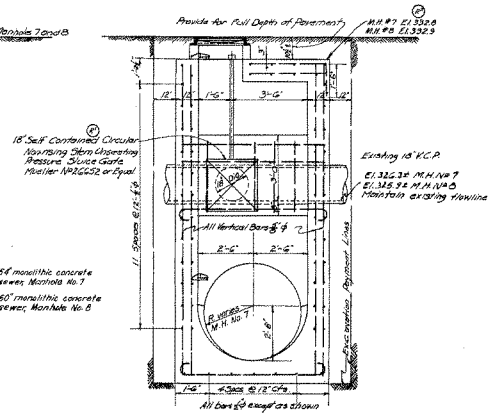
TOP REINFORCING.



SECTION C-C.



SECTION A-A.



SECTION B-B.

Note:
Longitudinal Steel of Monolithic Concrete Sewer to extend 48 diameters of bar into manhole and bent if necessary.
For reinforcing around 18" openings see Sheet 100
For reinforcing around 54" & 60" openings see Sheet 104
353 lb. ft. of ½ ϕ and 434 lb. ft. of ⅝ ϕ reinforcing steel required for M.H. #7. Total weight = 1092 #
353 lb. ft. of ½ ϕ and 449 lb. ft. of ⅝ ϕ reinforcing steel required for M.H. #8. Total weight = 1109 #
For location see sheet No. 97.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 7 & 8

SHEET 103 OF 108 SHEETS SCALE: 1/2" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] MAJOR, CORPS OF ENGINEERS

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION

APPROVED: [signature] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY R.F.P. TR. BY DM. CK. BY M.R.B.

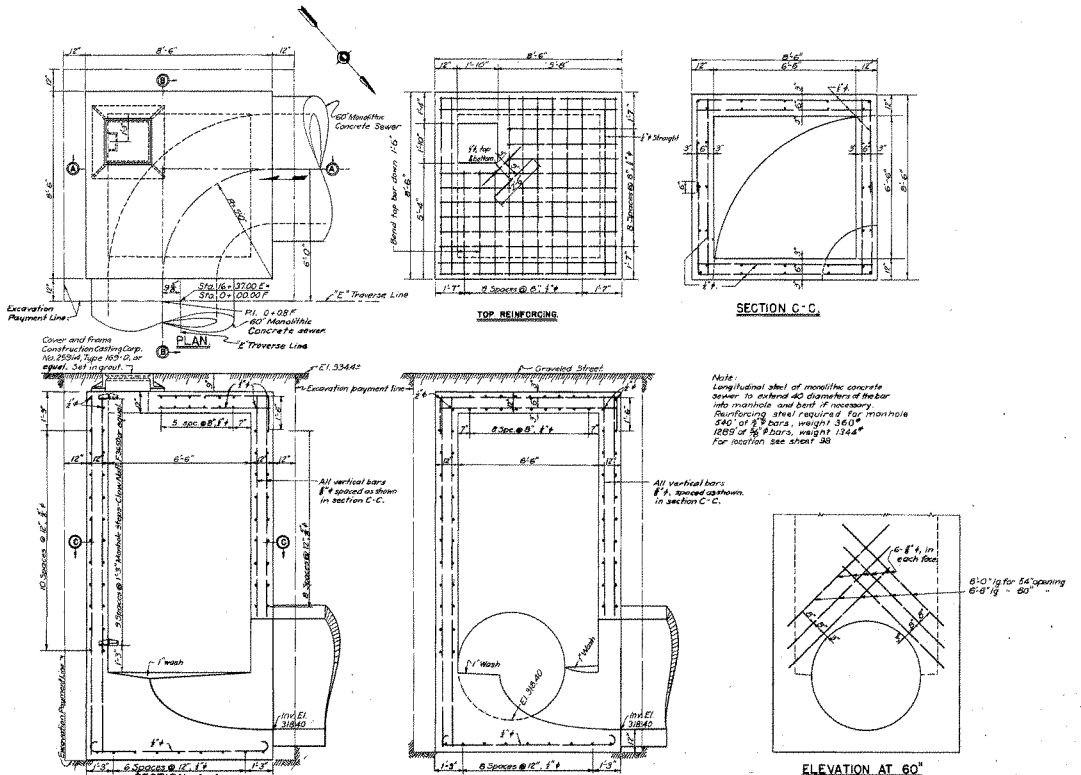
BY	DATE	CHARACTER
F.B.	11-17-41	Inv. El. of pipe revised and minor corrections

REVISIONS

BY	DATE	AUTHORITY	REVISION
R*		Field	Elevations added.
R*	Sept. 1946	C.O. #2	Gates deleted

AS BUILT REVISIONS

AS BUILT 934-12.3/103



BY	DATE	CHARACTER
	7-8-41	Stations corrected & minor revisions

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLE NO. 9.

SHEET 104 OF 108 SHEETS SCALE: 1/4" = 1'-0".

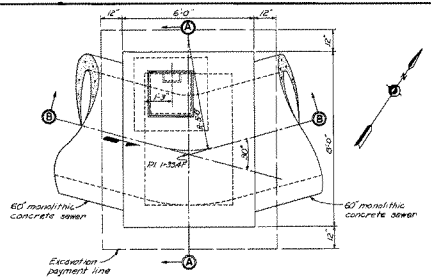
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941.

SUBMITTED: SENIOR ENGINEER, CHIEF OF DESIGN

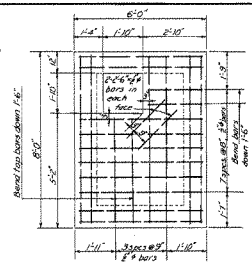
APPROVAL RECOMMENDED: PROJECT ENGINEER, CHIEF OF DESIGN. DR. BY B.F.R. TR. BY L.M.S.

APPROVED: LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER. CK. BY B.F.R.

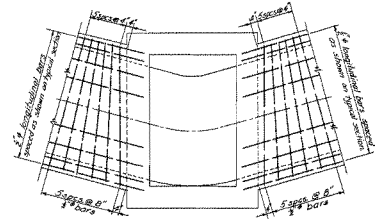
AS BUILT 934-12.3/104



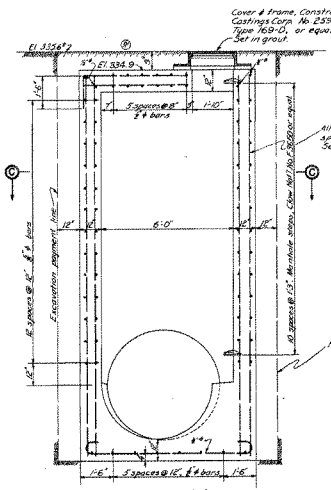
PLAN



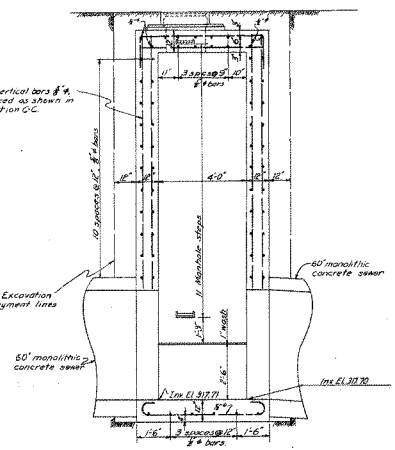
TOP REINFORCING



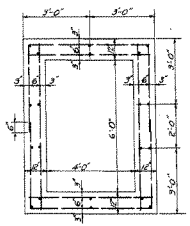
REINFORCING SPACING FOR 60" SEWER NEAR MANHOLE



SECTION A-A



SECTION B-B



SECTION C-C

Note:
Longitudinal steel of monolithic concrete sewer to extend into the manhole 15 - 40 diameters of bar and bent if necessary.

For reinforcing around openings see sheet 104

Reinforcing steel required for manhole:
325 ft. of ½" ϕ bars, wt. 217 #
1106 ft. of ⅝" ϕ bars, wt. 1156 #
For location see sheet 96.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLE NO. 10

SHEET 105 OF 108 SHEETS SCALES ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: CHIEF DESIGNING BRANCH OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

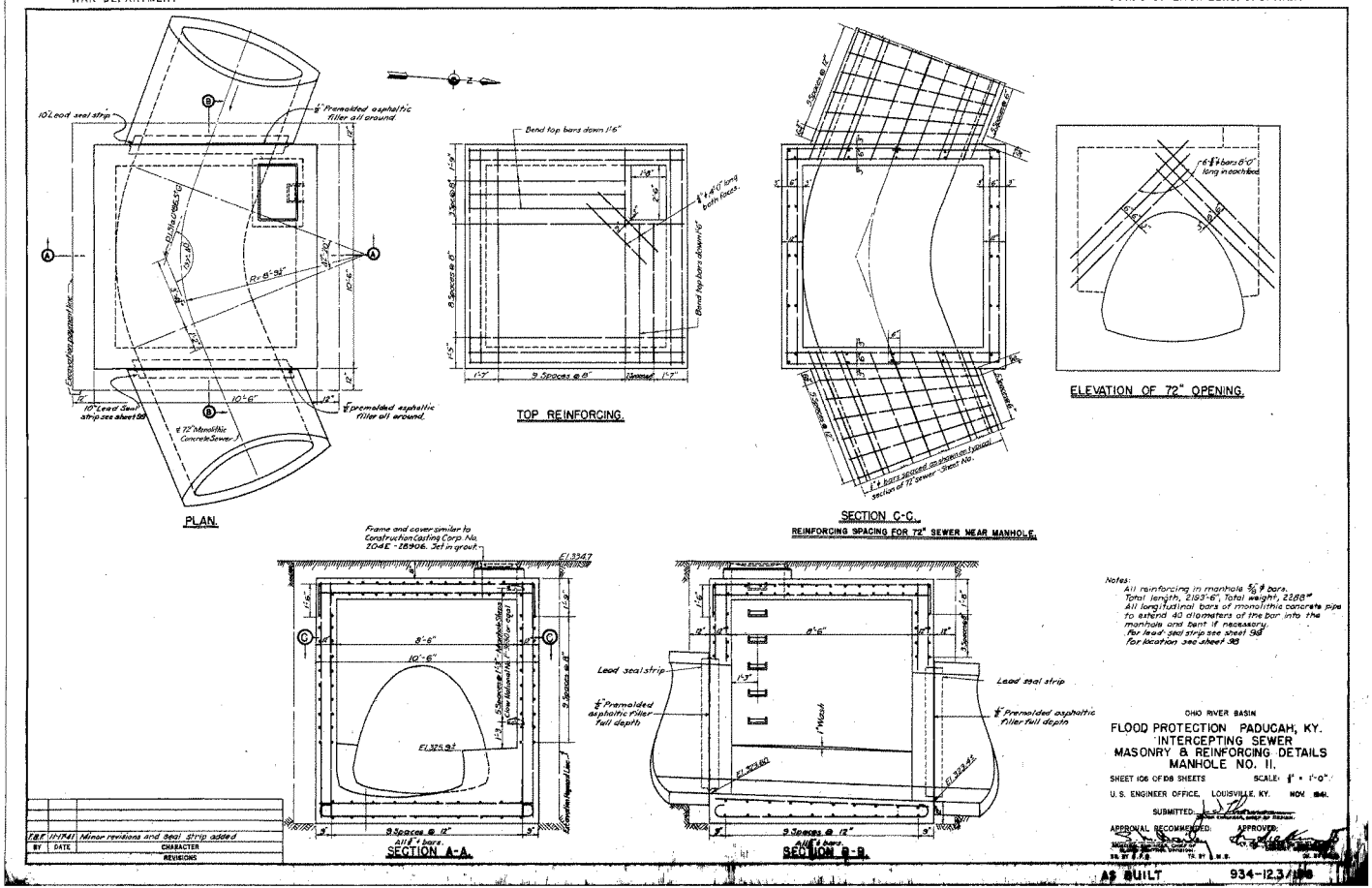
DR. BY G.F.B. TR. BY E.E. CK. BY G.F.B.

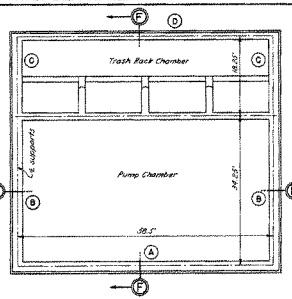
BY	DATE	CHARACTER REVISIONS
FBF	9-17-46	Station corrected & minor revisions

MK	DATE	AUTHORITY	REVISION
		Field	Elevation added

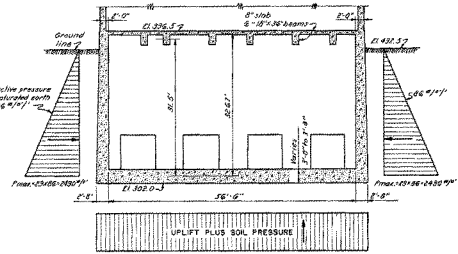
AS BUILT REVISIONS

AS BUILT 934-12.3/105

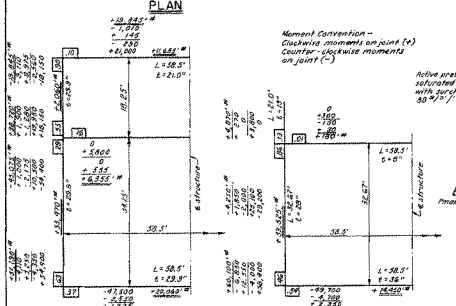

10" Lead seal strip
½" Premolded asphaltic filler all around
R=8'-9½"
10" Lead Seal strip see sheet 98
72" Monolithic Concrete Sewer
PLAN.
Bend top bars down 1'6"
½"x4'-0" long bolts each
9 Spaces @ 8"
TOP REINFORCING.
SECTION C-C.
REINFORCING SPACING FOR 72" SEWER NEAR MANHOLE.
6-⅝" ϕ bars 8'-0" long in each face
ELEVATION OF 72" OPENING.
Frame and cover similar to Construction Casting Corp. No. 204E-28906. Set in grout
El. 334.7
8'-6"
10'-6"
El. 325.9±
9 Spaces @ 12"
SECTION A-A.
Lead seal strip
½" Premolded asphaltic filler full depth
1" Mastic
El. 323.60
SECTION B-B.
Notes:
All reinforcing in manhole ⅝" ϕ bars.
Total length, 2193'-6", Total weight, 2288#
All longitudinal bars of monolithic concrete pipe to extend 40 diameters of the bar into the manhole and bent if necessary.
For lead seal strip see sheet 98
For location see sheet 93
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLE NO. 11.
SHEET 106 OF 108 SHEETS
SCALE: ½" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
BY DATE CHARACTER REVISIONS
1-17-41 Minor revisions and seal strip added
AS BUILT
934-12.3



PLAN

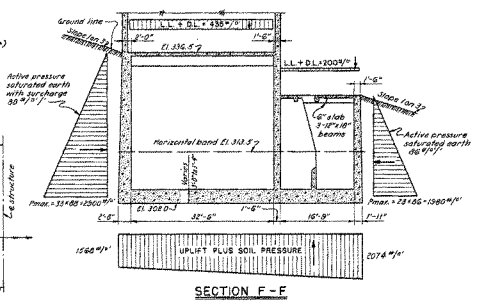


SECTION E-E

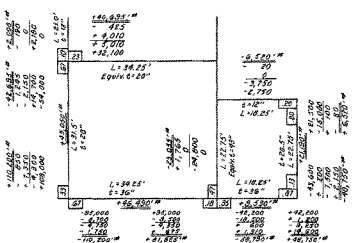


HORIZONTAL BAND – EL. 313.5

VERTICAL BAND – SECTION E-E



SECTION F-F



VERTICAL BAND – SECTION F-F

DESIGN OF MEMBERS

Panel	Type Slab	m	Section	Average Pressure	-M Coeff	-M Unadjusted	Design Moments and Reinforcing: Average -M adjusted	As Reqd	As Used	Maximum +M adjusted	As Reqd	As Used
A	4 edges Cont.	.54	Vert. -M top	1160 #/ft²	.085	54,000	46,635	1.51	2.68	—	—	—
			Vert. -M bottom		.075	108,000	110,800	2.85	2.68	—	—	—
			Vert. +M center		—	—	—	—	—	45,050	1.23	1.34
			Hor. -M ends		.033	47,500	51,190	1.43	1.33	—	—	—
			Hor. +M center		—	—	—	—	—	20,080	.55	0.53
B	1 edge Discont.	.56	Vert. -M top	1245 #/ft²	.022	23,200	4,250	0.14	1.17	—	—	—
			Vert. -M bottom		0.04	58,400	60,100	1.50	1.50	—	—	—
			Vert. +M center		—	—	—	—	—	33,525	0.90	0.95
			Hor. -M ends		.041	54,400	51,015	1.37	1.33	—	—	—
			Hor. +M center		—	—	—	—	—	33,970	0.92	1.33
Base of Pump Chamber	4 edges Cont.	.90	-M short span	1740 #/ft²	.063	95,000	78,795	2.19	2.68	—	—	—
			+M short span		—	—	21,882	0.58	—	46,430	1.01	1.56
			-M long span		.033	49,700	60,100	1.36	1.50	—	—	—
			+M long span		—	—	—	—	—	18,950	0.32	0.50

Weights and Pressures

A. Weights
1. Concrete — 150 lbs. per cu. ft.
2. Water — 62.5 lbs. per cu. ft.

B. Active pressures
1. Water — 62.5 lbs. per sq. ft.
2. Saturated earth - angle of repose = 28° - 34° - no surcharge — 88 lbs. per sq. ft.
3. Saturated earth - angle of repose = 28° - 34° - 1 on 3 slope surcharge — 95 lbs. per sq. ft.

Allowable Working Stresses

A. Steel reinforcing — 18,000 lbs. per sq. in.

B. Concrete
1. Ultimate compressive strength at 28 days — 3,000 lbs. per sq. in.
2. Compression - extreme fibre stress — 1,200 lbs. per sq. in.
3. Shear - beams without web reinforcement, but with end anchorage of longitudinal steel — 90 lbs. per sq. in.
4. Bond - end anchorage provided — 225 lbs. per sq. in.

Loading Assumptions

Loads on substructure walls taken as full active pressure of saturated soil to ground line. Pump sump assumed dry.

Friction on wall and base assumed to equal only unbalanced horizontal forces on opposite sides of pump plant.

Roof:
Designed for 30 #/ft² live load plus any concentrations due to skylight beams or similar framing. Slab designed as continuous normal to beams and as flange of "T" beams parallel to beams. "T" beams designed for simple supports.

Walls:
1. Designed for 20 #/ft² wind load normal to surface.
2. Designed for eccentric vertical load equal to one half crane, plus hoist, plus 125% of maximum live load vertical reaction in conjunction with horizontal thrust acting in either direction at base of rail, equal to 10% of trolley weight with full load.

Floor:
Slab designed as continuous, for a concentrated load equal to weight of heaviest probable piece of equipment plus 100% impact, or a uniform load of 250 #/ft², whichever is greater. Beams designed as rectangular beams for both full and partial half and supporting concentrated loads equal to the weight of pump, motor and maximum hydraulic thrust, all plus 25% for impact, or for dead load, including pump and motor, plus uniform live load of 150 #/ft² on area of floor not occupied by pumps, whichever is greater.

Base:
Designed as a rectangular slab having full continuity with side walls.

Walls:
Designed as slabs under various degrees of edge restraint and poured monolithically with adjacent walls, base and floor.

Crane:
Capacity based on weight of heaviest manufactured motor or pump of capacity specified.

Trash Rack:
Designed for full stoppage with water at maximum pumping stage on outside of racks.

Floor Plates:
Floor plates over trash chambers are designed for a maximum deflection of 1/350 of the span with a live load of 150 #/ft². Floor plates on motor floor are designed for a concentrated load of 1/2 motor weight.

Method of Procedure

The 1940 Joint Code has been used as a basis of design throughout, except as noted otherwise. Reference is also made to Timoshenko's "Theory of Plates and Shells". The substructure has been considered as a group of slabs poured monolithically with each other and restrained at their periphery. A horizontal section through the pump sump, as well as a vertical section thru each principal axis of the plant has been analyzed as a continuous frame, using the end moment coefficients, corresponding to the degree of restraint assumed existing at the edges of the slab, for the unbalanced moments. These moments have then been adjusted according to the principles of moment distribution. Total loads on panels are considered as equivalent uniform loads.

The same sections are also analyzed as elastic frames using beam coefficients and actual loads. This second analysis serves as a double check on the distribution of shear and moment but is not used for steel selection except for the short span of rectangular panels whose ratio of length to width is 1.5 or greater.

The analysis of slabs whose ratio of length to width is less than 1.5 is checked by using beam analysis in two directions, with actual total load "W", the load distribution in each direction being determined by the equation $W_{short\ span} = (0.8 - 1.0)W_{total}$, where L/S is the ratio of long to short span.

DHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

DESIGN DATA

SHEET 1 OF 1 SHEET — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCTOBER, 1941

SUBMITTED: [signature] — Flood Control Engineer, Corps of Engineers

APPROVAL RECOMMENDED: [signature] — Chief, Engineering Division, Flood Control Division

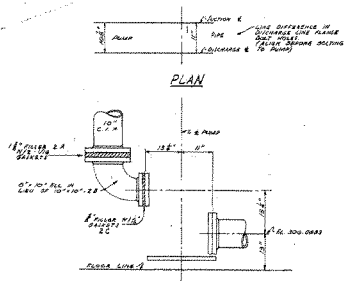
APPROVED: [signature] — Colonel, Corps of Engineers, District Engineer

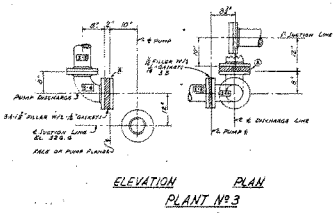
SCALES: DIMENSIONS 1" = 10' ; FORCES 1" = 2000#

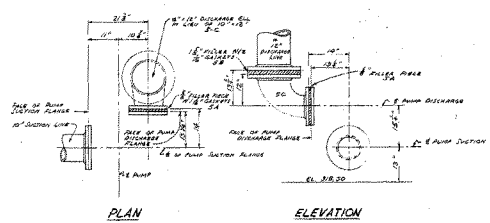
DR. BY W.A.H. — TR. BY R.M.L. — CK. BY F.B.F.

934-12.3/A

"REVISED AS BUILT"

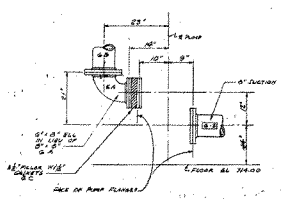


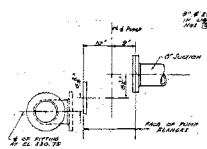


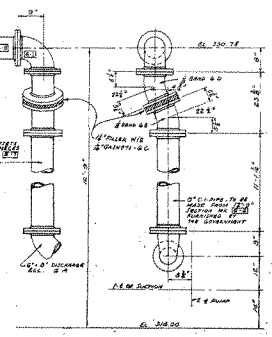


NOTES

1. ALL CLOSING PIECES TO BE CLOW-NATIONAL F-1768.
2. CONTRACTOR TO FURNISH REQUIRED FITTINGS, OFFSETS, PIPE CLOSURES, SPECIAL LENGTH BOLTS & ADDITIONAL GASKETS TO COMPLETE PIPING AT THE PUMPS.
3. THIS DRAWING TO BE USED IN CONJUNCTION WITH AMERICAN CAST IRON PIPE CO. DRAWING 30-D-1-1-1, DATED 10-1-42, CONTRACTORS DRAWING "PUMPING PLANTS - PADUCAH KY." DETAIL 2-C-1, CONTRACTOR'S "FITTINGS" DATED 7-11-42, AS REVISED 4-25-42.







PLANT Nº 6

OHIO RIVER BASIN

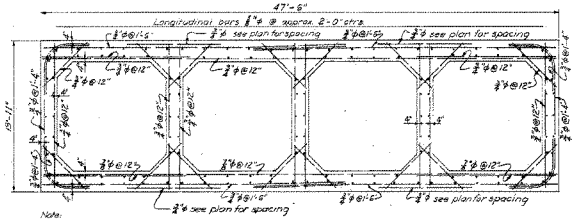
FLOOD PROTECTION PADUCAH KENTUCKY

PUMPING PLANTS NOS. 2, 3, 5 & 6

PIPING REVISIONS

SHEET 14 OF 14 SHEETS SCALE: 1/4" = 1'-0"

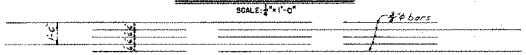
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAR. 1946



Note:
Reinforcing as shown is for section at 36.5' from ℄ of dam.

REINFORCING STEEL DETAILS

SCALE: ½" = 1'-0"



PLAN-TYPICAL BAR SPACING

Case No.	Point	Max. Shear	− Moment	+ Moment
I	1	21,100#	38,580#	
	2			18,650#
	3	24,320# / 23,320#	58,400'# / 36,400'#	
	4			11,650#
	5	22,700#	53,100#	
	6	13,340#		
	7			6,750'#
	8	14,580#		
	9	22,690#	39,080#	
	10			30,740'#
	11	25,940# / 24,100#	53,080# / 51,650'#	
	12			12,200'#
	13	24,400#	57,200'#	

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

IN 34 SHEETS

CONTENTS

934-12.5/1 LOCATION PLAN
934-12.5/2 PLAN & PROFILE
934-12.5/3 GENERAL LAYOUT
934-12.5/4 SECTION & ELEVATION
934-12.5/5 BORINGS
934-12.5/6 MASONRY DETAILS PLAN & SECTION
934-12.5/7 MASONRY DETAILS PLAN & SECTION
934-12.5/8 MASONRY DETAILS ROOF PLAN & ELEVATIONS
934-12.5/9 REINFORCING DETAILS LANDSIDE & RIVERSIDE SUPERSTRUCTURE WALLS
934-12.5/10 REINFORCING DETAILS SUPERSTRUCTURE END WALLS & ROOF SLAB
934-12.5/11 REINFORCING DETAILS MOTOR FLOOR
934-12.5/12 REINFORCING DETAILS PUMPING PLANT BASE
934-12.5/13 REINFORCING DETAILS PUMPING PLANT BASE
934-12.5/14 REINFORCING DETAILS LANDSIDE & RIVERSIDE SUBSTRUCTURE WALLS
934-12.5/15 REINFORCING DETAILS DISCHARGE CHAMBER WALL
934-12.5/16 REINFORCING DETAILS EAST, WEST AND INTERMEDIATE WALLS
934-12.5/17 MASONRY DETAILS STILLING BASIN PLAN
934-12.5/18 MASONRY DETAILS STILLING BASIN SECTIONS & DETAILS
934-12.5/19 REINFORCING DETAILS STILLING BASIN SLAB, PIERS & BAFFLES
934-12.5/20 REINFORCING DETAILS STILLING BASIN WALL NO.7
934-12.5/21 REINFORCING DETAILS STILLING BASIN WALLS NOS.8 TO 14 INCLUSIVE
934-12.5/22 MASONRY & REINFORCING DETAILS MONOLITH NO.1
934-12.5/23 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 2,3,4,5 & 6
934-12.5/24 MASONRY DETAILS LANDSIDE HEADWALL
934-12.5/25 REINFORCING DETAILS LANDSIDE HEADWALL
934-12.5/26 MASONRY DETAILS MULTIPLE BOX CULVERT
934-12.5/27 REINFORCING DETAILS MULTIPLE BOX CULVERT
934-12.5/28 REINFORCING DETAILS MULTIPLE BOX CULVERT
934-12.5/29 MISCELLANEOUS DETAILS
934-12.5/30 MISCELLANEOUS DETAILS
934-12.5/31 MISCELLANEOUS DETAILS
934-12.5/32 LIGHTING & POWER SYSTEMS
934-12.5/33 HYDROGRAPHS
934-12.5/34 BORROW PIT LOCATION & BORINGS

U.S. ENGINEER OFFICE, LOUISVILLE, KY.

934-12.5/6

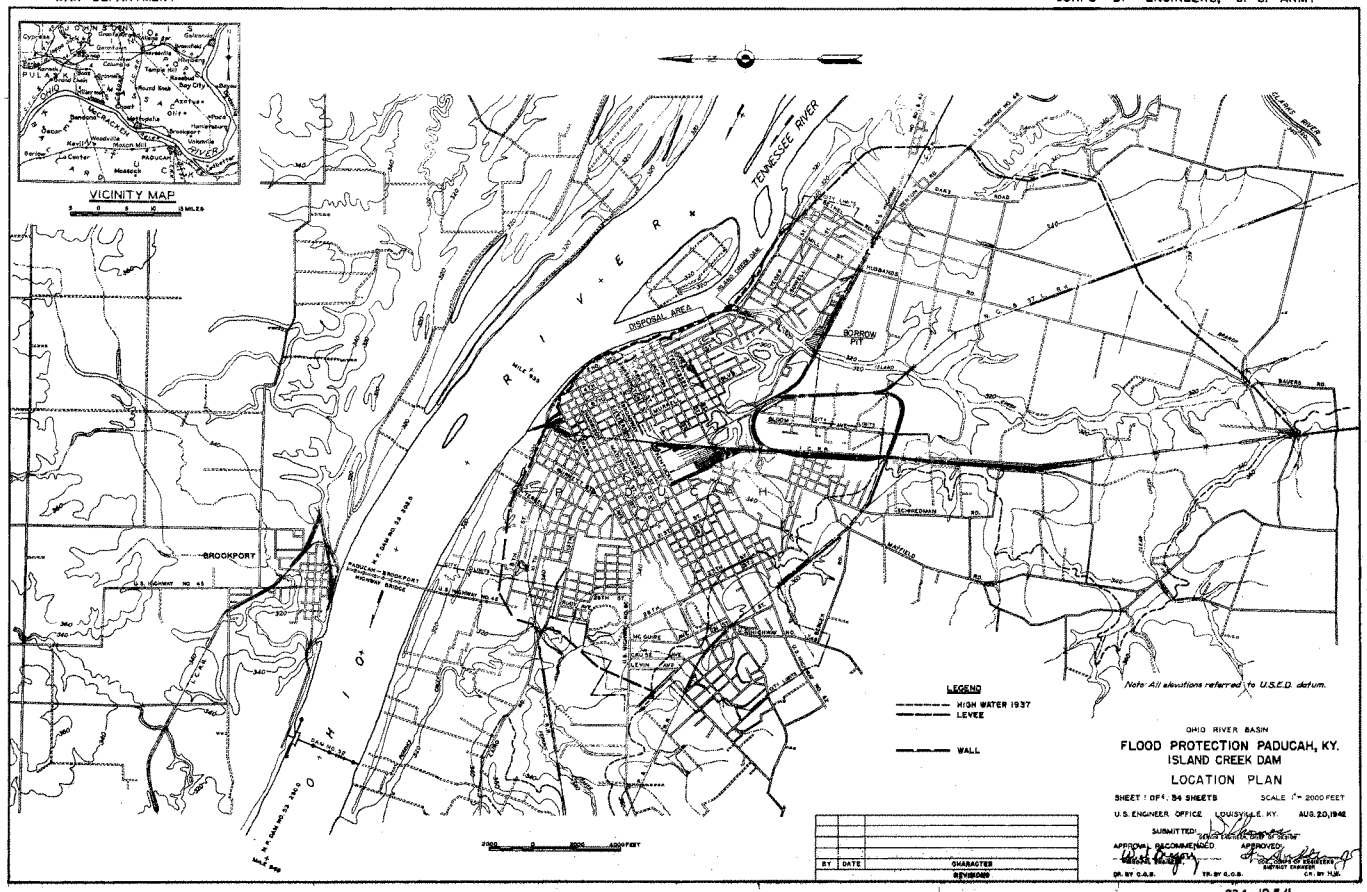
"RELIEVED AS BUILT"

2/3

974

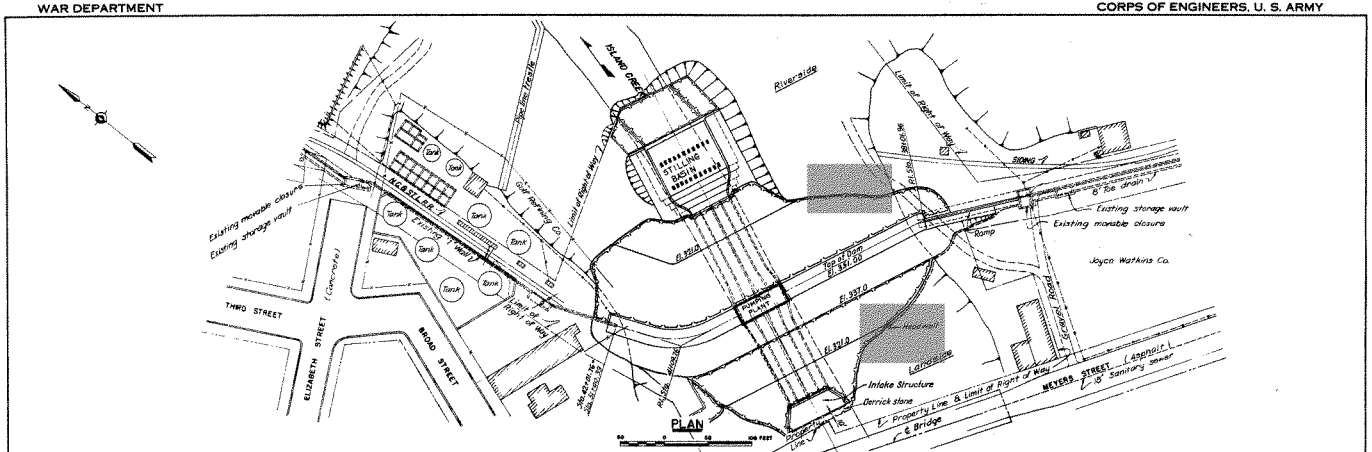
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



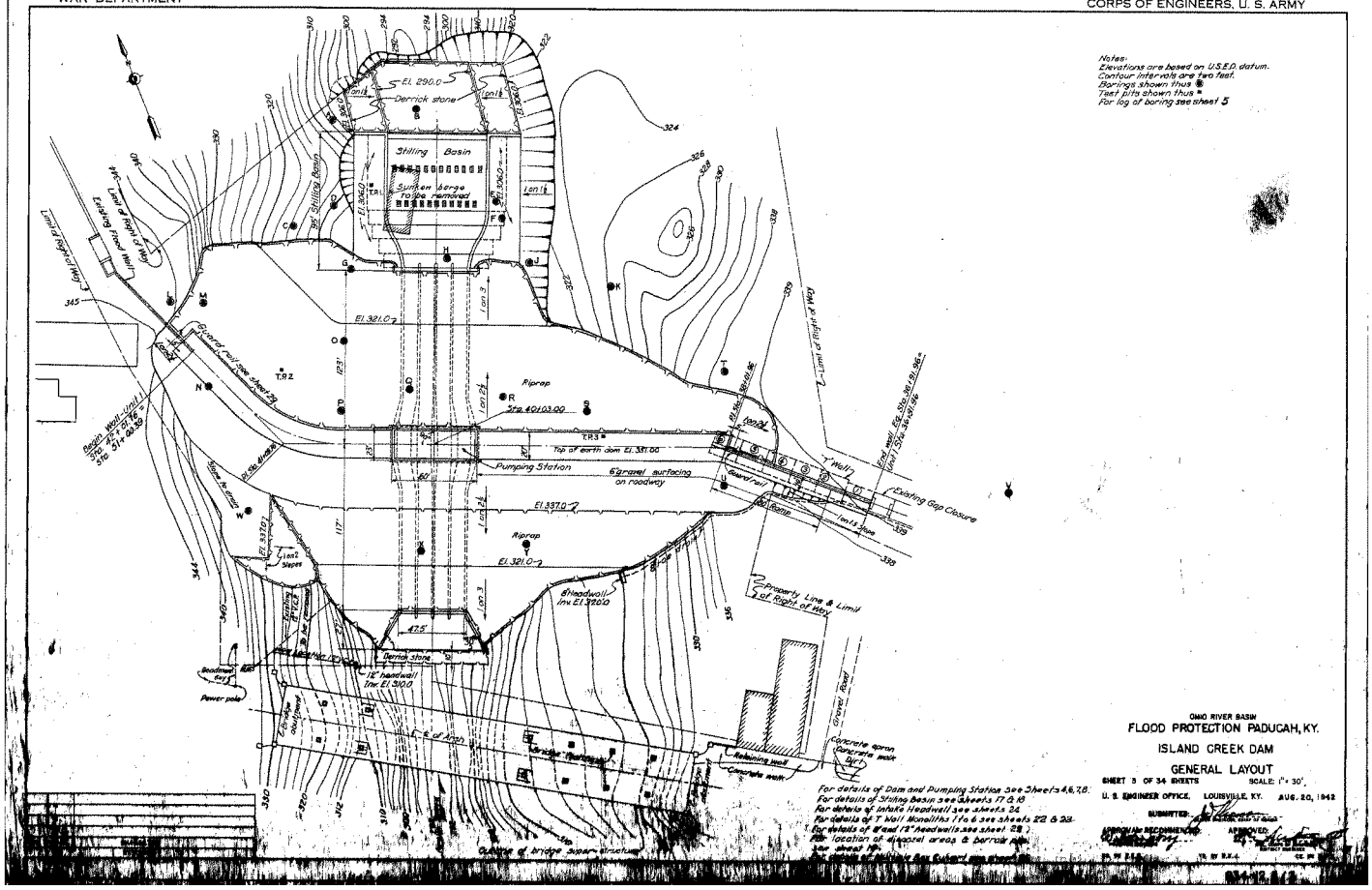
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY


ISLAND CREEK
Riverside
Limit of Right of Way
SIDING 1
8" Tile drain
Existing storage vault
Existing movable closure
Joyce Watkins Co.
Ramp
Existing movable closure
Existing storage vault
Tank
Tank
Tank

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

GENERAL LAYOUT

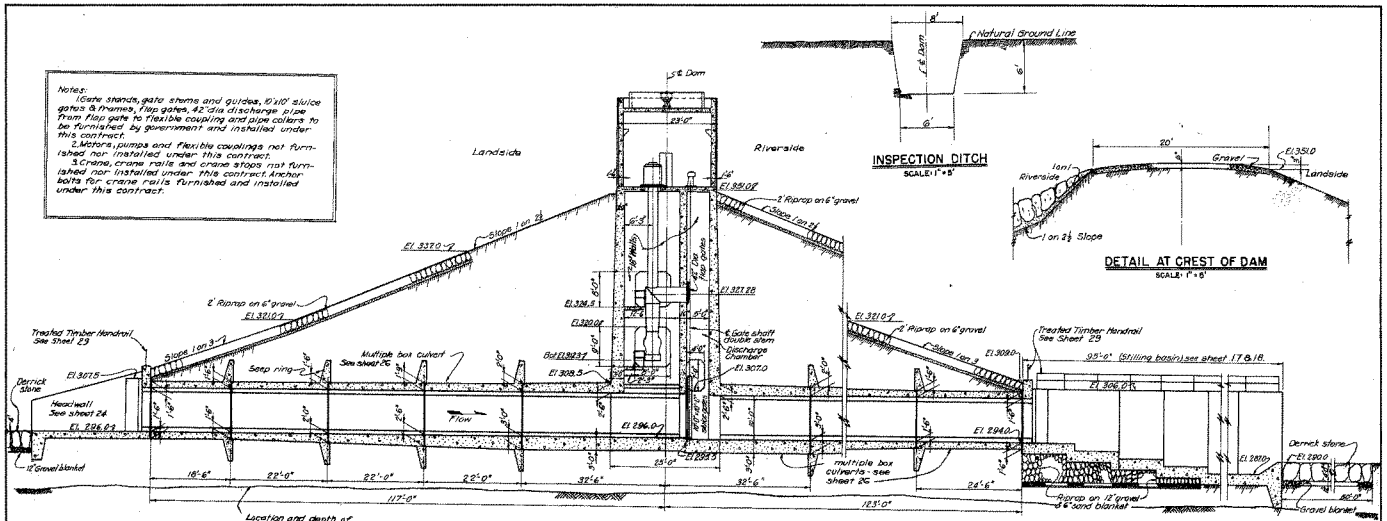
SHEET 3 OF 34 SHEETS SCALE: 1" = 30'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED:

APPROVAL RECOMMENDED: APPROVED:

Notes:
1. Gate stands, gate stems and guides, 10'x10' sluice gates & frames, flap gates, 42" dia discharge pipe from flap gate to flexible coupling and pipe collars to be furnished by government and installed under this contract.
2. Motors, pumps and flexible couplings not furnished nor installed under this contract.
3. Crane, crane rails and crane stops not furnished nor installed under this contract. Anchor bolts for crane rails furnished and installed under this contract.



BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

SECTION & ELEVATION

SHEET 4 OF 34 SHEETS · SCALES AS SHOWN

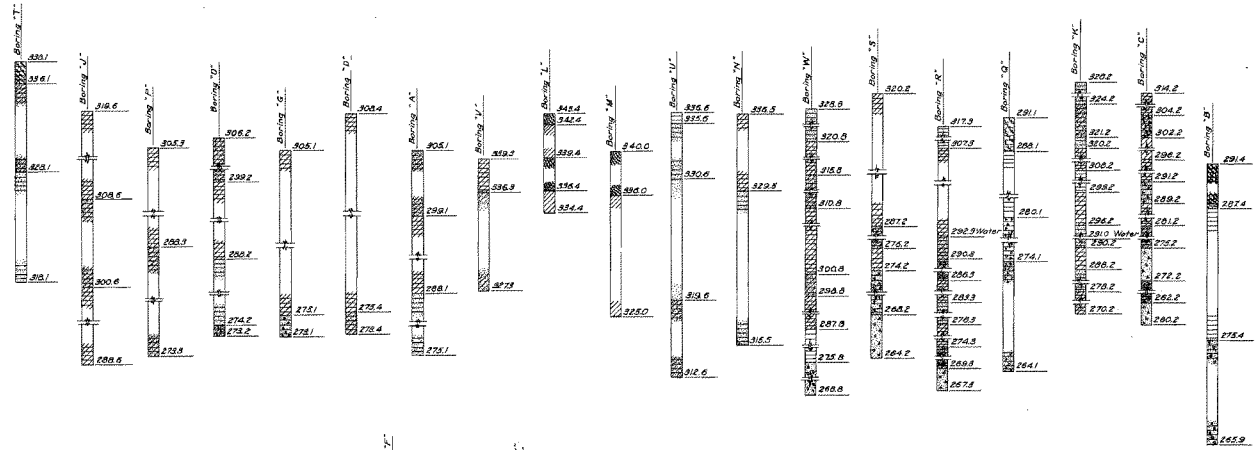
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. [illegible], 1948

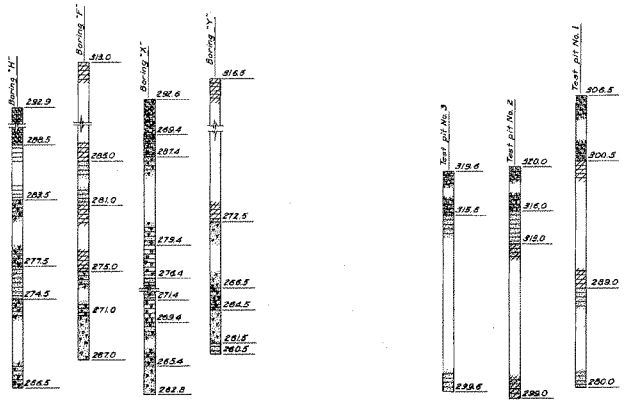
SUBMITTED: [illegible] CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEER

APPROVED: [illegible] DIVISION ENGINEER

954-12-[illegible]





BORING SYMBOLS

- Sand
- Clay
- Gravel
- Silt
- Mud
- Debris
- Cinders

Note:
For location of borings see sheet 3
For borrow pit borings see sheet 34

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
BORINGS

SHEET 8 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

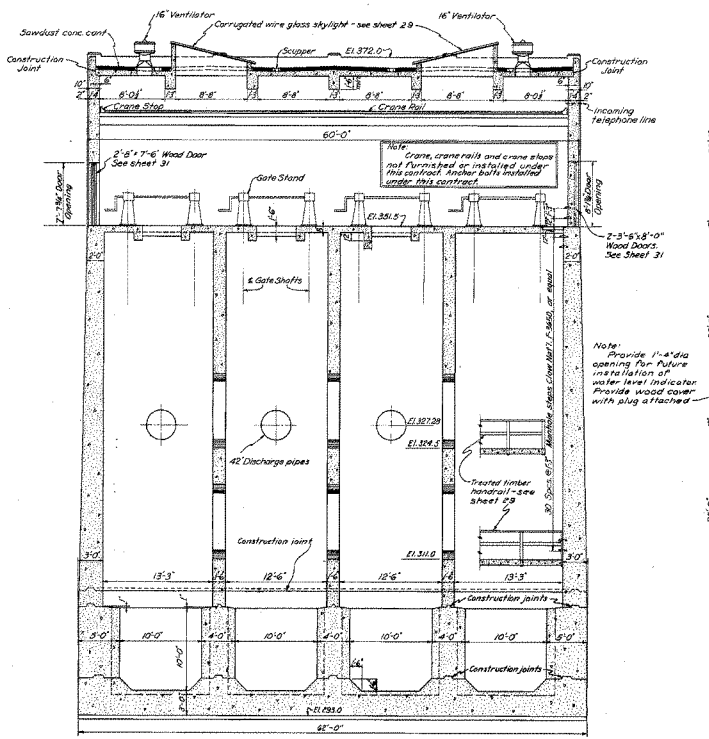
SUBMITTED: [illegible] CHIEF ENGINEER, OHIO RIVER DIVISION

APPROVAL RECOMMENDED: [illegible] PROJECT ENGINEER

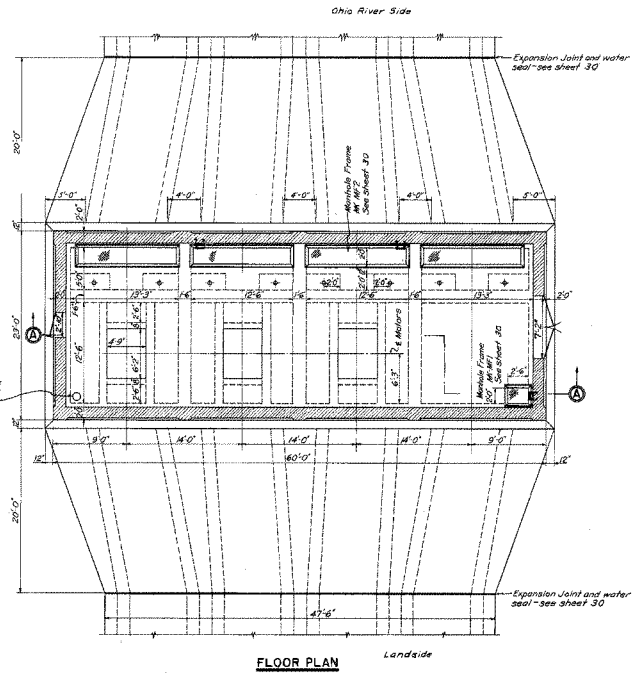
APPROVED: [illegible] COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY J. B. B. TR. BY R. L. S. CK. BY H. M.

934-12.6/5



SECTION A-A



FLOOR PLAN

Notes:
All openings in motor floor to be covered with 2" plgmts. See sheet 30 for typical detail.
All manhole frames furnished and installed under this contract.
For reinforcing details see sheets 9 to 16 incl.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS-PLAN & SECTION

SHEET 6 OF 34 SHEETS SCALE: $\frac{1}{8}$" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 30, 1942

SUBMITTED: [illegible] ASSISTANT DISTRICT ENGINEER

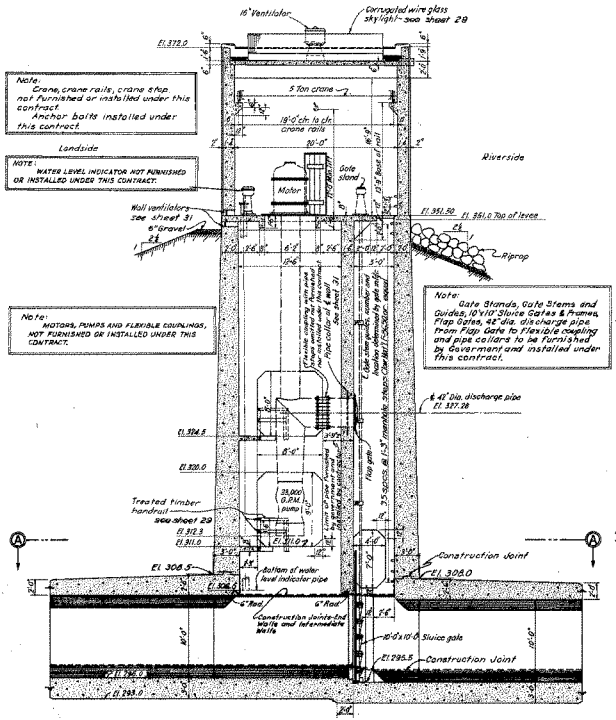
APPROVED AND RECOMMENDED: [illegible] DISTRICT ENGINEER

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

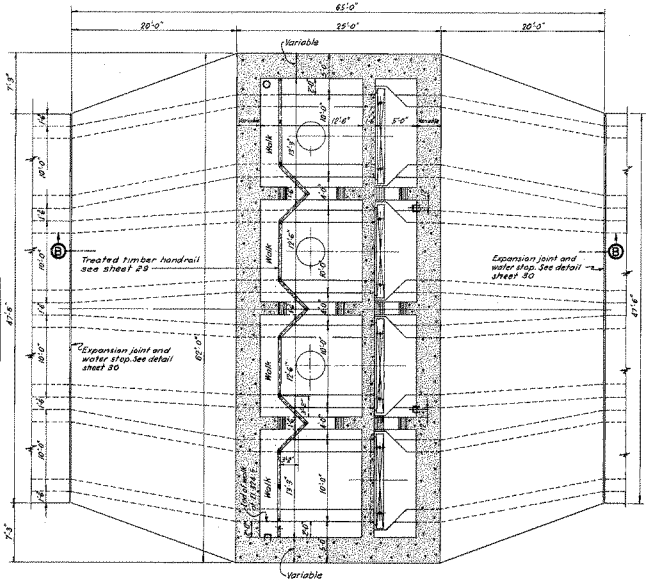
DR. BY C.B. TR. BY C.B. CK. BY W.W.

934-12.5/6

086



SECTION B-B



PLAN AT A-A

Note: For reinforcing details see sheets 9 to 16 incl.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

MASONRY DETAILS

PLAN AND SECTION

SHEET 7 OF 34 SHEETS SCALE: 3/16" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: (SIGNATURE, CHIEF OF DESIGN)

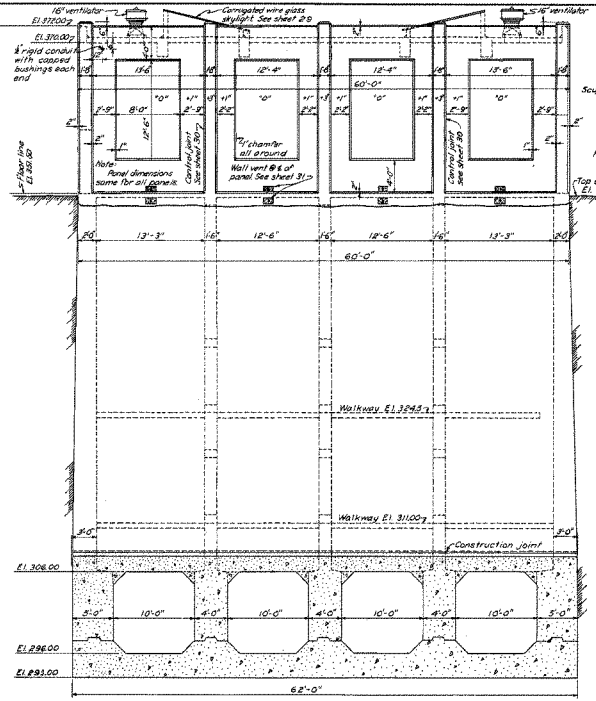
APPROVAL RECOMMENDED: (SIGNATURE, PRINCIPAL ENGINEER) DR. BY W. F. C.

APPROVED: (SIGNATURE, CHIEF OF ENGINEERS) DATE OF APPROVAL TR. BY W. J. B. CK. BY H. M.

934-12.5/7

WAR DEPARTMENT

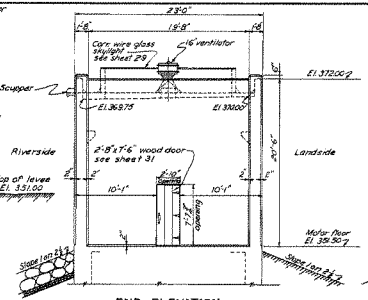
CORPS OF ENGINEERS, U. S. ARMY



LANDSIDE ELEVATION

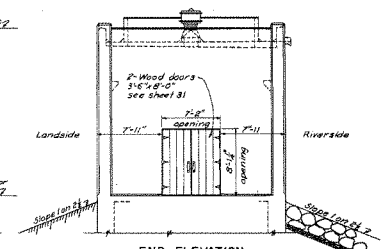
SCALE: 1/8" = 1'-0"

Riverside elevation same except omit wall vents



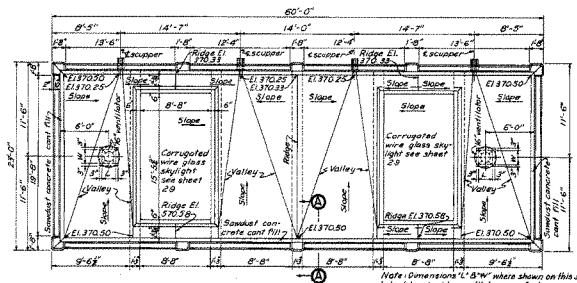
END ELEVATION

SCALE: 1/8" = 1'-0"



END ELEVATION

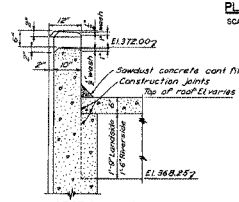
SCALE: 1/8" = 1'-0"



PLAN ROOF

SCALE: 1/8" = 1'-0"

Note: Dimensions "L" & "W" where shown on this sheet to be determined by ventilator manufacturer.



SECTION A-A

SCALE: 1/4" = 1'-0"

Note:
The outside faces of 16" wall is used as "0" surface. Other surfaces projecting from 16" wall are shown thus, (+).
For reinforcing details see sheets 9 to 16 incl.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS
ROOF PLAN & ELEVATIONS

SHEET 8 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [signature] CHIEF DESIGNER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER

APPROVED: [signature] DIST. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY M.E.E. TR. BY E.P.S. CK. BY H.W.

934-12.5/8

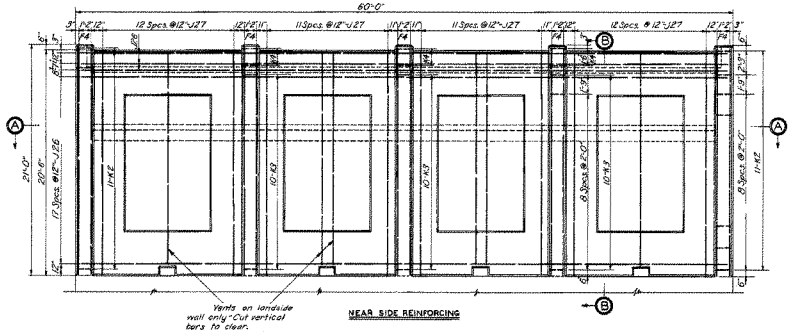
982

271

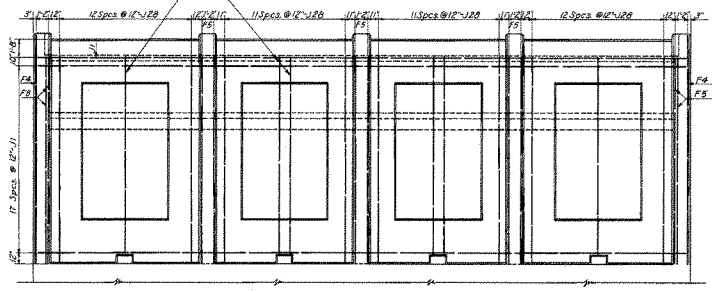
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

1



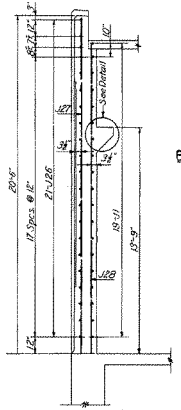
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

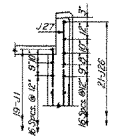
LANDSIDE WALL

(RIVERSIDE WALL IDENTICAL, EXCEPT ROOF SLAB IS 3" LOWER, SHIFT BARS TO AVOID SCUPPERS)



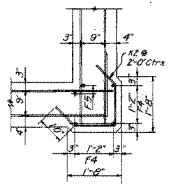
SECTION B-B

SCALE: 3/8" = 1'-0"



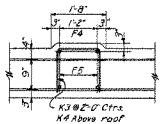
PART SECTION B-B
RIVERSIDE WALL

SCALE: 3/8" = 1'-0"



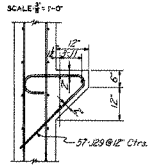
CORNER PILASTER

SCALE: 3/4" = 1'-0"



INTERMEDIATE PILASTER

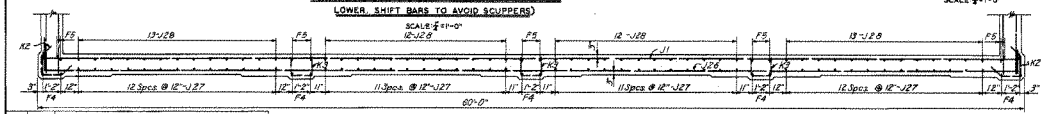
SCALE: 3/4" = 1'-0"



CRANE BRACKET

SCALE: 3/4" = 1'-0"

Note: For masonry details see sheets 6 to 8 incl.



SECTION A-A

SCALE: 1/8" = 1'-0"

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

REINFORCING DETAILS

LANDSIDE & RIVERSIDE SUPERSTRUCTURE WALLS

SHEET 9 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: CHIEF ENGINEER OFFICE

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

APPROVED: COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY M. K. S. TR. BY L.E.H. CK. BY V. M.

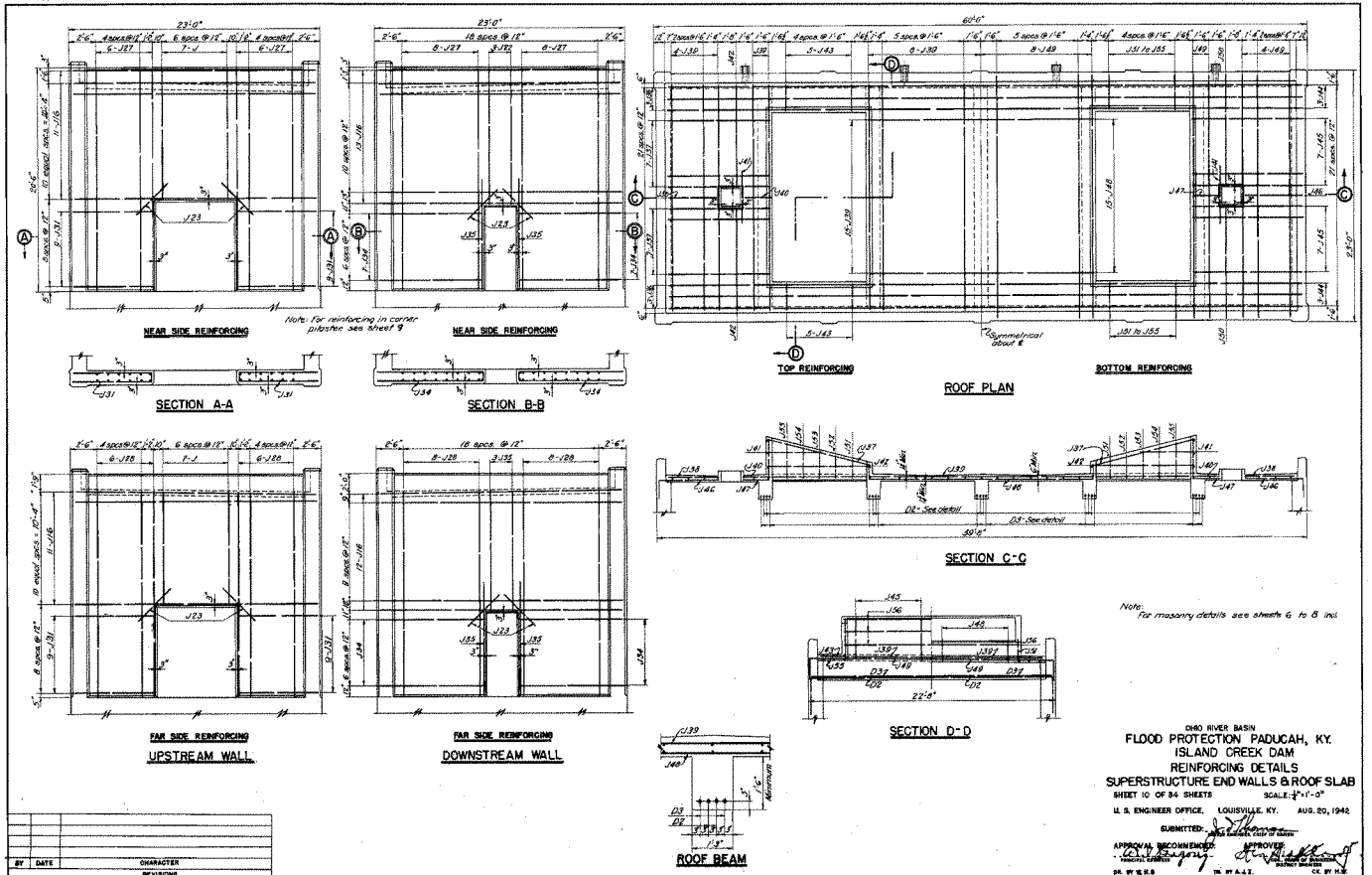
934-12.5/9

983

222

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
SUPERSTRUCTURE END WALLS & ROOF SLAB

SHEET 10 OF 34 SHEETS SCALE: 1/4"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [signature] Chief, Design Branch

APPROVAL RECOMMENDED: [signature] Principal Engineer

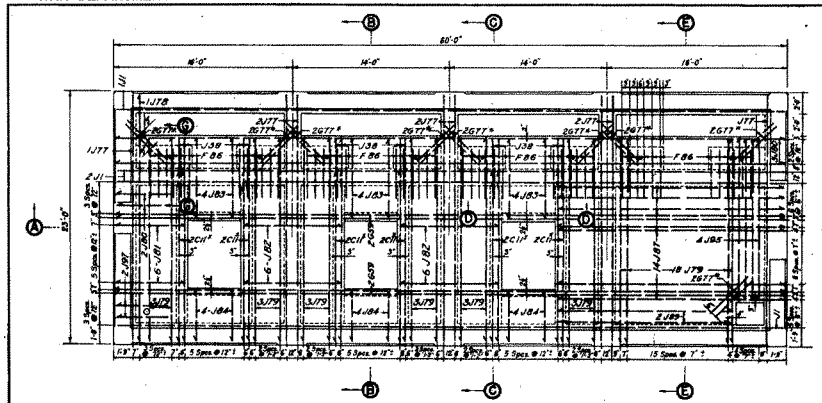
APPROVED: [signature] Col., Corps of Engineers, District Engineer

DR. BY W. H. B. TR. BY A. J. Z. CK. BY H. W.

934 - 12.5/10

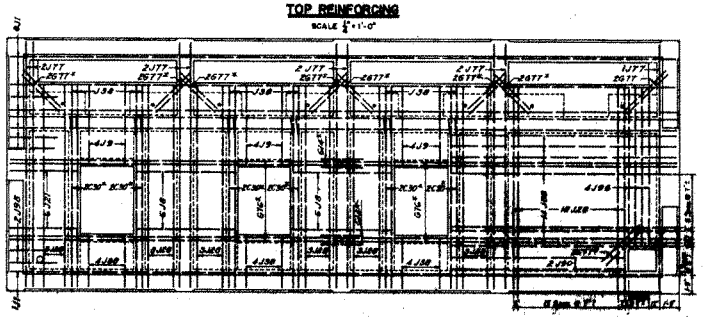
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



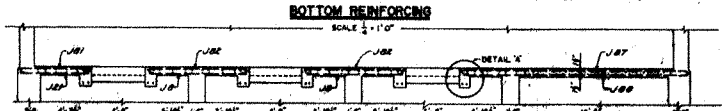
TOP REINFORCING

SCALE $\frac{1}{4}$ = 1'-0"



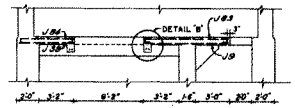
BOTTOM REINFORCING

SCALE $\frac{1}{4}$ = 1'-0"



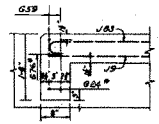
SECTION A-A

SCALE $\frac{1}{4}$ = 1'-0"



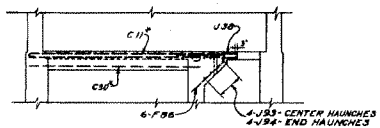
SECTION B-B

SCALE $\frac{1}{4}$ = 1'-0"



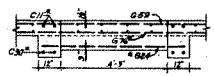
DETAIL "B"

SCALE 1 = 1'-0"



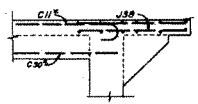
SECTION C-C

SCALE $\frac{1}{4}$ = 1'-0"



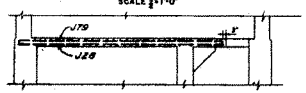
SECTION D-D

SCALE $\frac{1}{4}$ = 1'-0"



SECTION G-G

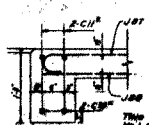
SCALE $\frac{1}{4}$ = 1'-0"



SECTION E-E

SCALE $\frac{1}{4}$ = 1'-0"

BY	DATE	CHARACTER
		REVISIONS



Notes:
For frequently detailed see sheet 6, 7, 8
*Bars to be furnished by government & installed by contractor

This plan represents the design under his contract, to which we refer.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

REINFORCING DETAILS

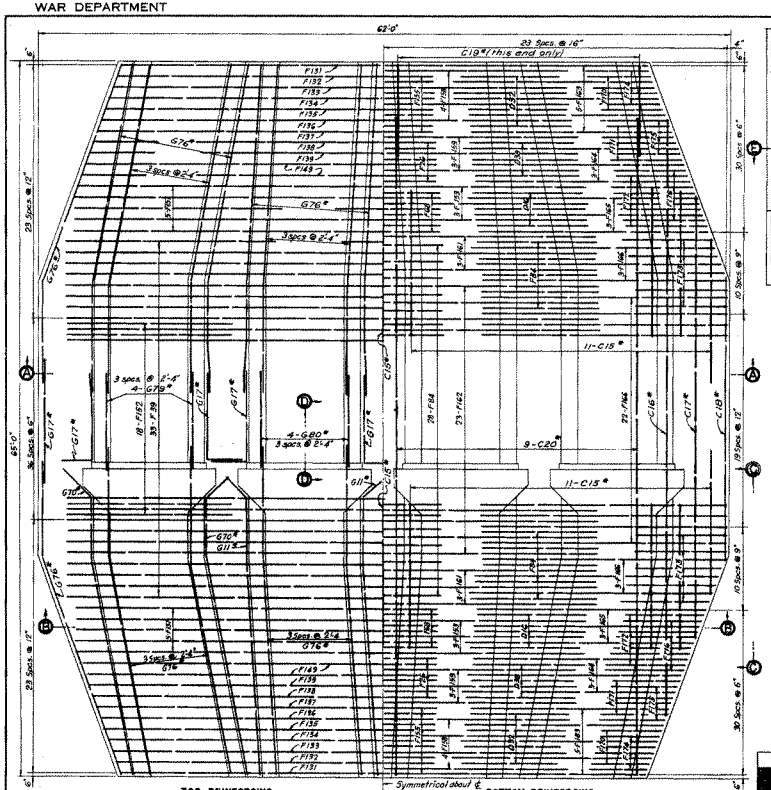
MOTOR FLOOR

SHEET 11 OF 14 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

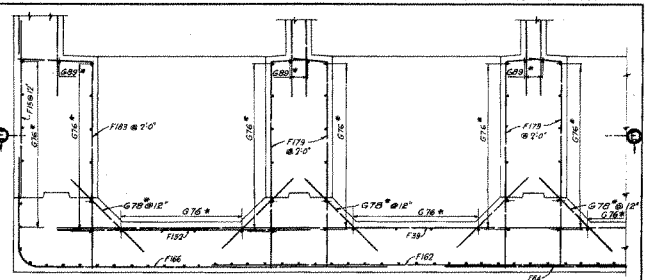


TOP REINFORCING

BOTTOM REINFORCING

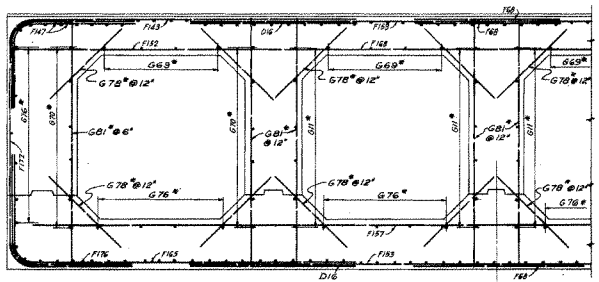
PUMPING PLANT BASE - BOTTOM

SCALE: $\frac{1}{4}$" = 1'-0"



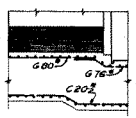
SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"



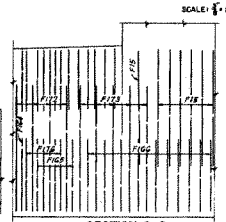
SECTION B-B

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION D-D

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION C-C

SCALE: $\frac{1}{4}$" = 1'-0"

Notes:
For section E-E see sheet 13.
For masonry details see sheets 6, 7 & 8.
All reinforcing to have 4" min. cover unless otherwise noted.
*Bars to be furnished by government and installed by contractor.
G73*, G12*, G76* bars to be bent in field as required.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
PUMPING PLANT BASE

SHEET 12 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

SUBMITTED: [illegible] — Lt. Colonel, Corps of Engineers, District Engineer

APPROVAL RECOMMENDED: [illegible] — Colonel, Corps of Engineers, Division Engineer

APPROVED: [illegible] — Lt. Colonel, Corps of Engineers, District Engineer

DR. BY G.K.J. — TR. BY M.J.B. — CK. BY M.J.

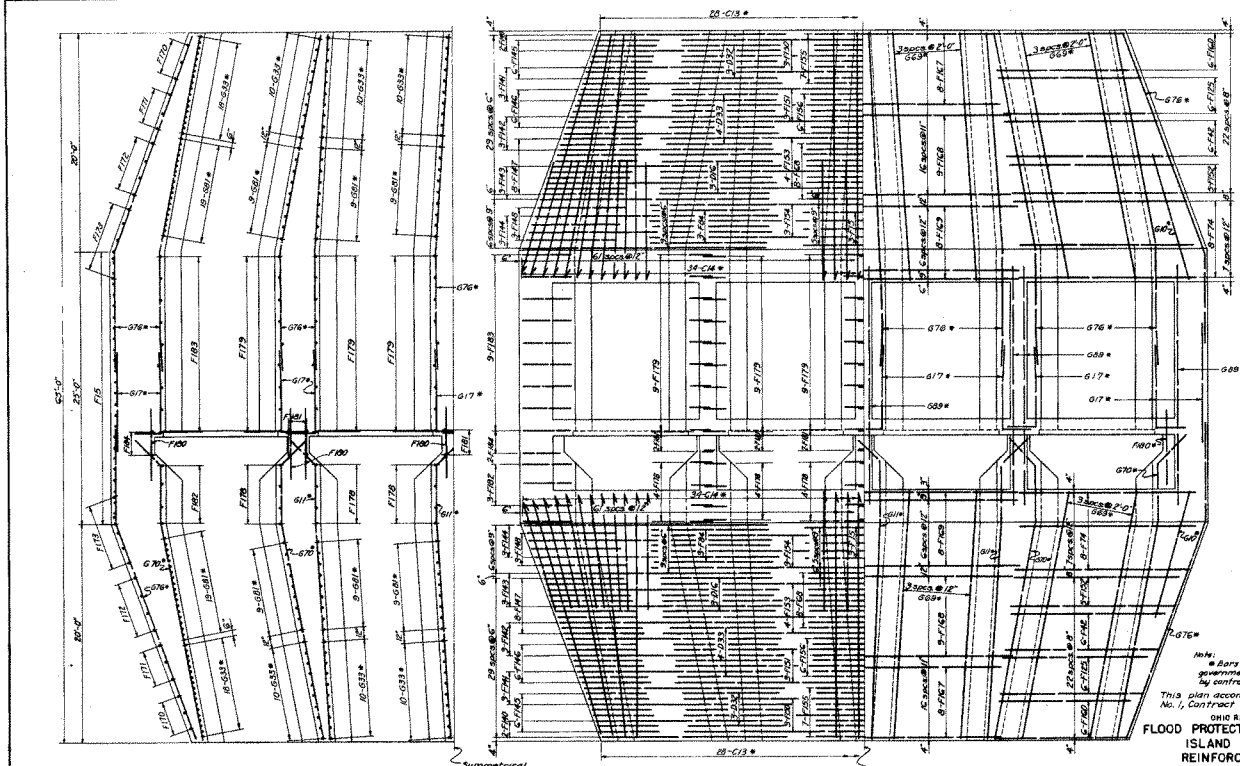
BY	DATE	CHARACTER
		REVISIONS

This plan accompanies Change Order No. 1, Contract No. W559 eng 6625.

934-12.5/12.1

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note:
G11, G17, G70, G71, G72 & G73 to be bent in field.
For location of Section E-E see sheet No. 12.1

BY	DATE	CHARACTER
		REVISIONS

PUMPING PLANT BASE - TOP

Note:
All reinforcing to have 6" Min cover unless otherwise noted
For reinforcing in bottom of pumping plant base see sheet 12.1
For masonry details see sheets 6, 7 & 8

Note:
* Bars to be furnished by government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W-599 eng CC.25.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
PUMPING PLANT BASE

SHEET 13 OF 34 SHEETS — SCALE: 1/2" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] — PRINCIPAL ENGINEER

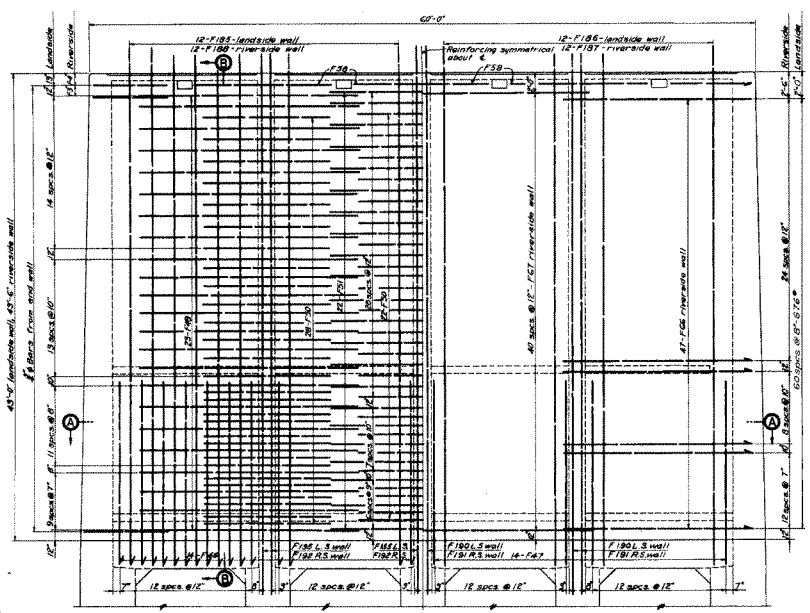
APPROVED: [illegible] — COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY W.K.B. — TR. BY C.R.C. — CK. BY W.W.

934-12.5/13.1

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



NEAR SIDE REINFORCING

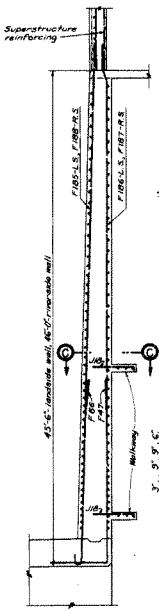
FAR SIDE REINFORCING

ELEVATION

SCALE: $\frac{1}{8}$"=1'-0"

LANDSIDE WALL SHOWN

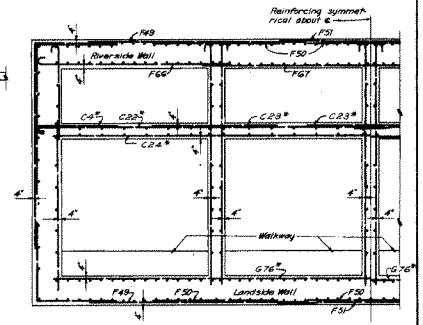
Note:
Reinforcing in landside and riverside walls same except as indicated. See section A-A.
All reinforcing to have 4" min. cover unless otherwise noted.



SECTION B-B

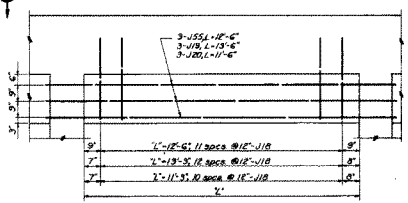
SCALE: $\frac{1}{8}$"=1'-0"

Note - Walkways shown are on landside only.



SECTION A-A

SCALE: $\frac{1}{8}$"=1'-0"



SECTION C-C

SCALE: $\frac{1}{8}$"=1'-0"

Notes:
For masonry details see sheets 6, 7 & 8.
*Bars to be furnished government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W559 eng 6625.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
LANDSIDE & RIVERSIDE SUBSTRUCTURE WALLS

SHEET 14 OF 54 SHEETS — SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

SUBMITTED: [signature] Major, Corps of Engrs.

APPROVAL RECOMMENDED: [signature] Thomas Cuddihy — APPROVED: [signature] Major General, Chief of Engineers

DR. BY W.E.P. — TR. BY C.R.E. — CK. BY E.M.

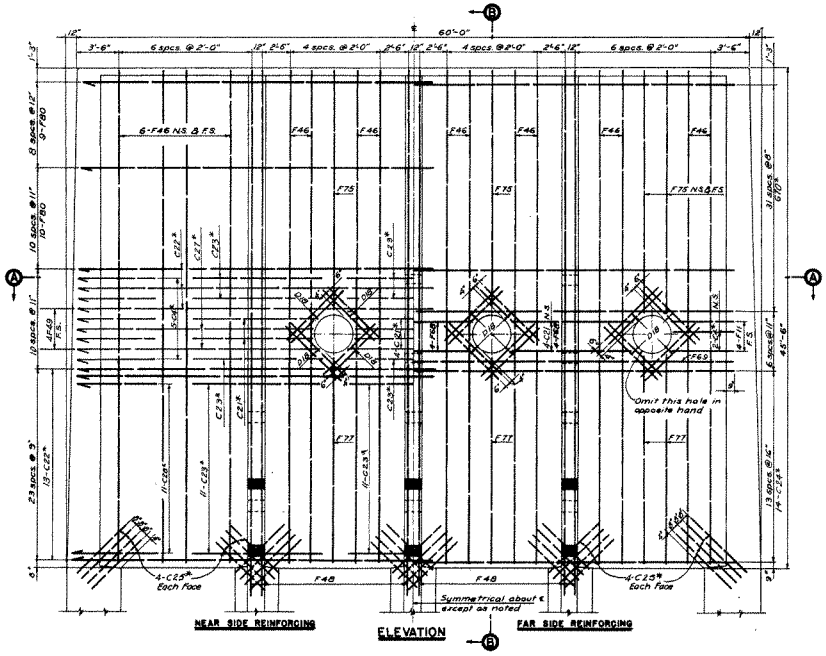
934-12.5/14.1

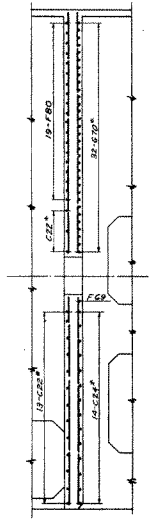
BY	DATE	CHARACTER REVISIONS

886

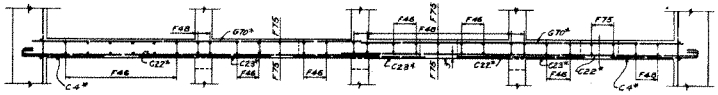
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





SECTION B-B



SECTION A-A

Note:
All reinforcing to have 4" min cover unless otherwise noted.
*bars to be furnished by government and installed by contractor.

For masonry details see sheets 6, 7 & 8

This plan accompanies Change Order No. 1, Contract No. W 559 eng 6625.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
DISCHARGE CHAMBER WALL

SHEET 18 OF 34 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED:

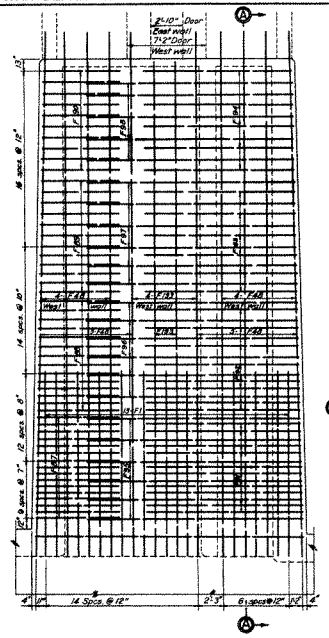
APPROVAL RECOMMENDED:

BY	DATE	CHARACTER OF REVISIONS

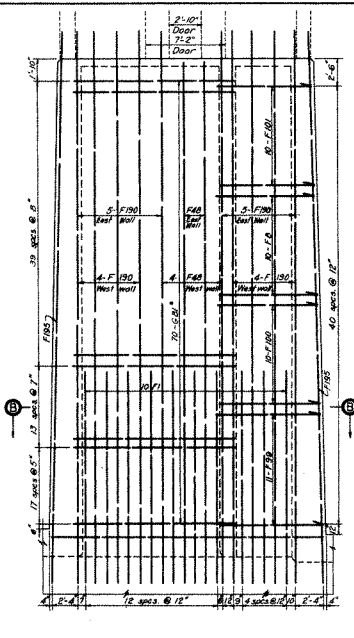
934-12.5/15.1

WAR DEPARTMENT

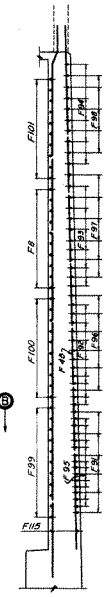
CORPS OF ENGINEERS, U. S. ARMY



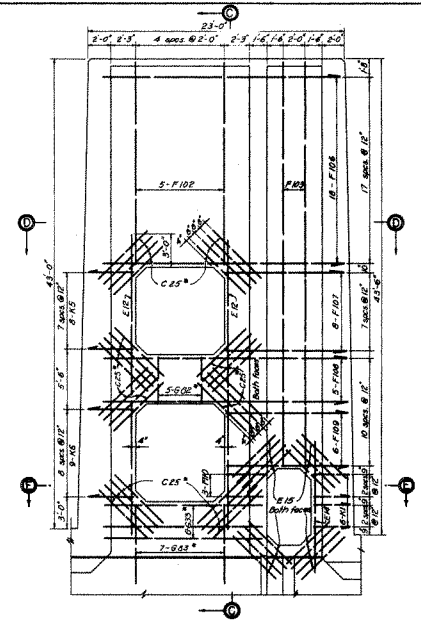
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

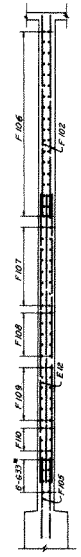


SECTION A-A



INTERMEDIATE WALL

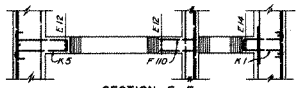
NEAR & FAR SIDES IDENTICAL



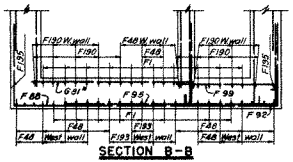
SECTION C-C

EAST WALL

WEST WALL OPPOSITE HAND AS NOTED

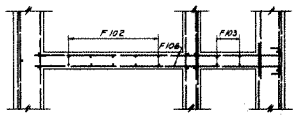


SECTION E-E



SECTION B-B

* Bars furnished by Government and installed by contractor.



SECTION D-D

Note:
For masonry details see sheets 6, 7 & 8
All reinforcing to have 4" min. cover unless otherwise noted.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

REINFORCING DETAILS

EAST, WEST & INTERMEDIATE WALLS

SHEET 16 OF 34 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED:

APPROVAL RECOMMENDED: APPROVED:

DR. BY E.E.A. TR. BY E.T. CK. BY E.M.

934-12.5/16

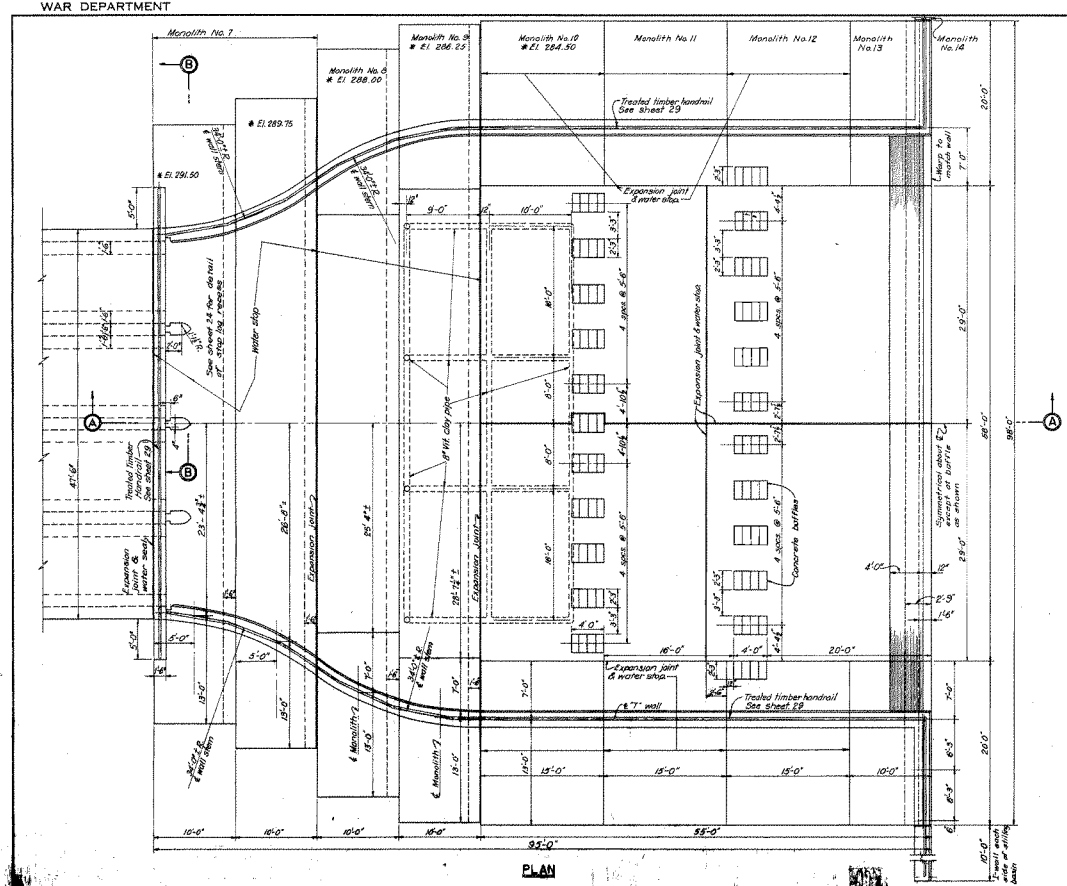
BY	DATE	CHARACTER REVISIONS

This plan accompanies Change Order No. 1, Contract No. W559 eng 6625.

066

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note:
Elevations shown thus # are bottom of base.
For sections A-A and B-B see sheet 18
For reinforcing details see sheet 19, 20 & 21
For details of stop log bearing angles and pier see sheet 24

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS
STILLING BASIN PLAN

SHEET 17 OF 84 SHEETS SCALE 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: DISTRICT ENGINEER, CHIEF OF DESIGN

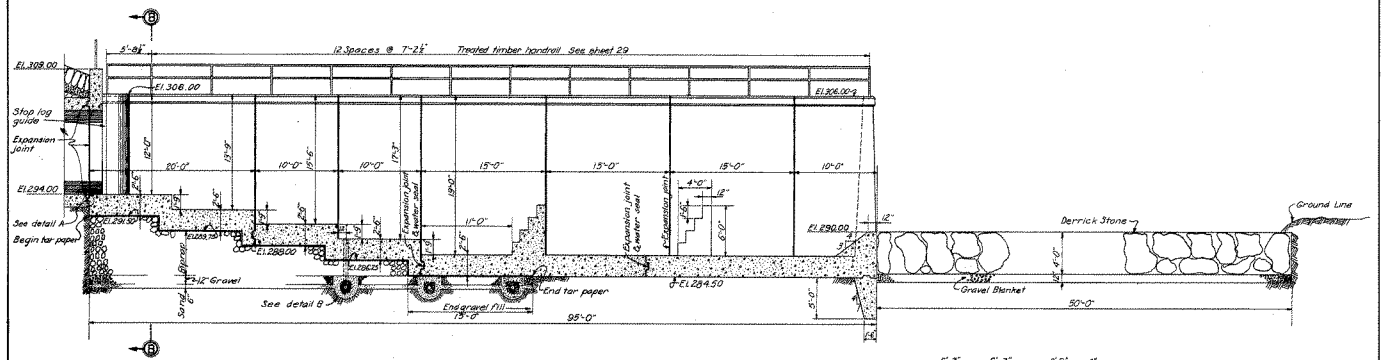
APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

APPROVED: COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.B. TR. BY E.T. CK. BY H.W.

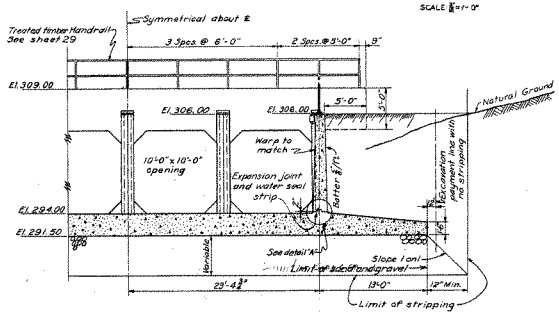
934-12.5/17

"AS BUILT"



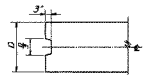
SECTION A-A

SCALE 1/8" = 1'-0"



SECTION B-B

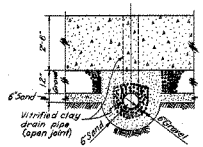
SCALE 1/8" = 1'-0"



DETAIL "A"
TYPICAL KEYWAY

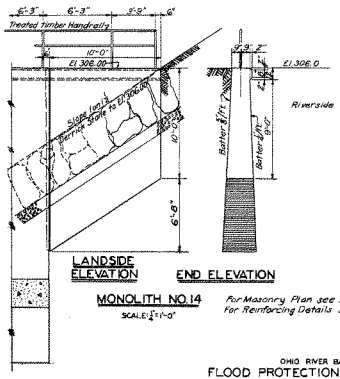
HORIZONTAL & VERTICAL JOINTS

NO SCALE



DETAIL "B"

SCALE 1/4" = 1'-0"



LANDSIDE ELEVATION

END ELEVATION

MONOLITH NO. 14

SCALE: 1/4" = 1'-0"

For Masonry Plan see sheet 17
For Reinforcing Details see sheets 19, 20 & 21

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

MASONRY DETAILS

STILLING BASIN-SECTIONS & DETAILS

SHEET 18 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: JOHN C. HOLLAND, CHIEF OF DESIGN

APPROVAL RECOMMENDED: W. W. Bigger, PROJECT ENGINEER — APPROVED: [illegible], LT. COL. C.E. CHIEF OF ENGINEERS, DISTRICT ENGINEER

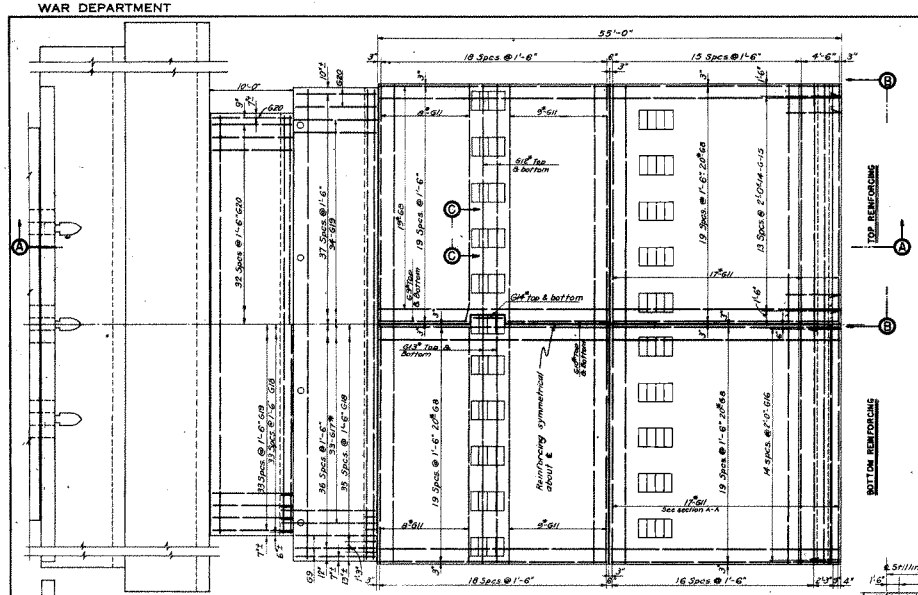
DR. BY C.B. — TR. BY L.E.K. — CK. BY H.M.

934-12.5/18

BY	DATE	CHARACTER REVISION

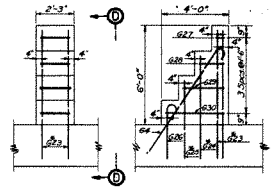
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

SCALE: 3/16" = 1'-0"

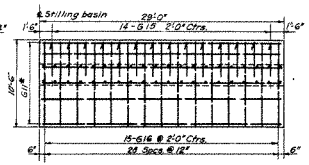


SECTION C-C

SCALE: 3/8" = 1'-0"

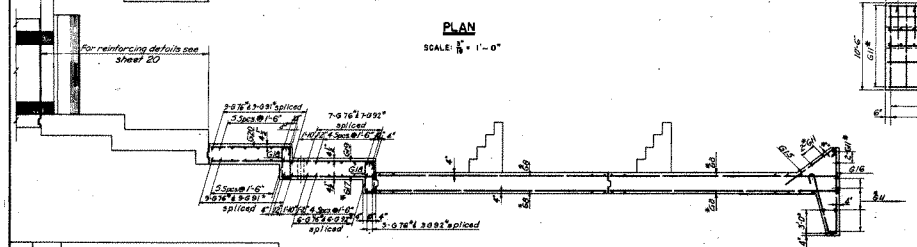
SECTION D-D

SCALE: 3/8" = 1'-0"



ELEVATION B-B

SCALE: 3/8" = 1'-0"



SECTION A-A

SCALE: 3/16" = 1'-0"

Note:
For masonry details see sheets 17 & 18
All reinforcing to have 4" min. cover unless otherwise noted.
*Bars to be furnished by Government and installed by contractor

This plan accompanies Change Order No. 1, Contract No. W559 eng GCE5.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
STILLING BASIN SLAB, PIERS & BAFFLES

SHEET 18 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUGUST 20, 1942

SUBMITTED: [signature] CHIEF DESIGNER, CORPS OF ENGRS.

APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH

APPROVED: [signature] DISTRICT ENGINEER

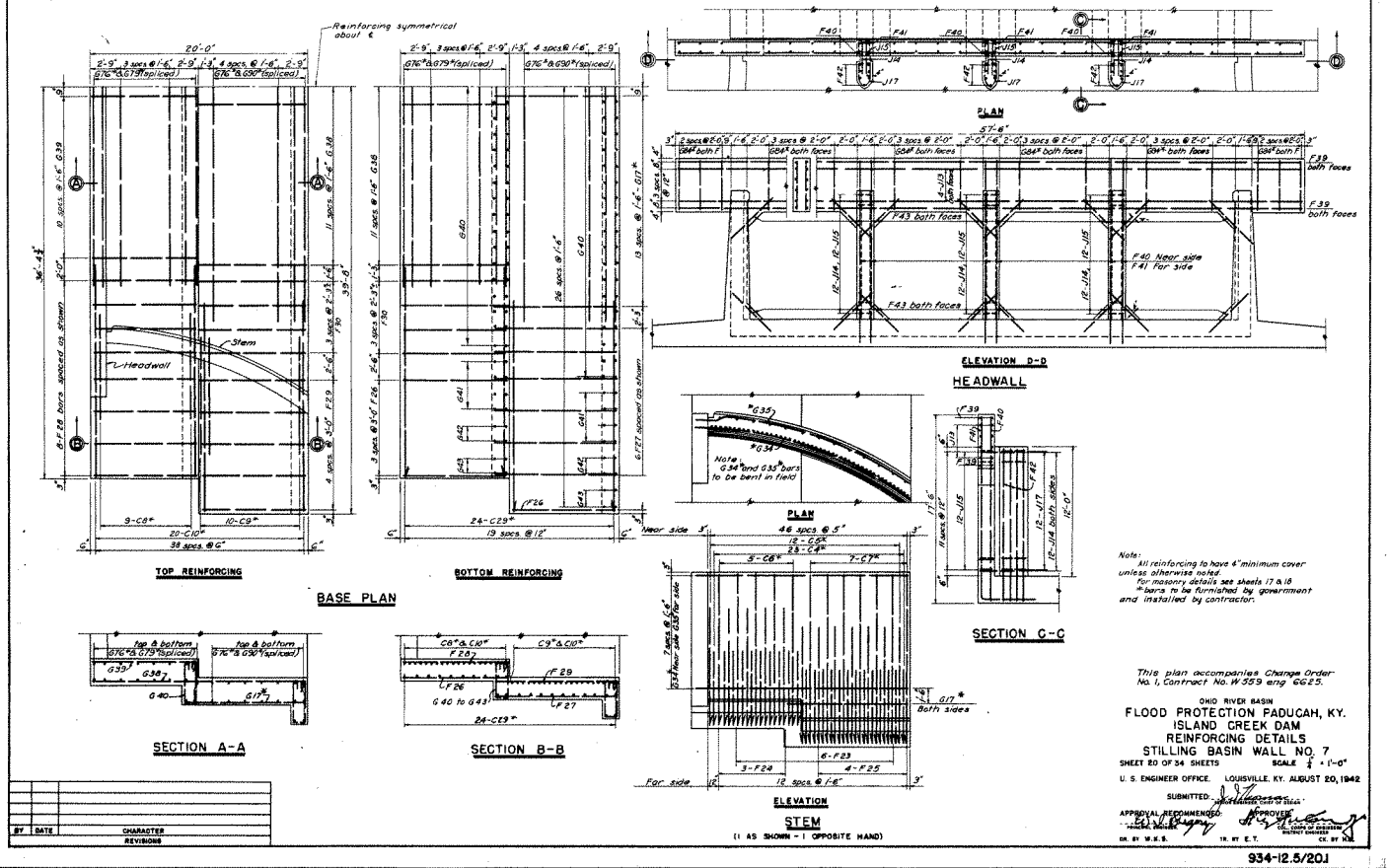
DR. BY C.E. — TR. BY H.W.W. — CK. BY [illegible]

934-12.5/19.1

DATE	CHARACTER REVISIONS

WAR DEPARTMENT

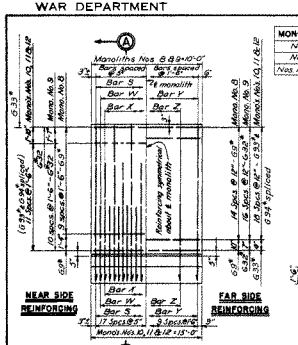
CORPS OF ENGINEERS, U. S. ARMY



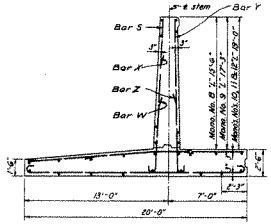
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

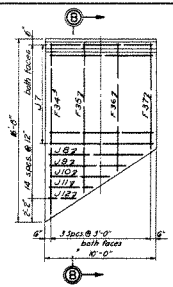
MONOLITH	BAR S	BAR W	BAR X	BAR Y	BAR Z
No. 8	7-#C3	13-#C4	7-#C5	5-F22	3-F23
No. 9	7-#C2	11-#C4	6-#C5	4-F21	3-F23
Nos. 10, 11 & 12	10-#C1	17-#C4	8-#C5	5-F20	5-F23



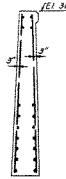
LANDSIDE ELEVATION
MONOLITHS NOS. 8 TO 12



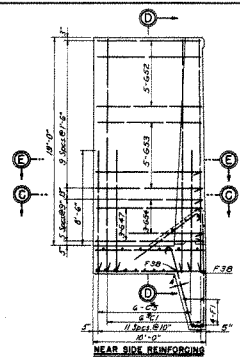
SECTION A-A

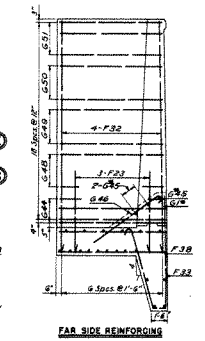


LANDSIDE ELEVATION
"I" WALL
MONOLITH NO. 14

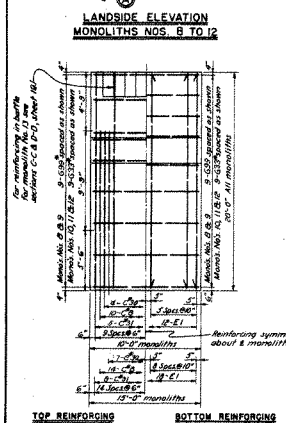


SECTION B-B



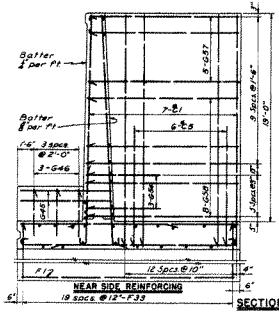


LANDSIDE ELEVATION – MONOLITH NO. 13

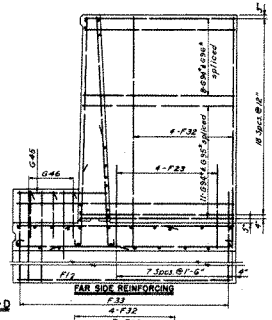


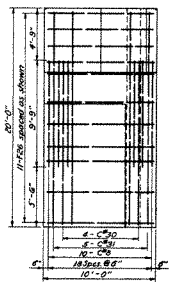
TOP REINFORCING BOTTOM REINFORCING

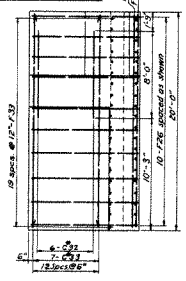
BASE PLAN



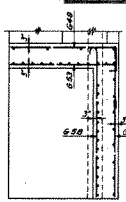
SECTION D-D



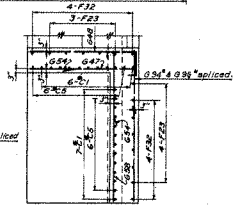




BASE PLAN
MONOLITH NO. 13



SECTION E-E



SECTION C-C

Notes:
For masonry details see sheets 17 and 18.
All reinforcing to have 4" min cover unless otherwise noted.
* Bars to be furnished by government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W 539 eng 6622.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
STILLING BASIN WALLS NOS. 8 TO 14 INCL.

SHEET 81 OF 94 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [illegible] Chief, Design Section

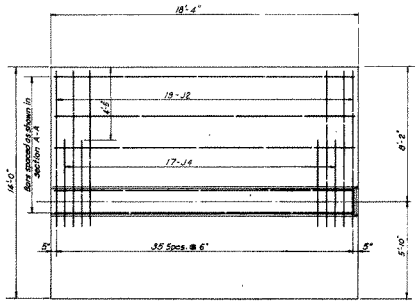
APPROVAL RECOMMENDED: [illegible] Principal Engineer

APPROVED: [illegible] Chief, Design Branch, District Engineer

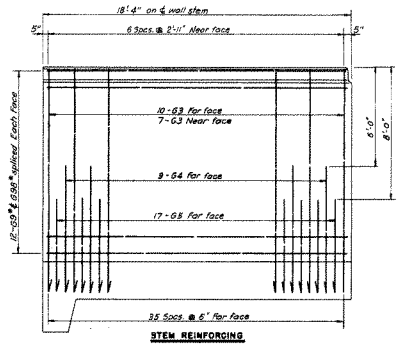
DR. BY C.B. TR. BY R.R.L. CK. BY R.E.

934-12.5/21.1

BY	DATE	CHARACTER
		REVISIONS



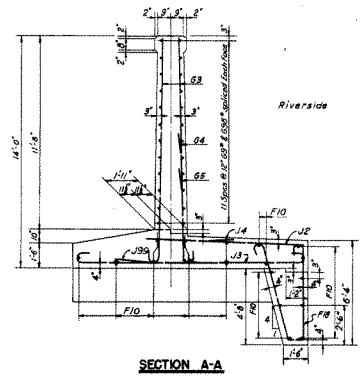
TOP REINFORCING



STEM REINFORCING

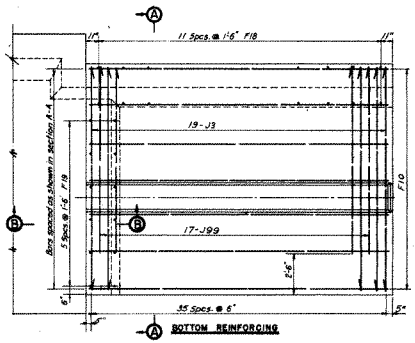
LANDSIDE ELEVATION

SCALE: 1/8" = 1'-0"



SECTION A-A

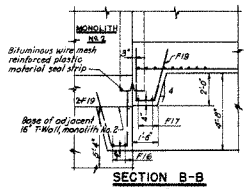
SCALE: 1/8" = 1'-0"



BOTTOM REINFORCING

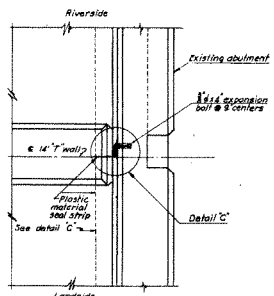
PLAN - BASE

SCALE: 1/8" = 1'-0"



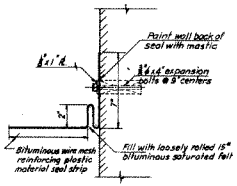
SECTION B-B

SCALE: 1/8" = 1'-0"



DETAIL OF CONNECTION TO EXISTING CLOSURE

SCALE: 1/8" = 1'-0"



DETAIL "C"

SCALE: 3"=1'-0"

For location of seal in base and cutoff see sheet 23.

Note:
X bars furnished by government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W559 eng 6625.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY & REINFORCING DETAILS
MONOLITH NO. 1

SHEET 22 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

APPROVED: COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

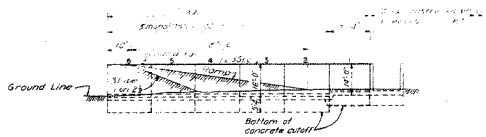
DR. BY E.C.B. TR. BY W.J.B. CK. BY KJB

934-12.5/22.1

BY	DATE	CHARACTER REVISIONS

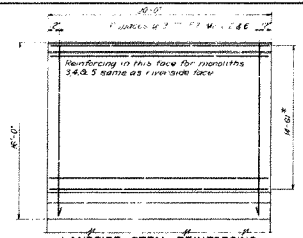
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



LANDSIDE ELEVATION - UPSTREAM "T" WALL - MONOLITHS

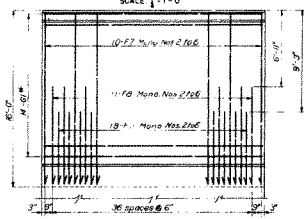
SCALE 1" = 20'



LANDSIDE STEM REINFORCING

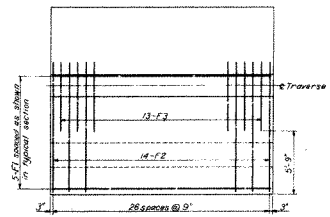
MONOLITHS NOS. 2 & 6

SCALE: 1/8" = 1'-0"



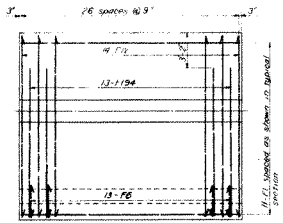
RIVERSIDE STEM REINFORCING

SCALE: 1/8" = 1'-0"



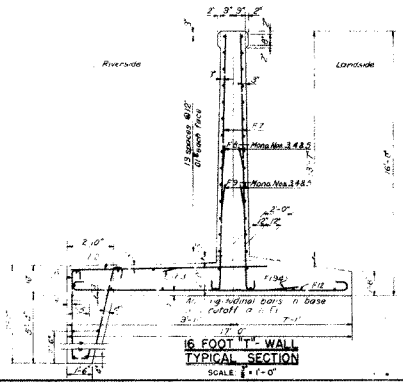
PLAN - BASE - TOP REINFORCING

SCALE: 1/8" = 1'-0"



PLAN - BASE - BOTTOM REINFORCING

SCALE: 1/8" = 1'-0"



16 FOOT "T" - WALL

TYPICAL SECTION

SCALE 1/8" = 1'-0"

16 FOOT "T" - WALL

MONOLITHS NOS. 2,3,4,5 & 6

Note:
Place seal block at riverside edge of base between monoliths 1 and 2, for details see sheet 23
*bars furnished by government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W 559 eng 6625.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 2,3,4,5 & 6

SHEET 23 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

SUBMITTED: [illegible] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible] — APPROVED: [illegible] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

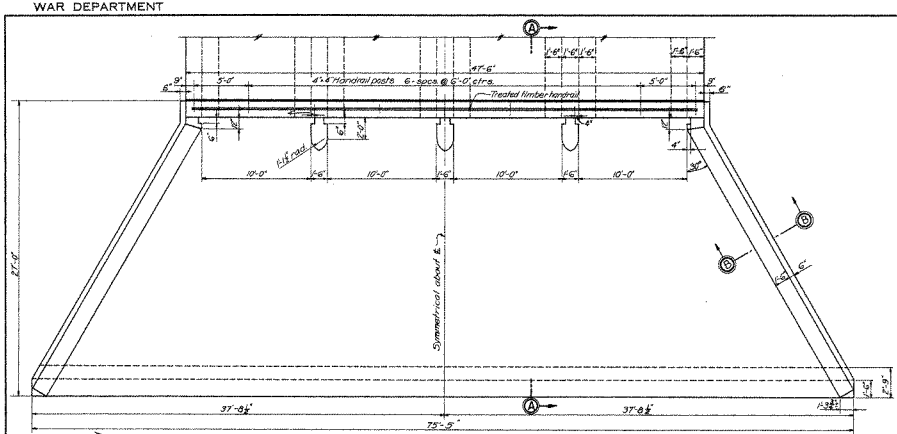
DR. BY W.R.B. — TR. BY D.R.C. — CK. BY H.W.

BY	DATE	CHARACTER REVISIONS

934 - 12.5/23.1

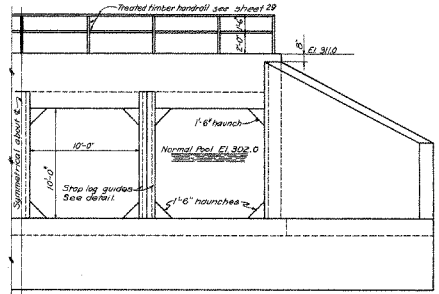
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



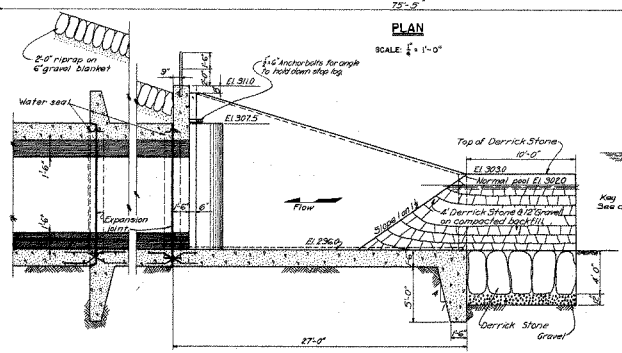
PLAN

SCALE: ¼" = 1'-0"



HALF FRONT ELEVATION

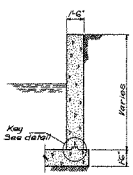
SCALE: ¼" = 1'-0"



SECTION A-A

SCALE: ¼" = 1'-0"

Note: for reinforcing details see sheet 25.

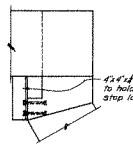


SECTION B-B

SCALE: ¼" = 1'-0"

DETAIL OF KEYWAY

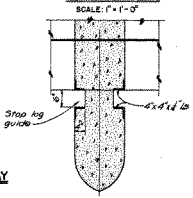
SCALE: NONE



PLAN

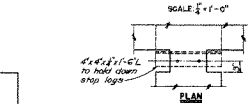
STOP LOG KEEPER ON WING WALL

SCALE: 1" = 1'-0"



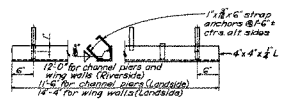
DETAIL AT PIER

SCALE: ¼" = 1'-0"



STOP LOG KEEPER ON TOP OF PIER

SCALE: 1" = 1'-0"



STOP LOG GUIDE ANGLES

MAKE 12 FOR CHANNEL PIERS MARK CPBL, WT. EACH 79#
MAKE 4 FOR WING WALLS MARK WBL WT. EACH 98#
MAKE 16 FOR CHANNEL PIERS AND WING WALLS (RIVERSIDE) MARK CPBL, WT. EACH 82#
SCALE: 1" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

MASONRY DETAILS

LANDSIDE HEADWALL

SHEET 24 OF 54 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20 1948

SUBMITTED: [illegible] CHIEF, CONSTRUCTION DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEERING DIVISION — APPROVED: [illegible] LT. COL. CE, DISTRICT ENGINEER

DR. BY H.W. — TR. BY C.R.G. — CK. BY H.W.

934-12.5/24

BY	DATE	CHARACTER REVISIONS

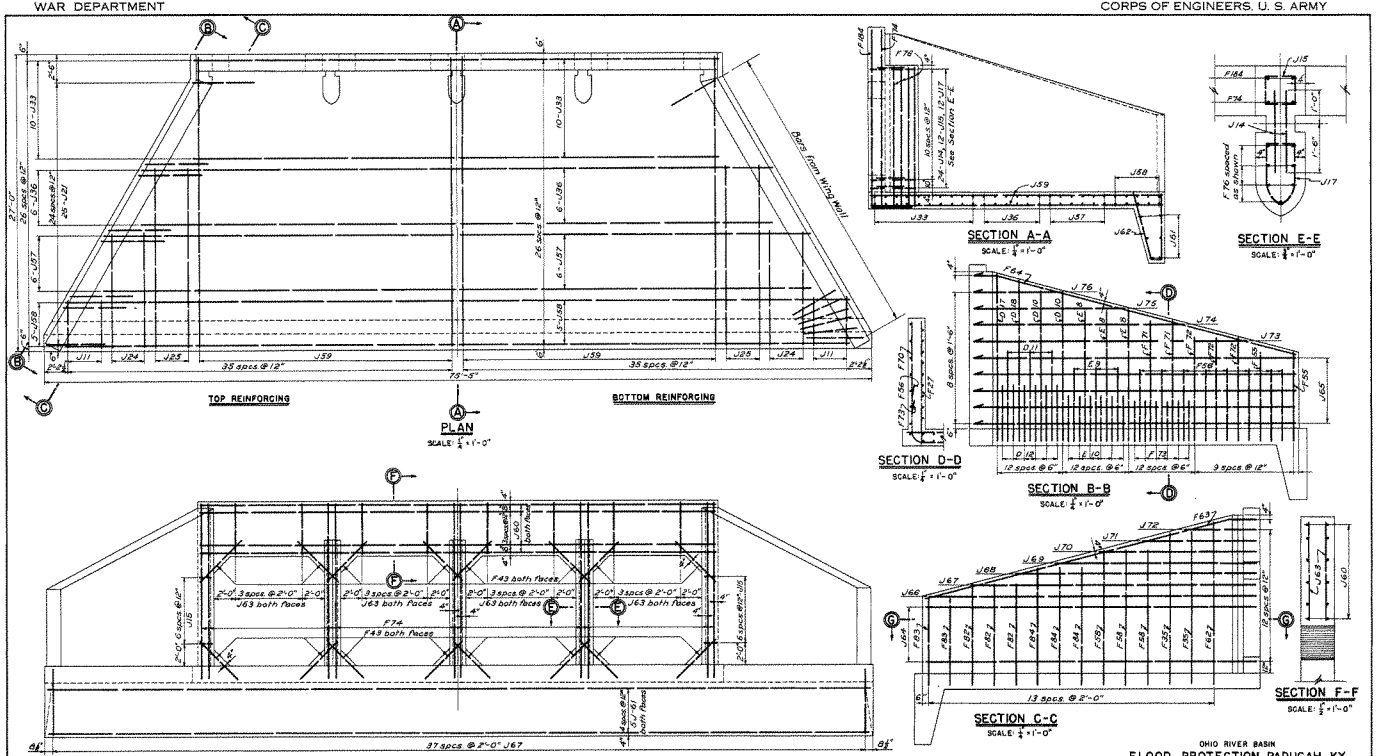
"BELIEVED AS BUILT"

237

866

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



NOTE:- All reinforcing to have 4" min. cover unless otherwise noted. For masonry details see sheet No. 24

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

REINFORCING DETAILS

LANDSIDE HEADWALL

SHEET 25 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

SUBMITTED: [signature] CHIEF ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER

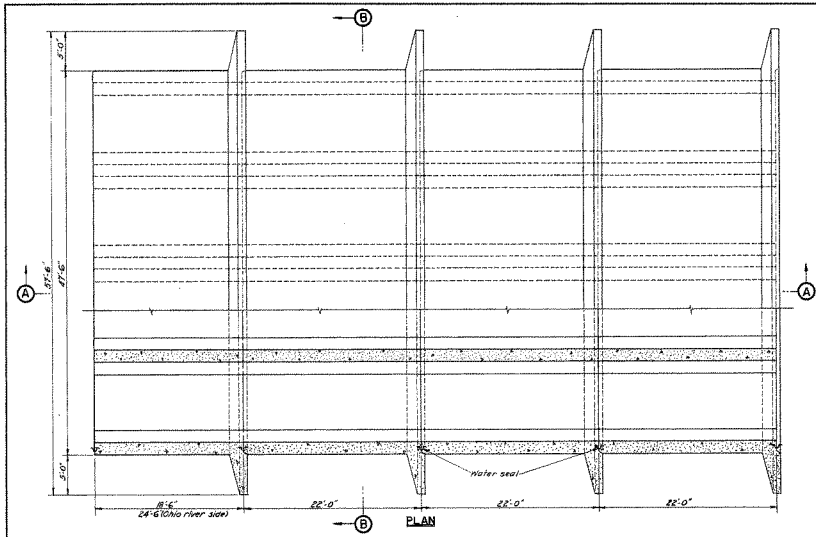
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY R.K.J. — TR. BY E.R.S. — CK. BY H.M.

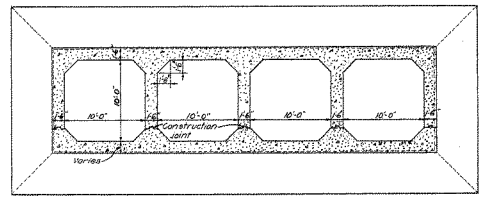
934-12.5/25

WAR DEPARTMENT

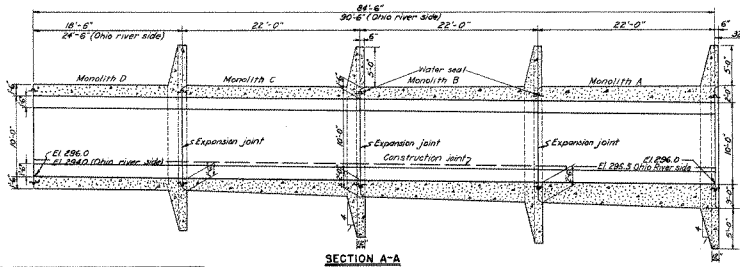
CORPS OF ENGINEERS, U. S. ARMY



PLAN



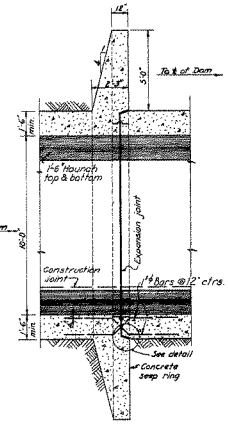
SECTION B-B



SECTION A-A
MULTIPLE BOX CULVERT

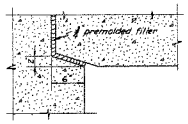
SCALE: $\frac{1}{8}$" = 1'-0"

Make Island Creek section as shown
Make Ohio River section opposite hand ℄ as noted.



SECTION THRU BOX CULVERT

SCALE: $\frac{1}{8}$" = 1'-0"



DETAIL OF EXPANSION JOINT

SCALE: 1½" = 1'-0"

Note:
For reinforcing details see sheets 27 & 28
For water-seal detail see sheet 30

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS
MULTIPLE BOX CULVERT

SHEET 26 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [illegible] Lt. Colonel, Corps of Engineers, Chief of Design

APPROVAL RECOMMENDED: [illegible] Chief, Design Branch

APPROVED: [illegible] Lt. Colonel, Corps of Engineers, District Engineer

DR. BY H.F.C. & R.B.F. — TR. BY H.E.F. — CK. BY H.W.

934-12.5/26

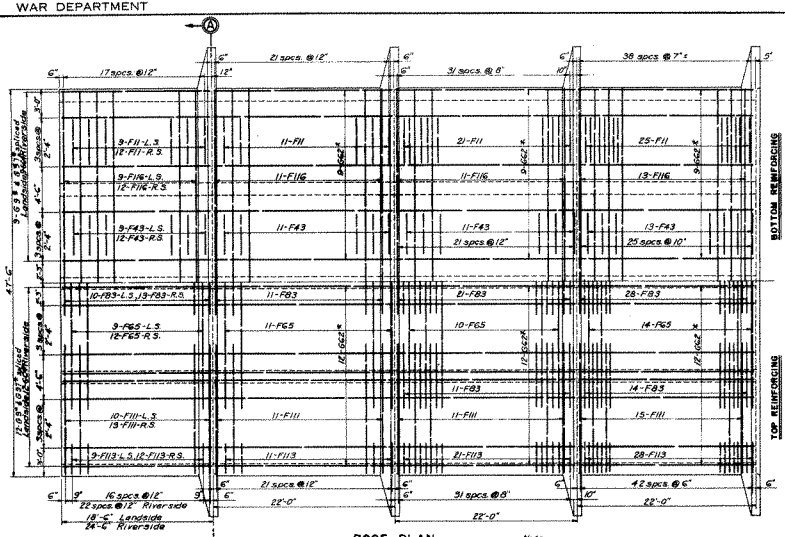
RELIEVED AS BUILT

239

1000

WAR DEPARTMENT

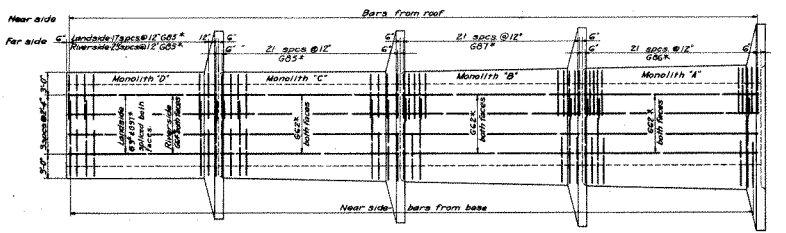
CORPS OF ENGINEERS, U. S. ARMY



ROOF PLAN

SCALE: 3/16" = 1'-0"

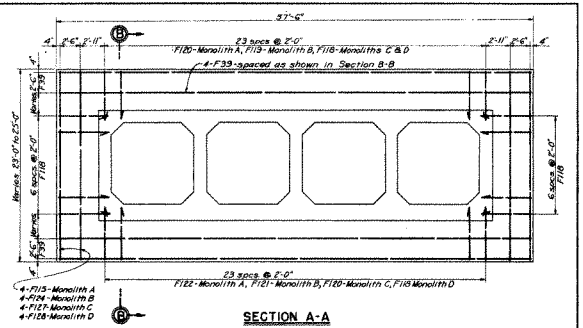
Note:
Landside culvert shown; Riverside culvert differs only in Monolith "D" as indicated.



ELEVATION

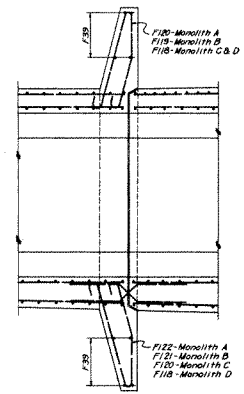
SCALE: 3/16" = 1'-0"

Note:
Reinforcing for the two exterior walls is the same, but opposite hand; that for the inner walls is shown on sheet 28.
For reinforcing in base plan of Box Culvert see sheet 28.
For masonry details see sheet 26.
All reinforcing to have 4" min. cover unless otherwise noted.



SECTION A-A

SCALE: 3/8" = 1'-0"



SECTION B-B

SCALE: 3/8" = 1'-0"

Note:
* Bars to be furnished by government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W 359 eng 6625.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
MULTIPLE BOX CULVERT

SHEET 27 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

SUBMITTED: [illegible]

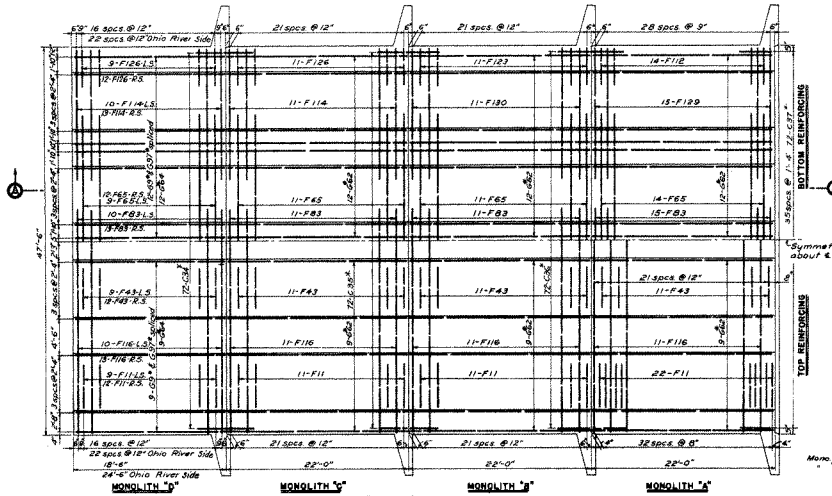
APPROVAL RECOMMENDED: [illegible] — APPROVED: [illegible]

DR. BY W.K.B. — TR. BY G.R.D. — CK. BY [illegible]

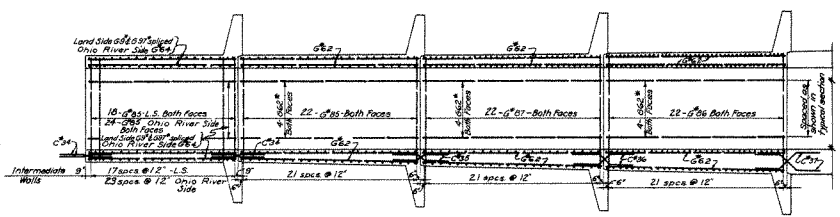
BY	DATE	CHARACTER	REVISIONS

934-12.5/27.1

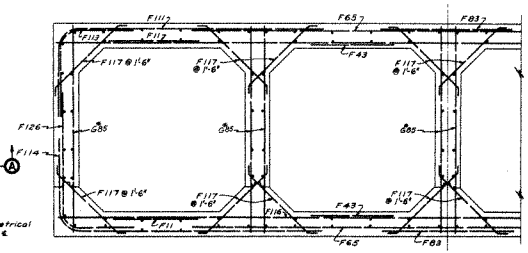
1001



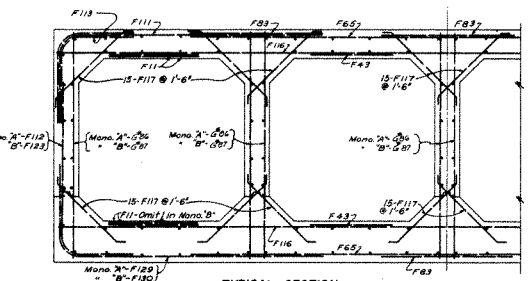
BASE PLAN
SCALE: 1/8" = 1'-0"



SECTION A-A
SCALE: 1/8" = 1'-0"



TYPICAL SECTION
MONOLITHS "C" & "D"
SCALE: 1/8" = 1'-0"



TYPICAL SECTION
MONOLITHS "A" & "B"
SCALE: 1/8" = 1'-0"

Note:
For reinforcing in roof plan of box culvert see sheet 27.1
For masonry details see sheet 26
All reinforcing to have 4" min. cover unless otherwise noted.
* Bars to be furnished by Government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W539 eng 6625.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
MULTIPLE BOX CULVERT

SHEET 28 OF 54 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: (Signature) (Title) CHIEF OF DESIGN

APPROVAL RECOMMENDED: (Signature) PRINCIPAL ENGINEER

APPROVED: (Signature) CHIEF, DESIGN OF ENGINEERS DISTRICT ENGINEER

DR. BY R.K.J. TR. BY E.R.S. CK. BY R.W.

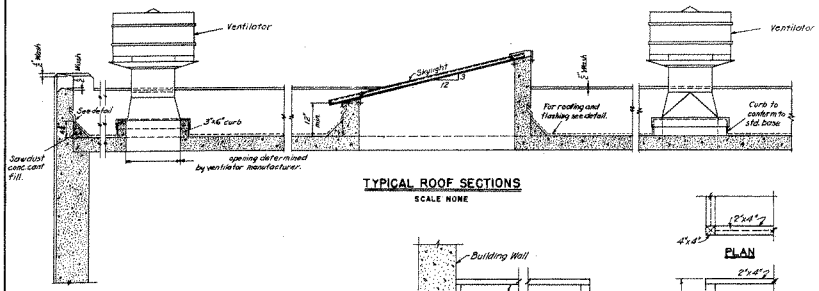
934-12.5/28.1

BY	DATE	CHARACTER	REVISIONS
J.M.K.	10/9/42	Bar marking and spacing corrected.	

"AS BUILT"

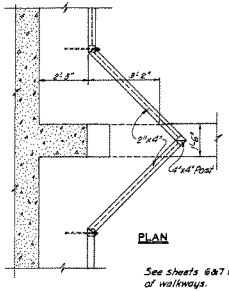
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



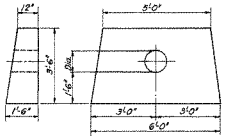
TYPICAL ROOF SECTIONS

SCALE NONE



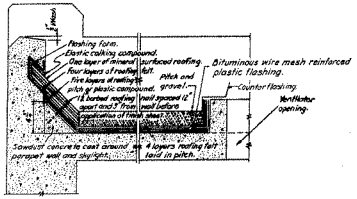
PLAN

See sheets 6&7 for location of walkways.



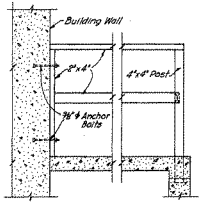
HEADWALL DETAIL FOR 8" AND 12" PIPE

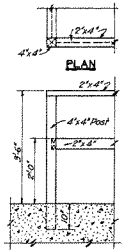
NO SCALE



TYPICAL ROOFING DETAILS

SCALE: NONE

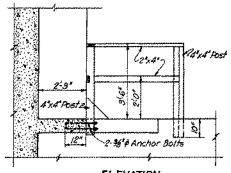




PLAN

END POST & RAIL

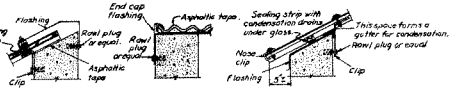
SCALE: 3/4" = 1'-0"



ELEVATION

WALKWAY HANDRAIL AT INTERMEDIATE WALLS

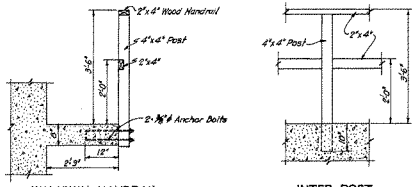
SCALE: 1/2" = 1'-0"



HEAD JAMB SILL

DETAILS OF SKYLIGHT

SCALE: 2" = 1'-0"



WALKWAY HANDRAIL

SCALE: 3/4" = 1'-0"

INTER POST TYPICAL ANCHOR

SCALE: 3/4" = 1'-0"

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MISCELLANEOUS DETAILS

SHEET 29 OF 34 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942.

SUBMITTED: [illegible] CHIEF, DESIGN BRANCH

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH

APPROVED: [illegible] DISTRICT ENGINEER

DR. BY: G.N.B.-W.J.B. TR. BY: H. A. F. CK. BY: [illegible]

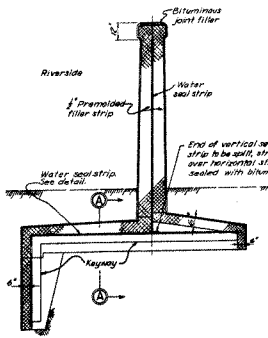
934-12.5/29

"BELIEVED AS BUILT"

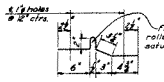
1003

WAR DEPARTMENT

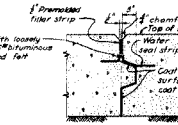
CORPS OF ENGINEERS, U. S. ARMY



TYPICAL T-WALL EXPANSION JOINT
FOR CONCRETE CUT-OFF
SCALE: ⅛" = 1'-0"

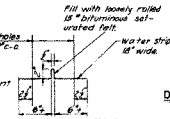


WATER SEAL STRIP
SCALE: 1½" = 1'-0"

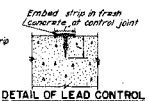


SECTION A-A
NOT TO SCALE

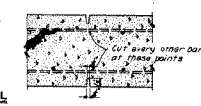
Note:
Bituminous wire mesh reinforced plastic material



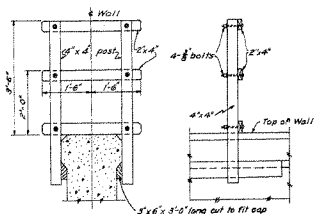
WATER SEAL STRIP
SCALE: 1½" = 1'-0"



DETAIL OF LEAD CONTROL JOINT COVER
SCALE: HALF SIZE

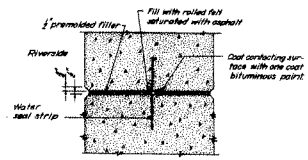


SECTIONAL PLAN
TYPICAL DETAIL
WEAKENED PLANE CONTROL JOINT
SCALE: NONE

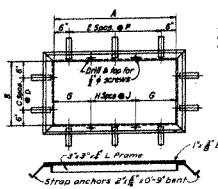


Note:
Guard rail at Sta. 37+96.96 to be as shown.
To install guard rail at Sta. 51+05.00 holes must be drilled in existing concrete and 4"x4" posts grouted in place.

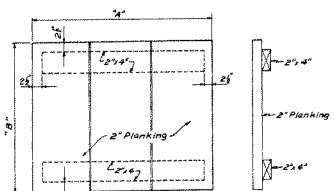
GUARD RAIL
SCALE: ¾" = 1'-0"



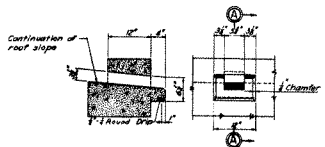
TYPICAL EXPANSION JOINT IN STEM OF WALL
SCALE: 1½" = 1'-0"



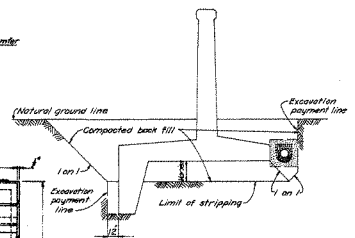
MANHOLE FRAME
NO SCALE



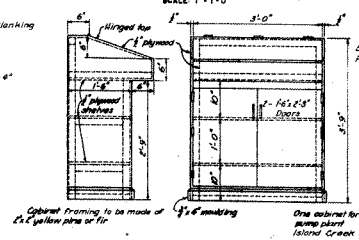
MANHOLE COVER
SCALE: 1½" = 1'-0"



SECTION A-A
ELEVATION
CONCRETE SCUPPER
SCALE: 1" = 1'-0"



TYPICAL STRIPPING SECTION "T" WALL
SCALE: ¼" = 1'-0"



STORAGE CABINET AND DESK
SCALE: 1" = 1'-0"
1 REQUIRED.

MANHOLE FRAMES													
A	B	C	D	E	F	G	H	V	No. straps	No. holes	Make	Mark	Wt. each
2'-0"	2'-6"	1	1'-6"	1	12"	12"	-	-	8	2	1	MF1	73.5#
12'-6"	2'-0"	1	12"	8	1'-0"	10¾"	5	2'-0"	22	12	4	MF2	218.9#

MANHOLE COVERS			
Manhole Size	A	"B"	Make
2'-0 x 2'-6"	2'-10"	2'-6"	1
2'-10" x 12'-6"	2'-4"	3'-1"	16
4'-9" x 6'-8"	3'-1"	6'-8"	4

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MISCELLANEOUS DETAILS

SHEET 30 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20, 1942

SUBMITTED: [illegible] — DISTRICT ENGINEER, CHIEF OF DESIGN

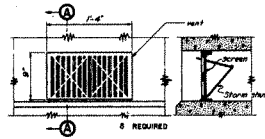
APPROVAL RECOMMENDED: [illegible] — DIV. ENGINEER

APPROVED: [illegible] — CHIEF OF ENGINEERS

DR. BY E.H.B. — TR. BY E.H.B. — CK. BY F.S.P.

934-12/6/30

"REVIEWED AS BUILT"



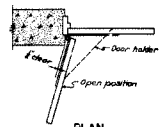
ELEVATION

SECTION A-A

TYPICAL DETAIL WALL VENTILATORS

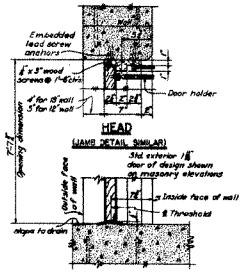
SCALE: 1½" = 1'-0"

Note: Omit shutters on substructure ventilators



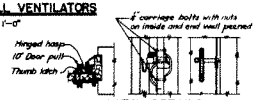
PLAN

DOOR HOLDER



ACCESS DOOR FRAME DETAILS

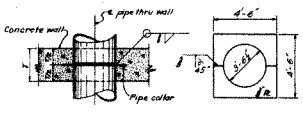
SCALE: 1½" = 1'-0"



LATCH DETAILS

(FOR 2'-8" x 7'-0" DOOR)

SCALE: 1" = 1'-0"



PLAN

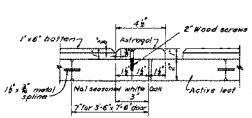
ELEVATION

PIPE COLLAR

MATERIAL: STRUCTURAL STEEL

SCALE: NONE

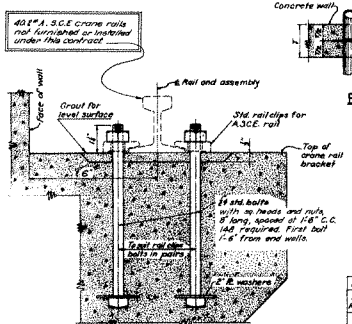
3 REQUIRED



SECTION THRU DOUBLE DOOR

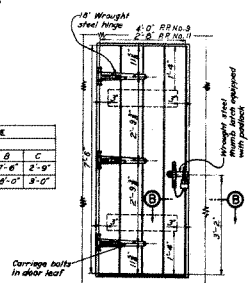
ISLAND CREEK DAM

SCALE: 3" = 1'-0"



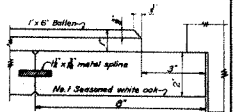
RAIL ANCHORAGE DETAIL

ACCESS DOOR SCHEDULE				
No. Req'd	Masonry Opening Dimensions	A	B	C
1	2'-8" x 7'-7⅜"	2'-8"	7'-6"	2'-9"
2	7'-2" x 8'-1⅜"	3'-6"	8'-0"	3'-0"



ACCESS DOOR ELEVATION

SCALE: ½" = 1'-0"



SECTION B-B

SCALE: HALF SIZE

SCALE: NONE

THRESHOLD FOR WOOD ACCESS DOORS

SCALE: FULL SIZE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

MISCELLANEOUS DETAILS

SHEET 31 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [illegible] DIST. ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER

APPROVED: [illegible] DIST. CORPS OF ENGINEERS, DISTRICT ENGINEER

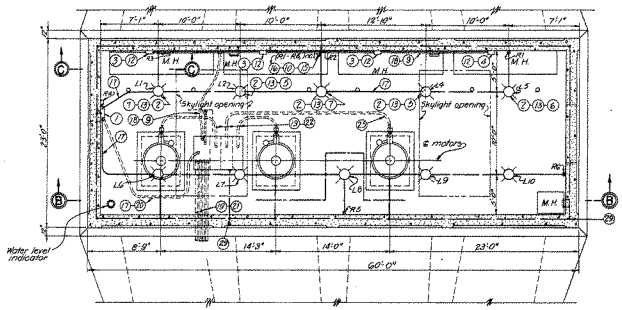
DR. BY: W.A.H. TR. BY: M.N.M.

934-12.5/31

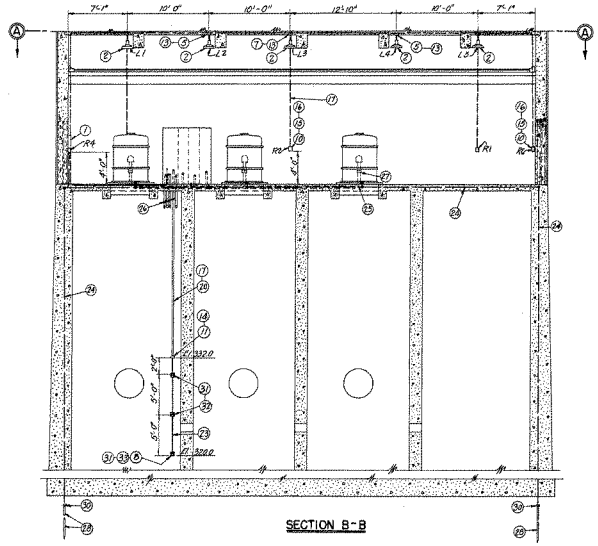
"BELIEVED AS BUILT"

BY	DATE	CHARACTER REVISIONS

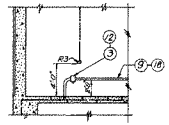
1005



SECTIONAL PLAN A-A



SECTION B-B

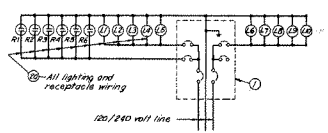


SECTION C-C

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1 *	4 circuit lighting panel (surface type)			1 *
2 *	R.L.M. dome reflector and socket	West	349573	10 *
3 *	Conduit outlet	Crouse-Hinds	FDCT3	3 *
4 *	" "	" "	FDL3	1 *
5	" "	" "	SKC12	6
6	" "	" "	SKL12	1
7	" "	" "	SKT12	3
8 *	1/0 electrode, for detail see sheet 24			1 *
9 *	#8-1 cond. cable, VC, 600 V. ins. with W.P. braid			240' ± *
10 *	Conduit outlet	Crouse-Hinds	FS141	6 *
11 *	" "	" "	8147	1 *
12 *	" Cover	" "	05100	4 *
13 *	" Cover	" "	SKB4	10 *
14 *	" "	" "	1771	1 *
15 *	Duplex plug receptacle			6 *
16 *	Wall surface plate			6 *
17	1/2" electrical metallic tubing (E.M.T.)			170'±
18	1" rigid electrical conduit			15'±
19	3/4" rigid electrical conduit			90'±
20 *	#12 type SN insulated copper wire			700'± *
21 *	300 MCM 3-cond. cable, VC, 600 V. ins. with lead jacket			680'± *
22 *	750 " 1-" " " " " " W.P. braid			240'± *
23 *	#6 H.D. bare solid copper wire			15'± *
24 *	2/0 bare stranded copper cable			450'±
25	3/4" standard 90° elbow			6
26	Special long radius elbow 3/4" × 36" radius	G.E.		4
27 *	3/4" Erickson coupling			3 *
28	Copperweld ground rod, 5/8" × 8'-0" long			4
29	"Y" connector for #2/0 stranded cable	Burndy	NT2626	8
30	Connector for #2/0 stranded cable to 3/4" rod	"	GAM436	8
31 *	3" bell circle type insulator	Lapp	13761	3 *
32 *	Bus support fitting. Drill to clamp #6 solid wire	Locke	9859	2 *
33 *	Bus support fitting. Drill to clamp 1/0 stranded	"	9853	1 *
34				
35				

* These materials not to be furnished or installed under this contract.



WIRING DIAGRAM - LIGHTING CIRCUIT

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

LEGEND

Notes:
Figures in circles refer to part numbers on Bill of Material.
All material shall be of the manufacture, type & catalog number specified, or its equal.
All conduit in floor shall be placed as near the center of same as possible & shall clear opening for pump removal.
Small fittings, conduits, E.M.T. couplings and adapters, etc., not listed shall be furnished as required.
200 watt bulbs shall be furnished and installed in all lights, under separate contract.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

LIGHTING & POWER SYSTEMS

SHEET 32 OF 34 SHEETS SCALE 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [illegible] CHIEF, DESIGN BRANCH

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER

APPROVED: [illegible] COL., CORPS OF ENGINEERS DISTRICT ENGINEER

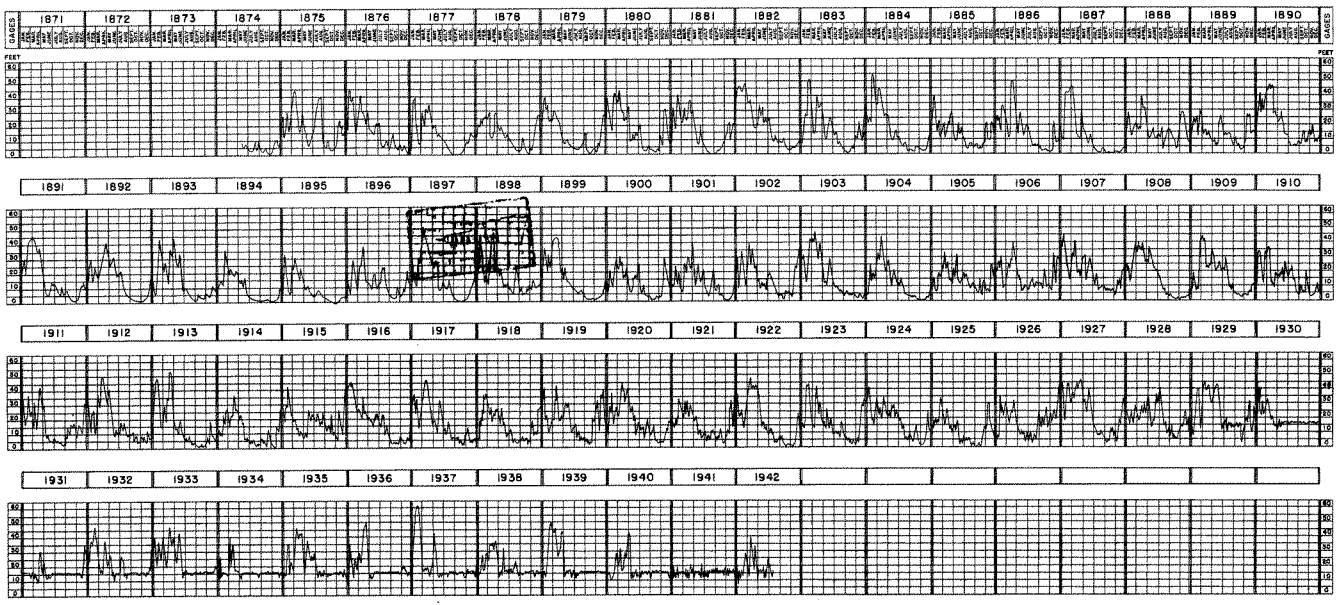
DR. BY A.J.Z. TR. BY A.J.Z. CK. BY D.S.

934-12.5/32

1006

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note:
Zero Gage = El. 286.26 (U.S.E.D. datum).
Dam No. 52 placed in operation Oct. 27, 1928,
for location see sheet 934-12.5/1

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

HYDROGRAPHS

SHEET 33 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED:

APPROVAL RECOMMENDED: Chief, Hydrologic Section, Hydraulic Branch

APPROVED: Chief, Engineering Division, Assistant Chief

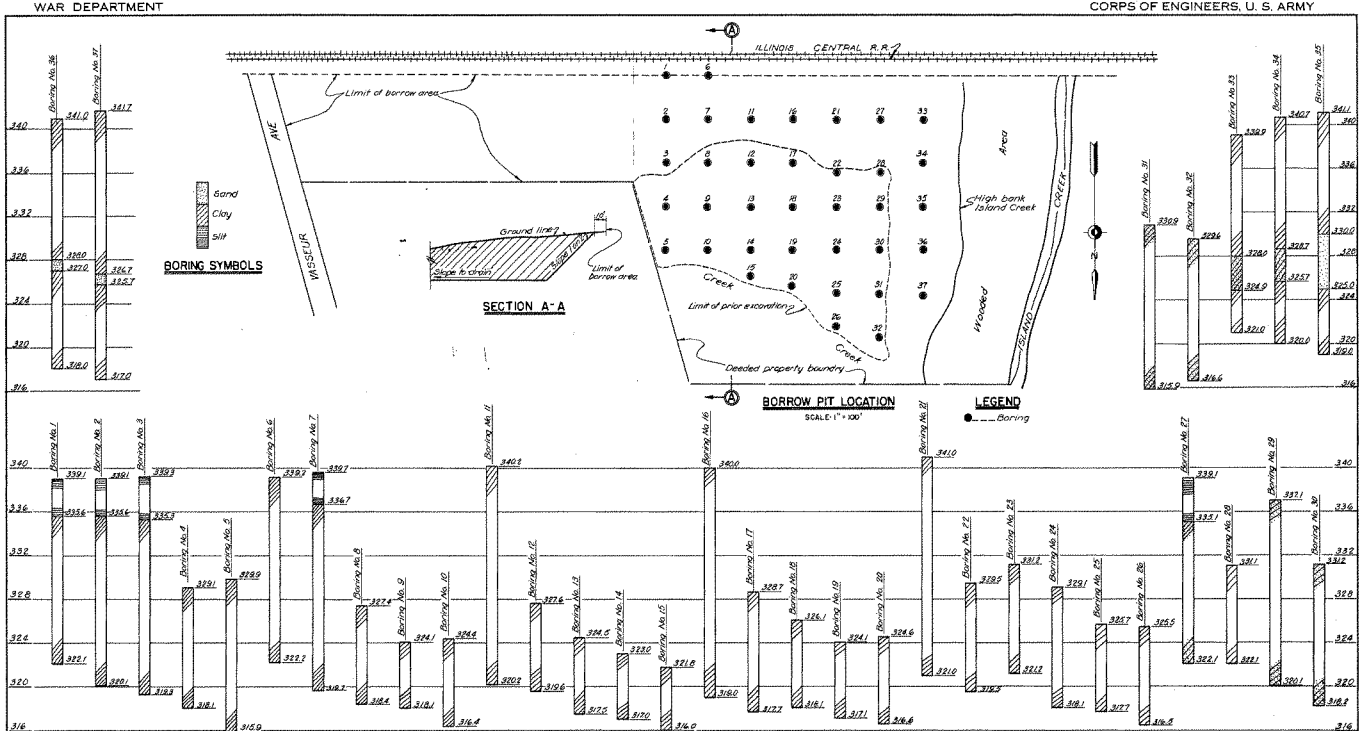
DR. BY R.M.L. TR. BY R.M.L. CK. BY H.W.

934-12.5/33

1007

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note: For dam site borings see sheet 5

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
BORROW PIT LOCATION AND BORINGS

SHEET 34 OF 34 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — AUG. 20 1942

SUBMITTED: [illegible] — DISTRICT ENGINEER, CHIEF OF DESIGN

APPROVED AND RECOMMENDED: [illegible] — PRINCIPAL ENGINEER

APPROVED: [illegible] — CHIEF OF ENGINEERS, DISTRICT ENGINEER

DR. BY A. J. Z. — TR. BY A. J. Z. — CK. BY [illegible]

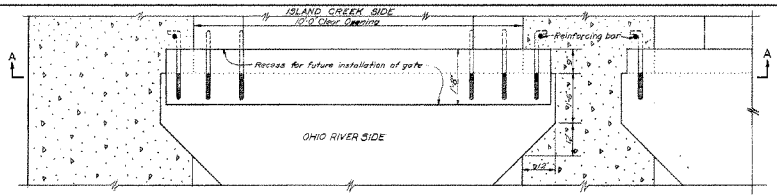
934-12.5/34

"RELIEVED AS BUILT"

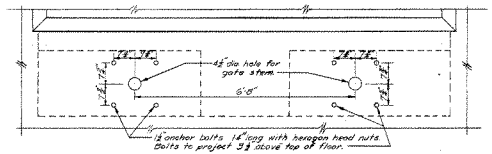
1008

WAR DEPARTMENT

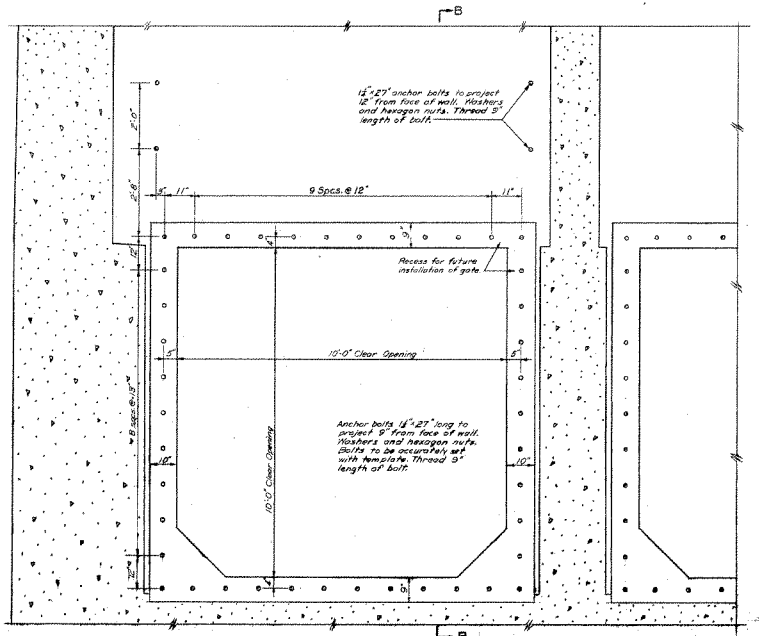
CORPS OF ENGINEERS, U. S. ARMY



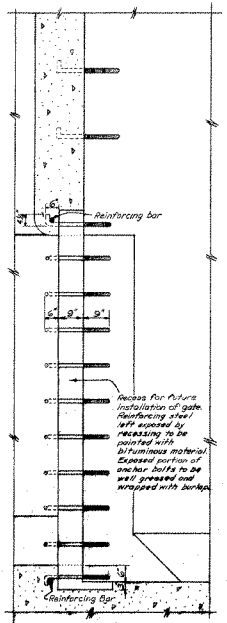
SECTIONAL PLAN
THRU GATE RECESS



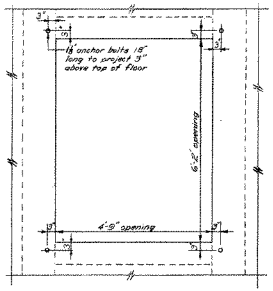
ANCHOR BOLTS FOR GATE STAND



SECTION A-A



SECTION B-B



ANCHOR BOLTS FOR PUMP MOTOR

Note:
Expansion anchor bolts for Water Level Indicator to be installed at future date when Water Level Indicator is installed.

..... Indicates future final finish lines.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM.

ANCHOR BOLT LAYOUT
FOR GATE, GATE STAND &
PUMP MOTOR

SHEET 1 OF 1 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. MAR. 28, 1963

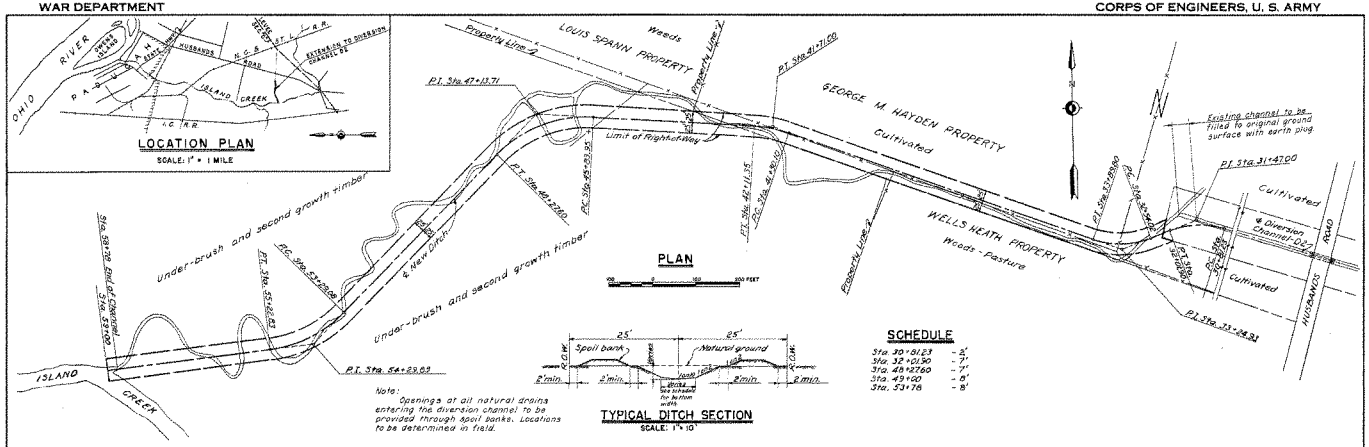
RELIEVED AS BUILT 834-12-5-

071

1009

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



1010

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KENTUCKY

PUMPING PLANTS NOS. 4, 8, 9 & 10

INDEX

PUMPING PLANT NO. 4 SHEET 934-12.7/2

PUMPING PLANT NO. 8 SHEET 934-12.7/13

PUMPING PLANT NO. 9 SHEET 934-12.7/14

PUMPING PLANT NO. 10 SHEET 934-12.7/25

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

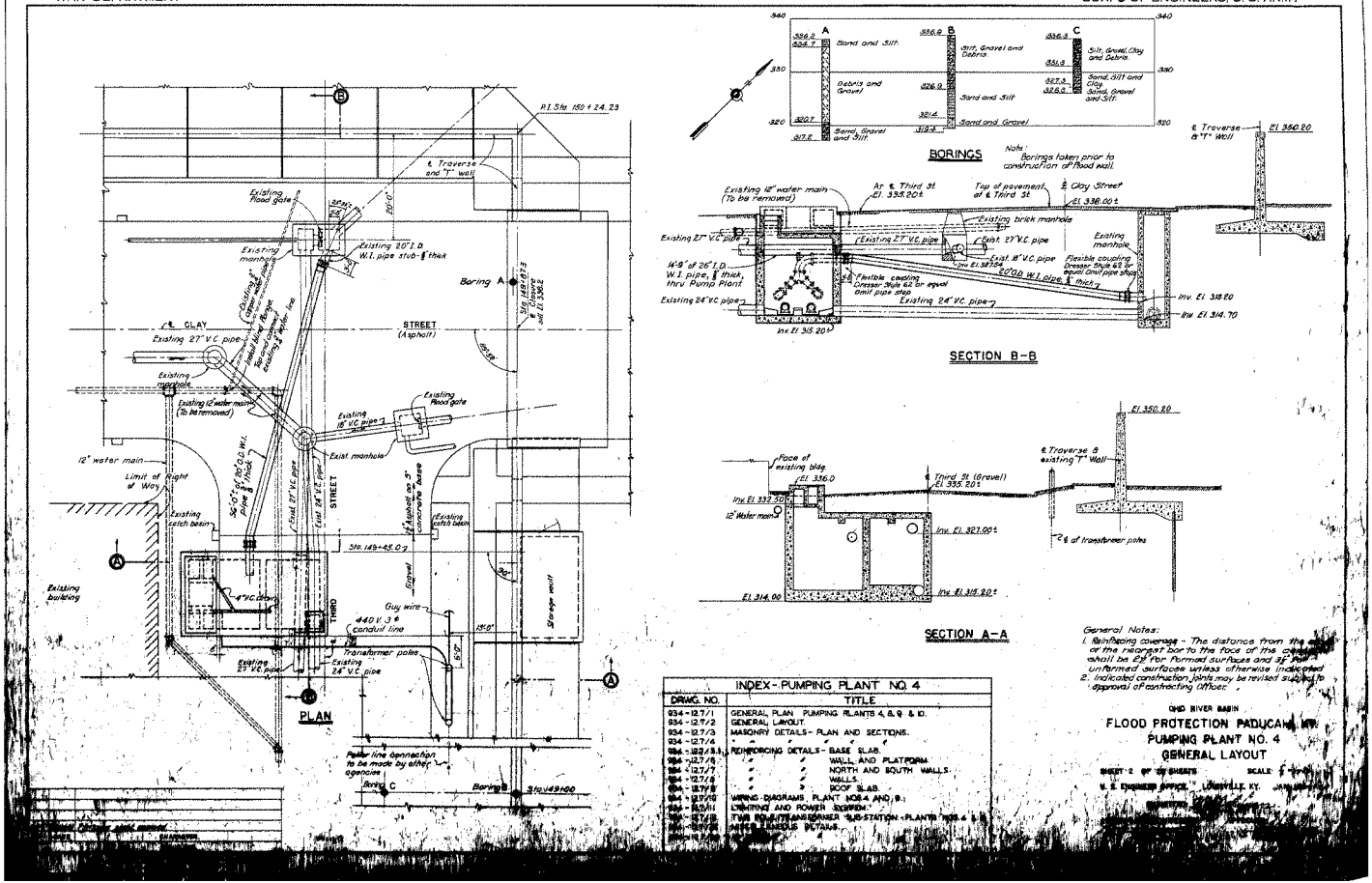
"RELIEVED AS BUILT"
934-12.7/6

WAR DEPARTMENT

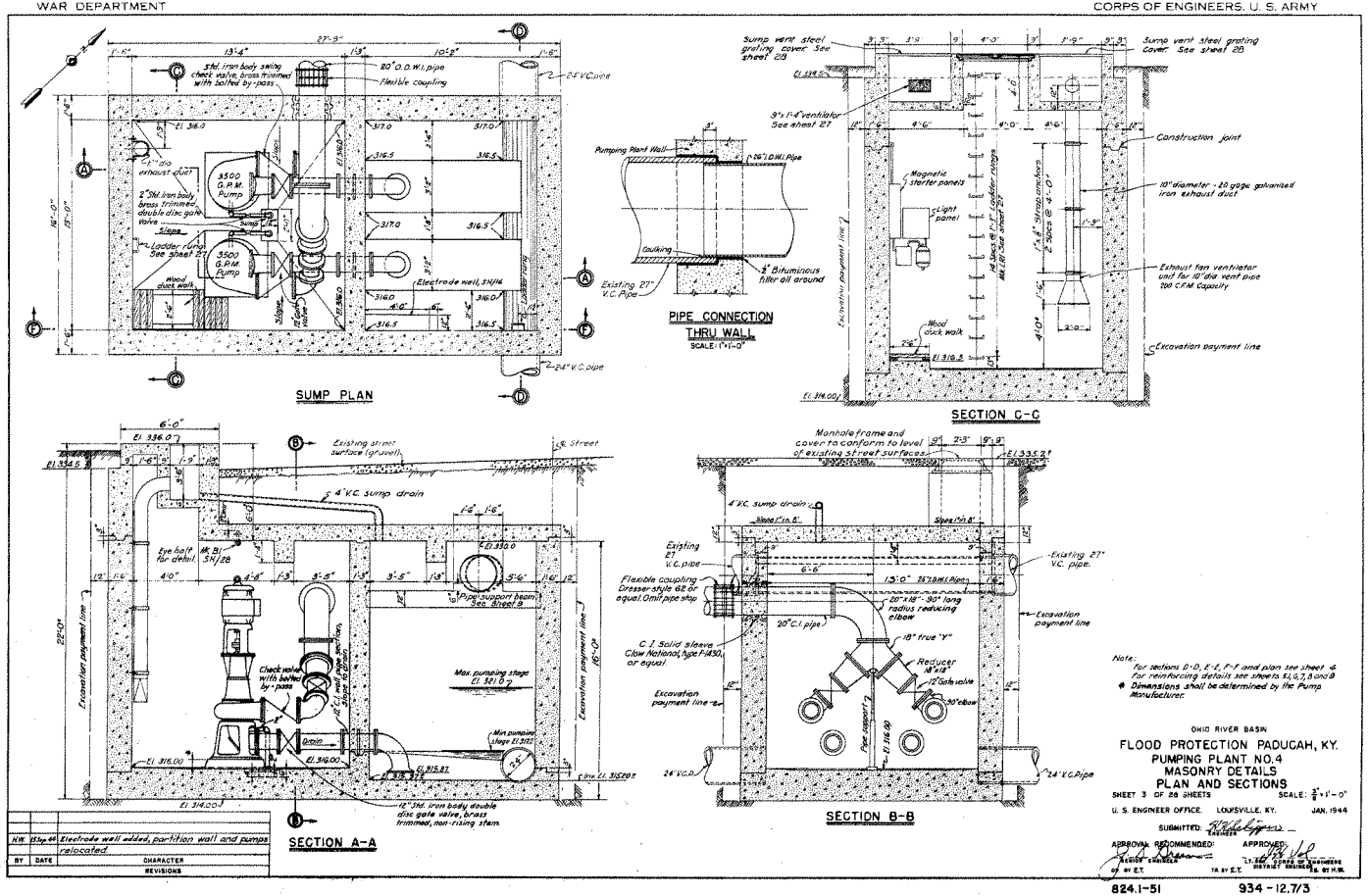
CORPS OF ENGINEERS, U. S. ARMY

WAR DEPARTMENT

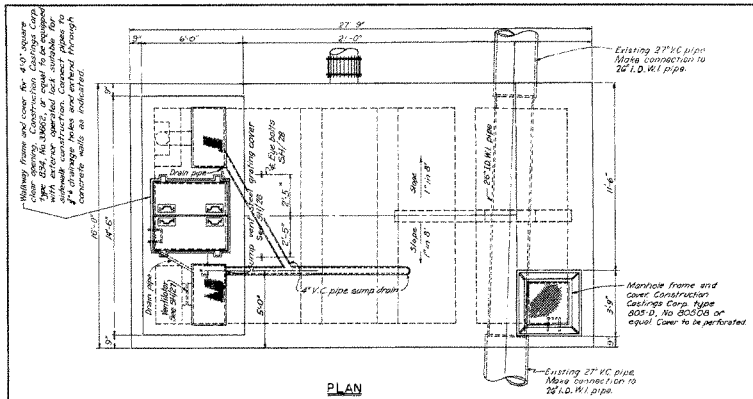
CORPS OF ENGINEERS, U. S. ARMY



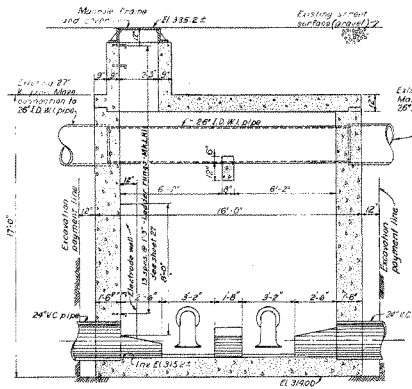
INDEX - PUMPING PLANT NO. 4	
DRWG. NO.	TITLE
934-12.7/1	GENERAL PLAN PUMPING PLANTS 4, 8, 9 & 10.
934-12.7/2	GENERAL LAYOUT.
934-12.7/3	MASONRY DETAILS - PLAN AND SECTIONS.
934-12.7/4	" " " "
934-12.7/5	REINFORCING DETAILS - BASE SLAB.
934-12.7/6	" " WALL AND PLATFORM
934-12.7/7	" " NORTH AND SOUTH WALLS.
934-12.7/8	" " WALLS.
934-12.7/9	" " ROOF SLAB.
934-12.7/10	WIRING DIAGRAMS PLANT NOS. 4 AND 8.
934-12.7/11	LIGHTING AND POWER SCHEME.
934-12.7/12	TWIN REDUCTION TRANSFORMER SUB-STATION PLANTS NOS. 4 & 8.
934-12.7/13	[illegible] DETAILS.



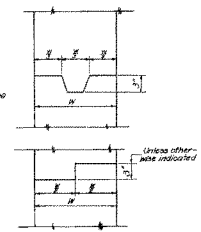
BY	DATE	CHARACTER REVISIONS
H.W.	5 Sep. 44	Electrode well added, partition wall and pumps relocated.



PLAN

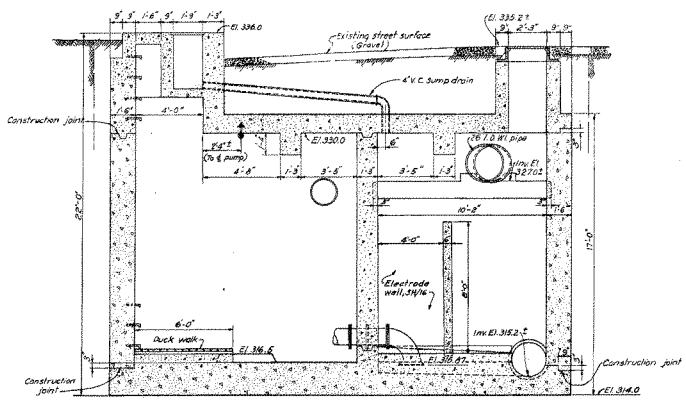


SECTION D-D



TYPICAL CONSTRUCTION JOINTS

SCALE: NONE



SECTION F-F

Notes:
For location of Section D-D and F-F see sheet 3.
For reinforcing details see sheets 5, 6, 7, 8 and 9
All exposed corners of concrete shall be chamfered one inch.
For pipe connection thru wall see sheet 3

BY	DATE	CHARACTER
KH	13 Jul 44	Partition wall relocated, electrode wall added.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
MASONRY DETAILS
PLAN & SECTIONS

SHEET 4 OF 28 SHEETS SCALE: 3/8" = 1'-0"

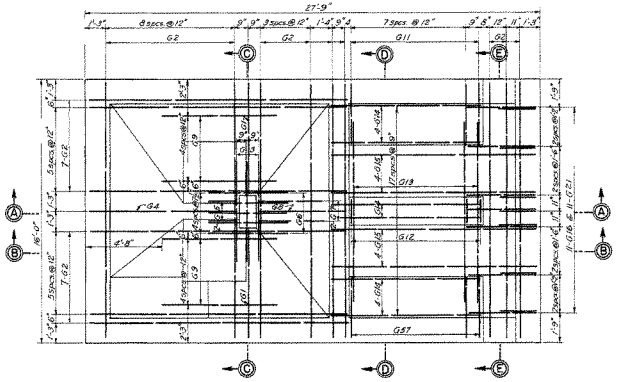
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED

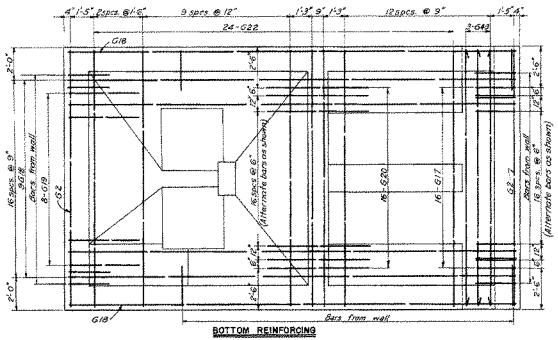
APPROVED RECOMMENDED: APPROVED:

SENIOR ENGINEER 08/01 E.T. 18.01 E.T. LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER CH. BR. H.K.

"BELIEVED AS BUILT" 934-12.7/4

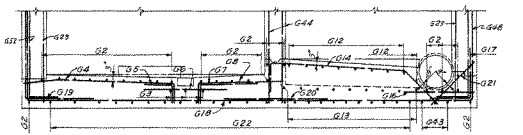


TOP REINFORCING

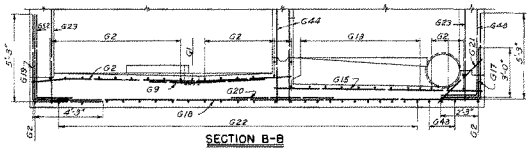


BOTTOM REINFORCING

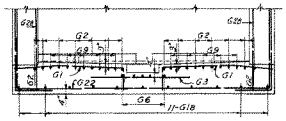
BASE SLAB



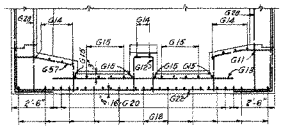
SECTION A-A



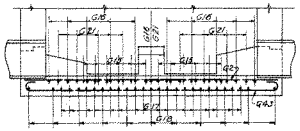
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

Note:
For masonry details see sheets 3 and 4

OHIO RIVER BASIN

FLOOD PROTECTION PAOUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
BASE SLAB

SHEET 5 OF 26 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1944

SUBMITTED: CHIEF ENGINEER

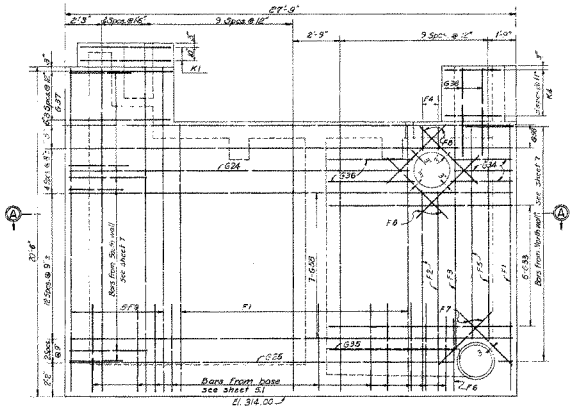
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

APPROVED: COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

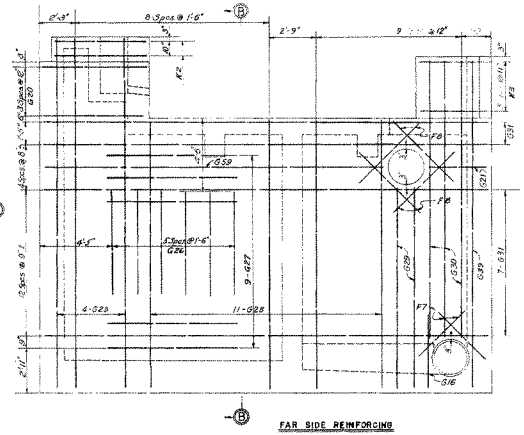
DR. BY A.E.S. TR. BY E.M.L. CK. BY H.W.

BY	DATE	CHARACTER REVISIONS
HW	13 Sept 44	This sheet supersedes sheet 934-12.7/5

"RELIEVED AS BUILT" 934-12.7/5.1



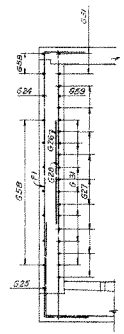
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

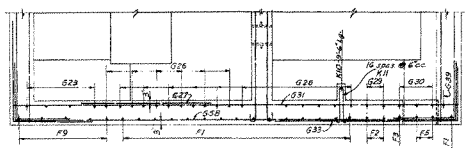
ELEVATION - EAST WALL

SCALE: 3/8" = 1'-0"



SECTION B-B

SCALE: 3/8" = 1'-0"



SECTION A-A

SCALE: 3/8" = 1'-0"

REINFORCING LEGEND	
MARK	BAR SIZE
A	1 1/4" Sq.
B	1 1/4" Sq.
C	1" Sq.
D	1" Rd.
E	3/4" Rd.
F	3/4" Rd.
G	3/4" Rd.
H	5/8" Sq.
J	5/8" Rd.
K	3/8" Rd.
L	1/4" Rd.

Mark A1, A2, etc., indicate 1 1/4" sq. bars of specific length and bending as shown in bar lists and bending diagrams to be furnished to contractor

Note: For masonry details see sheets 3 and 4.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
EAST WALL

SHEET 6 OF 28 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: R. A. Wagner
DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible]
CHIEF ENGINEER

APPROVED: [illegible]
LT. COL. CORPS OF ENGINEERS
DISTRICT ENGINEER

DR. BY R.K.V. TR. BY R.K.V. CK. BY H.W.

934-12.7/6

BY	DATE	REVISIONS
HH	3/3/44	Reinforcing revised, interior wall moved

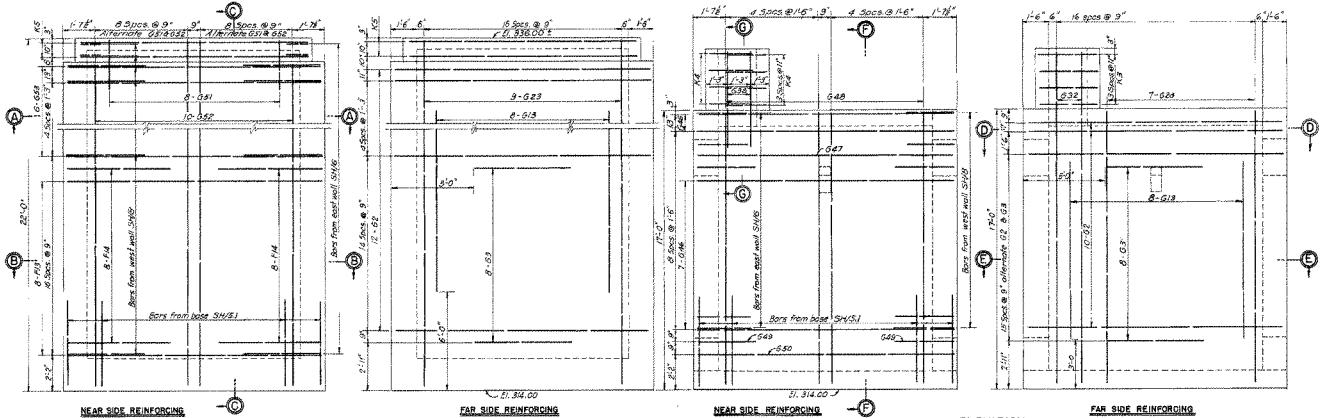
CHARACTER

"DELIVERED AS BUILT"

1017

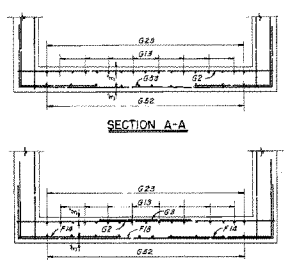
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



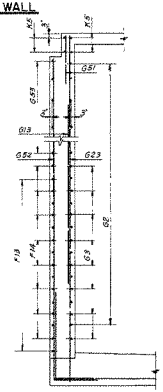
ELEVATION SOUTH WALL

ELEVATION NORTH WALL

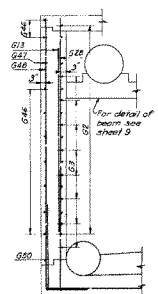


SECTION A-A

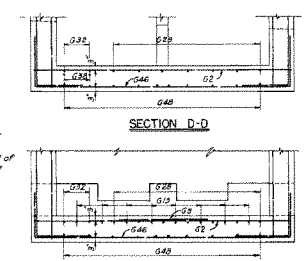
SECTION B-B



SECTION C-C
SOUTH WALL

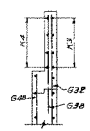


SECTION F-F
NORTH WALL



SECTION D-D

SECTION E-E



SECTION G-G

Note:
For masonry details see sheets 3 & 4

H.W.	15 Sept.	Reinforcing marks changed
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
NORTH & SOUTH WALLS

SHEET 7 OF 28 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: B. B. Lingen
CHIEF

APPROVAL RECOMMENDED: APPROVED:
SENIOR ENGINEER DISTRICT ENGINEER

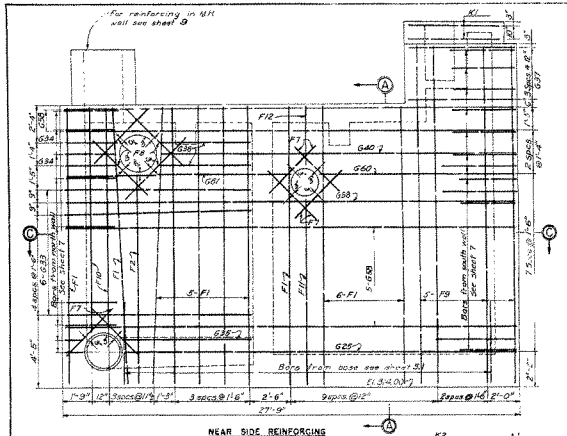
DR. BY W.A.B. TR. BY W.J.B. CK. BY H.W.

"BELIEVED AS BUILT" 934-12.7/7

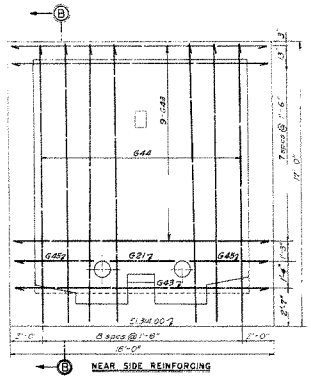
255

WAR DEPARTMENT

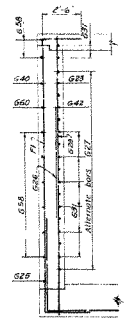
CORPS OF ENGINEERS, U. S. ARMY



NEAR SIDE REINFORCING

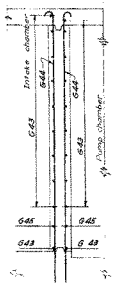


NEAR SIDE REINFORCING



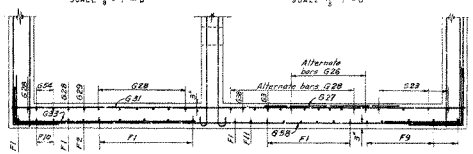
SECTION A-A

SCALE: $\frac{1}{8}$" = 1'-0"



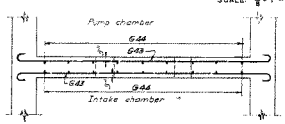
SECTION B-B

SCALE: $\frac{1}{8}$" = 1'-0"



SECTION C-C

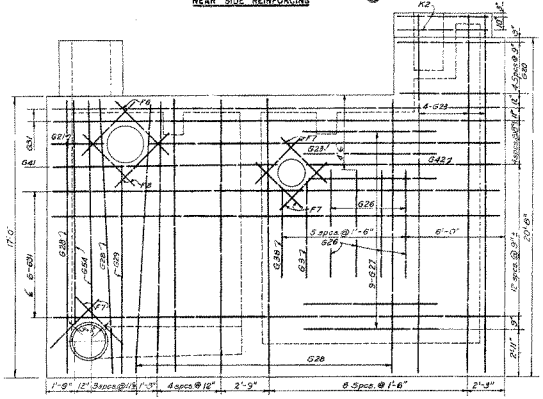
SCALE: $\frac{1}{8}$" = 1'-0"



SECTION D-D

SCALE: $\frac{1}{8}$" = 1'-0"

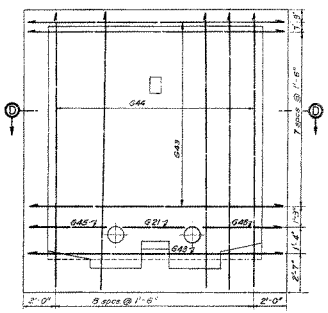
Note: For masonry details see sheets 3 and 4



FAR SIDE REINFORCING

WEST WALL

SCALE: $\frac{1}{8}$" = 1'-0"



FAR SIDE REINFORCING

INTERIOR WALL

SCALE: $\frac{1}{8}$" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 4

REINFORCING DETAILS

WALLS

SHEET 8 OF 28 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY JAN. 1944

SUBMITTED: DRAFTSMAN

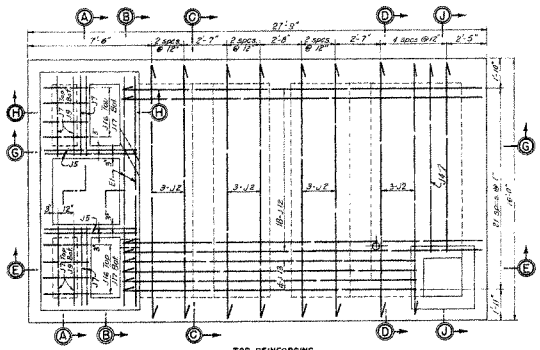
APPROVAL RECOMMENDED: SENIOR ENGINEER APPROVED: DISTRICT ENGINEER

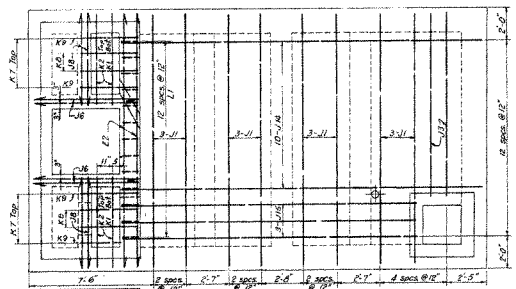
BY	DATE	CHARACTER	
H.W.	8-Sep-44	Reinforcing revised, interior wall moved	

REVISIONS

"BELIEVED AS BUILT," 934-12.7/8

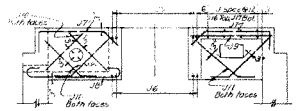
956





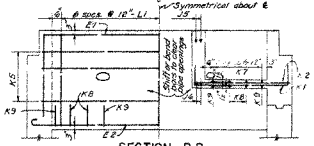
PLAN-ROOF SLAB

SCALE: $\frac{3}{8}$" = 1'-0"



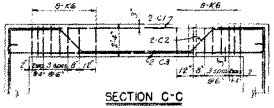
SECTION A-A

SCALE: $\frac{3}{8}$" = 1'-0"



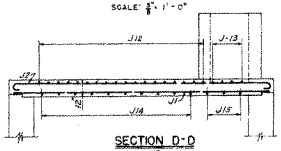
SECTION B-B

SCALE: $\frac{3}{8}$" = 1'-0"



SECTION C-C

SCALE: $\frac{3}{8}$" = 1'-0"



SECTION D-D

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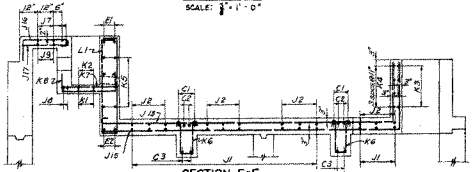

SECTION E-E

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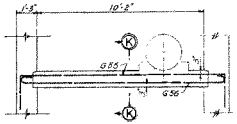


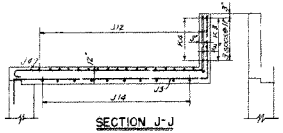
ELEVATION

PIPE SUPPORT BEAM

SCALE: $\frac{3}{8}$" = 1'-0"

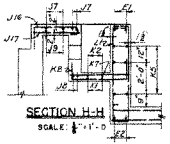
SECTION K-K

SCALE: $\frac{3}{8}$" = 1'-0"



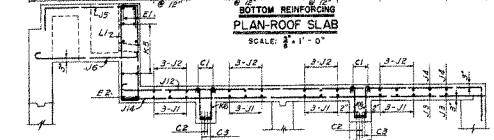
SECTION J-J

SCALE: $\frac{3}{8}$" = 1'-0"



SECTION H-H

SCALE: $\frac{3}{8}$" = 1'-0"



SECTION G-G

SCALE: $\frac{3}{8}$" = 1'-0"

Note:
For masonry details
see sheets 3 and 4

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
ROOF SLAB

SHEET 9 OF 28 SHEETS — SCALE: $\frac{3}{8}$" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

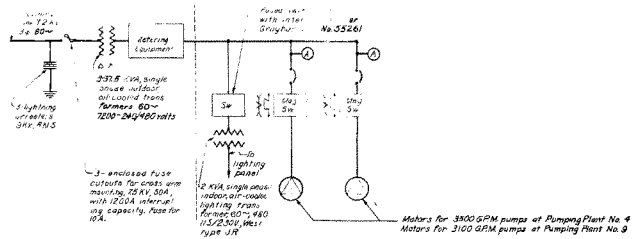
SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] — DESIGN ENGINEER — DR. BY E.T.

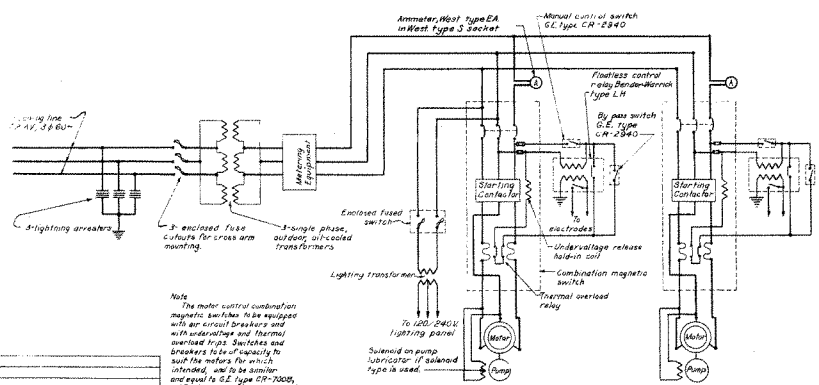
APPROVED: [illegible] — CHIEF ENGINEER — DISTRICT ENGINEER — CK. BY H.W.

BY	DATE	CHARACTER	REVISIONS
H.W.	8/24/44	Reinforcing bar marks revised.	

934-12.7/9



SINGLE LINE DIAGRAM



WIRING DIAGRAM

Note
The motor control combination magnetic switches to be equipped with air circuit breakers and with undervoltage and thermal overload trips. Switches and breakers to be of capacity to suit the motors for which intended, and to be similar and equal to G.E. type CR-7005, 440 volt, in type II dust-tight case.

LEGEND

- Air circuit breaker
- Mag Sw — Magnetic switch
- Undervoltage device
- Thermal overload relay
- Current transformer
- Voltmeter
- Ammeter
- Squirrel cage induction motor
- Fuse
- Contactor switch
- Heater element

Note:
All equipment shall be of the manufacture, type, and catalog number specified, or its equal.

BY	DATE	CHARACTER
W.A.R.	11/6/45	Catalog No changed on fused switch.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NO. 4 & 9
WIRING DIAGRAMS

SHEET 10 OF 28 SHEETS SCALES NONE

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] SENIOR ENGINEER

APPROVED: [signature] LT. COLONEL, CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.E.E. TR. BY B.P.S. CK. BY D.S.

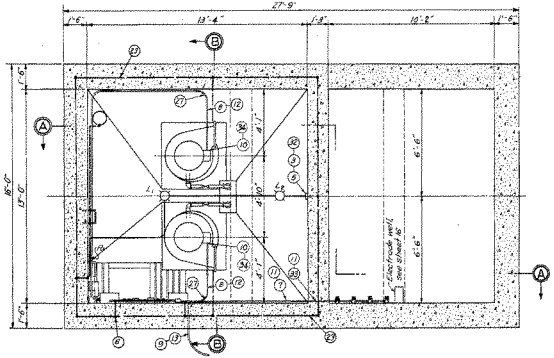
"BELIEVED AS BUILT" 934-12.7/10

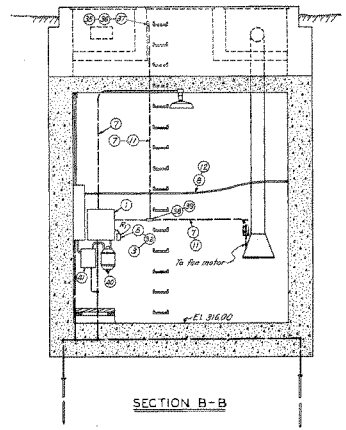
258

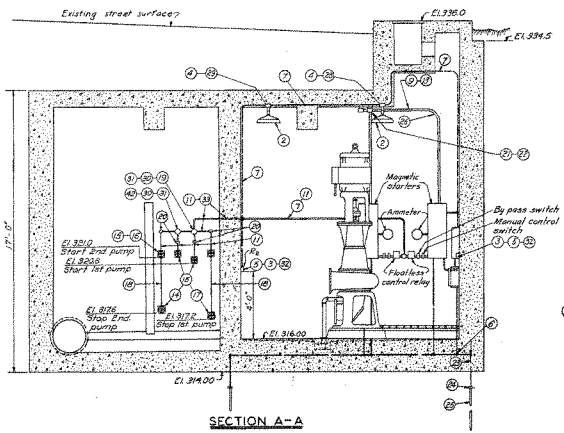
1021

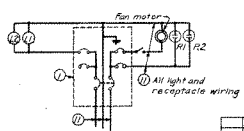
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY









BILL OF MATERIALS

PART NO.	DESCRIPTION	M.F.R.	CAT. NO.	QUANTITY
1	4 circuit light distribution panel (Surface type)			
2	R.L.M. dome reflector and socket	West.	349537	2
3	Condulet outlet	Crouse-Hinds	F3141	2
4	Condulet outlet cover	" "	SK864	2
5	Duplex plug receptacle			2
6	T connectors for #4/0 stranded cable	Burndy	NT2626	10
7	½" Electrical metallic tubing (E.M.T.)			90 ft
8	1¼" " " "			40 ft
9	2" Rigid electrical conduit			115 ft
10	1½" E.M.T. connector			2
11	#12 A.W.G. insulated wire			230 ft
12	#4, 1 cond. cable R.C. 600 V. ins. with W.P. braid			120 ft
13	#1/0, " " " " " " with 60% rubber jacket			350 ft
14	Brass electrode ½" Ø × 2' long - see detail Sheet 24			4
15	3" bolt circle type insulator	Lapp	13761	6
16	Bus support fitting, drill to clamp #8 bare wire	Locke	9853	2
17	Bus support fitting, drill to clamp ½" ø electrode	Locke	9853	4
18	#8 A.W.G. hard drawn copper wire			10 ft
19	Condulet outlet	Crouse-Hinds	SKX 12	1
20	Electrode holder	Sensenbrenner	Type E.S.	4
21	Condulet outlet	Crouse-Hinds	T57	1
22	Condulet cover	" "	5770	1
23	#4/0 Bare stranded copper cable			200 ft
24	Connector for #4/0 stranded cable to ¾" ground rod	Burndy	GA6426	4
25	Ground rod ¾" × 18'-0" (Copperweld)			4
26	2" Standard 90° Elbow			4
27	1¼" Standard 90° Elbow (E.M.T.)			4
28	Condulet outlet	Crouse-Hinds	SKO 12	1
29	" "	" "	SKL 12	1
30	Condulet cover	" "	SK809	2
31	Condulet cover gasket	" "	Gask208	2
32	Wall surface plate			2
33	¾" rigid electrical conduit			10 ft
34	1¼" Flexible metal conduit			2 ft
35	Condulet outlet	Crouse-Hinds	FS1	1
36	Flush tumbler switch	Bryant	3951	1
37	Surface switch plate	Crouse-Hinds	DS32	1
38	Condulet outlet	" "	T17	1
39	Condulet cover	" "	1770	1
40	Transformer 460-115/230 V. 2 K.V.A.	West.	911415	1
41	Enclosed fused switch, 2 pole, cover interlocked	Graybar	55261	1
42	Condulet outlet	Crouse-Hinds	SK7	1

Notes:

Small fittings, condulets, E.M.T. couplings and adapters, etc., not listed shall be furnished as required.
200 watt bulbs shall be furnished and installed in all lights.
Figures in circles refer to part numbers on Bill of Material.
All material shall be of the manufacture, type, and catalog number specified, or its equal.

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

BY	DATE	CHARACTER
		WAR 18 July 43 Item # 41, Catalog No. Changed to 55261
		H.W. 10 Sept 44 Electrode well added, bill of material revised.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 4

LIGHTING AND POWER SYSTEMS

SHEET 11 OF 28 SHEETS SCALE: ¼"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF ENGINEER

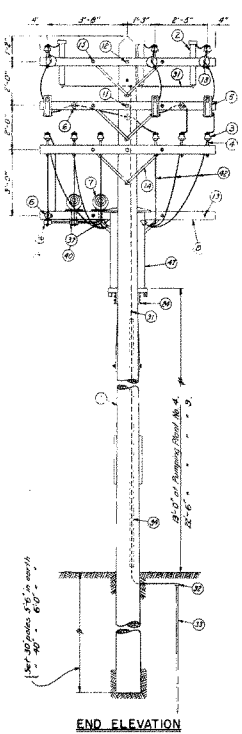
APPROVED: [signature] Lt. Col., Corps of Engineers, District Engineer

DR. BY J.R.H. TR. BY L.E.H. CK. BY D.R.

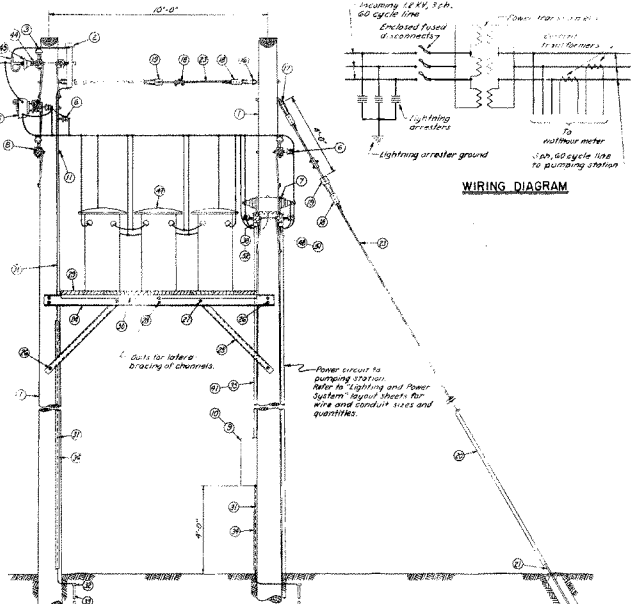
"RELIEVED AS BUILT" 934-12.7/11

259

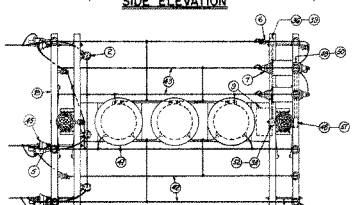
1022



END ELEVATION



SIDE ELEVATION



PLAN

WIRING DIAGRAM

Notes

All material shall be of the manufacture, type, & catalog number specified, or its equal.

Seamless connectors shall be used for making splices and taps to bus.

Figures in circles refer to part numbers on the bill of material.

Small parts, fittings, etc., not called for shall be furnished as required.

All bolts and lag screws to be furnished with a full complement of washers in accordance with best practice.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR	CATALOG NO.	QUANTITY R.P. NO. 4	QUANTITY R.P. NO. 9
1	Wood pole, 30', class 1			2	
	Wood pole, 40', class 1				2
2	Lightning arrester	G.E.	9LA10A5	3	1
3	Pin type insulator	Joslyn	L401	18	"
4	Steel pin for insulator	Joslyn	J210A	15	18
5	Enclosed fused cutout	West	834201	3	3
6	Primary lead wire holder	Hubbard	1660	6	6
7	Current transformer, 20/5A.	G.E.	34L507	2	
	Current transformer, 20/5A.	G.E.	34L506		2
8	Crossarm, Douglas fir, 3½"×4½"×8'-0"			7	7
9	Watt hour meter	G.E.	77×311	1	1
10	Meter enclosure	Superior	PSU-1016	1	1
11	Machine bolt, galvanized, ⅝"×16"	Joslyn	J8816	3	3
12	Machine bolt, galvanized, ⅝"×20"	Joslyn	J8820	2	2
13	Double arming bolt, ⅝"×20"	Joslyn	J8870	5	5
14	Crossarm brace	Joslyn	J7126	14	14
15	Carriage bolt, ⅝"×5"	Joslyn	J8835	14	14
16	Thimble eye bolt, shoulder type, 12"	Joslyn	J8812	2	2
17	Thimble eye bolt, shoulder type, 12" 45° angle	Joslyn	J8012	1	1
18	Guy wire clamp, 3 bolt	Joslyn	J1121	8	8
19	Guy strain insulator	Joslyn	L1254	2	2
20	Guy guard	Joslyn	J1610	1	1
21	Anchor rod, thimbleye, ¾"×8'	Joslyn	J7428	1	1
22	Guy anchor exp. 3 way, 8' for ¾" rod	Everstick	836	1	1
23	Guy wire, ⅜", Siemens-Martin double galv.			40'	30'
24	Channel iron, gal. 2½"×0'-6" @ 9.2#/ft.			2	2
25	Channel iron, gal. 3½"×4'-8" @ 5.0#/ft.			4	4
26	Machine bolt, galvanized, ⅝"×14"	Joslyn	J8814	6	6
27	Machine bolt, galvanized, ⅝"×18"	Joslyn	J8918	4	4
28	Double arming bolt, ⅝"×16"	Joslyn	J8886	2	2
29	Treated yellow pine boards, 1"×12"×16'			8	8
30	Treated yellow pine strips, 2"×2"×14'-5"			4	4
31	Ground wire, #2 bare copper			45'	55'
32	Ground wire clamp	Joslyn	J8495	1	2
33	Copper-weld ground rod, ⅝"×8'			1	2
34	Wood moulding	Joslyn	Size #1	20'	30'
35	1" Rigid electrical conduit			15'	25'
36	Conduit outlet	Crouse-Hinds	E37	1	1
37	Conduit outlet	Crouse-Hinds	C37	2	2
38	Conduit outlet	Crouse-Hinds	LL37	1	1
39	1-hole composition cover	Crouse-Hinds	3771	1	1
40	3-hole composition cover	Crouse-Hinds	3773	2	2
41	No. 12 insulated copper wire			110'	180'
42	No. 8 solid H.D. triple braid W.P. wire			90'	30'
43	No. 2 solid H.D. triple braid W.P. wire			55'	
	No. 4 solid H.D. triple braid W.P. wire				55'
44	Drop forged eyenut	Joslyn	J1092	3	3
45	6" strain insulator	Locke	16583	3	3
46	Strain clamp	Locke	20087	3	3
47	Power transformer, 7200-240/480 v., 3150VA	G.E.	23H139	3	3
48	Conduit outlet	Crouse-Hinds	LR37	1	
	Conduit outlet	Crouse-Hinds	LR47		1
49	Conduit outlet	Crouse-Hinds	E37	1	
	Conduit outlet	Crouse-Hinds	E47		1
50	3-hole composition cover	Crouse-Hinds	3773	1	
	3-hole composition cover	Crouse-Hinds	4773		1
51	Blank composition cover	Crouse-Hinds	3770	1	
	Blank composition cover	Crouse-Hinds	4770		1
52	Blank composition cover	Crouse-Hinds	3770	1	1

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 4 & 9
TWO-POLE TRANSFORMER SUBSTATION

SHEET 12 OF 28 SHEETS — SCALE: ½"=1'-0"

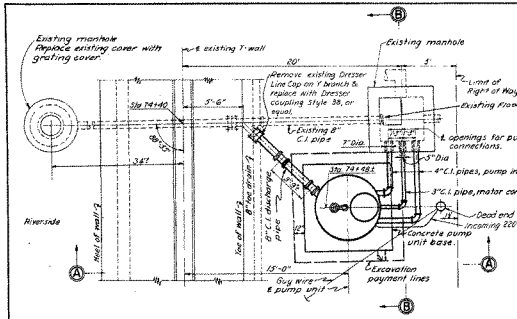
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

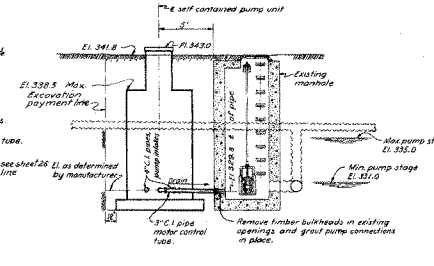
SUBMITTED: [signature] ENGINEER

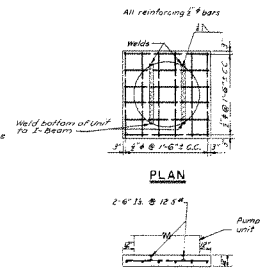
APPROVAL RECOMMENDED: [signature] BRANCH CHIEF — APPROVED: [signature] CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER

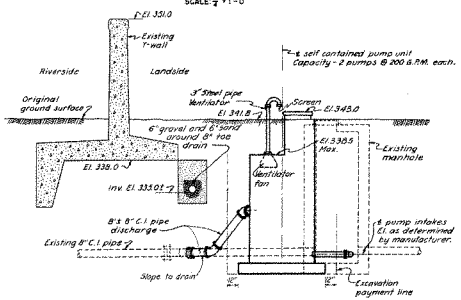
BY: C.E.E. TR. BY: R.M.L. CK. BY: D.B.

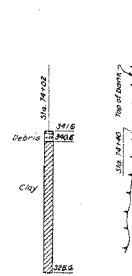
"BELIEVED AS BUILT" 934-12.7/12

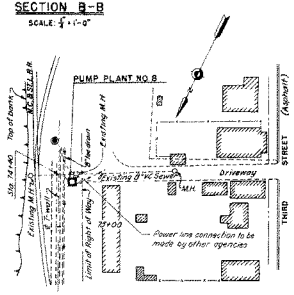




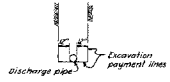








Note: Grade backfill to drain away from floodwall and pumping plant.



BY	DATE	CHARACTER REVISIONS

INDEX - PUMPING PLANT NO. 8	
DRWG. NO.	TITLE
934-12.7/13	MASONRY AND REINFORCING DETAILS.
934-12.7/29	POLE STRUCTURES.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 8

MASONRY & REINFORCING DETAILS

SHEET 13 OF 28 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY JAN. 1944

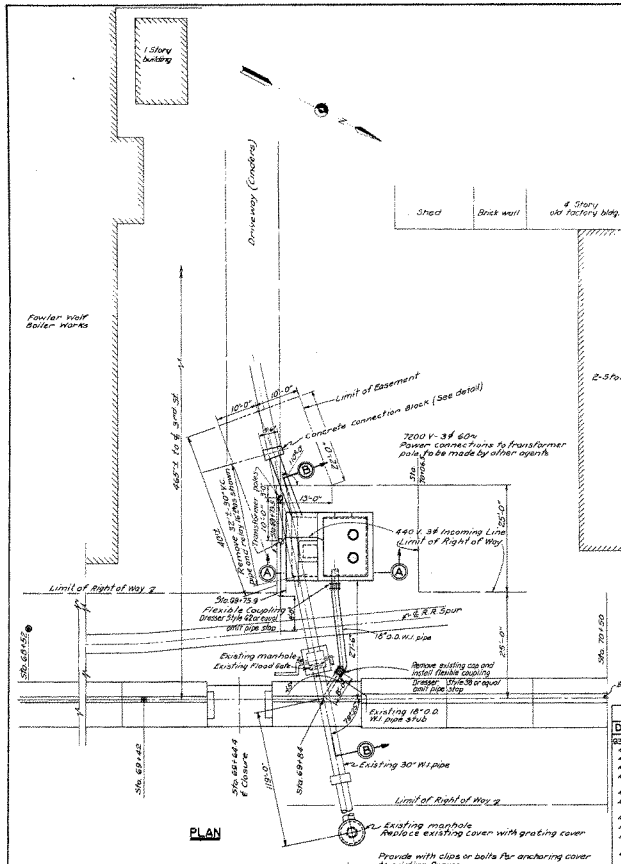
SUBMITTED: [signature] OWNER

APPROVAL RECOMMENDED: [signature] LEAD ENGINEER DR. BY J.L.F.

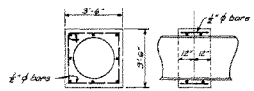
APPROVED: [signature] DISTRICT ENGINEER CK. BY H.W.

824.1-51 934-12.7/13

"RELIEVED AS BUILT"

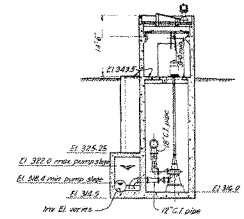


PLAN

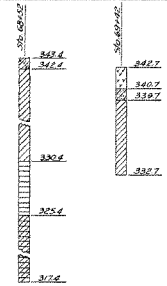


CONCRETE CONNECTION BLOCK

SCALE: NONE

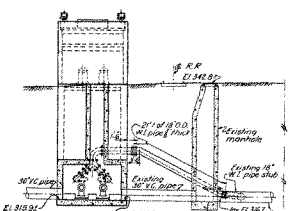


SECTION A-A



BORINGS

SYMBOLS



SECTION B-B

General Notes:

1 Reinforcing coverage - The distance from the edge of the nearest bar to the face of the concrete shall be 2½" on formed surfaces and 3½" on unformed surfaces unless otherwise indicated.

2 Indicated construction joints may be revised subject to approval of Contracting Office

3 Grade backfill to drain away from floodwall and pumping plant. Maximum backfill around pumping plant to El 343.0

4 All exposed corners of concrete shall be chamfered one inch.

BY	DATE	CHARACTER
R.W.	10/5/44	Pumping plant revised and right of way relocated.

REVISIONS

INDEX - PUMPING PLANT NO 9

DRWG. NO.	TITLE	DRWG. NO.	TITLE
934-12.7/1	GENERAL PLAN PLANTS NOS. 4, 8, 9, AND 10.	934-12.7/22	REINFORCING DETAILS - SUPERSTRUCTURE WALLS.
" " 10	WIRING DIAGRAMS PLANTS NOS. 4 AND 9.	" " 23	REINFORCING DETAILS - INTAKE CHAMBER.
" " 12	2 POLE TRANSFORMER SUB-STA.-PLS. NOS. 4 & 9	" " 24	LIGHTING AND POWER SYSTEM.
" " 14	GENERAL LAYOUT.	" " 27	MISCELLANEOUS DETAILS
" " 15	MASONRY DETAILS-MOTOR FLOOR, ROOF PLAN AND SECTION.	" " 28	MISCELLANEOUS DETAILS.
" " 16	MASONRY DETAILS-ELEVATION AND SECTIONS.		
" " 17	REINFORCING DETAILS-BASE SLAB AND MOTOR FLOOR.		
" " 18	REINFORCING DETAILS-NORTH WALL.		
" " 19	" " " -SOUTH WALL.		
" " 20	" " " -SUPERSTRUCTURE AND SUBSTRUCTURE EAST WALL.		
" " 21	REINFORCING DETAILS-SUBSTRUCTURE WEST WALL AND ROOF SLAB.		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 9

GENERAL LAYOUT

SHEET 14 OF 28 SHEETS SCALE: 1" = 10'-0"

U. S. ENGINEER OFFICE LOUISVILLE KY. JAN. 1944

SUBMITTED: [signature] ENGINEER

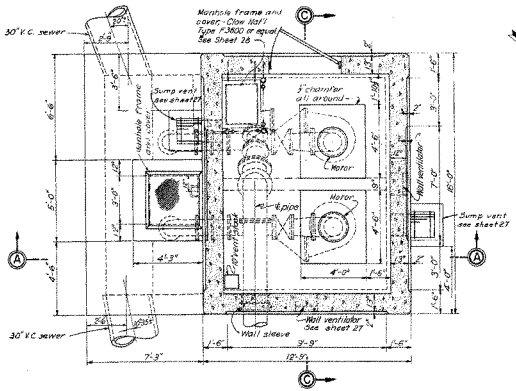
APPROVAL RECOMMENDED: [signature] SENIOR ENGINEER

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

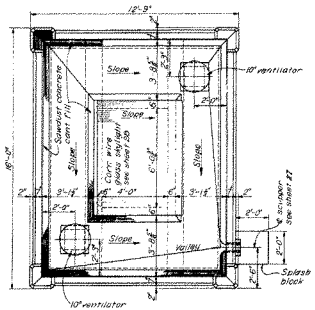
DR. BY J.L.E. & R.R.K. TR. BY J.L.E. & R.R.K. CK. BY H. W.

934-12.7/14

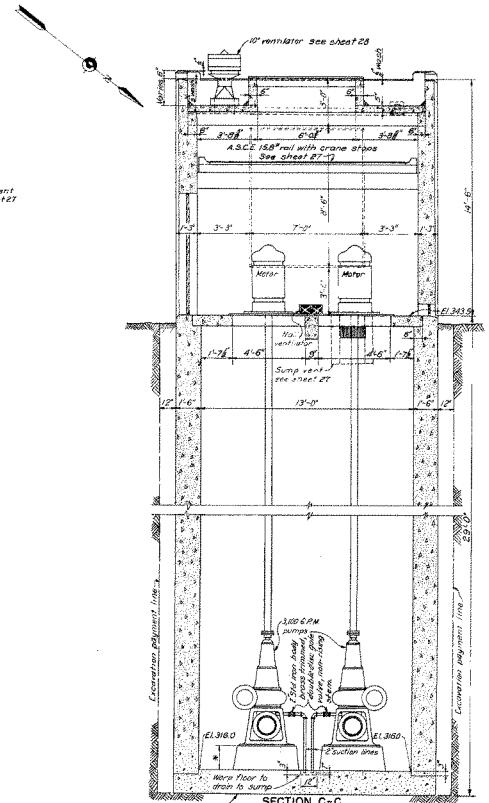
"BELIEVED AS BUILT"



MOTOR FLOOR PLAN
SCALE- 3/8" = 1'-0"

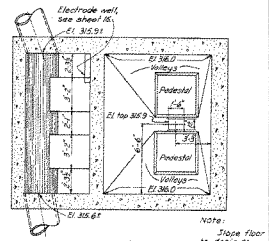


ROOF PLAN
SCALE 3/8" = 1'-0"



SECTION C-C
SCALE: 3/8" = 1'-0"

* Dimension shall be determined by pump manufacturer



PLAN-SUMP FLOOR
SCALE- 3/8" = 1'-0"

Note: Slope floor to drain to sump.

Note: For reinforcing details see sheets 17 to 28 incl. For Section A-A see sheet 18.

H.N.	25 Sep 44	Intake chamber enlarged and revised, pumps raised, electrode well added.
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
MASONRY DETAILS
MOTOR FLOOR, ROOF PLAN & SECTION
SHEET 15 OF 28 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. JAN. 1944

SUBMITTED: [illegible] ENGINEER

APPROVAL RECOMMENDED: [illegible] SENIOR ENGINEER

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

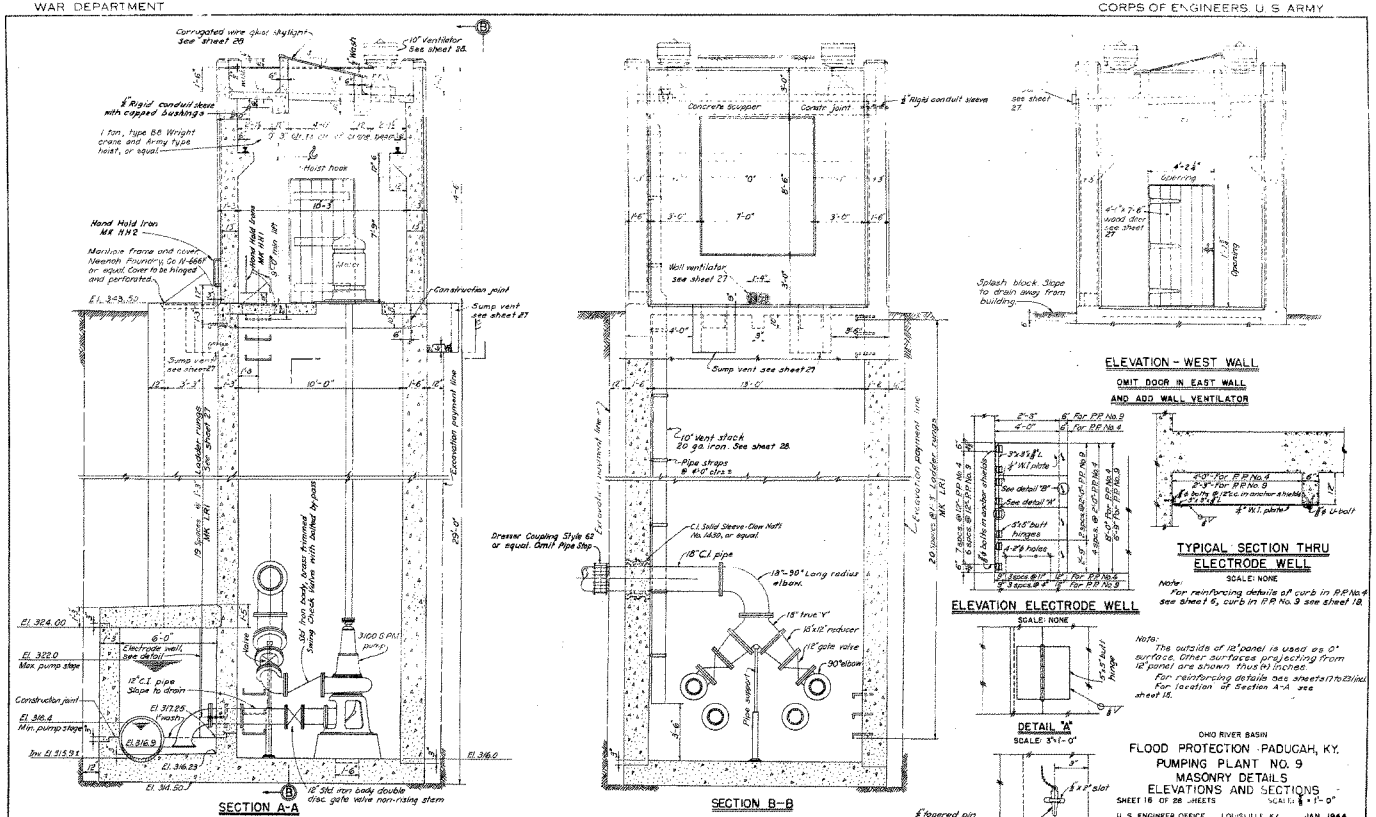
DR. BY R.K.V. TR. BY R.K.V. CK. BY H.W.

824.1-51 934-12.7/15

"DELIEVED AS BUILT" [illegible]

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

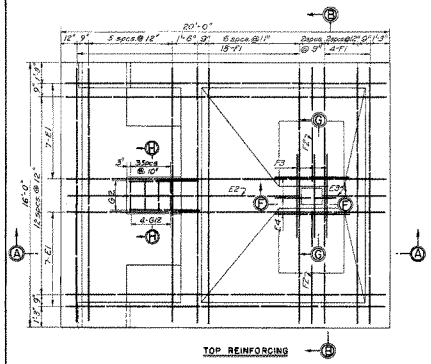


BY	DATE	CHARACTER REVISIONS
HW	8 Sept 44	Electrode well added. Intake chamber enlarged and revised, pumps raised.

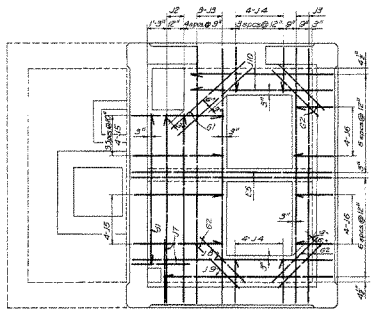
1027

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

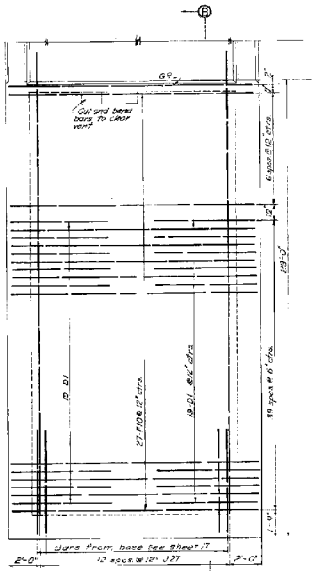


TOP REINFORCING

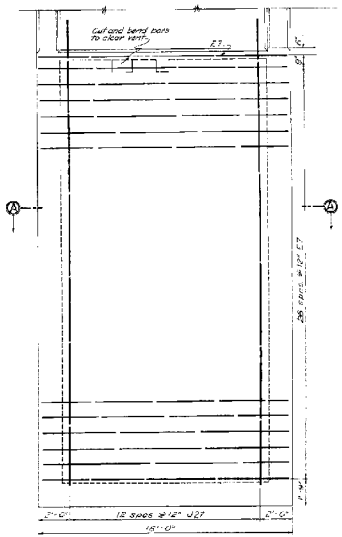


WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



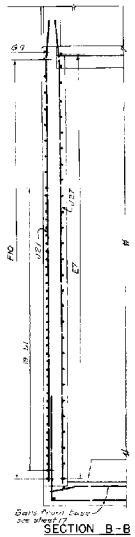
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

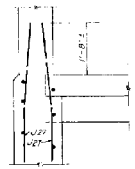
ELEVATION – NORTH WALL

SCALE: $\frac{3}{8}$" = 1'-0"



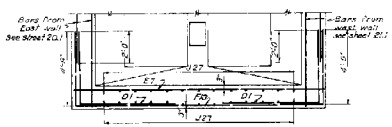
SECTION B-B

SCALE: $\frac{3}{8}$" = 1'-0"



DETAIL AT FLOOR

SCALE: $\frac{3}{8}$" = 1'-0"



SECTION A-A

SCALE: $\frac{3}{8}$" = 1'-0"

Note:
For masonry details see sheets 15 and 16

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
NORTH WALL

SHEET 18 OF 28 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [illegible] CHIEF ENG.

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH

APPROVED: [illegible] CHIEF ENGINEER

DR. BY R.B.V. TR. BY [illegible] CK. BY H.K.

BY	DATE	CHARACTER REVISIONS
HH	15/44	Reinforcing revised

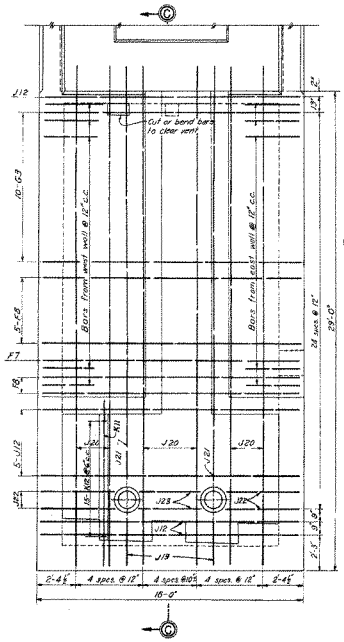
934-12 7/18

"BELIEVED AS BUILT"

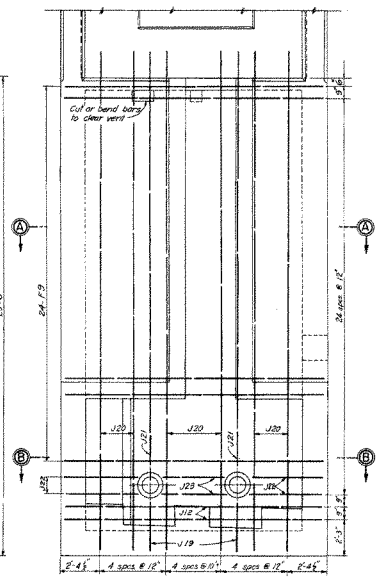
266

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

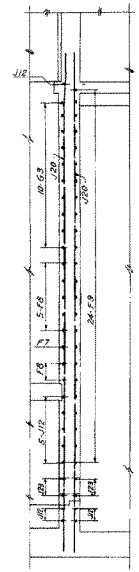


NEAR SIDE REINFORCING

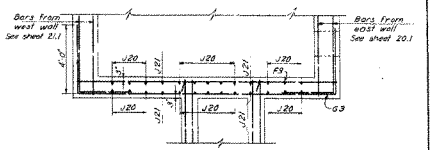


FAR SIDE REINFORCING

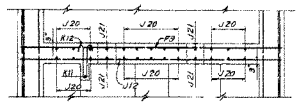
ELEVATION-SOUTH WALL



SECTION C-C



SECTION A-A



SECTION B-B

HW	15-2-44	Pipe openings relocated. Reinf. revised
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 9

REINFORCING DETAILS

SOUTH WALL

SHEET 19 OF 28 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEER

APPROVED: [illegible] CHIEF OF ENGINEERS, CORPS OF ENGINEERS

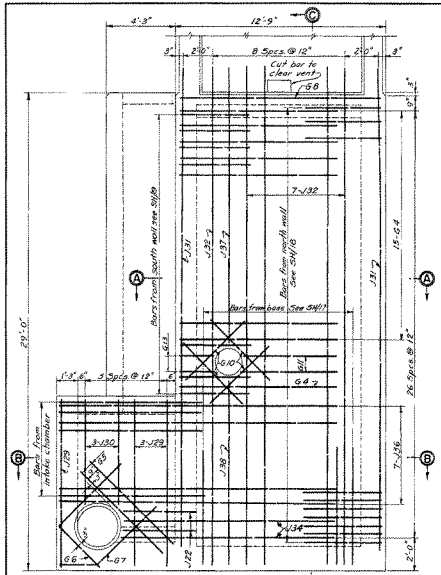
DR. BY W. J. S. TR. BY R.E. CK. BY H.W.

"DELIVERED AS BUILT" 934-12.7/19

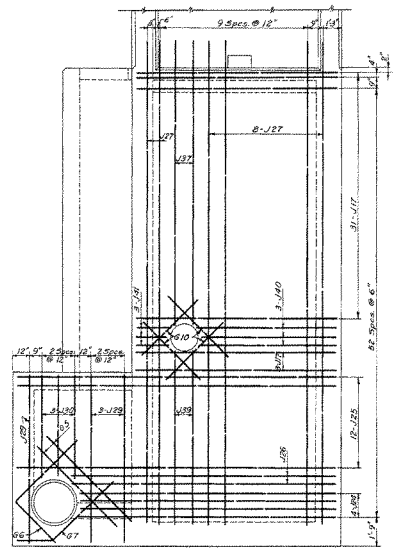
1030

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

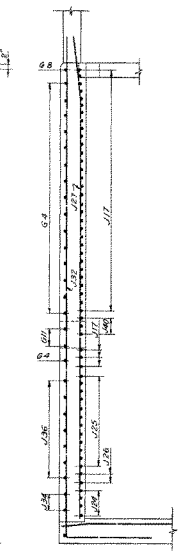


NEAR SIDE REINFORCING

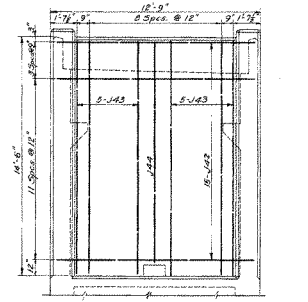


FAR SIDE REINFORCING

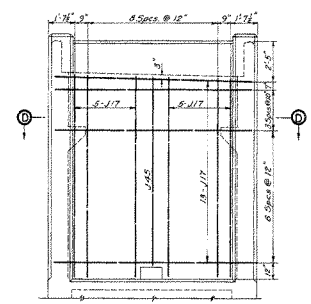
ELEVATION-EAST WALL SUBSTRUCTURE



SECTION C-C

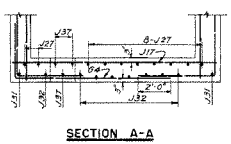


NEAR SIDE REINFORCING

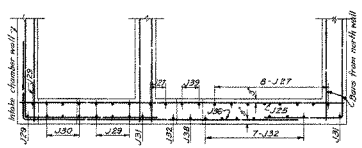


FAR SIDE REINFORCING

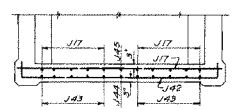
ELEVATION-EAST WALL SUPERSTRUCTURE



SECTION A-A



SECTION B-B



SECTION D-D

Note:
For masonry details see sheets 16 and 16

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
SUPERSTRUCTURE & SUBSTRUCTURE
EAST WALL

SHEET 20 OF 28 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1944

SUBMITTED: A. J. Fulton
MECH. ENGINEER

APPROVAL RECOMMENDED: J. E. Evans
PROJECT ENGINEER
CHF. BY W.A.D.-A.E.S. TR. BY C.L.B.

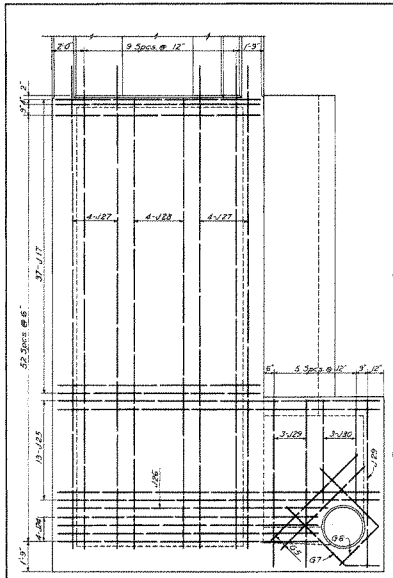
APPROVED: [illegible]
CHIEF, DIVISION OF ENGINEERING
DISTRICT ENGINEER
CK. BY H.W.

N.W. 13 Sept. 44	This sheet supersedes sheet No. 934-12.7/20	
BY	DATE	CHARACTER
		REVISIONS

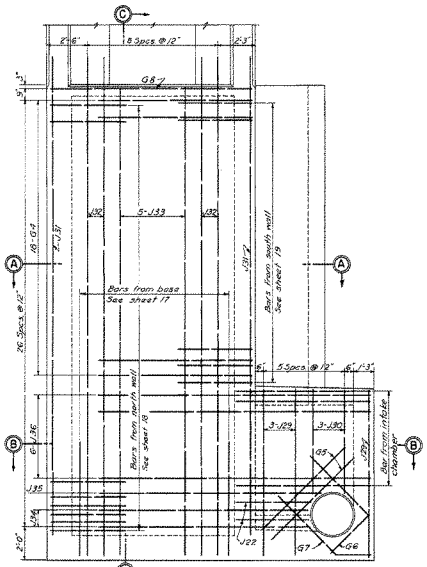
"BELIEVED AS BUILT" ~~"RELIEVED AS BUILT"~~ 934 - 12.7/20.1

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

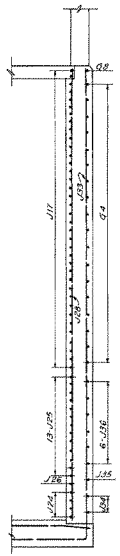


FAR SIDE REINFORCING

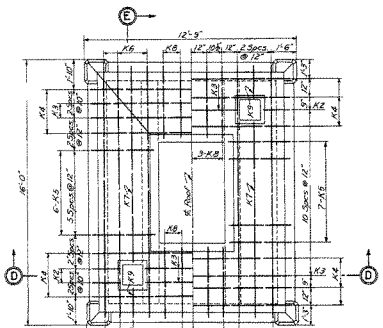


NEAR SIDE REINFORCING

ELEVATION - SUBSTRUCTURE WEST WALL



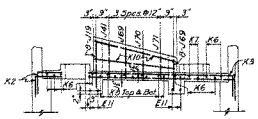
SECTION C-C



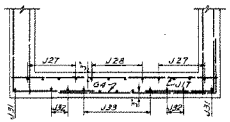
HALF PLAN - TOP REINF HALF PLAN - BOTTOM REINF

PLAN - ROOF SLAB

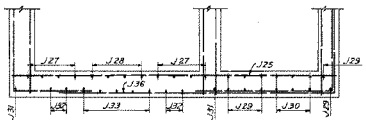
Note:
Reinforcing symmetrical about ℄ except that roof ventilator openings are opposite hand and opposite ends of roof.



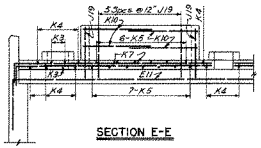
SECTION D-D



SECTION A-A



SECTION B-B



SECTION E-E

Note:
For masonry details see sheet 15 and 16.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
SUBSTRUCTURE WEST WALL & ROOF SLAB

SHEET 21 OF SHEETS SCALES 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1944

SUBMITTED: Chas. L. Gilden
CHIEF DESIGNER

APPROVAL RECOMMENDED: APPROVED:
PRINCIPAL ENGINEER COLONEL OF ENGINEERS DISTRICT ENGINEER

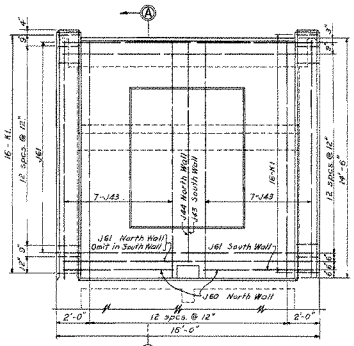
SR. BY A.E.S. TR. BY H.P.G. CK. BY H.M.

H.N.	03 Sep 44	This sheet supersedes sheet 934-12.7/21
BY	DATE	CHARACTER
		REVISIONS

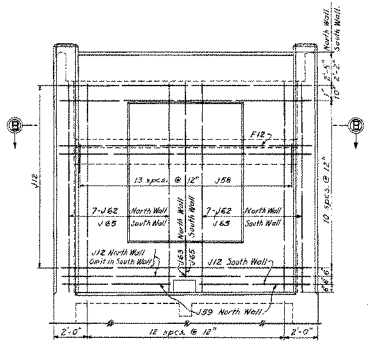
"BELIEVED AS BUILT" 934 - 12.7/21.1

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



NEAR SIDE REINFORCING

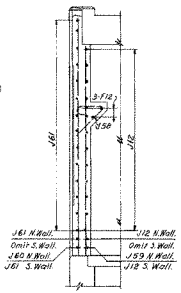


FAR SIDE REINFORCING

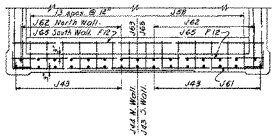
SUPERSTRUCTURE ELEVATION

NORTH WALL AS SHOWN

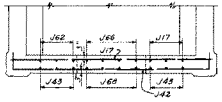
SOUTH WALL SAME EXCEPT AS NOTED



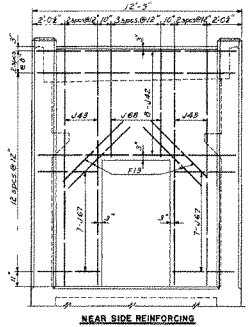
SECTION A-A



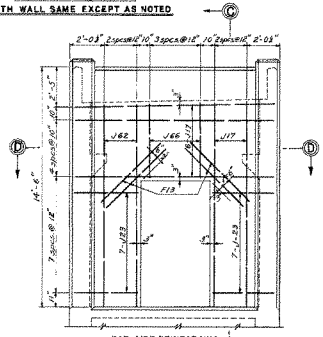
SECTION B-B



SECTION D-D



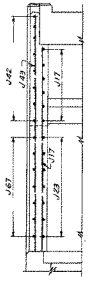
NEAR SIDE REINFORCING



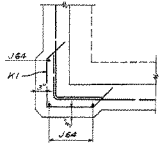
FAR SIDE REINFORCING

ELEVATION

WEST WALL SUPERSTRUCTURE

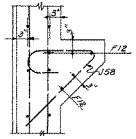


SECTION C-C



TYPICAL PILASTER REINFORCING

SCALE: 1" = 1'-0"



CRANE BRACKET DETAIL

SCALE: 1" = 1'-0"

Note:
For masonry details see sheets 15 & 16.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
SUPERSTRUCTURE WALLS

SHEET 22 OF 28 SHEETS SCALE: ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] CHIEF ENGINEER

APPROVAL RECOMMENDED: [signature] SENIOR ENGINEER — APPROVED: [signature] CHIEF OF ENGINEERS, DISTRICT ENGINEER

DR. BY R.K.J. TR. BY M.A.F. CK. BY H.W.

BY	DATE	CHARACTER
H.W.	12/7/22	Reinforcing marks changed

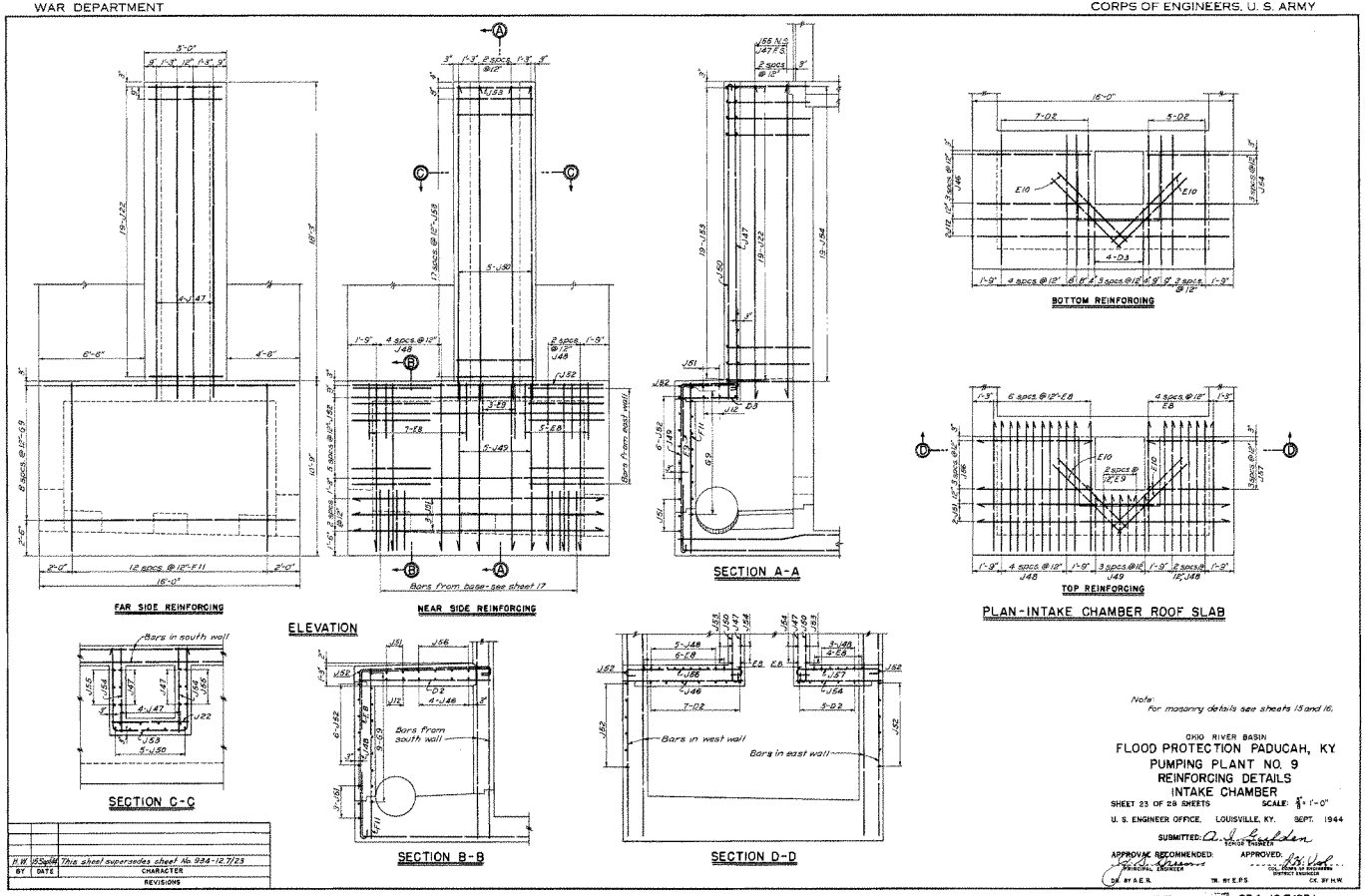
REVISIONS

"RELIEVED AS BUILT" 934 - 12.7/22

770

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note:
For masonry details see sheets 15 and 16.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
PUMPING PLANT NO. 9
REINFORCING DETAILS
INTAKE CHAMBER

SHEET 23 OF 28 SHEETS SCALE: $\frac{3}{8}$" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1944

SUBMITTED: A. J. Lockden
TENUR THURSTON

APPROVAL RECOMMENDED: APPROVED:
PRINCIPAL ENGINEER COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY A.E.R. TR. BY E.P.S. CK. BY H.W.

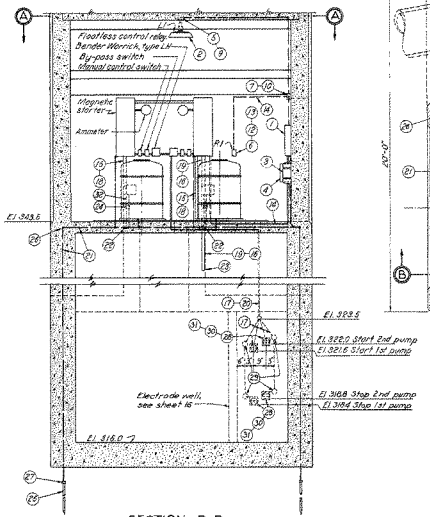
BY	DATE	CHARACTER
H.W.	6Sept44	This sheet supersedes sheet No. 934-12.7/23

REVISIONS

"BELIEVED AS BUILT" 934-12.7/23.1

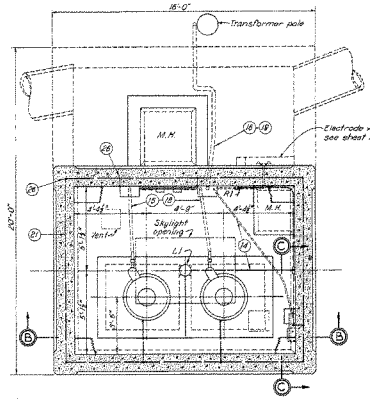
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



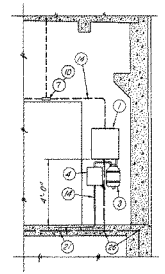
SECTION B-B

SCALE: $\frac{1}{8}$" = 1'-0"



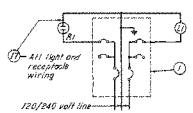
SECTIONAL PLAN A-A

SCALE: $\frac{1}{8}$" = 1'-0"

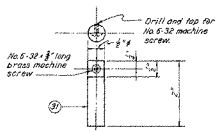


SECTION C-C

SCALE: $\frac{1}{8}$" = 1'-0"



WIRING DIAGRAM - LIGHTING CIRCUIT



ELECTRODE DETAIL

SCALE: $\frac{3}{4}$" = 1"

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	4 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West	349573	1
3	Transformer, 480-115/230 V., 2 KVA, dry type	West	5141-6	1
4	Enclosed fused switch, 2 pole, cover interlocked	Brayton	5896	1
5	Conduit outlet	Crouse-Hinds	H1547	1
6	Conduit outlet	Crouse-Hinds	FS141	1
7	Conduit outlet	" "	T111147	1
8	Conduit cover	" "	H516	1
10	Conduit cover	" "	1770	1
12	Duplex plug receptacle			1
13	Wall surface plate			1
14	$\frac{1}{2}$" Electrical metallic tubing (E.M.T.)			60'±
15	$\frac{1}{2}$" Rigid electrical conduit			30'±
16	$\frac{1}{2}$" rigid electrical conduit			45'±
17	#12 insulated copper wire			345'±
18	#6, 1-cond cable, R.C. 600 V ins. with W.P. braid			90'±
19	#8, 1-cond cable, R.C. 600 V ins with 60% rubber jacket			135'±
20	$\frac{3}{4}$" Rigid electrical conduit			30'±
21	#2/0 bare stranded copper cable			110'±
22	$\frac{1}{2}$" standard 90° elbow (E.M.T.)			4
23	$\frac{1}{2}$" standard 90° elbow			2
24	$\frac{1}{2}$" Connector			2
26	Copperweld ground rod, $\frac{3}{8}$" × $\frac{3}{8}$" × 8'-0" long			4
26	"T" connector for #2/0 stranded cable	Burndy	NT2E2B6	10
27	Connector for #2/0 stranded cable to $\frac{3}{8}$" rod	"	GA6426	4
28	3" bell circle type insulator	Lapp	13761	4
29	Wireholder	Joslyn	J1955	4
30	Bus support fitting. Drill to clamp $\frac{1}{2}$" ø electrode	Locke	9833	4
31	Brass electrode (see detail)			4
32	$\frac{1}{2}$" Flexible metal conduit			2'±

Notes.

Figures in circles refer to part numbers on bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

All conduit to clear openings for pump removal.

Small fittings, conduits, E.M.T. couplings and adapters, etc. not listed shall be furnished as required.

All conduit in floor shall be placed as near the center of same as possible.

200 watt bulbs shall be furnished and installed in all lights.

LEGEND

Embedded Conduit
Exposed Conduit
Concealed Conduit
Ground Wire

BY	DATE	CHARACTER
H.W.	15 Sept 44	Electrode well added, sectional plan revised.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 9

LIGHTING AND POWER SYSTEMS

SHEET 24 OF 29 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] DISTRICT ENGINEER

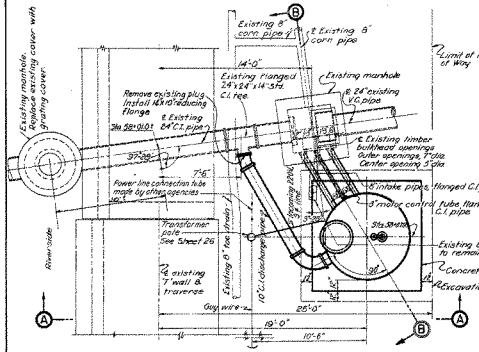
APPROVAL RECOMMENDED: [signature] CHIEF ENGINEER — APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.E.E. — TR. BY E.S. — CK. BY D.S.

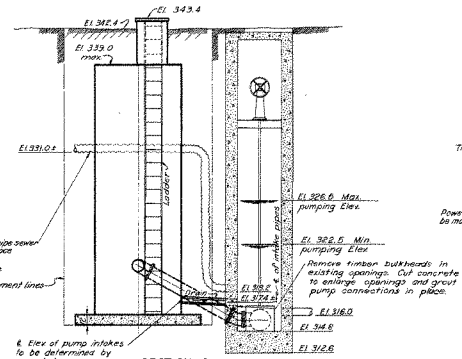
"BELIEVED AS BUILT" 934-12.7/24

1035

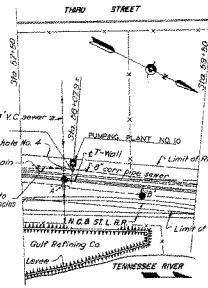
272



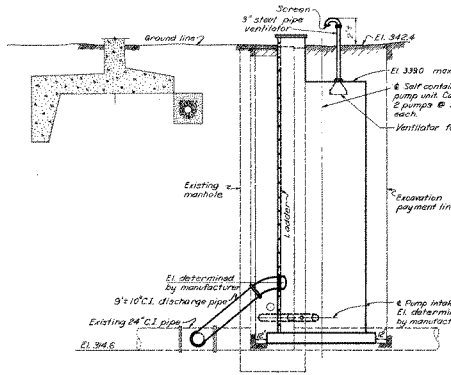
PLAN
SCALE: $\frac{1}{4}$" = 1'-0"



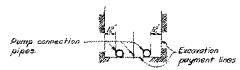
SECTION B-B
SCALE: $\frac{1}{4}$" = 1'-0"



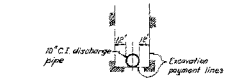
LOCATION PLAN
SCALE: 1" = 50'



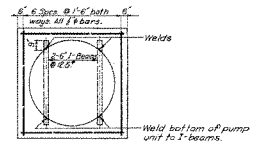
SECTION A-A
SCALE: $\frac{1}{4}$" = 1'-0"



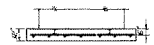
SECTION THRU PUMP INTAKE PIPES
SCALE $\frac{1}{4}$" = 1'-0"



SECTION THRU PUMP DISCHARGE PIPE
SCALE: $\frac{1}{4}$" = 1'-0"

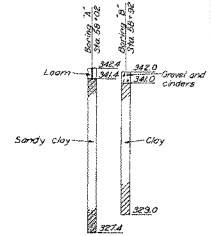


PLAN



ELEVATION
SCALE: $\frac{1}{4}$" = 1'-0"
Note: All reinforcing ⅝" bars.

DETAIL OF BASE UNDER PUMP UNIT



BORINGS
SCALES: HOR. NONE
VERT. 1" = 4'-0"

Note: Borings shown on plan thus ● Grade backfill to drain away from floodwall and pump plant.

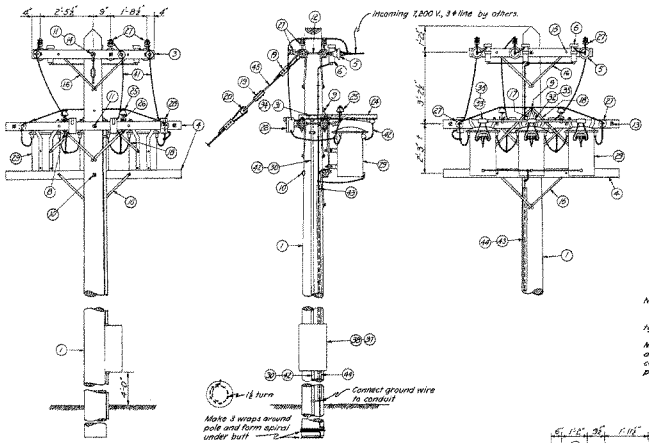
BY	DATE	CHARACTER
		REVISIONS

INDEX PUMPING PLANT NO. 10	
DRWG. NO.	TITLE
934-12.7/1	GENERAL PLAN
934-12.7/25	MASONRY DETAILS - PLAN AND SECTIONS
934-12.7/26	POLE STRUCTURES

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 10
MASONRY & REINFORCING DETAILS

SHEET 25 OF 68 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED: [illegible] DISTRICT ENGINEER
APPROVAL RECOMMENDED: [illegible] DIVISION ENGINEER
APPROVED: [illegible] U.S. CORPS OF ENGINEERS DISTRICT ENGINEER
DR. BY R.K.J. TR. BY C.H.S. CK. BY H.M.

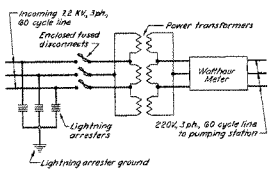
824.1-51 934-12.7/25



ASSEMBLY NO. 1

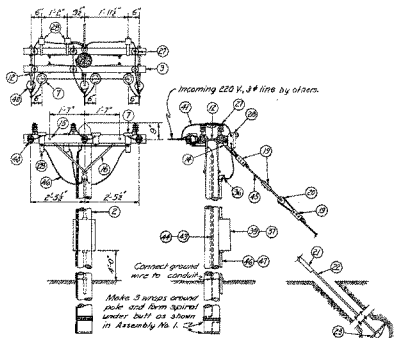
TRANSFORMER POLE SUPPORT FOR PUMPING PLANT NO. 10

Notes:
Figures in circles refer to part numbers.
All material shall be of the manufacture, type and catalog number specified, or its equal.
Small fittings not called for in the Bill of Material to be furnished as required; all bolts and lag screws to be furnished with a full complement of washers in accordance with best practice.
Set 30' poles 5½' in earth



WIRING DIAGRAM

FOR ASSEMBLY NO. 1



ASSEMBLY NO. 2

DEAD END POLE FOR PUMPING PLANT NO. 8

GUY ANCHOR ASSEMBLY

BILL OF MATERIAL

PART NO.	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	QUANTITY REQD. ASSEMBLY NO. 1	QUANTITY REQD. ASSEMBLY NO. 2
1	Wood pole, 30', class 1			1	
2	Wood pole, 30', class 3				1
3	Crossarm, Douglas fir, 3½"×4½"×5'-7"			2	2
4	Crossarm, Douglas fir, 3½"×4½"×6'-0"			3	
5	Suspension insulator with thimbleye	Locke	18121	3	
6	Lightning arrester	G.E.	9LA10AE	3	
7	Lightning arrester	G.E.	9LA10A1		3
8	Machine bolt, galv., ½"×7"	Joslyn	J8707	4	
9	Machine bolt, galv., ½"×14"	Joslyn	J8714	1	
10	Machine bolt, galv., ½"×16"	Joslyn	J8816	1	
11	Machine bolt, galv., ½"×18"	Joslyn	J8818	2	1
12	Double arming eyebolt, ½"×18"	Joslyn	J3618	8	3
13	Double arming bolt, ½"×18"	Joslyn	J8868	2	
14	Angle thimbleye	Joslyn	J9500	1	1
15	Carriage bolt, ½"×4½"	Joslyn	J8634½	10	4
16	Crossarm brace, galv.	Joslyn	J7128	10	4
17	Crossarm brace, enlarge 9/16" hole for ½" bolt	Joslyn	J7124	2	
18	Crossarm brace, enlarge 9/16" hole for ½" bolt	Joslyn	J7132	2	
19	Clamp, 3 bolt	Joslyn	J1128	4	4
20	Guy strain insulator	Joslyn	L1894	1	1
21	Guy guard	Joslyn	J1818	1	1
22	Anchor rod, thimbleye, ¾"×8'-0"	Joslyn	J7418	1	1
23	Guy anchor, exp., 5-way, 8" for ¾" rod	Everstick	834	1	1
24	Channel iron, galv., 3"×1½"×3'-6", 5.0#/ft.			2	
25	Pin type distribution insulator	Joslyn	L401	2	
26	Steel pin for insulator	Hubbard	5707	2	
27	Primary lead wireholder	Hubbard	1660	8	8
28	Fuse cutout, complete, 50 A.	Westinghouse	834200	3	3
29	Power transformer, 7200-120/240V., 7.5 KVA	G.E.	264551	3	
30	1½" rigid electrical conduit			40'±	
31	Conduit outlet	Crouse-Hinds	LB47	1	
32	Conduit outlet	Crouse-Hinds	T47	1	
33	Conduit outlet	Crouse-Hinds	E47	2	
34	Composition conduit cover, blank	Crouse-Hinds	4770	1	
35	Composition conduit cover, 2-hole	Crouse-Hinds	4772	3	
36	Service entrance fitting	Crouse-Hinds	T284		1
37	Meter enclosure box	Superior	PNW1769	1	1
38	Watthour meter	G.E.	65×836	1	
39	Watthour meter	G.E.	77×286		1
40	Strain insulator	Joslyn	J6324		3
41	#6, H.D. triple braid, W.P. wire			60'±	15'±
42	#6, 1-cond cable, RC, 600 V. ins. with 60% rubber jacket			130'±	
43	Ground wire, #8 bare copper, stranded			30'±	30'±
44	Wood moulding	Joslyn	Size #1	80'±	25'±
45	Guy wire, Siemens-Martin, galv., ⅜"			40'±	40'±
46	#6 h cond cable, RC, 600 V. ins. with 60% rubber jacket				130'±
47	¾" rigid electrical conduit				40'±

DING RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 8 AND 10

POLE STRUCTURES

SHEET 26 OF 28 SHEETS SCALE: ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF ENGINEER

APPROVED: [signature] COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY E.S. TR. BY G.E.E.-R.B.L. CK. BY S.S.

BY	DATE	CHARACTER

REVISIONS

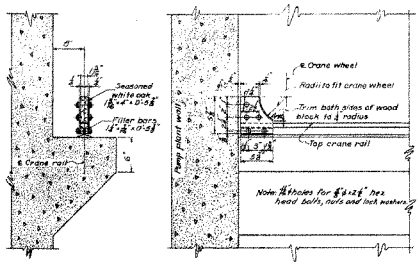
"BELIEVED AS BUILT" 934-12.7/26

274

1037

WAR DEPARTMENT

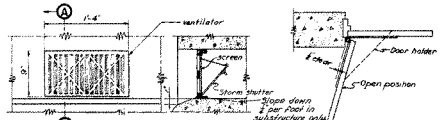
CORPS OF ENGINEERS, U. S. ARMY



CRANE STOP DETAILS

MATERIAL: STRUCTURAL STEEL EXCEPT AS SHOWN

SCALE: NONE



ELEVATION

SECTION A-A

PLAN

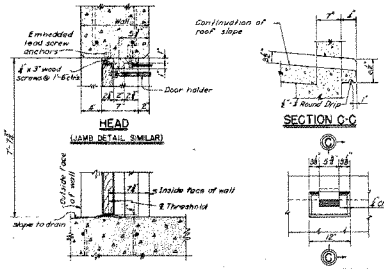
DOOR HOLDER

TYPICAL DETAIL WALL VENTILATORS

8 REQUIRED

SCALE: 1½" = 1'-0"

Note: Omit shutters on substructure ventilators



HEAD

(JAMB DETAIL SIMILAR)

SECTION C-C

SILL

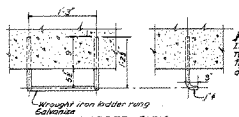
ACCESS DOOR FRAME DETAILS

SCALE: 1½" = 1'-0"

ELEVATION

CONCRETE SCUPPER

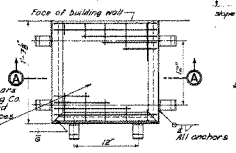
SCALE: 1" = 1'-0"



LADDER RUNG

MK LR1 MAKE 71 WT. 10.4# EACH

SCALE: 1" = 1'-0"

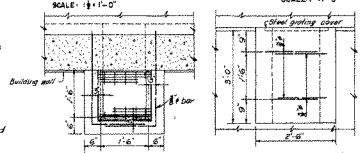


GRATING FRAME & COVER

SCALE: 1½" = 1'-0"

MAKE 2 MK GF2 WT 23.0# EACH

MATERIAL STRUCTURAL STEEL

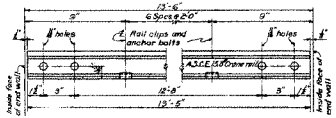


PLAN

ELEVATION

TYPICAL SUMP VENT WITH GRATING COVER

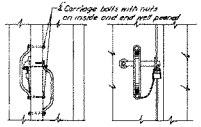
SCALE: ½" = 1'-0"



CRANE RAIL & ANCHORS

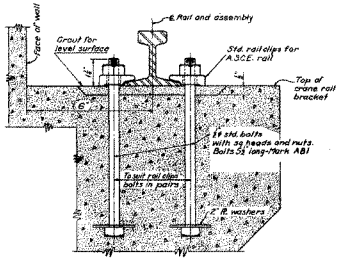
MATERIAL: STRUCTURAL STEEL

SCALE: NONE



LATCH DETAILS

SCALE: 1½" = 1'-0"

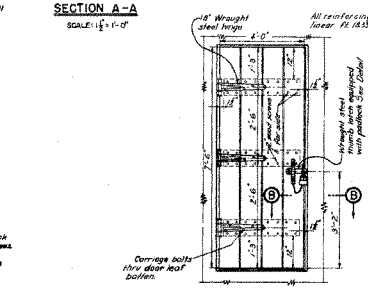


RAIL ANCHORAGE DETAIL

SCALE: NONE

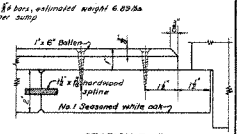
THRESHOLD FOR WOOD ACCESS DOORS

SCALE: FULL SIZE



ACCESS DOOR ELEVATION

SCALE: ½" = 1'-0"



SECTION B-B

SCALE: NONE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MISCELLANEOUS DETAILS

SHEET 27 OF 28 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [illegible] ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH

APPROVED: [illegible] DISTRICT ENGINEER

DR. BY N.W.S. TR. BY N.W.S. CK. BY H.W.

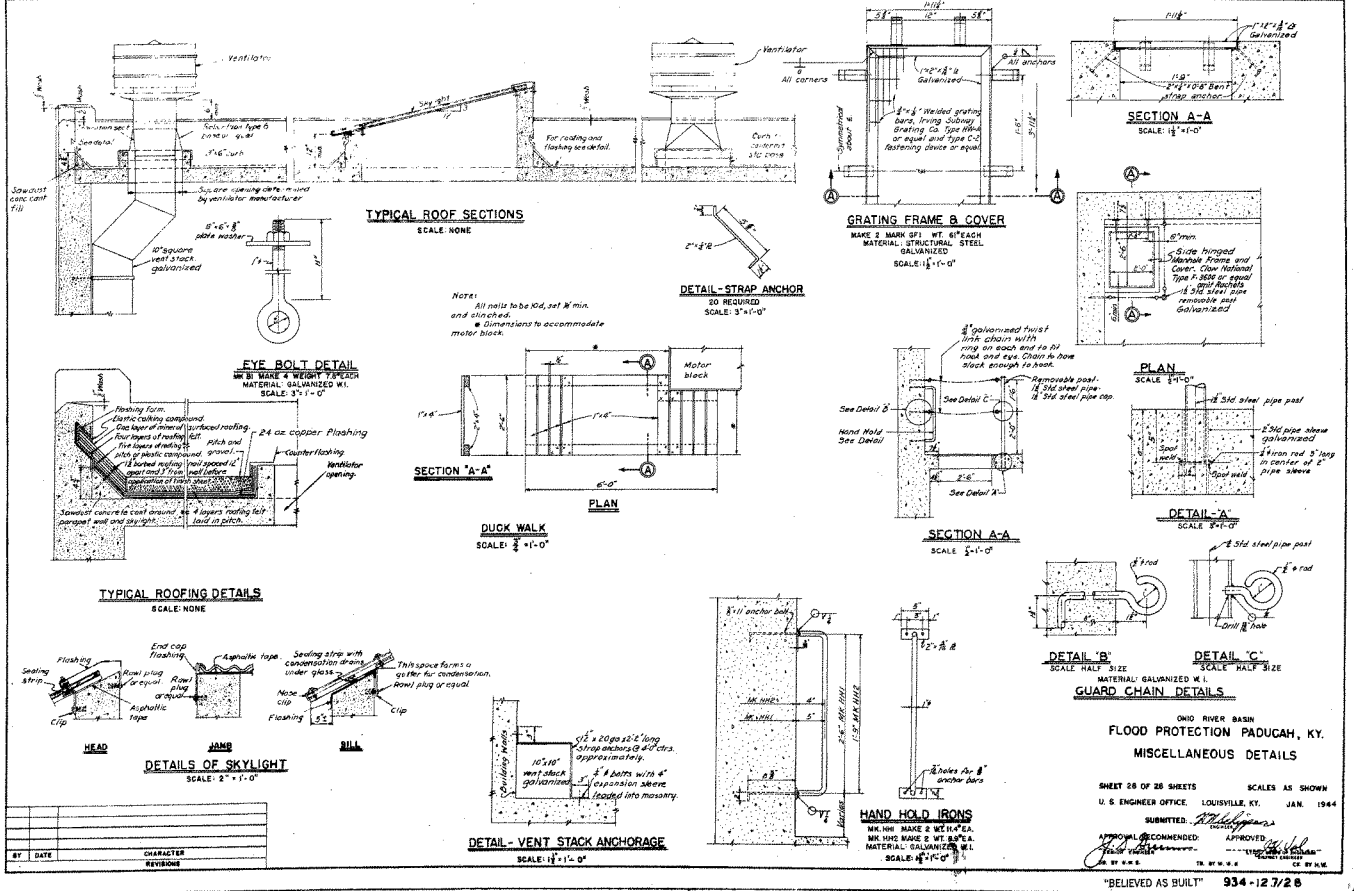
BY	DATE	CHARACTER
		REVISIONS

"BELIEVED AS BUILT" 934-12.7/27

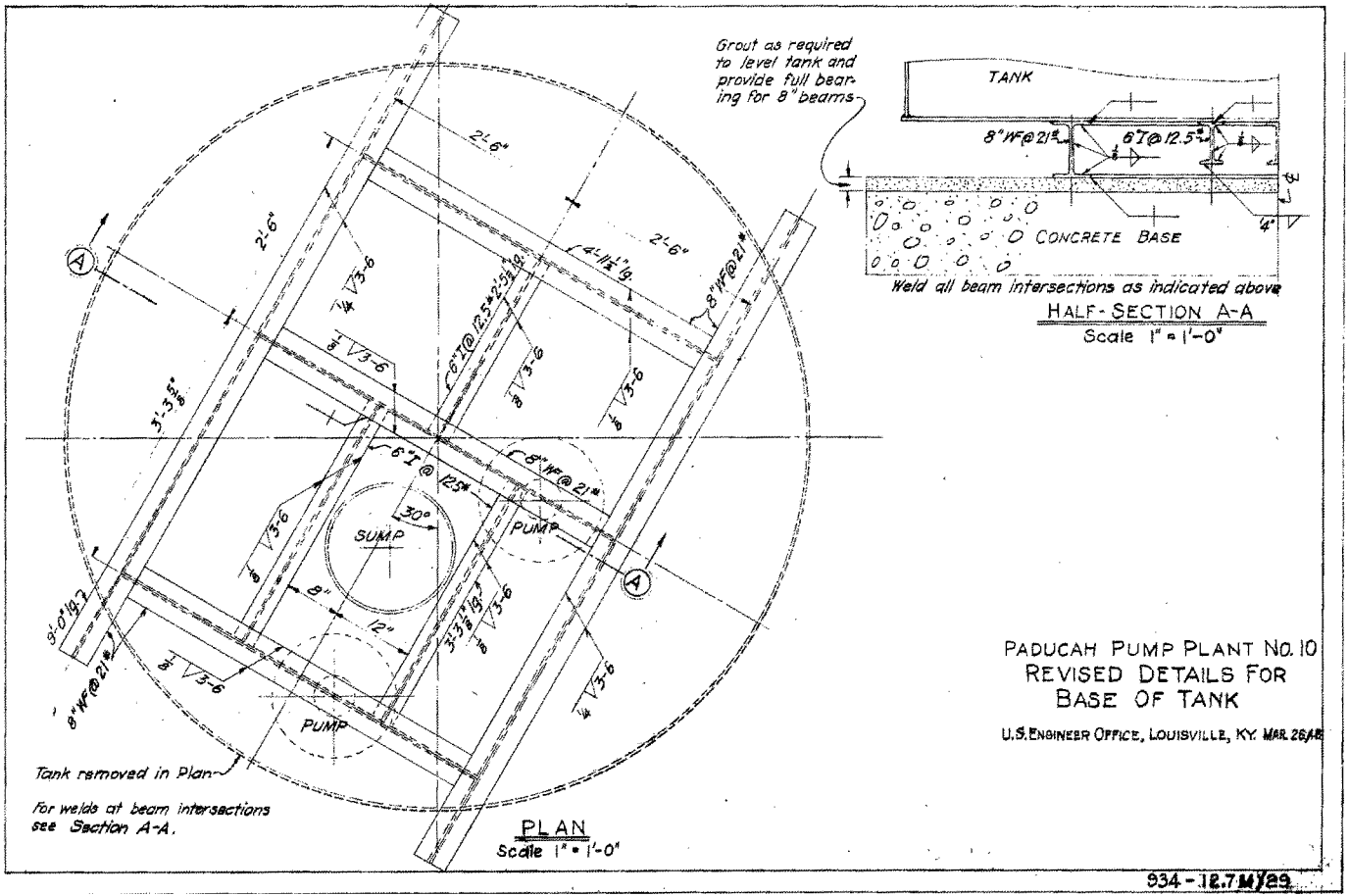
275

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY


Ventilator
See detail
Sawdust conc. cant fill
Square opening data: mind by ventilator manufacturer
8"x6"x3/8" plate washer
10" square vent stack galvanized
TYPICAL ROOF SECTIONS
SCALE: NONE
For roofing and flashing see detail.
Curb: contours size come
Ventilator
All corners
All anchors
1"x2"x3/8" U Galvanized
3/8"x3/8" Welded grating bars, Irving Subway Grating Co. Type HH or equal and Type C-2 fastening device or equal
GRATING FRAME & COVER
MAKE 2 MARK GF1 WT. 61# EACH
MATERIAL: STRUCTURAL STEEL
GALVANIZED
SCALE: 1½"=1'-0"
1"x2"x3/8" Bent strap anchor
Galvanized
SECTION A-A
SCALE: 1½"=1'-0"
Side hinged manhole frame and cover. Clow National Type F-3600 or equal
18 Std steel pipe removable post Galvanized
PLAN
SCALE ½"=1'-0"
EYE BOLT DETAIL
MK B1 MAKE 4 WEIGHT 7.5# EACH
MATERIAL: GALVANIZED W.I.
SCALE: 3"=1'-0"
Note:
All nails to be 10d, set ⅛" min. and clinched.
* Dimensions to accommodate motor block.
DETAIL-STRAP ANCHOR
20 REQUIRED
SCALE: 3"=1'-0"
Flashing form.
Elastic calking compound.
One layer of mineral surfaced roofing felt
Four layers of roofing felt
Five layers of roofing felt
Pitch and gravel
pitch or plastic compound
18 barbed roofing felt spaced 12" apart and 3" from wall before application of flash sheet
24 oz copper Flashing
Counter flashing
Ventilator opening.
Sawdust concrete to cant around parapet wall and skylight.
4 layers roofing felt laid in pitch.
TYPICAL ROOFING DETAILS
SCALE: NONE
Motor block
SECTION "A-A"
PLAN
DUCK WALK
SCALE: ¾"=1'-0"
¾" galvanized twist link chain with ring on each end to fit hook and eye. Chain to have slack enough to hook.
Removable post 18 Std steel pipe
18" Std steel pipe cap.
See Detail B
See Detail C
Hand Hold See Detail
See Detail A
SECTION A-A
SCALE ½"=1'-0"
18 Std steel pipe post
2" Std pipe sleeve galvanized
¾" iron rod 5" long in center of 2" pipe sleeve
Spot weld
DETAIL-"A"
SCALE ¾"=1'-0"
18 Std steel pipe post
¾" rod
2" ø rod
Drill ⅜" hole
DETAIL "B"
SCALE HALF SIZE
DETAIL "C"
SCALE HALF SIZE
MATERIAL: GALVANIZED W.I.
GUARD CHAIN DETAILS
Flashing
Seaming strip
Roofing plug or equal
Asphaltic tape
Clip
HEAD
End cap flashing
Asphaltic tape
Roofing plug or equal
JAMB
Seaming strip with compensation drains under glass
This space forms a gutter for condensation. Roofing plug or equal
Nose clip
Flashing
Clip
SILL
DETAILS OF SKYLIGHT
SCALE: 2"=1'-0"
Ceiling joists
10"x10" vent stack galvanized
3/8" ø bolts with 4" expansion sleeve leaded into masonry.
DETAIL- VENT STACK ANCHORAGE
SCALE: 1½"=1'-0"
3/8" anchor bolt
MK HH1 4"
MK HH2 5"
2"x2"x3/8" HH1
1½"x3/8" HH2
Washer
2"x3/8" U
1"ø
3/8" holes for 3/8" anchor bars
HAND HOLD IRONS
MK. HH1 MAKE 2 WT. 11.4# EA.
MK. HH2 MAKE 2 WT. 8.8# EA.
MATERIAL: GALVANIZED W.I.
SCALE: ½"=1'-0"
BY | DATE | CHARACTER REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
SHEET 28 OF 28 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
"BELIEVED AS BUILT" 934-12.7/28

276


Grout as required to level tank and provide full bearing for 8" beams
TANK
8" WF @ 21#
6" I @ 12.5#
CONCRETE BASE
4"
Weld all beam intersections as indicated above
HALF-SECTION A-A
Scale 1" = 1'-0"
2'-6"
2'-6"
2'-6"
3'-3 5/8"
4'-11 1/4" 19
8" WF @ 21#
6" I @ 12.5#
6" I @ 12.5#
8" WF @ 21#
30°
SUMP
PUMP
PUMP
8"
12"
3'-3 1/8" 19
9'-0" 19
8" WF @ 21#
Tank removed in Plan
For welds at beam intersections see Section A-A.
PLAN
Scale 1" = 1'-0"
PADUCAH PUMP PLANT NO. 10
REVISED DETAILS FOR
BASE OF TANK
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAR. 26/48
934-12.7 M/29

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KENTUCKY

PUMPING EQUIPMENT AND GATES

INDEX

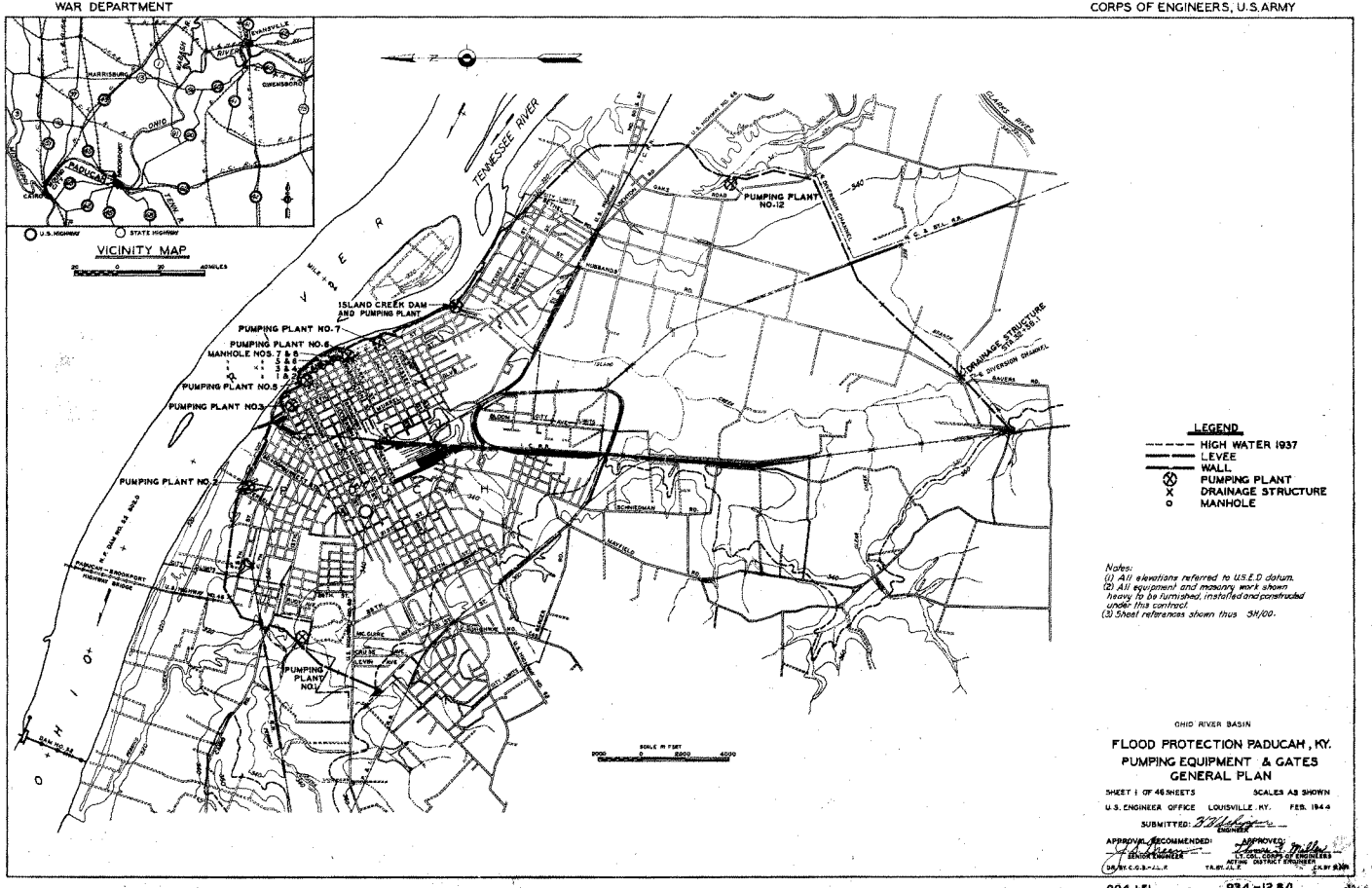
GENERAL PLAN	SHEET 934-12.8/1
PUMPING PLANT NO. 1	" " - " 2
PUMPING PLANT NO. 2	" " - " 4
PUMPING PLANT NO. 3	" " - " 7
PUMPING PLANT NO. 5	" " - " 9
PUMPING PLANT NO. 6	" " - " 12
PUMPING PLANT NO. 7	" " - " 15
PUMPING PLANT NO. 12	" " - " 18
INTERCEPTER SEWER MANHOLES	" " - " 21
ISLAND CREEK DAM PUMPING PLANT	" " - " 23
DRAINAGE STRUCTURE STA. 32+38.1	" " - " 30

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

"BELIEVED AS BUILT"

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING EQUIPMENT & GATES
GENERAL PLAN

SHEET 1 OF 46 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE LOUISVILLE, KY. FEB. 1944

SUBMITTED: ENGINEER

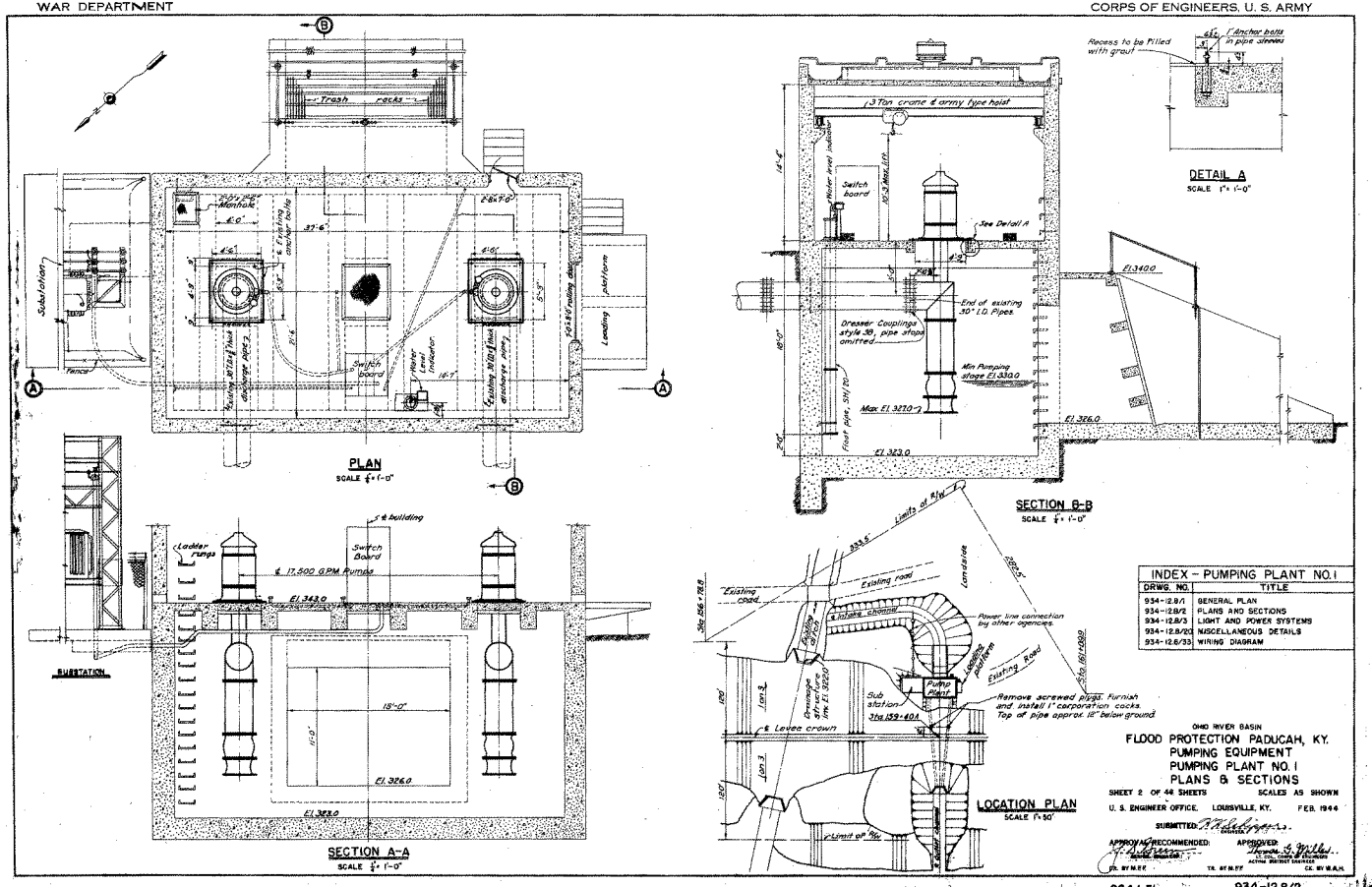
APPROVAL RECOMMENDED: SENIOR ENGINEER — APPROVED: LT. COL. CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

824.1-51 934-12.8/1

1042

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY


PLAN
SCALE 1/4" = 1'-0"
SECTION A-A
SCALE 1/4" = 1'-0"
SECTION B-B
SCALE 1/4" = 1'-0"
DETAIL A
SCALE 1" = 1'-0"
LOCATION PLAN
SCALE 1" = 50'
SUBSTATION
Trash racks
Manhole
Substation
Fence
Existing anchor bolts
Existing 30" Pump discharge pipe
Existing 30" Pump discharge pipe
Switch board
Water level indicator
Loading platform
Ladder rungs
Switch Board
℄ 17,500 GPM Pumps
El. 343.0
El. 326.0
El. 323.0
3 Ton crane & army type hoist
Water level indicator
See Detail A
End of existing 30" I.D. Pipes
Dresser Couplings style 39, pipe stops omitted
Min Pumping stage El. 330.0
Max El. 327.0
Floor pipe, SW/DC
Recess to be filled with grout
Anchor bolts in pipe sleeves
Existing road
Existing levee
Power line connection by other agencies
Pump Plant
Sub station
Drainage structure Inv. El. 322.0
Remove screwed plugs. Furnish and install 1" corporation cocks. Top of pipe approx. 12" below ground
℄ Levee crown
Limit of R/W
Existing road
Existing road
Loading platform
Land slope
Sta. 156+78.8
Sta. 161+30.0
Sta. 159+40.0
Sta. 155+00.0
Sta. 152+40.0
Sta. 150+00.0
Sta. 147+60.0
Sta. 145+20.0
Sta. 142+80.0
Sta. 140+40.0
Sta. 138+00.0
Sta. 135+60.0
Sta. 133+20.0
Sta. 130+80.0
Sta. 128+40.0
Sta. 126+00.0
Sta. 123+60.0
Sta. 121+20.0
Sta. 118+80.0
Sta. 116+40.0
Sta. 114+00.0
Sta. 111+60.0
Sta. 109+20.0
Sta. 106+80.0
Sta. 104+40.0
Sta. 102+00.0
Sta. 99+60.0
Sta. 97+20.0
Sta. 94+80.0
Sta. 92+40.0
Sta. 90+00.0
Sta. 87+60.0
Sta. 85+20.0
Sta. 82+80.0
Sta. 80+40.0
Sta. 78+00.0
Sta. 75+60.0
Sta. 73+20.0
Sta. 70+80.0
Sta. 68+40.0
Sta. 66+00.0
Sta. 63+60.0
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Sta. 34+80.0
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Sta. 30+00.0
Sta. 27+60.0
Sta. 25+20.0
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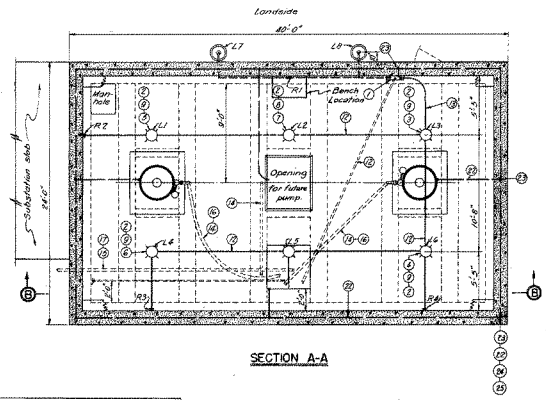
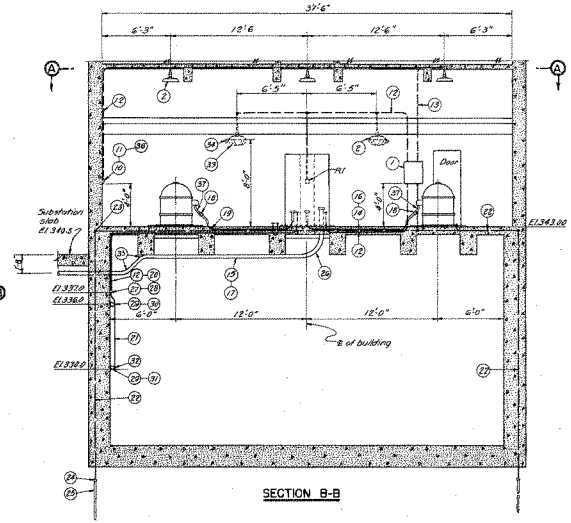
Sta. 14+40.0
Sta. 15+60.0
Sta. 16+80.0
Sta. 18+00.0
Sta. 19+20.0
Sta. 20+40.0
Sta. 21+60.0
Sta. 22+80.0
Sta.

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SECTION A-A



SECTION B-B

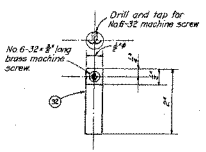
BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR	CATLOG NO.	QUAN.	
1	4 Circuit light distribution panel (Surface type)			1	
2	R.L.M. dome reflector & socket	West	349573	7	
3	Conduit outlet	Crouse Hinds	SKT22	1	
4	" "	"	SKT12	1	
5	" "	"	SKC12	1	
6	" "	"	SKL12	1	
7	" "	"	GI51	2	
8	" Cover	"	HS15	2	
9	" "	"	SK54	4	
10	" outlet	"	FS1	4	
11	Duplex plug receptacle			4	
12	¾" Rigid electrical conduit			1265'	
13	¾" " " "			70'	
14	1¼" " "			335'	
15	3½" " "			50'	
16 *	#6 Cond. cable, Type SNW			1351'	*
17 *	#6 10 MCM, cond. cable, Type R.H. with 60% rubber jacket			150'	*
18 *	1¼" coupling			2	*
19	1¼" Standard 90° elbow			6	
20 *	#12 Insulated copper wire			540'	*
21	#6 H.D. bare solid wire			10'	
22	#20 Bare stranded copper wire			265'	
23	"T" Connector for #20 stranded cable	Burndy	HT2626	8	
24	Connector for #20 stranded cable to ½" rod	"	GA6426	4	
25	Ground rod, ½" x 8'-0" long	Copper Weld		4	
26	Special long radius 90° elbow, 3½" x 42" radius			2	
27	Conduit outlet	Crouse Hinds	A17	1	
28	" cover	"	TT1	1	
29	3" bolt circle type insulator	Lapp	13761	2	
30	Bus support fitting. Drill to clamp #6 bare solid wire	Locke	9853	1	
31	" " " " " 1 dia. electrode	"	9853	1	
32	Brass electrode (See Detail)			1	
33	Wire guard for reflector	West	351497	2	
34	Padlock	"	351484	2	
35	3½" Standard radius 45° elbow			2	
36	Wall surface plate			4	
37 A	Flexible metal conduit 1½" x 1'-6" lg.			2	*

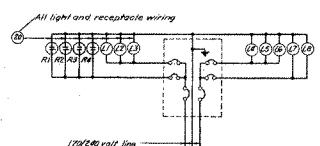
BY	DATE	CHARACTER
		REVISIONS

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire



ELECTRODE DETAIL
SCALE: NONE



WIRING DIAGRAM
LIGHTING CIRCUIT

Notes:
Figures in circles refer to part numbers on bill of material.
All material shall be of the manufacture, type, and catalog number specified or its equal.
Small fittings, conduitets, EMT couplings and adapters etc. not listed shall be furnished as required.
* Indicates materials to be furnished and installed under this contract. Other materials listed and shown were installed under previous contract and are of the type and catalog number specified or equal.
Install 200 watt bulbs to be furnished by Gov't. in all lighting fixtures.
Existing motor lead conduits are capped approximately 6" above floor.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
PUMPING EQUIPMENT
LIGHTING AND POWER SYSTEM

SHEET 3 OF 48 SHEETS SCALE: ¼" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

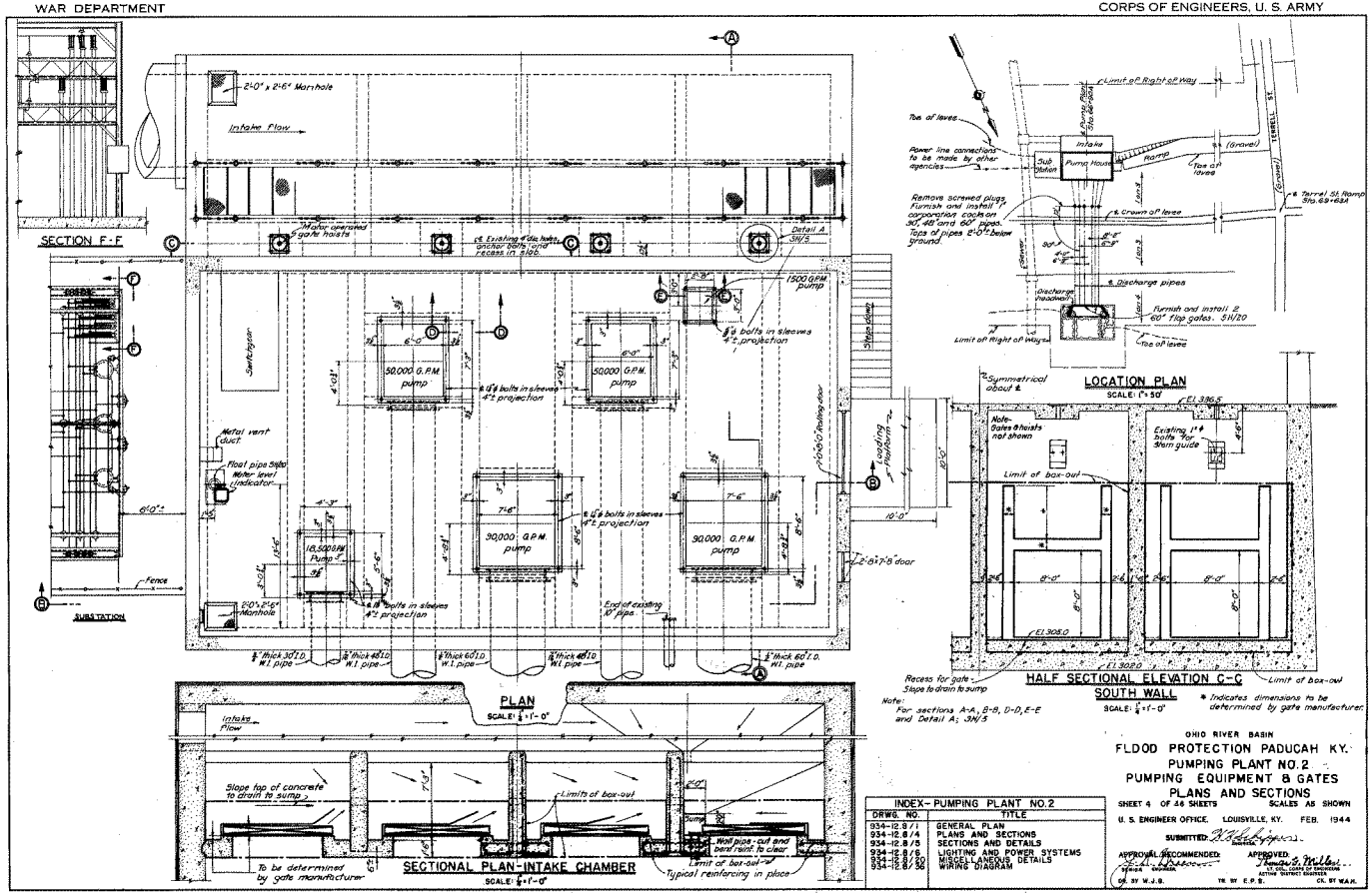
SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEER

APPROVED: [illegible] ACTING DISTRICT ENGINEER

DR. BY G.E.E. TR. BY A.J.Z. CK. BY G.E.

824.1-51 824-12.8/3



INDEX- PUMPING PLANT NO. 2	
DRWG. NO.	TITLE
934-12.9/1	GENERAL PLAN
934-12.8/4	PLANS AND SECTIONS
934-12.8/5	SECTIONS AND DETAILS
934-12.8/6	LIGHTING AND POWER SYSTEMS
934-12.8/30	MISCELLANEOUS DETAILS
934-12.8/36	WIRING DIAGRAM

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

PUMPING PLANT NO. 2

PUMPING EQUIPMENT & GATES

PLANS AND SECTIONS

SHEET 4 OF 46 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEER

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

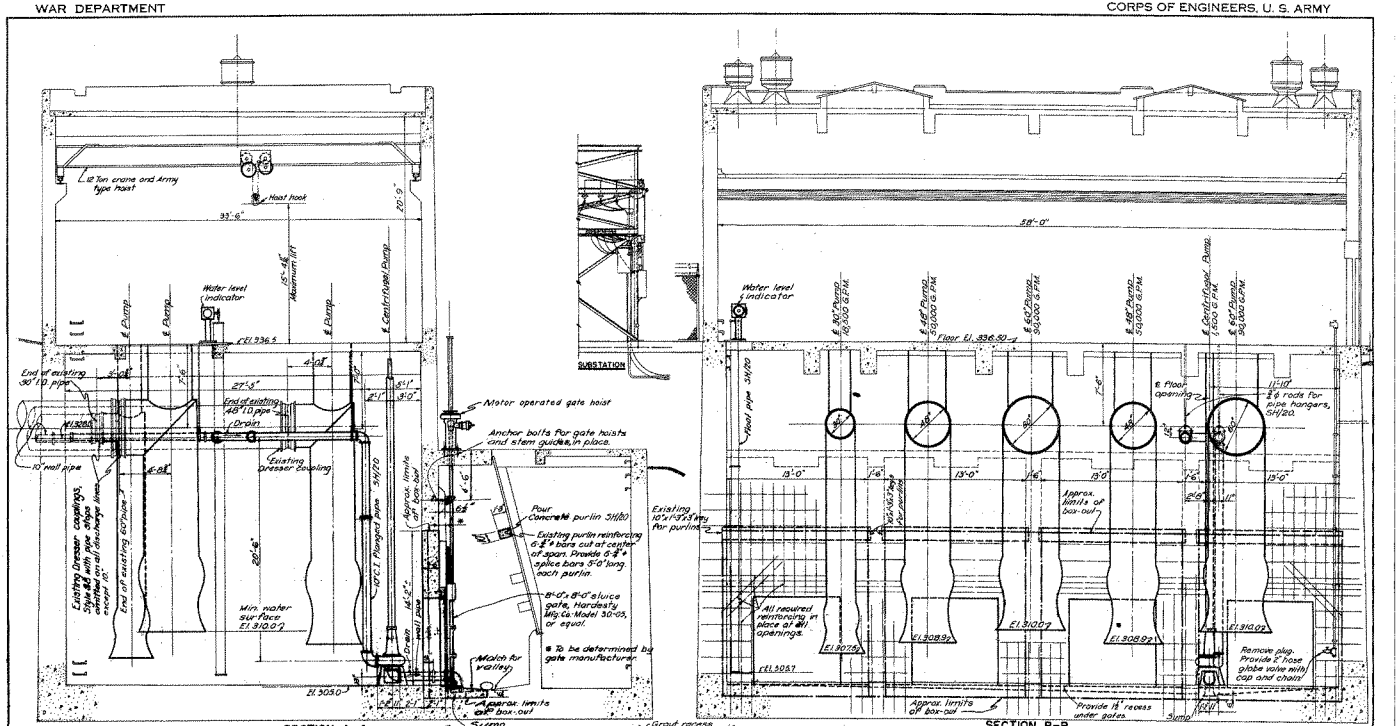
CK. BY W.J.B. — TR. BY E.P.B. — CK. BY W.A.K.

824.1-51 — 934-12.8/4

1045

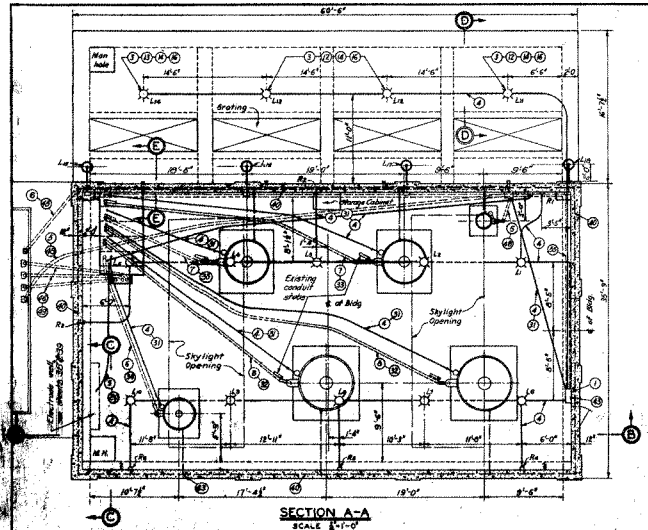
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

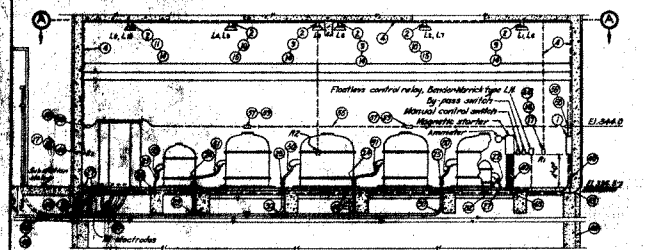


WAR DEPARTMENT

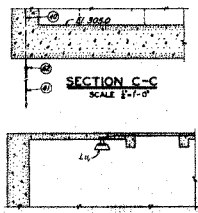
CORPS OF ENGINEERS, U. S. ARMY



SECTION A-A
SCALE 1/4"=1'-0"

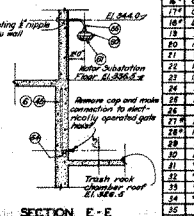


SECTION B-B
SCALE 1/4"=1'-0"

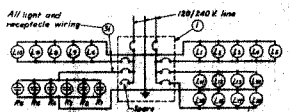


SECTION C-C
SCALE 1/4"=1'-0"

SECTION D-D
SCALE 1/4"=1'-0"



SECTION E-E
SCALE 1/4"=1'-0"



WIRING DIAGRAM, LIGHTING CIRCUITS

LEGEND

Embedded Conduit
Exposed Conduit
Ground Wire

Notes:

Figures in circles refer to Part No. in Bill of Material.

All material shall be of the manufacture, type, and catalog number specified or its equal.

Small fittings, conduitets E.M.T. couplings and adapters etc. not listed should be furnished as required.

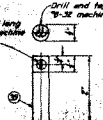
* Indicates material previously installed.

Install 200 watt lamps, to be furnished by Gov't, in all inside, outside and sump lighting fixtures.

Existing motor lead conduits are capped approximately 6" above floor.

Light existing conduit stubs on conduit runs which are to be abandoned between switchgear and motors shall be cut off level with floor and plugged with concrete.

For existing conduit and electrode layout, see sheet 3.2.



ELECTRODE DETAIL
SCALE: NONE

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUAN-TITY
1*	Line distribution panel (surface type) 125/250 V. 6 circuit			1
2*	R.L.M. dome reflector and socket	West	349 S 13	10
3*	Vaportite conduit with reflector and socket	Crouse-Hinds	VHDA 1959	4
4*	3/4" rigid electrical conduit			700'±
5*	1" " " " "			105'±
6*	1 1/2" " " " "			120'±
7	2" " " " "			55'±
8	2 1/2" " " " "			85'±
9*	Conduit outlet	Crouse-Hinds	3KT 18	4
10*	" "	" "	4 JET	4
11*	" "	" "	5 HL 12	2
12*	" "	" "	5 KC-18	3
13*	" "	" "	5 K-18	1
14*	Conduit cover	" "	3K-84	10
15*	" "	" "	11-818	4
16*	Cover gasket	" "	Gas 208	4
17*	Conduit outlet	" "	FS 1	6
18*	Duplex plug receptacle			6
19				
20	1/2" Rigid electrical conduit			30'±
21	Wire holder			49
22	1" Coupling			1
23	1/2" "			
24	2" "			1
25	2 1/2" "			1
26				
27*	1" Standard 90° elbow			4
28*	1/2" " " "			2
29	2" " " "			4
30	2 1/2" " " "			6
31	#12 AWG insulated copper wire			2630'±
32	#10 1 cond cable, Type VC-90			230'±
33	#10 1 " " " "			300'±
34	#6 1 " " " "			38'±
35				
36	3/8" bolt circle type insulators	Lapp	[illegible]	72
37				
38	Box support fitting, drill & clamp 3/8" electrode	"	[illegible]	2
39	Electrode (See Detail)			2
40*	#20 bare copper stranded cable			100'±
41*	3/4" x 8' copperweld ground rod			2
42*	Connector for #20 ground cable to 3/4" x 8' rod	Burndy	[illegible]	2
43*	"T" connector for #20 ground cable	"	[illegible]	14
44*	Duplex surface plates		[illegible]	6
45	#4 1 cond. cable, RH, with 60% rubber, jacket			[illegible]
46*	3/4" rigid electrical conduit			[illegible]
47*	Special long radius 90° elbow 3/4" x 42" radius	G.E.		[illegible]
48	#4 AWG 1 cond cable, Type SHV			[illegible]
49	350 MCM, 1 cond. cable, Type VC-90			[illegible]
50	Flexible metal conduit 2" x 1'-6" lg.			2
51	" " " 2" x 2'-0" lg.			2
52	" " " 1" x 1'-0" lg.			2
53	" " " 1 1/2" x 2'-0" lg.			1
54*	Conduletet	Crouse-Hinds	BT-4	4
55	3/4" Rigid electrical conduit			110'±
56	Conduletet	Crouse-Hinds	LB-75	2
57	"	" "	TB-75	2
58	"	" "	LBR-75	1
59	Conduletet corner	" "	TBR-75	2
60	R.L.M. dome reflector and socket	West	349 R 18	2
61	Wire guard for reflector	"	4014-S1	2

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

PUMPING EQUIPMENT AND GATES

LIGHTING & POWER SYSTEM

SHEET 6 OF 8E SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — FEB. 1944

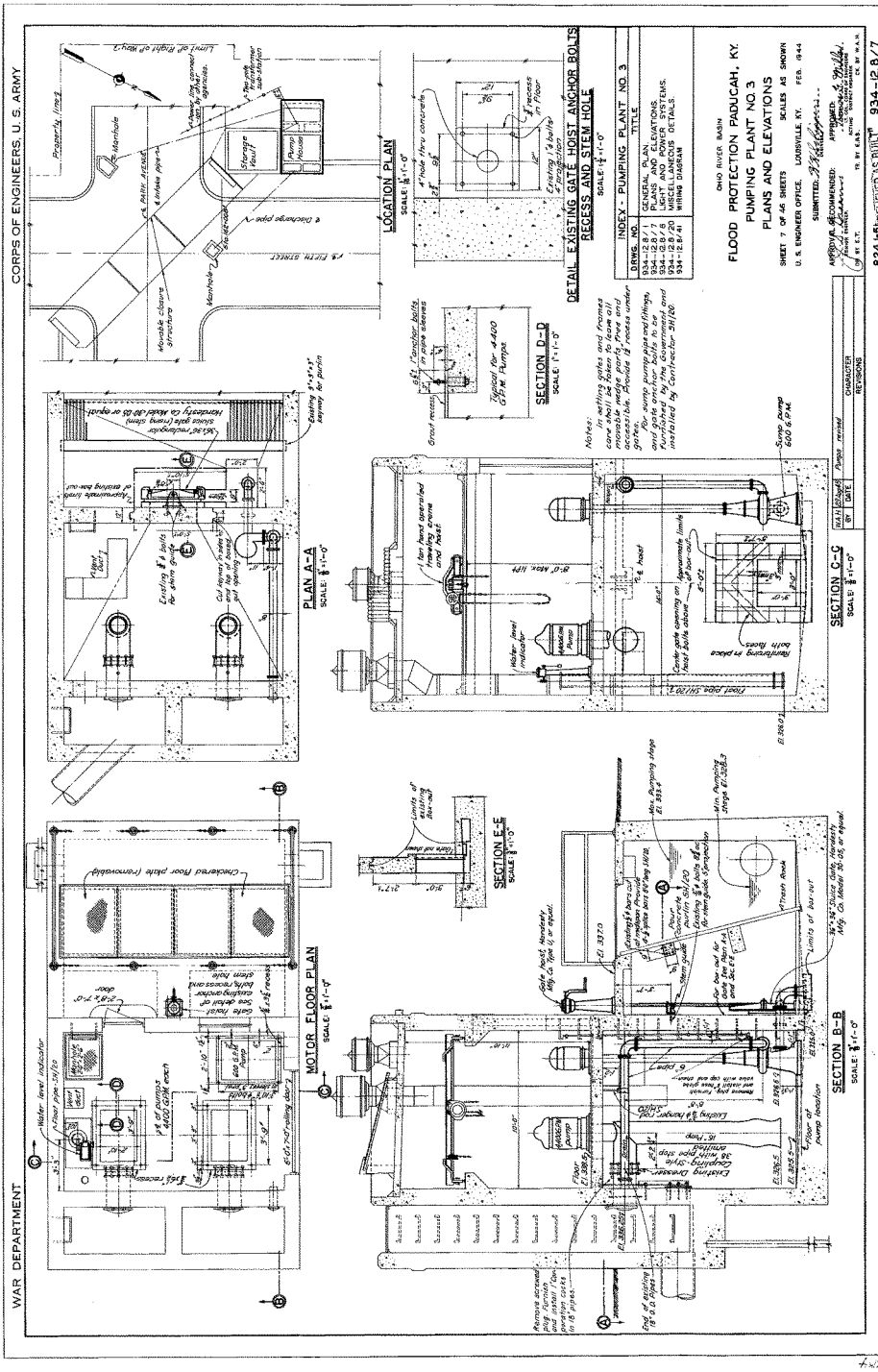
SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible]

APPROVED: [illegible]

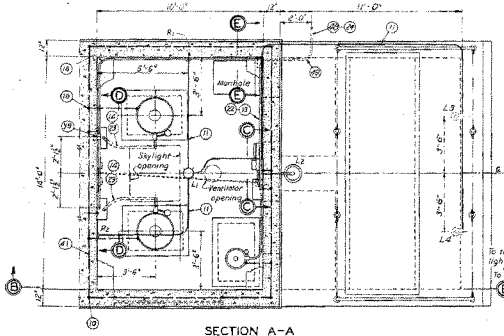
DATE | BY | CHARACTER REVISIONS

934-12.8/6

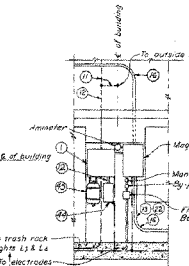

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
LOCATION PLAN
DETAIL EXISTING GATE HOIST ANCHOR BOLTS RECESS AND STEM HOLE
INDEX - PUMPING PLANT NO. 3
DRWG. NO. TITLE
934-12.8/1 GENERAL PLAN
934-12.8/7 PLANS AND ELEVATIONS
934-12.8/14 SECTIONS AND DETAILS
934-12.8/20 MISCELLANEOUS DETAILS
934-12.8/41 WIRING DIAGRAM
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
PLANS AND ELEVATIONS
SHEET 7 OF 46 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
SUBMITTED:
APPROVED:
RECOMMENDED:
824J-5 PLOTTED AS BUILT 934-12.8/7
PLAN A-A
MOTOR FLOOR PLAN
SECTION D-D
SECTION C-C
SECTION E-E
SECTION B-B
Sump pump 600 G.P.M.
Notes:
Chickered floor plate (removable)
Water level indicator
Floor pan-14/20
Gate hoist
Door
Existing Dressor Coupling-style 36 inch pipe stub
Floor El. 336.5
Floor of pump location
Remove screwed plug from end of 18" pipe and install gate in 18 pipes.
End of existing 18" O.D. pipes
Existing 3/4" bolts for stem guide
Concrete floor
Existing 3/4" bolts for stem guide
Min. Pumping stage El. 328.3
Min. Pumping stage El. 333.0
Trash rack
Limits of air vent
Sump pump
Floor El. 337.0
Floor El. 336.5
Floor El. 335.5
Existing 3/4" bolts for stem guide
Stem guide
Grout recess
Typical for 4400 G.P.M. Pumps
Existing 3/4" bolts for stem guide
Cut away 1" beam for gate spacing
Existing 3/4" bolts for stem guide
Existing 3"x3"x3" channel for purlin
Existing 3/4" bolts for stem guide
Lifting eye
Existing 3/4" bolts for stem guide
Water level indicator
Hand pump
Floor pipe 3/4 O.D.
Reinforcing in place
Gate hoist
Gate stem
Gate guide spacing on approximate limits of gate bolts above and below cut-out
Hand pump
Water level indicator
Hoist
Two man hoist operated traveling screw and hoist
Limits of existing trench
Gate hoist
Gate stem
Gate hoist
Gate stem
Gate hoist
Gate stem

WAR DEPARTMENT

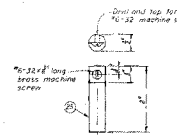
CORPS OF ENGINEERS, U. S. ARMY



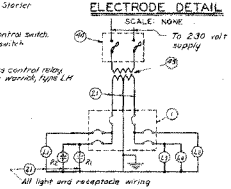
SECTION A-A
SCALE: 1/8"=1'-0"



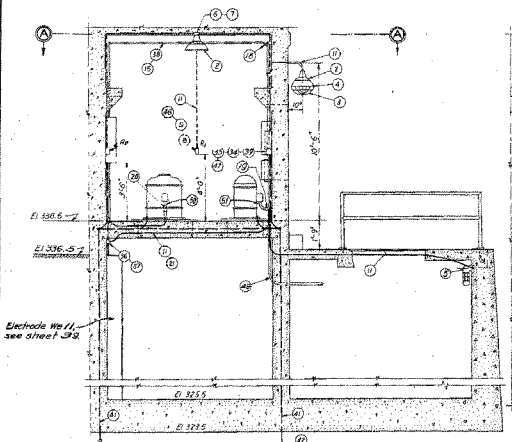
SECTION C-C
SCALE: 1/8"=1'-0"



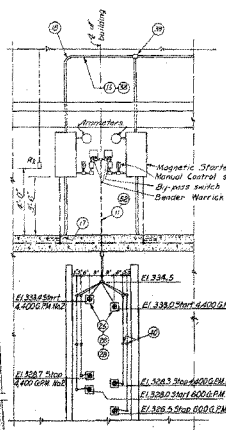
ELECTRODE DETAIL
SCALE: NONE



WIRING DIAGRAM
LIGHTING CIRCUIT



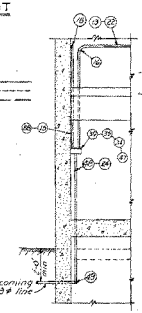
SECTION B-B
SCALE: 1/8"=1'-0"



SECTION D-D
SCALE: 1/8"=1'-0"

LEGEND

Embedded conduit
Exposed conduit
Ground wire



SECTION E-E
SCALE: 1/8"=1'-0"

Notes:
Figures in circles refer to part numbers in Bill of Material.
All material shall be of the manufacture, type and catalog number specified, or it's equal.

* Indicates material previously installed.

For existing electrode layout see sheet 40.

Install 200 watt bulbs, to be furnished by the Government, in all lighting fixtures.

Existing motor lead conduits for the two large motors are capped approximately 8" above the floor. The motor lead conduit for the small motor is capped approximately 5" from the wall.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUAN-TITY
1*	4 circuit light distribution panel (Surface Type)			1
2*	R.L.M. lamp reflector and socket	West	349373	2
3*	Wire guard	"	351497	2
4*	Wire guard padlock	"	351484	1
5*	Vapor-tite light	Crouse-Hinds	VM5165	2
6*	Conduit outlet	"	SAC 12	1
7*	Conduit cover	"	SK 84	1
8*	Conduit outlet	"	FS 1	2
9*	Duplex plug receptacle	Bryant	4752-2P-N1	2
10*	" connectors for #2/0 stranded cable	Burndy	NTE626	18
11*	3/4" rigid electrical conduit			74'
12*	3/4" " " "			14
13*	1" " " "			39'
14*	1 1/4" " " "			17'
15*	1 1/2" " " "			30'
16*	1" standard 90° elbow			4
17*	1 1/4" " " "			4
18*	1 1/2" " " "			4
19	1" Coupling			1
20	1 1/2" Coupling			2
21	#12 R.H.W. insulated copper wire			1700'
22	#6, 1 cond. cable, Type R.H. with 60% rubber jacket			603
23	#4, 1 cond. cable, Type R.H. with 60% rubber jacket			945
24	#2/0 Bond cable, Type R.H. with 60% rubber jacket			1203
25	Brass electrode, 3/4" x 8' long (See detail)			6
26	3" bolt circle type insulator	West	491736	6
27				
28	Bus support fitting. Drill to clamp 3/4" electrode	Locke	9853	6
29				
30				
31				
32				
33*	Conduit hub plate	"	95P7	1
34*	" " "	"	95P53	1
35*	Conduit	"	T211	1
36*	Conduit cover	"	2770	1
37*	#2/0, 1 cond. cable, Type SNW			70'
38*	Junction box	Crouse-Hinds	757	1
39	Wire holder	Joslyn	J1900	12
40*	#2/0 bare stranded copper cable			150'
41*	Connector for #2/0 stranded cable to 3/4" ground rod	Burndy	GR6426	4
42*	Ground rod, 3/4" x 8'	Copperweld		4
43*	Enclosed fused switch, 2 pole, cover interlocked	Bryant	56251	1
43*	Transformer, 230-230/115 volts, 2KVA, dry type	West	911415	1
44*	Wall surface plate	Bryant	7171	2
47*	Junction box plate	Crouse-Hinds	RSMPO	2
48*	2" rigid electrical conduit			90'
49*	Special long radius 90° elbow 2" x 24" rad.			4
50	Flexible metal conduit 1 1/4" x 24" long			2
51	" " " 1" x 1'-6" long			1
52	#12 Type RNW copper wire			100'

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING EQUIPMENT & GATES
PUMPING PLANT NO. 3
LIGHTING & POWER SYSTEMS

SHEET 8 OF 48 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] CHIEF ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEER

APPROVED: [illegible] ACTING DISTRICT ENGINEER

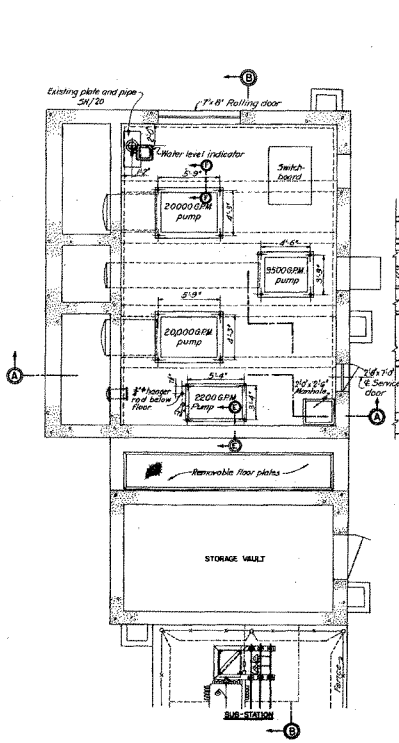
BY	DATE	CHARACTER REVISIONS

"RELIEVED AS BUILT" 824.1-51 934-128/8

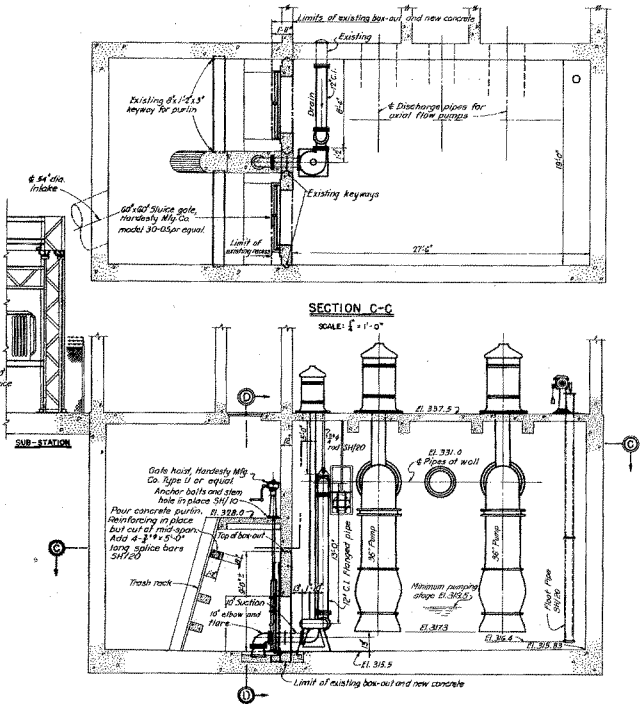
1049

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

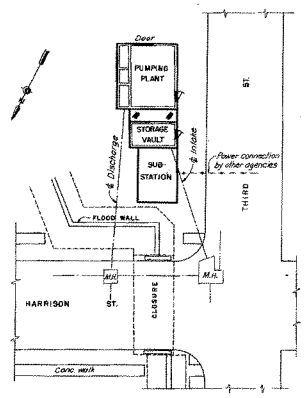


FLOOR PLAN
SCALE: 1/4" = 1'-0"



SECTION C-C
SCALE: 1/4" = 1'-0"

SECTION B-B
SCALE: 1/4" = 1'-0"



LOCATION MAP
SCALE: 1" = 20'

Notes:
For sections A-A, D-D, E-E and F-F see SH10
In setting gates and frames care shall be taken to leave all movable wedge parts free and accessible. Provide 1/2" recess under gates.
For sump pump pipe and fittings and gate frame anchor bolts to be furnished by the Government and installed by the Contractor, SH20.

BY	DATE	CHARACTER REVISIONS
WAK	22 Aug 45	Pumps revised

INDEX - PUMPING PLANT NO. 5

DRWG. NO.	TITLE
934-12.8/1	GENERAL PLAN.
934-12.8/9	PLANS AND SECTIONS.
934-12.8/10	DETAILS AND SECTIONS.
934-12.8/11	LIGHTING AND POWER SYSTEMS.
934-12.8/20	MISCELLANEOUS DETAILS
934-12.8/33	WIRING DIAGRAM

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 5
PUMPING EQUIPMENT AND GATES
PLANS AND SECTIONS

SHEET 9 OF 45 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — FEB. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] AS NIOR ENGINEER — APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

DR. BY Y.S. — TR. BY M.O.R. — CK. BY W.A.H.

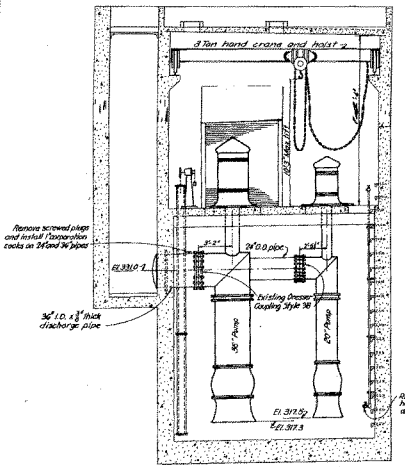
824.1-51 — 934-12.8/9

"BELIEVED AS BUILT"

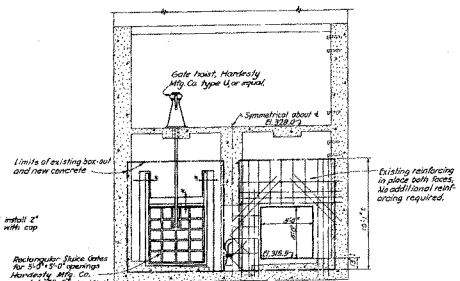
1050

WAR DEPARTMENT

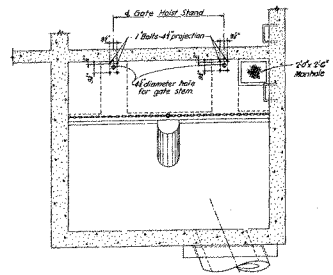
CORPS OF ENGINEERS, U. S. ARMY



SECTION A-A
SCALE: 1/4" = 1'-0"

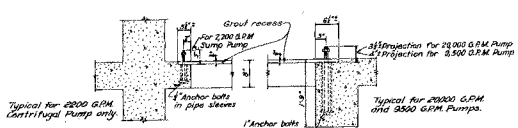


SECTION D-D
SCALE: 1/4" = 1'-0"



PLAN
GATE HOIST PLATFORM
SCALE: 1/4" = 1'-0"

Note:
For location of sections A-A, D-D, E-E and F-F, see 1/19.



SECTION E-E

SECTION F-F

SCALE: 1" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO.5
PUMPING EQUIPMENT AND GATES
DETAILS AND SECTIONS

SHEET 10 OF 46 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] ENGINEER

APPROVED RECOMMENDED: [illegible] SENIOR ENGINEER — DR. BY F.S.

APPROVED: [illegible] ASST. DISTRICT ENGINEER — TR. BY P.S. — CK. BY W.A.H.

BY	DATE	CHARACTER
W.A.H.	12 Aug 49	Pumps revised

REVISIONS

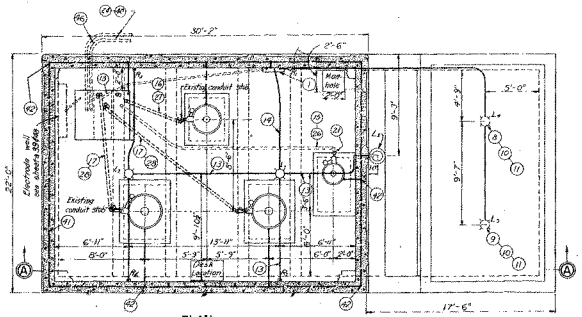
824.1-51

934-12.8/10 [illegible]

"BELIEVED AS BUILT"

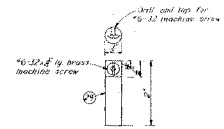
1051

287



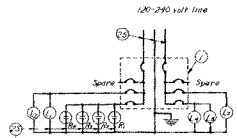
PLAN

SCALE: 1/4" = 1'-0"



ELECTRODE DETAIL

SCALE: NONE

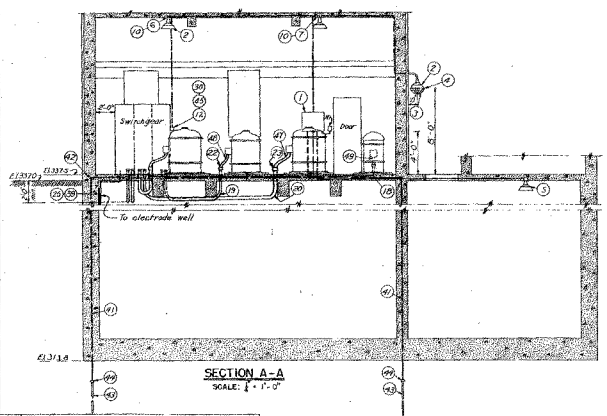


WIRING DIAGRAM

LIGHTING CIRCUIT

Concealed conduit
Embedded conduit
Exposed conduit
Ground wire

LEGEND



SECTION A-A

SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER

REVISIONS

Notes:

Figures in circles refer to part numbers in bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

Small fittings, conduits, couplings and adapters etc not listed shall be furnished as required.

* Indicates material previously installed.

All existing conduit stubs on conduit runs which are to be abandoned between switchgear and stairs shall be cut off level with floor and plugged with concrete.

Install 200 watt bulbs, furnished by the Government, in all lighting fixtures.

Existing motor lead conduits are capped approximately 6" above floor.

For existing layout, see sheet 42.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CAT. NO.	QUAN.
1*	6 circuit light distribution panel (surface type)			1
2*	14" M. dome reflector and socket	Westc.	3H9371	3
3*	Wire guard	"	3J1497	1
4*	Wire guard padlock	"	3J1484	1
5*	Vaporite conduitet with reflector and socket	Crouse-Hinds	VHM/939	2
6*	Conduitet outlet	" "	SK112	1
7*	" "	" "	SKX12	1
8*	" "	" "	SKC12	1
9*	" "	" "	SK12	1
10*	" cover	" "	SK84	4
11*	" gasket	" "	Gask2GR	2
12*	Duplex plug receptacle	Bryant	7484	4
13*	3/4" rigid electrical conduit			150'
14*	3/4" " "			20'
15*	1" " "			25'
16	2" " "			15'
17	3" " "			40'
18*	1" standard 90° elbow			2
19	2" " " "			2
20	3" " " "			4
21	1" coupling			
22	2" "			
23	3" "			
24*	3/4" rigid electrical conduit			140'
25	#12 insulated copper wire			140'
26	#8 stand. cable, Type R.H. with 60% rubber jacket			80'
27	#6 stand. cable, Type R.H. with " " "			40'
28	#350 M.C.M. stand. cable Type R.H. with 60% rubber jacket			120'
29	Brass electrode, 3/4" x 2' (see detail)			12
30	1" bolt circle type insulator	Westl.	43/136	12
31				
32	Bus support fitting Drill to clamp 3/4" electrode			12
33				
34				
35				
36				
37				
38*	Wall surface plate	Bryant	HV31	4
39	1 1/4" Rigid electrical conduit			16'
40	#500 M.C.M. stand. cable, Type R.H. with 60% rubber jacket			440'
41*	#2/0 bare stranded copper cable			240'
42*	"T" connectors for #2/0 stranded cable	Burndy	KT2626	10
43*	Ground rod, 3/4" x 8'	Copperweld		4
44*	Connector for #2/0 stranded cable to 3/4" ground rod	Burndy	GK6426	4
45*	Conduitet outlet	Crouse-Hinds	FS	4
46*	Special long radius 90° elbow, 3" x 36" radius		R.E.	8
47	Flexible metal conduit 3 1/2" x 8'-6" lg.			2
48	" " " 2" x 1'-6" lg. ±			1
49	" " " 1" x 1'-6" lg. ±			1
50	Wireholders	Joslyn	J1860	25

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 5

PUMPING EQUIPMENT AND GATES

LIGHTING & POWER SYSTEMS

SHEET 11 OF 48 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — FEB. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] DISTRICT ENGINEER

APPROVED: [signature] COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

CH. DIV. O.D. — TR. DIV. C.R.C. — CH. DIV. O.D.

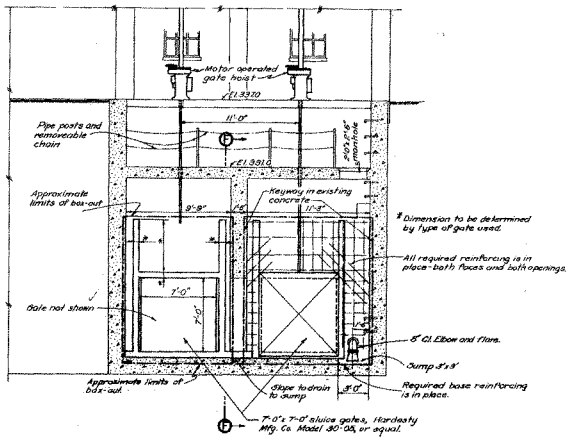
824.1-51 — 934-12.8/11

1052

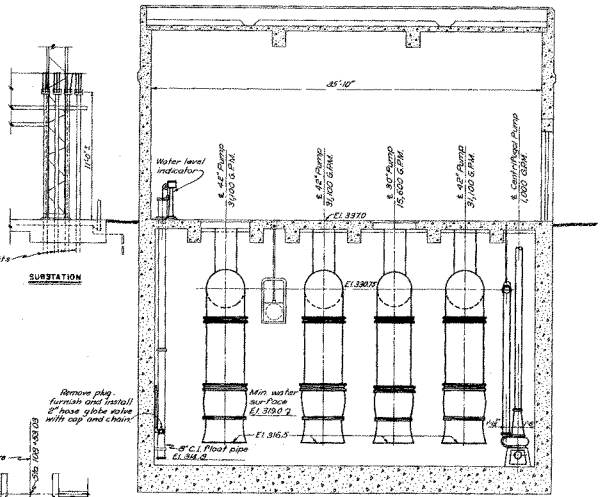
"REDUCED 5% ON PRINT"

WAR DEPARTMENT

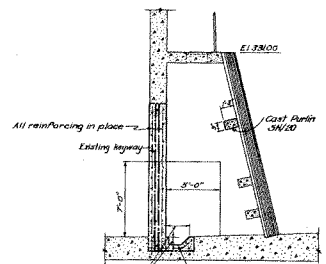
CORPS OF ENGINEERS, U. S. ARMY



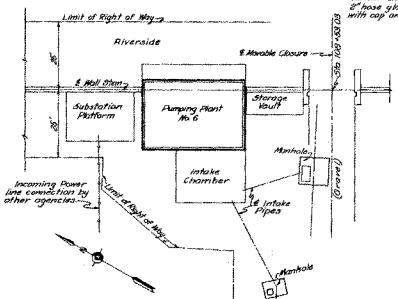
SECTION B-B



SECTION C-C



SECTION F-F



LOCATION PLAN

SCALE: 1/4" = 1'-0"

Note:
In setting gate frame, care shall be taken to leave all wedge parts free and accessible.
For location of sections B-B & C-C; SH/13
For sump pump pipe and fittings and gate anchor bolts to be furnished by Government: SH/20

W.A.H.	2 Aug 48	Pumps revised
BY	DATE	CHARACTER
		REVISIONS

INDEX - PUMPING PLANT NO. 6

DRWG. NO.	TITLE
934-12.8/1	GENERAL PLAN.
934-12.8/12	LOCATION PLAN AND SECTIONS.
934-12.8/13	PLAN AND SECTION.
934-12.8/20	MISCELLANEOUS DETAILS.
934-12.8/14	LIGHTING & POWER SYSTEMS.
934-12.8/33	WIRING DIAGRAM.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 6
PUMPING EQUIPMENT AND GATES
LOCATION PLAN & SECTIONS

SHEET 12 OF 46 SHEETS SCALES 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: R. C. Hedges
CHIEF, E.D.

APPROVAL RECOMMENDED: W. A. Greene
CHIEF, E. DESIGNER

APPROVED: Thomas J. Miller
LT. COL. C.E.
ACTING DISTRICT ENGINEER

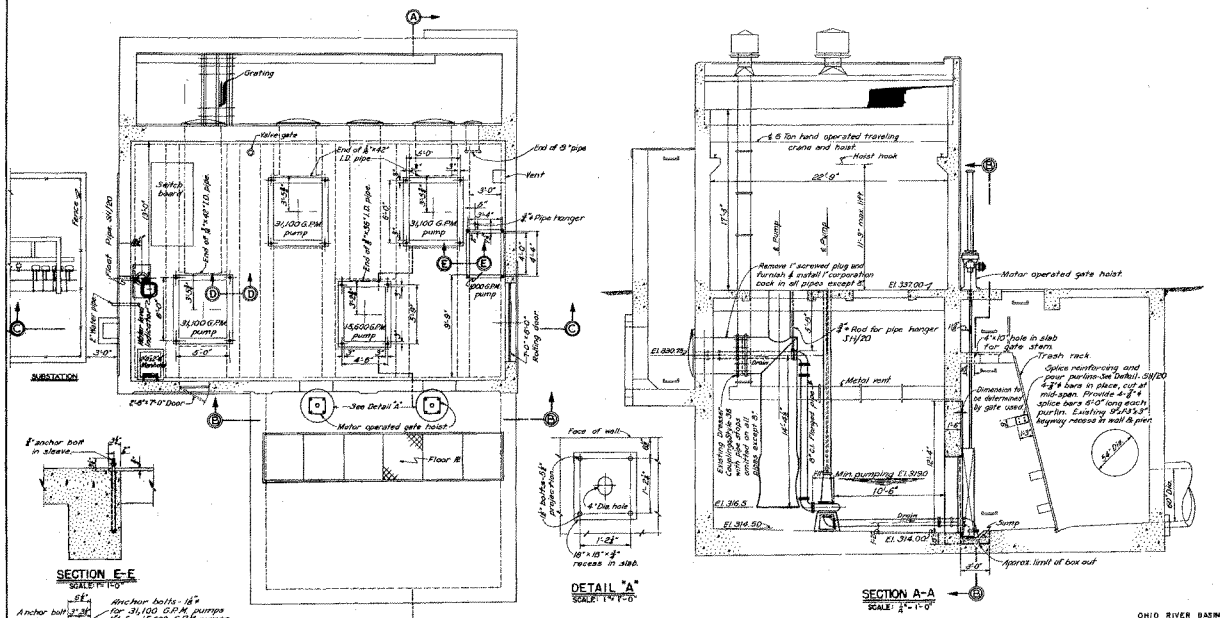
DS. BY W.W.S. TR. BY E.P.S. CK. BY W.A.H.

824.1-51 "BELIEVED AS BUILT" 934-12.8/12

1053

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 6
PUMPING EQUIPMENT AND GATES
PLAN AND SECTIONS

SHEET 13 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: W. H. Hoge
DESIGNED BY

APPROVAL RECOMMENDED: Leslie Simmons, District Engineer

APPROVED: Howard S. Miller, Lt. Col., Corps of Engineers, Acting District Engineer

DR. BY W.B.S. CK. BY W.H.H. TR. BY K.C.T.

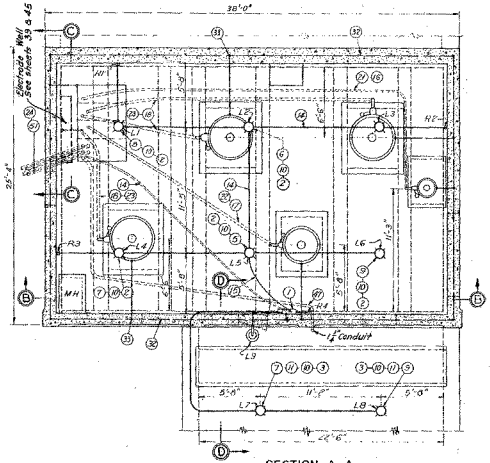
824.1-51

934-12.8/13

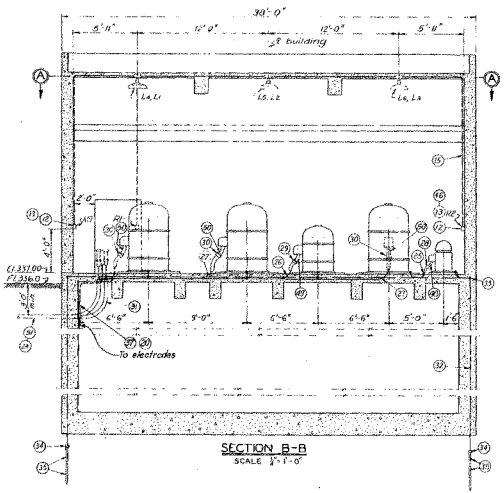
"RELIEVED AS BUILT"

290

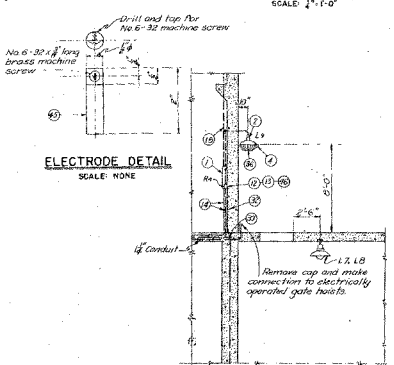
WAR DEPARTMENT



SECTION A-A
SCALE: 1/4" = 1'-0"

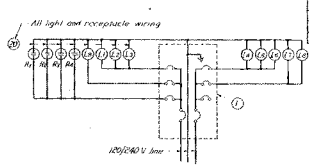


SECTION B-B
SCALE: 1/4" = 1'-0"



ELECTRODE DETAIL
SCALE: NONE

SECTION D-D
SCALE: 1/4" = 1'-0"



WIRING DIAGRAM
LIGHTING CIRCUIT

LEGEND

Embedded Conduit
Exposed Conduit
Concealed Conduit
Ground Wire

BY	DATE	CHARACTER REVISIONS

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUAN. REQ.
1 *	6 circuit light distribution panel (Surface type)			1
2 *	R.L.M. dome reflector and socket	West	JA9513	7
3 *	Vaporite conduit with reflector and socket	Crouse-Hinds	VMDA1150	2
4 *	Pendlock	West	351484	1
5 *	Condulet outlet	Crouse-Hinds	SKX 22	1
6 *	" " "	" "	SKT 12	1
7 *	" " "	" "	SKC 12	3
8 *	" " "	" "	SKL 12	1
9 *	" " "	" "	SK 12	2
10 *	Condulet cover	" "	SK 64	8
11 *	Gasket	" "	Gask 208	2
12 *	Condulet outlet	" "	FS 1	4
13 *	Duplex plug receptacle	Bryant	Type 9019 4826	4
14 *	¾" rigid electrical conduit			240'±
15 *	3" " " "			20'±
16 *	1" " " "			30'±
17 *	2" " " "			30'±
18 *	3" " " "			60'±
19 *	#6 hard drawn tensolid wire			25'±
20	#12 AWG insulated copper wire			700'±
21	#8 1 cond. cable, with 60% rubber jacket			130'±
22 *	#3/0 " Type RH, " " "			80'±
23	350 MCM 1 cond. cable, Type RH, with 60% rubber jacket			200'±
24	350 " " Type RH, with 60% rubber jacket			400'±
25 *	1" standard 90° elbow			2
26 *	2" " " "			2
27 *	3" " " "			6
28	1" Coupling			1
29	2" "			1
30	3" "			3
31 *	Special long radius 90° elbow, 48" x 48" radius	G.E.		8
32 *	#10 bare stranded copper wire			280'±
33 *	1" connector for #10 stranded cable	Burndy	NI 2626	11
34 *	Connector for #10 stranded cable to ¾" rod	"	GA 6426	4
35 *	Ground rod, ¾" x 8'-0" long	Copperweld		4
36 *	Wire guard for reflector	Ref-I	351497	1
37	1½" Rigid electrical conduit			20'±
38	Wireholder	Joslyn	J1980	41
39				
40				
41				
42	3" bolt circle type insulator	Lapp	13761	16
43				
44	Bus support fitting drilled to clamp ¾" dia. electrode *		9653	16
45	Brass electrode (See detail)			16
46 *	Wall surface plate			4
47	#4 1 cond. cable, Type RH, with 60% rubber jacket			125'±
48	Flexible metal conduit 1" x 1'-6" lg.			1
49	" " " 2" x 2'-0" lg.			1
50	" " " 3" x 2'-0" lg.			3
51 *	4" rigid electrical conduit			130'±

Notes:

Figures in circles refer to Part numbers on Bill of Material.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
Small fittings, conduits, couplings and adapters etc. not listed shall be furnished as required.
* Indicates materials previously installed.

For existing electrode layout see sheet No. 44

Install 200 watt bulbs, to be furnished by the Government in all lighting fixtures.
Existing motor lead conduits are capped approximately 6" above floor

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
PUMPING EQUIPMENT AND GATES
LIGHTING & POWER SYSTEMS

SHEET 14 OF 46 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE KY. — FEB 1944

SUBMITTED: [signature] ENGINEER

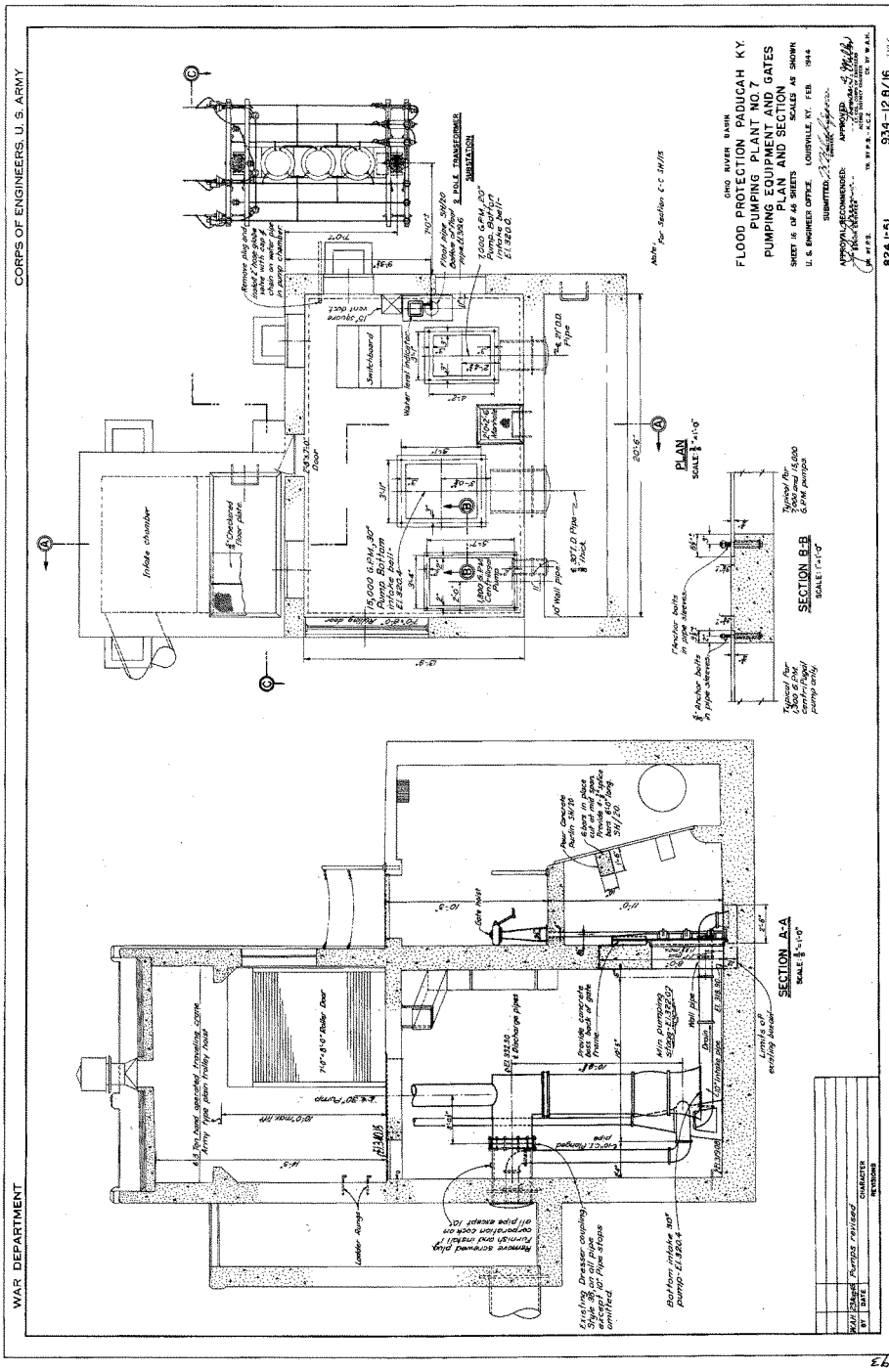
APPROVAL RECOMMENDED: [signature] CHIEF ENGINEER

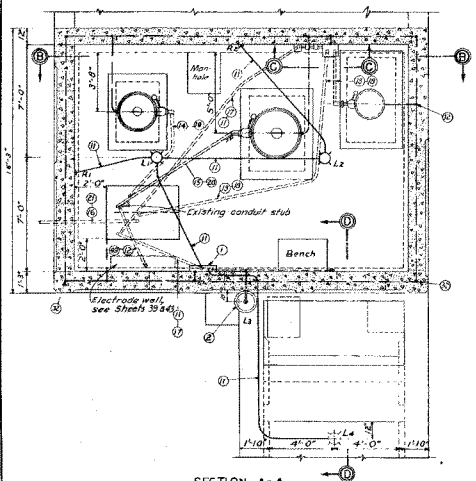
APPROVED: Thomas F. Walker LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY D.S. - D.E.E. TR. BY R.K.V. CK. BY B.S.

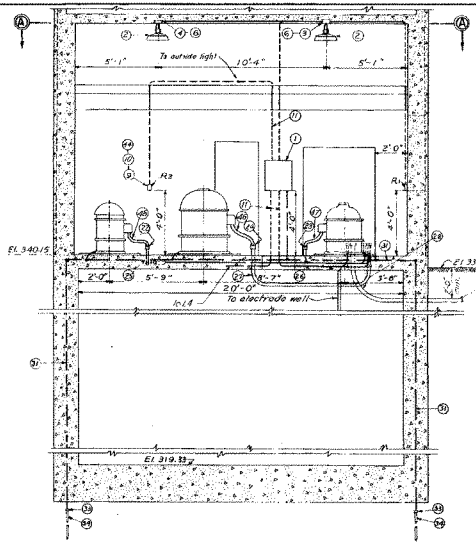
COLORED AS BUILT 824.1-51 934-12.8/14

1055

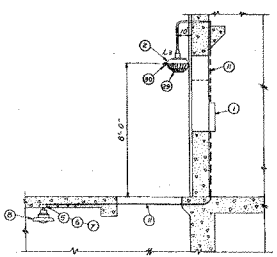

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 7
PUMPING EQUIPMENT AND GATES
PLAN AND SECTION
SHEET 16 OF 46 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. FEB. 1944
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
934-12.8/16
824.1-51
"BELIEVED AS BUILT"
PLAN
SCALE 1/8" = 1'-0"
SECTION B-B
SCALE 1"=1'-0"
SECTION A-A
SCALE 1/8" = 1'-0"
Intake chamber
Checkered floor plate
Sump Pump
Switchboard
Water level indicator
15,000 G.P.M. 30" Pump Bottom intake bell-El. 302.4
1200 G.P.M. 20" Pump Bottom intake bell-El. 302.4
Typical for 15,000 G.P.M. pumps
Typical for 1200 G.P.M. centrifugal pump only
Remove screwed plug and install 1" Brass operation cock on oil pipe except 10"
Bottom intake for pump-El. 302.4
Ladder Rungs
Gate hoist
Limits of existing block
Drain
Well pipe
Pump Concrete Purlin 3x12
Provide separate base-block and gate frame
Min pumping stage-El. 325.67
Rubber Flanged pipe
Remove plug and install gate valve
Remove plug and install 1" Brass operation cock on oil pipe except 10"
Provide 1" Gate valve and 1" long bolt 30" long
Provide 1" Gate valve and 1" long bolt 30" long
Remove plug and install 1" Brass operation cock on oil pipe except 10"
Remove plug and install 1" Brass operation cock on oil pipe except 10"
Remove plug and install 1" Brass operation cock on oil pipe except 10"



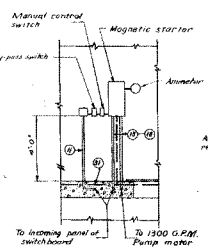
SECTION A-A



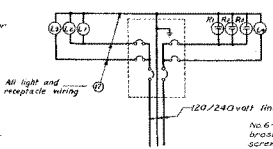
SECTION B-B



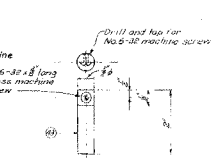
SECTION D-D



SECTION C-C



WIRING DIAGRAM
LIGHTING CIRCUIT



ELECTRODE DETAIL
SCALE: NONE

LEGEND
Embedded Conduit
Exposed Conduit
Ground Wire
Concealed Conduit

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUAN. REQ'D
1*	4 circuit light distribution panel (surface type)			1
2*	R.L.M. dome reflector and socket	West.	349573	3
3*	Conduit outlet	Crouse-Hinds	SKT 12	1
4*	" "	"	SKL 12	1
5*	" "	"	SK 12	1
6*	Conduit cover	" "	SK 84	3
7*	Conduit gasket	" "	Gsk 208	1
8*	Vaporite conduit with reflector and socket	" "	VHM 1939	1
9*	Conduit outlet	" "	F31	3
10*	Duplex plug receptacle	Bryant	5345-B-1ST 5826	3
11*	1/2" Rigid electrical conduit			155'±
12*	3/4" " " "			2'±
13*	1" " " "			40'±
14*	1 1/4" " " "			15'±
15*	2" " " "			15'±
16*	3" " " "			40'±
17	#12 A.W.G. insulated copper wire			310'±
18	#8 A.W.G. lamp cable, Type RH, with 60% rubber jacket			120'±
19	#4 A.W.G. " " " " " " "			40'±
20	#6 A.W. " " " " " " "			45'±
21	#300 M.C.M. " " " "			120'±
22	1" coupling			1
23	1 1/4" "			1
24	2" "			1
25*	1" STT. 90° Elbow			4
26*	1 1/4" " "			2
27	2" " "			2
28*	Special long radius 90° elbow, 3"φ x 36" rad.	G.E.		2
29*	Wire guard for reflector	West	351497	1
30*	Padlock	"	351489	
31*	#2/0 bare stranded copper cable			200'±
32*	T connector for #2/0 copper cable	Burndy	NT 6526	10
33*	Connector for #2/0 str. cable to 3/4" grnd. rod	"	GA 6926	4
34	Ground rod 3/4"φ, 8' long	Copperweld		4
35				
36				
37				
38				
39				
40	3 bolt circle type insulators	West	497736	
41	Bus support fitting (nib to clamp 3/8" bare solid wire)	Locke	3653	
42	" " " " " 1/2"φ electrode	"	"	
43	Brass electrode (See Detail)			1
44*	Wall surface plate	Bryant	HY-31	3
45	Flexible metal conduit 1"x 12'0" lg.			1
46	" " " 2"x 2'6" lg.			1
47	" " " 1 1/4"x 2'0" lg.			1
48	Wireholder	Joslyn	J1980	17
49	#12 Insulated copper wire, Type SNW			175'±

Notes:

Figures in circles refer to part Nos. in Bill of Material.

All material shall be of the manufacture, type and catalog number specified or its equal.

Small fittings, conduits E.M.T. couplings and adapters etc. not listed shall be furnished as required.

Two existing conduit stubs on conduit run which is to be abandoned between switchgear and motor shall be cut off level with floor and plugged with concrete.

* Indicates material previously installed.

Install 200 watt bulbs to be furnished by the government in all lighting fixtures.

Existing motor lead conduits are capped approximately 6" above floor.

For existing conduit and electrode layout see sheet 46

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
PUMPING EQUIPMENT & GATES
LIGHTING & POWER SYSTEMS

SHEET 17 OF 46 SHEETS SCALE 1/8" = 1'-0"

U.S. ENGINEER OFFICE. LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible]

APPROVED: RECOMMENDED: [illegible] SENIOR ENGINEER

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY A.L.T. TR. BY M.L. CK. BY D.S.

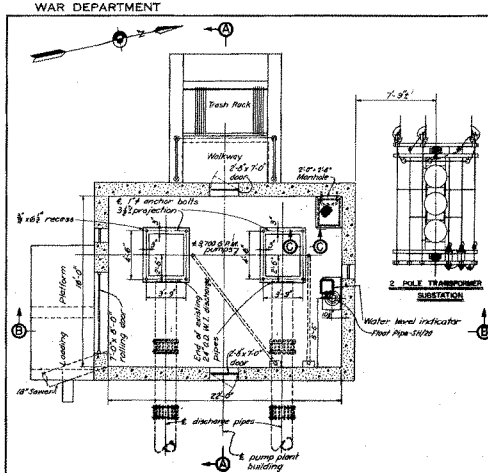
824.1-51

934-12.8/17

"BELIEVED AS BUILT"

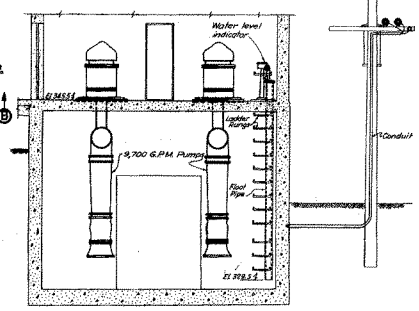
BY	DATE	CHARACTER
		REVISIONS

1057

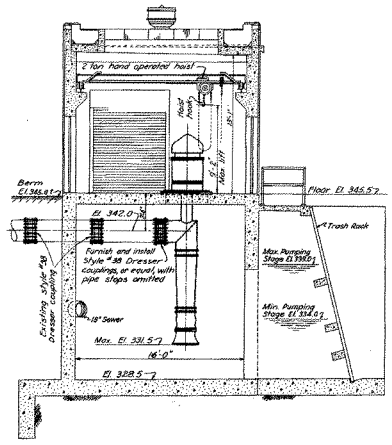


FLOOR PLAN
SCALE: ¼"=1'-0"

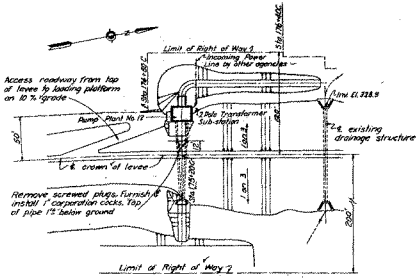
2 POLE TRANSFORMER SUBSTATION



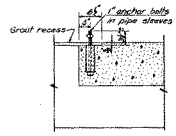
SECTION B-B
SCALE: ¼"=1'-0"



SECTION A-A
SCALE: ¼"=1'-0"



LOCATION PLAN
SCALE: 1"=50'



SECTION C-C
SCALE: 1"=0"

INDEX PUMPING PLANT NO. 12	
DRWG. NO.	TITLE
934-12.8/1	GENERAL PLAN
934-12.8/18	PLANS AND SECTIONS
934-12.8/19	LIGHTING AND POWER SYSTEM
934-12.8/20	MISCELLANEOUS DETAILS
934-12.8/41	WIRING DIAGRAM

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 12
PUMPING EQUIPMENT & GATES
PLANS AND SECTIONS

SHEET 18 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] MANAGER

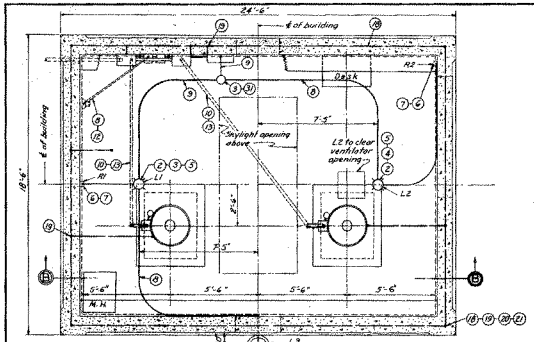
APPROVAL RECOMMENDED: [illegible] SENIOR ENGINEER

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS ACTING DISTRICT ENGINEER

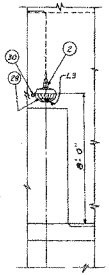
DR. BY E.T. TR. BY E.T. CK. BY W.A.H.

824.1-51 934-12.8/18

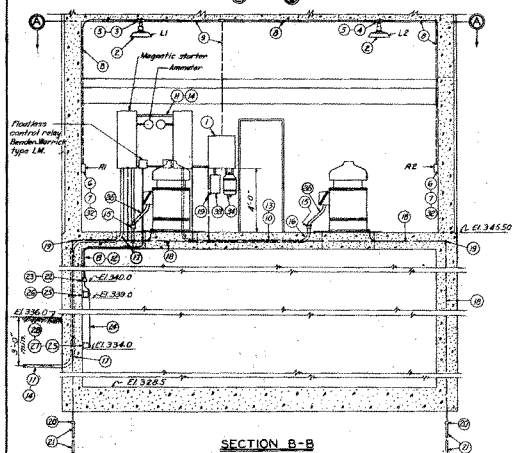
"BELIEVED AS BUILT"



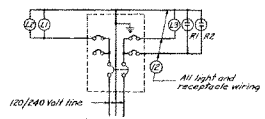
SECTION A-A



SECTION C-C



SECTION B-B

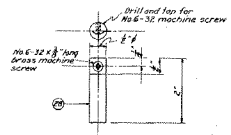


WIRING DIAGRAM OF LIGHTING CIRCUIT

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	4-Circuit light distribution panel (surface type)			1
2	ALM dome reflector and socket	West.	349513	3
3	Condulet outlet	Crouse-Hinds	XCT 22	2
4	"	" "	XCL 12	1
5	" cover	" "	XCB 9	2
6	" outlet	" "	FS-1	2
7	Duplex plug receptacle			2
8	1/2" rigid electrical conduit			100ft
9	3/4" " " "			30ft
10	1" " " "			40ft
11	1 1/2" " " "			40ft
12A	#12 AWG insulated copper wire			300ft*
13A	#9 AWG, 1-cond cable, Type RH, with 60% rubber jacket			125ft*
14A	#6 " " " " Type SNW			12.5ft*
15A	1/2" Coupling			2 *
16	1/2" Std 90° elbow			4
17	1/2" " " "			4
18	#2/0 bare stranded copper cable			190ft
19	"T" connector for #2/0 stranded cable	Burndy	NT2626	10
20	Connector for #2/0 stranded cable to 3/4" ground rod	"	GA6426	4
21	Ground rod, 3/4"x8'	Copperweld		4
22	Condulet outlet	Crouse-Hinds	A17	1
23	" cover	" "	1771	1
24	#6 AWG, hard drawn copper wire			6*
25	3" bolt circle type insulator	Lapp	13761	2
26	Bus support fitting. Drill to clamp #6 bare solid wire	Locke	9853	1
27	" " " " 3/4" ϕ electrode	"		1
28	Brass electrode, 3/4" ϕ x 8' long (See detail)			1
29	Wire guard for reflector	West.	351497	1
30	Padlock	"	351484	1
31	Condulet cover	Crouse-Hinds	XCB 9	1
32	Wall surface plate			2
33	Enclosed Fused switch, 2 pole, cover interlocked	Cruttenden	56761	1
34	Transformer, 460-115/230V, 2KVA, dry type	West.	911418	1
35	Flexible metal conduit 1 3/4"x2'-0"lg			2*

Note:
Figures in circles refer to part numbers on bill of material.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
Small fittings, conduits, couplings and adapters, etc. not listed shall be furnished as required.
* Indicates materials to be furnished and installed under this contract. Other materials listed and shown were installed under previous contract and are of the type and catalog number specified or equal.
Install 200 watt bulbs, furnished by the Government, in all lighting fixtures.
Existing motor lead conduits are capped approximately 4' above floor.



ELECTRODE DETAIL

SCALE: NONE

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.12
PUMPING EQUIPMENT AND GATES
LIGHTING & POWER SYSTEMS

SHEET 19 OF 46 SHEETS SCALE: 3/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEER

APPROVED: [illegible] ACTING DISTRICT ENGINEER

DR. BY C.E.E. TR. BY J.L.F. CK. BY D.S.

824.1-51

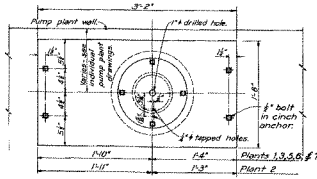
934-12.8/19

"BELIEVED AS BUILT."

1059

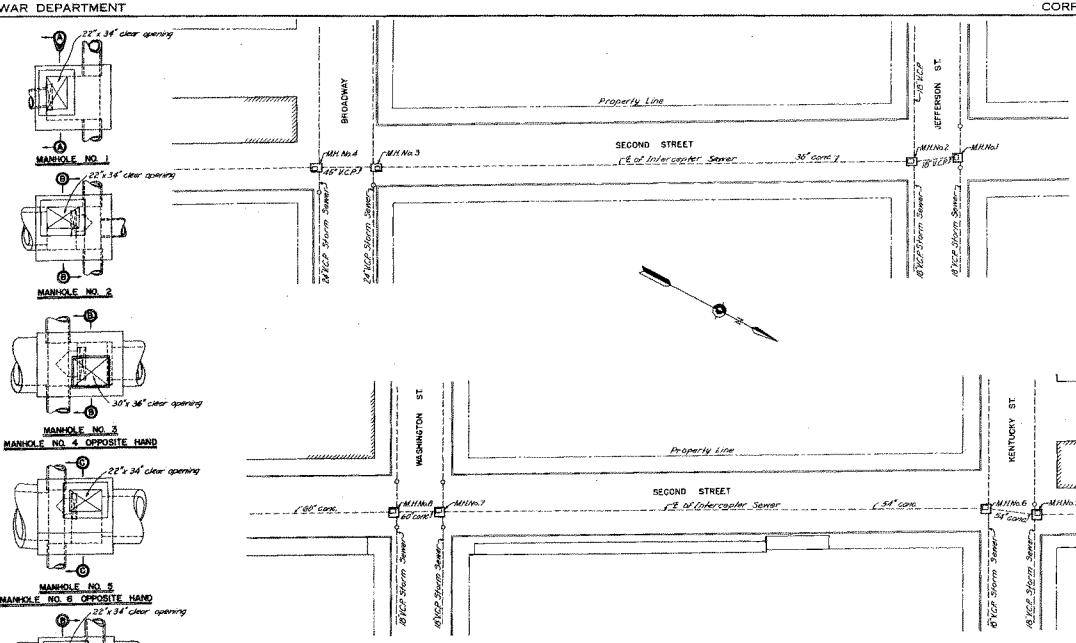
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY


3'-2"
Pump plant wall.
1" drilled hole.
Varies - see individual pump plant drawings
1'-6"
1'-6"
1'-6"

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

INTERCEPTER SEWER MANHOLES

LOCATION PLAN

SHEET 21 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] ENGINEER.

APPROVAL RECOMMENDED: [illegible] SENIOR ENGINEER

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

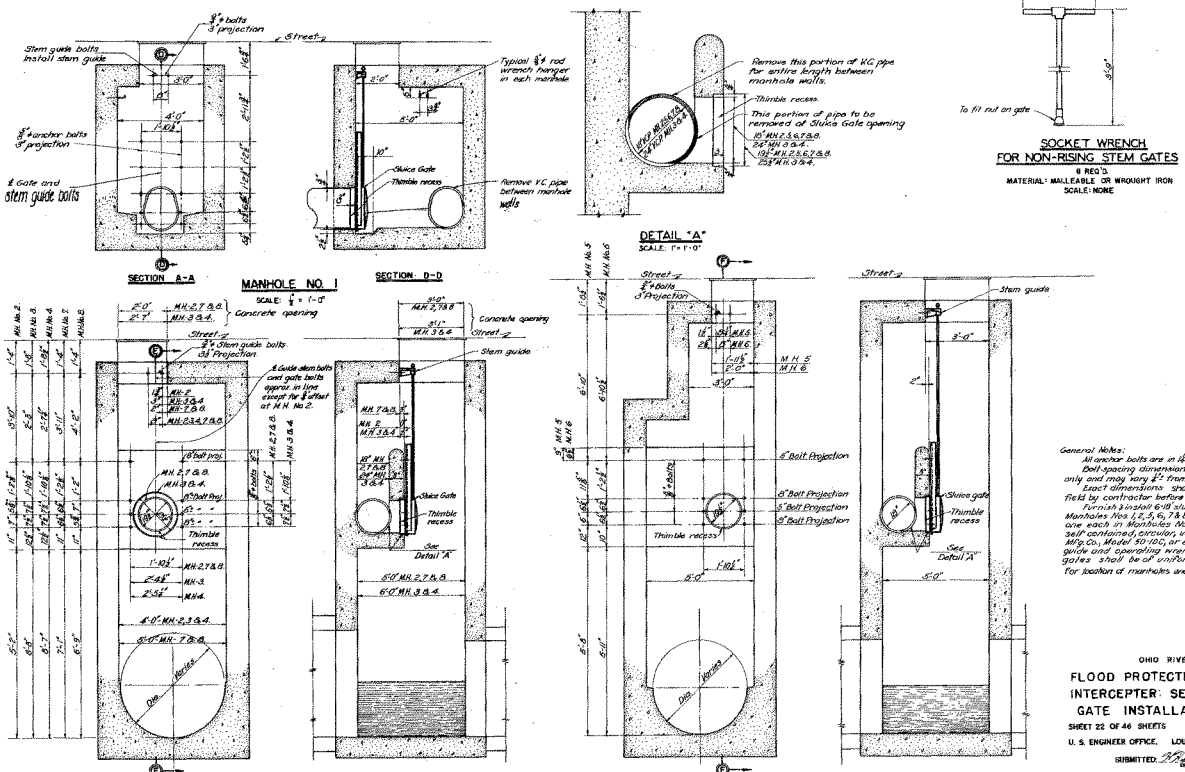
DR. BY W.W.S. TR. BY W.W.S. CK. BY W.A.H.

INDEX - INTERCEPTER SEWER MANHOLES	
DRWG. NO.	TITLE
934-12.8/1	GENERAL PLAN
934-12.8/21	LOCATION PLAN
934-12.8/22	GATE INSTALLATION DETAILS

824.1-51

934-12.8/21

"BELIEVED AS BUILT."



General Notes:

All anchor bolts are in 16" ϕ sleeves 9" deep.

Bolt spacing dimensions given are approximate only and may vary 3/4" from as shown.

Exact dimensions shall be determined in field by contractor before ordering gates and guides.

Furnish 3 (one) 6'-0" sluice gates, and each in Manholes Nos. 1, 2, 5, 6, 7 & 8 and 2-24" sluice gates, one each in Manholes Nos. 3 and 4. Gates to be self contained, circular, unsealing pressure, Hardesty Mfg. Co., Model 50-10C, or equal, complete with stem guide and operating wrench. Operating nuts on all gates shall be of uniform size.

For location of manholes and sections, SH 12.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY INTERCEPTER SEWER MANHOLES GATE INSTALLATION DETAILS

SHEET 22 OF 46 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEER DIVISION

APPROVED: James E. Miller ACTING DISTRICT ENGINEER

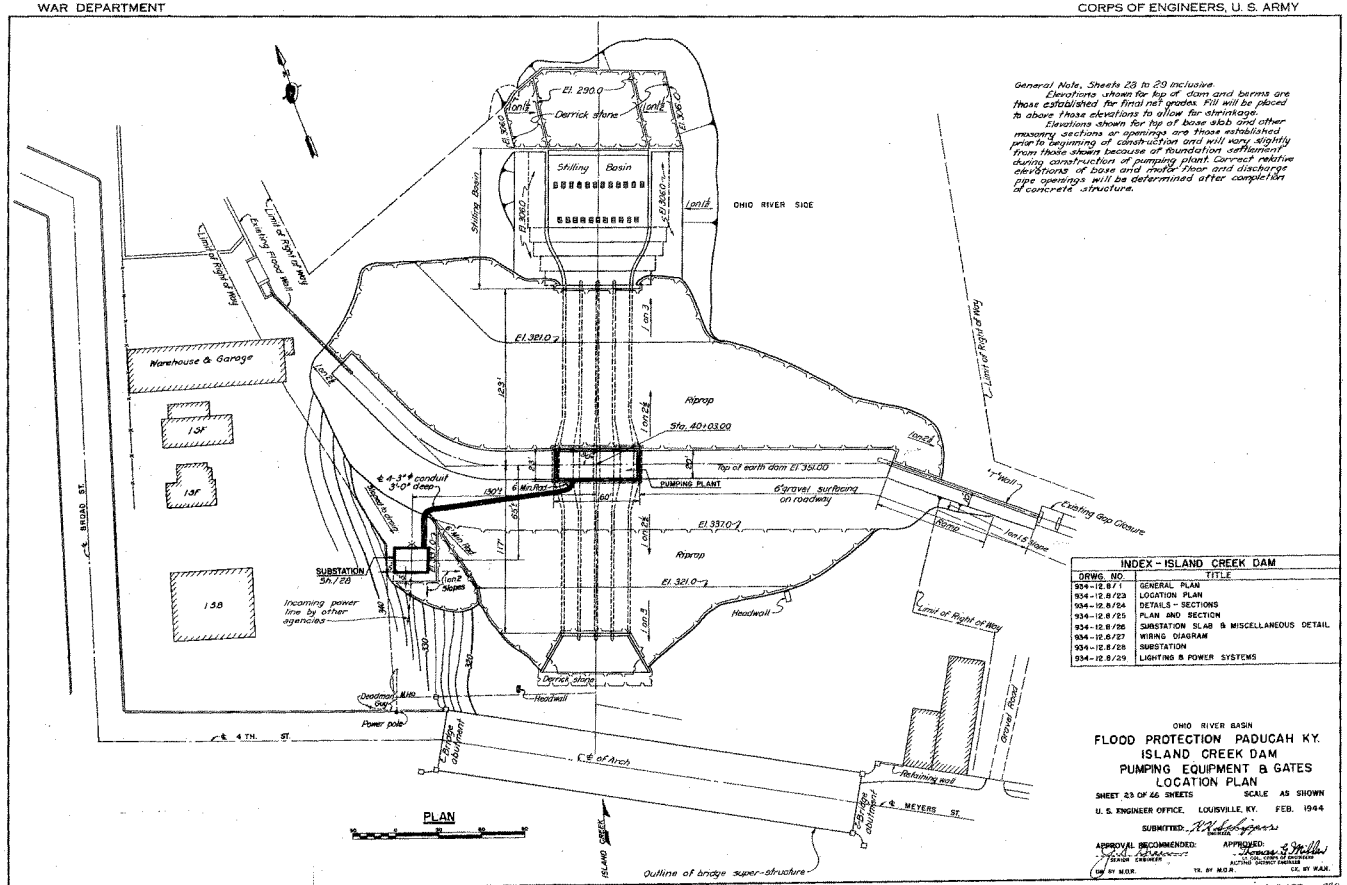
DR. BY R.K.K. TR. BY R.K.K. CK. BY W.A.H.

824.1-51 934-12.8/22

"BELIEVED AS BUILT"

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



General Note. Sheets 23 to 29 inclusive

Elevations shown for top of dam and berms are those established for final net grades. Fill will be placed to above those elevations to allow for shrinkage.

Elevations shown for top of base slab and other masonry sections on openings are those established prior to beginning of construction and will vary slightly from those shown because of foundation settlement during construction of pumping plant. Correct relative elevations of base and motor floor and discharge pipe openings will be determined after completion of concrete structure.

INDEX - ISLAND CREEK DAM

DRWG. NO.	TITLE
934-12.8/1	GENERAL PLAN
934-12.8/23	LOCATION PLAN
934-12.8/24	DETAILS - SECTIONS
934-12.8/25	PLAN AND SECTION
934-12.8/26	SUBSTATION SLAB & MISCELLANEOUS DETAIL
934-12.8/27	WIRING DIAGRAM
934-12.8/28	SUBSTATION
934-12.8/29	LIGHTING & POWER SYSTEMS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

ISLAND CREEK DAM

PUMPING EQUIPMENT & GATES

LOCATION PLAN

SHEET 23 OF 66 SHEETS SCALE AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: R. R. Rogers
DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible]
CHIEF, ENGINEERING DIVISION

APPROVED: [illegible]
ACTING DISTRICT ENGINEER

TR. BY M.O.R. CK. BY W.A.H.

824.1-51

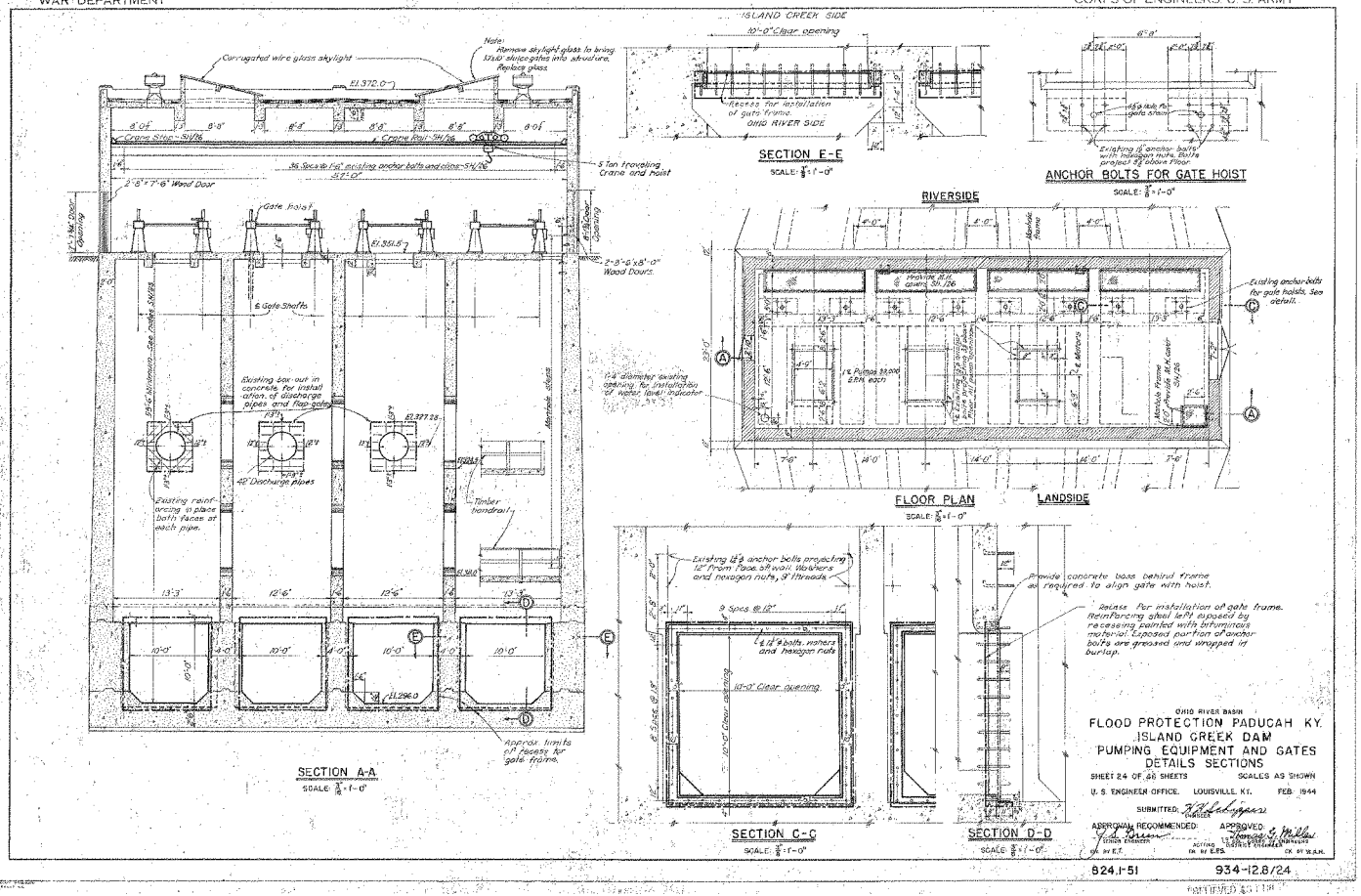
934-12.8/23

"BELIEVED AS BUILT"

1063

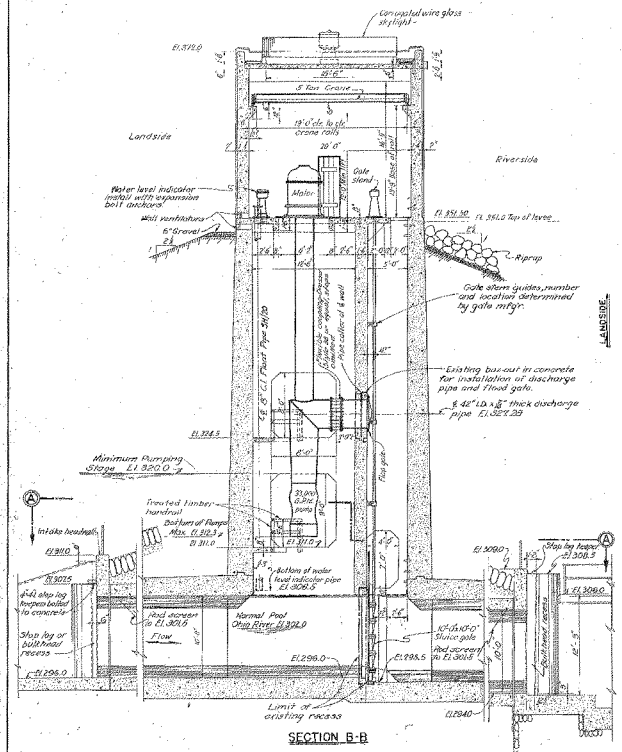
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

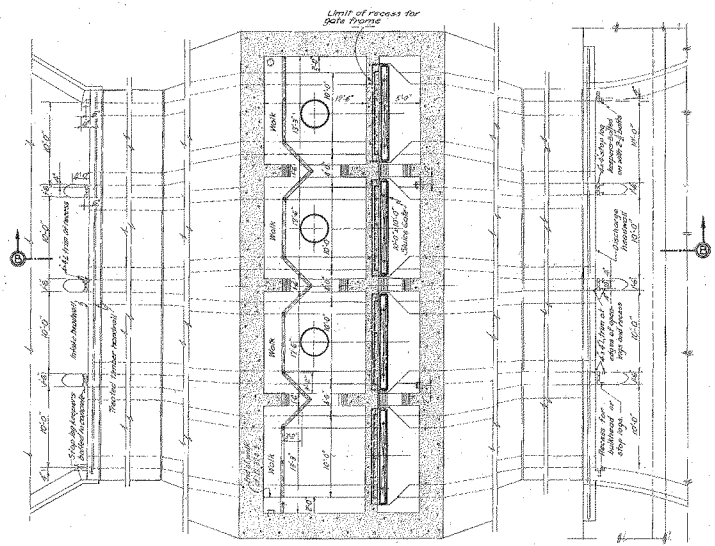


WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SECTION B-B



PLAN AT A-A

Note:
For details of crane rail, crane stop, pipe collar, see S14/28

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
PLAN AND SECTION

SHEET 23 OF 46 SHEETS SCALE: 3/16" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

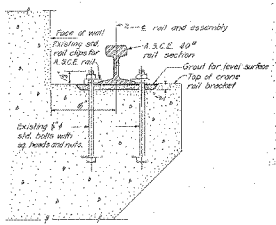
SUBMITTED: B. Wheelinger
ENGINEER

APPROVAL RECOMMENDED: Geo. R. Dixon
CHIEF ENGINEER
OR, TH. W. W. S.

APPROVED: Geo. R. Dixon
COL. CORPS OF ENGINEERS
ACTING DISTRICT ENGINEER
TH. BY R.A.V.

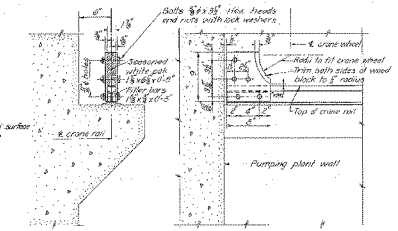
824.1-51 934-12.8/25

"DELIVERED AS BUILT"



RAIL ANCHORAGE DETAIL

SCALE: 3" = 1'-0"

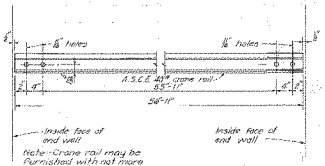


CRANE STOP DETAILS

MATERIAL: STRUCTURAL STEEL, EXCEPT AS SHOWN

MK. CS1 = MAKE 6

SCALE: 1½" = 1'-0"

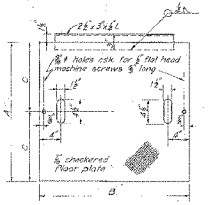


CRANE RAIL DETAIL

MATERIAL: STRUCTURAL STEEL

MK. CR1 = MAKE 2

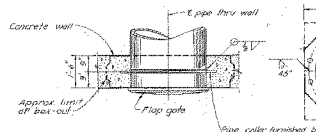
SCALE: 1½" = 1'-0"



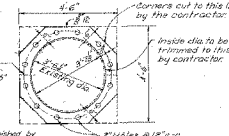
MANHOLE COVER

SCALE: NONE

MANHOLE COVERS								
Manhole size	A	B	C	Angle section	Hand holes	Make	Mark	Wt. each
2'-0" x 2'-0"	1'-8½"	2'-0½"	1⅛"	none	2	1	MC1	125#
2'-0" x 1'-8"	1'-1½"	2'-2½"	12⅝"	"	2	4	MC2	94#
	1'-1½"	1'-4½"	12⅝"	1'-10"	2	20	MC3	110#



PLAN



ELEVATION

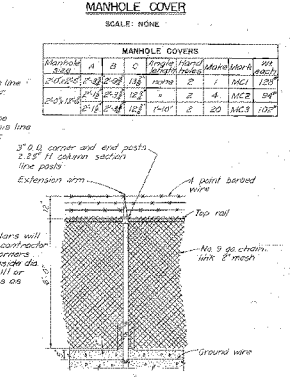
Note:
Square pipe collars will be furnished to the contractor who shall cut the corners and increase the inside dia. as indicated and drill or punch the 3" holes as shown.

PIPE COLLAR

MATERIAL: STRUCTURAL STEEL

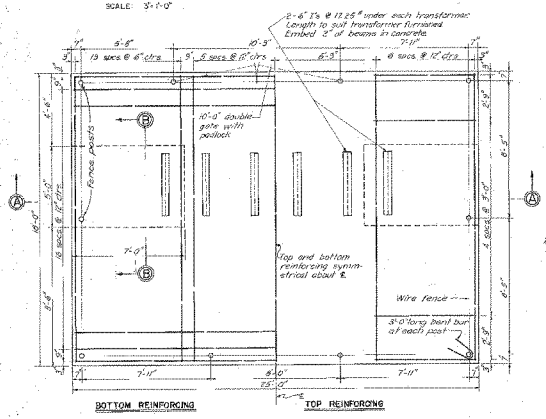
MAKE 8

SCALE: ½" = 1'-0"



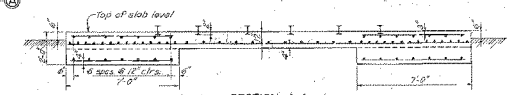
WIRE FENCE DETAIL

SCALE: ½" = 1'-0"



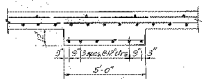
PLAN - TRANSFORMER SLAB

SCALE: ⅛" = 1'-0"



SECTION A-A

SCALE: ⅛" = 1'-0"



SECTION B-B

SCALE: ⅛" = 1'-0"

Note:
1855 linear feet of ⅝" ø steel reinforcing bars required. Total weight 1,125.# Cut and bend bars in field.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY

ISLAND CREEK DAM

PUMPING EQUIPMENT AND GATES

SUBSTATION SLAB & MISCELLANEOUS DETAIL

SHEET 28 OF 48 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] SENIOR ENGINEER

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

DR. DI. E.T. TR. BY E.P.S. CK. BY W.A.H.

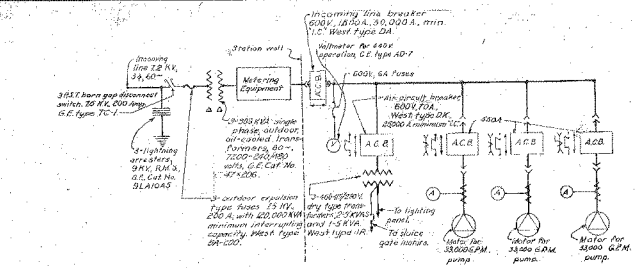
824.1-51

934-12.8/26

"BELIEVED AS BUILT"

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

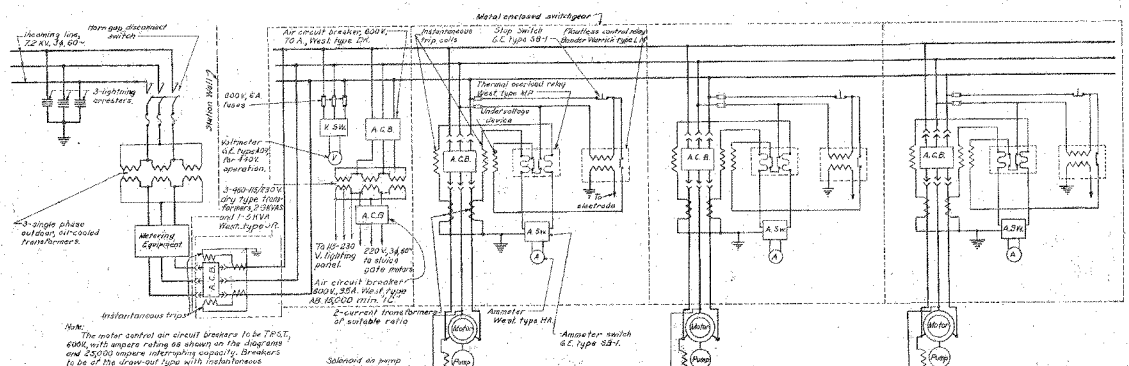


SINGLE LINE DIAGRAM

LEGEND

A.C.B. or Air circuit breaker	Voltmeter
Heater element	Ammeter
Undervoltage device	Squirrel cage induction motor
Thermal overload relay	or Fuse
Instantaneous overcurrent trip	Contactor switch
Current transformer	

Note: All equipment shall be of the manufacture, type, and catalog number specified, or its equal.



Note:
The motor control air circuit breakers to be T.P.S.T., 600V., with ampere rating as shown on the diagrams and 25,000 ampere interrupting capacity. Breakers to be of the draw-out type with instantaneous short circuit trips, time delay undervoltage trips, and thermal overload relays. West. type DK, G.E. type AE-18.

Switchgear will be furnished by the government & shall be installed under this contract.

The incoming line air circuit breaker shall be T.P.S.T., 600V., 1B.O.A., 30,000 A., interrupting capacity. Breakers to be of the draw-out type with instantaneous short circuit trips, West. type DA.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
WIRING DIAGRAM

SHEET 27 OF 46 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1942

SUBMITTED: [illegible] CHIEF ENGR.

APPROVAL RECOMMENDED: [illegible] SENIOR ENGINEER

APPROVED: Thomas J. Mullen LT. COL. CORPS OF ENGINEERS ACTING DISTRICT ENGINEER

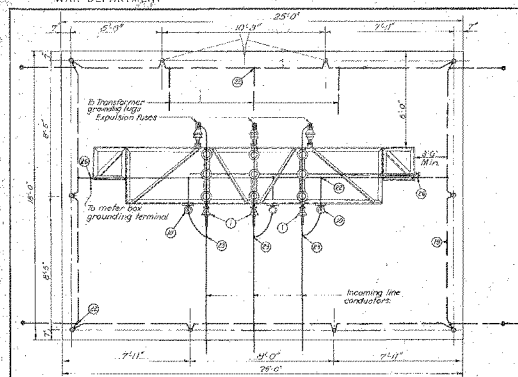
OK BY C.E.E. OK BY H.E.S. OK BY D.E.

824.1-51 934-12.8/27

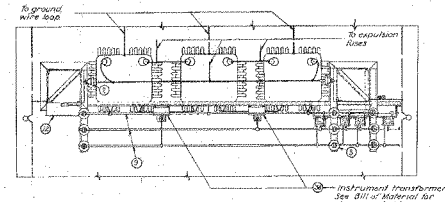
BETWEEN 1067 & 1068

WAR DEPARTMENT

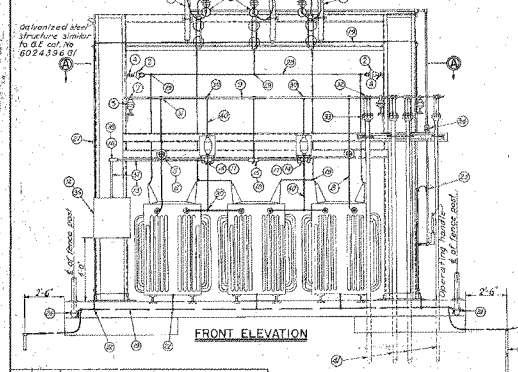
CORPS OF ENGINEERS, U. S. ARMY



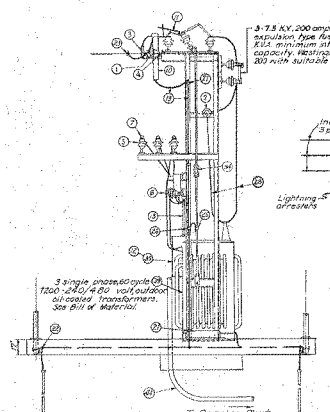
PLAN

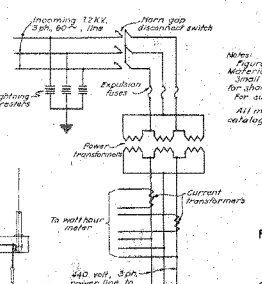


SECTION PLAN A-A



FRONT ELEVATION





WIRING DIAGRAM

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY
1	6" strain insulators	Locke	16588	3
2	6" strain insulators	Locke	18062	2
3	Strain clamps	Locke	20087	3
4	Hooks	Locke	2569	5
5	Insulator units	G.E.	6039910101	11
6	Bus supports	G.E.	6039203695	2
7	Bus supports	G.E.	6036.0560	9
8	1" IPS copper tubing			20'±
9	1½" extra heavy IPS copper tubing buses ea. 20'± long			3
10	Lightning arresters	G.E.	9LA10045	3
11	3 POLE horn gap disconnect switch G.E. type TCI	G.E.	6053962021	1
12	Meter box	Superior	PDU 7730	1
13	1" rigid electrical conduit			15'±
14	Conduit outlet Crouse-Hinds		E37	1
15	Conduit outlet "	"	C37	2
16	Conduit outlet "	"	LB37	2
17	3-hole composition cover "	"	3773	2
18	1-hole composition cover "	"	3771	1
19	#2/0 bare stranded copper cable			200'±
20	Ground rod ¾"x8' (Copperweld)			4
21	Connector for ¾" rod and #2/0 cable	Burndy	GK6426	4
22	T connector for #2/0 cable "	"	NTC626	12
23	Disconnecting clamp	G.E.	6024459301	3
24	Connector for #2/0 cable and fence posts	Burndy	Type CID	3
25	Connector for #2/0 cable and ¾" pipe	"	GD1636	1
26	Connector for #2/0 cable to structural framework	"	GC2626	2
27	" " " " " "	"	GB2626	61
28	#20 bare solid copper wire			50'±
29	"T" connectors for #20 bare solid copper wire	G.E.	6039422038	5
30	" " ½" IPS copper tubing	"	6006242416	4
31	" " " ½" IPS main to ¾" IPS branch	"	6006242169	2
32	" " ½" IPS main to 3/8" IPS branch	"	6006216055	15
33	"Y" Service entrance fitting Crouse-Hinds		FSG3	4
34	Operating rod insulator	Lapp	6993	1
35	Watthour meter	G.E.	77 # 311	1
36	Current transformer, 150/5A	"	33 # 607	2
37	#12 insulated copper wire			100'±
38	Blunt conduit cover Crouse-Hinds		3770	1
39	Power transformer, 7200-240/480V, 333 KVA	G.E.	47 # 208	3
40	1½" extra heavy IPS copper tubing			20'±
41	Special long radius elbow 3"x36" rad.	G.E.		4

Notes:
Figures in circles refer to part numbers on the Bill of Material.
Small electrical fittings, power connectors, etc., not called for shall be furnished as required.
For substation slab and fence detail, SH/28

All material shall be of the manufacture, type, and catalog number specified, or its equal

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
SUBSTATION

SHEET 26 OF 46 SHEETS SCALE: ¾"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEER

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS ACTING DISTRICT ENGINEER

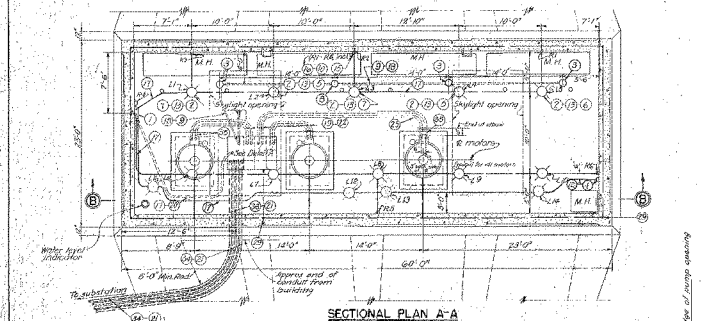
BY U.S.E.D. BY F.E.D. BY D.S.

824.1-51 934-12.8/28

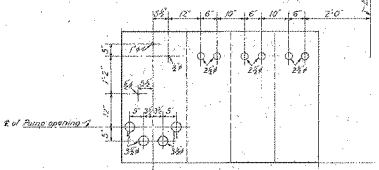
BELIEVED AS BUILT

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

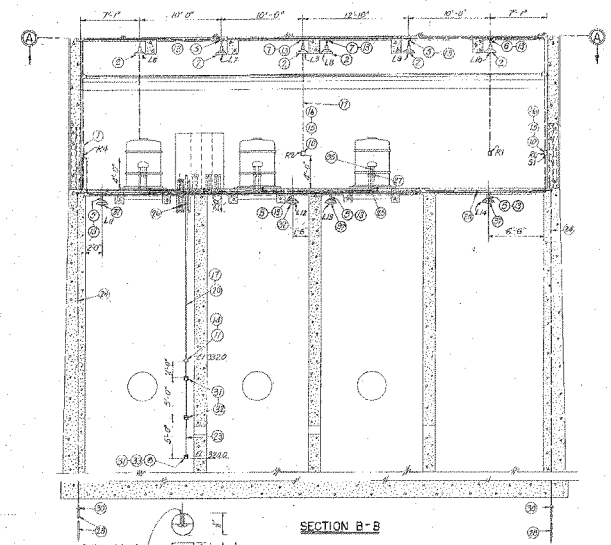


SECTIONAL PLAN A-A



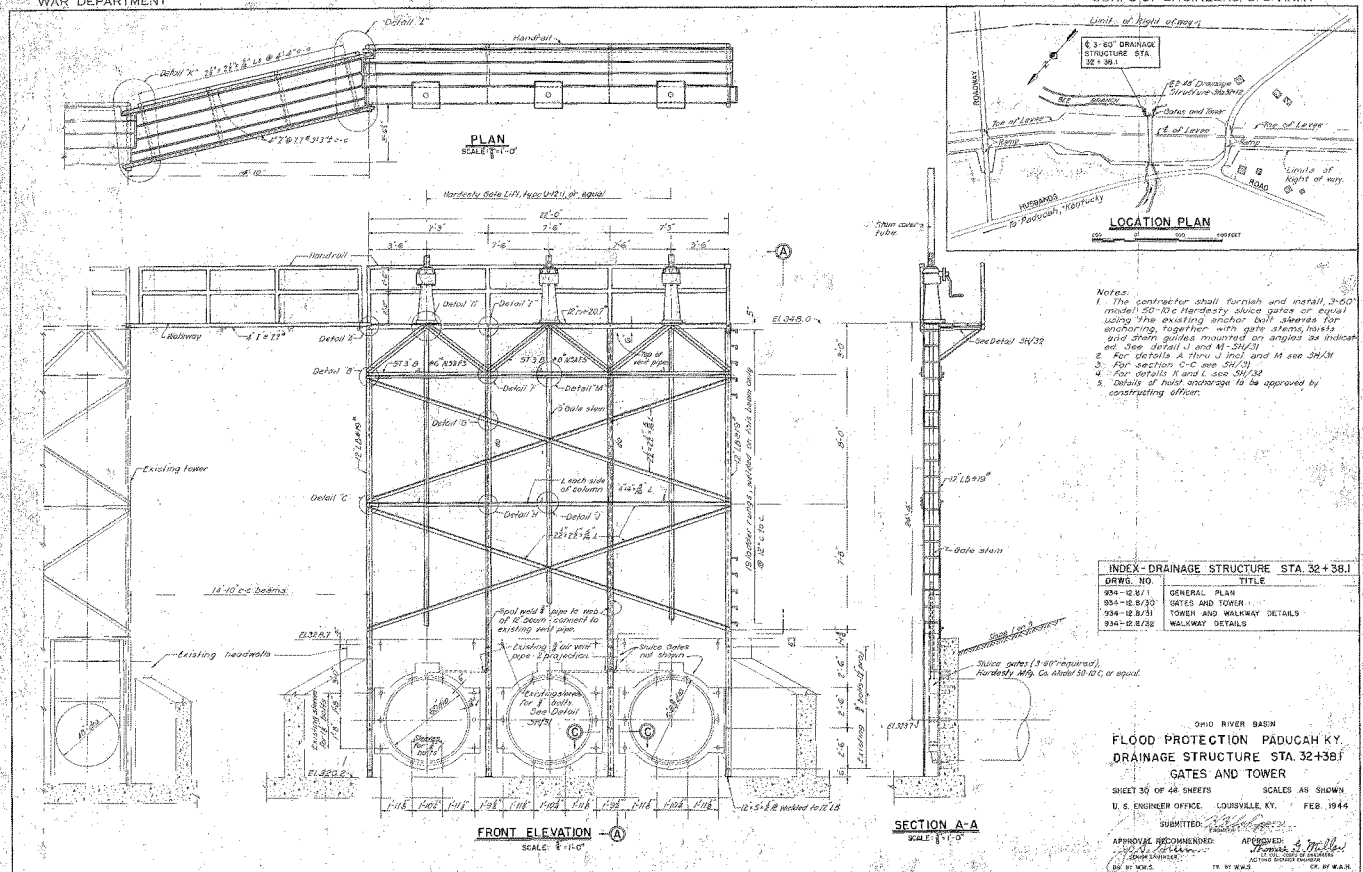
DETAIL "A"

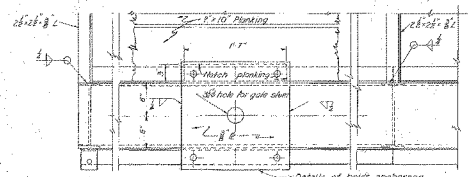
SCALE $\frac{3}{4}$" = 1'-0"


7'-1"
10'-0"
10'-6"
12'-10"
10'-0"
7'-1"
6'-6"
3'-0"
3'-0"
3'-0

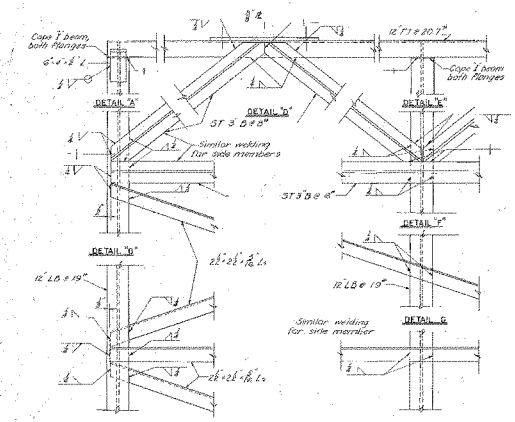
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



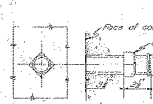


PLAN



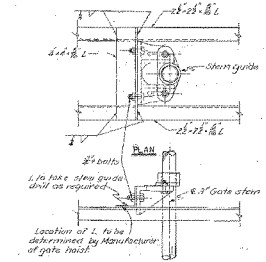
WELDING DETAILS

SCALE: 1½" = 1'-0"

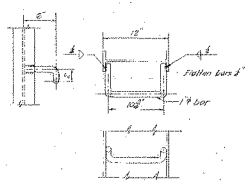


EXISTING ANCHOR BOLT SLEEVE

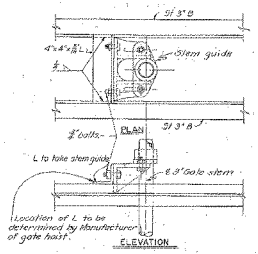
SCALE: NONE



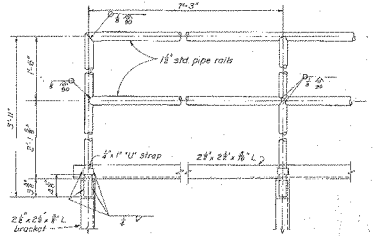
DETAIL "J"



DETAIL OF LADDER RUNG

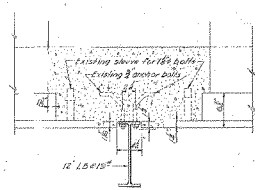


DETAIL "M"



HAND RAIL DETAIL

SCALE: 1½" = 1'-0"



SECTION C-C

SCALE: 1½" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 32+38.1

TOWER AND WALKWAY DETAILS

SHEET 31 OF 48 SHEETS SCALE: 1½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

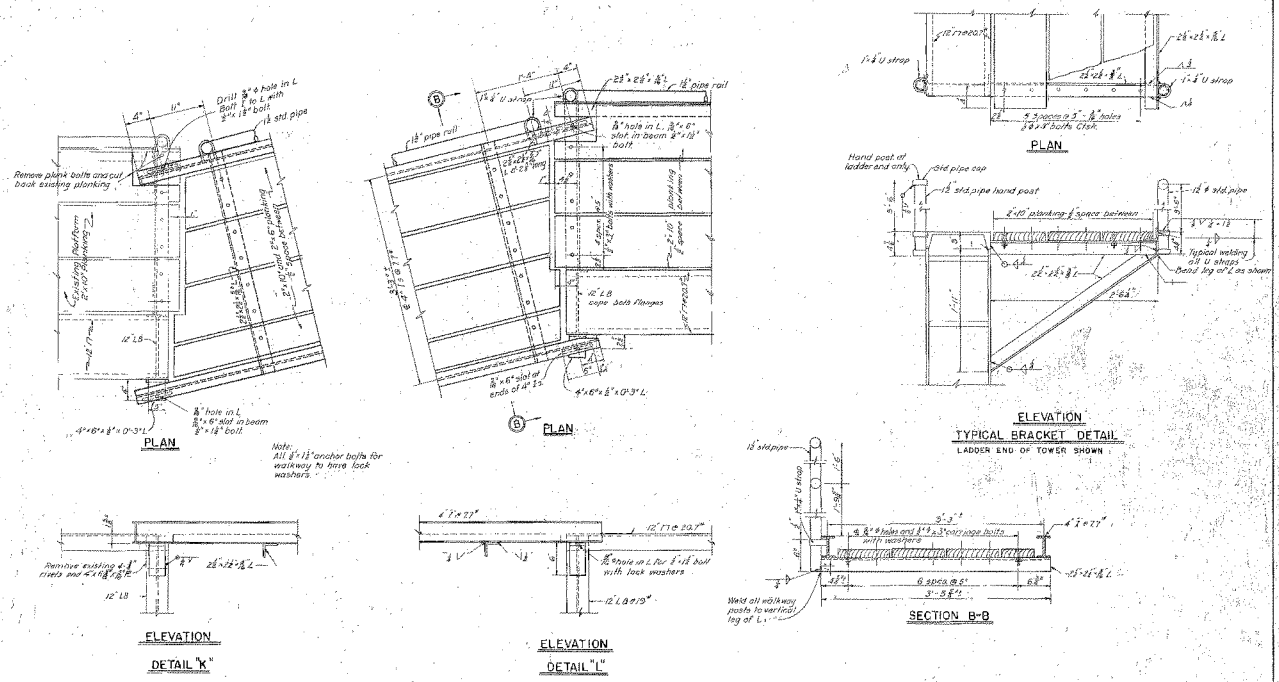
SUBMITTED: [illegible] DESIGNED

APPROVAL RECOMMENDED: [illegible] DISTRICT ENGINEER, LOUISVILLE, KY. APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

824.1-51 934-12.8/31

"RETRIEVED AS BUILT"

1071



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

DRAINAGE STRUCTURE STA. 32+38.1

WALKWAY DETAILS

SHEET 32 OF 46 SHEETS SCALE: 1" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

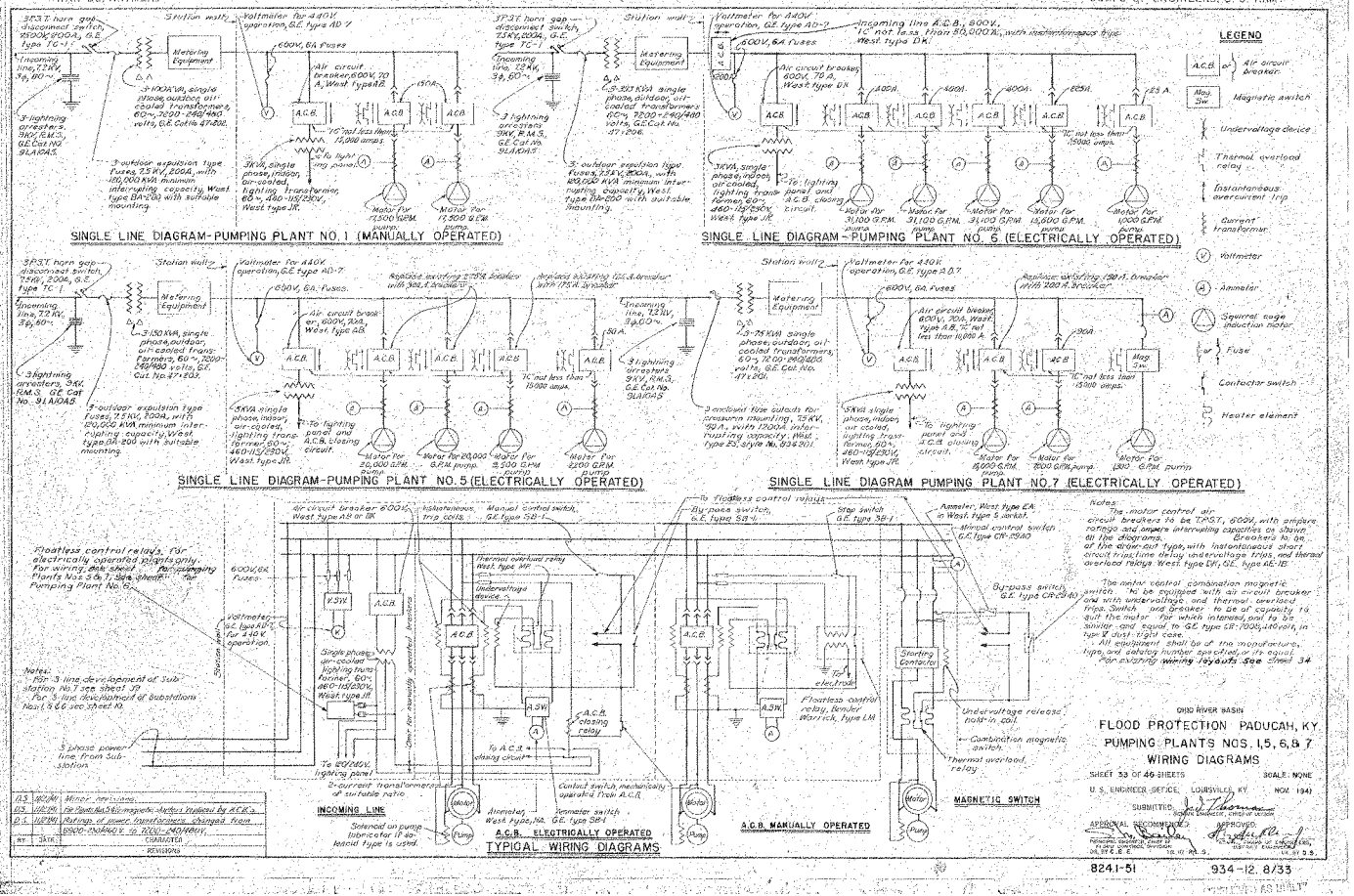
SUBMITTED: [illegible] ENGINEER

APPROVAL RECOMMENDED: [illegible] SENIOR ENGINEER, 97 W.R.S.

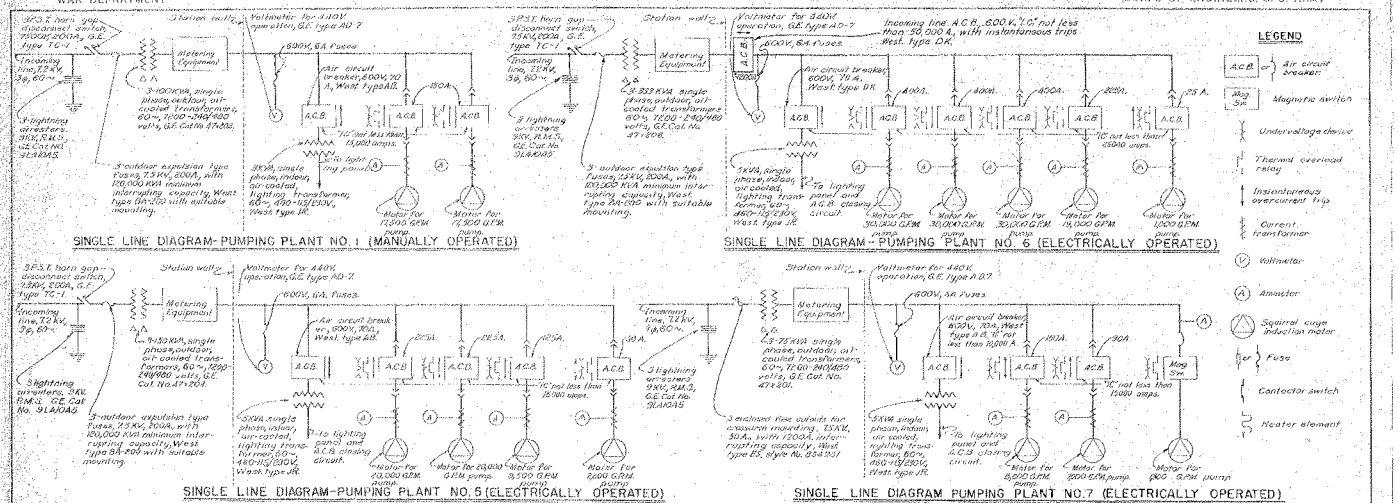
APPROVED: [illegible] ACTING DIV. CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER, TR. 91 W.R.S. CE. 97 W.R.S.

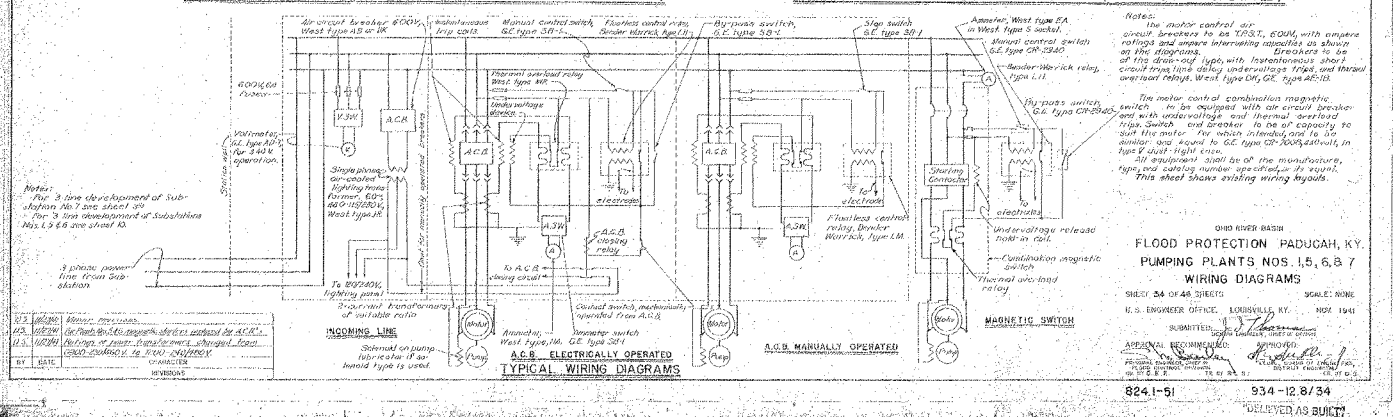
824.1-51 934-12.8/32

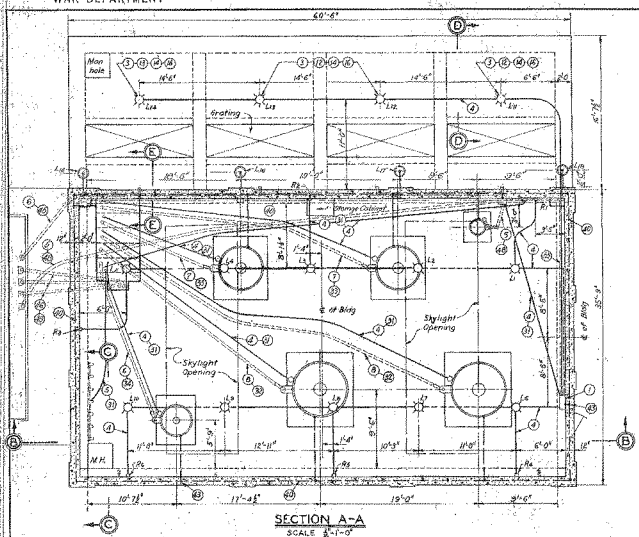
"RELIEVED AS BUILT"


SINGLE LINE DIAGRAM-PUMPING PLANT NO. 1 (MANUALLY OPERATED)
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 6 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 5 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM PUMPING PLANT NO. 7 (ELECTRICALLY OPERATED)
LEGEND
A.C.B. or Air circuit breaker
Mag. Sw. Magnetic switch
Undervoltage device
Thermal overload relay
Instantaneous overcurrent trip
Current transformer
Voltmeter
Ammeter
Squirrel cage induction motor
or Fuse
Contactor switch
Heater element
Floatless control relays, for electrically operated plants only.
Notes:
INCOMING LINE
A.C.B. ELECTRICALLY OPERATED
A.C.B. MANUALLY OPERATED
MAGNETIC SWITCH
TYPICAL WIRING DIAGRAMS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1, 5, 6, & 7
WIRING DIAGRAMS
SHEET 33 OF 46 SHEETS
SCALE: NONE
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
824.1-51
934-12. 8/33

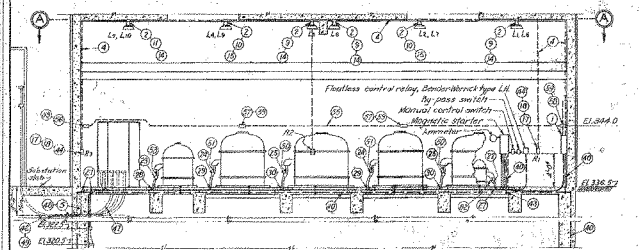
WAR DEPARTMENT — CORPS OF ENGINEERS, U. S. ARMY



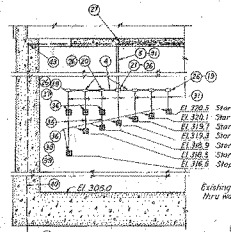




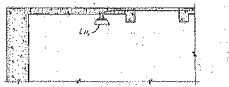
SECTION A-A
SCALE ¼"=1'-0"



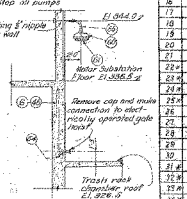
SECTION B-B
SCALE ¼"=1'-0"



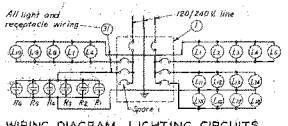
SECTION C-C
SCALE ¼"=1'-0"



SECTION D-D
SCALE ¼"=1'-0"



SECTION E-E
SCALE ¼"=1'-0"



WIRING DIAGRAM, LIGHTING CIRCUITS

LEGEND

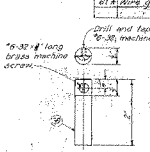
Embedded Conduit
Exposed Conduit
Ground Wire

Notes:

Figures in circles refer to Part No. in Bill of Material
All material shall be of the manufacture, type, and catalog number specified or its equal.
Small fittings, conduits, couplings and adapters etc. not listed shall be furnished as required.
* Indicates material which has not been installed
Existing motor lead conduits are cupped approximately 6" above floor.
This sheet shows existing construction.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY
1	Line distribution panel (surface type) 125/250 V. 6 circuit			1
2	R.L.M. dome reflector and socket	West.	949573	10
3	Aquarite conduit with reflector and socket	Crouse-Hinds	VIDA1989	4
4	2" rigid electrical conduit			700'±
5	" " " "			103'±
6	1½" " " "			120'±
7	1¼" " " "			62'±
8	2" " " "			85'±
9	Condulet outlet	Crouse-Hinds	9KT 12	4
10	" " "	" "	8 LB 7	4
11	" " "	" "	9KL 12	2
12	" " "	" "	3KG-12	3
13	" " "	" "	3K-12	1
14	Condulet cover	" "	2K-64	10
15	" " "	" "	H-515	4
16	Cover gasket	" "	Gasa 208	4
17	Condulet outlet	" "	FS1	6
18	Duplex plug receptacle			6
19	Conduit outlet	Crouse-Hinds	E17	2
20	" "	" "	C17	4
21	" "	" "	TB 137	1
22 *	1" Coupling			1 *
23 *	¾" "			1 *
24 *	1½" "			2 *
25 *	2" "			2 *
26	Condulet cover	Crouse-Hinds	137	7
27	1" Standard 90° elbow			4
28	1½" " " "			2
29	1¼" " " "			4
30	2" " " "			4
31 *	#12 AWG insulated copper wire			200'±
32 *	#500, 1 cond cable, RC, 3000 V. ins. with 60% rubber jacket			260'±
33 *	" 2, 1 " " " " " " "			168'±
34 *	" 3, 1 " " " " " " "			75'±
35	#6, H.D bare copper wire			10'±
36	3" bolt circle type insulators	Lapp	13761	10
37	Bus support fitting, drill to clamp #6 bare solid wire	Locke	9853	3
38	Bus support fitting, drill to clamp 3/8" electrode	"	9853	7
39	Electrode (See Detail)			3
40	#210 bare copper stranded cable			610'±
41	¾" x 8' copperweld ground rod			4
42	Connector for #210 ground cable to ¾" rod	Burndy	GA 6426	4
43	"T" connector for #210 ground cable	"	NT 2626	13
44	Duplex surface plates			6
45 *	#4 1 cond cable, RC, 3000 V. ins. with 60% rubber jacket			222'±
46	3/4" rigid electrical conduit			85'±
47	Special long radius 90° elbow 3/4" x 42" radius	G.E.		6
48 *	#8 AWG, 1 cond cable, RC 600 V. ins. with 60% rubber jacket			236'±
49 *	300 MCM, 1 cond cable, RC 3000 V. ins. with 60% rubber jacket			170'±
50 *	Flexible metal conduit 2" x 2'-0" lg.			2 *
51 *	" " 1½" x 1'-0" lg.			2 *
52 *	" " 1" x 1'-0" lg.			1 *
53 *	" " ¾" x 1'-0" lg.			1 *
54	Condulet	Crouse-Hinds	B79	3
55 *	3/4" rigid electrical conduit			110'±
56 *	Condulet	Crouse-Hinds	LB17	1 *
57 *	"	" "	T8 17	2 *
58 *	"	" "	LB6R7	1 *
59 *	Condulet cover	" "	177	4 *
60 *	R.L.M. dome reflector and socket	West.	949573	4 *
61 *	Wire guard for reflector	"	15016-97	4 *



ELECTRODE DETAIL
SCALE: NONE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
PUMPING EQUIPMENT AND GATES
LIGHTING & POWER SYSTEM

SHEET 35 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] DESIGNER

APPROVAL RECOMMENDED: [illegible] DIVISION ENGINEER

APPROVED: Thomas S. Miller, Lt. Colonel, Corps of Engineers, ACTING DISTRICT ENGINEER

DR. BY D.E. TR. BY R.K.V. CK. BY V.D.B.

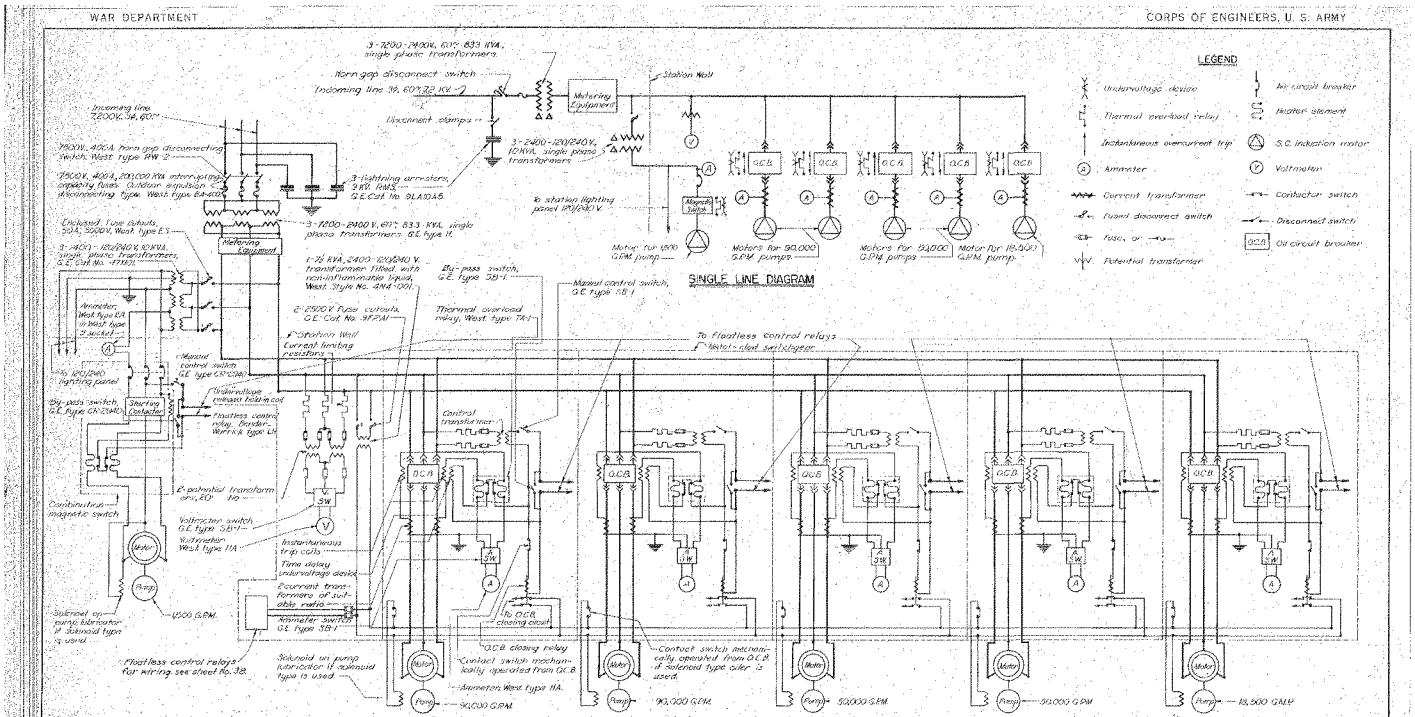
824.1-51

934-12.8/35

BY	DATE	CHARACTER
		REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Notes:

The electrically operated motor control oil circuit breakers to be TPST, 800A, 50,000 KVA interrupting capacity with thermal overload relays, time delay undervoltage and instantaneous short circuit trips. They shall be dynamic-bed construction, G.E. type TK-143, West type F-184.

The motor control combination magnetic switch to be equipped with air circuit breaker and with thermal overload and undervoltage trips. Starter and breaker to be of capacity to suit motor and to be similar and equal to G.E. type CR 7009, 220V, in type X dust tight case.

All equipment shall be of manufacture, type, and catalog number specified, or its equal.

For existing wiring layout see sheet 37

BY	DATE	CHARACTER
R.S.	10/1/41	Minor revisions.
R.S.	10/1/41	Rating of power transformers changed from 6300-2300 V. to 7200-2400 V.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

WIRING DIAGRAM

SHEET 38 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [illegible] SENIOR ENGINEER, ENGR. DESIGN

APPROVAL RECOMMENDED: [illegible] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

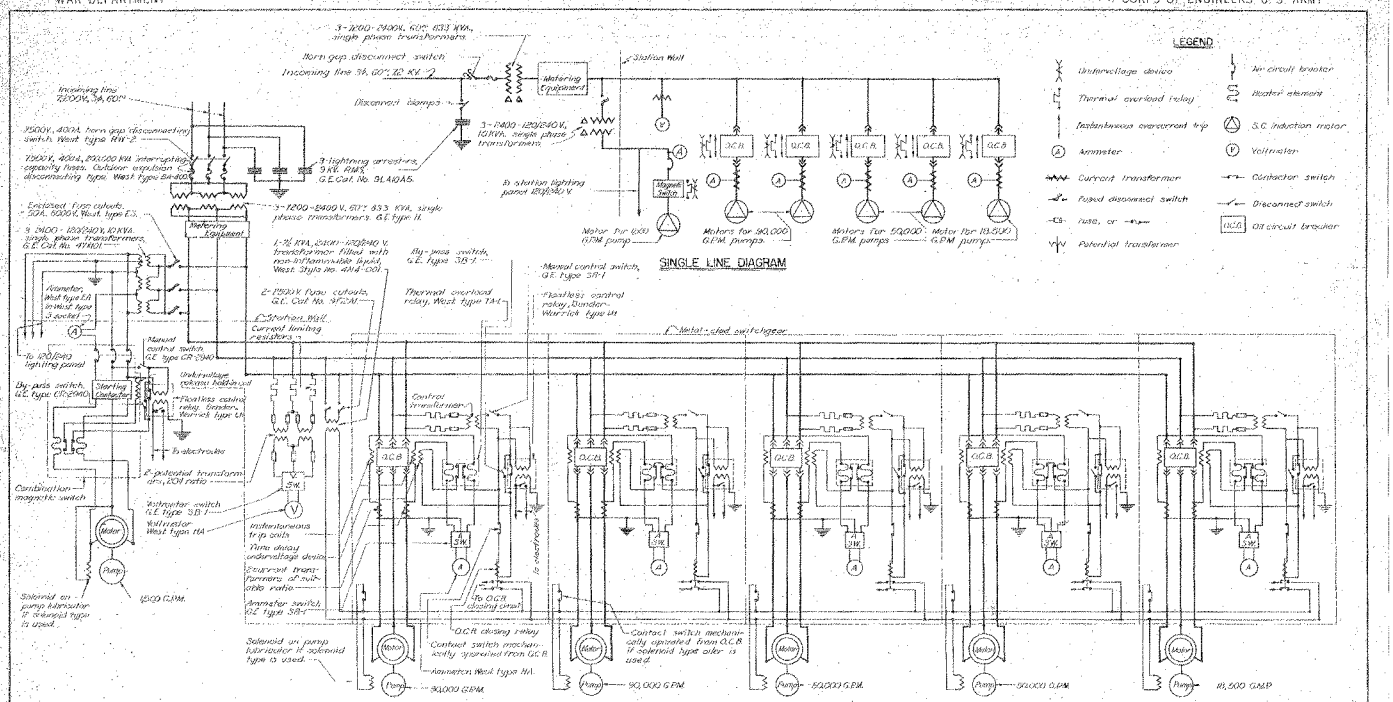
APPROVED: [illegible] DISTRICT ENGINEER U. S. CORPS OF ENGINEERS

DR. BY D.S. TR. BY G.R.S. CK. BY D.S.

824.1-51 934-12.8/36

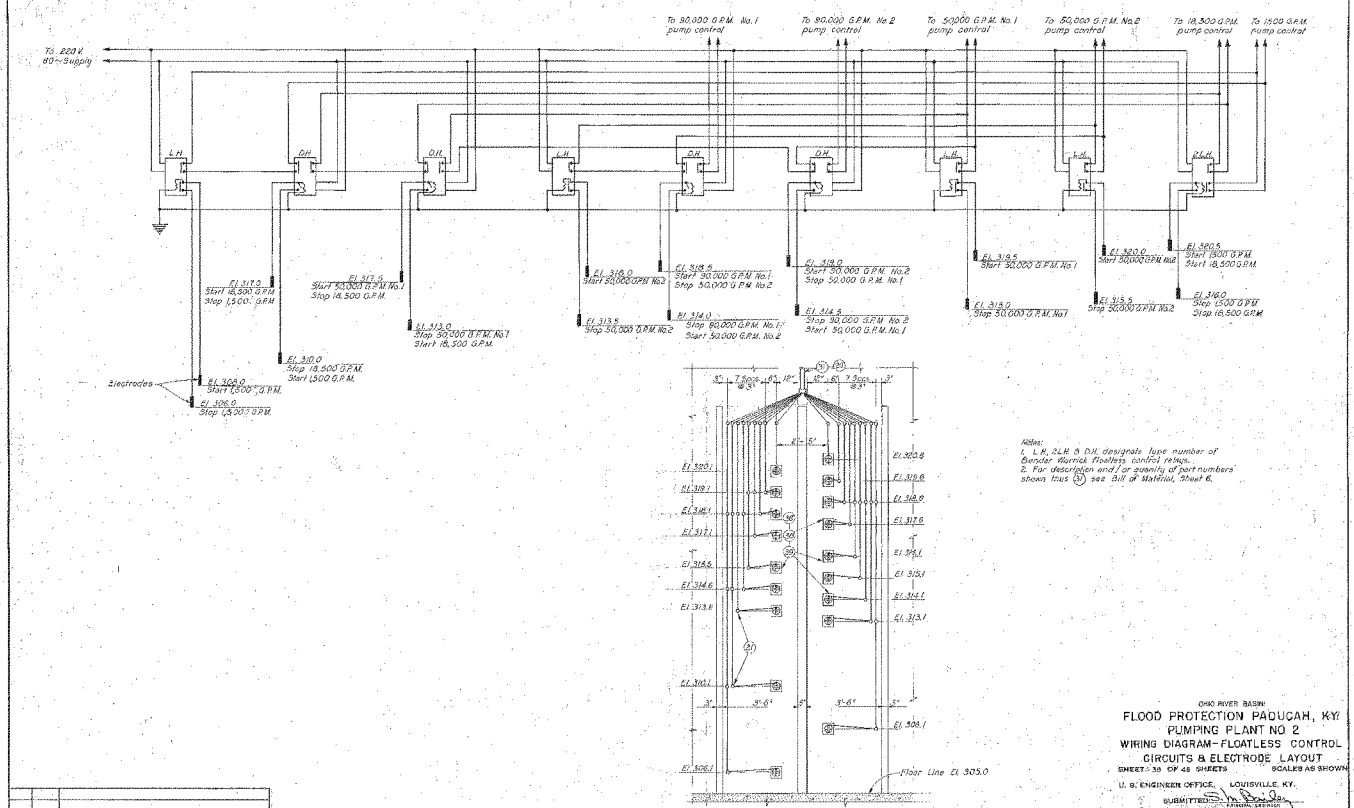
RECEIVED AS BUILT

WAR DEPARTMENT — CORPS OF ENGINEERS U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



ELECTRODE LOCATION LAYOUT

SCALE: 1/8" = 1'-0"

Notes:
1. L.H., 2L.H. & D.H. designate type number of Bendix Warrick Floatless control relays.
2. For description and / or quantity of part numbers shown thus (31) see Bill of Material, Sheet 6.

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO 2

WIRING DIAGRAM-FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT

SHEET 38 OF 45 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

SUBMITTED: [illegible] FIELD ENGINEER

APPROVAL RECOMMENDED: [illegible] DIVISION ENGINEER

APPROVED: [illegible] DIVISION ENGINEER

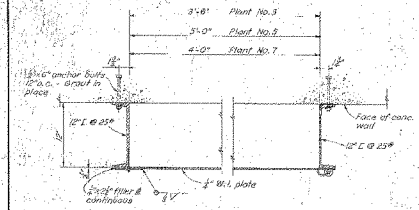
824,1-51 934-12.8/38

"RELIEVED AS BUILT"

1078

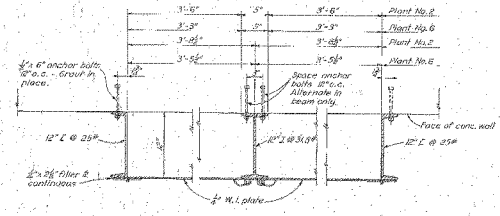
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



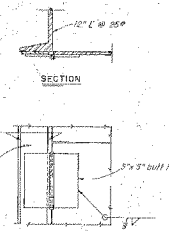
SECTION A-A

SCALE: 1 1/2" = 1' 0"



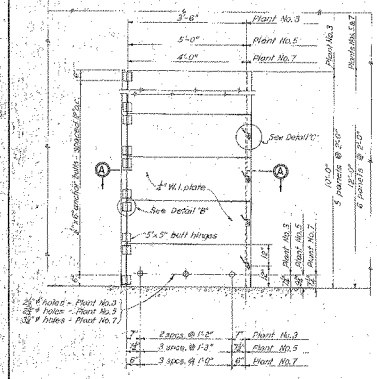
SECTION D-D

SCALE: 1 1/2" = 1' 0"



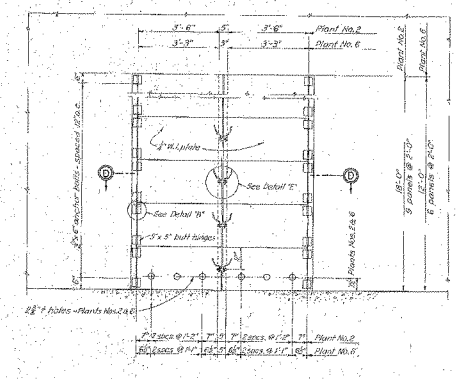
DETAIL "B"

SCALE: 3" = 1' 0"



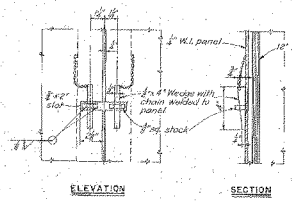
ELECTRODE WELLS
FOR PUMPING PLANTS NOS. 3, 5 & 7

SCALE: 1/2" = 1' - 0"



ELECTRODE WELLS
FOR PUMPING PLANTS NOS. 2 & 6

SCALE: 1/2" = 1' - 0"



DETAIL "E"
DETAIL "C" SIMILAR

SCALE: 3" = 1' - 0"

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 2, 3, 5, 6 & 7

ELECTRODE WELLS, SECTIONS & DETAILS

SHEET 39 OF 46 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — 1945

SUBMITTED: [illegible] ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEER

APPROVED: [illegible] LT. COL. C.E. DIST. ENGINEER

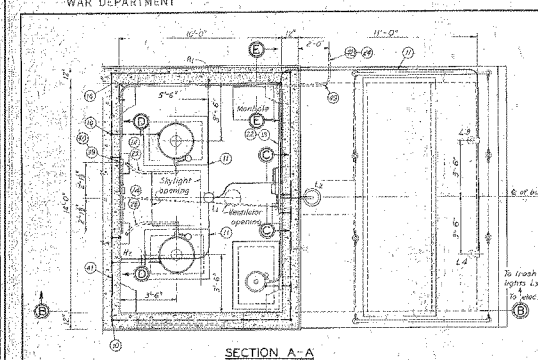
824'1-51 934-12.8/39

"REVISED AS BUILT"

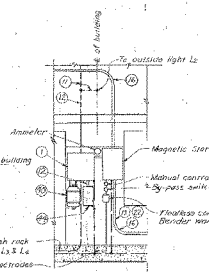
1079

WAR DEPARTMENT

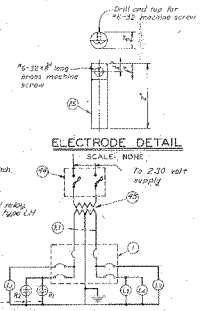
CORPS OF ENGINEERS, U.S. ARMY



SECTION A-A
SCALE: 1/8"=1'-0"

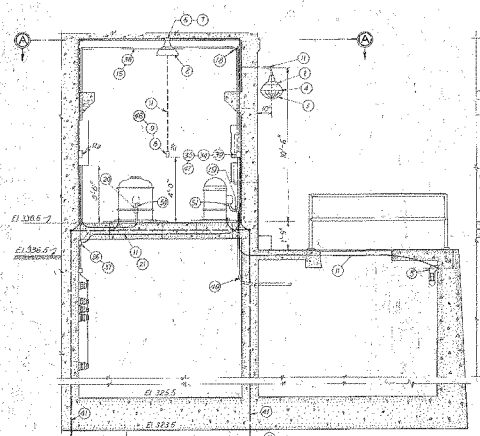


SECTION C-C
SCALE: 1/8"=1'-0"

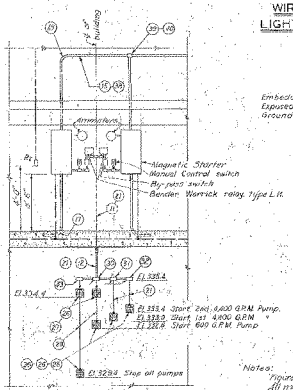


ELECTRODE DETAIL
SCALE: NONE

WIRING DIAGRAM
LIGHTING CIRCUIT



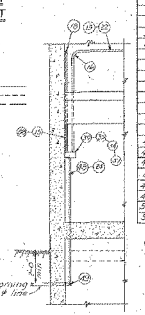
SECTION B-B
SCALE: 1/8"=1'-0"



SECTION D-D
SCALE: 1/8"=1'-0"

LEGEND

Embedded conduit
Exposed conduit
Ground wire



SECTION E-E
SCALE: 1/8"=1'-0"

Notes:
Figures in circles refer to part numbers in Bill of Material.
All material shall be of the manufacture, type and catalog number specified, or its equal.

# Indicates material which has not been installed.

This sheet shows existing construction.

Existing motor lead conduits for the two large motors are capped, approximately 8" above the floor. The motor lead conduit for the small motor is capped approximately 5" from the wall.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY
1	4 circuit light distribution panel (Surface Type)			1
2	21 L.M. dome reflector and socket	West	149573	2
3	Wire guard	"	391497	1
4	Wire guard padlock	"	351484	1
5	Vaporlite light	Crouse-Hinds	VHG189	2
6	Conduulet outlet	" "	SKC 12	1
7	Conduulet cover	" "	SK 84	1
8	Conduulet outlet	" "	FS 1	2
9	Duplex plug receptacle	Bryant	5-20R, 5-20P	2
10	"T" connectors for #2/0 stranded cable	Burndy	NT2426	12
11	3" rigid electrical conduit			165
12	3" " " "			12
13	1" " " "			395
14	1/2" " " "			117
15	1" " " "			30' *
16	1" standard 90° elbow			4
17	1" " " "			4
18	1" " " "			8
19*	1" Coupling			14
20*	1/2" Coupling			2*
21*	#10 AWG insulated copper wire			260' *
22*	#1/0 cond cable, R.C. 600V ins with 60% rubber jacket			60' *
23*	#6/0 cond cable, R.C. 600V ins with 60% rubber jacket			90' *
24*	250 M cond cable, R.C. 600V ins with 60% rubber jacket			150' *
25	Brass electrode, 3/4" x 2' long (See detail)			4
26	3" bolt circle type insulator	West	497738	6
27	Bus support fitting Drill to clamp #6 bare solid wire	Locke	9853	8
28	Bus support fitting, Drill to clamp 3/4" electrode	"		4
29	#6 AWG tap'd drawn copper wire			10' *
30	Conduulet outlet	Crouse-Hinds	TB127	1
31	" " "	" "	C 17	1
32	" " "	" "	E 11	2
33	Conduulet outlet cover	" "	1771	6
34	Conduulet-hub inlets	" "	85477	1
35	" " "	" "	85853	1
36	Conduulet	" "	T317	1
37	Conduulet cover	" "	2770	1
38*	#2 cond cable, R.C. 600V ins with 60% rubber jacket			205' *
39	Junction box	Crouse-Hinds	FCD	1
40	Conduulet outlet cover	" "	5770	1
41	* 2/0 bare stranded copper cable			150' *
42	Connector for #2/0 stranded cable to 3/4" ground rod	Burndy	GK4426	4
43	Ground rod, 3/4" x 8'	Copperweld		4
44	Enclosed fused switch, 2 pole, cover interlocked	Graybar	36251	1
45	Transformer, 230-230/115 volts, 1KVA, dry type	West	911415	1
46	Wall surface plate	Bryant	4173I	2
47	Junction box plate	Crouse-Hinds	KOWP10	6
48	2" rigid electrical conduit			50' *
49	Special long radius 90° elbow 22" x 28" rad.			3
50*	Flexible metal conduit 1/2" x 2' long			2 *
51*	" " " 1 1/2" x 2' long			1 *

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING EQUIPMENT & GATES
PUMPING PLANT NO. 3
LIGHTING & POWER SYSTEMS

SHEET 40 OF 46 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — FEB. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BR.

APPROVED: [signature] CHIEF, ENGINEERING DIVISION, DIST. ENGINEER

DR. BY D.S. — TR. BY H.C.B. & R.R.V. — CK. BY D.S.

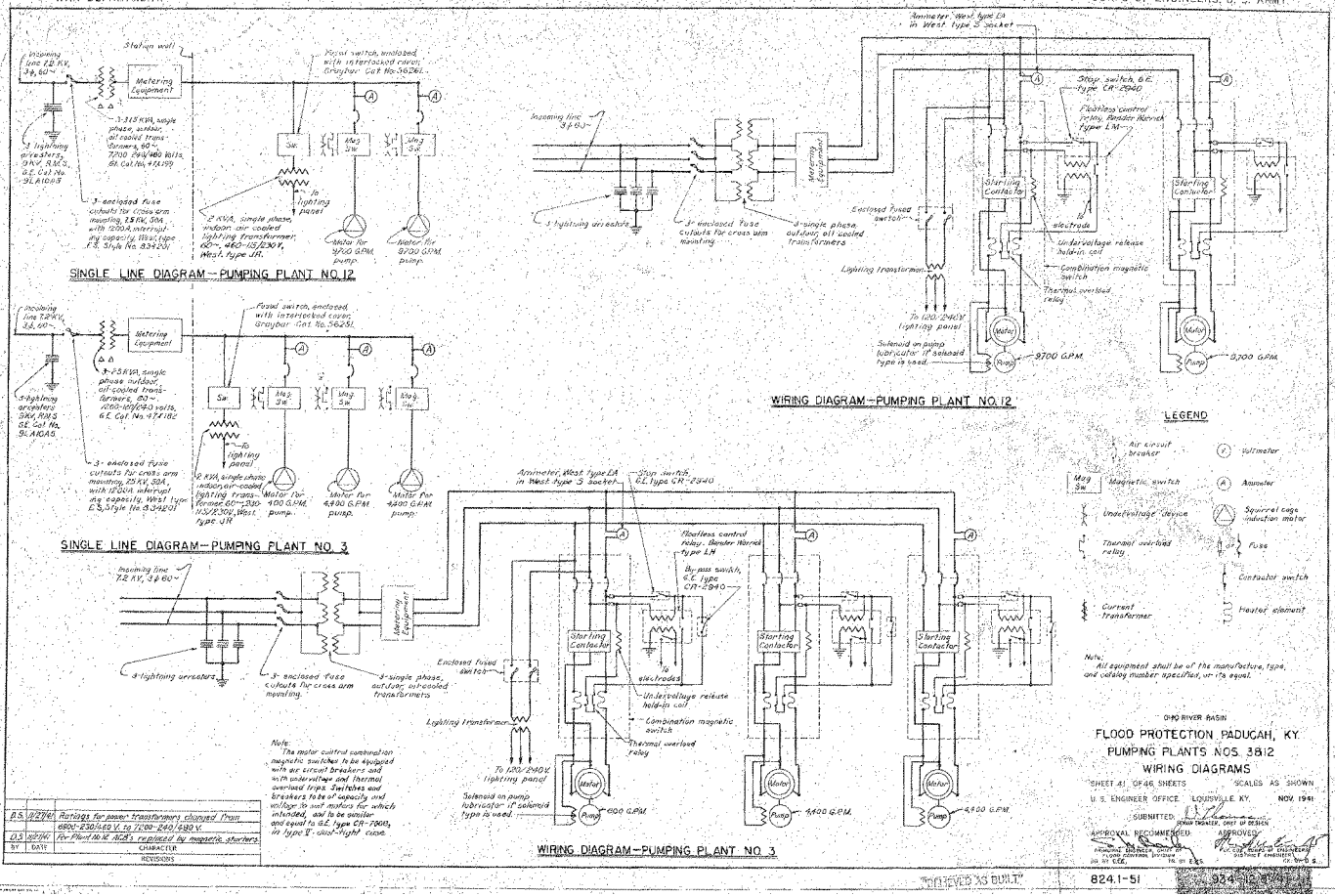
824.1-51

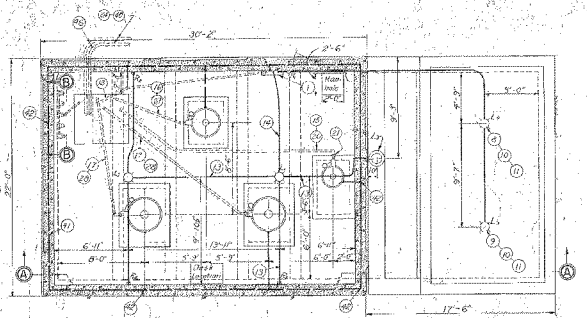
934-12.8/40

* "BELIEVED AS BUILT"

1080

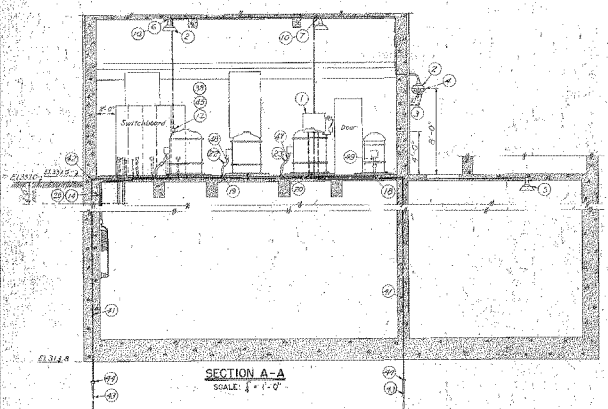
WAR DEPARTMENT. CORPS OF ENGINEERS, U. S. ARMY





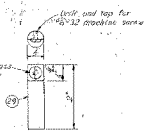
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



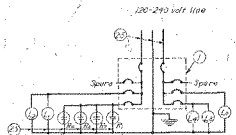
SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"



ELECTRODE DETAIL

SCALE: NONE



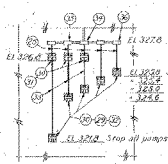
All light and receptacle wiring

WIRING DIAGRAM

LIGHTING CIRCUIT

Concealed conduit
Embedded conduit
Exposed conduit
Ground wire

LEGEND



SECTION B-B

SCALE: $\frac{1}{4}$" = 1'-0"

Notes:

Figures in circles refer to part numbers in bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

Small fittings, conduits, couplings and adapters, etc., not listed shall be furnished as required.

* Indicates material which has not been installed.

Existing motor lead conduits are capped approximately 6" above floor.

This sheet shows existing construction.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CAT. NO.	QUAN.
1	6 circuit light distribution panel (surface type)			1
2	RLM dome reflector and socket	Wesp	343573	3
3	Wire guard	"	351457	1
4	Wire guard padlock	"	321484	1
5	Vapertite conduit with reflector and socket	Crouse-Hinds	VPM1037	2
6	Conduit outlet	" "	SK112	1
7	" "	" "	SKX12	1
8	" "	" "	SKC12	1
9	" "	" "	SK12	1
10	" cover	" "	SK84	2
11	" gasket	" "	Gasx208	2
12	Duplex plug receptacle	Bryant	1762 W.P.	4
13	$\frac{1}{2}$" rigid electrical conduit			150'
14	$\frac{3}{4}$" " "			15'
15	1" " "			25'
16	1½" " "			15'
17	1½" " "			102'
18	1" standard 90° elbow			5
19	1½" " " "			2
20	2" " " "			4
21 *	1" coupling			1
22 *	1½" "			1
23 *	2" "			2
24	3½" rigid electrical conduit			140'
25 *	#12 insulated copper wire			560'
26 *	#8 lead cable, R.C. 600V. lex with 60% rubber jacket			80'
27 *	#4 lead cable, R.C. 600V. lex with " " " "			40'
28 *	#10 lead cable, R.C. 600V. lex with " " " "			120'
29	Brass electrode, $\frac{3}{8}$" x 2" lg. (See detail)			3
30	$\frac{1}{2}$" bolt circle type insulator	West	4011 N.C.	8
31	Bus support fitting. Drill to clamp #6 bare solid wire	Locke	3653	3
32	Bus support fitting. Drill to clamp $\frac{3}{8}$" electrode	"	"	5
33	#6 hard drawn copper wire			1 lb
34	Conduit outlet	Crouse-Hinds	FB-127	1
35	" "	" "	C-17	2
36	" "	" "	E-17	2
37	Conduit outlet covers	" "	FF-1	3
38	Wall outlet box, with	Bryant	1492	2
40 *	#10 M.C.M. lead cable, R.C. 600V. lex with 60% rubber jacket			440'
41	#2/0 bare stranded copper cable			260'
42	"T" connectors for #2/0 stranded cable	Burndy	H72646	10
43	Ground rod, $\frac{3}{4}$" x 8'	Copperweld		4
44	Connector for #2/0 stranded cable to $\frac{3}{4}$" ground rod	Burndy	GA64426	4
45	Conduit outlet	Crouse-Hinds	FS	4
46	Special long radius 90° elbow, 3½" 130' radius		GE	8
47 *	Flexible conduit 6" x 1'-6" lg.			2
48 *	" " 12" x 1'-6" lg.			1
49 *	" " 12" x 1'-6" lg.			1

BY	DATE	CHARACTER
		REVISION

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 5

PUMPING EQUIPMENT AND GATES

LIGHTING & POWER SYSTEMS

SHEET 48 OF 48 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — FEB. 1944

SUBMITTED: W. F. Kuhlmann, ENGINEER

APPROVAL RECOMMENDED: Jack Green, BRANCH ENGINEER — APPROVED: James E. Miller, CHIEF, DIV. OF ENGINEERING, BRANCH SUPPORT ENGINEER

DR. BY D.E. — TR. BY E.R.G.

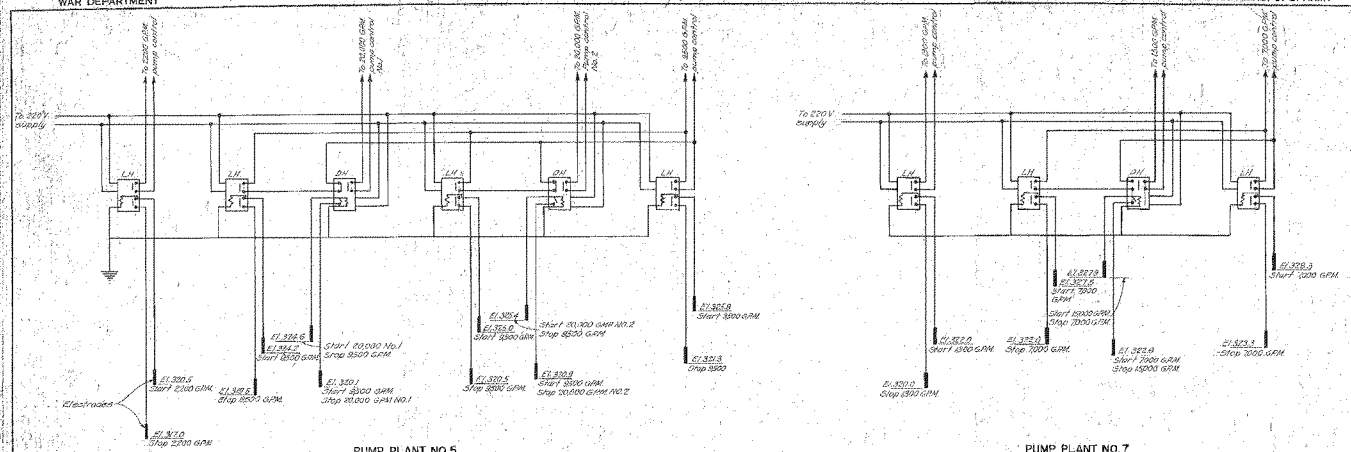
824.F51 — 934-12.8/42

"BELIEVED AS BUILT"

1082

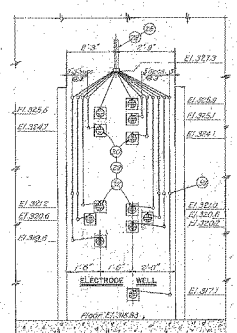
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

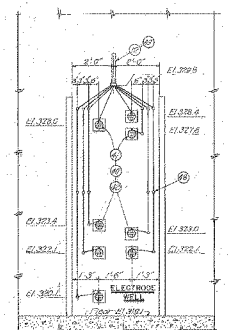


PUMP PLANT NO.5
SCALE: NONE

PUMP PLANT NO.7
SCALE: NONE



ELECTRODE LOCATION LAYOUT
PUMPING PLANT NO.5
SCALE: 1/4" = 1'-0"



ELECTRODE LOCATION LAYOUT
PUMPING PLANT NO.7
SCALE: 1/4" = 1'-0"

Notes:
L.H. and D.H. designate type No. of Bender Warrick floatless control relays.
For description and/or quantity of part Nos. shown thus (25) see Bill of Material, sheet No. 11 for pumping plant No. 5, and sheet No. 17 for pumping plant No. 7.

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 5 & 7
WIRING DIAGRAM-FLOATLESS CONTROL
CIRCUITS & ELECTRODE LAYOUT
SHEETS 43 OF 46 SHEETS SCALES AS SHOWN.
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED: [illegible]
APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEERING DIVISION
APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER
DR. BY K.E. TR. BY H.A.K. CK. BY D.G.

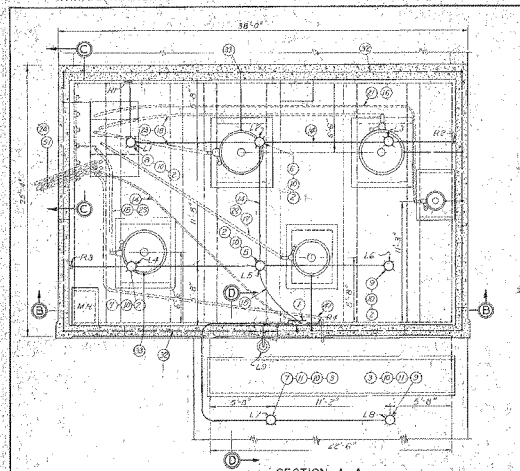
8241-51 934-12.8/43

"AS BUILT"

1083

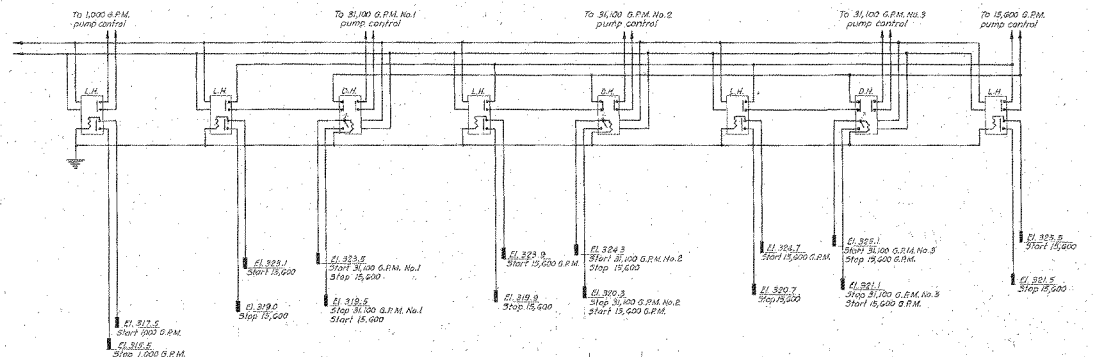
WAR DEPARTMENT

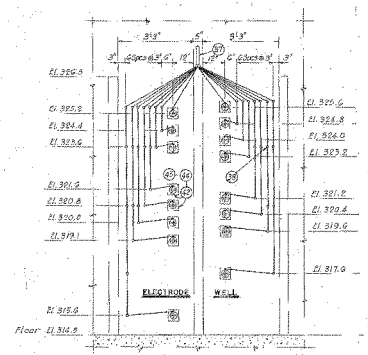
CORPS OF ENGINEERS, U. S. ARMY


38'-0"
22'-6"
25'-0"
L1
L2
L3
L4
L5
L6
L7
L8
L9
MH
H.P.
H.P.
H.P.

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





ELECTRODE LOCATION LAYOUT

SCALE: $\frac{1}{8}$" = 1'-0"

Note:
L.H. and D.H. designate type No. of Bender Warrick floatless control relays.
For description and/or quantity of part nos. shown thus (57) see bill of material. Sheet No. 14.

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 6

WIRING DIAGRAM - FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT

SHEET 43 OF 45 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] TH. BY D.E.

APPROVED: [illegible] TH. BY W.E.B. CH. BY D.E.

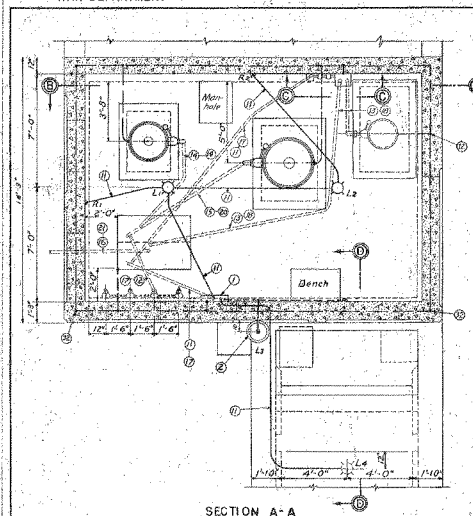
824.1-51

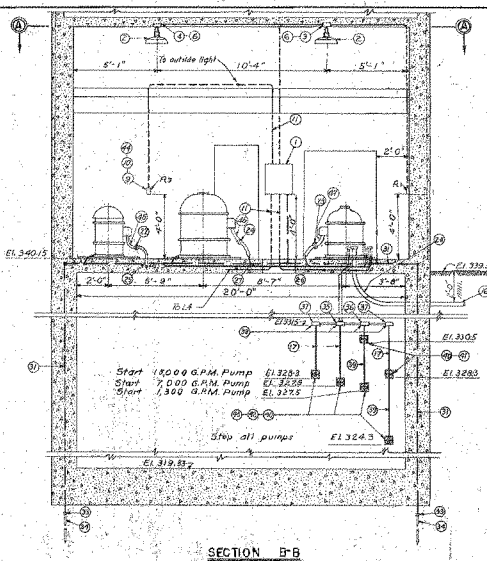
934-12.6/45

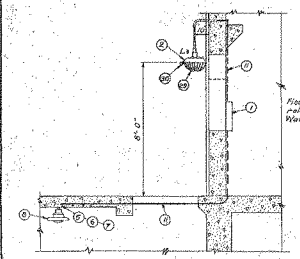
"BELIEVED AS BUILT"

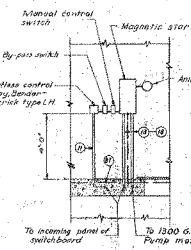
WAR DEPARTMENT

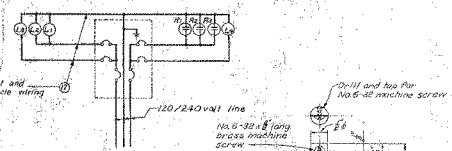
CORPS OF ENGINEERS, U. S. ARMY

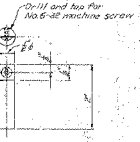












LEGEND

Embedded Conduit
Exposed Conduit
Ground Wire
Concealed Conduit

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUAN.
1	4 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West	349373	3
3	Conduit outlet	Crouse-Hinds	SKT 12	1
4	" "	" "	SKL 12	1
5	" "	" "	JK 12	1
6	Conduit cover	" "	SK 84	3
7	Conduit gasket	" "	Gsk 208	1
8	Vapor tite conduit with reflector and socket	" "	VRM 1919	1
9	Conduit outlet	" "	FS1	1
10	Duplex plug receptacle	Bryant	5262-2 HI NEMA	3
11	1/2" Rigid electrical conduit			155'±
12	3/4" " " "			20'±
13	1" " " "			40'±
14	1 1/4" " " "			15'±
15	1 1/2" " " "			15'±
16	2" " " "			40'±
17*	#12 A.W.G. insulated copper wire			380'± *
18*	#8 A.W.G. lead cable K.C.200 V. Br. with 60% rubber jacket			120'± *
19*	#6 A.W.G. " " " " " " " "			40'± *
20*	#2 A.W.G. " " " " " " " " "			45'± *
21*	250 MCM " " " " " " " "			120'± *
22*	1" Coupling			1 *
23*	1 1/4" "			1 *
24*	1 1/2" "			1 *
25	1" Std. 90° Elbow			4
26	1 1/4" " "			2
27	1 1/2" " "			2
28	Special long radius 90° elbow, 3" ϕ x 36" rad.	G.E.		2
29	Wire guard for reflector	West	351497	1
30	Padlock	"	351484	
31	#2/0 bare stranded copper cable			200'±
32	1" connector for #2/0 copper cable	Burndy	NT 2626	10
33	Connector for #2/0 str. cable to 3/4" grnd. rod	"	GA 6626	4
34	Ground rod 3/4" ϕ, 8' long	Copperweld		4
35	Conduit outlet	Crouse-Hinds	FS 167	1
36	" "	" "	C 17	1
37	" "	" "	E 17	2
38	Conduit cover	" "	1771	4
39	#6 A.W.G. hard drawn copper wire			10'±
40	Shell circle type insulators	West	491736	8
41	Bus support fitting bid to clamp 6 bare wire	Locke	9653	2
42	" " " " " 3/4" ϕ electrode	"	"	4
43	Brass electrode (See Detail)			4
44	Wall surface plate	Bryant	HV-31	3
45*	Flexible metal conduit 1" x 1 ft. lg.			1 *
46*	" " " 1 1/4" x 1 ft. lg.			1 *
47*	" " " 1 1/2" x 1 ft. lg.			1 *

Notes:
Figures in circles refer to part No. in Bill of Material.
All material shall be of the manufacture, type and catalog number specified or its equal.
Small fittings, conduits, couplings, and adapters, etc., not listed shall be furnished as required.
* Indicates material which has not been installed.
Existing motor lead conduits are capped approximately 6" above floor.
This sheet shows existing construction.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
PUMPING EQUIPMENT & GATES
LIGHTING & POWER SYSTEMS

SHEET 46 OF 46 SHEETS SCALE 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible]

APPROVED RECOMMENDED: [illegible] DIVISION ENGINEER

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY A.L.T. TR. BY H.L. CK. BY D.B.

BY	DATE	CHARACTER REVISIONS

624.1-51

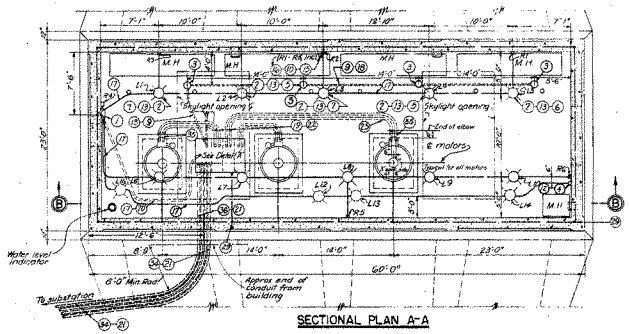
934-12.8/46

"BELIEVED AS BUILT"

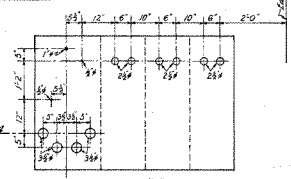
1086

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

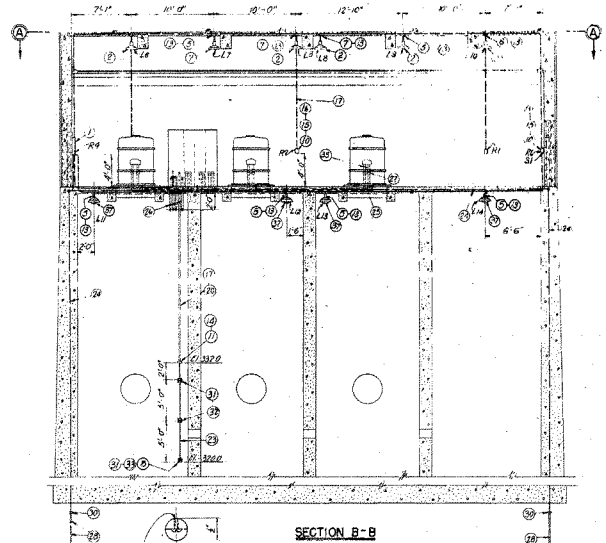


SECTIONAL PLAN A-A

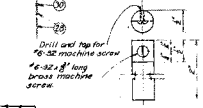


DETAIL "A"

SCALE 3/4" = 1'-0"

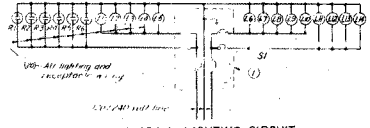


SECTION B-B



ELECTRODE DETAIL

SCALE FULL SIZE



WIRING DIAGRAM - LIGHTING CIRCUIT

LEGEND

Notes:

Figures in circles refer to part numbers on Bill of Material. All material shall be of the manufacture, type & catalog number specified, or its equal.

Small fittings, conduits, E.M.T. couplings and adapters, etc. not listed shall be furnished as required.

* 200 watt lamps shall be furnished by government and installed in all lights by Contractor.

This drawing is for information of the switch gear manufacturer & indicates the space available for the switchgear.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1 *	8 circuit lighting panel (surface type)			1 *
2 *	R.L. Malone reflector and socket	Heat.	340573	10 *
3	Floor Box	G.E.	SP-9300	4
4 *	Surface Switch Plate			1 *
5	Condulet Outlet	Crouse-Hinds	SKC12	10
6	" "	" "	SKL12	1
7	" "	" "	SKT12	3
8 *	1/2" electrode (See detail)			1 *
9 *	#8 stranded cable VC, 600 v ins with W.P. braid			180'*
10 *	Condulet outlet	Crouse-Hinds	FS161	6 *
11 *	" "	" "	R141	1 *
12 *	Flush Tumbler Switch	Bryant	3951	1 *
13 *	Condulet Cover	Crouse-Hinds	BK84	16 *
14 *	" "	" "	1771	1 *
15 *	Duplex plug receptacle			6 *
16 *	Wall surface plate			6 *
17	1/2" electrical metallic tubing (E.M.T.)			380'*
18	1" rigid electrical conduit			60'*
19	2 1/2" Rigid electrical conduit			130'*
20 *	#12 type insulated copper wire			114 0'*
21 *	500 MCM - cond. cable 2C, 600 v ins with 60% rubber jacket			3150'*
22 *	#2/0 " " " " "			420'*
23 *	#6 H.D. bare solid copper wire			[illegible]
24 *	#4/0 bare stranded copper cable			[illegible]
25 *	1/2" Standard 90° elbow			26
26 *	Special long radius elbow 1/2"	G.E.		4
27 *	1/2" E.M.E. coupling			16 *
28	Equipment ground rod 5/8" x 8' long			4
29	1/2" Connector for #8 stranded cable	Burndy	NT7426	4
30	Connector for #8 solid cable	"	GB447L	3
31 *	3 pole circuit breaker	Iuppi	1761	1 *
32 *	Bus support fitting (and for bare #6 solid wire)	Locke	9803	7 *
33 *	Bus support fitting (with clamp)	"	9803	1 *
34	2" Rigid electrical conduit			[illegible]*
35 *	1 heater conduit - conduit 1/2" x 2" (8")			[illegible]
36	3/4" Rigid electrical conduit			65'*
37 *	Vapor light Socket & Reflector	Crouse-Hinds	LK1463	7 *

BY	DATE	CHARACTER REVISIONS

"BELIEVED AS BUILT"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

PUMPING EQUIPMENT AND GATES

LIGHTING AND POWER SYSTEM

SHEET 1 OF 2 SHEETS SCALE 3/8" = 1'-0"

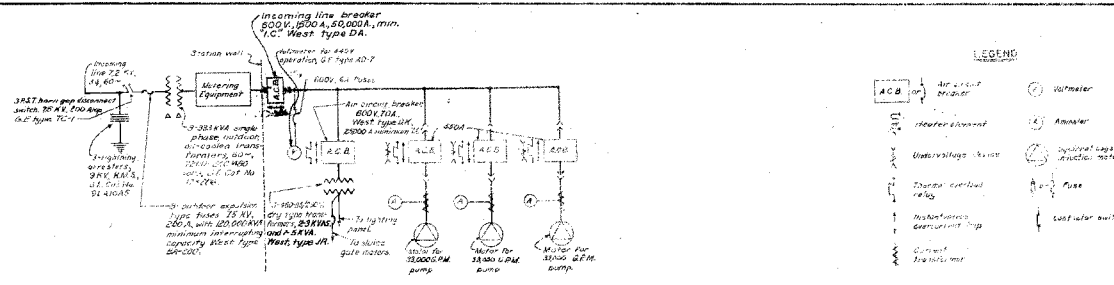
U. S. ENGINEER OFFICE LOUISVILLE, KY. AUG. 1945

SUBMITTED: PRINCIPAL ENGINEER

APPROVAL RECOMMENDED: APPROVED:

DISTRICT ENGINEER

BY A.L.F. TR. BY A.L.F.

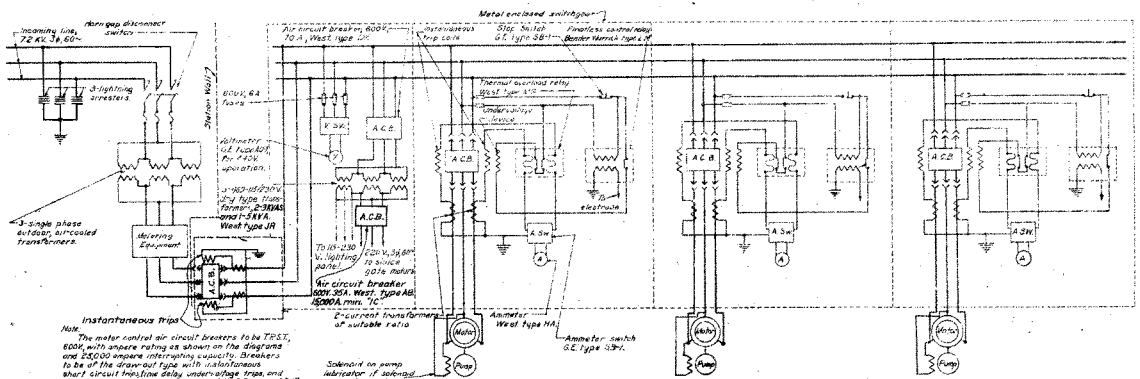


SINGLE LINE DIAGRAM

LEGEND

A.C.B. or	Air circuit breaker
	Heater element
	Undervoltage device
	Thermal overload relay
	Instantaneous overcurrent trip
	Current transformer
	Voltmeter
	Ammeter
	Squirrel cage induction motor
	Fuse
	Cast iron switch

Note.
All equipment shall be of the manufacture, type, and catalog number specified, or its equal.



Note.
The motor control air circuit breakers to be T.P.S.T., 600V., with ampere rating as shown on the diagrams and 22,000 ampere interrupting capacity. Breakers to be of the draw-out type with instantaneous short circuit trip, time delay undervoltage trips, and thermal overload relays. West type DK G.E. type AE-18.
Switchgear only shall be furnished under this contract.
The incoming line air circuit breaker shall be T.P.S.T., 600V., 1600 A., 50,000 A., interrupting capacity. Breaker to be of the draw-out type with instantaneous short circuit trips. West type DA.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

PUMPING EQUIPMENT AND GATES

WIRING DIAGRAM

SHEET 2 OF 2 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 1945

SUBMITTED: [illegible] PRINCIPAL ENGINEER

RECOMMENDED: [illegible] CHIEF ENGINEER

APPROVED: [illegible] CHIEF OF ENGINEERS, GENERAL, U.S. ARMY

DR. BY C.E.C. TR. BY N.S.S. CK. BY O.S.

"BELIEVED AS BUILT" 824.1-51 934-12,30

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH AREA

MOVABLE CLOSURE PARTS

SUPPLY CONTRACT

824.1-51

INDEX

PADUCAH AREA

(BROOKPORT & HARRISBURG, ILL.)

934-12.11/ 1.1 STRUCTURAL DETAILS

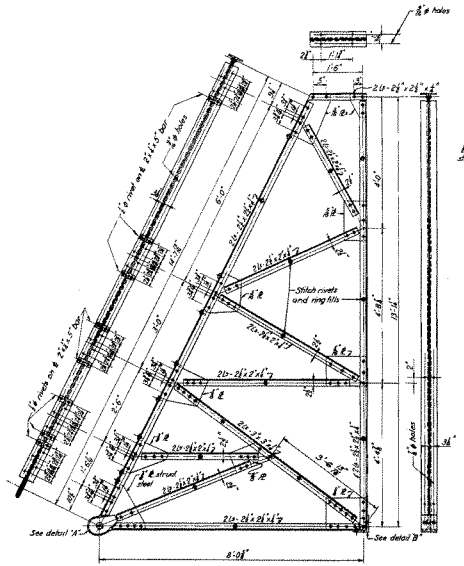
934-12.11/ 2.1 STRUCTURAL DETAILS & PINS

934-12.11/ 3.1 STRUCTURAL DETAILS

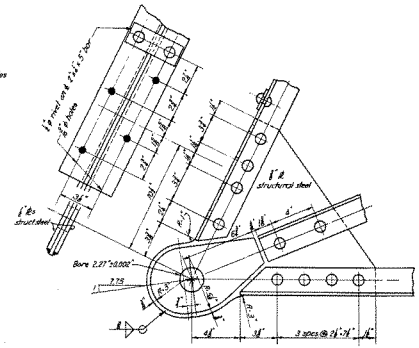
934-12.11/ 4.1 STRUCTURAL DETAILS

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

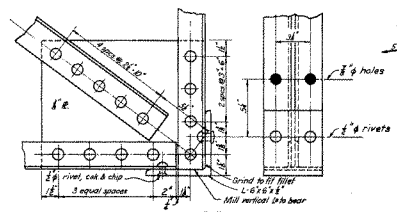
"BELIEVED AS BUILT"



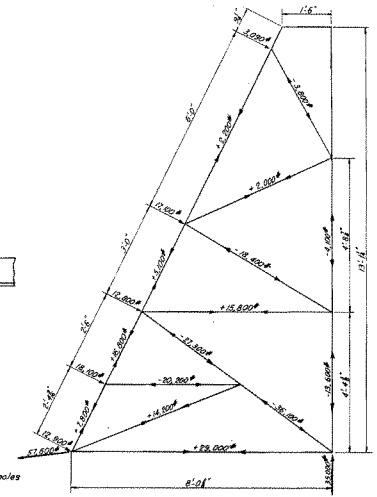
TRUSS
HARRISBURG STA. 23+73.8
MATERIAL: NO. AL 14-TALUMINUM, EXCEPT AS NOTED
MARK: CT1 NO. REQ'D: 2
WEIGHT:
STRUCTURAL STEEL 34 LBS.
ALUMINUM 240 LBS.
SCALE: 3/8" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3"=1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3"=1'-0"



STRESS DIAGRAM
SCALE: 3/8" = 1'-0"

General Notes, Aluminum Alloy Trusses.

All holes to be drilled or sub-punched 1/16" less than nominal size and reamed to finished diameter.

Rivet holes to be not more than 1/16" greater diameter than nominal size of rivet.

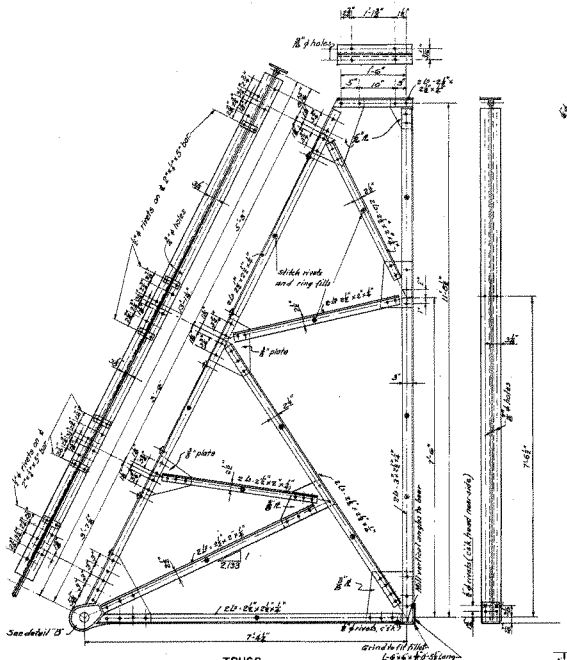
Standard gages to be used on all angles except as otherwise indicated.

Minimum rivet pitch for 7/8" rivets to be 2½" except as otherwise indicated.

Minimum distance from the center of a rivet to a sheared edge to be 2 rivet diameters unless otherwise indicated.

All rivets to be 1/4" annealed steel, driven cold with cone point head except as otherwise indicated.

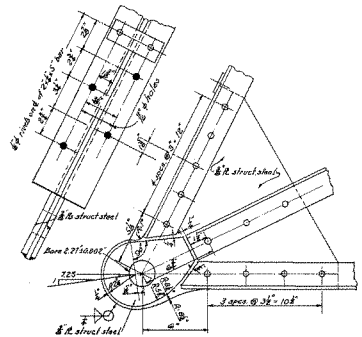
1/4" rivets to be AL 14-T Aluminum alloy, driven cold, and with cone-point heads unless otherwise indicated.



TRUSS

HARRISBURG STA. 100 + 81

MATERIAL: NO. AL 14-T ALUMINUM, EXCEPT AS NOTED
MARK: GT33
NO. REQ'D: 2
WEIGHT
STRUCTURAL STEEL: 32 LBS.
ALUMINUM: 192 LBS.
SCALE: 1" = 1'-0"

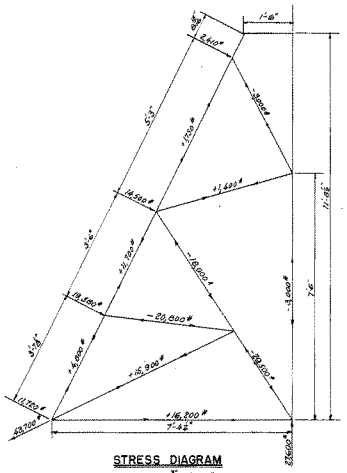


DETAIL "B"

PIN JOINT

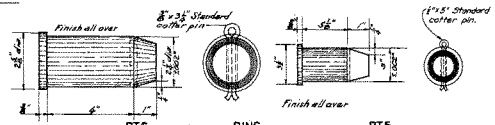
SCALE: 3" = 1'-0"

PIN & COTTERPIN SCHEDULE			
LOCATION	NO. REQ'D	WT. EACH	MARK
Harrisburg 156+198	3	.13.9#	PT 5
" 186+50	3	.13.9#	PT 5
" 23+73.5	2	6.25#	PT 6
" 100+81	2	6.25#	PT 6



STRESS DIAGRAM

SCALE: 1/4" = 1'-0"



PT6

PINS

SEE PIN AND COTTERPIN SCHEDULE FOR PINS REQUIRED

MATERIAL - NICKEL STEEL
SCALE: NONE

PT5

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY. AREA
MOVABLE CLOSURE PARTS
STRUCTURAL DETAILS & PINS

SHEETS 2 OF 4 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1947

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: THOMAS J. SANDERS, DR. BY J.W.C.

APPROVED: DENNIS J. SULLIVAN, DIVISION ENGINEER, DR. BY W.F.T.

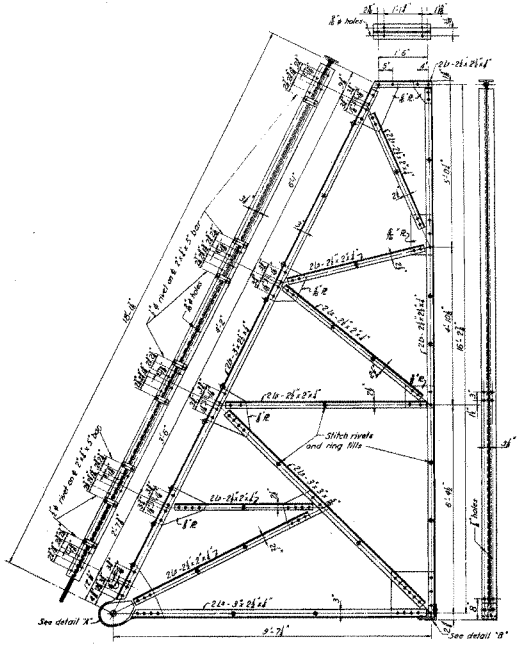
BY	DATE	CHARACTER

REVISIONS

824.1-51

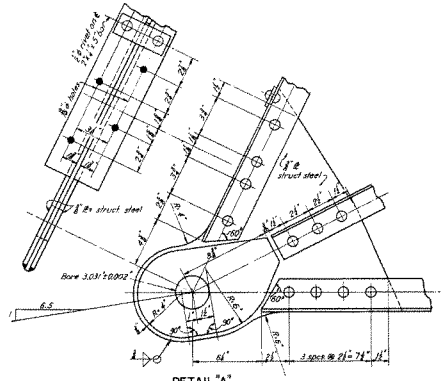
934-18.11/2.1

326

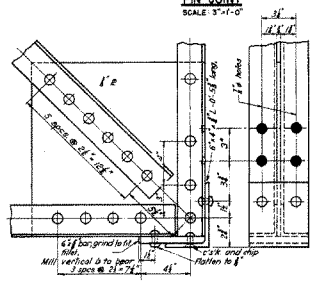


TRUSS FOR STAS. 156 + 93 & 186 + 20 HARRISBURG, ILL.

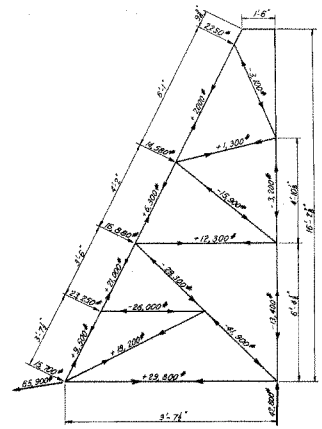
MATERIAL: NO. AL 14-T ALUMINUM, EXCEPT AS NOTED
MARK: CT6
NO. REQ'D. SEE SCHEDULE
WEIGHT:
STRUCTURAL STEEL 48 LBS.
ALUMINUM 298 LBS.
SCALE: 3/8" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3" = 1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3" = 1'-0"



STRESS DIAGRAM
SCALE: 1/8" = 1'-0"

TRUSS SCHEDULE			
LOCATION	STATION	NO. REQ'D.	MARK
Harrisburg, Ill.	156 + 93	3	CT6
"	186 + 20	3	CT6

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY AREA
MOVABLE CLOSURE PARTS
STRUCTURAL DETAILS

SHEET 3 OF 4 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1947

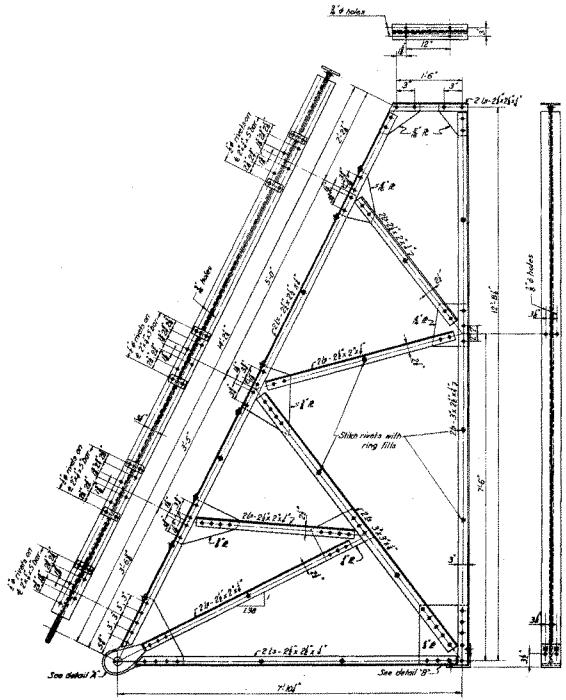
SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: FEDERAL RESIDENT
APPROVED: SOL. CURRIER, DISTRICT ENGINEER

DR. BY C.A.H. TR. BY C.A.H. CK. BY W.A.H.

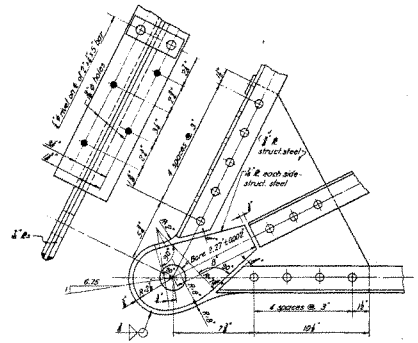
824.1-51 934-12.1V 3.1

RECEIVED AS BUILT

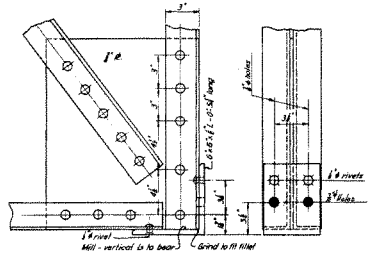


TRUSS FOR STA. 53+12.0 BROOKPORT, ILL.

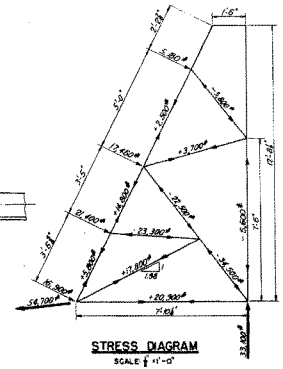
MATERIAL: NO. AL 14-T ALUMINUM, EXCEPT AS NOTED
MARK CT7 NO. REQ'D. 2
WEIGHT
STRUCTURAL STEEL 37 LBS.
ALUMINUM 214 LBS.
SCALE: 1" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3" = 1'-0"



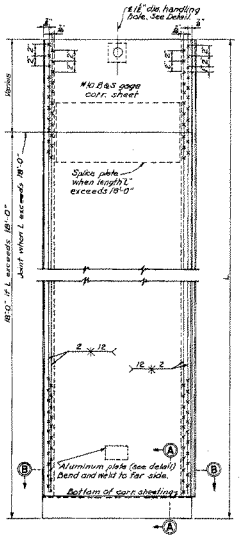
DETAIL "B"
HEEL SEAT
SCALE: 3" = 1'-0"



STRESS DIAGRAM
SCALE: ¼" = 1'-0"

WAR DEPARTMENT

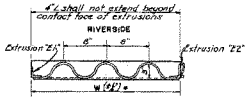
CORPS OF ENGINEERS, U. S. ARMY



SHEETING PANEL
LANDSIDE ELEVATION

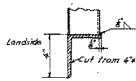
SCALE: NONE

MATERIAL: AL 61-T ALUMINUM ALLOY



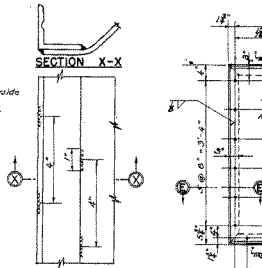
SECTION B-B

SCALE: 1 1/2" = 1'-0"



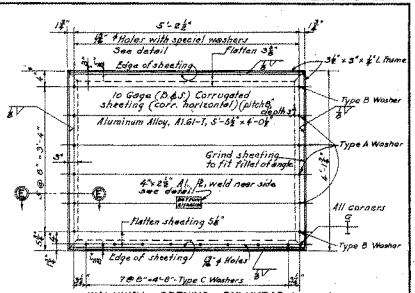
SECTION A-A

SCALE: 3" = 1'-0"



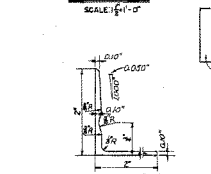
ALTERNATE DETAIL FOR WELDING EXTRUSIONS TO PANEL

SCALE: NONE



WALKWAY OPENING BULKHEAD

FOR OPENINGS AT STAS. 107 + 80.7 & 108 + 55.3
EVANSVILLE HOWELL SECTION
MAKE 2 - MARK EB1 - WT. 79 LBS. EA.
MATERIAL: ALUMINUM ALLOY AL 61-T
SCALE: 1" = 1'-0"

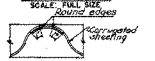


EXTRUSION "E1"

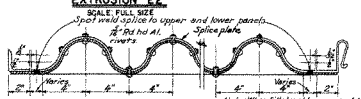
SCALE: FULL SIZE

EXTRUSION "E2"

SCALE: FULL SIZE

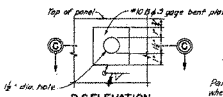


SECTION C-C



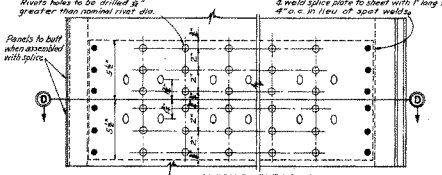
SECTION D-D

Note: When fillet welds are used to join extrusion to sheet, make distance from edge of splice to edge of extrusion 1/4", & weld splice plate to sheet with 1" long fillets 4" o.c. in lieu of spot welds.



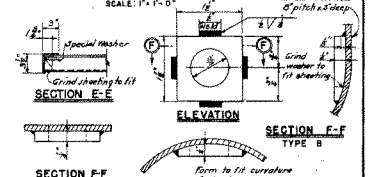
R.S. ELEVATION
HANDLING HOLE DETAIL

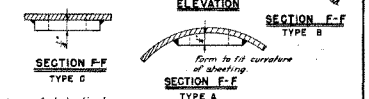
SCALE: 3" = 1'-0"



LANDSIDE ELEVATION
SPLICE IN SHEETING PANELS

SCALE: 3" = 1'-0"





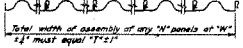
Note:
The corrugated sheeting has a nominal pitch of 8" & depth of 3". ± 1/4" tolerance in pitch is allowable.

SPECIAL WASHERS FOR WALKWAY OPENINGS

SCALE: NONE

SHEETING SCHEDULE							
LOCATION	STATION	WIDTH "W" ±	LENGTH "L"	NO. REQ'D	"T" ϕ	TOTAL WT.	MARK
Brookport, Ill.	53+12.0	5'-2 1/4"	16'-1"	7	3/1'-2"	1940	C.S. 23
" "	81+00.5	4'-6 1/4"	11'-1"	3	18'-2"	595	" " 16
" "	59+49.2	4'-6 1/4"	11'-1"	5	18'-2"	595	" " 16
" "	92+68.9	5'-3 1/4"	12'-10"	5	21'-2"	719	" " 32
" "	97+18.6	5'-3 1/4"	11'-1"	5	21'-2"	682	" " 31
" "	110+58.00	5'-2 1/4"	13'-10"	7	3/1'-2"	1160	" " 21
" "	114+38.54	5'-2 1/4"	13'-10"	7	3/1'-2"	1160	" " 21
" "	195+30.7	5'-3 1/4"	11'-1"	5	21'-2"	682	" " 31
Golconda, Ill.	10+41.0	5'-2 1/4"	13'-4"	7	3/1'-2"	1040	" " 20
" "	19+34.2	5'-4 1/4"	12'-4"	3	9'-2"	336	" " 17
" "	21+05.6	5'-2 1/4"	11'-1"	7	3/1'-2"	959	" " 19
Harrisburg, Ill.	23+73.8	5'-2 1/4"	16'-10"	7	3/1'-2"	1400	" " 24
" "	100+81	5'-2 1/4"	14'-1"	7	3/1'-2"	1220	" " 22
" "	156+80	5'-2 1/4"	20'-1"	7	3/1'-2"	1750	" " 25
" "	166+20	5'-2 1/4"	20'-4"	7	3/1'-2"	1791	" " 26

* Width tolerance for panel = ± 1/4".
Edge of panel to be not more than 1/4" out of parallel.
Schedule contains "N" #1 panels for each closure.



Total width of assembly of any "N" panels at "W" ± 1/4" must equal "T" ± 1"

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY. AREA
MOVABLE CLOSURE PARTS
SHEETING PANELS AND
WALKWAY OPENING BULKHEADS

SHEETS 1 OF 1 SHEETS SCALES AS SHOWN

CORPS OF ENGINEERS LOUISVILLE, KY. SEPT. 1947

SUBMITTED: CHIEF, DESIGNING SECTION

APPROVAL RECOMMENDED: SR. W. S. A.

APPROVED: TR. W. C. P. E.

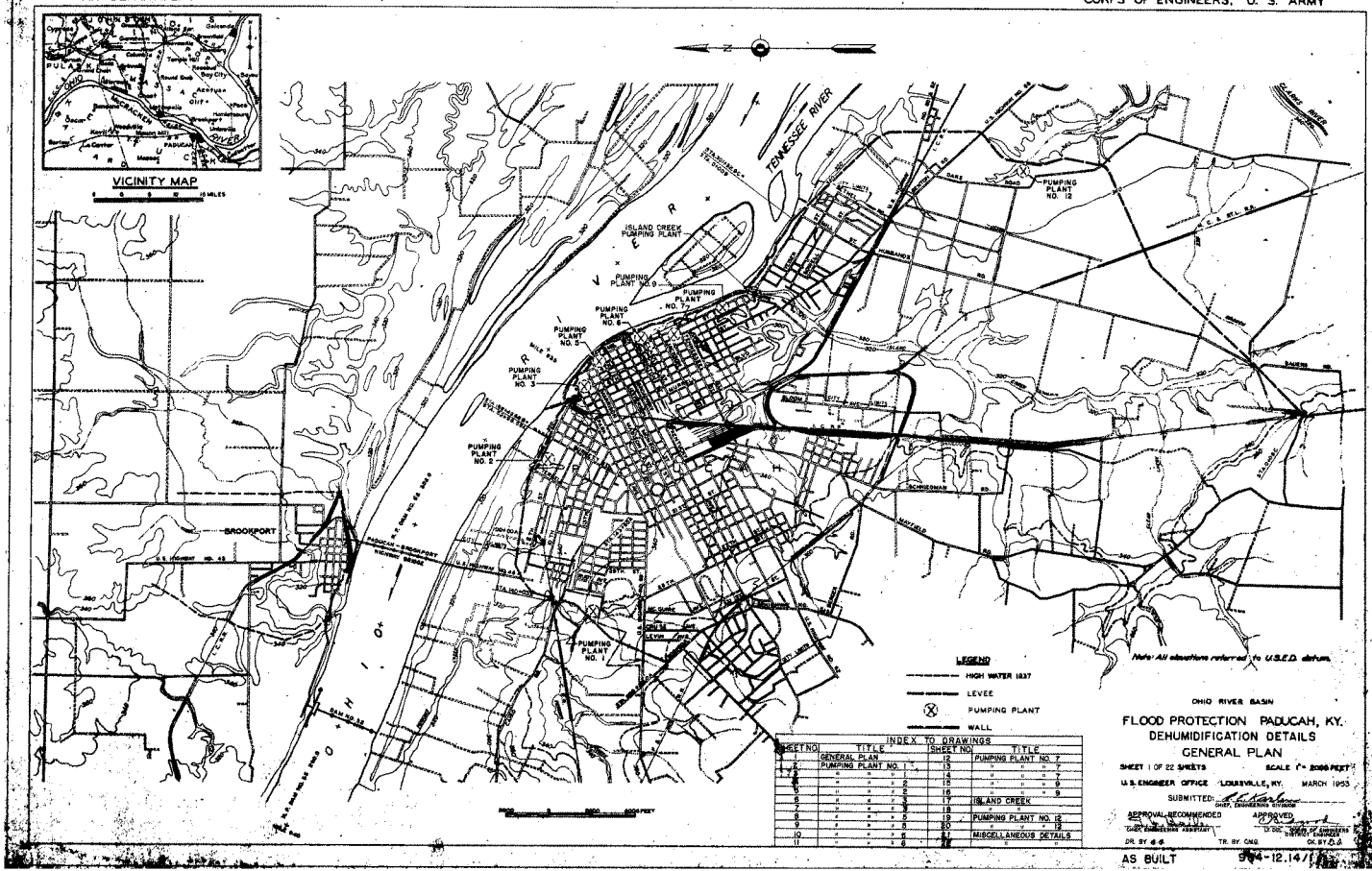
884.1-51

884-18.1

WHEN COMPLETE AS BUILT

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



INDEX TO DRAWINGS

SHEET NO.	TITLE	SHEET NO.	TITLE
1	GENERAL PLAN	12	PUMPING PLANT NO. 7
2	PUMPING PLANT NO. 1	13	" " " " 7
3	" " " " 1	14	" " " " 7
4	" " " " 2	15	" " " " 9
5	" " " " 2	16	" " " " 9
6	" " " " 3	17	ISLAND CREEK
7	" " " " 3	18	" "
8	" " " " 5	19	PUMPING PLANT NO. 12
9	" " " " 5	20	" " " " 12
10	" " " " 6	21	MISCELLANEOUS DETAILS
11	" " " " 6	22	" "

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DEHUMIDIFICATION DETAILS
GENERAL PLAN

SHEET 1 OF 22 SHEETS — SCALE 1" = 2000 FEET

U.S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1953

SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

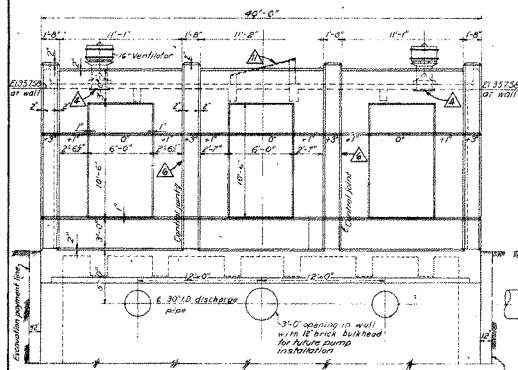
APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION

APPROVED: [signature] COL. CORPS OF ENGINEERS DISTRICT ENGINEER

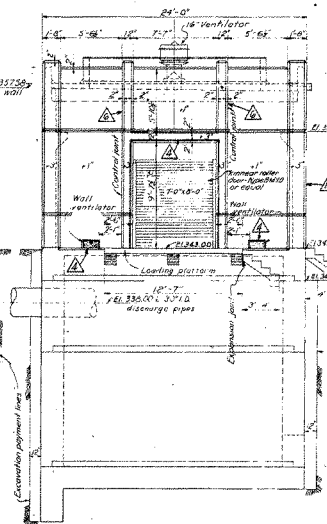
DR. BY G.G. TR. BY CMG. CK. BY D.D.

AS BUILT

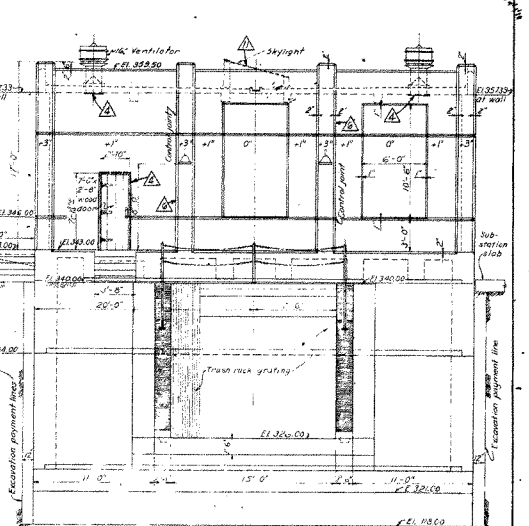
594-12.14/1



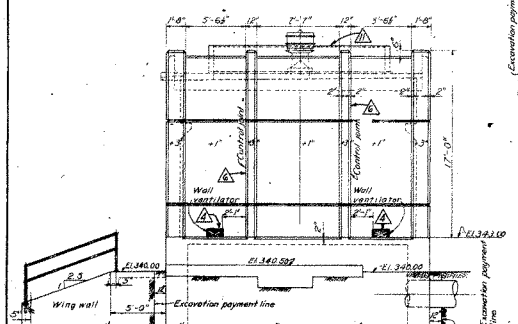
NORTH WALL



WEST WALL



SOUTH WALL



EAST WALL

ITEMS OF WORK UNDER DEHUMIDIFICATION CONTRACT

1. Furnish and install dehumidification unit Desomatic Model SOR-B-AE, 110V. 60~ or equal. Provide suitable supports with 1'-6" clearance above floor.
2. Furnish and install reactivation air lines thru wall ventilator. Provide vapor-tight connection at cover plate.
3. Paint all concrete surfaces in superstructure, including floor, with a vapor barrier plastic.
4. Cover all door and ventilators openings in plant superstructure as shown by details on sheets E1 & E2. Dimensions of openings shall be verified in field prior to fabrication.
5. Seal all incoming line conduits, including electrical conduit not shown on plans.
6. Caulk all control joints.
7. Seal pipe wall for water level indicator.
8. Install gasket under cover, around edges and between sections, modify hinges. Also see Detail A, B & C, Sheet E1.
9. Caulk ventilator duct openings at sump and roof and seal duct joints.
10. Caulk opening around valve stem. Provide rubber gasket under cover and attach to box.
11. Caulk and seal skylight glass and frame so as to be vapor-tight.
12. Seal cracks in exterior of superstructure concrete walls, including parapet and paint with one coat of waterproof paint.
13. Permanently secure ventilating sash in windows in closed position and caulk windows so as to be vapor tight.

Notes:
1. See C.O. Nos. 1 and 2, "As Built" corrections.
2. Duplex receptacles installed within 6'-0" of unit where required.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1

DEHUMIDIFICATION DETAILS

SHEET 2 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

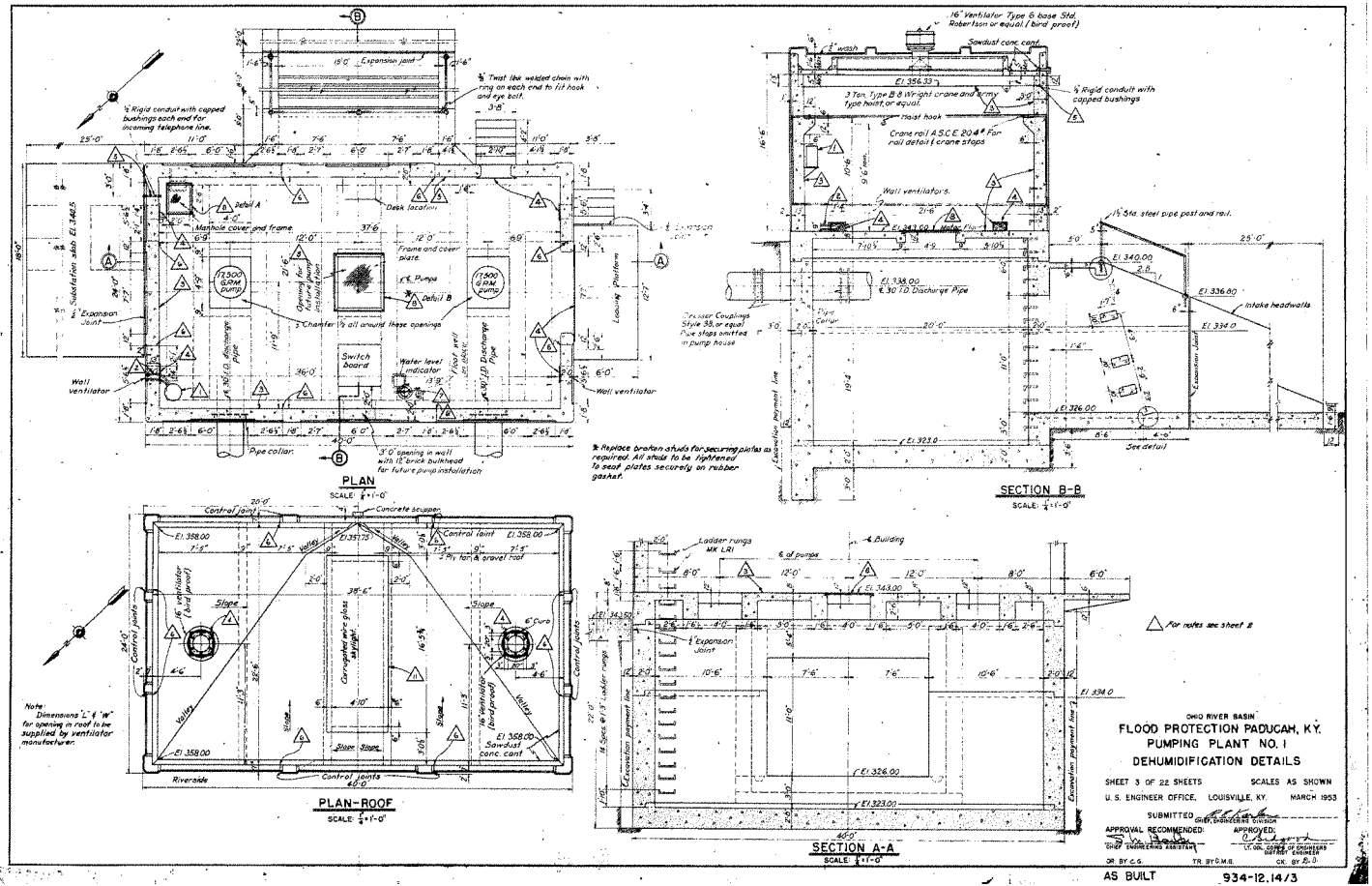
SUBMITTED: CHIEF, ENGINEERING DIVISION

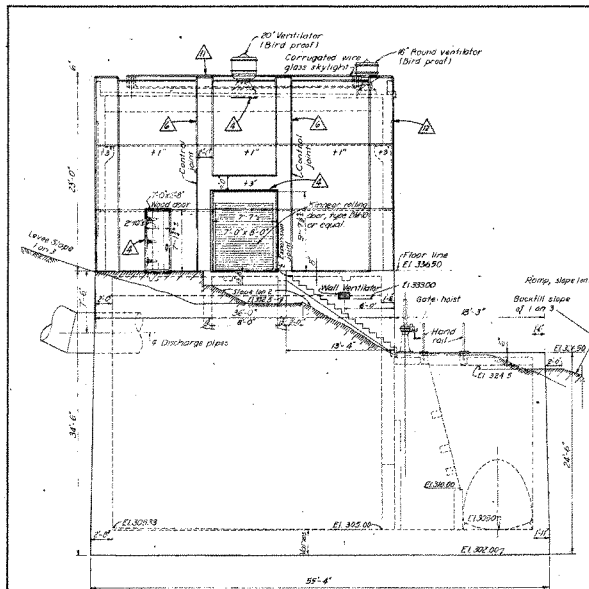
APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT

APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY C.G. TR. BY O.M.G. CK. BY D.D.

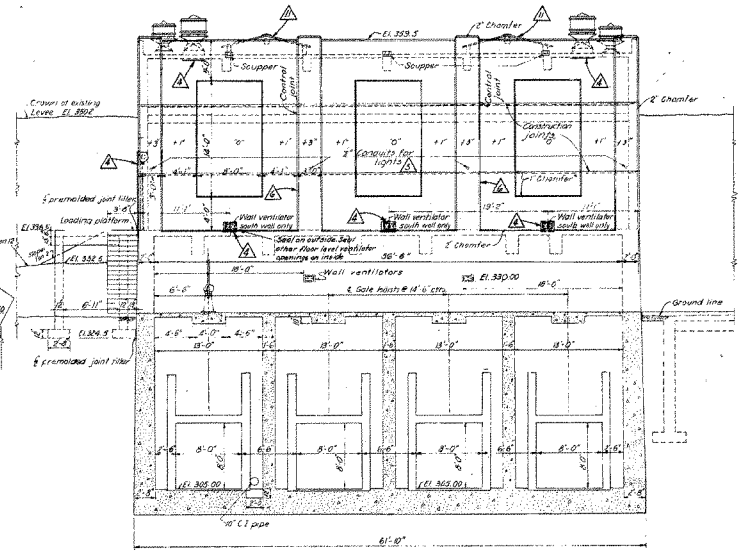
AS BUILT 934-12.14/2


PLAN
SCALE: 1/4"=1'-0"
PLAN-ROOF
SCALE: 1/4"=1'-0"
SECTION B-B
SCALE: 1/4"=1'-0"
SECTION A-A
SCALE: 1/4"=1'-0"
Note: Dimensions "L" & "W" for opening in roof to be supplied by ventilator manufacturer.
* Replace broken studs for securing plates as required. All studs to be tightened to seal plates securely on rubber gasket.
For notes see sheet 2
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
DEHUMIDIFICATION DETAILS
SHEET 3 OF 22 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
MARCH 1953
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.14/3



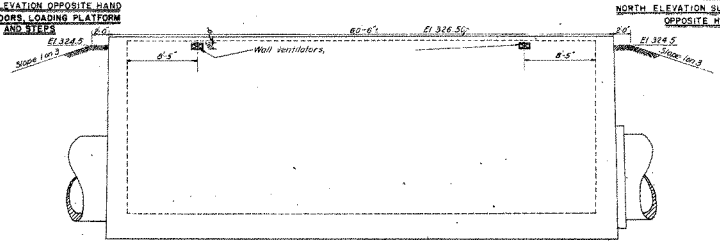
WEST ELEVATION

EAST ELEVATION OPPOSITE HAND
OMIT DOORS, LOADING PLATFORM AND STEPS



SECTIONAL ELEVATION SOUTH WALL

NORTH ELEVATION SUPERSTRUCTURE OPPOSITE HAND



ELEVATION — SOUTH WALL INTAKE CHAMBER

△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO 2

DEHUMIDIFICATION DETAILS

SHEET 4 OF 22 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: R. E. Kelly
CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: J. C. Lawrence
CHIEF ENGINEERING ASSISTANT

APPROVED: R. E. Kelly
LT. COL., CORPS OF ENGINEERS
DISTRICT ENGINEER

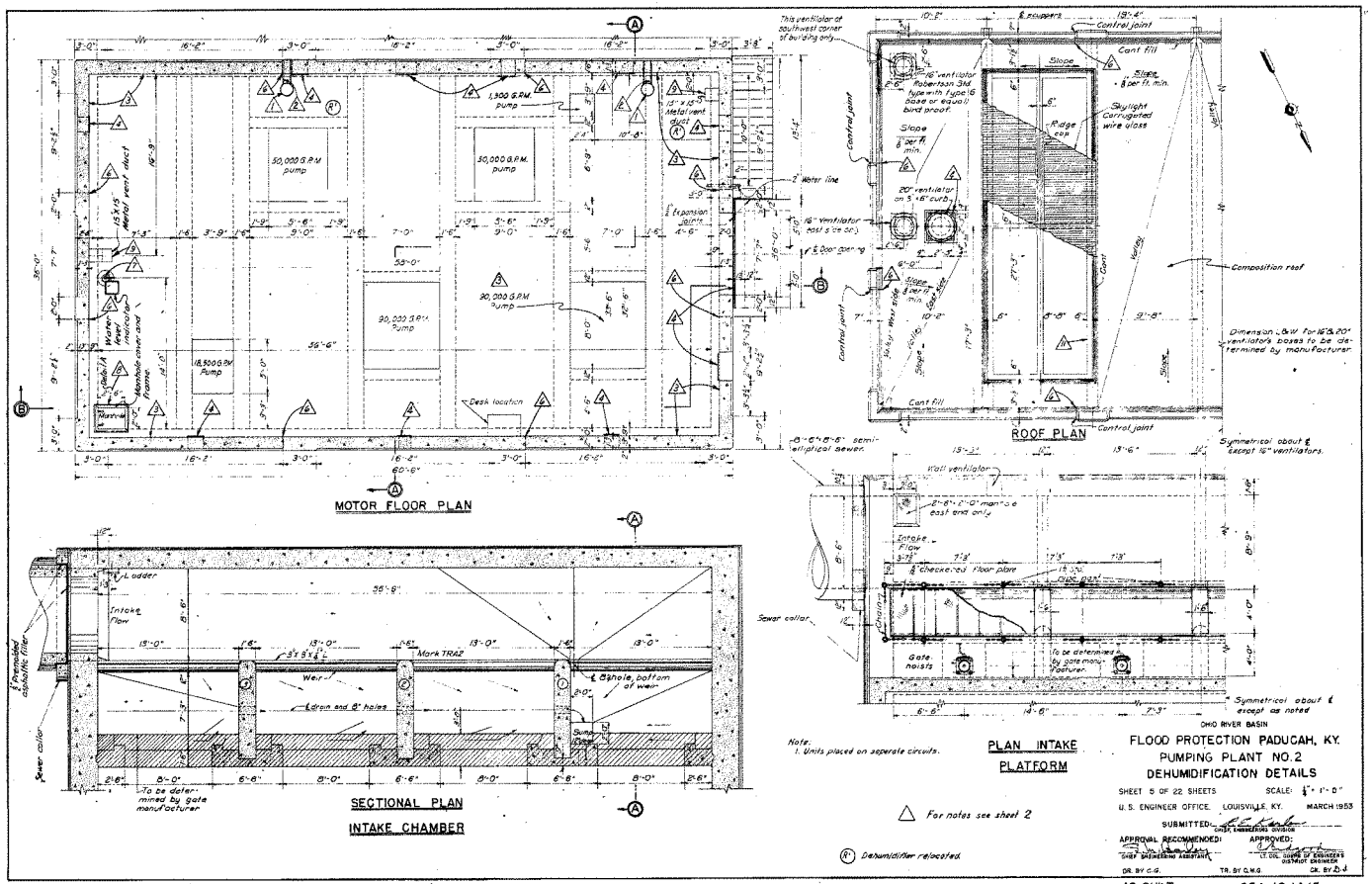
DR. BY C.J. TR. BY O.M.G. CK. BY D.J.

AS BUILT 934-12.14/4

333

1098

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
DEHUMIDIFICATION DETAILS

SHEET 5 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

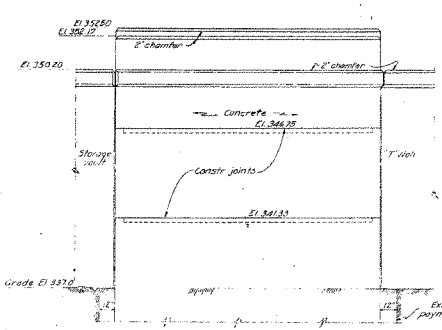
APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT

APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.G. TR. BY C.W.G. CK. BY D.J.

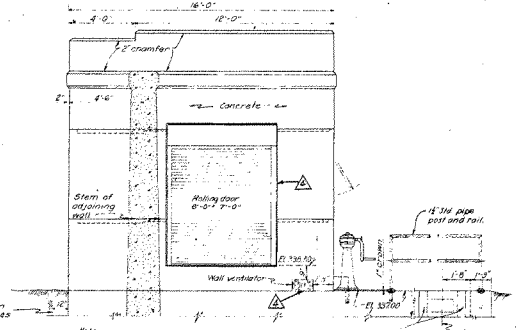
AS BUILT 934-12.14/5

1099



EAST ELEVATION

SCALE: $\frac{3}{8}$" = 1'-0"

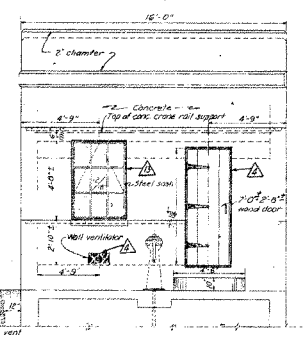


Note:
Door and wall ventilator omitted on south elevation.

NORTH ELEVATION

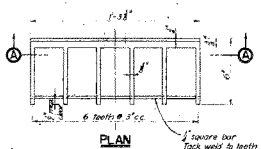
SOUTH ELEVATION OPPOSITE HAND EXCEPT AS NOTED

SCALE: $\frac{3}{8}$" = 1'-0"



WEST ELEVATION

SCALE: $\frac{3}{8}$" = 1'-0"

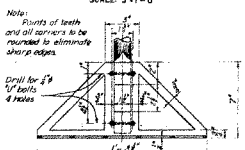


PLAN

SCALE: 3" = 1'-0"

RAKE HANDLE SCHEDULE	
PUMPING PLANT	LENGTH
No. 1	17'-0"
No. 2	19'-0"
No. 3	15'-0"
No. 5	15'-0"
No. 6	19'-0"
No. 7	12'-0"
No. 12	19'-0"

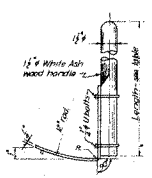
Note:
Points of teeth and all corners to be rounded to eliminate sharp edges.



SECTION A-A

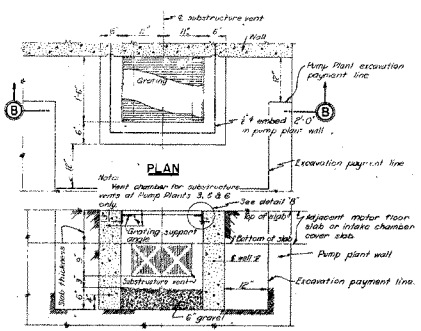
HAND RAKE

MAKE 1 FOR EACH PUMPING PLANT
MATERIAL STRUCTURAL STEEL WT 4.7 LBS.
2-"U" BOLTS WT 0.25 LBS.



Weight of rake with 19'-0" handle = 15 lbs.

SIDE VIEW



PLAN

SECTION B-B

TYPICAL DETAIL

SUBSTRUCTURE VENT CHAMBER

SCALE: 1" = 1'-0"

△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 3

DEHUMIDIFICATION DETAILS

SHEET 6 OF 22 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT

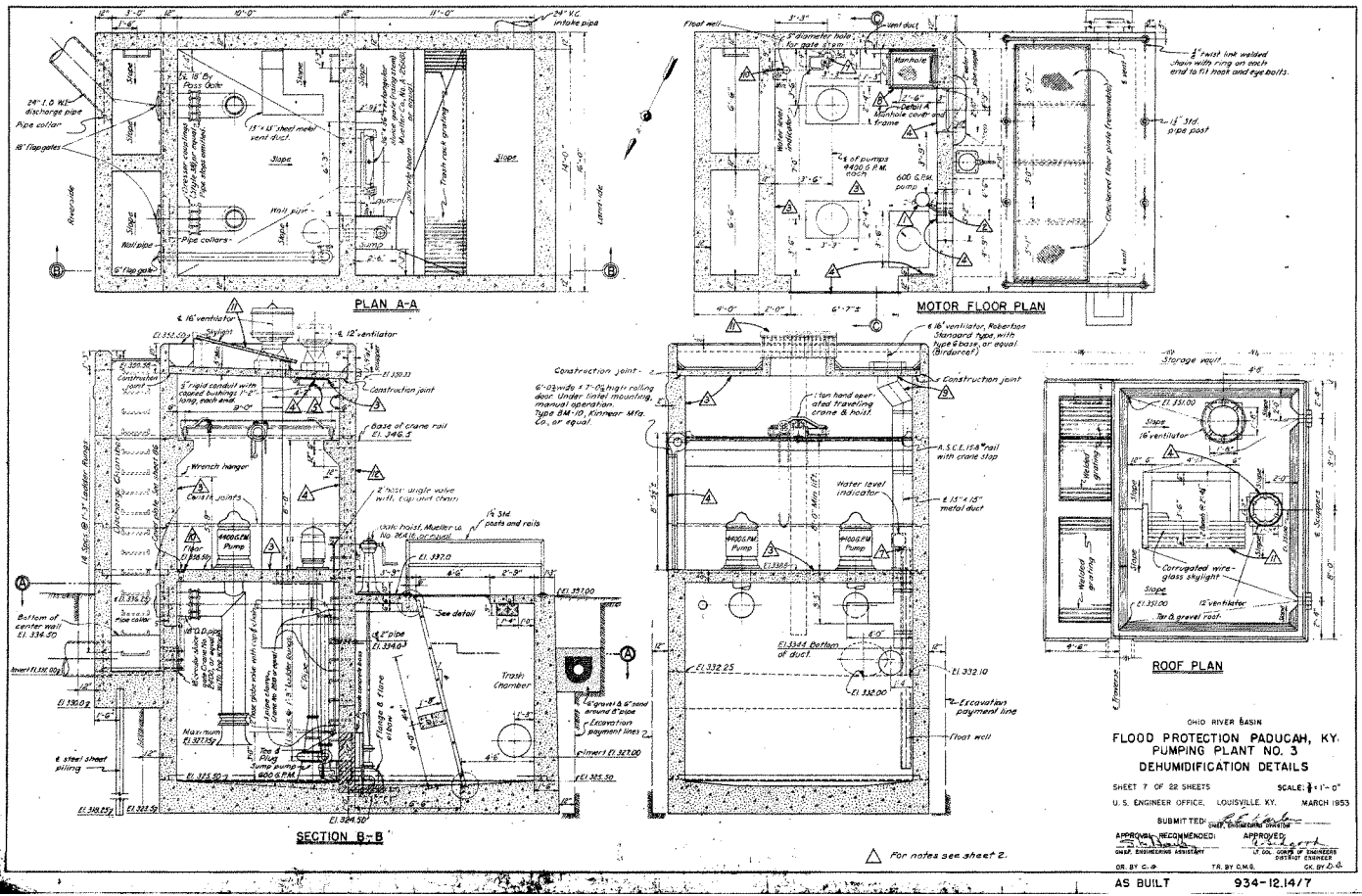
APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY C.G. TR. BY C.M.G. CK. BY D.G.

AS BUILT 934-12.14/6

335

1100



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
DEHUMIDIFICATION DETAILS

SHEET 7 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, ENGINEERING ASSISTANT

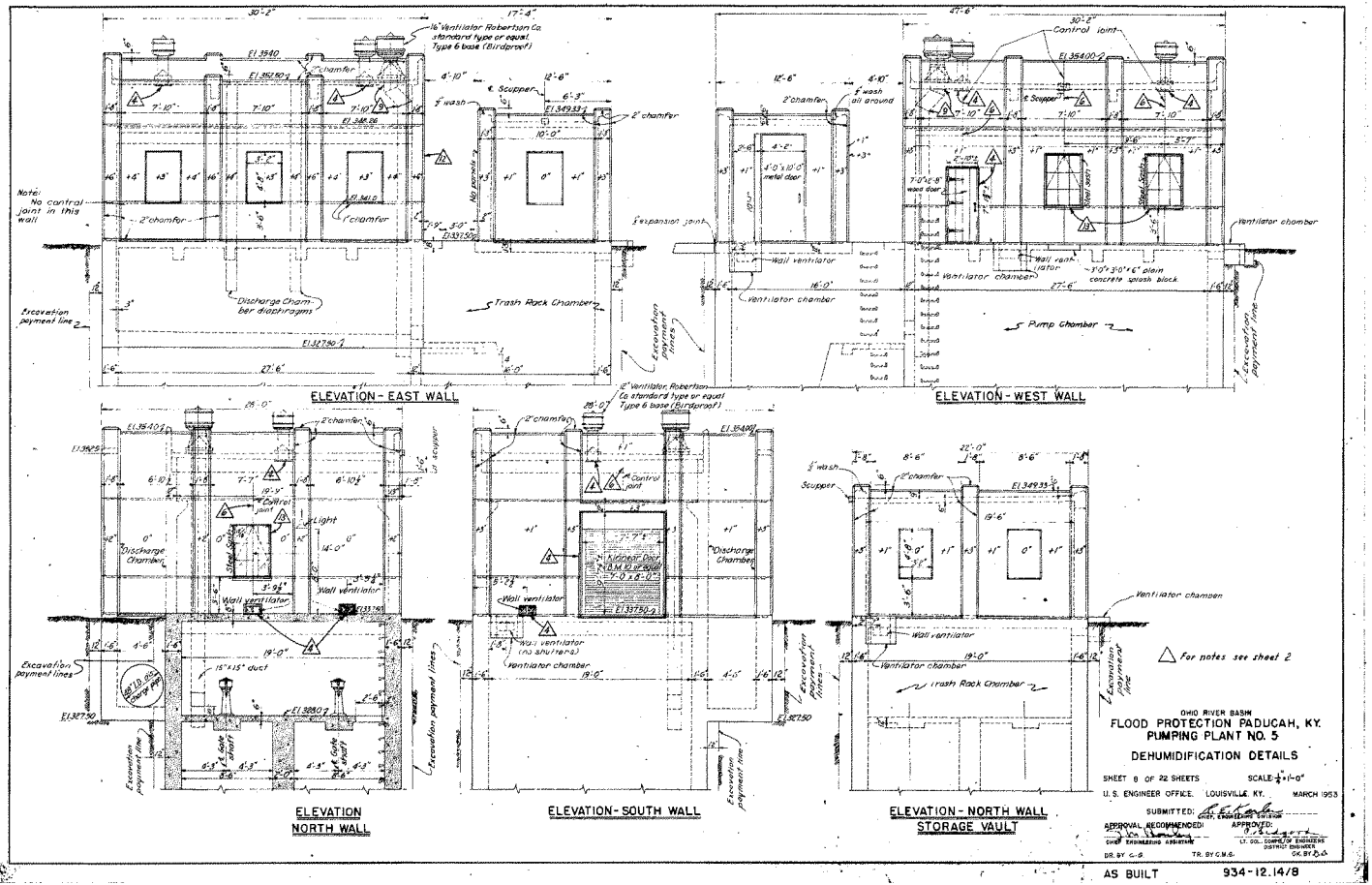
APPROVED: LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.J.P. TR. BY C.M.S. CK. BY D.J.

AS BUILT 934-12.14/7

1101

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5

DEHUMIDIFICATION DETAILS

SHEET 8 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

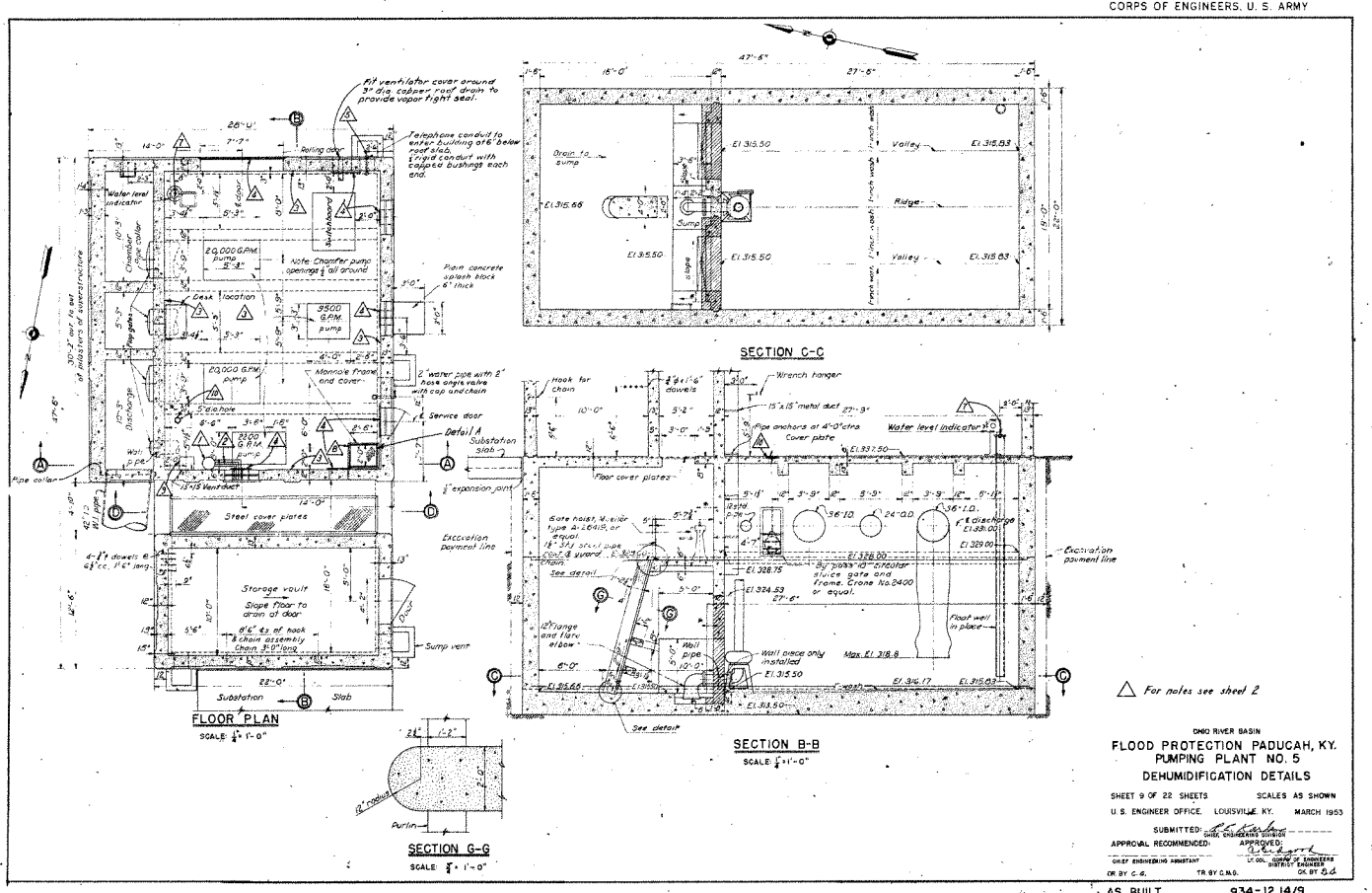
SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION

APPROVED: LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.G. TR. BY C.M.G. CK. BY

AS BUILT 934-12.14/8



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
DEHUMIDIFICATION DETAILS

SHEET 9 OF 22 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT

APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

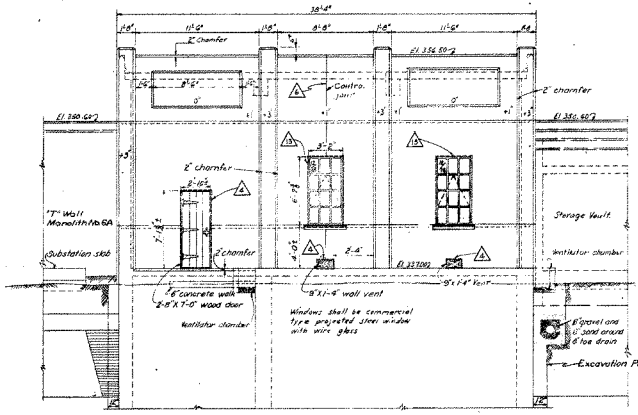
DR. BY C.G. — TR. BY C.M.G. — CK. BY

AS BUILT — 934-12.14/9

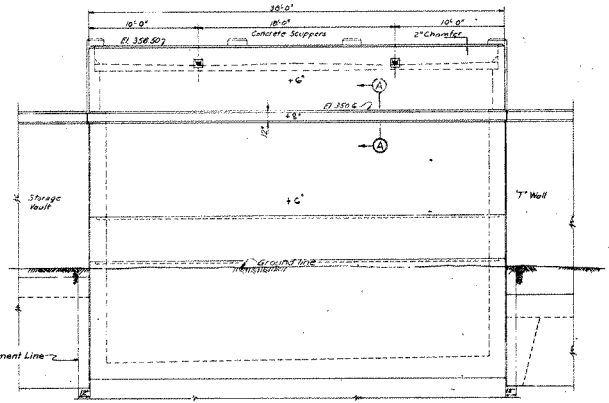
1103

398

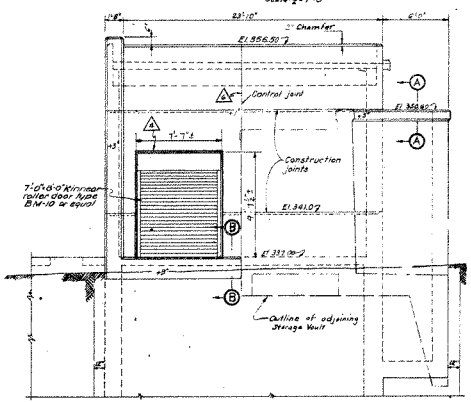
CORPS OF ENGINEERS U.S. ARMY



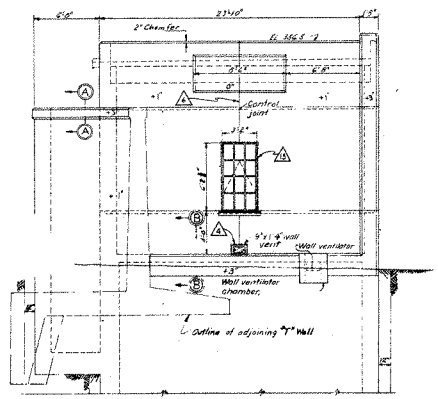
ELEVATION - WEST WALL
Scale: 1/4" = 1'-0"



EAST ELEVATION
Scale: 1/4" = 1'-0"



SOUTH ELEVATION
Scale: 1/4" = 1'-0"



NORTH ELEVATION
Scale: 1/4" = 1'-0"

△ For notes see sheet 2

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
DEHUMIDIFICATION DETAILS

SHEET 10 OF 22 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

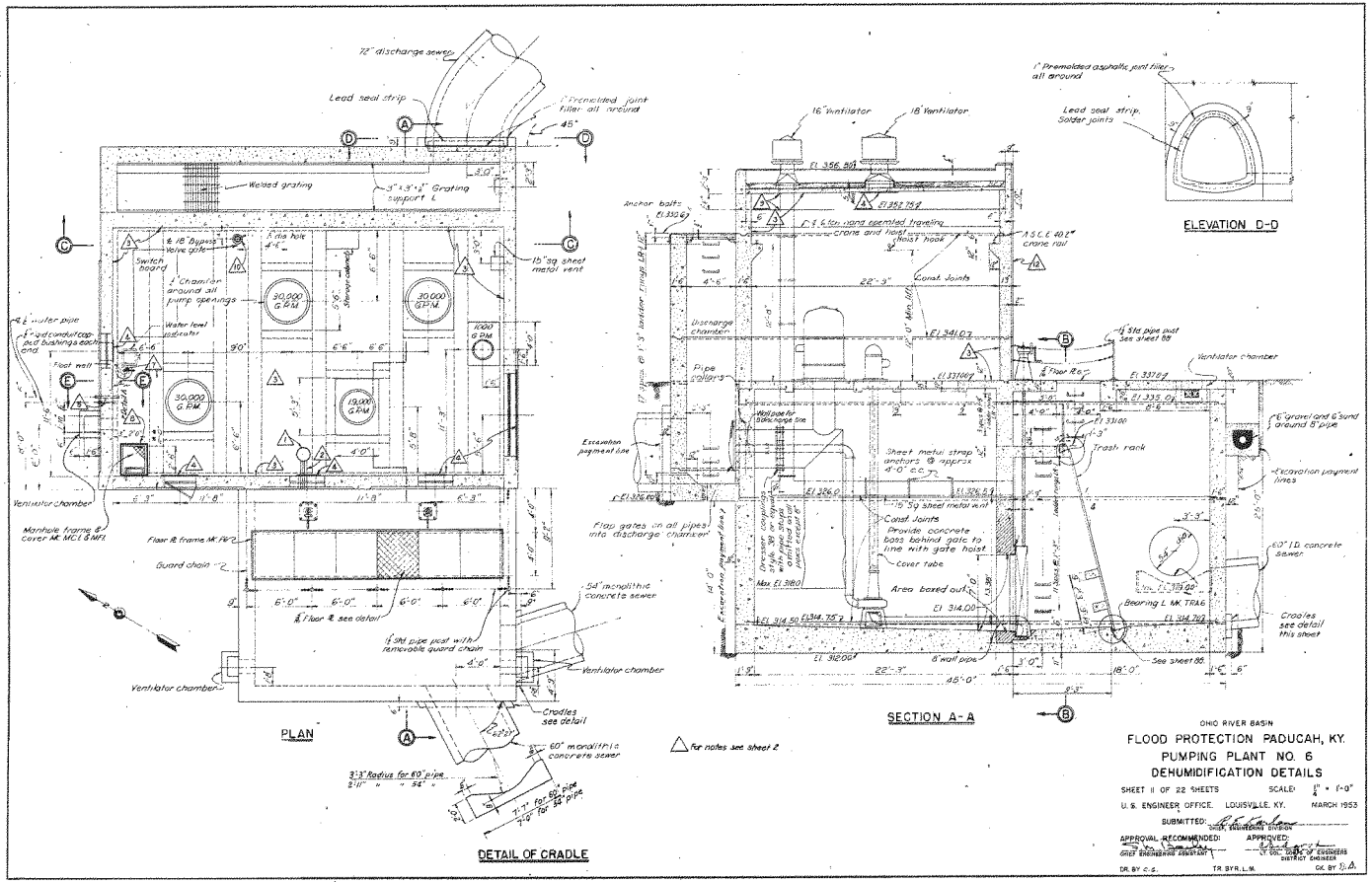
SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION — APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.G. — TR. BY G.M.G. — CK. BY D.O.

AS BUILT — 934-12.14/10

339



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 6

DEHUMIDIFICATION DETAILS

SHEET 11 OF 22 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

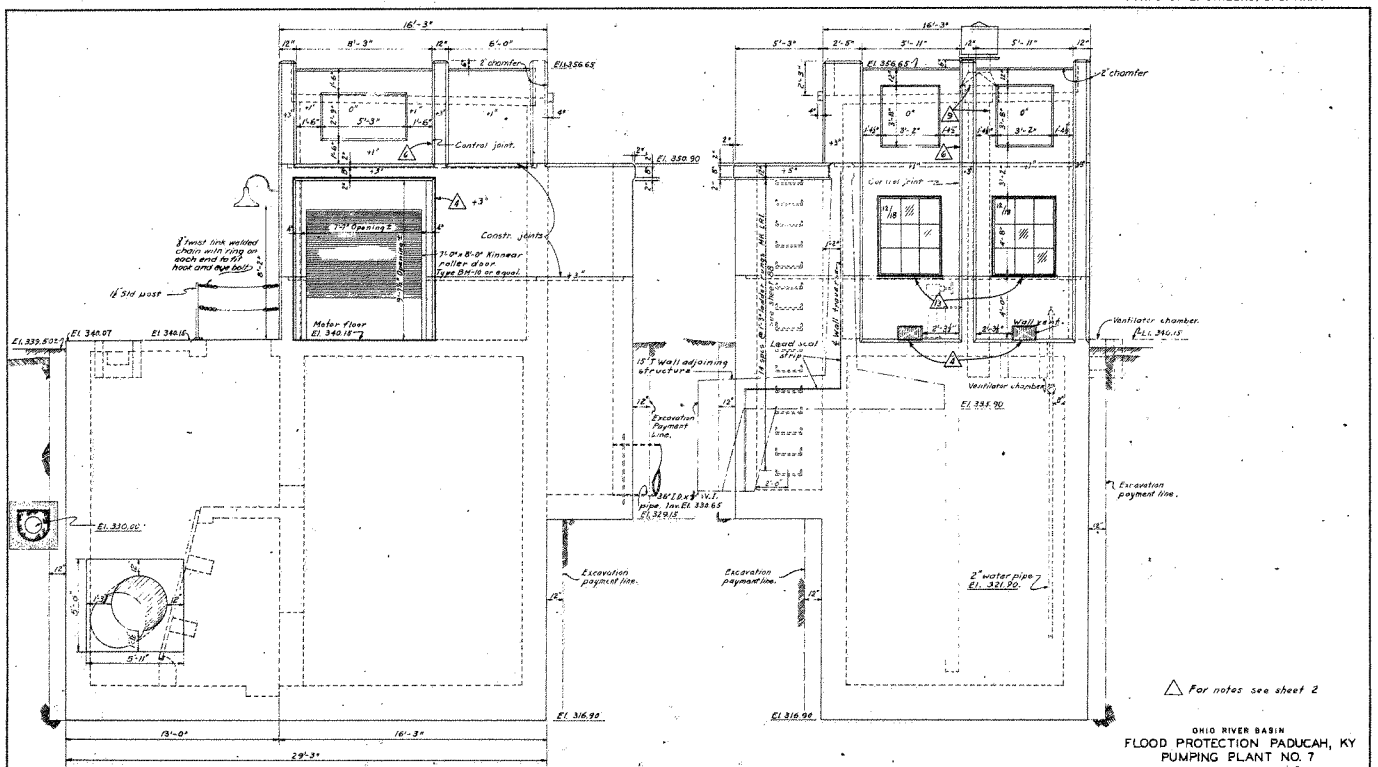
APPROVAL RECOMMENDED: [signature] CHIEF ENGINEERING DIVISION

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.S. TR. BY R.L.M. CK. BY D.A.

AS BUILT 934-12.14/11

CORPS OF ENGINEERS, U. S. ARMY



SOUTH ELEVATION

NORTH ELEVATION

△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY

PUMPING PLANT NO. 7

DEHUMIDIFICATION DETAILS

SHEET 12 OF 22 SHEETS SCALE 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

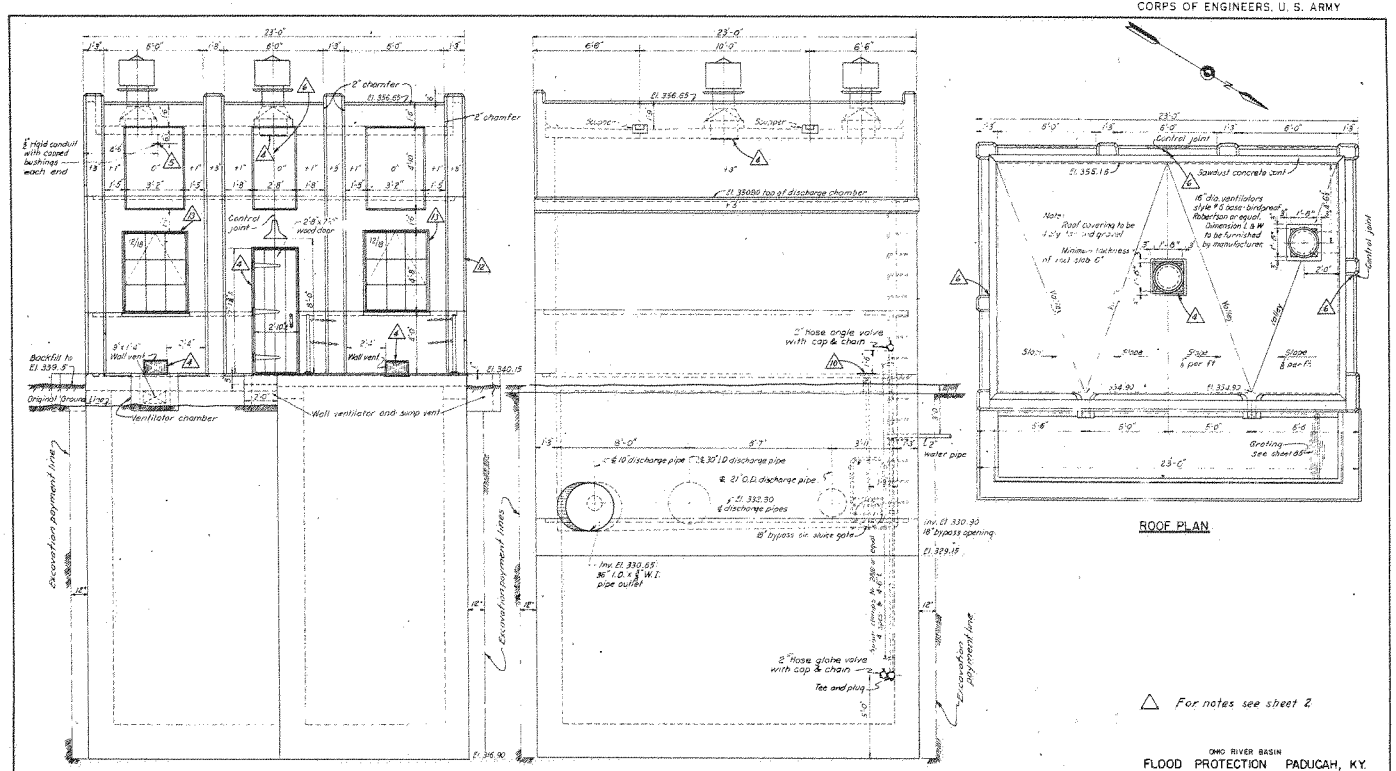
APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT

APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C. G. TR. BY R. L. M. CK. BY R. D.

AS BUILT 934-12.14/12

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
DEHUMIDIFICATION DETAILS

SHEET 13 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1953

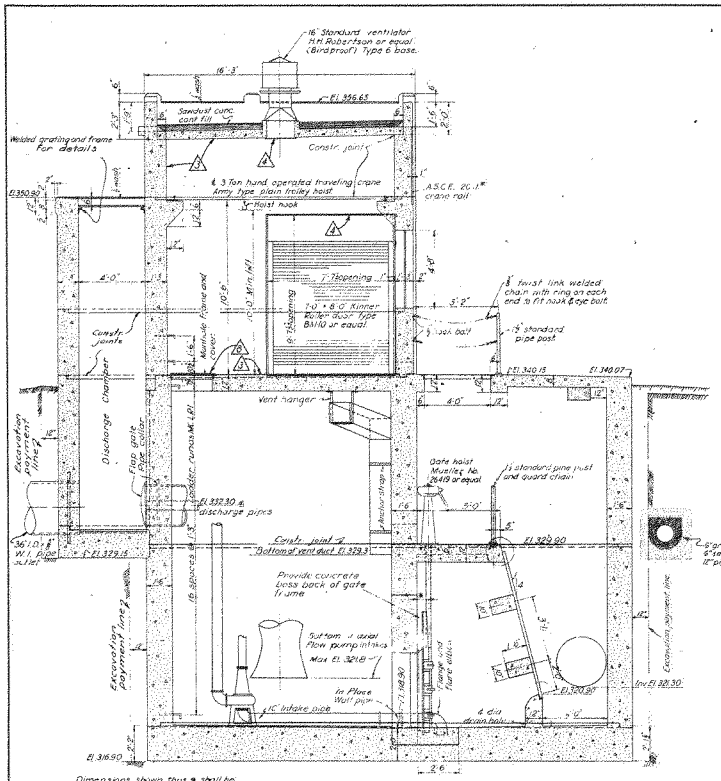
SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

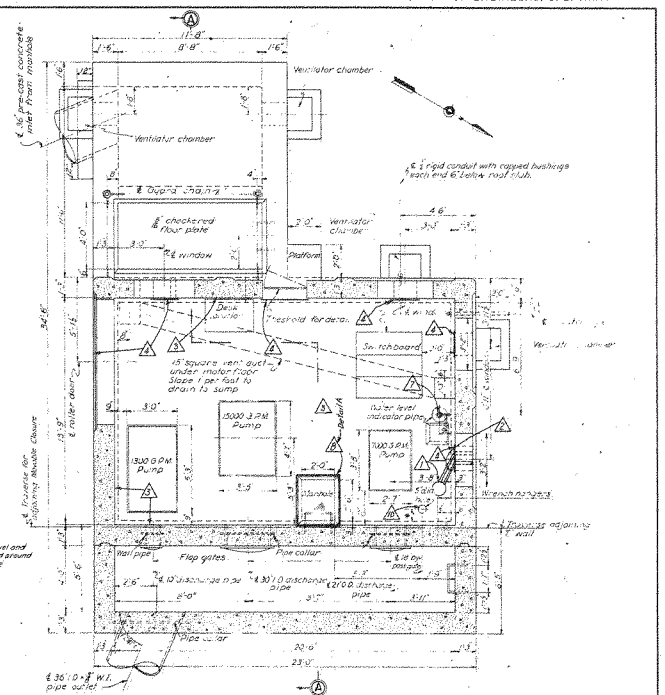
APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY C. G. TR. BY R.L.M. CK. BY D.A.

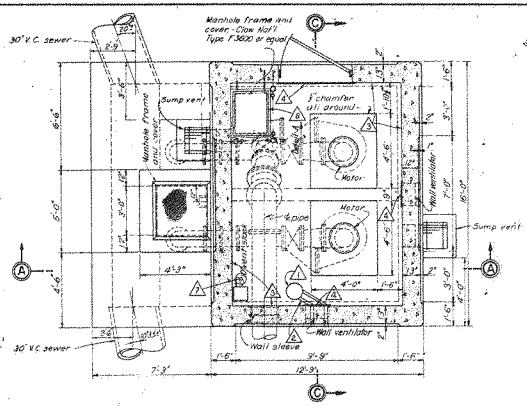
AS BUILT 934-12.14/13



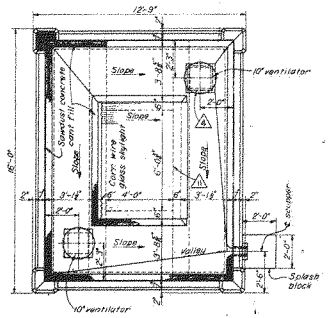
SECTION A-A


Ventilator chamber
Ventilator chamber
Checkered floor plate
Window
Platform
Threshold for door
Switchboard
15" square vent duct under motor floor. Slope 1 per foot to drain to sump
15000 G.P.M. Pump
1800 G.P.M. Pump
1000 G.P.M. Pump
Water level indicator pipe
Wrench hangers
Wall pipe
Flap gates
Pipe collar
Pipe collar
Pipe collar

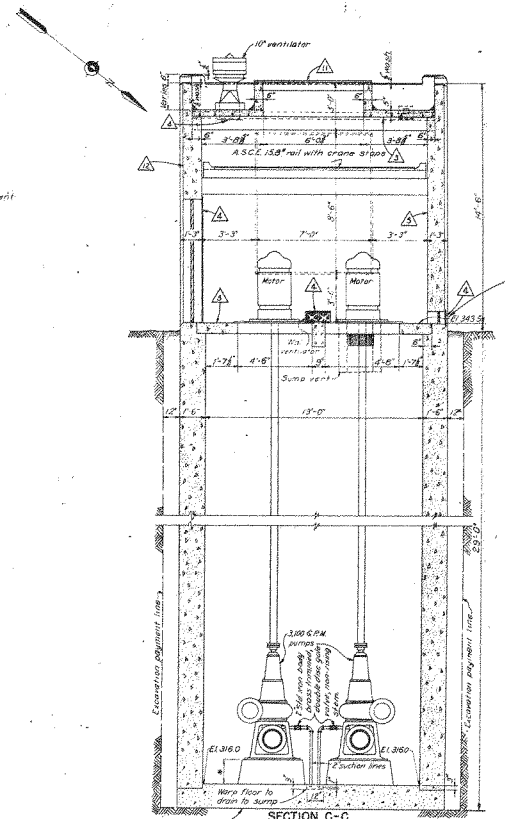
CORPS OF ENGINEERS, U. S. ARMY



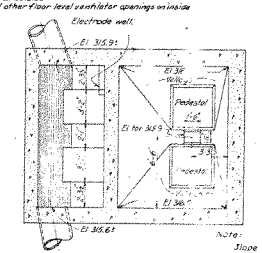
MOTOR FLOOR PLAN
SCALE - 3/8" = 1'-0"



ROOF PLAN
SCALE 3/8" = 1'-0"



SECTION C-C
SCALE: 3/8" = 1'-0"



PLAN-SUMP FLOOR
SCALE - 3/4" = 1'-0"

Note:
Slope floor to drain to sump.

△ For notes see sheet 2

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
DEHUMIDIFICATION DETAILS

SHEET 15 OF 22 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1953

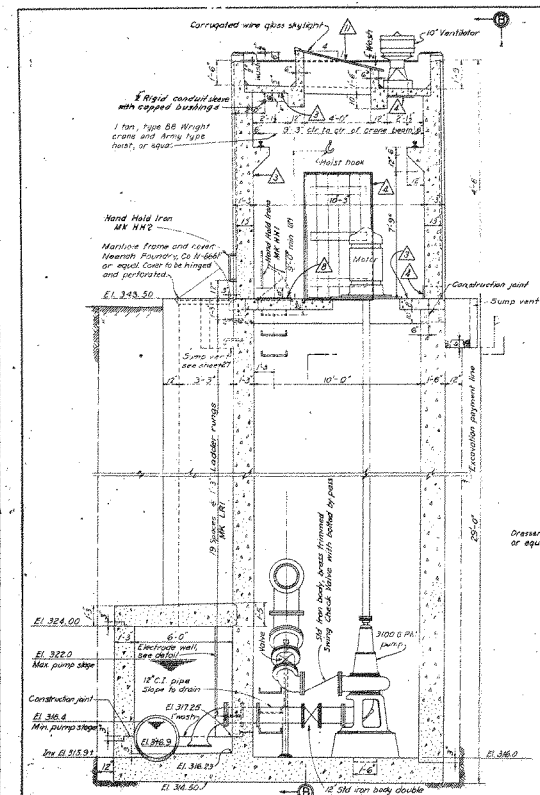
SUBMITTED: R. E. Karlson
CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION
APPROVED: Lt. Col. CORPS OF ENGINEERS DISTRICT ENGINEER

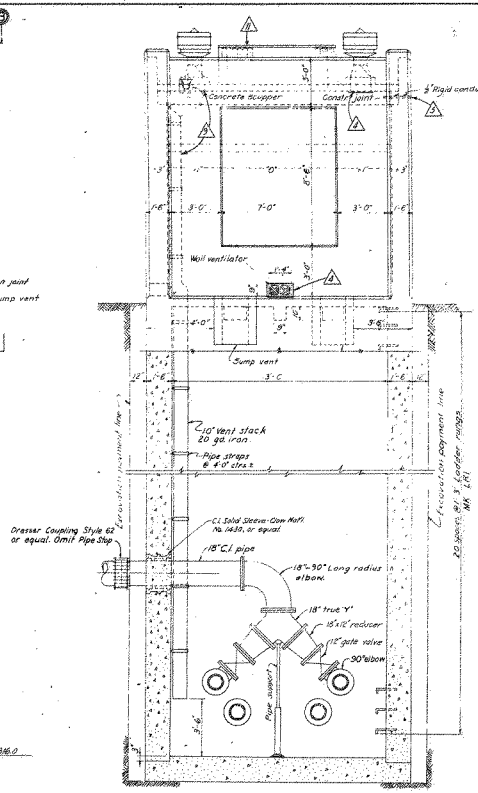
DR. BY C. S. TR. BY R.L.M. CK. BY J.O.

AS BUILT 934-12.14/15

CORPS OF ENGINEERS, U. S. ARMY



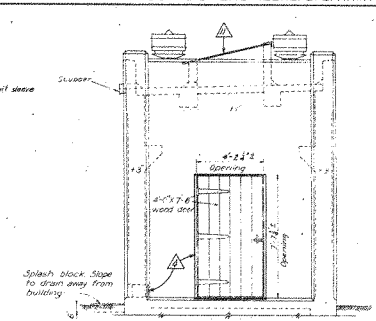
SECTION A-A



SECTION B-B

SUPERSTRUCTURE SOUTH WALL OPPOSITE HAND

OMIT WALL VENTILATOR



ELEVATION - WEST WALL

OMIT DOOR IN EAST WALL

AND ADD WALL VENTILATOR

△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION - PADUCAH, KY.

PUMPING PLANT NO. 9

DEHUMIDIFICATION DETAILS

SHEET 16 OF 22 SHEETS SCALE: ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: [illegible] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEERING ASSISTANT

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

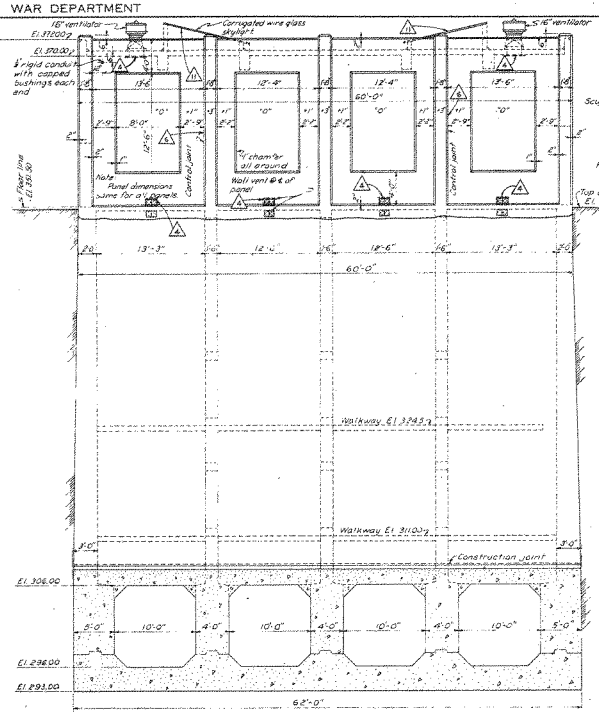
DR. BY C. S. TR. BY R. L. N. CK. BY C. G.

AS BUILT 934-12.14/16

1110

WAR DEPARTMENT

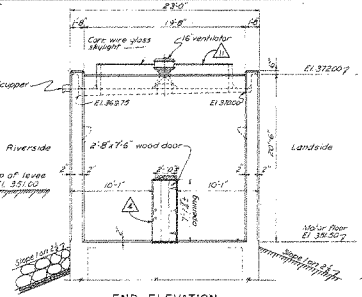
CORPS OF ENGINEERS, U. S. ARMY



LANDSIDE ELEVATION

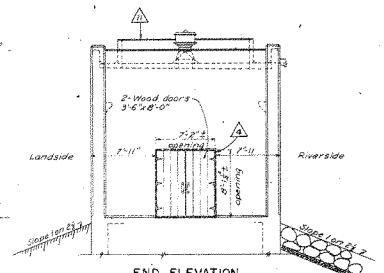
SCALE: 1/8" = 1'-0"

Riverside elevation same except omit wall vents



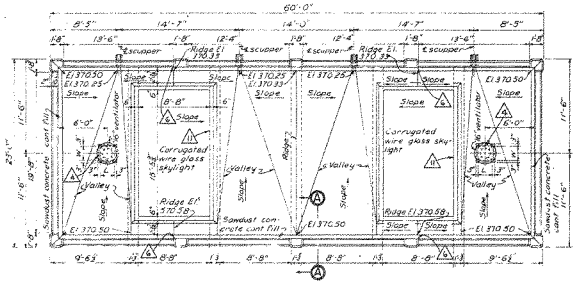
END ELEVATION

SCALE: 1/8" = 1'-0"



END ELEVATION

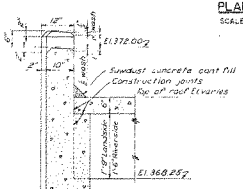
SCALE: 1/8" = 1'-0"



PLAN ROOF

SCALE: 1/16" = 1'-0"

△ For notes see sheet 2



SECTION A-A

SCALE: 1/4" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM

DEHUMIDIFICATION DETAILS

SHEET 17 OF 22 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — MARCH 1953

SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [signature] CHIEF ENGINEERING DIVISION

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

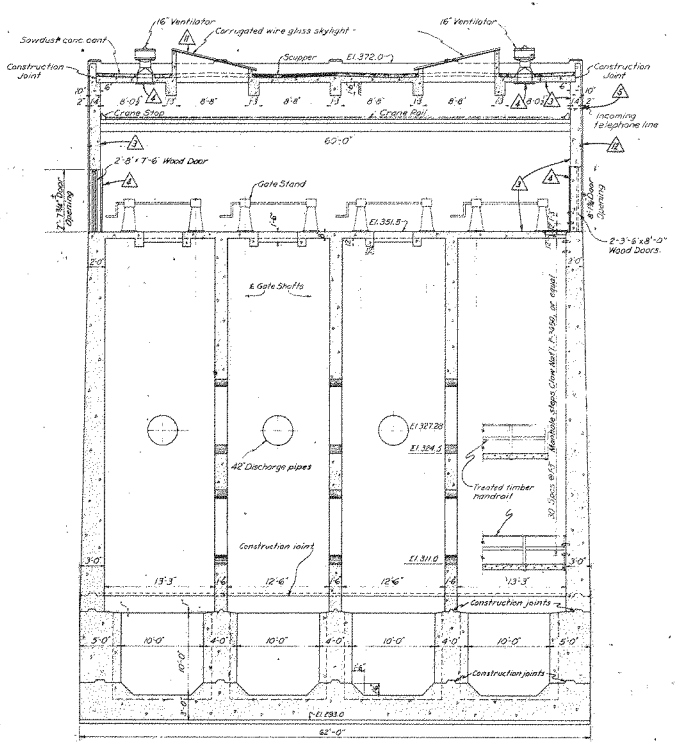
DR. BY C.G. — TR. BY R.L.M. — CK. BY D.J.

AS BUILT — 934-12.14/17

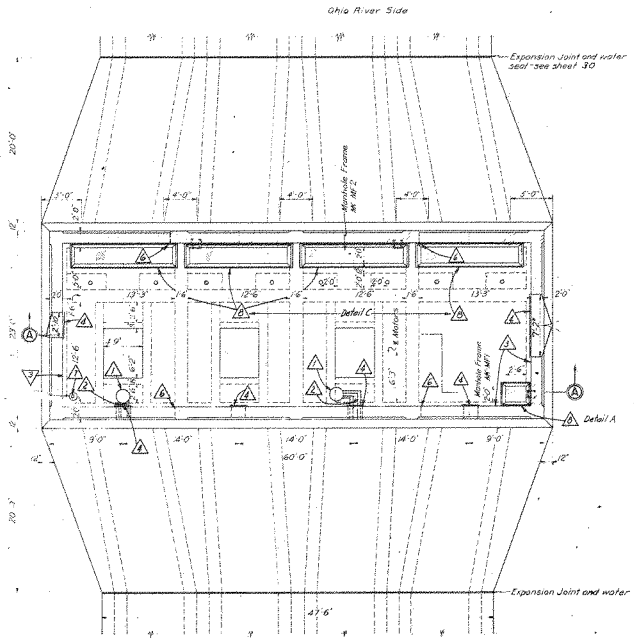
1111

346

CORPS OF ENGINEERS, U. S. ARMY



SECTION A-A



FLOOR PLAN

△ For notes see sheet 2

Note:
1. Units placed on separate circuits.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
DEHUMIDIFICATION DETAILS

SHEET 18 OF 22 SHEETS SCALE: 1/16" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

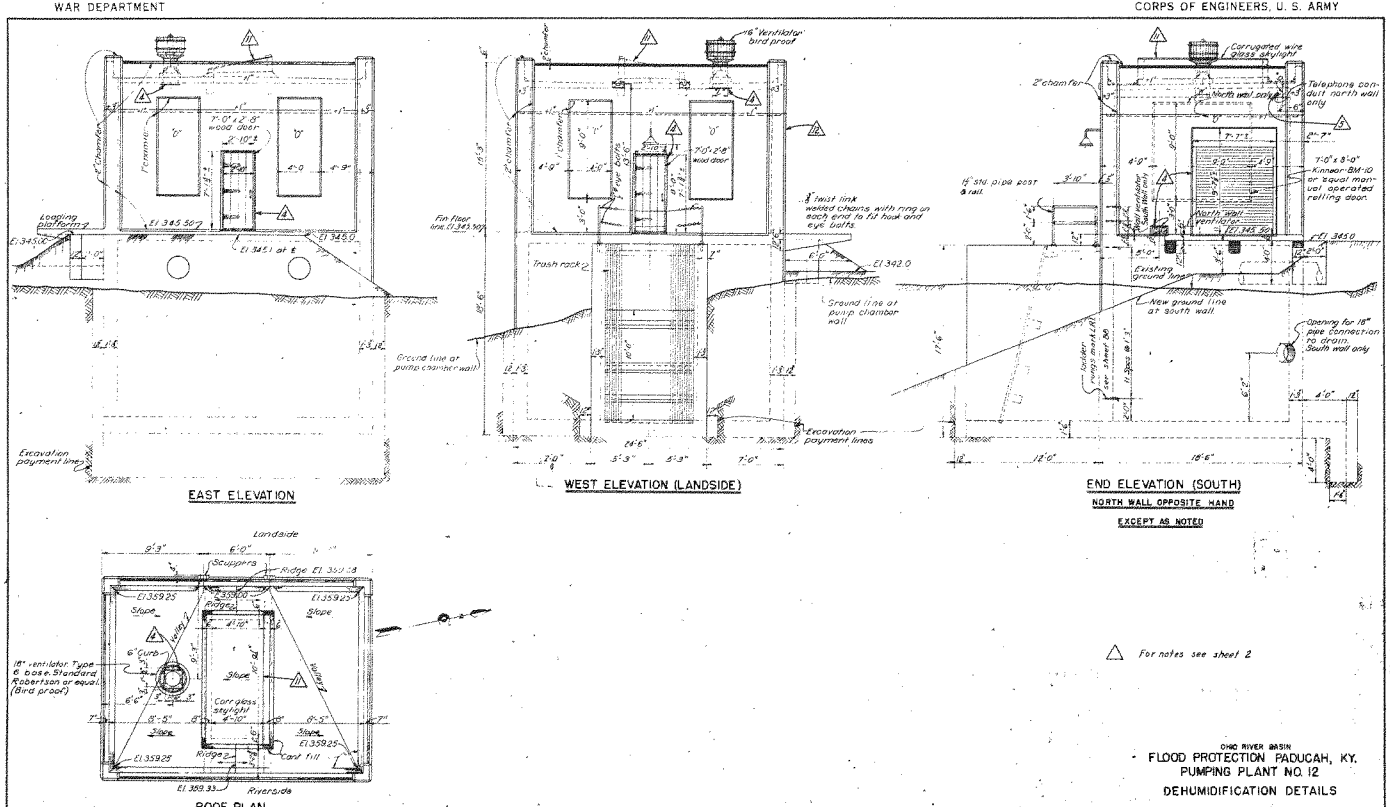
APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT

APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C. G. TR. BY R.L.M. CK. BY E.J.A.

AS BUILT 934-12.14/18

1112



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12

DEHUMIDIFICATION DETAILS

SHEET 19 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

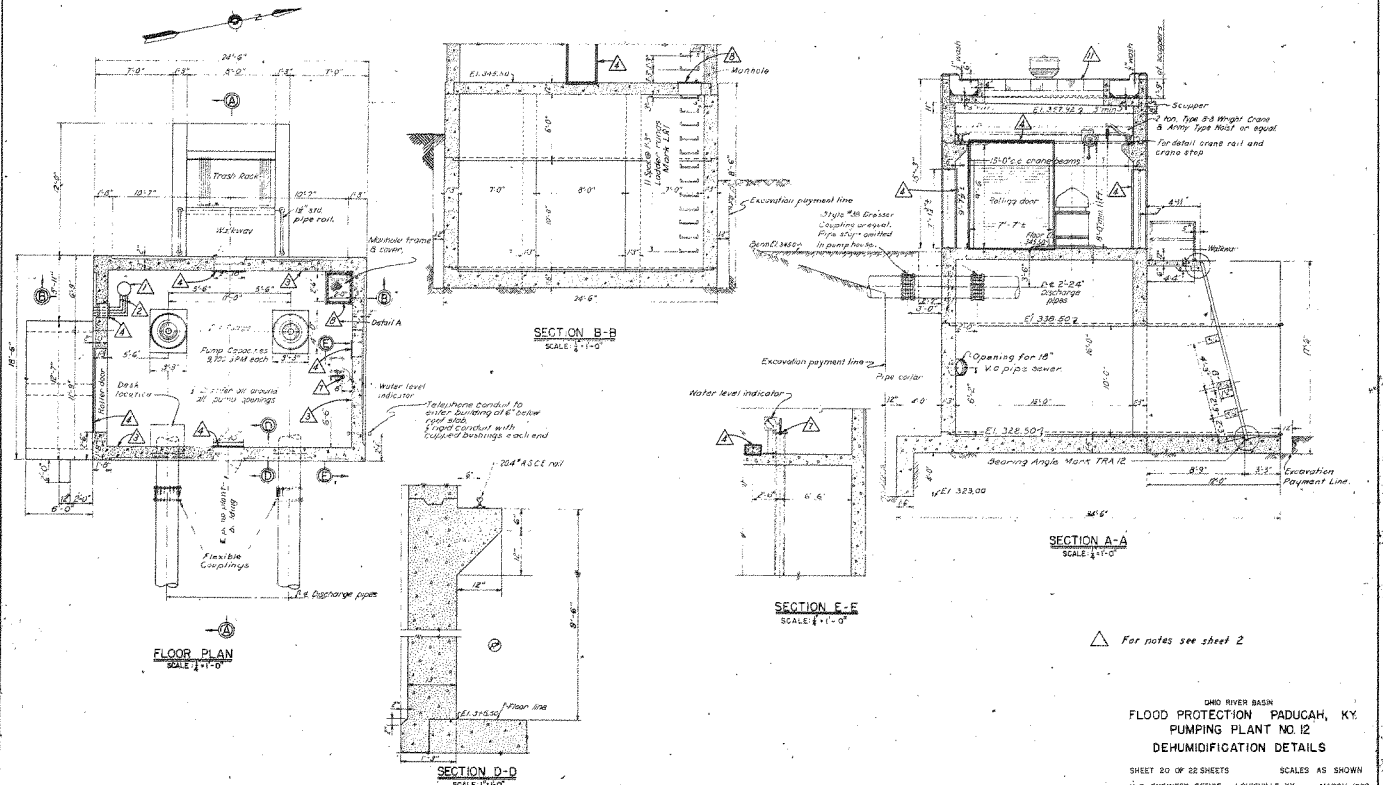
APPROVAL RECOMMENDED: CHIEF, ENGINEERING ASSISTANT

APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY: C. G. TR. BY: R.L.M. CK. BY: E.J.

AS BUILT 934-12.14 / 19

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 12

DEHUMIDIFICATION DETAILS

SHEET 20 OF 22 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

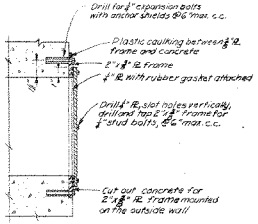
APPROVAL RECOMMENDED: CHIEF, ENGINEERING ASSISTANT

APPROVED: LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY O.G. TR. BY R.L.M. CK. BY D.J.

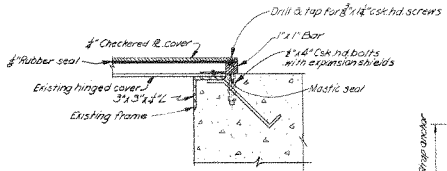
AS BUILT

934-12.14/20



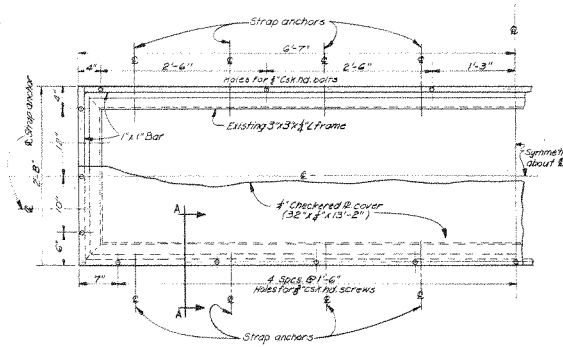
OUTSIDE WALL VENTILATOR COVER PL

SCALE: 3"=1'-0"



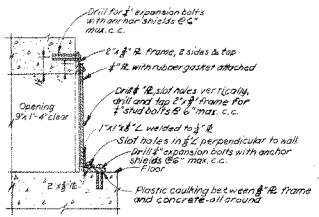
SECTION A-A

SCALE: 3"=1'-0"



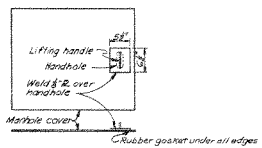
DETAIL "C"

SCALE: 1½"=1'-0"

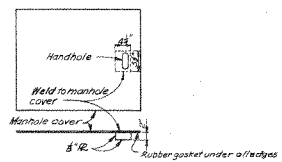


INSIDE WALL VENTILATOR COVER PL

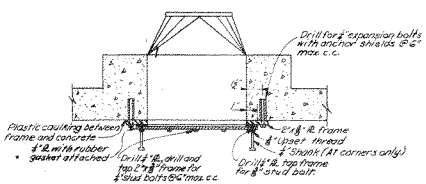
SCALE: 3"=1'-0"



MANHOLE COVER DETAIL "A"



MANHOLE COVER DETAIL "B"



VENTILATOR COVER PL

SCALE: NONE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS

MISCELLANEOUS

DEHUMIDIFICATION DETAILS

SHEET 21 OF 22 SHEETS SCALE: AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1953

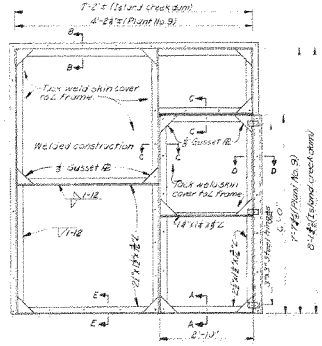
SUBMITTED: _____ CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING ASSISTANT

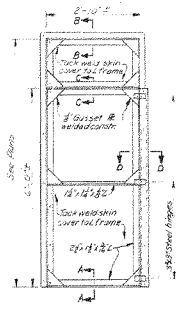
APPROVED: _____ LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY C.G. TR. BY E.L.B. CK. BY D.J.

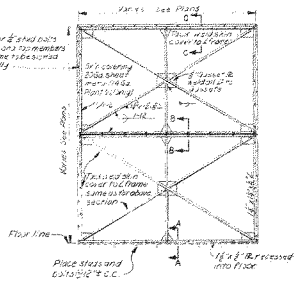
AS BUILT 934-12.14/21



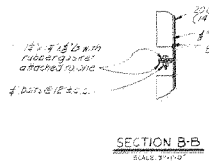
WOOD DOOR COVER
SCALE: 3/4"=1'-0"



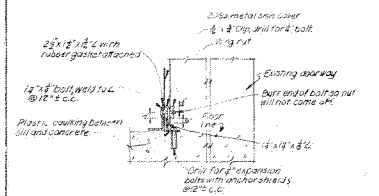
WOOD DOOR COVER
SCALE: 3/4"=1'-0"



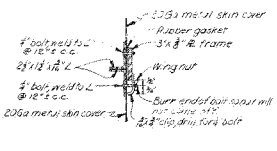
ROLLER DOOR COVER
SCALE: 3/4"=1'-0"



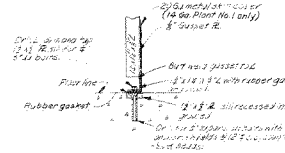
SECTION B-B
SCALE: 3"=1'-0"



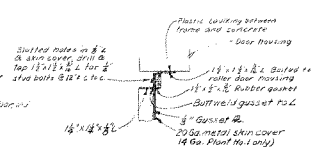
SECTION A-A
SCALE: 3"=1'-0"



SECTION C-C
SCALE: 3"=1'-0"

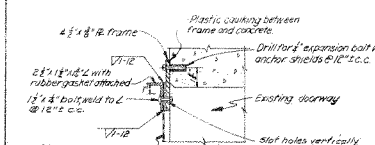


SECTION A-A
SCALE: 3"=1'-0"



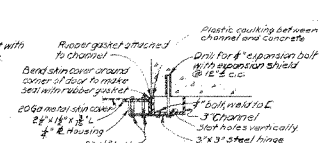
(R) SECTION C-C
SCALE: 3"=1'-0"

(R) Section C-C revised.

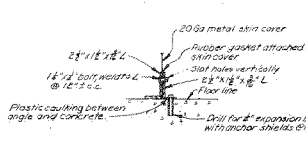


SECTION B-B
SCALE: 3"=1'-0"

Note:
Covers to be placed over doors on inside of plants.



SECTION D-D
SCALE: 3"=1'-0"



SECTION E-E
SCALE: 3"=1'-0"

Note:
Cover to be placed over doors on inside of plants.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS
MISCELLANEOUS
DEHUMIDIFICATION DETAILS

SHEET 22 OF 22 SHEETS SCALE: AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1953

SUBMITTED: _____ CHIEF, ENGINEERING DIVISION

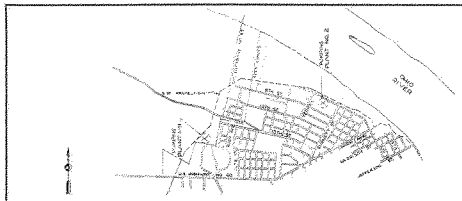
APPROVAL RECOMMENDED: _____ CHIEF ENGINEERING ASSISTANT

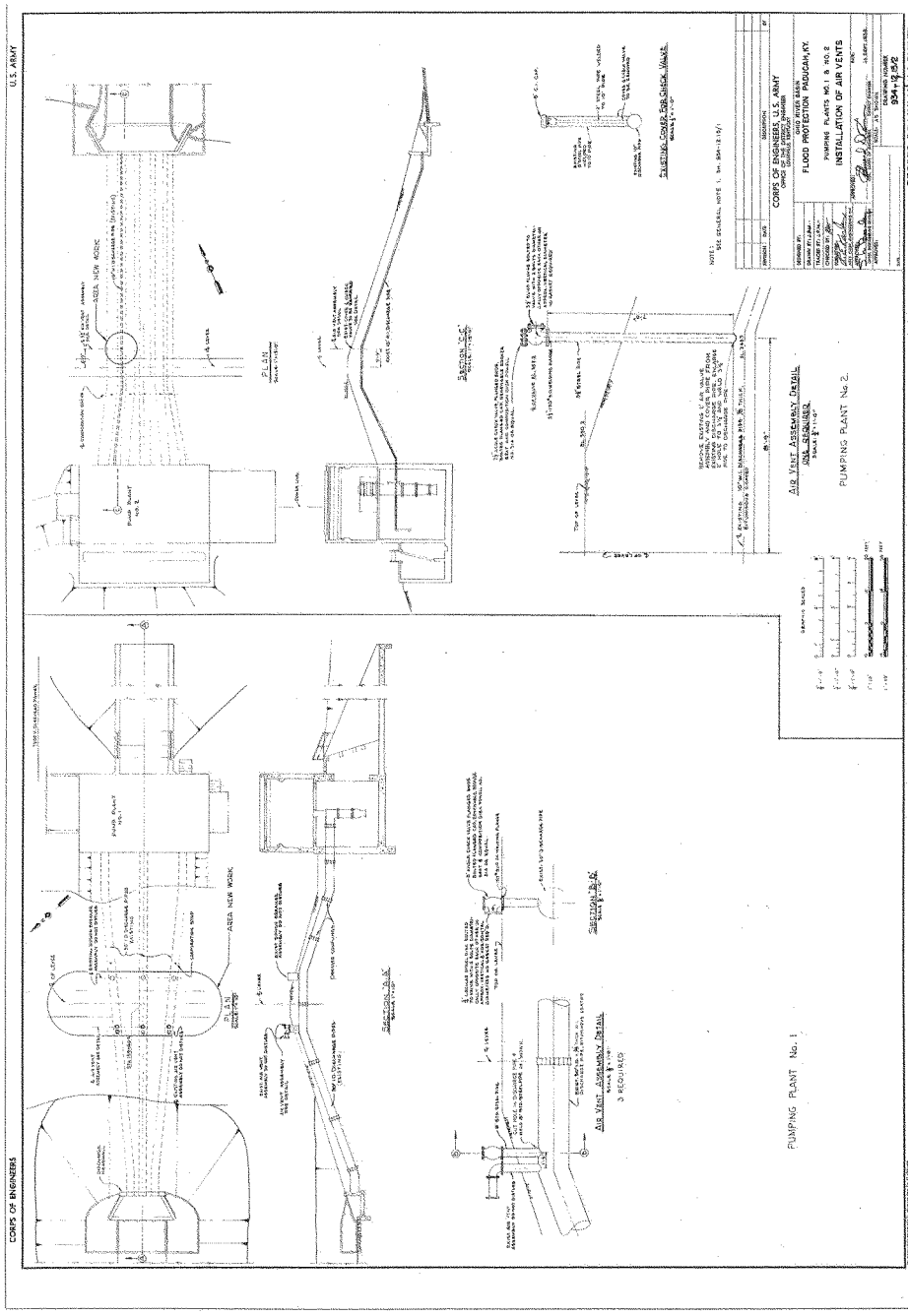
APPROVED: _____ LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY G.H. TR. BY E.L.B. CK. BY T.A.

AS BUILT 934-12.14/22

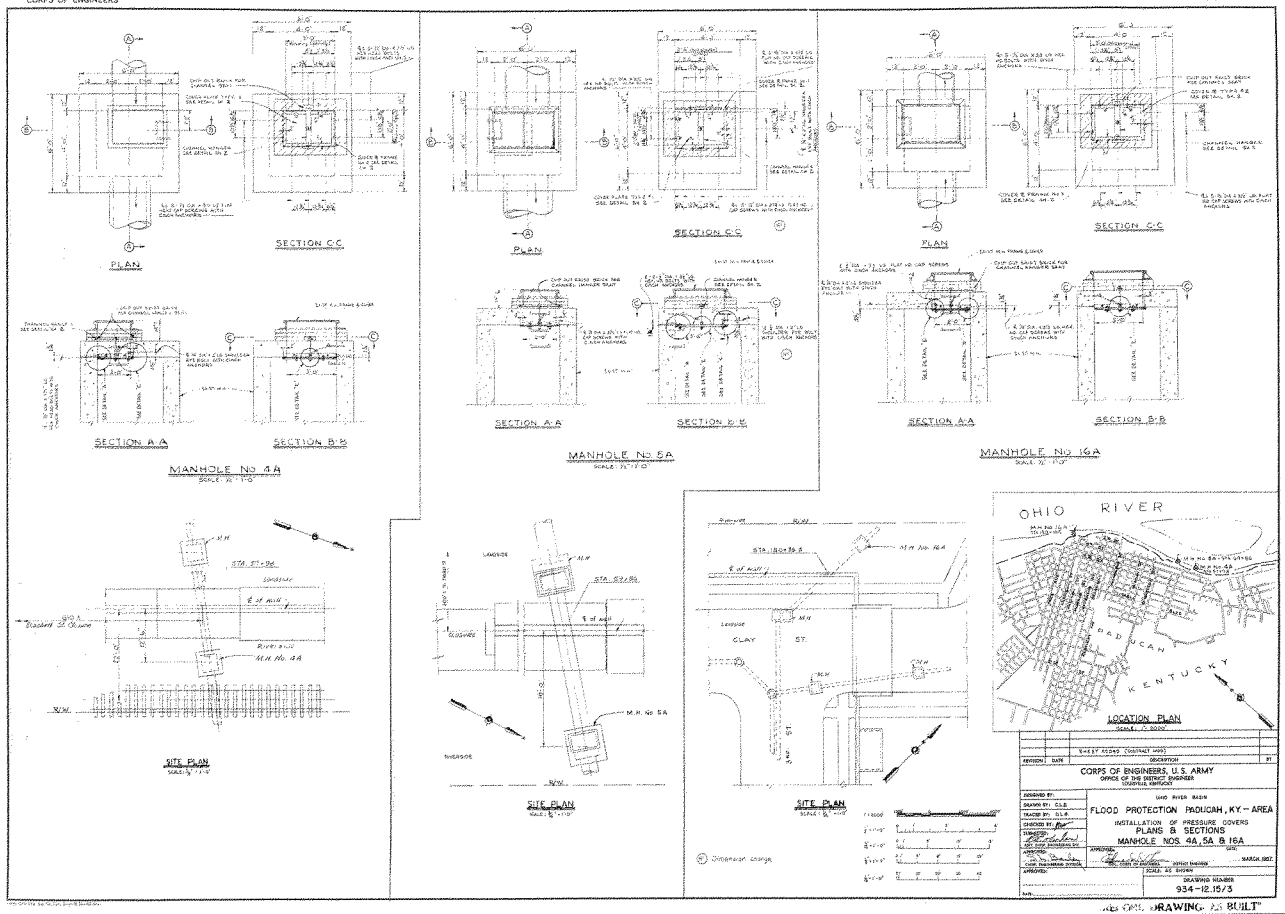
1116

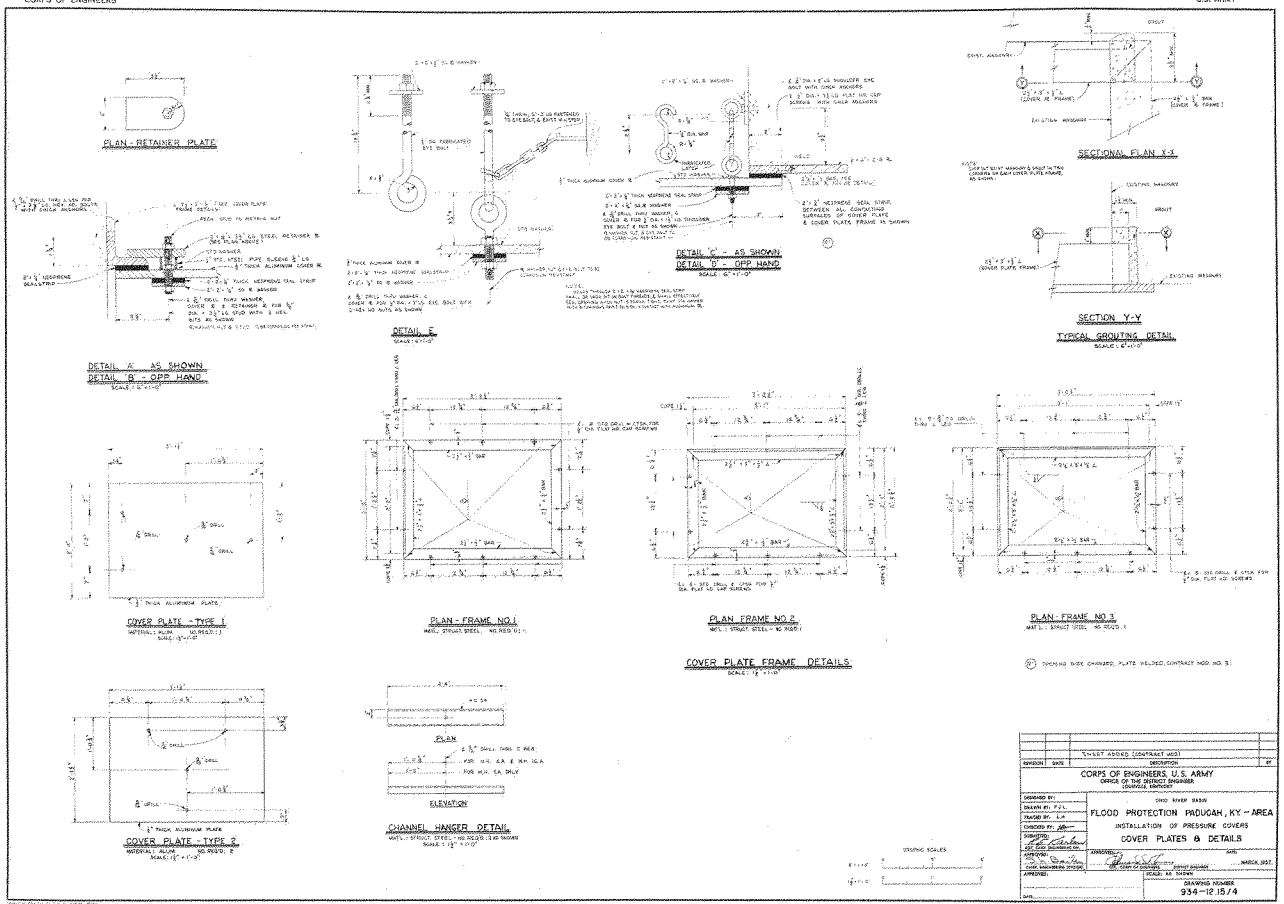

OHIO RIVER
PUMPING PLANT NO. 2
PUMPING PLANT NO. 1
CITY LIMITS
LEVEE
FLOOD WALL
PUMPING PLANT NO. 3
LEVEE
FLOOD WALL
LEVEE
FLOOD WALL
LEVEE
FLOOD WALL

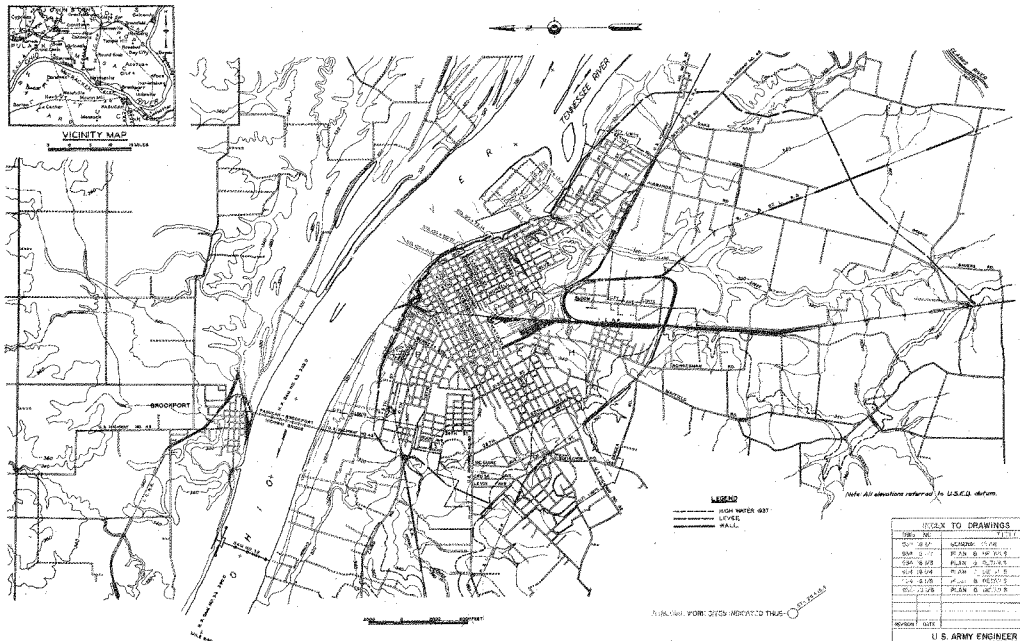

U.S. ARMY
CORPS OF ENGINEERS
RECORD DRAWING "AS BUILT"
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY
OHIO RIVER BASIN
PUMPING PLANTS NO. 1 & NO. 2
INSTALLATION OF AIR VENTS
PLAN
SECTION "C-C"
AIR VENT ASSEMBLY DETAIL
PUMPING PLANT No. 2
PUMPING PLANT No. 1
SECTION A-A
SECTION B-B
AIR VENT ASSEMBLY DETAIL
3 REQUIRED
AREA NEW WORK
934-19.5/2

CORPS OF ENGINEERS

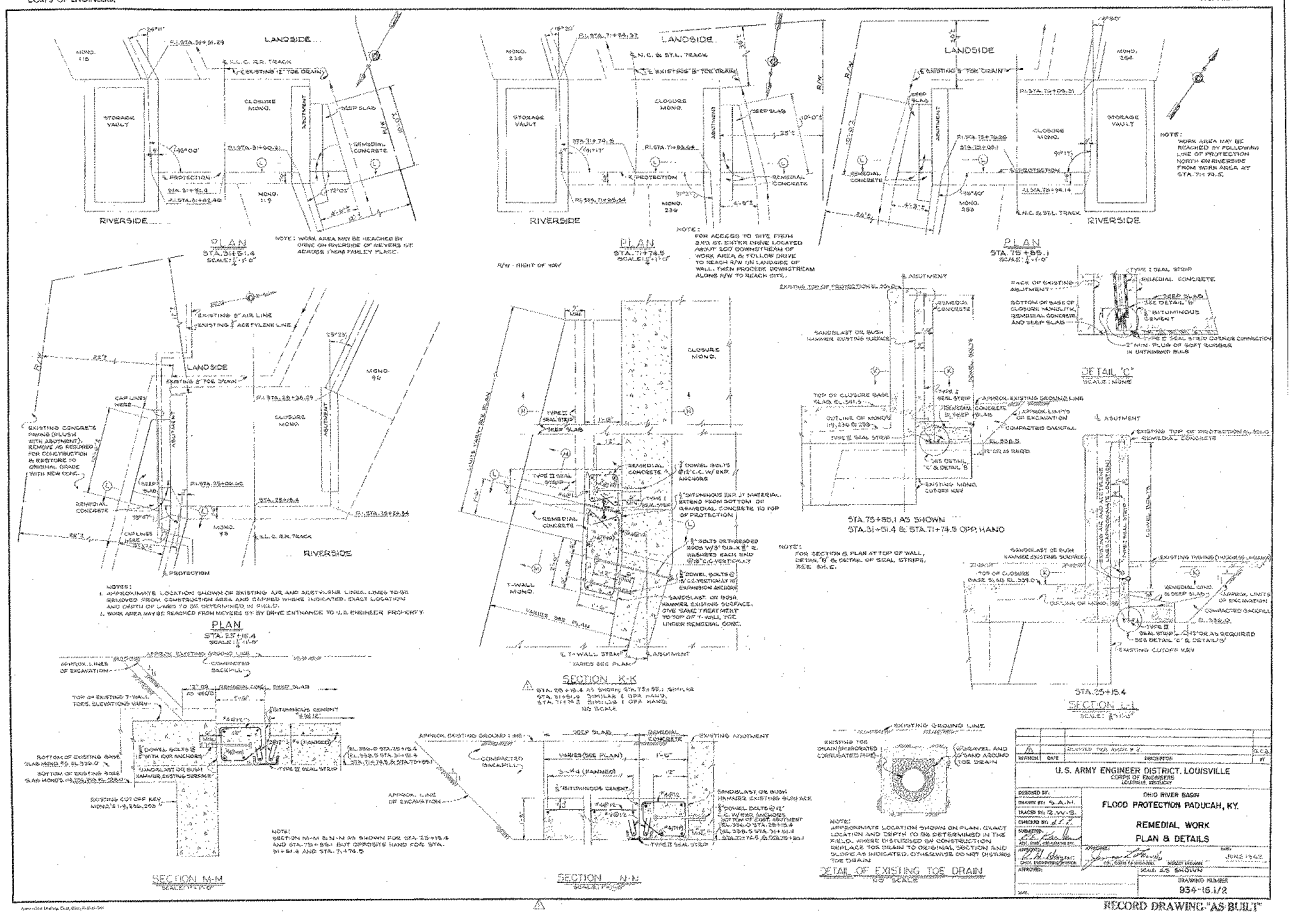
U.S. ARMY



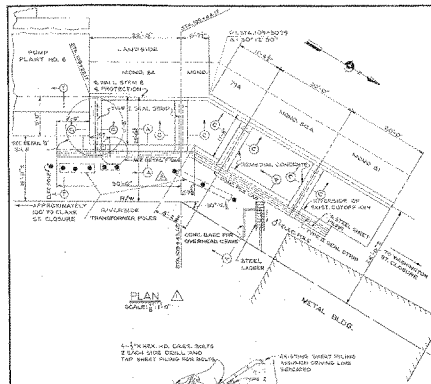

PLAN - RETAINER PLATE
DETAIL 'A' - AS SHOWN
DETAIL 'B' - OPP HAND
SCALE: 6" = 1'-0"
DETAIL 'E'
SCALE: 6" = 1'-0"
DETAIL 'C' - AS SHOWN
DETAIL 'D' - OPP HAND
SCALE: 6" = 1'-0"
SECTIONAL PLAN X-X
SECTION Y-Y
TYPICAL GROUTING DETAIL
SCALE: 6" = 1'-0"
COVER PLATE - TYPE 1
PLAN - FRAME NO. 1
PLAN - FRAME NO. 2
PLAN - FRAME NO. 3
COVER PLATE FRAME DETAILS
SCALE: 1/2" = 1'-0"
COVER PLATE - TYPE 2
PLAN
ELEVATION
CHANNEL HANGER DETAIL
SCALE: 1/2" = 1'-0"
DRAWING SCALES
CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE, KENTUCKY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY - AREA
INSTALLATION OF PRESSURE COVERS
COVER PLATES & DETAILS
SCALE: AS SHOWN
DRAWING NUMBER
934-12.15/4
RECORD DRAWING-"AS BUILT"



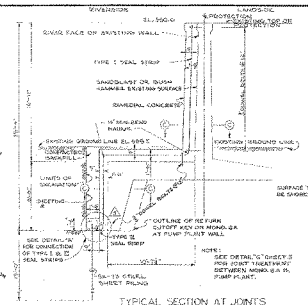
RECORD DRAWING - AS BUILT


PLAN
STA. 25+16.4
SCALE: 1"=10'
PLAN
STA. 31+51.4
SCALE: 1"=10'
PLAN
STA. 71+74.5
SCALE: 1"=10'
PLAN
STA. 75+85.1
SCALE: 1"=10'
LANDSIDE
RIVERSIDE
STORAGE VAULT
CLOSURE MONO.
ABUTMENT
SEEP SLAB
REMEDIAL CONCRETE
PROTECTION
NOTE: WORK AREA MAY BE REACHED BY DRIVE ON RIVERSIDE OF LEVEES VIA ACCESS (NOW FAULTY) PLACE.
NOTE: FOR ACCESS TO SITE FROM 2ND ST. ENTER DRIVE LOCATED ABOUT 500' DOWNSTREAM OF WORK AREA & FOLLOW DRIVE TO REACH R/W ON LANDSIDE OF WALL. THEN PROCEED DOWNSTREAM ALONG R/W TO REACH SITE.
R/W - RIGHT OF WAY
NOTE: WORK AREA MAY BE REACHED BY FOLLOWING LINE OF PROTECTION NORTH ON RIVERSIDE FROM WORK AREA AT STA. 71+93.5.
NOTES:
1. APPROXIMATE LOCATION SHOWN OF EXISTING AIR AND ACETYLENE LINES. LINES TO BE REMOVED FROM CONSTRUCTION AREA AND CAPPED WHERE INDICATED. EXACT LOCATION AND DEPTH OF LINES TO BE DETERMINED IN FIELD.
2. WORK AREA MAY BE REACHED FROM LEVEES BY DRIVE ENTRANCE TO U.S. ENGINEER PROPERTY.
SECTION K-K
STA. 25+16.4 AS SHOWN, STA. 75+92.1 SIMILAR
STA. 31+51.4 SIMILAR & OPP. HAND
STA. 71+74.5 SIMILAR & OPP. HAND
NO SCALE
STA. 75+85.1 AS SHOWN
STA. 31+51.4 & STA. 71+74.5 OPP. HAND
NOTE: FOR SECTION & PLAN AT TOP OF WALL, DETAIL 'B' & DETAIL OF SEAL STRIPS, SEE SHT. C.
DETAIL 'C'
SCALE: NONE
SECTION L-L
SCALE: 1"=10'
SECTION M-M
SCALE: 1"=10'
SECTION N-N
SCALE: 1"=10'
DETAIL OF EXISTING TOE DRAIN
NO SCALE
NOTE: APPROXIMATE LOCATION SHOWN ON PLAN. EXACT LOCATION AND DEPTH TO BE DETERMINED IN THE FIELD, WHERE DISCUSSED OF CONSTRUCTION DRAINAGE FOR DRAIN TO ORIGINAL SECTION AND SLOPE AS INDICATED OTHERWISE DO NOT DISTURB TOE DRAIN.
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REMEDIAL WORK
PLAN & DETAILS
DESIGNED BY:
DRAWN BY: G. A. M.
TRACED BY: R. W. S.
CHECKED BY:
APPROVED:
SCALE: AS SHOWN
DATE: JUNE 1962
DRAWING NUMBER
934-15 1/2
RECORD DRAWING "AS BUILT"

CORPS OF ENGINEERS. U.S. ARMY

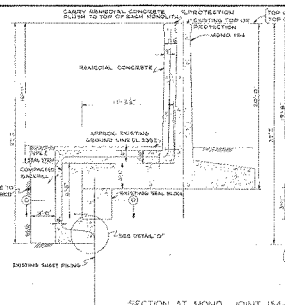


PLAN
SCALE: 1"=10'

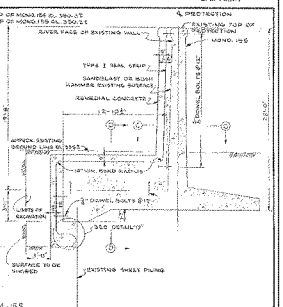


TYPICAL SECTION AT JOINTS
MONOLITHS 154, 155, 156 & 157
SCALE: 1"=10'

NOTE:
SEE DETAIL "G" SHEET 3 FOR JOINT TREATMENT BETWEEN MONO. 84 & 85 PUMP PLANT.

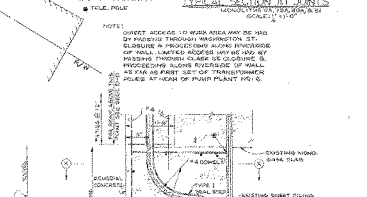


SECTION AT MONO. JOINT 154-155
SCALE: 1"=10'

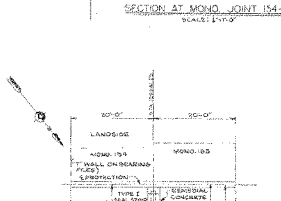


DETAIL "E"
SCALE: NONE

NOTES:
1. MODIFICATIONS TO CONNECTION SHOWN MAY BE NECESSARY IF FIELD CONDITIONS DICTATE. ANY MODIFICATION MUST BE MADE WITH APPROVAL OF CONTRACTING OFFICER.
2. CEMENT REPLACE SOFT RUBBER PLUG IN TYPE I SEAL STRIP COATING BULB AND TEAR DOWN BULBS AND PLUG FOR FLAT FACING SURFACE. LEAVING 1" MIN. PLUG IN UNTRAMMED CENTER PANEL. COAT ALL CONTACTING RUBBER SURFACES WITH SUMMER CONCRETE. FILL VOIDS BETWEEN STRIP AND PILING AS NEEDED WITH SOFT RUBBER.
3. CONTACT LENGTH OF RUBBER SEAL STRIP WITH SHEET PILING SHALL BE 3 INCHES MINIMUM.

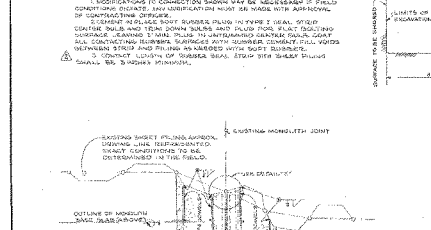


DETAIL "D"
SCALE: NONE



PLAN
SCALE: 1"=10'

NOTES:
1. WORK AREA MAY BE REACHED ALONG RIGHT OF WAY FROM FIRST & JEFFERSON STS.
2. SAND PILE AT WORK AREA ON RIVERSIDE OF WALL TO BE REMOVED BY OTHERS.



SECTION X-X
SCALE: NONE

GENERAL NOTES:

1. ANGULAR INTERSECTIONS WITHIN REACHES OF TYPE I OR TYPE II WATERSTOP SHALL BE SEMI-CIRCULAR OR SHAP ROUNDED LEAVING A 6" MINIMUM CONTACTING LENGTH FOR SPLICING IN FIELD. EXCEPT THAT ENTIRE LENGTH OF STOP MAY BE MADE CONTINUOUS BY MAKING SPLICES IN SHOP RATHER THAN IN THE FIELD. SPLICES SHALL BE MADE ACCORDING TO MFR'S RECOMMENDATIONS SUBJECT TO APPROVAL OF CONTRACTING OFFICER. AT ALL INTER-SECTIONS INVOLVING SPLICING OF TYPE I STOP THE HOLLOW CENTER BULB PORTION SHALL BE SEALED AT EXTREMITY WITH A SOFT RUBBER PLUG PRIOR TO SPLICING. ALSO ALL OPEN ENDS OF TYPE I STOP SHALL BE SEALED WITH A SOFT RUBBER PLUG WITH 2" MINIMUM LENGTH.
2. FOR SECTIONS A-A, C-C, & D-D, SEE DETAILS A & F, SHT. SH. 5. FOR SECTIONS B-B & E-E, SEE DETAILS B & F, SHT. SH. 5. THE REMAINING SECTIONS ARE TYPICAL. SEE DETAILS A & F, SHT. SH. 5. REINFORCEMENT MAY BE CONTINUOUS AROUND ALL CORNERS SOMEWHAT AS SHOWN ON DETAIL "F".
3. ALL TRENCH SHALL CLEAR FACE OF CONCRETE A MINIMUM DISTANCE OF 3".
4. REINF. BENDING DETAILS SHALL CONFORM TO THE BUILDING CODE REQUIREMENTS OF THE AMERICAN CONCRETE INSTITUTE AD 318-56.
7. FULL AND CONTINUOUS CONTACT OF TYPE II SEAL ON SOIL SHALL BE OBTAINED.
5. ALL SAND BLASTED OR BUSH HAMMERED SURFACES TO WHICH NEW CONCRETE IS TO BE BONDED SHALL BE THOROUGHLY WETTED PRIOR TO PLACEMENT OF NEW CONCRETE. IMMEDIATELY BEFORE PLACE-MENT OF CONCRETE THE CONTACT SURFACE SHALL BE COATED WITH NEAT CEMENT PASTE.
6. THE PILING SHALL BE CONTINUOUSLY INTERLOCKED.
8. FOR PLAN AT TOP OF WALL IN DIRECTION AT TOP OF WALL SEE SH. 6
10. JOINTS IN PILE CAPS SHALL BE LOCATED OPPOSITE EXISTING MONOLITH JOINTS EXCEPT WHERE SHOWN OTHERWISE. REINFORCING BARS MAY PASS THROUGH JOINTS.

* STEEL SHEETING IF USED MAY BE LEFT IN PLACE ON MONOLITHS AS BACKFILLING OPERATION PROGRESSES. WHERE SHEETING IS USED SHALL BE REMOVED AS BACKFILLING OPERATION PROGRESSES. ALL WALES & STRUTS SHALL BE REMOVED.

NOTE:
TYPE SECTION A-A, SEE SH. 6
FOR SECTION C-C, SEE SH. 6
FOR SECTION D-D, SEE SH. 6
FOR SECTION F-F, SEE SH. 5

3	SHT 4 OF SCHEDULE AT PLAN FOR REMOVING "PAL MONOLITH" JOINTS		M.L.K.
2	REVISED EXISTING WALL ANGLE W. 2.		R.L.B.
1	1-10-62 PLAN & TYPICAL SECTION AT JOINTS REVISED. AMEND. NO. 1		T.C.L.
REVISION:	DATE	INITIALS	

U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

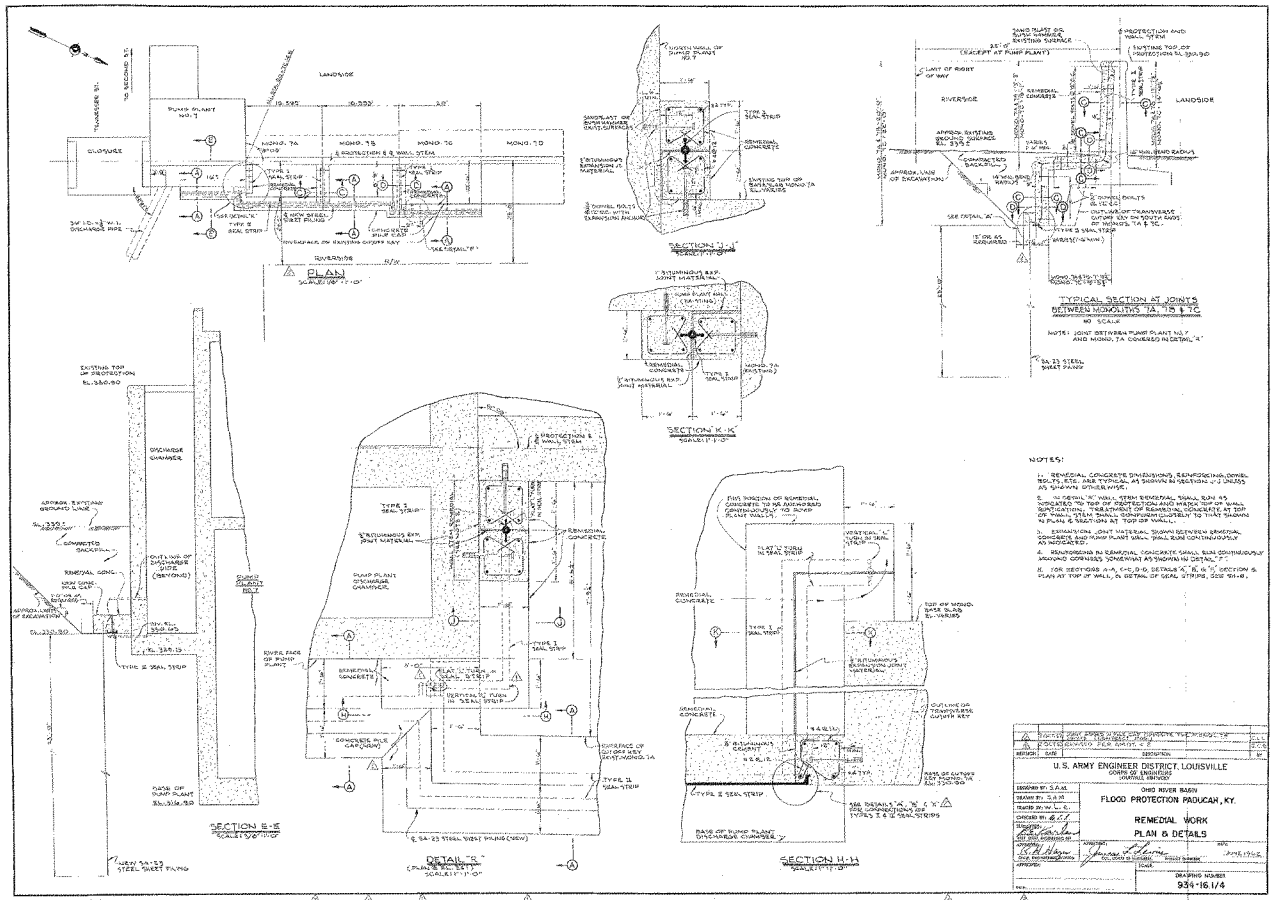
DESIGNED BY:
DRAWN BY: S. A. M.
TRACED BY: C. W. S.
CHECKED BY: J. L. K.
SUBMITTED: R. F. Van Ness
CHIEF, ENGINEERING DIV.
APPROVED: R. F. Van Ness
CHIEF, ENGINEERING DIV.

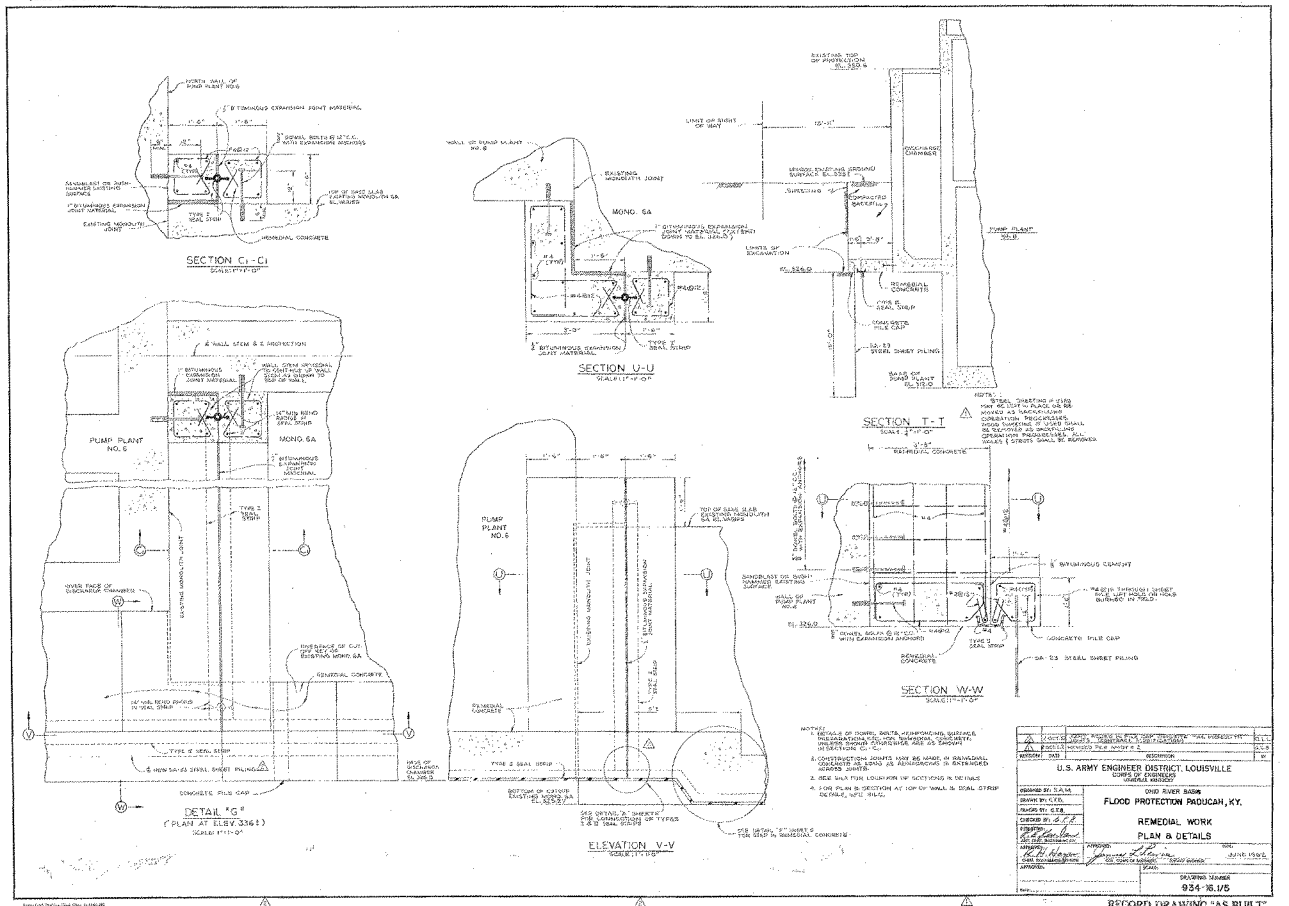
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REMEDIAL WORK
PLAN & DETAILS

APPROVED: Lawrence Fitzpatrick
CHIEF, DIVISION OF CONSTRUCTION
DATE: JUNE 1962
SCALE: AS NOTED
DRAWING NUMBER: 934-18.1/3

RECORD DRAWING-"AS BUILT"

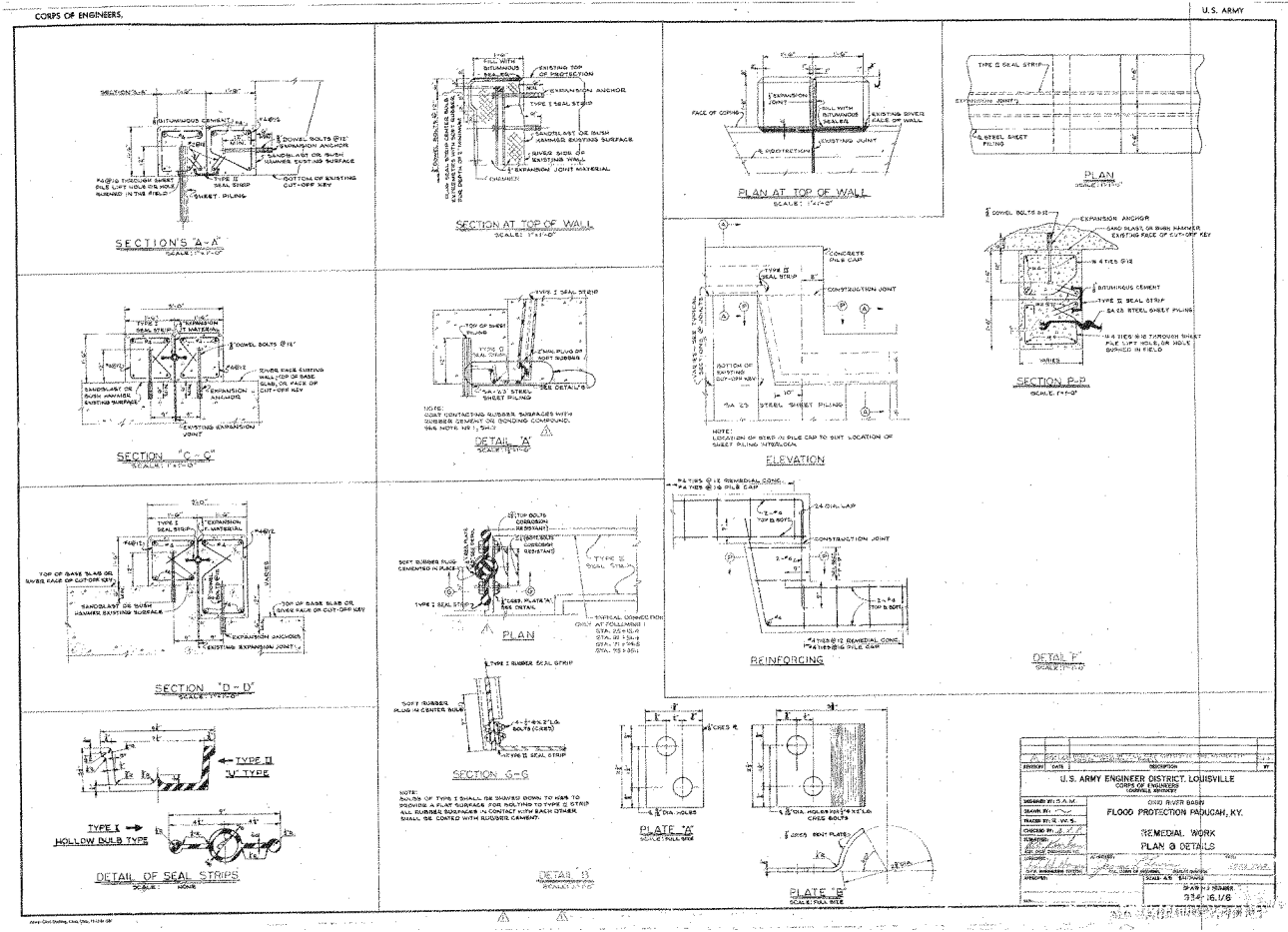
1123

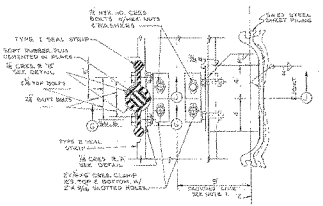

PLAN
SCALE: 1/8" = 1'-0"
LANDSIDE
RIVERSIDE
PUMP PLANT NO. 7
CLOSURE
MONO. 7A
MONO. 7B
MONO. 7C
MONO. 7D
TYPE 2 SEAL STRIP
TYPE 3 SEAL STRIP
SECTION 7-7
SECTION K-K
SCALE: 1" = 1'-0"
TYPICAL SECTION AT JOINTS BETWEEN MONOLITHS 7A, 7B & 7C
NO SCALE
NOTE: JOINT BETWEEN PUMP PLANT NO. 7 AND MONO. 7A COVERED IN DETAIL "R"
SA 23 STEEL SHEET PAVING
SECTION E-E
SCALE: 1/8" = 1'-0"
DISCHARGE CHAMBER
PUMP PLANT DISCHARGE CHAMBER
DETAIL "R"
SCALE: 1" = 1'-0"
SECTION H-H
SCALE: 1" = 1'-0"
NOTES:
1. REMEDIAL CONCRETE DIMENSIONS, REINFORCING, DOWEL BOLTS, ETC. ARE TYPICAL AS SHOWN IN SECTION 7-7 UNLESS AS SHOWN OTHERWISE.
2. IN REMEDIAL "R" WALL, STEM REMEDIAL SEAL RUN AS INDICATED "TO TOP OF PROTECTION AND MATCH TOP OF WALL SUPERSTRUCTURE". TREATMENT OF REMEDIAL CONCRETE AT TOP OF WALL STEM SHALL CONFORM IDENTICALLY TO THAT SHOWN IN PLAN & SECTION AT TOP OF WALL.
3. EXPANSION JOINT MATERIAL SHOWN BETWEEN REMEDIAL CONCRETE AND PUMP PLANT WALL SHALL RUN CONTINUOUSLY AS INDICATED.
4. REINFORCING IN REMEDIAL CONCRETE SHALL RUN CONTINUOUSLY BEYOND CORNERS SOMEWHAT AS SHOWN IN DETAIL "T".
5. FOR SECTIONS A-A, C-C, D-D, DETAILS "K", "L" & "S", SECTION 5, PLAN AT TOP OF WALL, & DETAIL OF SEAL STRIPS, SEE 9H-8.
U. S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REMEDIAL WORK
PLAN & DETAILS
DRAWING NUMBER
9H-16 1/4
RECORD DRAWING "AS BUILT"


SECTION C1-C1
SCALE: 1"=1'-0"
SECTION U-U
SCALE: 1"=1'-0"
SECTION T-T
SCALE: 1"=1'-0"
SECTION W-W
SCALE: 1"=1'-0"
DETAIL "G"
(PLANT AT ELEV. 336±)
SCALE: 1"=1'-0"
ELEVATION V-V
SCALE: 1"=1'-0"
PUMP PLANT NO. 6
MONG. GA
REMEDIAL CONCRETE
TYPE 2 SEAL STRIP
TYPE 5 SEAL STRIP
CONCRETE PILE CAP
SA-23 STEEL SHEET PILING
EXISTING MONOLITH JOINT
BITUMINOUS EXPANSION JOINT MATERIAL
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REMEDIAL WORK
PLAN & DETAILS
JUNE 1962
934-16.1/5
RECORD DRAWING-"AS BUILT"

CORPS OF ENGINEERS.

U.S. ARMY



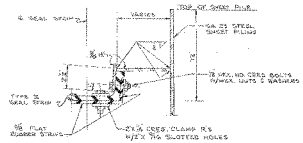


NOTES:

1. SLOTTED CLAMP RS ACROSS INTERSECTION MAY BE OMITTED IN SECTION D-D IF TYPE II SEAL STRIP IS OF MOLDED RATHER THAN SPLICED TYPE CONSTRUCTION. LOCATION OF SHEET PILING & POSITION OF INTERLOCK MAY VARY FROM THAT SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR DETAILING CONNECTION PLATES TO MATCH ACTUAL FIELD CONDITIONS.

PLAN OF DETAIL 'B'

SCALE: 3"=1'-0"

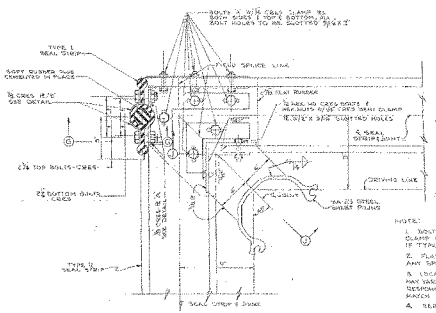


NOTE:

FLAT RUBBER STRIPS & SPLICE PLATES MAY BE OMITTED IF SHOP MOLDED RUBBER SECTIONS ARE USED. IF USED, THE 3/8" FLAT RUBBER STRIPS SHALL EXTEND PAST ANY SPLICE POINT IN TYPE II SEAL STRIP AT LEAST 5"

SECTION J-J

SCALE: 3"=1'-0"



NOTES:

1. BOLTS 'A' (7/8 HEX. HD. CORS W/HEX. NUT) AND 7/8 CORS CLAMP RS & 3/8 FLAT RUBBER STRIPS MAY BE OMITTED IF TYPE II SEAL STRIP SPLICE IS SHOP FABRICATED.
2. FLAT RUBBER STRIPS, IF USED, SHALL EXTEND PAST ANY SPLICE POINT IN TYPE II SEAL STRIP AT LEAST 5".
3. LOCATION OF SHEET PILING & POSITION OF INTERLOCK MAY VARY FROM THAT SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR DETAILING CONNECTION PLATES TO MATCH ACTUAL FIELD CONDITIONS.
4. SEE ALSO DETAILS 'A' & 'B', SHT. 6.

DETAIL 'X'

SCALE: 3"=1'-0"

REVISION	DATE	DESCRIPTION	BY

U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

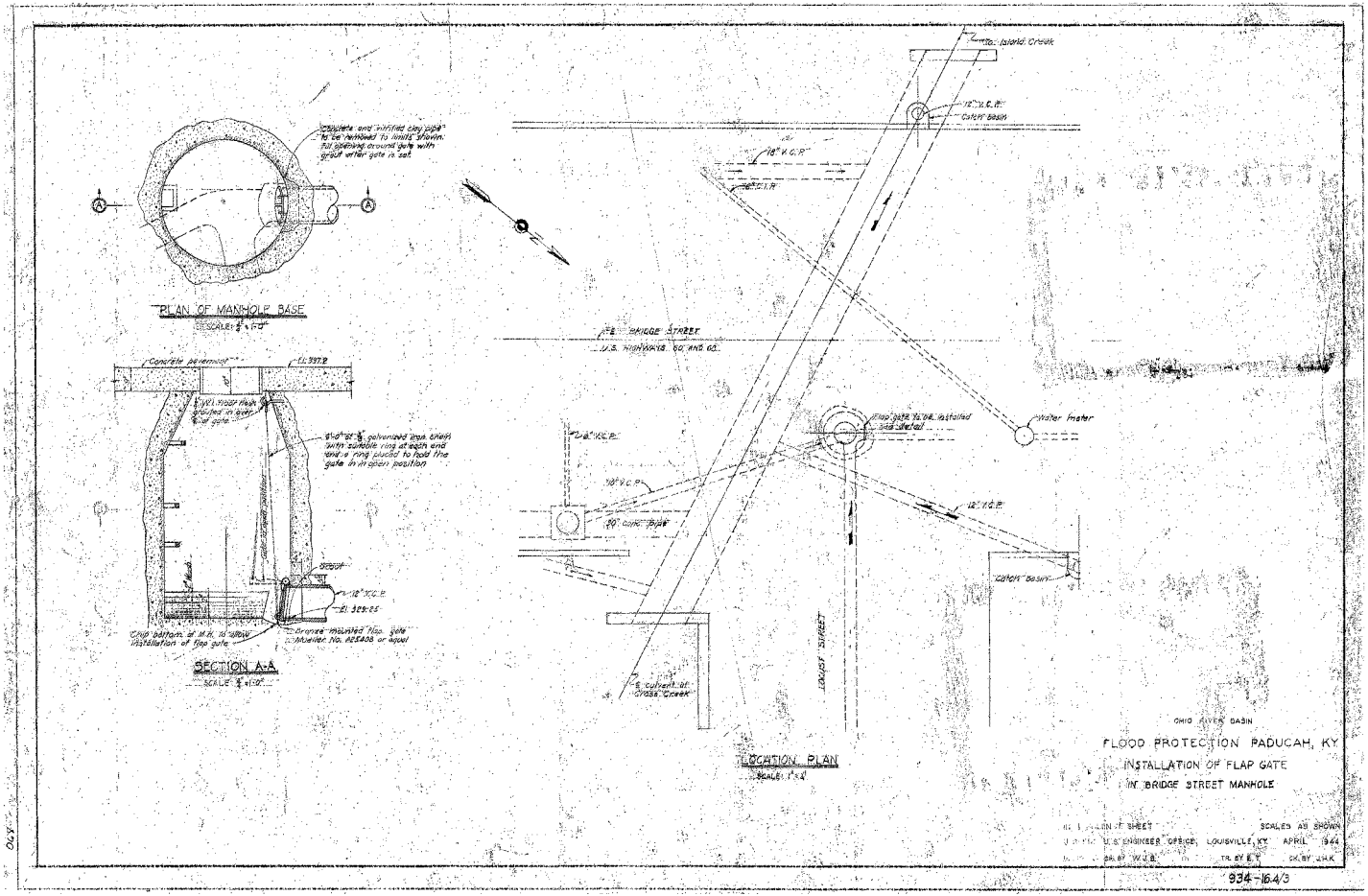
OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

REMEDIAL WORK
DETAILS & SECTIONS

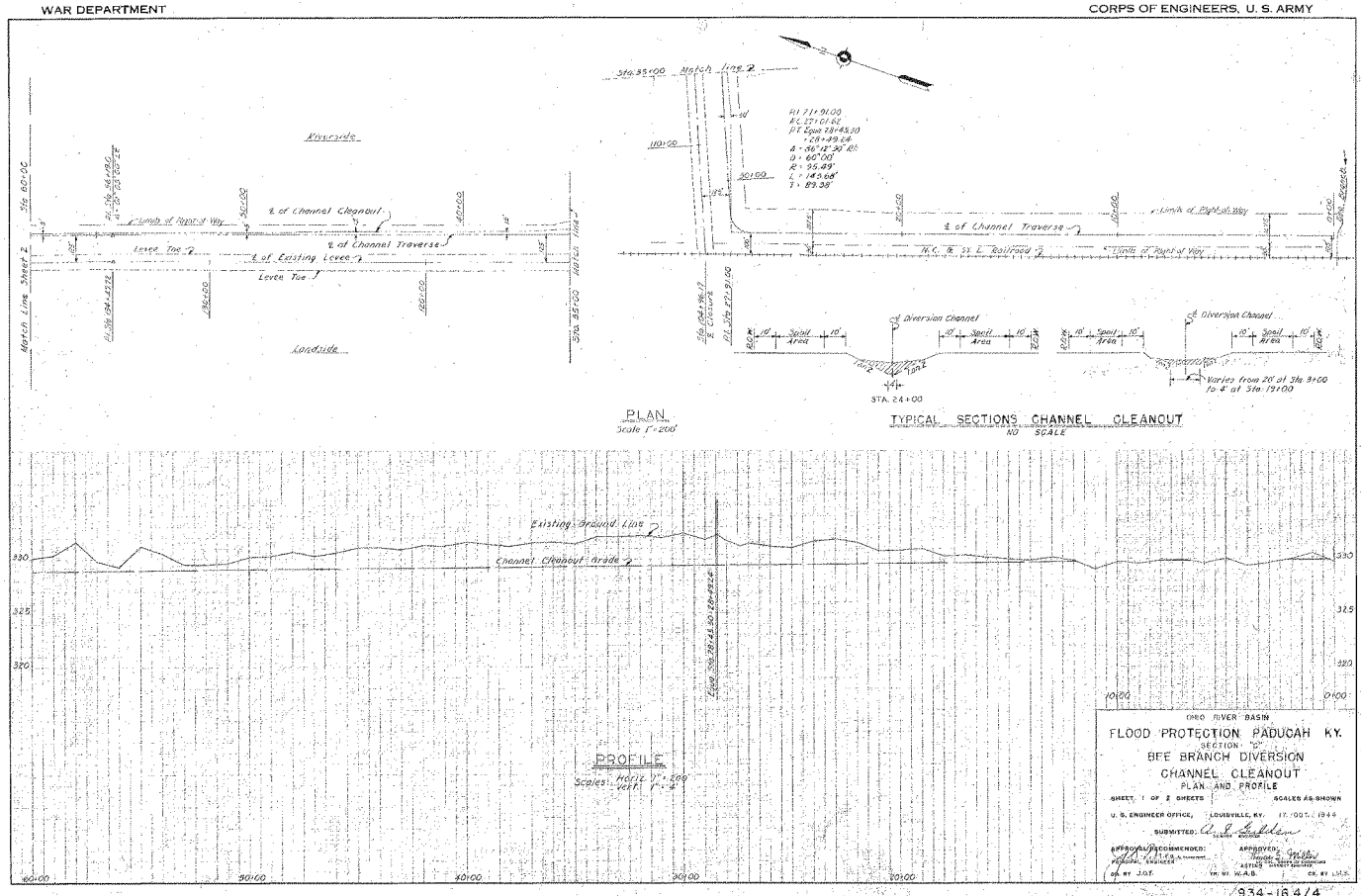
DESIGNED BY: S.A.M.
DRAWN BY: S.A.M.
TRACED BY: F.W.R.D.
CHECKED BY: S.A.M.
SUBMITTED:
APPROVED:
APPROVED:
DATE: OCT. 1948
CHIEF, ENGINEERING DIVISION
ACT. CHIEF OF ENGINEERS
CHIEF, DESIGN BRANCH
DRAWING NUMBER
934-16.1/7

RECORD DRAWING-"AS BUILT"


Bricks and vitrified clay pipe to be removed to inside of form. Fill opening around gate with grout after gate is set.
PLAN OF MANHOLE BASE
SCALE: 1" = 1'-0"
Concrete pavement
EL. 337.2
W.I. floor flash grouted in over 1/2" of gate
6'-0" or 1/2" galvanized iron chain with suitable ring at each end; one ring placed to hold the gate in in open position
Grout
18" V.C.P.
EL. 325.25
Chip bottom of M.H. to allow installation of flap gate
Bronze mounted flap gate (Mueller No. 825408 or equal)
SECTION A-A
SCALE: 1" = 1'-0"
To Island Creek
12" V.C.P.
Catch basin
18" V.C.P.
BRIDGE STREET
U.S. HIGHWAYS 60 AND 62
Flap gate 1/2 DIA. installed see detail
Water heater
12" V.C.P.
18" V.C.P.
60" conc. pipe
12" V.C.P.
Catch basin
LOUISA STREET
To culvert of Cross Creek
LOCATION PLAN
SCALE: 1" = 4'
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
INSTALLATION OF FLAP GATE
IN BRIDGE STREET MANHOLE
SCALED AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. APRIL 1944
934-16.4/3

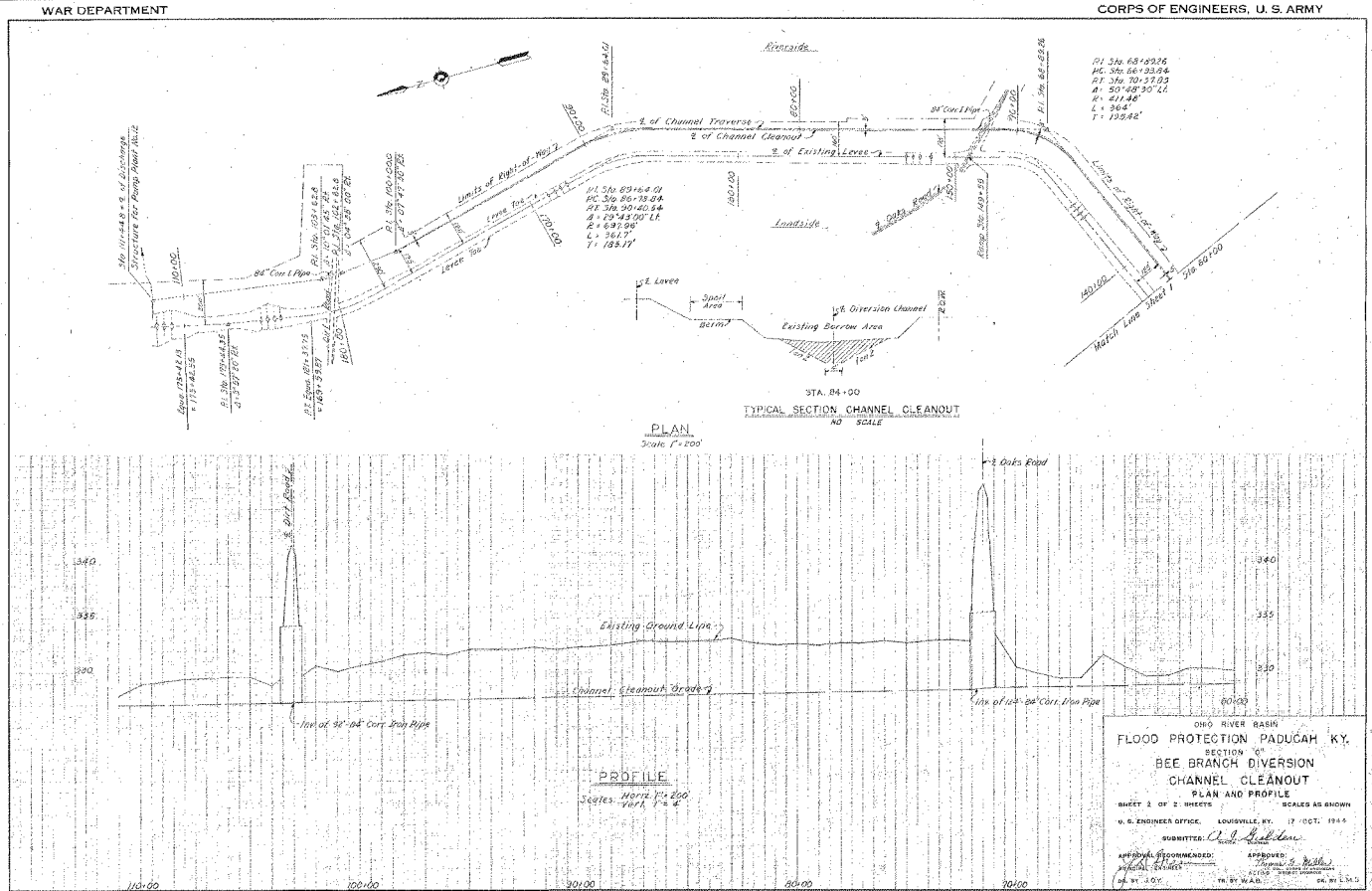
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

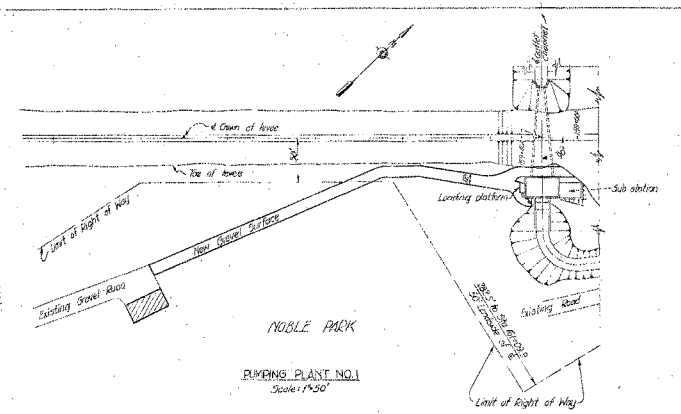


WAR DEPARTMENT

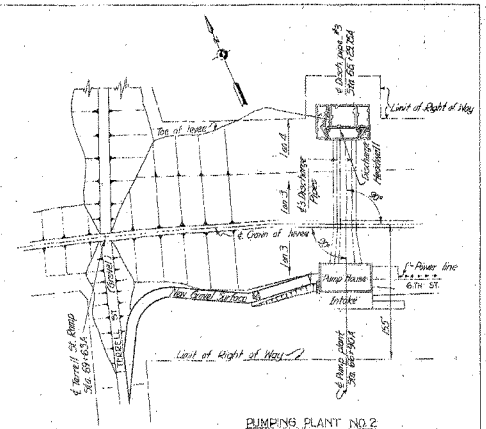
CORPS OF ENGINEERS, U. S. ARMY



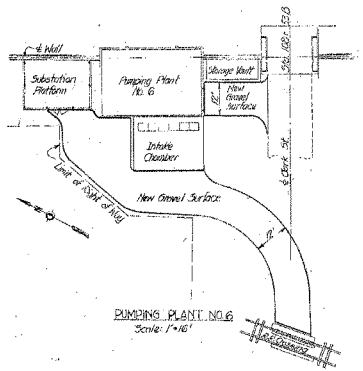
1130



PUMPING PLANT NO. 1
Scale: 1"=50'



PUMPING PLANT NO. 2
Scale: 1"=50'



PUMPING PLANT NO. 6
Scale: 1"=10'

TYPICAL CROSS SECTION
ACCESS DRIVE
No scale

OHIO RIVER BASIN

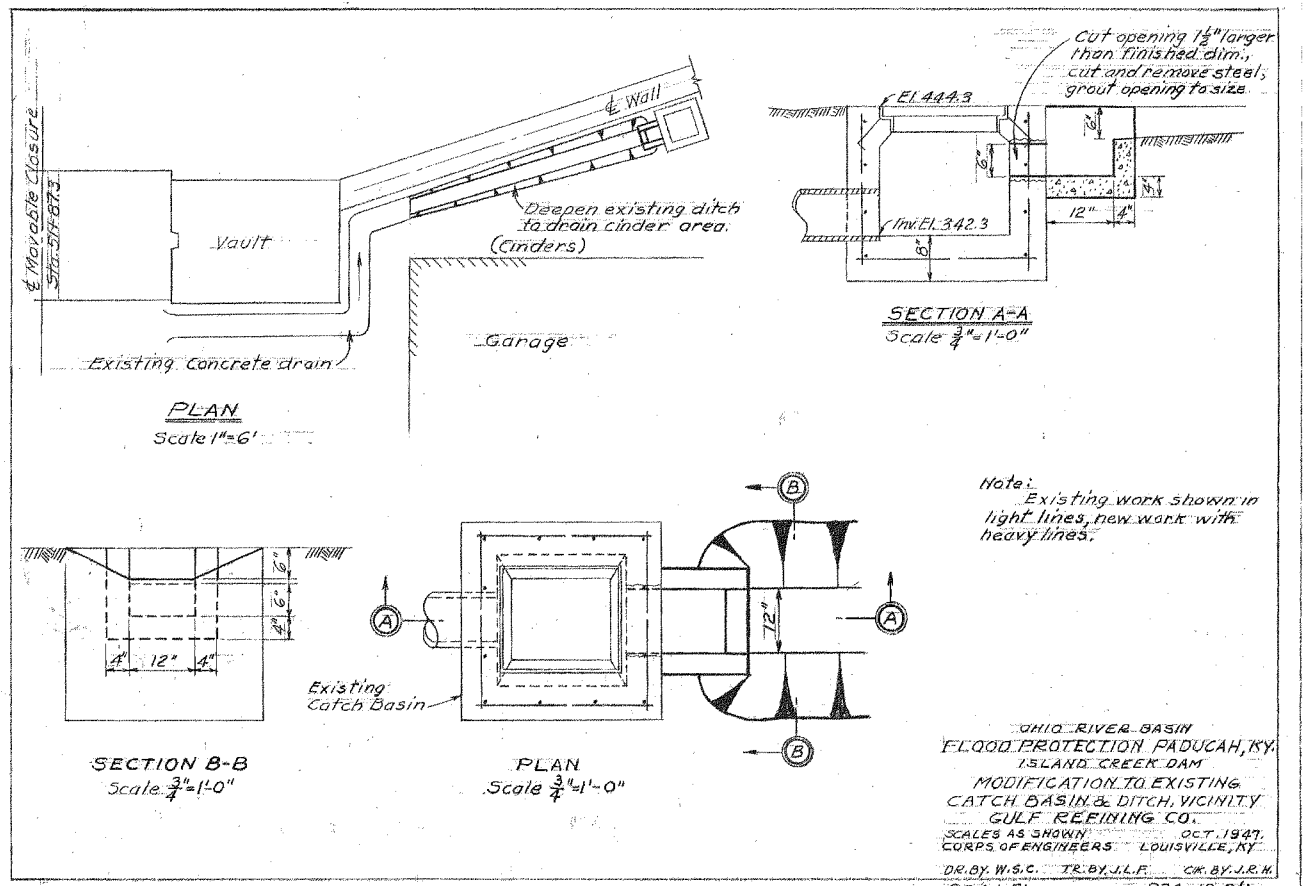
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1, 2 & 6
ACCESS DRIVES

SHEET 1 OF 1 SHEETS SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS WAR DEPARTMENT
LOUISVILLE, KY. APRIL 1945

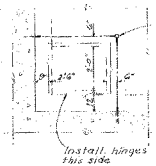
SUBMITTED
APPROVAL RECOMMENDED: APPROVED
TECHNICAL ASSISTANT — DISTRICT ENGINEER
DES. BY DR. BY CHK. BY TR. BY CK. BY L.R.B.

824.1-511 934-18.1

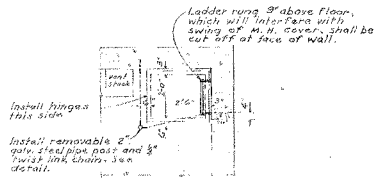
"BELIEVED AS BUILT"


℄ Movable Closure
Sta. 5+87.5
Vault
℄ Wall
Deepen existing ditch to drain cinder area. (Cinders)
Existing Concrete drain
Garage
PLAN
Scale 1"=6'
Cut opening 1½" larger than finished dim., cut and remove steel; grout opening to size.
El. 444.3
Inv. El. 342.3
12"
4"
6"
SECTION A-A
Scale ¾"=1'-0"
6"
6"
4"
4"
12"
4"
SECTION B-B
Scale ¾"=1'-0"
Existing Catch Basin
72"
A
B
PLAN
Scale ¾"=1'-0"
Note: Existing work shown in light lines, new work with heavy lines.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MODIFICATION TO EXISTING
CATCH BASIN & DITCH, VICINITY
GULF REFINING CO.
SCALES AS SHOWN
OCT. 1947.
CORPS OF ENGINEERS
LOUISVILLE, KY
DR. BY. W.S.C.
TR. BY. J.L.F.
CK. BY. J.R.H.
824.1-51
934-18.2/1

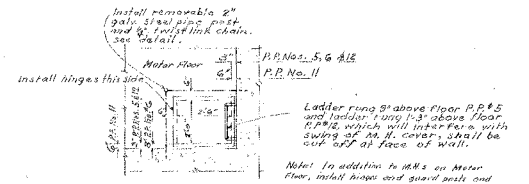
071



PLAN
PLANTS NOS. 1 & 2

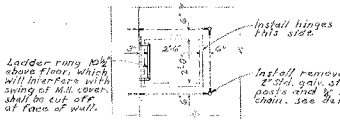


PLAN
PLANT NO. 3



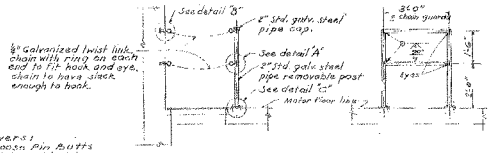
PLAN
PLANTS NOS. 5, 6, 11 & 12
(6 MANHOLES
4 in motor floor
2 on trash rack platform)

Note: Install hinges on 24 covers over gate wells of Pump Plant No. 11. Covers shall be hinged at end to swing to wall except that covers at ladder shall be hinged on side.

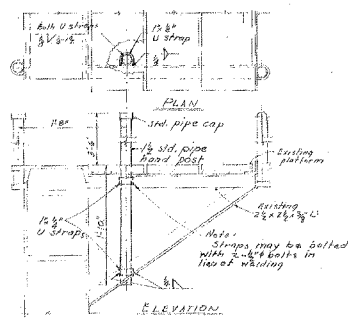


PLAN
PLANT NO. 7

Hinges for manhole covers:
2 - 2"x4" Cring Heavy Cocks Pin Butts each cover. Hinges shall be welded to frame and cover or installed with 3 - ⅜" bolts or flip screws each leaf.

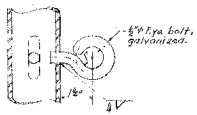


TYPICAL GUARD POST DETAILS
FOR CHAIN OR RAIL

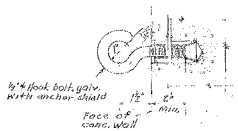


DRAINAGE STRUCTURE STA. 37+38.1
TYPICAL BRACKET SHOWING
NEW HAND POST DETAIL
SCALE: 1½"=1'-0"

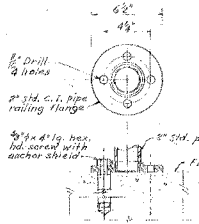
GUARD CHAIN DETAILS AT MOTOR FLOOR MANHOLES
SCALE: ½"=1'-0"



DETAIL "A"
SCALE: HALF SIZE



DETAIL "B"
SCALE: HALF SIZE



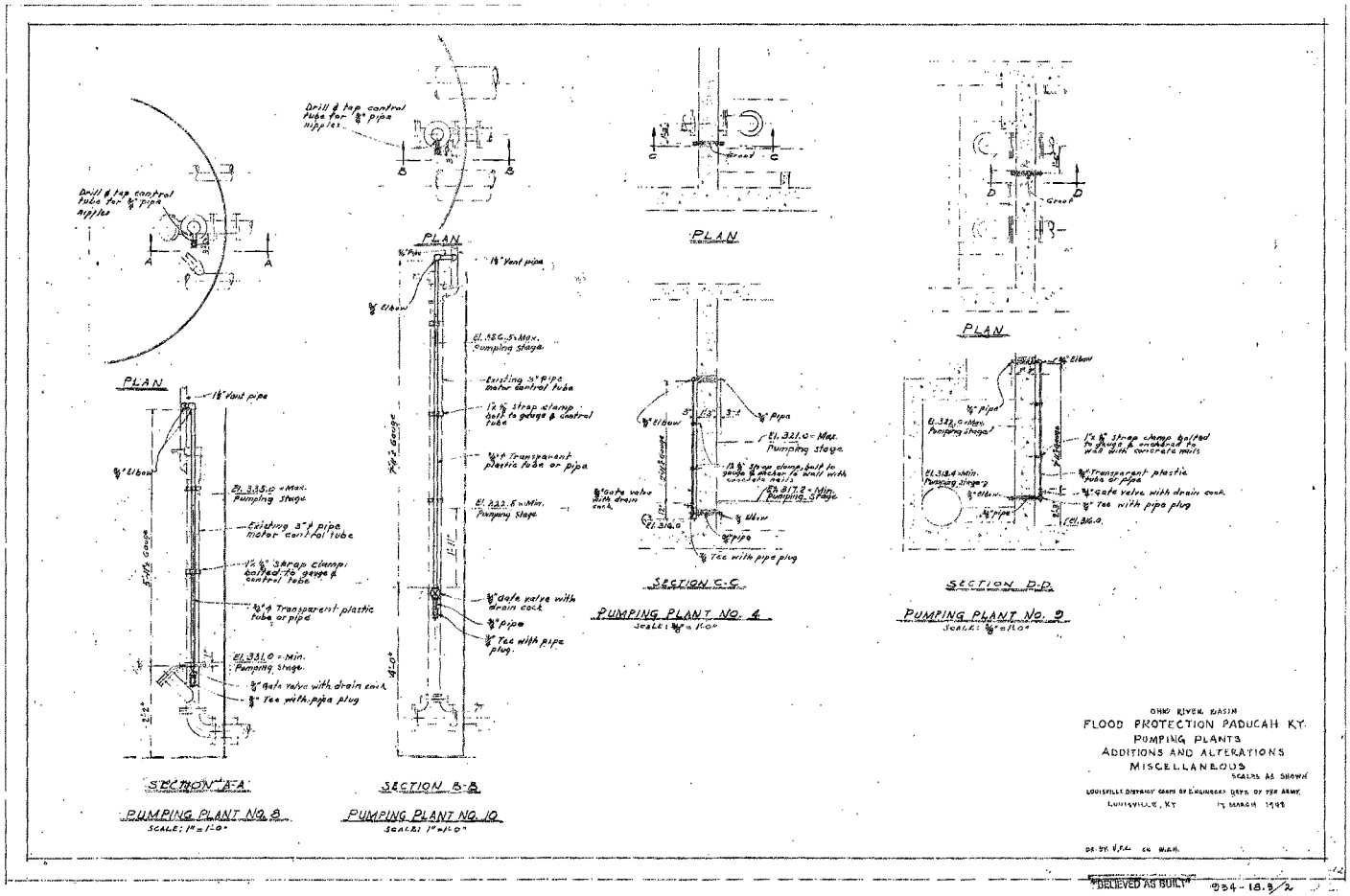
DETAIL "C"
SCALE: 3" = 1'-0"

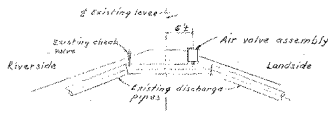
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS
ADDITIONS & REVISIONS
MISCELLANEOUS
SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS DEPT. OF THE ARMY
LOUISVILLE, KY. 16 MARCH 1949

DR. BY: W.P.C. CK. BY: W.H.M.

DELIVERED AS BUILT 324-18.3/1

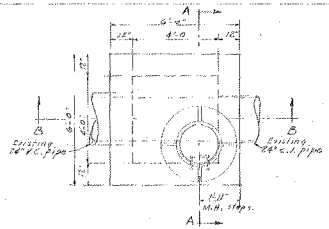
1133


Drill & tap control tube for ¾" pipe nipples
PLAN
18" Vent pipe
¾" Elbow
El. 335.0 = Max. Pumping Stage
Existing 3" pipe motor control tube
1½ ⅜" Strap clamp bolted to gauge & control tube
¾" ϕ Transparent plastic tube or pipe
El. 331.0 = Min. Pumping Stage
¾" gate valve with drain cock
¾" Tee with pipe plug
5'-6½" Gauge
2'-2"
SECTION A-A
PUMPING PLANT No. 8
SCALE: 1" = 1'-0"
Drill & tap control tube for ¾" pipe nipples
B
B
PLAN
¾" Pipe
18" Vent pipe
¾" Elbow
El. 336.5 = Max. Pumping Stage
Existing 3" pipe motor control tube
1½ ⅜" Strap clamp bolt to gauge & control tube
¾" ϕ Transparent plastic tube or pipe
El. 332.6 = Min. Pumping Stage
¾" gate valve with drain cock
¾" pipe
¾" Tee with pipe plug
7'-6½" Gauge
4'-0"
SECTION B-B
PUMPING PLANT No. 10
SCALE: 1" = 1'-0"
C
C
Grout
PLAN
¾" Elbow
3"
3"
¾" Pipe
El. 321.0 = Max. Pumping Stage
1½ ⅜" Strap clamp bolt to gauge & anchor to wall with concrete nails
El. 317.2 = Min. Pumping Stage
¾" gate valve with drain cock
¾" Elbow
¾" pipe
¾" Tee with pipe plug
El. 316.0
SECTION C-C
PUMPING PLANT No. 4
SCALE: ¾" = 1'-0"
D
D
Grout
PLAN
¾" Elbow
¾" pipe
El. 322.0 = Max. Pumping Stage
El. 318.4 = Min. Pumping Stage
¾" Elbow
¾" pipe
1½ ⅜" Strap clamp bolted to gauge & anchored to wall with concrete nails
¾" Transparent plastic tube or pipe
¾" gate valve with drain cock
¾" Tee with pipe plug
El. 316.0
SECTION D-D
PUMPING PLANT No. 9
SCALE: ¾" = 1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANTS
ADDITIONS AND ALTERATIONS
MISCELLANEOUS
SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS DEPT. OF THE ARMY
LOUISVILLE, KY 15 MARCH 1948
DR. BY J.F.G. CK. W.E.H.
"BELIEVED AS BUILT"
934-18.8/2

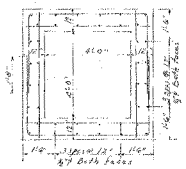


TYPICAL SECTION

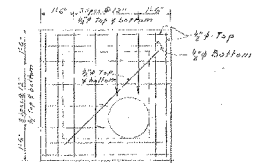
PUMPING PLANTS NOS. 1, 2 & 12



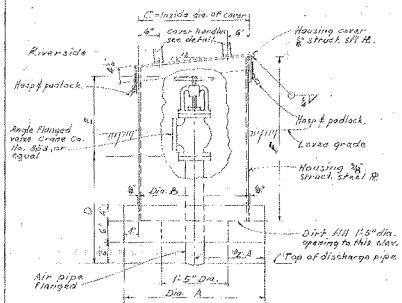
PLAN



SECTION C-C

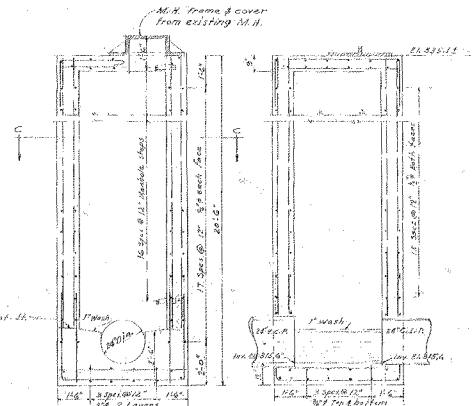


TOP REINFORCING

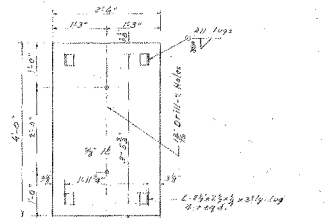


ELEVATION
SCALE: NONE

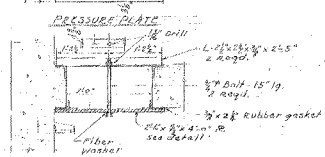
AIR VALVE ASSEMBLY



MANHOLE UNDER MYERS ST. BRIDGE JCNCR
TO PUMPING PLANT NO. 10
SCALE: 1/4" = 1'-0"

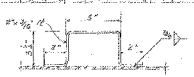


PRESSURE PLATE

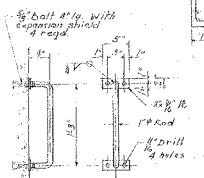


PRESSURE CHAMBER COVER
FOR MANHOLE 16-B5
SCALE: 1" = 1'-0"

SCHEDULE - AIR VALVE ASSEMBLY										
PLANT No.	AIR PIPE SIZE	No. REQD.	DIMENSIONS A	B	C	D	E	F	Size of Discharge Pipe
1	4"	2	2'-2 1/2"	2'-6"	2'-2"	3'-0"	1'-4 1/2"	2'-3"	30" I.D.
2	4"	2	"	"	"	"	"	"	"
2	4"	2	"	"	"	"	"	"	48" I.D.
2	6"	3	3'-0"	3'-0"	2'-1"	1'-9"	2'-3"	3'-2"	60" I.D.
12	4	2	2'-2 1/2"	2'-6"	2'-2"	3'-0"	1'-4 1/2"	2'-3"	60" O.D.



COVER HANDLE DETAIL
SCALE: 3" = 1'-0"



HAND HOLD IRON
MAKE ONE FOR MANHOLE No. 7A
MAKE ONE FOR PUMPING PLANT No. 4
MATL. - STRUCT. STEEL
SCALE: 1/2" = 1'-0"

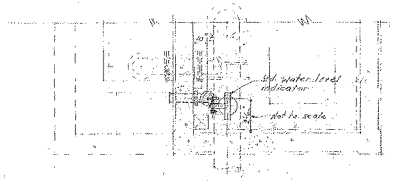
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS
ADDITIONS AND ALTERATIONS
MISCELLANEOUS
SCALES AS SHOWN

LOUISVILLE DISTRICT CORPS OF ENGINEERS, DEPT OF THE ARMY
LOUISVILLE, KY. 17 MARCH 1945

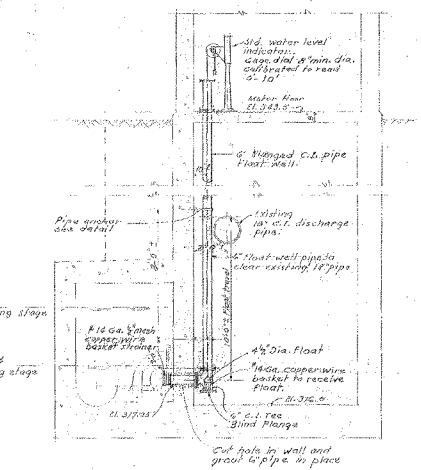
DR. BY: V.P.T. CK. W.D.H.

"BELIEVED AS BUILT" 934-18-3/3

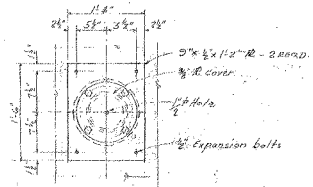
1135



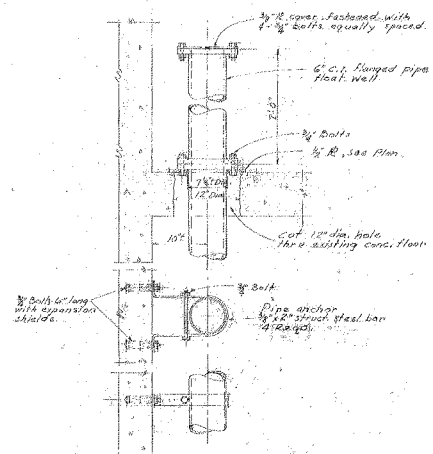
PLAN
SCALE: 3/8"=1'-0"



SECTION A-A
SCALE: 3/8"=1'-0"



PLAN



FLOAT WELL DETAIL
SCALE: 1 1/2"=12"-0"

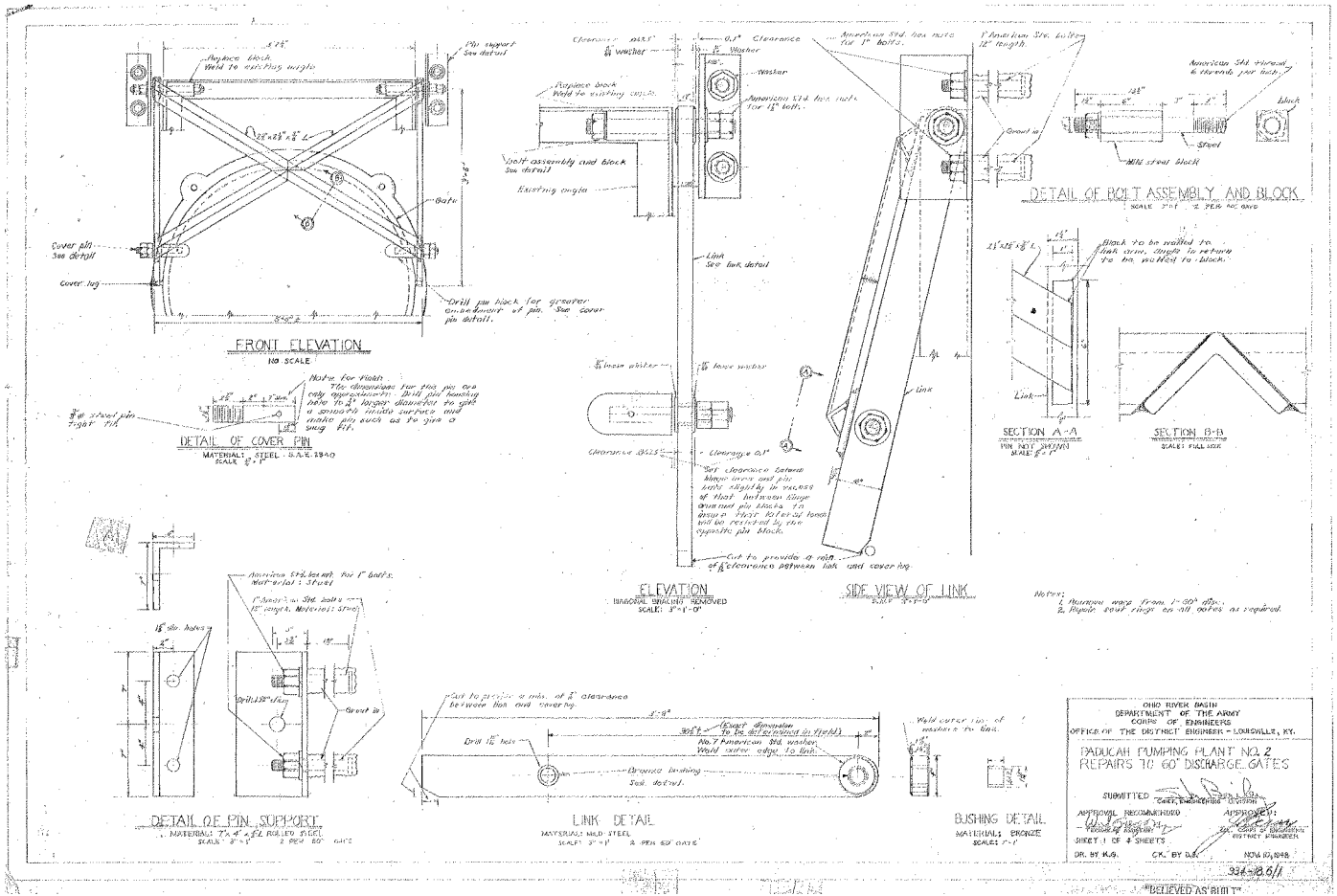
Details on this drawing supersede details for Wk. Indicator for P.P. 9 on Drg. 934-18-3/2

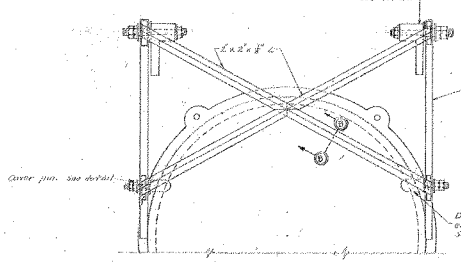
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
ADDITIONS AND ALTERATIONS
MISCELLANEOUS
SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS, DEPT. OF THE ARMY
LOUISVILLE, KY. 9 APRIL 1948

DR. BY: V.P.C. CK. BY:

934-18-3/4

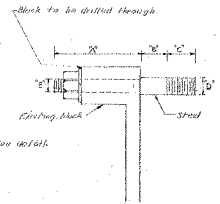
"BELIEVED AS BUILT"


FRONT ELEVATION
NO SCALE
Replace block. Weld to existing angle
Pin support. See detail
Gate
Cover plate. See detail
Cover lug
Drill pin hole for greater embedment of pin. See cover pin detail.
DETAIL OF COVER PIN
MATERIAL: STEEL - S.A.E. 1040
SCALE: 6" = 1'
Note for Field: The dimensions for the pin are only approximate. Drill pin bearing hole to 1/4" larger diameter to get a smooth finish surface and make pin work as for a snug fit.
3/4" steel pin. Tight fit
DETAIL OF PIN SUPPORT
MATERIAL: 7" x 4" x 5/8" ROLLED STEEL
SCALE: 6" = 1'
2 PER 60" GATE
Clearance 0.125"
3/4" washer
Replace block. Weld to existing angle
Bolt assembly and block. See detail
Existing angle
Link. See link detail
3/4" linear washer
3/4" loose washer
Clearance 0.125"
Clearance 0.1"
Set clearance between linear washer and pin, both slightly in excess of that between flange mounted pin blocks to ensure that lateral loads will be restricted by the opposite pin block.
Cut to provide a min. of 1/16" clearance between link and cover lug.
ELEVATION
LONGITUDINAL BRACING REMOVED
SCALE: 3" = 1'-0"
0.1" Clearance
3/4" Washer
Washer
American Std. hex nuts for 1" bolts.
American Std. hex nuts for 1/2" bolts.
1" American Std. bolts 12" length.
Ground in
Link
SIDE VIEW OF LINK
SCALE: 3" = 1'-0"
American Std. thread 6 threads per inch.
Block
Steel
Mild steel block
DETAIL OF BOLT ASSEMBLY AND BLOCK
SCALE: 2" = 1'
2 PER NC GATE
Block to be welded to link arm. Angle to remain to be welded to block.
Link
SECTION A-A
PIN NOT SHOWN
SCALE: 6" = 1'
SECTION B-B
SCALE: FULL SIZE
Notes:
1. Remove wedge from 1-90° div.
2. Repair seal edge on all gates as required.
American Std. beam nut for 1" bolts. Material: Steel
1" American Std. bolts 12" length. Material: Steel
1 1/8" dia. holes
Drill 1 1/2" deep
Grout in
Cut to provide a min. of 1/8" clearance between link and cover lug.
Drill 1 1/2" hole
Exact dimension to be determined in field.
No. 7 American Std. washer. Weld outer edge to link.
Bronze bushing. See detail.
LINK DETAIL
MATERIAL: MILD STEEL
SCALE: 3" = 1'
2 PER 60" GATE
Weld outer edge of washer to link.
BUSHING DETAIL
MATERIAL: BRONZE
SCALE: 1" = 1'
OHIO RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER - LOUISVILLE, KY.
PADUCAH PUMPING PLANT NO. 2
REPAIRS TO 60" DISCHARGE GATES
SUBMITTED
CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED
CHIEF OF ENGINEERING
APPROVED:
COL. CORPS OF ENGINEERS
DISTRICT ENGINEER
SHEET 1 OF 4 SHEETS
DR. BY H.S.
CK. BY D.E.
NOV 10, 1948
934-B.6/1
"BELIEVED AS BUILT"



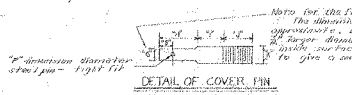
FRONT ELEVATION

NO SCALE



DETAIL OF BOLT ASSEMBLY AND BLOCK

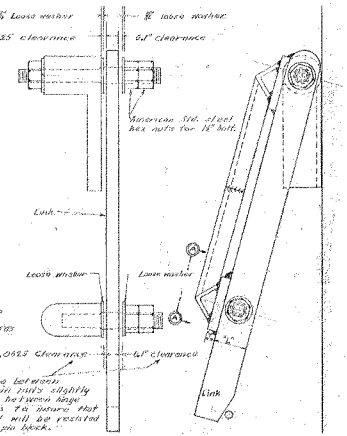
SCALE: $\frac{1}{2}$" = 1'



DETAIL OF COVER PIN

MATERIAL: STEEL - SAE 2340

SCALE: $\frac{1}{2}$" = 1'



Set clearance between hinge lateral and pin plate slightly in excess of that between hinge arms and pin blocks. To insure that the lateral load will be resisted by the opposite pin block.

FRONT ELEVATION

DIAGONAL BRACING REMOVED

SCALE: $\frac{1}{2}$" = 1'

SIDE ELEVATION

SCALE: $\frac{1}{2}$" = 1'

DIMENSION	48" GATE	30" GATE
A	Determine in field	Determine in field
B	8"	6"
C	4"	3"
D	2"	1"
E	2"	1"
F	1"	1"
G	1" ±	1" ±
H	1½" ±	1" ±
I	1½"	1½"
J	2½"	1½"
K	1"	1"
L	1"	1"
M	34½"	22"
N	Determine in field	Determine in field
O	Determine in field	Determine in field
P	1½"	1"
Q	1½"	1"
R	1½"	1"
S	Determine in field	Determine in field
T	1"	1"

LINK DETAIL

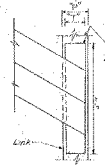
MATERIAL: MILD STEEL

SCALE: $\frac{1}{2}$" = 1'

BUSHING DETAIL

MATERIAL: BRONZE

SCALE: $\frac{1}{2}$" = 1'

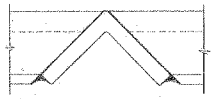


Block to be welded to link and ends to which to be welded to block.

SECTION A-A

PIN NOT SHOWN

SCALE: $\frac{1}{2}$" = 1'



SECTION B-B

SCALE: FULL SIZE

Note:

1. Repair seat rings on all gates as required.

BY	DATE

REVISIONS

OHIO RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER - LOUISVILLE, KY.

PADUCAH PUMPING PLANT NO. 2
REPAIRS TO 30" & 48" DISCHARGE GATES

SUBMITTED: CHIEF, ENGINEERING DESIGN

APPROVAL RECOMMENDED: TECHNICAL ASSISTANT

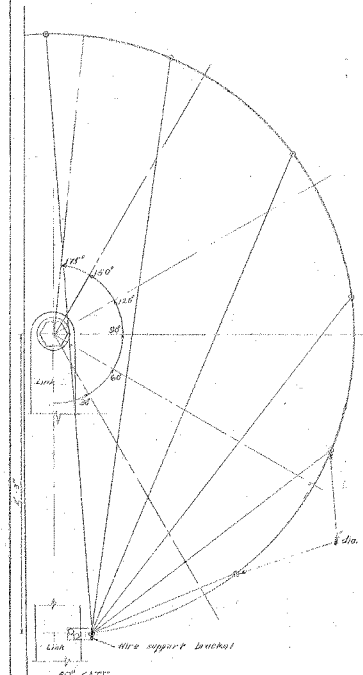
APPROVED: DISTRICT ENGINEER

SHEET 2 OF 4 SHEETS

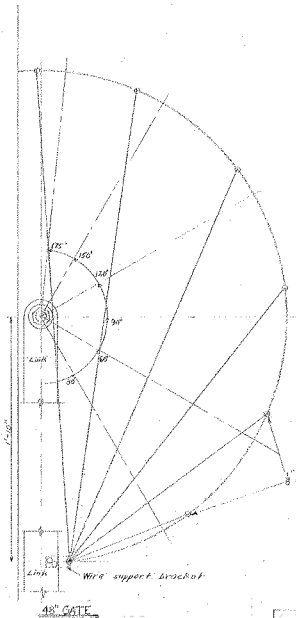
DR. BY K.G. CK. BY D.S.C. NOV. 10, 1948

"BELIEVED AS BUILT" 334-126/2

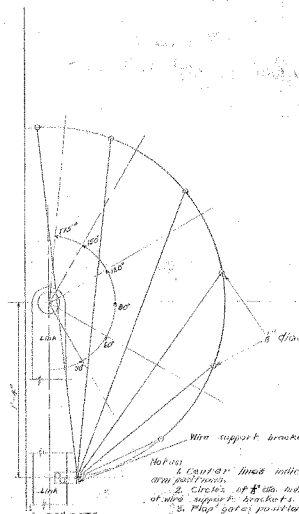
AD-3



60" GATE
SCALE 1/2" = 1'

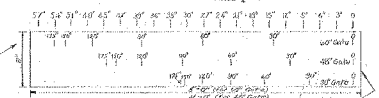


48" GATE
SCALE 1/2" = 1'



30" GATE
SCALE: 1/2" = 1'

Notes:
1. Center lines indicate true arm positions.
2. Circles of 1/8" dia. indicate positions of wire support brackets.
3. Plug gates positions are read directly to degrees on indicator board.
4. Indicator board to be painted white with black figures and markings.
5. Letters and markings to be 1½" in height.



Place 1½" numerals at top of board for respective gates.

DETAIL OF INDICATOR BOARD
MATERIAL: PRESSED YELLOW PINE
SCALE: 1½" = 1'-0"

Nailed: 2 for 60" Gate
2 for 48" Gate
1 for 30" Gate

GATE POSITION	0°	30°	60°	90°	120°	150°	170°
WIRE MOVEMENT 60" GATE	0"	14 3/4"	27 1/4"	39 1/8"	47"	52 5/8"	54 1/4"
WIRE MOVEMENT 48" GATE	0"	11 1/8"	22 1/2"	31 1/8"	37 3/4"	43"	44 1/2"
WIRE MOVEMENT 30" GATE	0"	8 1/2"	16"	22 1/8"	27 1/2"	30 3/4"	31 1/8"

INDICATOR BOARD CALIBRATION DATA

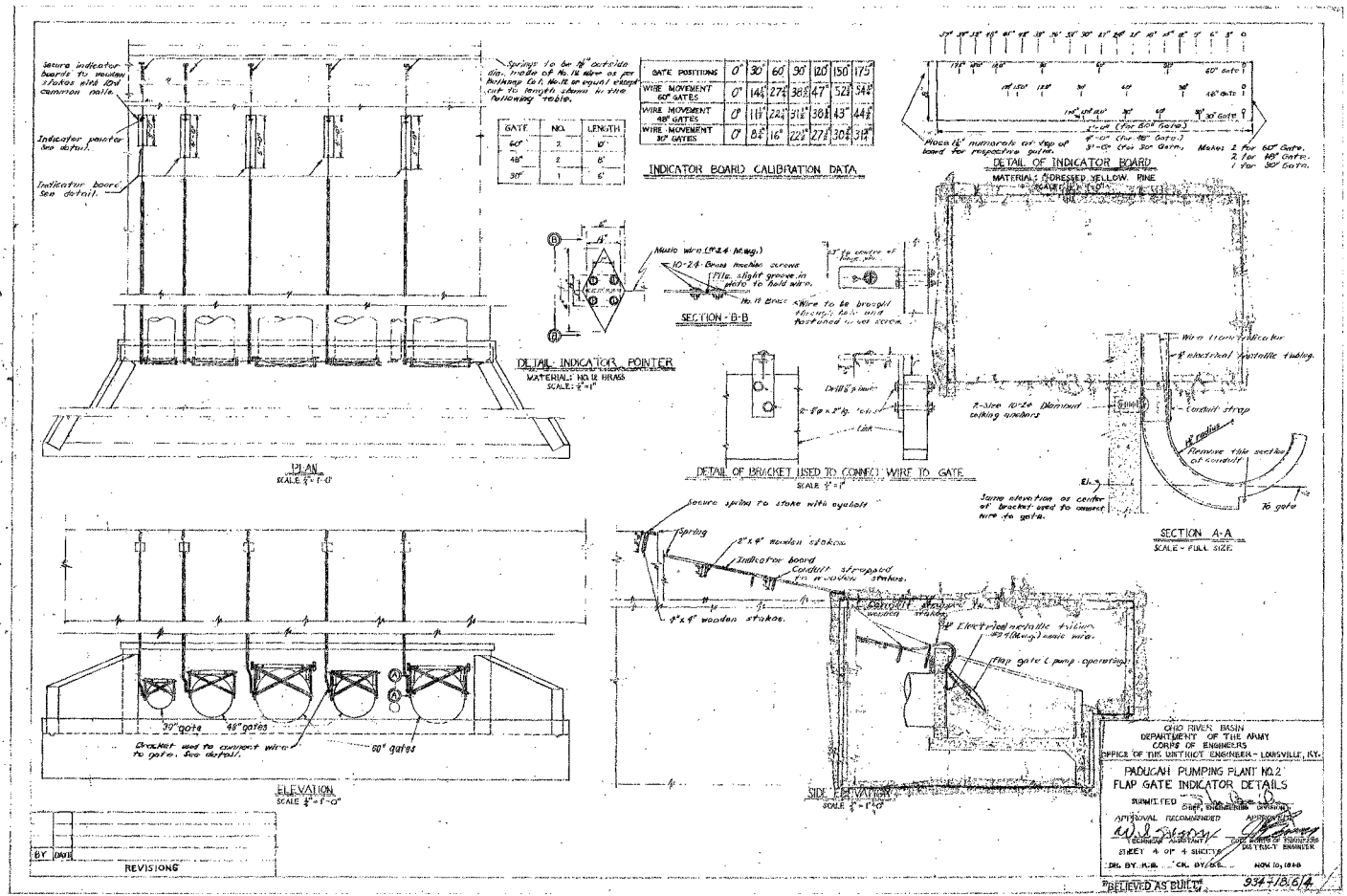
BY	DATE	REVISIONS

OHIO RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER - LOUISVILLE, KY.

PADUCAH PUMPING PLANT NO. 2
CALIBRATION OF INDICATOR BOARD

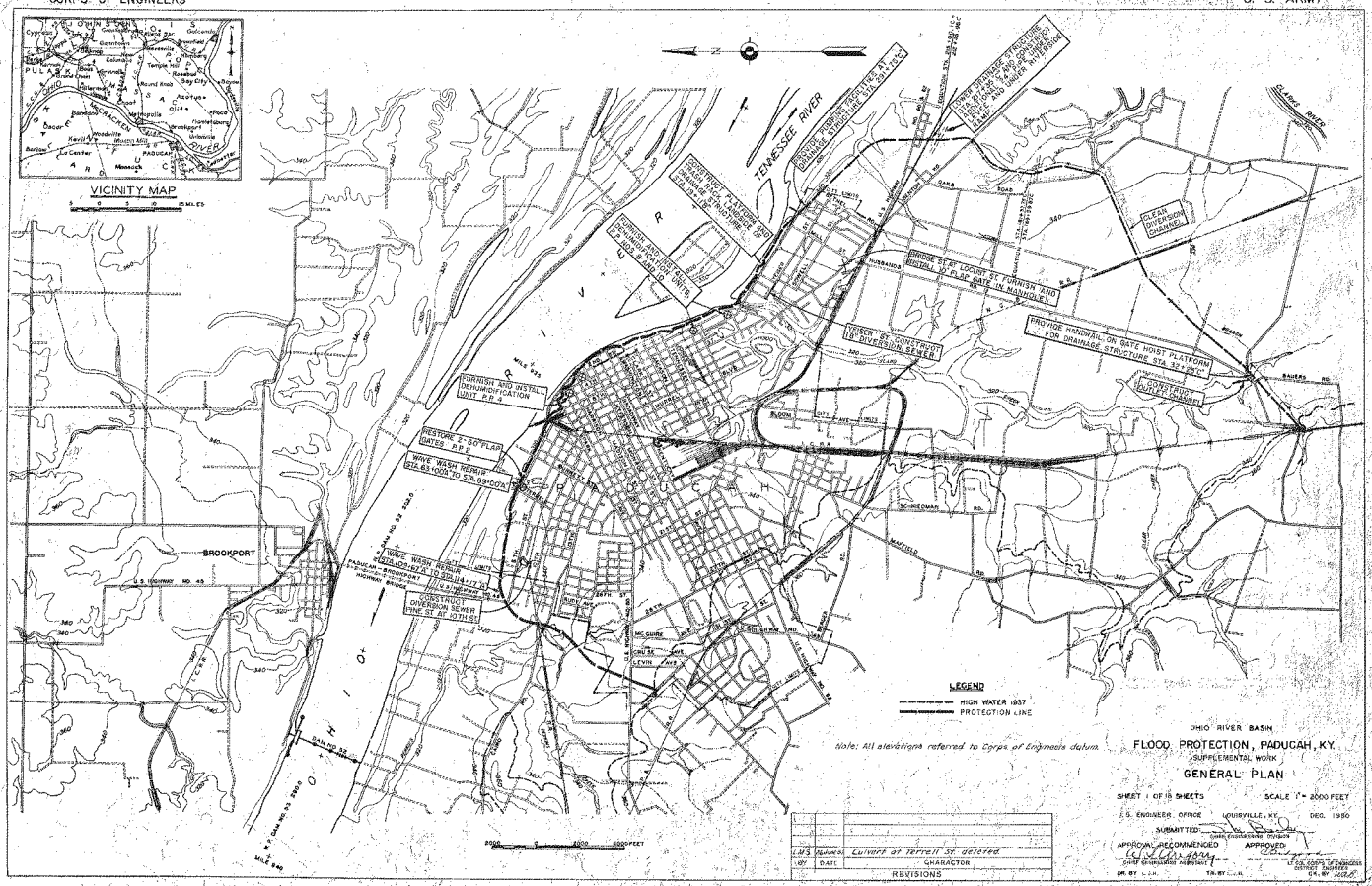
SUBMITTED: CHIEF ENGINEER (DESIGN)
APPROVAL RECOMMENDED: TECHNICAL ASSISTANT
APPROVED: DISTRICT ENGINEER
SHEET 3 OF 4 SHEETS.
DR: BY R.G. CK. BY D.S. NOV. 10, 1948

"BELIEVED AS BUILT" 934-18.6/3


Secure indicator boards to wooden stakes with 10d common nails.
Indicator pointer see detail.
Indicator board see detail.
PLAN
SCALE 3/8" = 1'-0"
Springs to be 1/4" outside dia. made of No. 12 wire or per Drawing No. 1, No. 12 or equal cut to length shown in the following table.
GATE	NO.	LENGTH
60"	2	10'
48"	2	8'
30"	1	6'
GATE POSITIONS	0°	30°	60°	90°	120°	150°	175°
WIRE MOVEMENT 60" GATES	0"	14 1/2"	27 1/2"	36 1/2"	47"	52 1/2"	54 1/2"
WIRE MOVEMENT 48" GATES	0"	11 1/8"	22 1/2"	31 1/2"	38 1/2"	43"	44 1/2"
WIRE MOVEMENT 30" GATES	0"	8 1/2"	16"	22 1/2"	27 1/2"	30 1/2"	31 1/2"
INDICATOR BOARD CALIBRATION DATA
DETAIL OF INDICATOR BOARD
MATERIAL: DRESSED YELLOW PINE
SCALE 3/8" = 1'-0"
Place 1/2" nutwrench on top of board for respective gate.
Makes 2 for 60" Gate. 2 for 48" Gate. 1 for 30" Gate.
Music wire (No. 24 B.W.G.)
10-24 Brass machine screws (File slight groove in plate to hold wire.)
No. 11 Brace
SECTION - B-B
DETAIL INDICATOR POINTER
MATERIAL: NO. 12 BRASS
SCALE: 1/2" = 1"
Wire to be brought through hole and fastened w/set screw.
Drill 1/8" x 1mm
2-1/8" x 2" lg. bolts
Link
DETAIL OF BRACKET USED TO CONNECT WIRE TO GATE
SCALE 1/2" = 1"
Wire from indicator
1/4" electrical metallic tubing.
2-size 10-24 Diamond tacking washers
Conduit strap
Remove the section of conduit
To gate
Same elevation as center of bracket used to connect wire to gate.
SECTION A-A
SCALE - FULL SIZE
Secure spring to stake with eyebolt
Spring
2"x4" wooden stakes
Indicator board
Conduit strapped to wooden stakes.
4"x4" wooden stakes.
Electrical metallic tubing
#24 (B.W.G.) music wire.
Flap gate (pump operating)
SIDE ELEVATION
SCALE 1/2" = 1'-0"
30" gate
48" gates
Bracket used to connect wire to gate. See detail.
60" gates
ELEVATION
SCALE 3/8" = 1'-0"
BY DATE
REVISIONS
OHIO RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER - LOUISVILLE, KY.
PADUCAH PUMPING PLANT NO. 2
FLAP GATE INDICATOR DETAILS
SUBMITTED
CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED
TECHNICAL ASSISTANT
CHIEF, BUREAU OF FINANCE AND ADMINISTRATION
DISTRICT ENGINEER
SHEET 4 OF 4 SHEETS
DRL. BY H.B. CK. BY G.S. NOV. 10, 1948
"BELIEVED AS BUILT"
934-7/18/6/4

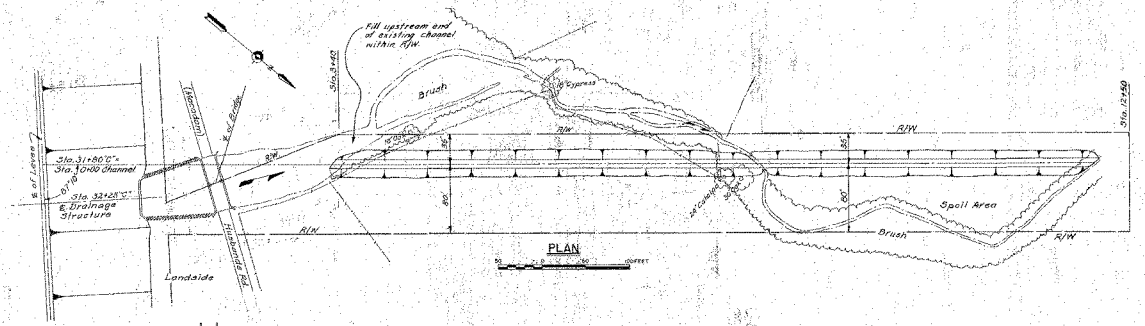
CORPS OF ENGINEERS

U. S. ARMY

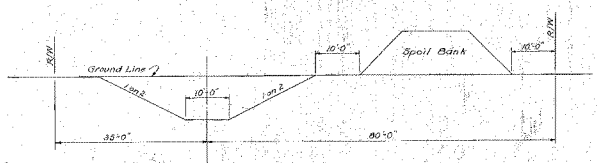


CORPS OF ENGINEERS

U. S. ARMY



Right of entry to channel site is available over property of F. M. Weatherington, north of site.



TYPICAL SECTION
NO SCALE

Note: Openings shall be left in spoil banks as required for drainage.

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

OUTLET CHANNEL

STA. 32+25 "C"

SHEETS 2 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [signature] CHIEF, LANDS AND DIRECT CONSTRUCTION BRANCH

APPROVED: [signature] LIEUT. COLONEL, CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY H.R.S. TR. BY H.R.S. CK. BY W.R.B.

L.M.S. 10/16/54	R/W Revised @ Sta. 12+90	
L.M.S. 10/16/54	R/W Revised	
BY	DATE	CHARACTER

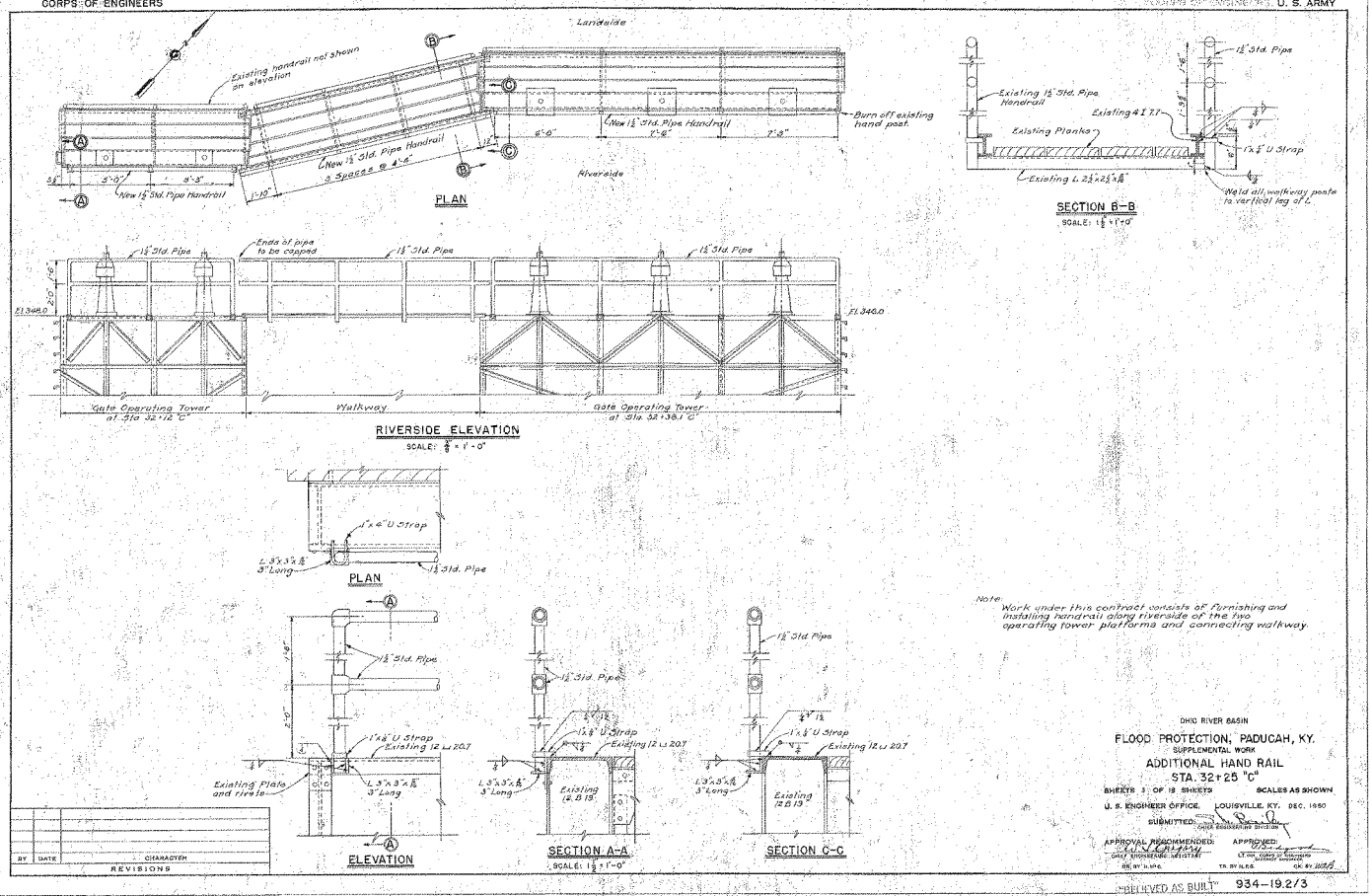
REVISIONS

"RELIEVED AS BUILT"

934-19.2/2

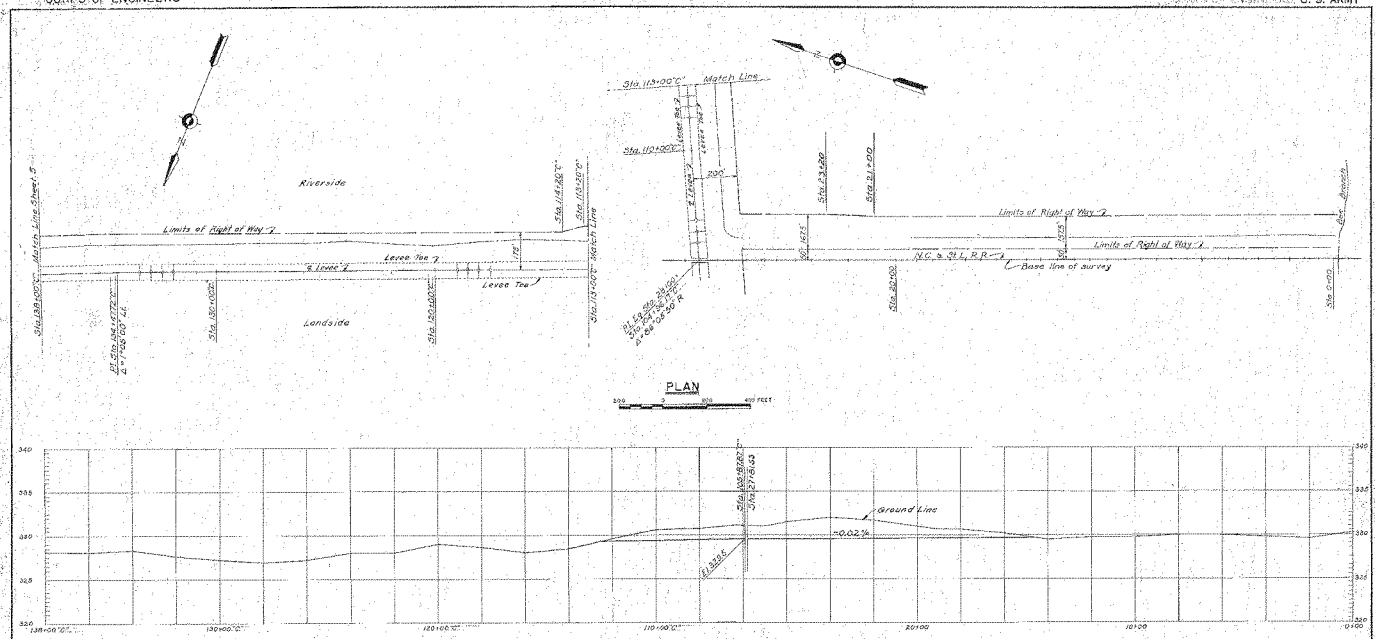
CORPS OF ENGINEERS

CORPS OF ENGINEERS, U. S. ARMY



CORPS OF ENGINEERS

U. S. ARMY



Notes:
Clean ditch to grade and section shown on plans, following thalweg of existing channel.
Spoil bank to be graded to drain. Side slopes not steeper than 1on1.
Ground line on profile from survey of October 1949.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SUPPLEMENTAL WORK

BEE BRANCH DIVERSION CHANNEL CLEANING

SHEETS 4 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: [illegible]
CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [illegible]
CHIEF, PLANNING & REPORTS BRANCH
DR. BY H.P.S.

APPROVED: [illegible]
LEGAL, DUTIES OF VARIOUS DISTRICT ENGINEERS
TR. BY H.P.S. CK. BY [illegible]

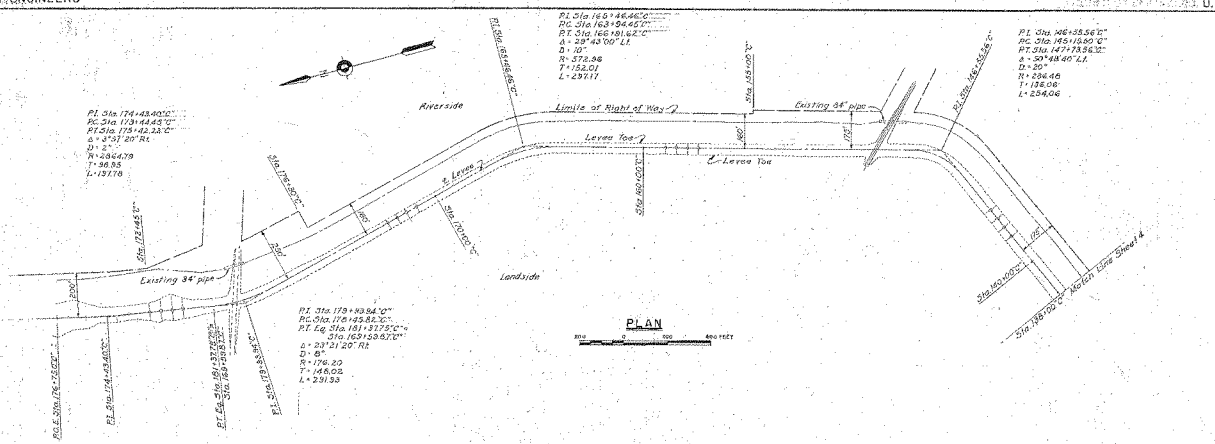
BY	DATE	CHARACTER

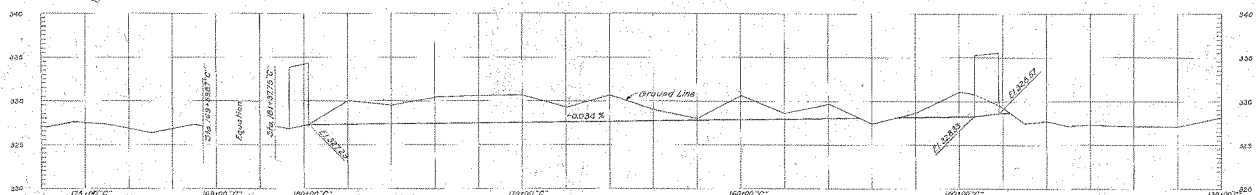
REVISIONS

"RELIEVED AS BUILT" 934/192/4

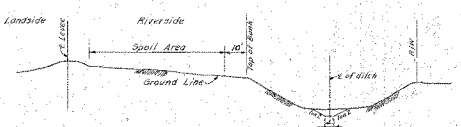
CORPS OF ENGINEERS

U. S. ARMY





PROFILE
SCALES: HOR. 1"=200' VERT. 1"=5'



TYPICAL SECTION
STA. 170+00'C"
NO SCALE

Note:
See note sheet 4.
Ground line on profile from survey of October 1949.

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK

BEE BRANCH DIVERSION
CHANNEL CLEANING

SHEETS 5 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 1950

SUBMITTED: [illegible] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEERING DIVISION

APPROVED: [illegible] CHIEF, CONSTRUCTION DIVISION

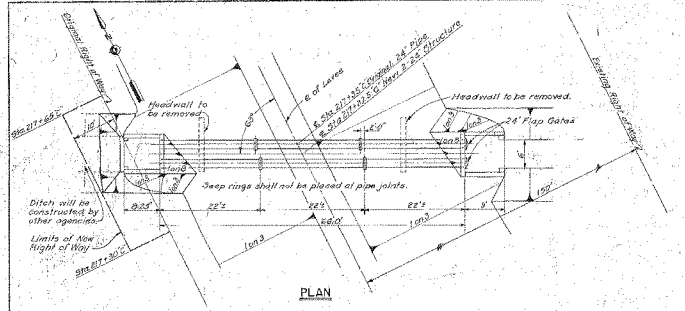
BY	DATE	CHARACTER

REVISIONS

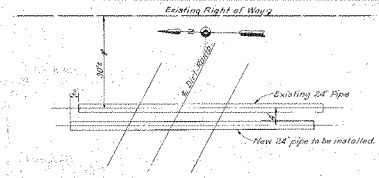
"REVISED AS BUILT" 934-19.2/5

1145

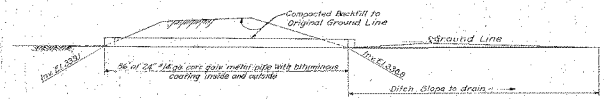
CORPS OF ENGINEERS — U. S. ARMY



PLAN



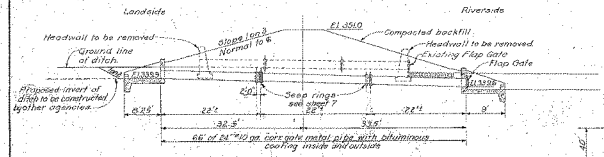
PLAN



SECTION

CULVERT UNDER RAMP STA. 214+70 "C" 120' RIVERSIDE

SCALE: 1" = 10'

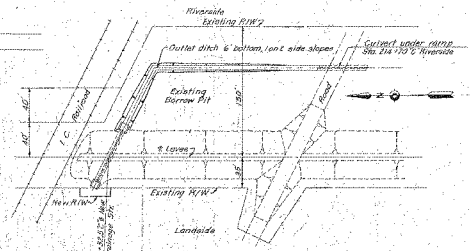


SECTION

DRAINAGE STRUCTURE STA. 217+32.5 "C"

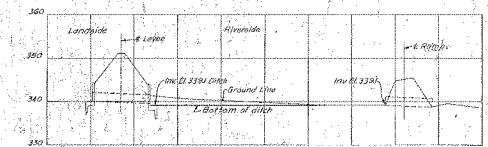
SCALE: 1" = 10'

Notes:
1. For details of headwalls, see sheet 7.
2. Existing pipe, Flap gate, and seep rings may be reused providing they are in good condition or repaired as approved by the Contracting Officer or his authorized representative.



LOCATION PLAN

SCALE: 1" = 50'



PROFILE OF OUTLET DITCH

SCALES HOR. 1" = 50' VERT. 1" = 10'

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

DRAINAGE STRUCTURE STA. 217+32.5 "C"

CULVERT STA. 214+70 "C"

SHEETS 6 OF 18 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — DEC. 1950

SUBMITTED: CHIEF, ENGINEERING DIVISION

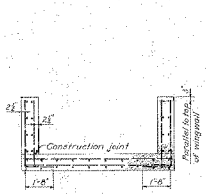
APPROVAL RECOMMENDED: CHIEF, INFORMATION ASSISTANT — APPROVED: CHIEF, CIVIL DIVISION

DR. BY L.J.R. — TR. BY L.J.R. — CK. BY [illegible]

"RELIEVED AS BUILT" 934-192/6

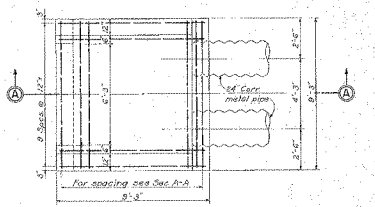
CORPS OF ENGINEERS

U. S. ARMY



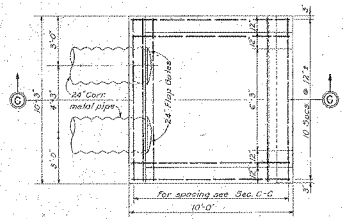
SECTION B-B

SCALE: $\frac{3}{8}$" = 1'-0"



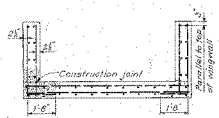
PLAN

SCALE: $\frac{3}{8}$" = 1'-0"



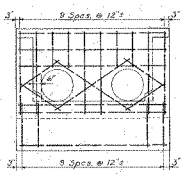
PLAN

SCALE: $\frac{3}{8}$" = 1'-0"



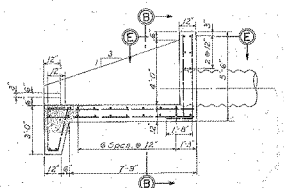
SECTION D-D

SCALE: $\frac{3}{8}$" = 1'-0"



ELEVATION

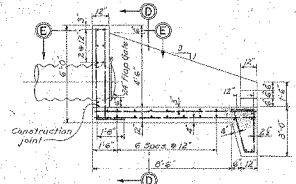
SCALE: $\frac{3}{8}$" = 1'-0"



SECTION A-A

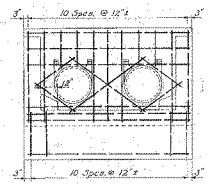
SCALE: $\frac{3}{8}$" = 1'-0"

24" INLET HEADWALL



SECTION C-C

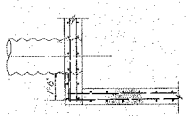
SCALE: $\frac{3}{8}$" = 1'-0"



ELEVATION

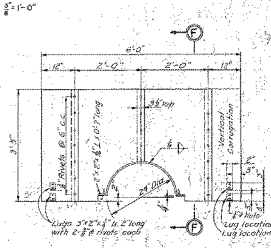
SCALE: $\frac{3}{8}$" = 1'-0"

24" OUTLET HEADWALL



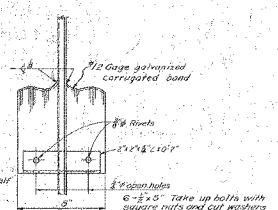
SECTION E-E

SCALE: $\frac{3}{8}$" = 1'-0"



ELEVATION

SCALE: $\frac{3}{8}$" = 1'-0"



SECTION F-F

SCALE: 3" = 1'-0"

Take up bolts with square nuts and cut washers to be furnished with each diaphragm.

DETAIL OF SEEP RINGS

Note:
Diaphragm #14 galvanized corrugated metal fully coated with bituminous material. Top half diaphragm shown, bottom half identical, except as noted.

Note:
All reinforcing $\frac{1}{2}$" ϕ @ 12" c.c. unless otherwise noted.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SUPPLEMENTAL WORK

DRAINAGE STRUCTURE DETAILS

STA. 217+32.5 "C"

SHEETS 7 OF 18 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, ENGINEERING ASSISTANT — APPROVED: CHIEF, BRANCH OF DESIGNS

DR. BY — TR. BY L.J.K. — CK. BY

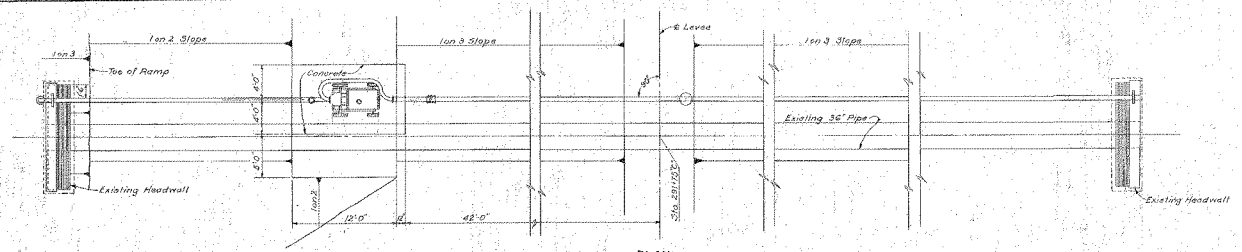
"RELIEVED AS BUILT"

934-19.2/7

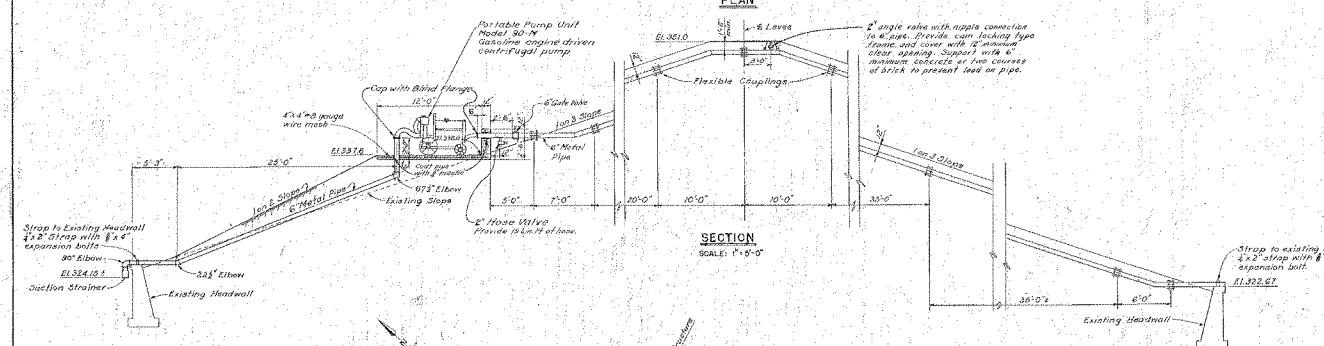
1147

CORPS OF ENGINEERS

U. S. ARMY

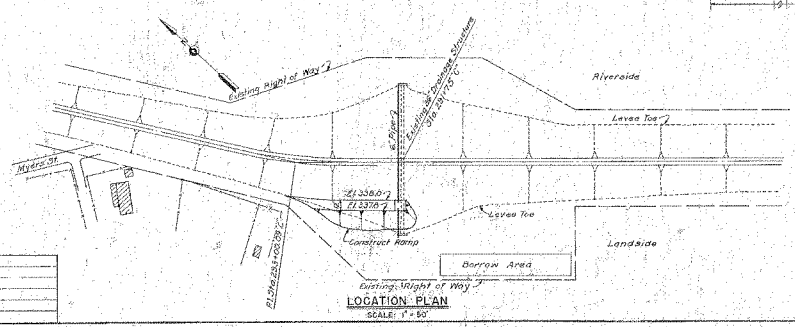


PLAN



SECTION

SCALE: 1" = 5'-0"



LOCATION PLAN

SCALE: 1" = 50'

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION - PADUCAH, KY.

SUPPLEMENTAL WORK

PUMPING FACILITIES

STA. 291+75 "C"

SHEETS 8 OF 16 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 1950

SUBMITTED: [illegible]

CHIEF ENGINEERING DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEERING DIVISION

APPROVED: [illegible] CHIEF, CORPS OF ENGINEERS DISTRICT ENGINEER

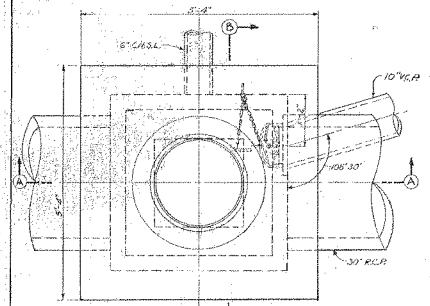
DR. BY L.J.R. TR. BY L.J.R. CK. BY [illegible]

SPECIFICATION NO. 934-19.2/8

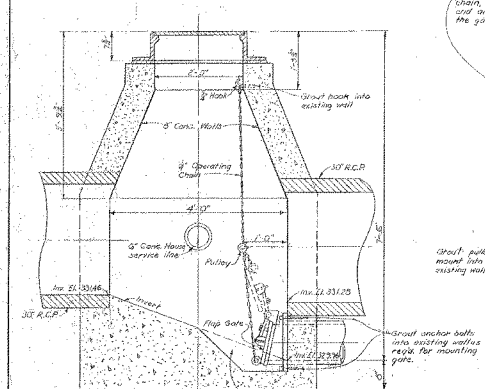
1148

CORPS OF ENGINEERS

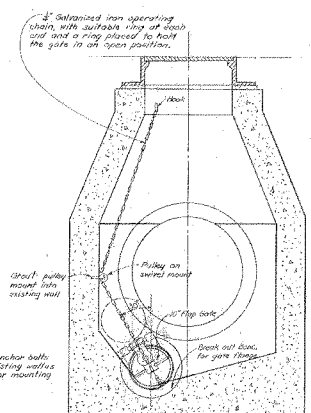
U. S. ARMY



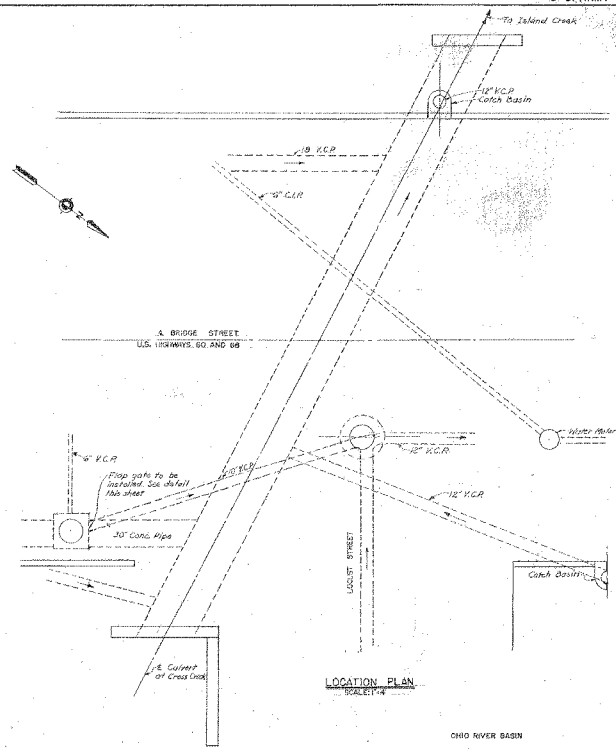
PLAN
SCALE 1"=3'-0"



SECTION A-A



SECTION B-B



LOCATION PLAN
SCALE 1"=4'

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

INSTALLATION OF FLAP GATE

BRIDGE ST. AT LOCUST ST.

SHEETS 9 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. FEB 1952

SUBMITTED _____ CHIEF ENGINEERING DIVISION

APPROVAL RECOMMENDED _____ CHIEF ENGINEERING ASSISTANT

APPROVED _____ LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

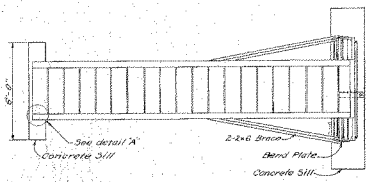
DR. BY DWM TR. BY A.S. CK. BY

(CONTRACT MOD. THIS DWG. SUPERSEDES 934-192/9 DATED DEC. 1950)

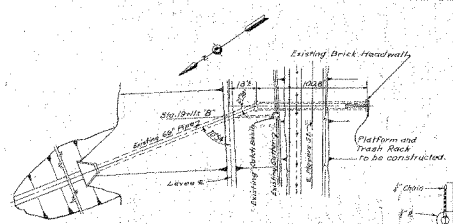
RECEIVED AS BUILT 934-192/9.1

CORPS OF ENGINEERS

U. S. ARMY

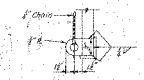


PLAN



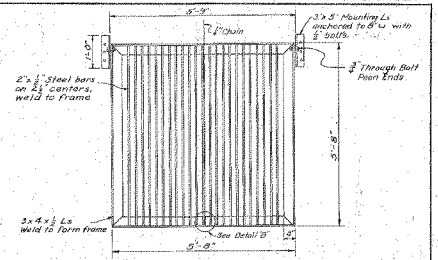
LOCATION PLAN

SCALE: 1" = 40'



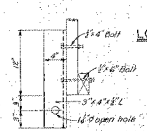
DETAIL "B"

SCALE: 1½" = 1'-0"



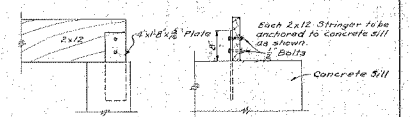
TRASH RACK

SCALE: 3/4" = 1'-0"



DETAIL "C"

SCALE: 1½" = 1'-0"

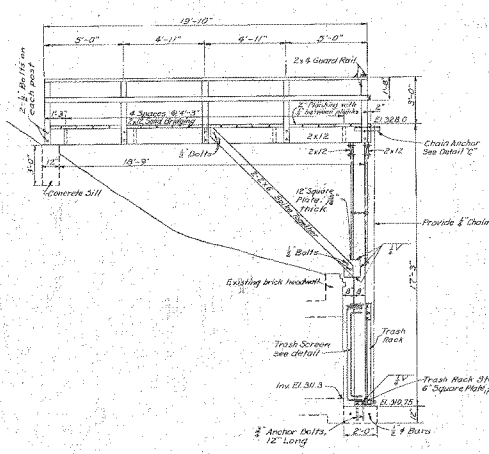


SIDE ELEVATION

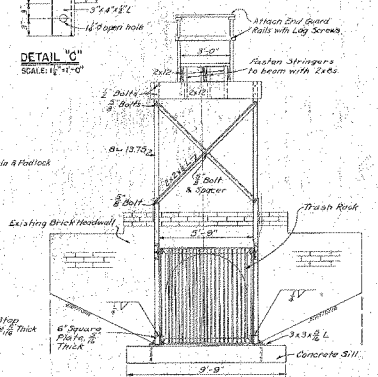
END ELEVATION

DETAIL "A"

SCALE: 1" = 1'-0"



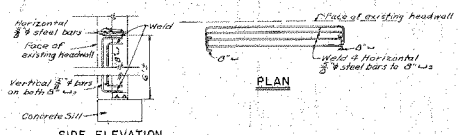
SIDE ELEVATION



FRONT ELEVATION

TRASH RACK AND PLATFORM

SCALE: 3/8" = 1'-0"



SIDE ELEVATION

PLAN

DETAIL OF TRASH SCREENING BARS WELDED TO 8" CHANNEL

SCALE: 3/4" = 1'-0"

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY

SUPPLEMENTAL WORK

TRASH RACK AND PLATFORM STA. 19+11 "B"

SHEETS 10 OF 18 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: [illegible] CHIEF, ENGINEERING DIVISION

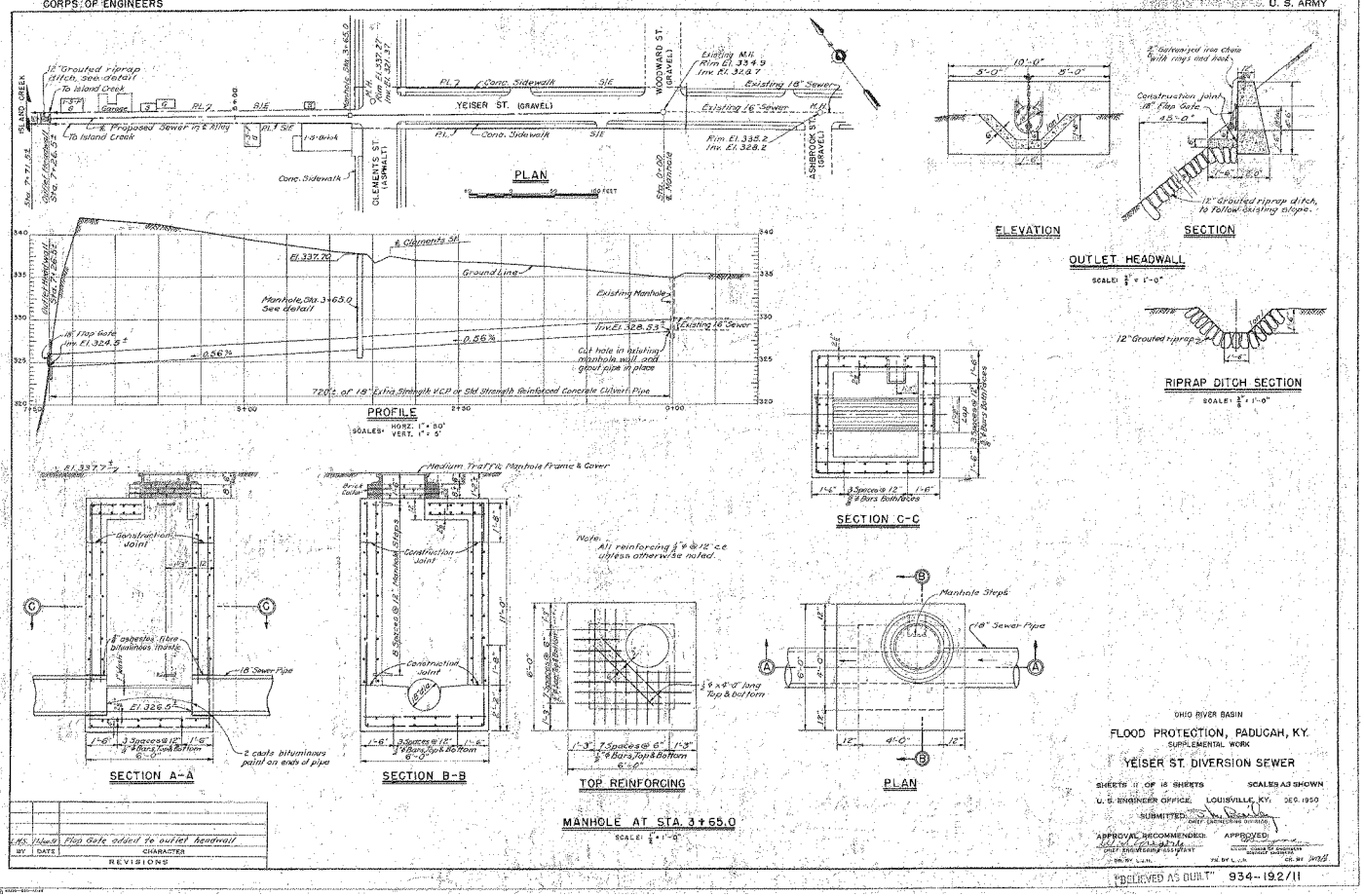
APPROVAL RECOMMENDED: [illegible] CHIEF ENGINEERING ASSISTANT — DR. BY F. W. BIG.

APPROVED: [illegible] CHIEF, LOCAL FLOOD PROTECTION BRANCH — TR. BY R.W.J. P.E. — CK. BY J.A.P.

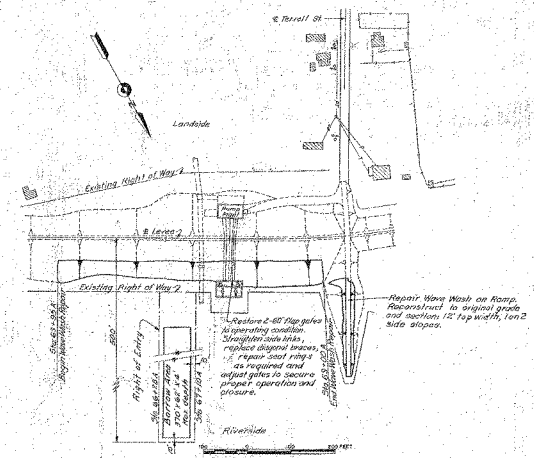
"PROJECT AS BUILT" 934-19.2/10

1150

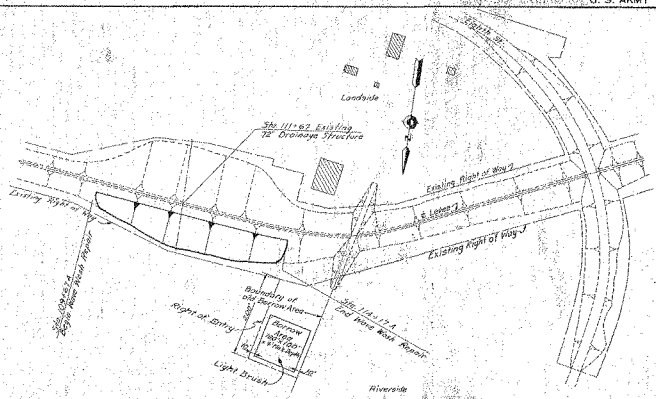
CORPS OF ENGINEERS — U. S. ARMY



CORPS OF ENGINEERS U. S. ARMY



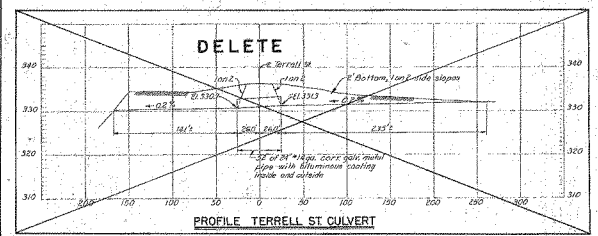
PLAN AT TERRELL ST



PLAN AT EIGHTH ST

TYPICAL SECTION WAVE WASH REPAIR

NO SCALE



PROFILE TERRELL ST CULVERT

BY	DATE	CHARACTER
L.M.S.	16 Jan 61	Deleted Culvert at Terrell St.
L.M.S.	16 Mar 61	Borrow Area at Terrell St. revised
L.M.S.	17 Jan 61	Wave Wash Repair Revised Sta 109+67 to Sta 114+17

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

WAVE WASH REPAIR AND TERRELL ST. CULVERT

SHEETS 2 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1960

SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION

APPROVED: [signature] LEGAL CORPS OF ENGINEERS DISTRICT ENGINEER

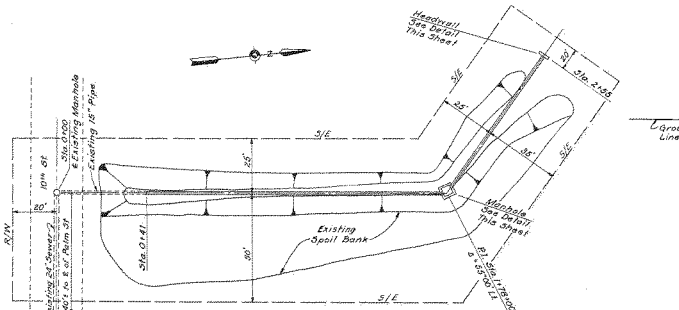
DR. BY L.J.K. TR. BY L.J.K. CK. BY [illegible]

"RECEIVED AS BUILT" 934-19.2/12

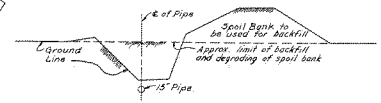
1152

CORPS OF ENGINEERS

U. S. ARMY

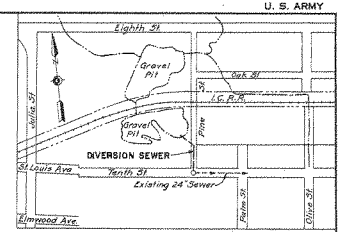


PLAN

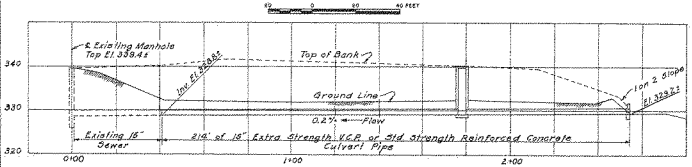


TYPICAL SECTION

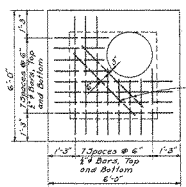
NO SCALE



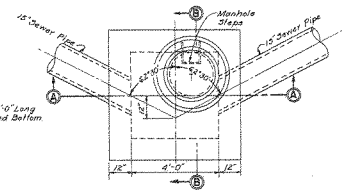
LOCATION PLAN



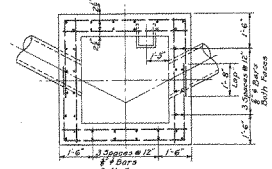
PROFILE



TOP REINFORCING



PLAN

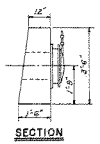


SECTION C-C

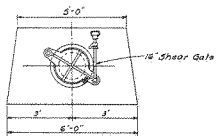
Note: All reinforcing 1/2" ϕ @ 12" c.c. unless otherwise noted.

MANHOLE AT STA. 1+78.00

SCALE: 1/4" = 1'-0"



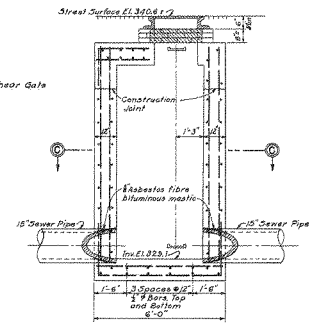
SECTION



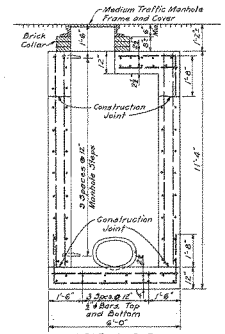
ELEVATION

HEADWALL AT STA. 2+55.00

SCALE: 1/4" = 1'-0"



SECTION A-A



SECTION B-B

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

PINE ST. DIVERSION SEWER

SHEETS 13 OF 18 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1951

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT — APPROVED: CHIEF, CIVIL DESIGN BRANCH

DR. BY H.P.S. — TR. BY H.P.S. — CK. BY L.M.S.

BY	DATE	CHARACTER
L.M.S.	26 Mar 51	R/W changed to S/E

REVISIONS

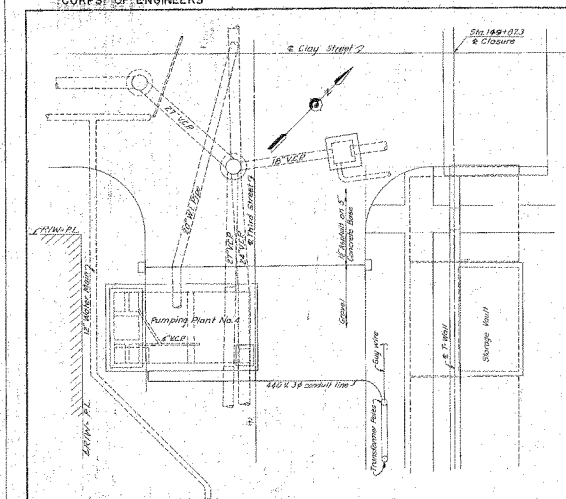
THIS DWG. SUPERSEDES DWG. NO. 934-192/13 DATED DEC. 1950

PREDECESSOR DWG. 934-192/13.1

1153

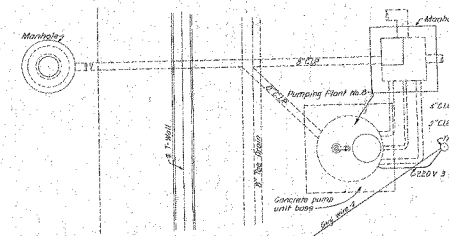
CORPS OF ENGINEERS

U. S. ARMY



PUMPING PLANT NO. 4

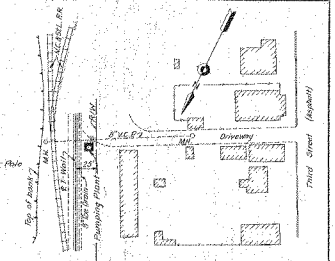
SCALE: ¼" = 1'-0"



PLAN

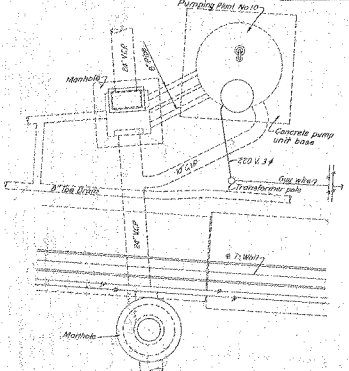
SCALE: ¼" = 1'-0"

PUMPING PLANT NO. 8



LOCATION PLAN

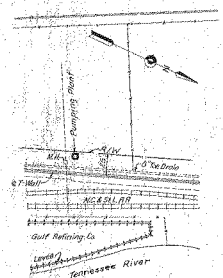
SCALE: 1" = 50'



PLAN

SCALE: ¼" = 1'-0"

PUMPING PLANT NO. 10



LOCATION PLAN

SCALE: 1" = 50'

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

DEHUMIDIFICATION EQUIPMENT

LOCATION PLANS

SHEETS 14 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: [illegible] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEERING ASSISTANT

APPROVED: [illegible] CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY L.C.R. TR. BY L.J.R. CK. BY [illegible]

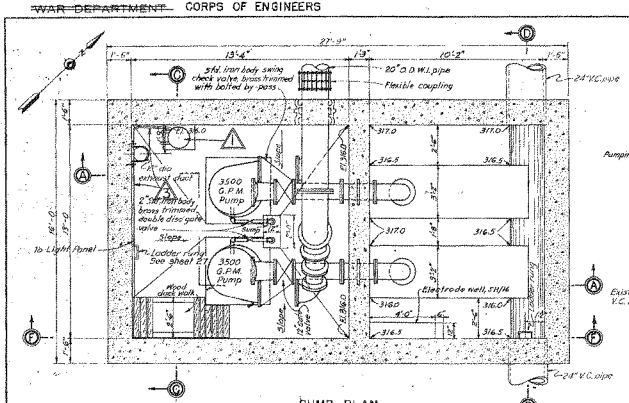
BY	DATE	CHARACTER

REVISIONS

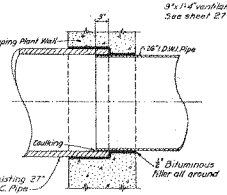
RECEIVED AS BUILT

934-19.2/14

1154

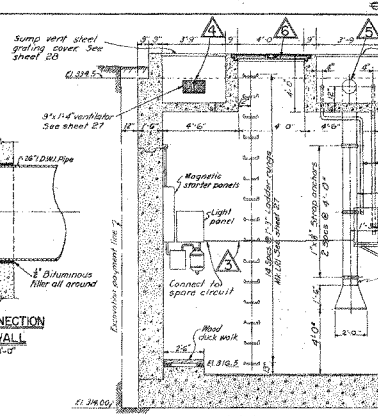


SUMP PLAN

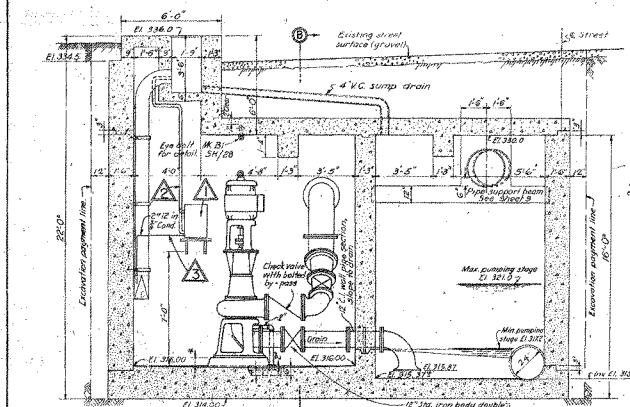


PIPE CONNECTION THRU WALL

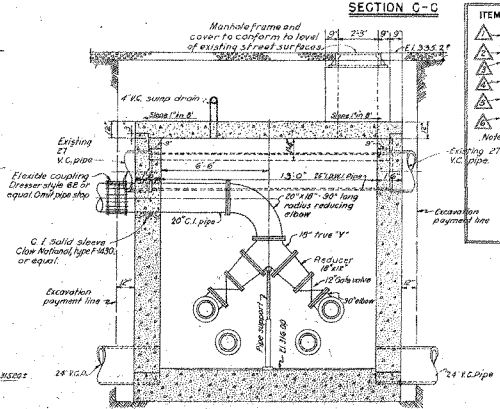
SCALE: 1"=1'-0"



SECTION C-C



SECTION A-A



SECTION B-B

ITEMS OF WORK UNDER SUPPLEMENTAL WORK CONTRACT

1. Furnish and install dehumidification unit, Dasomatic Model SOR-8, 110 V, 60 c., or equal.
2. Furnish and install ventilation air lines.
3. Furnish and install wiring to dehumidification unit.
4. Furnish and install cover for ventilation intake opening. See Detail 1, Dwg. 934-19.2/16
5. Furnish and install cover for ventilation exhaust opening. See Detail 2, Dwg. 934-19.2/16
6. Provide soft neoprene gaskets for 4'-0"x 4'-0" access opening. See Detail 2, Dwg. 934-19.2/16

Note: For Sections D-D, EE, FF and Plan, see Drawing 934-19.2/16

These drawings, except for title and notes regarding dehumidification, reproduced from original drawings for pumping plant construction contract. Exact location of mechanical and electrical equipment may vary slightly from position shown. Exact location to be determined in field.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

(SUPPLEMENTAL WORK)

PUMPING PLANT NO. 4

MASONRY DETAILS

PLAN AND SECTIONS

SHEET 15 OF 101 SHEETS SCALE: ¼"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [signature] CHIEF CONSTRUCTION ASSISTANT

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER, DEPUTY

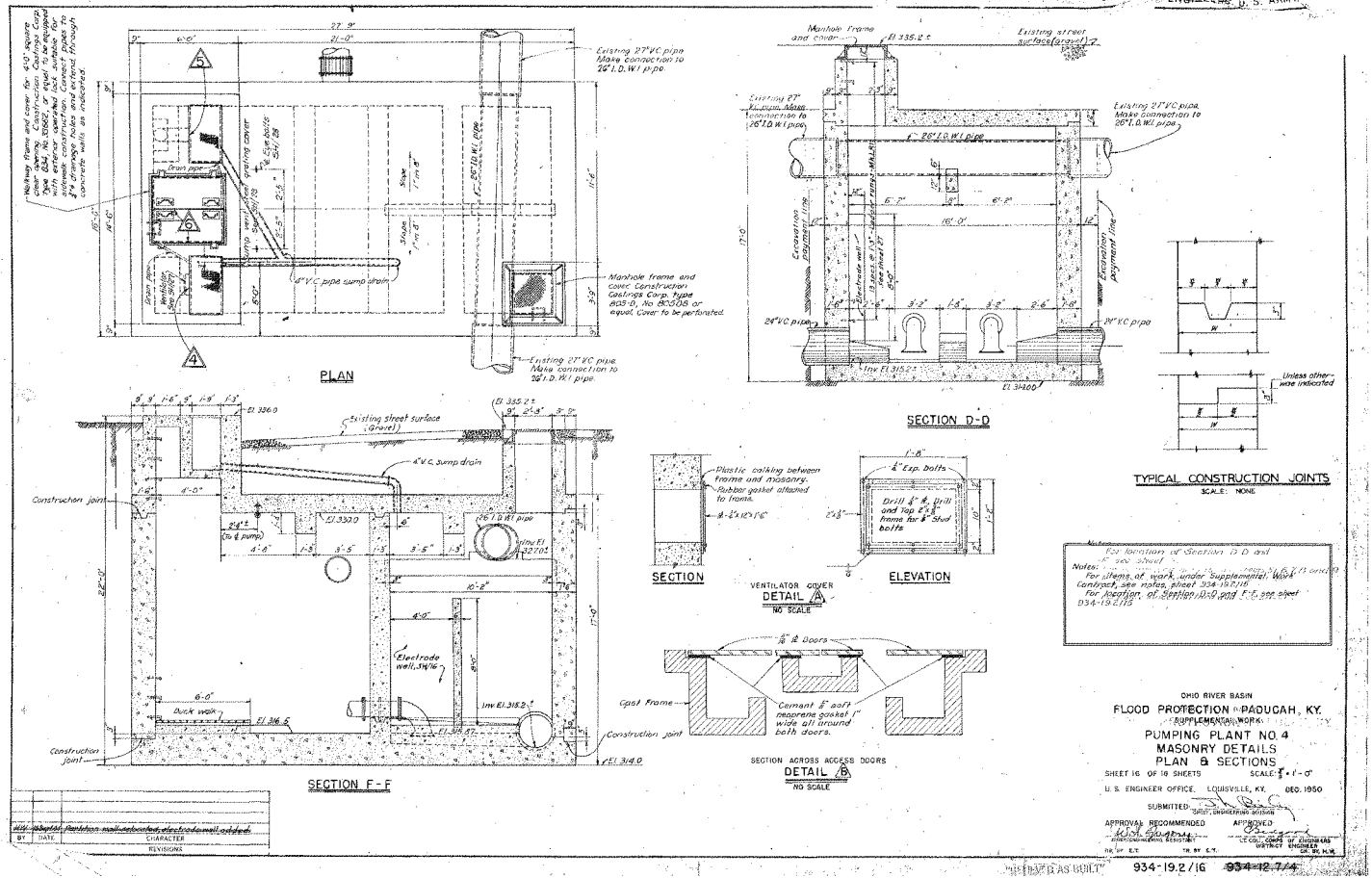
DR. BY E.S. TR. BY E.T.

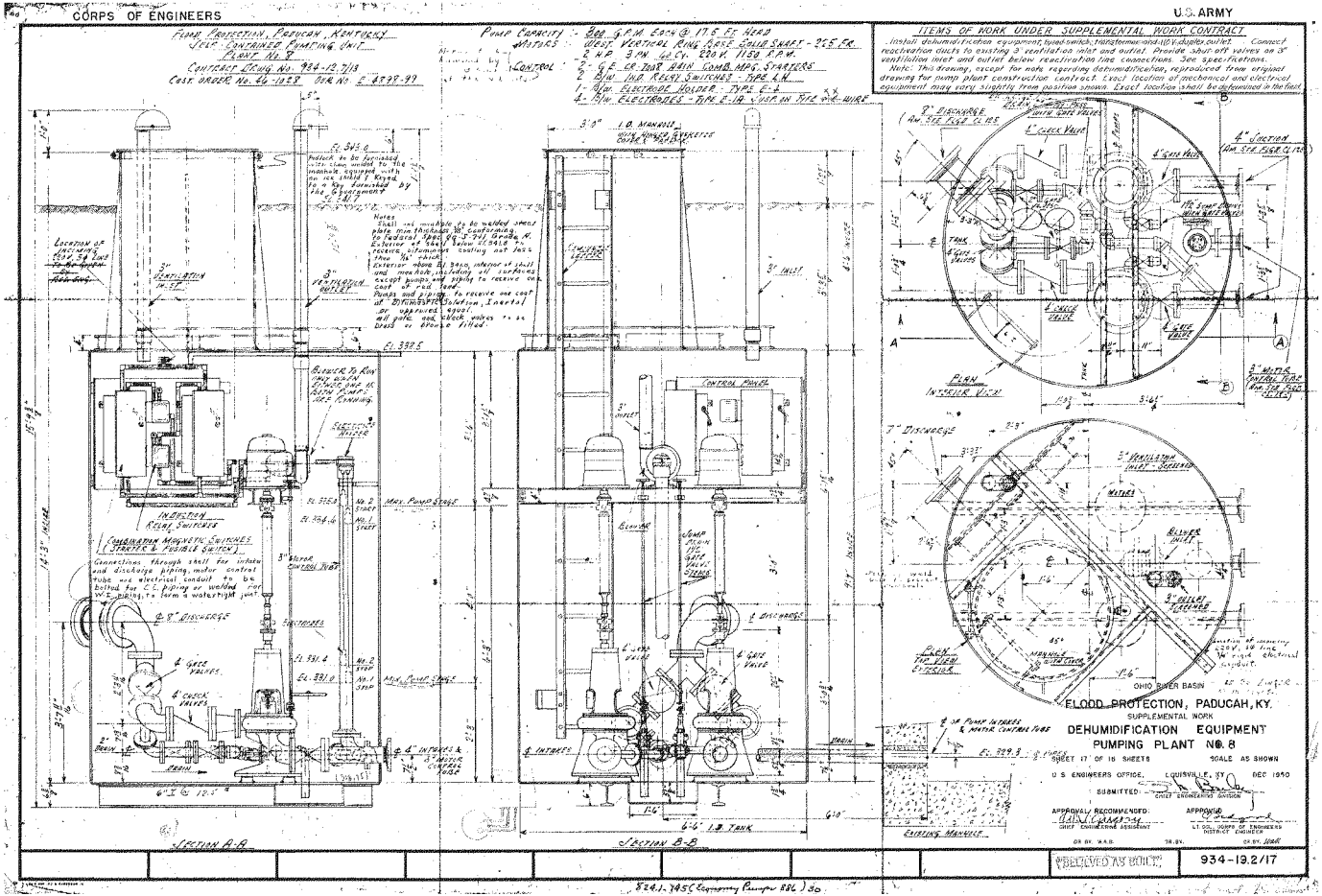
BY	DATE	CHARACTER REVISIONS
		~~Add Key to Electrode well ladder, partition wall and panels relocated~~

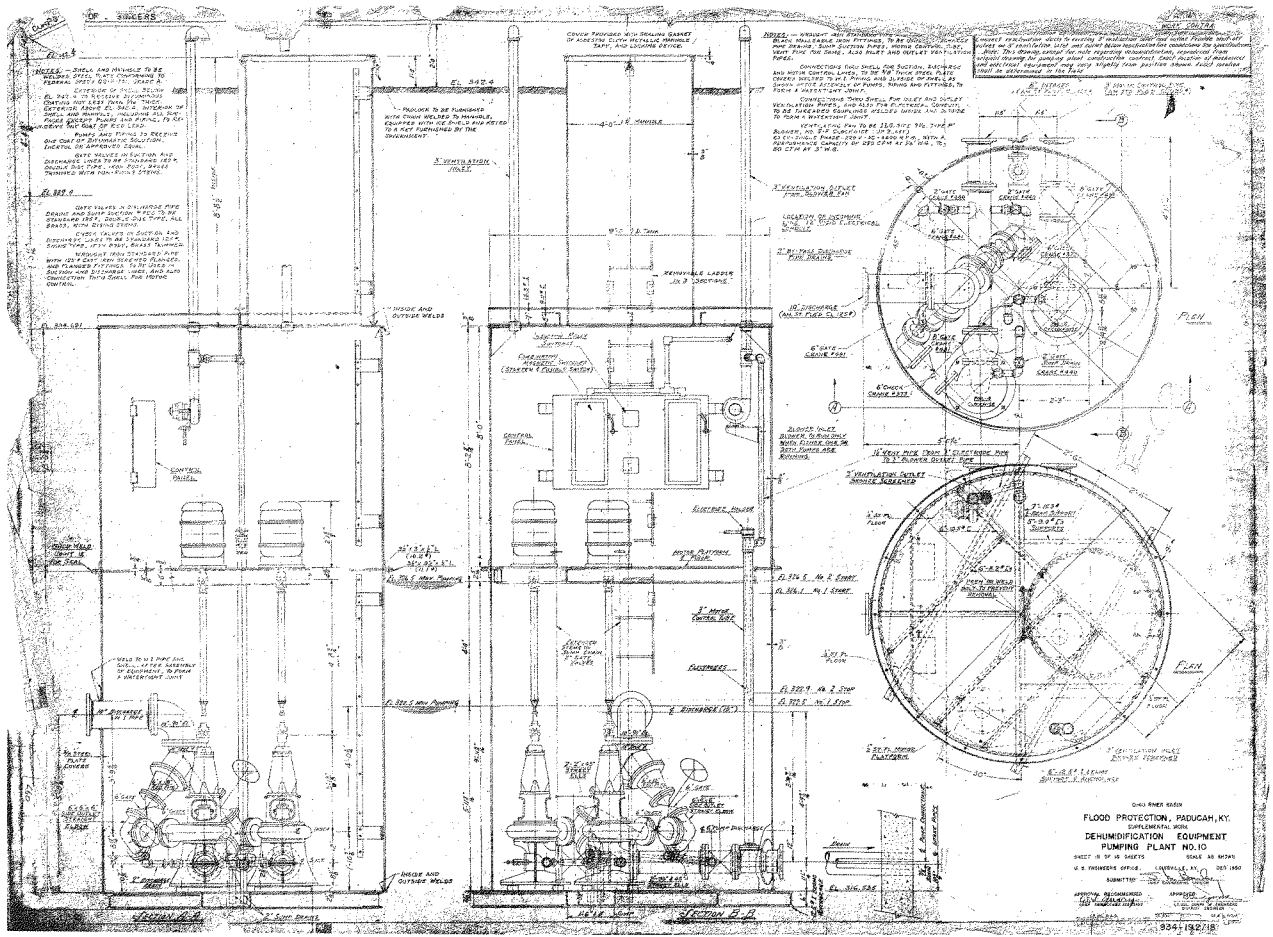
"DELIVERED AS BUILT" 934-19.2/15 ~~934-2.73~~

~~WAR DEPARTMENT~~ CORPS OF ENGINEERS

~~CORPS OF ENGINEERS~~ U. S. ARMY

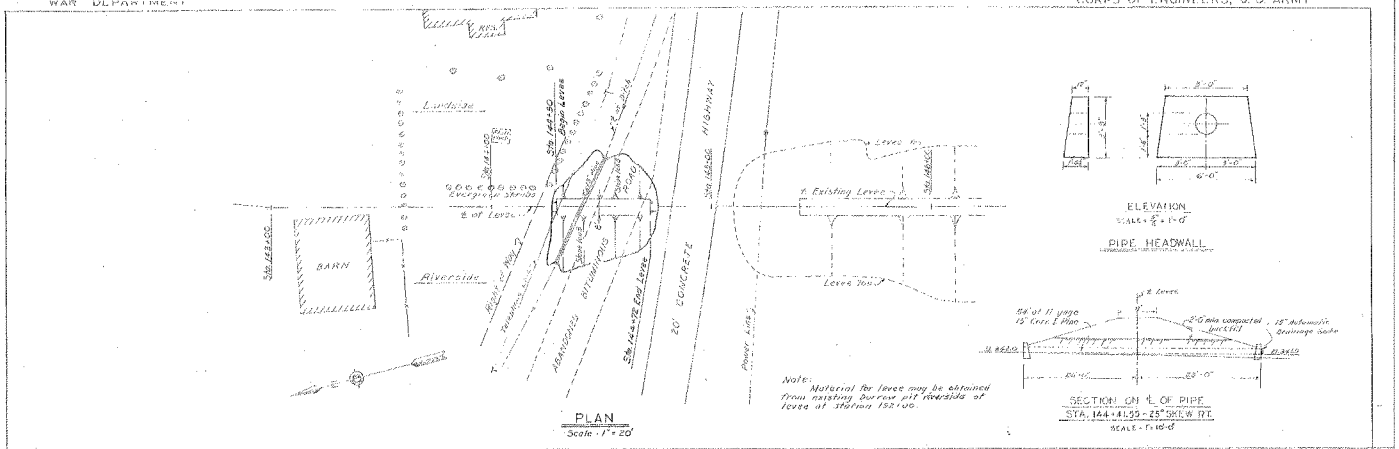


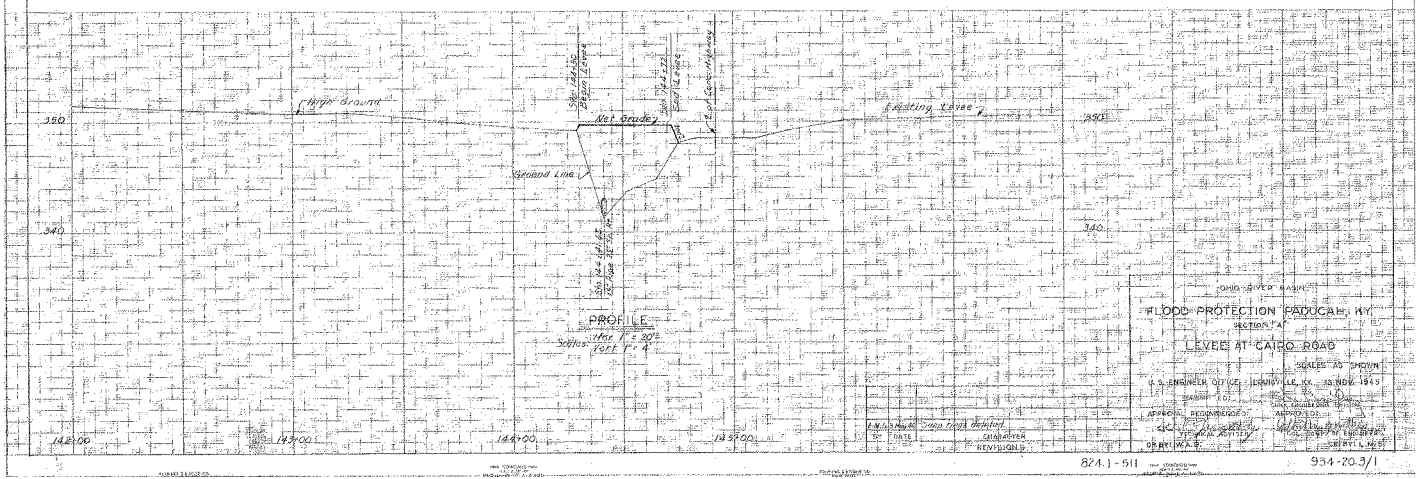

CORPS OF ENGINEERS
U.S. ARMY
FLOOD PROTECTION, PADUCAH, KENTUCKY
USER ENGINEER PUMPING UNIT
PLANT NO. 8
CONTRACT (ENG) NO. 934-12.7/13
COST ORDER No. 46-1058 DER No. E 8237-97
PUMP CAPACITY: 800 G.P.M. EACH @ 17.5 FT. HEAD
MOTORS: WEST VERTICAL RING OILER SOLID SHAFT - 225 FR
2 H.P. 3 PH 60 CY. 220 V. 1150 R.P.M.
CONTROL: 2 - G.E. CR 7002 MAIN COMB. MAG. STARTERS
2 - P.H. THR. RELAY SWITCHES - TYPE K.N.
1 - P.H. ELECTRODE HOLDER - TYPE E-1
4 - P.H. ELECTRODES - TYPE E-14 EXCEPT IN PIPE AND WIRE
ITEMS OF WORK UNDER SUPPLEMENTAL WORK CONTRACT
Install dehumidification equipment, two switch, transformer and 110 V. duplex outlet. Connect reactivation ducts to existing 3" ventilation inlet and outlet. Provide shut-off valves on 3" ventilation inlet and outlet below reactivation line connections. See specifications.
Note: This drawing, except for note regarding dehumidification, reproduced from original drawing for pump plant construction contract. Exact location of mechanical and electrical equipment may vary slightly from position shown. Exact location shall be determined in the field.
Notes
Shell and manhole to be welded steel plate from thickness 3/8" continuous to Federal Spec. QQ-S-741 Grade A. Exterior of shell below el. 340.0 to receive bituminous coating not less than 1/16" thick. Exterior above El. 340.0, interior of shell and manhole, including all surfaces except pumps and piping to receive one coat of red lead.
Pumps and piping to receive one coat of "DIMETHYPTE Solution, Inertol 30" approved equal.
All gate and check valves to be brass or bronze fitted.
Manhole Cover
Location of Anchorage
3" Ventilation Inlet
3" Ventilation Outlet
Inlet
Control Valve
Relay Switches
Combination Magnetic Switches (Starter & Fusible Switch)
Connections through shell for intake and discharge piping, motor control tube and electrical conduit to be bolted for C.I. piping or welded for W.I. piping to form a watertight joint
Max. Pump Stage
Electrodes
Gate Valves
Check Valves
Intakes
Drain
Section A-A
Section B-B
I.D. Tank
Plan Interior View
Plan Top Floor Exterior
Existing Manhole
Pump Plant Intake & Water Control Tube
Existing Ground
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
DEHUMIDIFICATION EQUIPMENT
PUMPING PLANT NO. 8
SHEET 17 OF 18 SHEETS
SCALE AS SHOWN
U.S. ENGINEERS OFFICE, LOUISVILLE, KY. DEC 1950
SUBMITTED:
CHIEF ENGINEERING DIVISION
APPROVAL RECOMMENDED:
CHIEF ENGINEERING ASSISTANT
APPROVED:
LT. COL. CORPS OF ENGINEERS
DISTRICT ENGINEER
RECEIVED AS BUILT
934-13.2/17

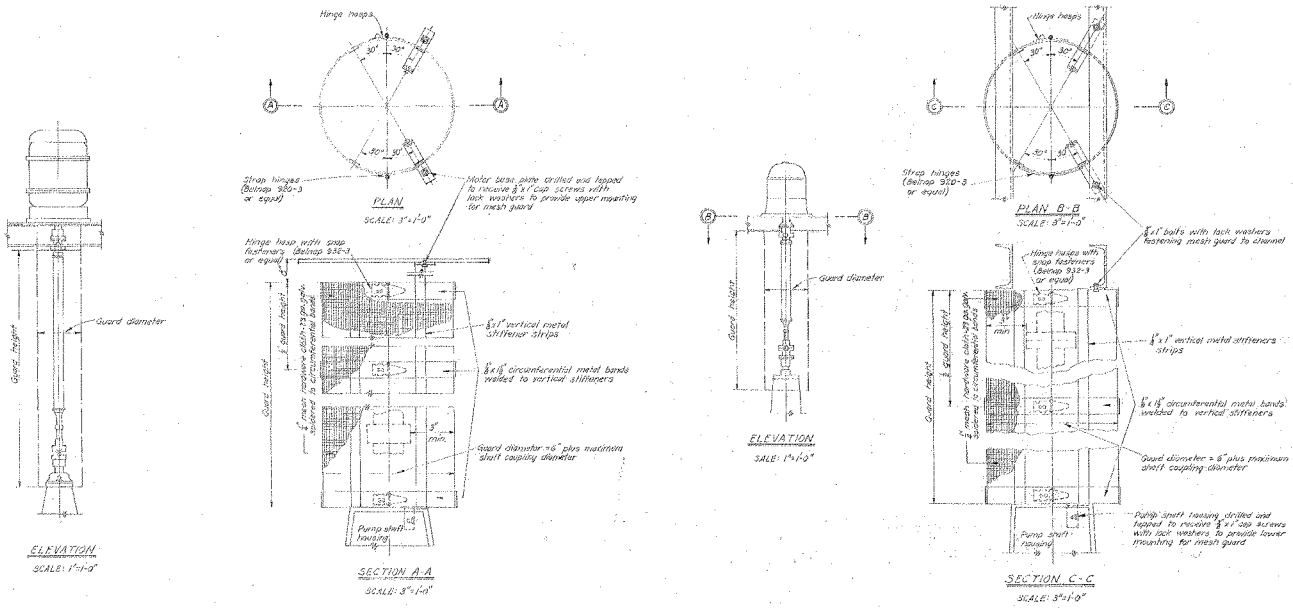

FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
DEHUMIDIFICATION EQUIPMENT
PUMPING PLANT NO. 10
OHIO RIVER BASIN
U. S. ENGINEER'S OFFICE, LOUISVILLE, KY.
934-1-12718
PLAN
SECTION A-A
SECTION B-B

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY







Note:
1. Installation of open shaft guard shall in no way interfere with the normal and safe operation of the pumping unit
2. Material for bands & straps shall be structural steel.
3. Cap screws shall be brass.
4. Paint all parts in conformance with specifications

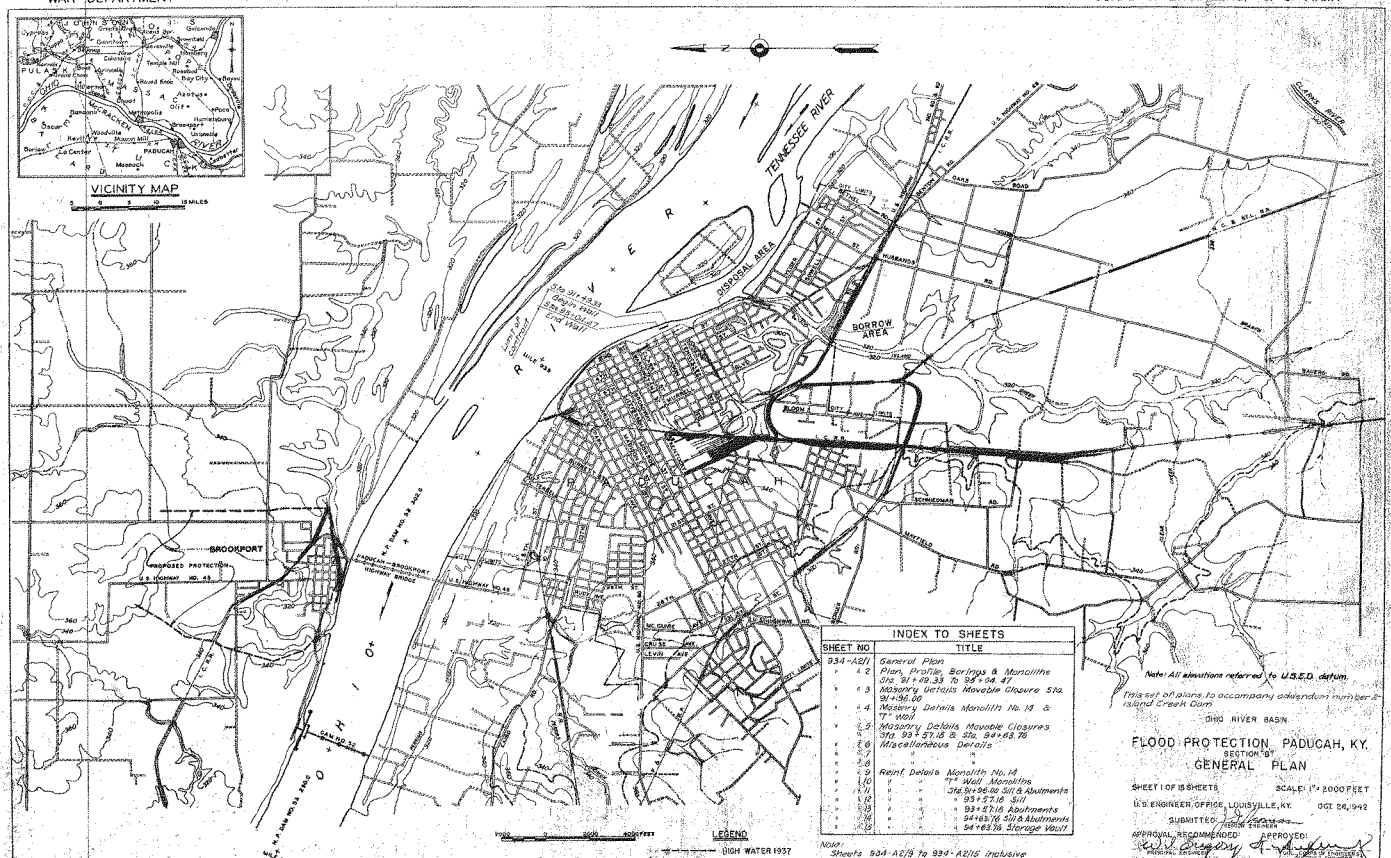
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 8 & 10
WIRE GUARD FOR PUMP SHAFTS

SHEET 1 OF 1 SHEET SCALED AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS
WAR DEPARTMENT LOUISVILLE, KY. JULY 1947
DR. BY TR. BY E.E. CK. BY

"RELIEVED AS BUILT" 934-20.4/1

WAR DEPARTMENT

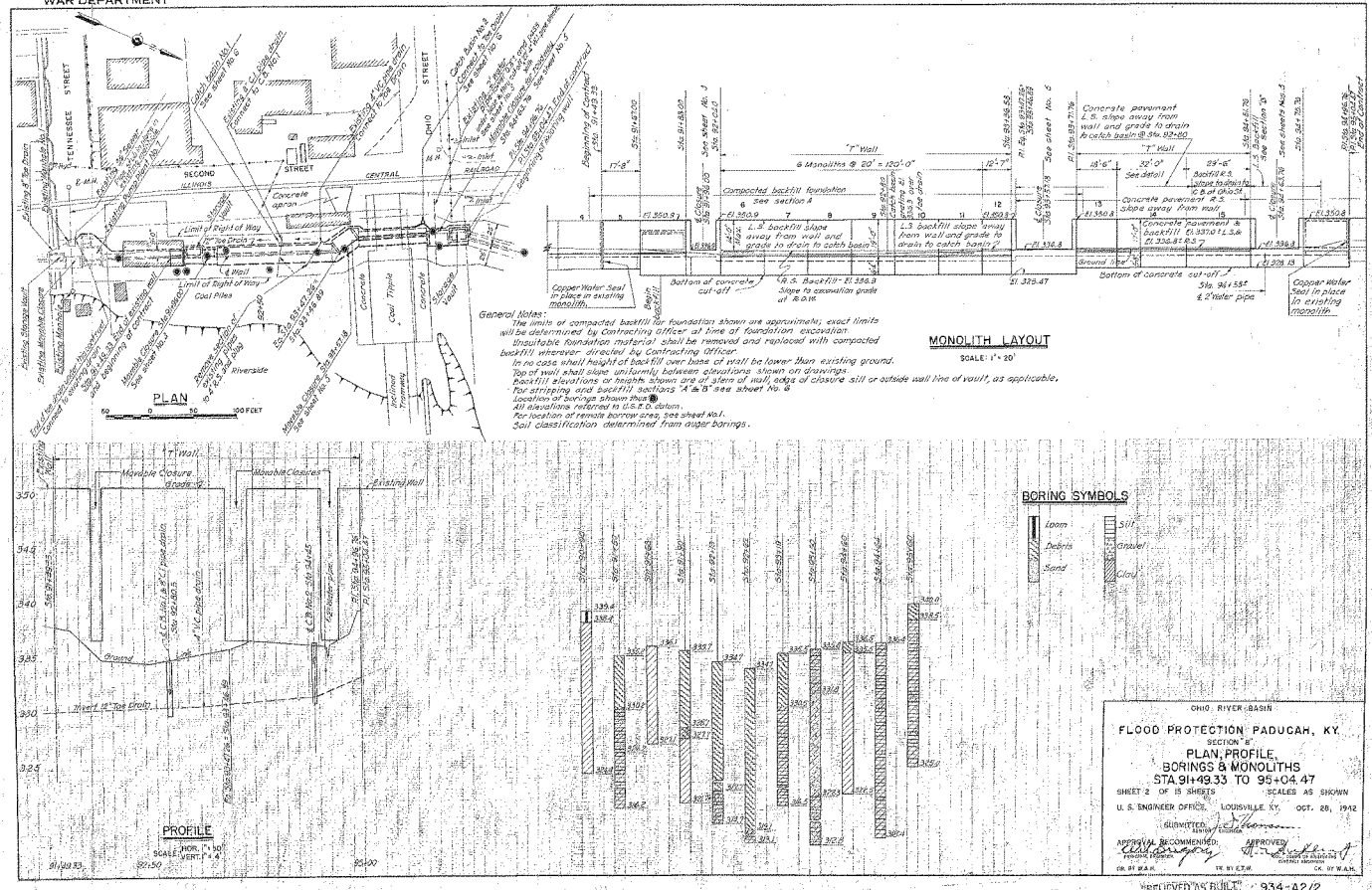
CORPS OF ENGINEERS, U. S. ARMY



934-A2/1

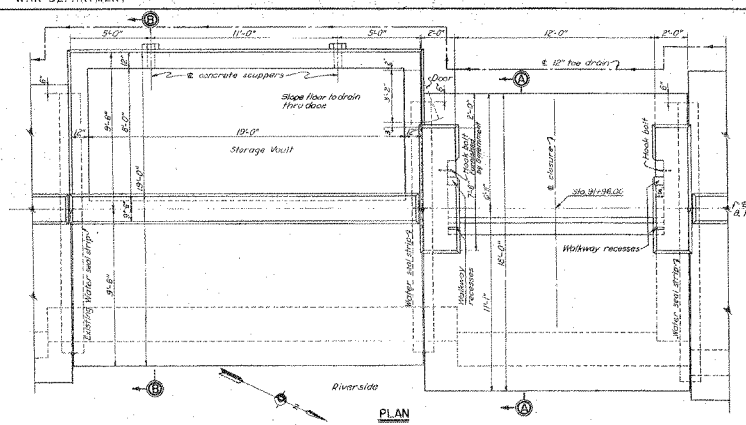
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

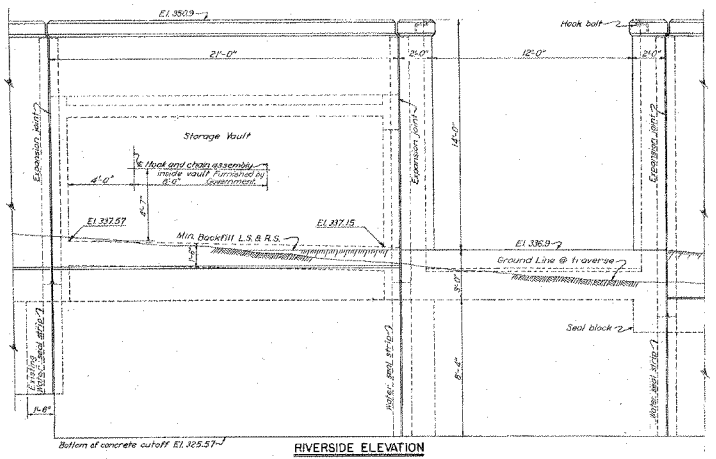


WAR DEPARTMENT

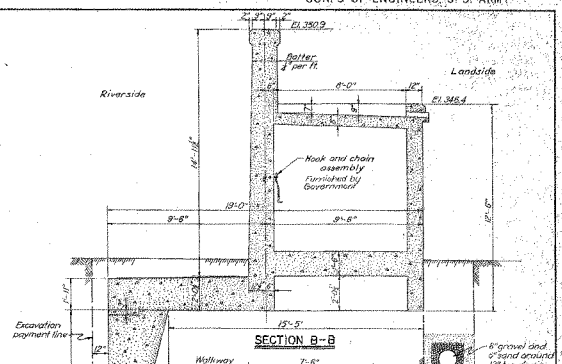
CORPS OF ENGINEERS, U. S. ARMY



PLAN



RIVERSIDE ELEVATION



This set of plans to accompany addendum number 2 - Island Creek Dam

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE: STA. 91+96.00

SHEET 3 OF 15 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. OCTOBER 28, 1942

SUBMITTED: MAJOR ENGINEER

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER

APPROVED: CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY W.A.K. TR. BY E.T.W. CK. BY J.H.B.

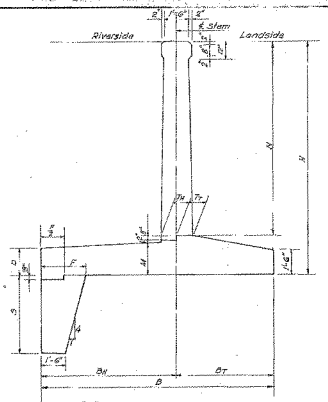
BY	DATE	CHARACTER
		REVISIONS

"RELEASED AS BUILT" 934-A2/3

1163

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

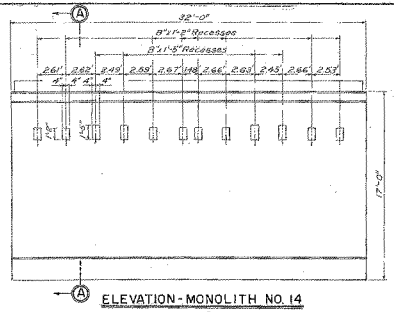


"T" WALL TYPICAL SECTION

NO SCALE

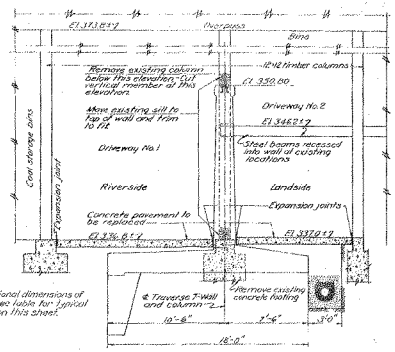
DIMENSIONS FOR MASONRY DETAILS										
With concrete cotoff L = 20' except as noted	H	B	Bu	Br	N	M	Tu-Tr	D	F	S
5-11 Incl, 13-18 & 21-25 & 28	17'-0"	18'-0"	10'-6"	7'-6"	14'-6"	2'-0"	12"	1'-11"	2'-11"	3'-0"
6-11 Incl, 12 + 19-27 Inclusive	19'-0"	20'-0"	11'-9"	8'-4"	16'-10"	2'-9"	12"	2'-1"	3'-1"	6'-4"

L = Length of monolith



ELEVATION - MONOLITH NO. 14

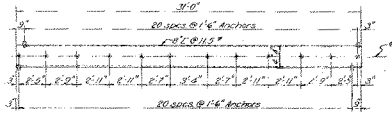
SCALE: $\frac{1}{8}$" = 1'-0"



SECTION A-A

SCALE: $\frac{1}{8}$" = 1'-0"

Note: For additional dimensions of 17'-0" T-Wall see table for typical wall section on this sheet.

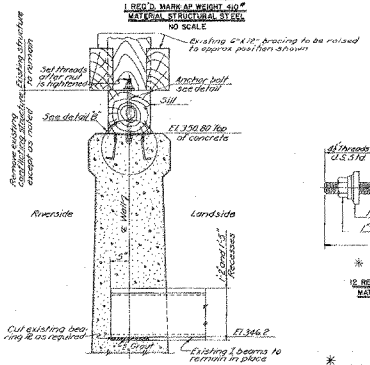


* ANCHOR PLATE

1 REQ'D. MARK AP WEIGHT 410#

MATERIAL STRUCTURAL STEEL

NO SCALE

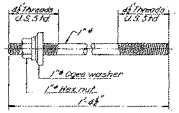


SECTION THRU WALL

SHOWING SILL ANCHORAGE AND BEAM RECESSES

REINFORCING BARS NOT SHOWN

SCALE: 1" = 1'-0"



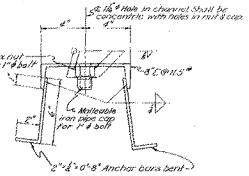
* ANCHOR BOLT

12 REQ'D. MARK AB-1 WT. 6.48# EACH

MATERIAL STRUCTURAL STEEL

SCALE: 3" = 1'-0"

* To be furnished by Government and installed by contractor.



DETAIL "B"

SCALE: 3" = 1'-0"

This set of plans to accompany addendum number 2 - Island Creek Dam

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MONOLITH NO. 14 B "T" WALL

SHEET 4 OF 15 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE LOUISVILLE, KY. OCT. 28, 1942

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION

APPROVED: [signature] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY K.H.A. TR. BY E.V. CK. BY JHR

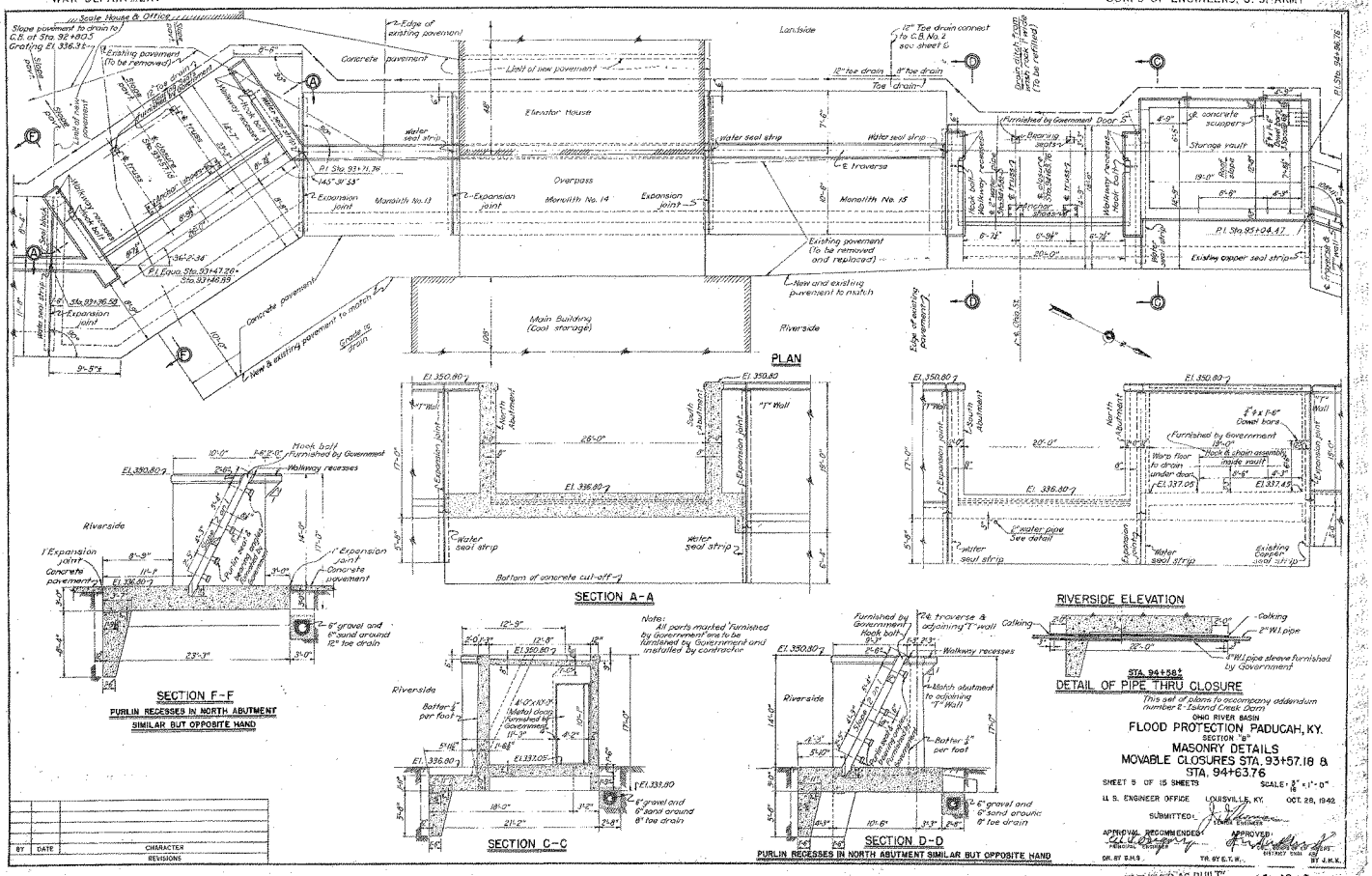
"RELIEVED AS BUILT"

934-A2/4

BY	DATE	CHARACTER REVISIONS

WAR DEPARTMENT

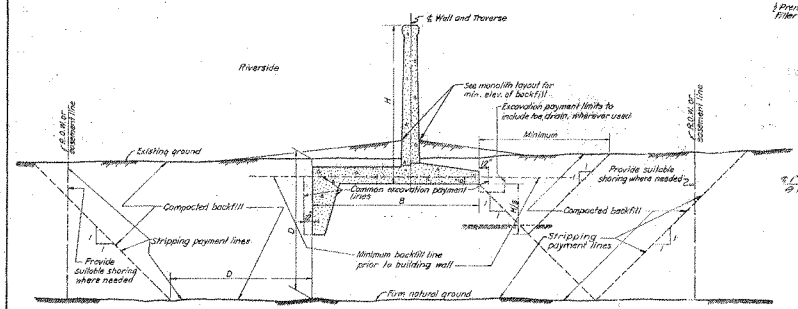
CORPS OF ENGINEERS, U. S. ARMY



"BELIEVED AS BUILT"

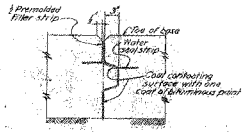
954-A2/5

1165

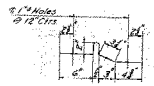


Note: Extend lon! slope of compacted backfill to existing ground where width of R.O.W. or easement permits.

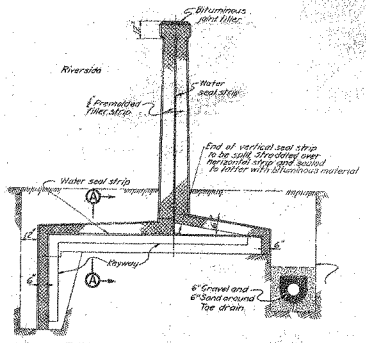
SECTION "A"
SCALE: 1/8" = 1'-0"



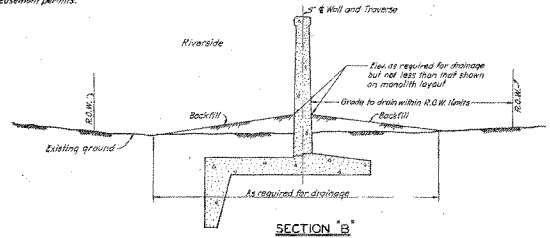
SECTION A-A
NOT TO SCALE



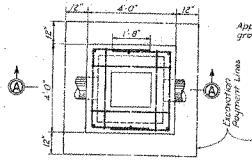
WATER SEAL STRIP
SCALE: 1/2" = 1'-0"



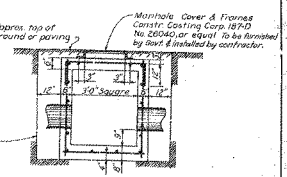
TYPICAL T-WALL EXPANSION JOINT
FOR CONCRETE CUT-OFF



SECTION "B"
SCALE: 1/8" = 1'-0"



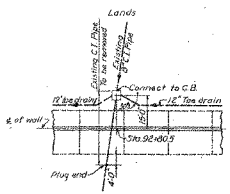
TYPICAL PLAN



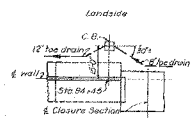
SECTION A-A

TYPICAL CATCH BASIN
SCALE: 1/2" = 1'-0"

CATCH BASIN SCHEDULE								
NO.	STATION	CONNECTIONS	ELEV. INVERT	APPROX. EL TOP GROUND	REINFORCING ⅝" ϕ LIN. FT.	LBS.		LOCATION PLAN SHEET NO.
1	92+80.5	6" C.I. pipe 2-12" pipes	332.0 330.7	334.8	163	109		This
2	94+45	12" pipe 8" pipe	334.7 334.7	336.5	151	101		This



LOCATION PLAN
CATCH BASIN NO. 1
SCALE: 1" = 20'



LOCATION PLAN
CATCH BASIN NO. 2
SCALE: 1" = 20'

This set of plans to accompany addendum No. 2 - Island Creek Dam.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

MISCELLANEOUS DETAILS

SHEET 6 OF 15 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1942

SUBMITTED: [signature] CHIEF ENGINEER

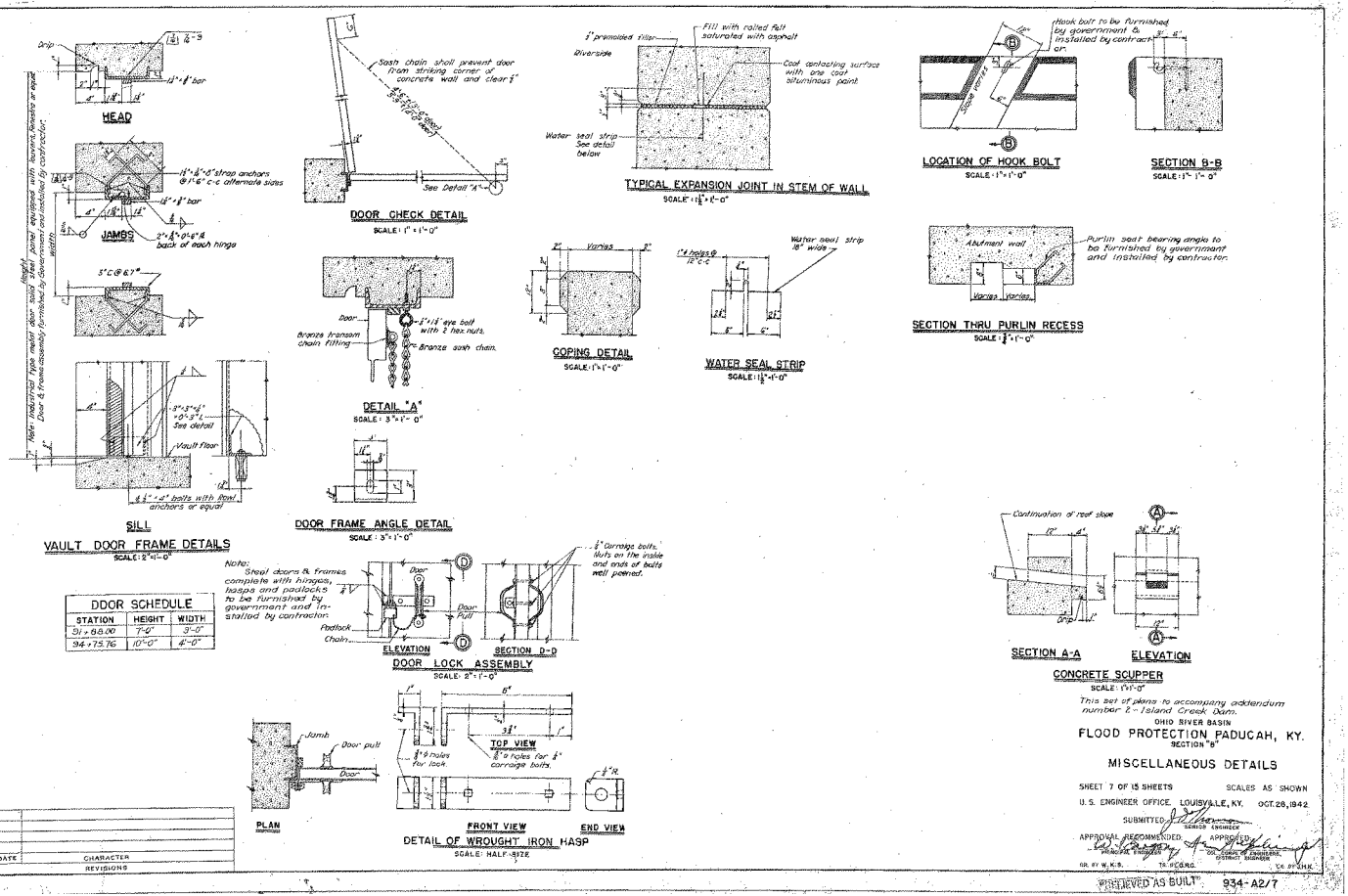
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER

APPROVED: [signature] COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY R.G.R. TR. BY A.J.Z. CK. BY J.N.K.

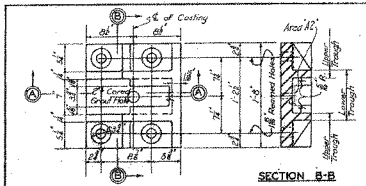
BY	DATE	CHARACTER REVISIONS

RELIEVED AS BUILT 934-A276

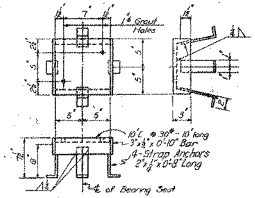

HEAD
JAMBS
SILL
VAULT DOOR FRAME DETAILS
SCALE: 2"=1'-0"
Note: Industrial type metal door sills, steel jones equipped with louvers, flashing or equal
Door & frame assembly furnished by government and installed by contractor.
Vault Floor
Sash chain shall prevent door from striking corner of concrete wall and clear 3/4"
See Detail "A"
DOOR CHECK DETAIL
SCALE: 1" = 1'-0"
Bronze transom chain fitting
Bronze sash chain.
DETAIL "A"
SCALE: 3"=1'-0"
DOOR FRAME ANGLE DETAIL
SCALE: 3"=1'-0"
3/4" premolded filler
Fill with rolled felt saturated with asphalt
Riverside
Coal coatcating surface with one coat bituminous paint
Water seal strip See detail below
TYPICAL EXPANSION JOINT IN STEM OF WALL
SCALE: 1 1/2"=1'-0"
COPING DETAIL
SCALE: 1"=1'-0"
WATER SEAL STRIP
SCALE: 1 1/2"=1'-0"
Hook bolt to be furnished by government & installed by contractor.
LOCATION OF HOOK BOLT
SCALE: 1"=1'-0"
SECTION B-B
SCALE: 1"=1'-0"
Abutment wall
Purlin seat bearing angle to be furnished by government and installed by contractor.
SECTION THRU PURLIN RECESS
SCALE: 3/4"=1'-0"
Continuation of roof slope
SECTION A-A
ELEVATION
CONCRETE SCUPPER
SCALE: 1"=1'-0"
Note: Steel doors & frames complete with hinges, hasps and padlocks to be furnished by government and installed by contractor.
DOOR SCHEDULE
STATION | HEIGHT | WIDTH
91+88.00 | 7'-0" | 3'-0"
94+75.76 | 10'-0" | 4'-0"
Door pull
Padlock
Chain
3/4" carriage bolts. Nuts on the inside and ends of bolts well peened.
ELEVATION
SECTION D-D
DOOR LOCK ASSEMBLY
SCALE: 2"=1'-0"
Jamb
Door pull
Door
PLAN
TOP VIEW
3/4" ø holes for 3/4" carriage bolts.
3/4" ø holes for lock.
FRONT VIEW
END VIEW
DETAIL OF WROUGHT IRON HASP
SCALE: HALF SIZE
BY | DATE | CHARACTER
REVISIONS
This set of plans to accompany addendum number 2 - Island Creek Dam.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MISCELLANEOUS DETAILS
SHEET 7 OF 15 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1942
SUBMITTED
SENIOR ENGINEER
APPROVAL RECOMMENDED
CHIEF, CIVIL ENGINEERING
APPROVED
COL. CORPS OF ENGINEERS
DISTRICT ENGINEER
GR. BY W.K.B.
TR. BY C.R.G.
CK. BY J.H.K.
"RETRACED AS BUILT"
934-A2/7

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

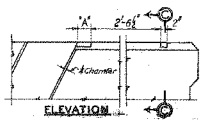


SECTION B-B

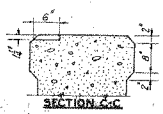


EMBEDDED BEARING SEAT

SCALE 1½" = 1'-0"

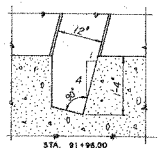


ELEVATION

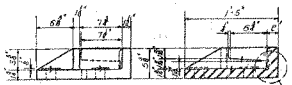


SECTION C-C

WALKWAY RECESS DIMENSIONS	
STATION	"A"
91+96.00	6"
93+57.18	3½"
94+63.76	3½"



STA. 91+96.00

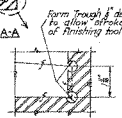


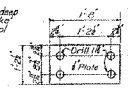
SECTION A-A

ANCHOR SHOE

SCALE 1½" = 1'-0"

Note: Anchor shoes & truss shoes not included in this contract. Details are shown only for locating anchor bolts.

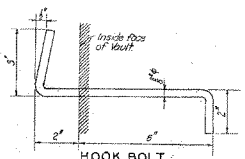




ANCHOR PLATE

SCALE: 1" = 1'-0"

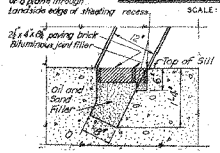
Note: Embedded Bearing Seats & Anchor Plates to be furnished by government & installed by contractor.



HOOK BOLT

SCALE 6" = 1'-0"

Note: These points shall not extend flirewards of a plane through landside edge of sheeting recess.



DETAIL OF SHEETING RECESS

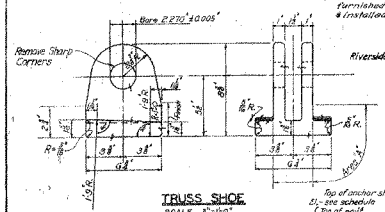
SCALE: 1" = 1'-0"

ANCHORAGE SCHEDULE				
STATION	MENSR BLOCK SIZES	A	B	ELEV. TOP OF B. SEAT & TOP OF ANCHOR BLOCK
93+57.18	2	1'-4½"	6'-2"	436.80
94+63.76	2	1'-4½"	6'-9"	436.30

DETAIL OF SHEETING RECESS AND SEAL TRENCH FILLER

SCALE: 1" = 1'-0"

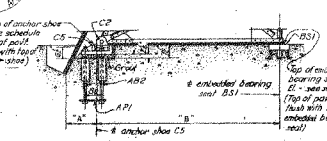
STA. 93+57.18 & 94+63.76



TRUSS SHOE

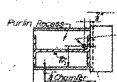
SCALE 3" = 1'-0"

CHAIN SCHEDULE			
STATION	NO. REQ'D	LENGTH	APPROX. WT. LBS.
91+67.00	2	1'-4"	62
94+76.76	2	6'-0"	246



TRUSS & ANCHOR ASSEMBLY

SCALE: ½" = 1'-0"

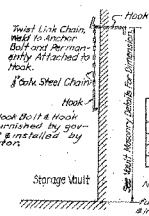


DETAIL OF PIPE INSERT

MARK P1 8 REQ'D. WT. 0.45 EACH

MATERIAL - GALVANIZED STEEL

SCALE: 1½" = 1'-0"



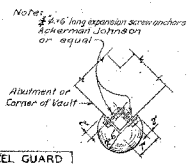
Note: Chain, Hook Bolt & Hook to be furnished by government & installed by contractor.

SHEETING CHAIN ASSEMBLY

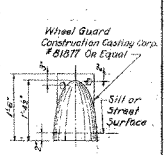
SCALE: ½" = 1'-0"

WHEEL GUARD SCHEDULE	
STATION	NO. REQ'D
91+96.00	4
93+57.18	4
94+63.76	4

Note: Wheelguard to be furnished by government & installed by contractor. Anchor bolts to be furnished and installed by contractor.



PLAN



ELEVATION

WHEEL GUARD DETAILS

SCALE: 1" = 1'-0"

Note: This set of plans to accompany addendum number 2, Island Creek Dam.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS DETAILS

SHEET 8 OF 5 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1942

SUBMITTED: [signature] — JUNIOR ENGINEER

APPROVAL RECOMMENDED: [signature] — PRINCIPAL ENGINEER

APPROVED: [signature] — CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY W.L.B. TR. BY H.W.S. CK. BY J.H.K.

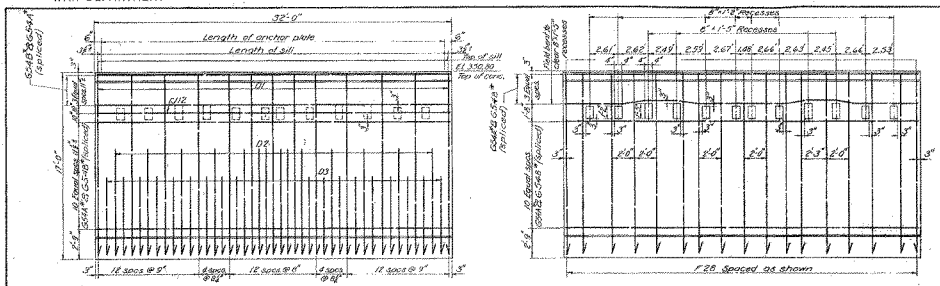
BY	DATE	CHARACTER REVISIONS

"BELIEVED AS BUILT" 934-A2/8

1168

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

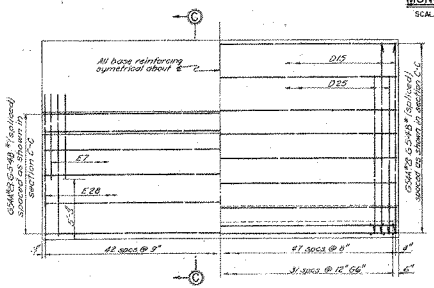


RIVERSIDE STEM REINFORCING

LANDSIDE STEM REINFORCING

MONOLITH NO. 14

SCALE: 1/4" = 1'-0"

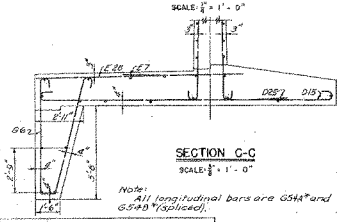


TOP REINFORCING

BOTTOM REINFORCING

PLAN

SCALE: 1/8" = 1'-0"



SECTION C-C

SCALE: 1/8" = 1'-0"

Note:
All longitudinal bars are G54A* and G54B* (spliced).

Notes:
For masonry details see sheet 4
Addendum No. 2
*= Bars to be furnished by government and installed by contractor.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS

MONOLITH NO. 14

SHEET 9 OF 15 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1942

SUBMITTED: [illegible]

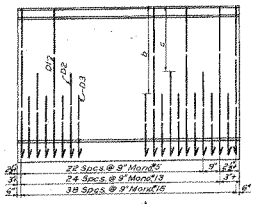
APPROVAL RECOMMENDED: [illegible] PROJECT ENGINEER — APPROVED: [illegible] DIST. ENGINEER, U.S. CORPS OF ENGINEERS

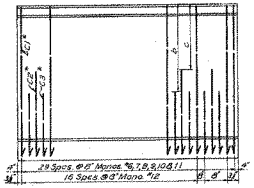
DR. BY K.H.A. TR. BY A.J.Z. CK. BY J.H.K.

"RETRIEVED AS BUILT" 934-A2/9

WAR DEPARTMENT

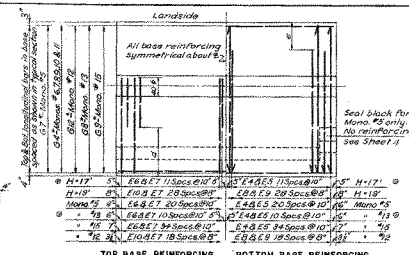
CORPS OF ENGINEERS, U. S. ARMY

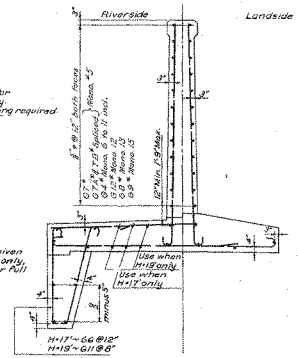




RIVERSIDE STEM REINFORCING

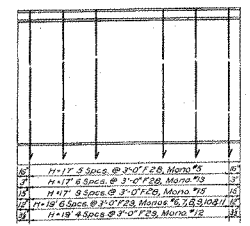
NO SCALE





"T" WALL TYPICAL SECTION

NO SCALE

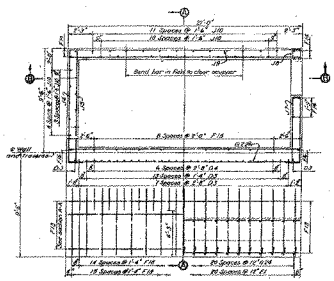


H=17 & H=19'

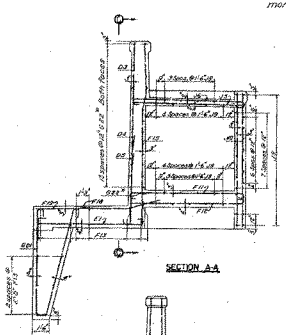
LANDSIDE STEM REINFORCING

NO SCALE

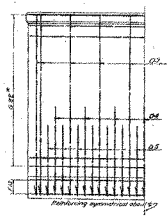
REINFORCING STEEL CUT-OFF DIMENSIONS				
H'	b	c	d'	a
17'	9'-6"	7'-0"	4'-9"	3'-4"
19'	11'-2"	8'-4"	5'-9"	2'-10"



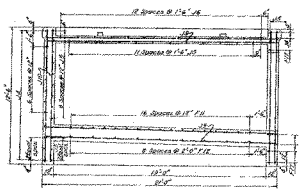
PLAN



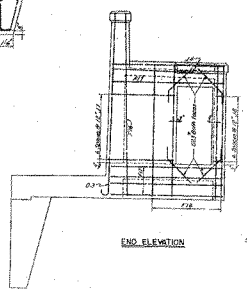
SECTION A-A



HALF SECTION C-C



SECTION B-B



END ELEVATION

STORAGE VAULT

ST. 91+96.00

SCALE: 1/4" = 1'-0"

Notes:
For masonry details see sheets 3 & 4, Addendum No. 2
* Bars to be furnished by Government and installed by contractor.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS

"T" WALL MONOLITHS

SHEET 10 OF 15 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1942

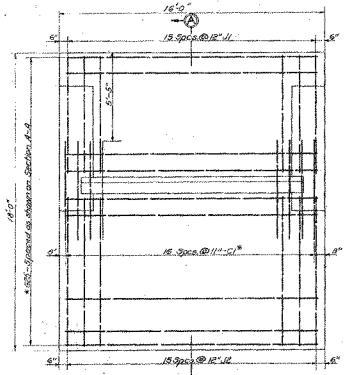
SUBMITTED: [signature] (Assist. Engineer)

APPROVAL RECOMMENDED: [signature] (Assist. Engineer) — APPROVED: [signature] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

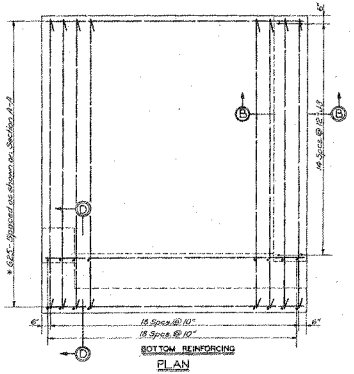
DR. BY K.H.A. — TR. BY E.F.S. — CK. BY J.H.K.

"RELIEVED AS BUILT" 934-A2/10

372

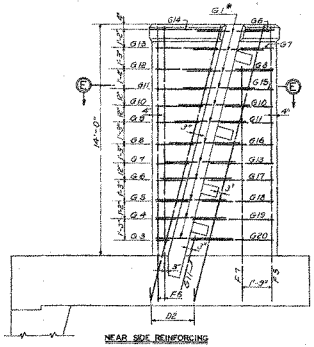


TOP REINFORCING

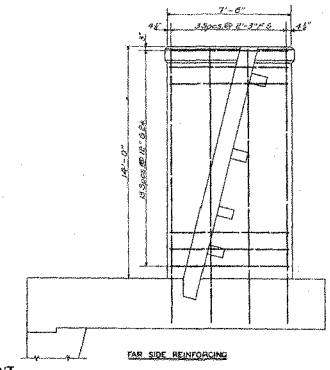


BOTTOM REINFORCING

PLAN



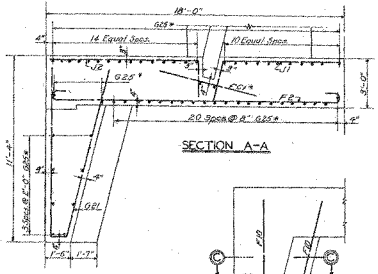
NEAR SIDE REINFORCING



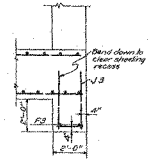
FAR SIDE REINFORCING

SOUTH ABUTMENT

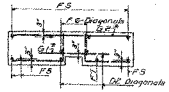
NORTH ABUTMENT—OPPOSITE HAND



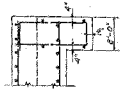
SECTION A-A



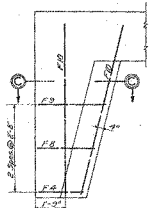
SECTION B-B



SECTION E-E



SECTION C-C



SECTION D-D

Note:
For masonry details see addendum No. 2 sheet 3
* = Bars to be furnished by Govt. and installed by contractor.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

REINFORCING DETAILS STA. 91+96.00

SILL & ABUTMENTS

SHEET 11 OF 15 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1942

SUBMITTED: [illegible] SENIOR ENGINEER

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEER DIV. APPROVED: [illegible] SEC. ENGR. OF ENGINEER DISTRICT

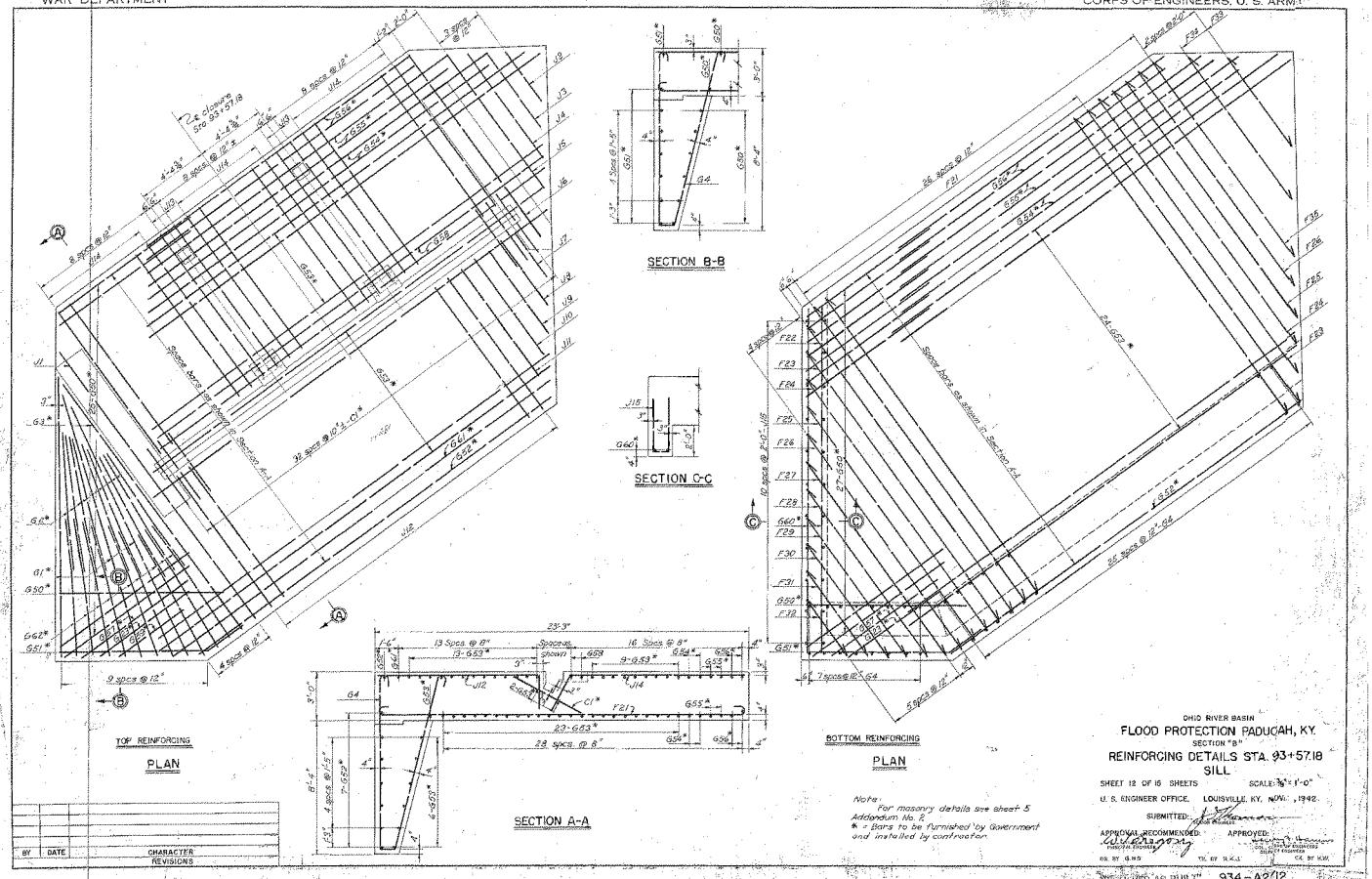
DR. BY C.G.R. TR. BY W.R.M. CK. BY J.H.K.

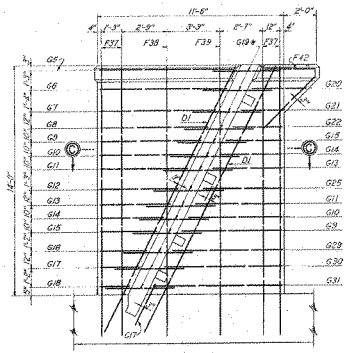
BY	DATE	CHARACTER REVISIONS

"AS BUILT" 934-AL/11

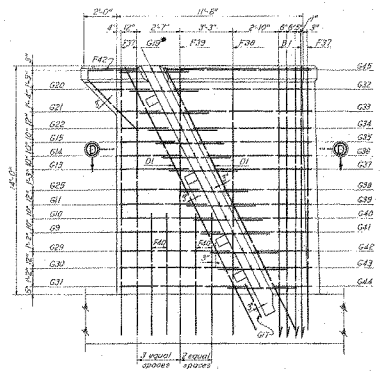
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

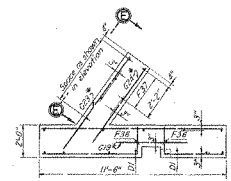




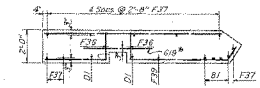
NEAR SIDE REINFORCING



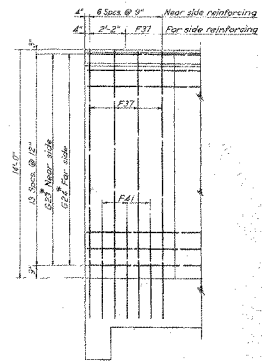
NEAR SIDE REINFORCING



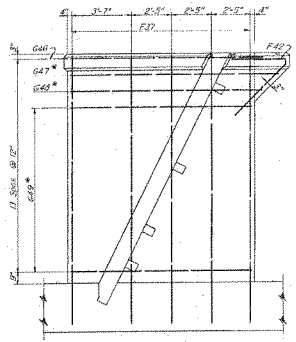
SECTION C-C



SECTION D-D

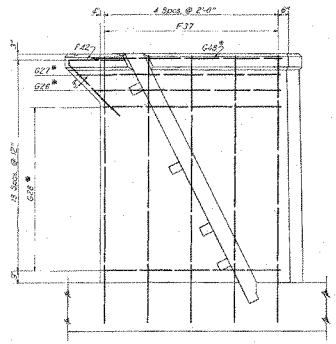


ELEVATION E-E



FAR SIDE REINFORCING

SOUTH ABUTMENT



FAR SIDE REINFORCING

NORTH ABUTMENT

Note:
For masonry details see sheet 5
Addendum No. 2
* = Bars to be furnished by Government and installed by contractor.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 93+57.18

ABUTMENTS

SHEET 13 OF 15 SHEETS

SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1942

SUBMITTED:

APPROVAL RECOMMENDED: APPROVED:

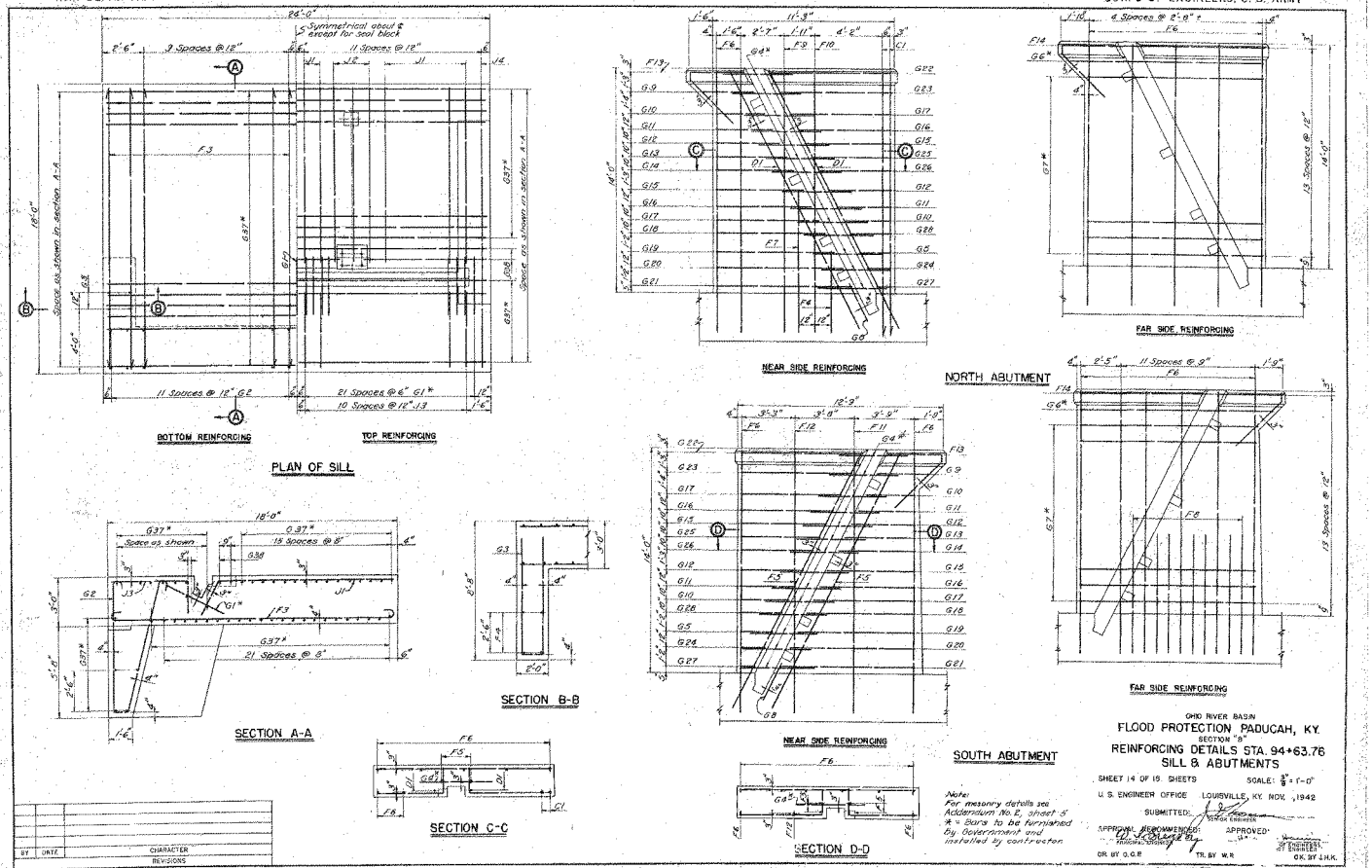
DR. BY G.H.S. TR. BY R.H.J. CK. BY J.H.K.

BY	DATE	CHARACTER OF REVISIONS

"RECEIVED AS BUILT" 934-A2/13

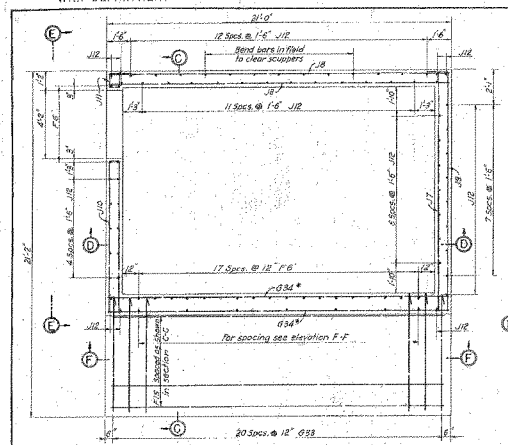
WAR DEPARTMENT

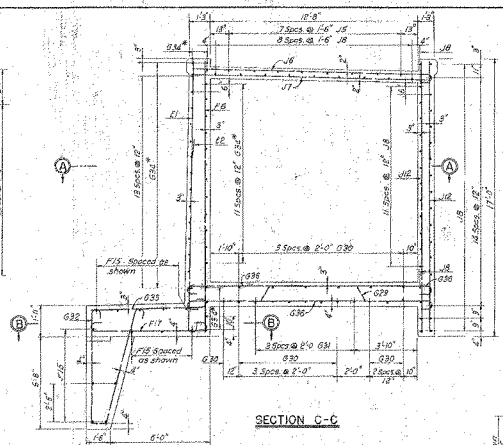
CORPS OF ENGINEERS, U. S. ARMY

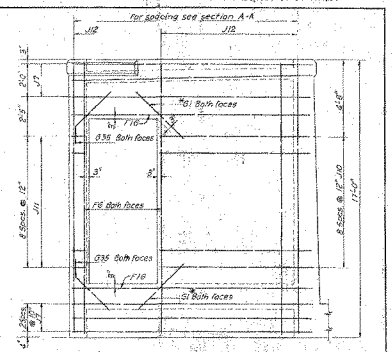


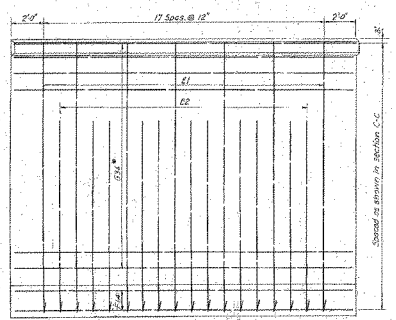
WAR DEPARTMENT

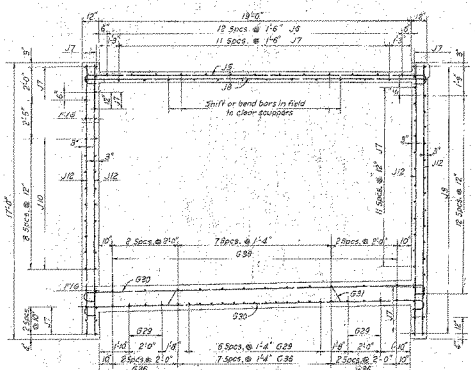
CORPS OF ENGINEERS, U. S. ARMY

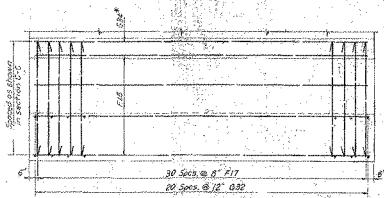












Note:
For masonry details see addendum No. 2 sheet 5
* = Bolts to be furnished by Government and installed by contractor.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 94+63.76.

STORAGE VAULT

SHEET 15 OF 15 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1942

SUBMITTED: DISTRICT ENGINEER

APPROVAL RECOMMENDED: DIVISION ENGINEER

APPROVED: COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

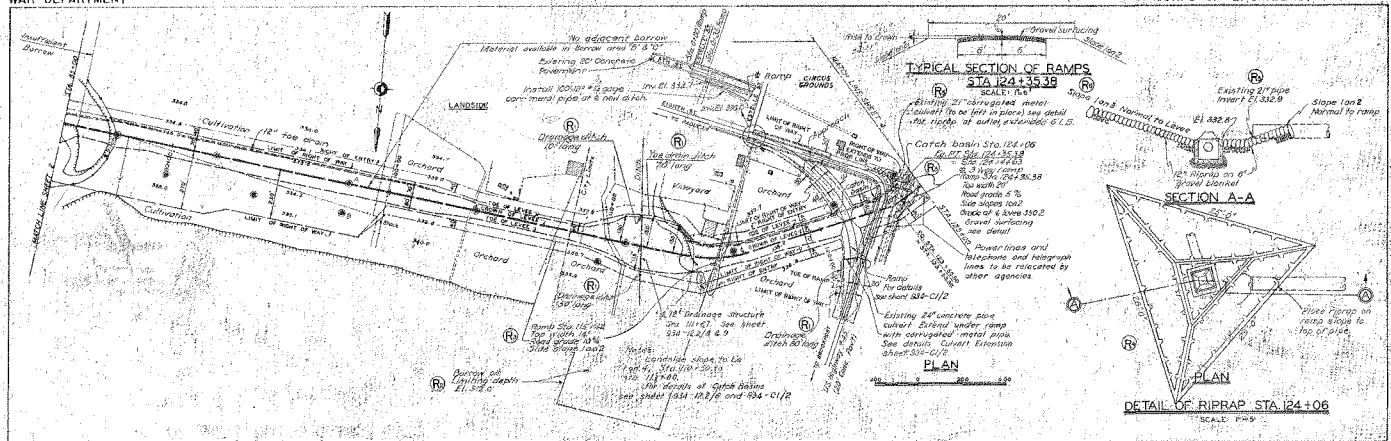
DR. G.H.B. TR. BY W.J.B. CK. BY J.H.K.

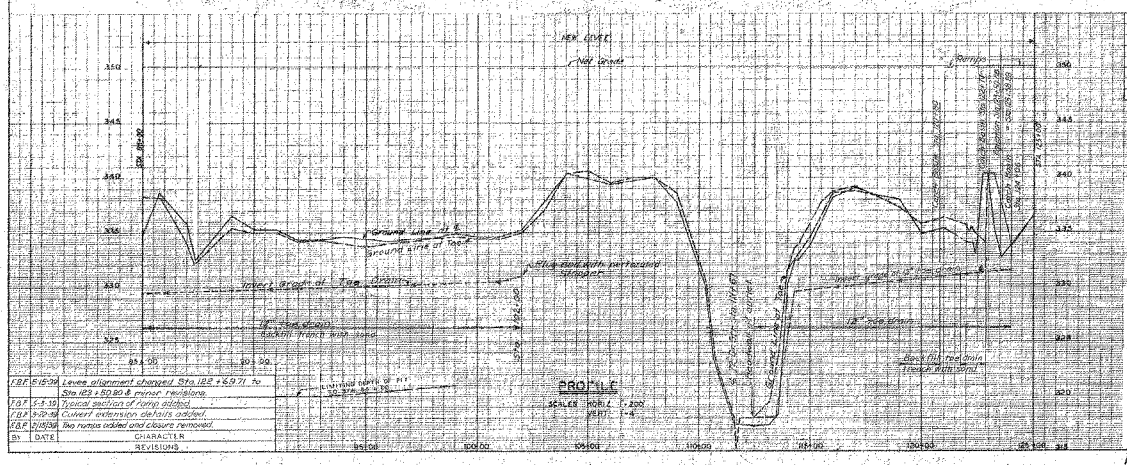
"REVISED AS BUILT" 934-A2/15

BY	DATE	CHARACTER REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





MK	DATE	AUTHORITY	REVISION
8		Field	Station changed
7		Field	Note changed
6		Field	Riprap changed
5		Field	Ramp note added
4		Field	Borrow pit location added
3		Field	Drainage ditches delete

AS BUILT REVISIONS

F.B.F.	5-15-39	Levee alignment changed Sta. 122+69.71 to Sta 123+50.82 & minor revisions.
F.B.F.	5-3-39	Typical section of ramp added.
F.B.F.	9-21-38	Culvert extension details added.
F.B.F.	9/15/38	Two ramps added and closure removed.

BY	DATE	CHARACTER
		REVISIONS

General Notes:-
All elevations referred to U.S.E.D. datum
For log of borings see sheet 934-12.2/5
For typical sections see sheet 934-12.2/6
For ice drain details see sheet 934-12.2/6

Plan to accompany change order No 1, Contract No. W555 eng-4808

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "X"

SHEET 3 OF 21 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. 1939

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] Lt. Col., Corps of Engineers

APPROVED: [illegible] Lt. Col., Corps of Engineers

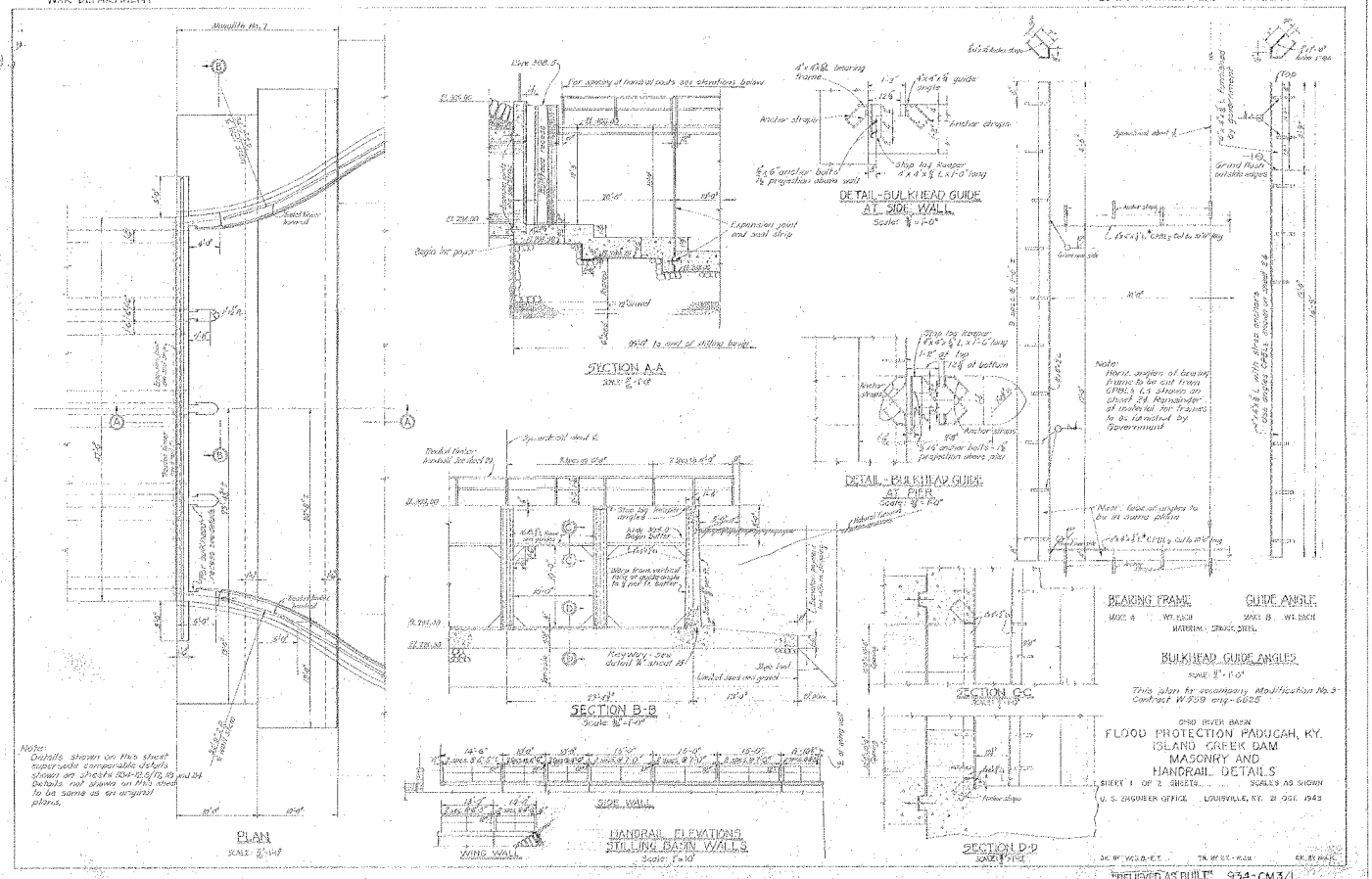
DR. BY C.G.B. — TR. BY J.C.N. — CK. BY J.C.Y.

AS BUILT 934-C1/1

1176

WAR DEPARTMENT

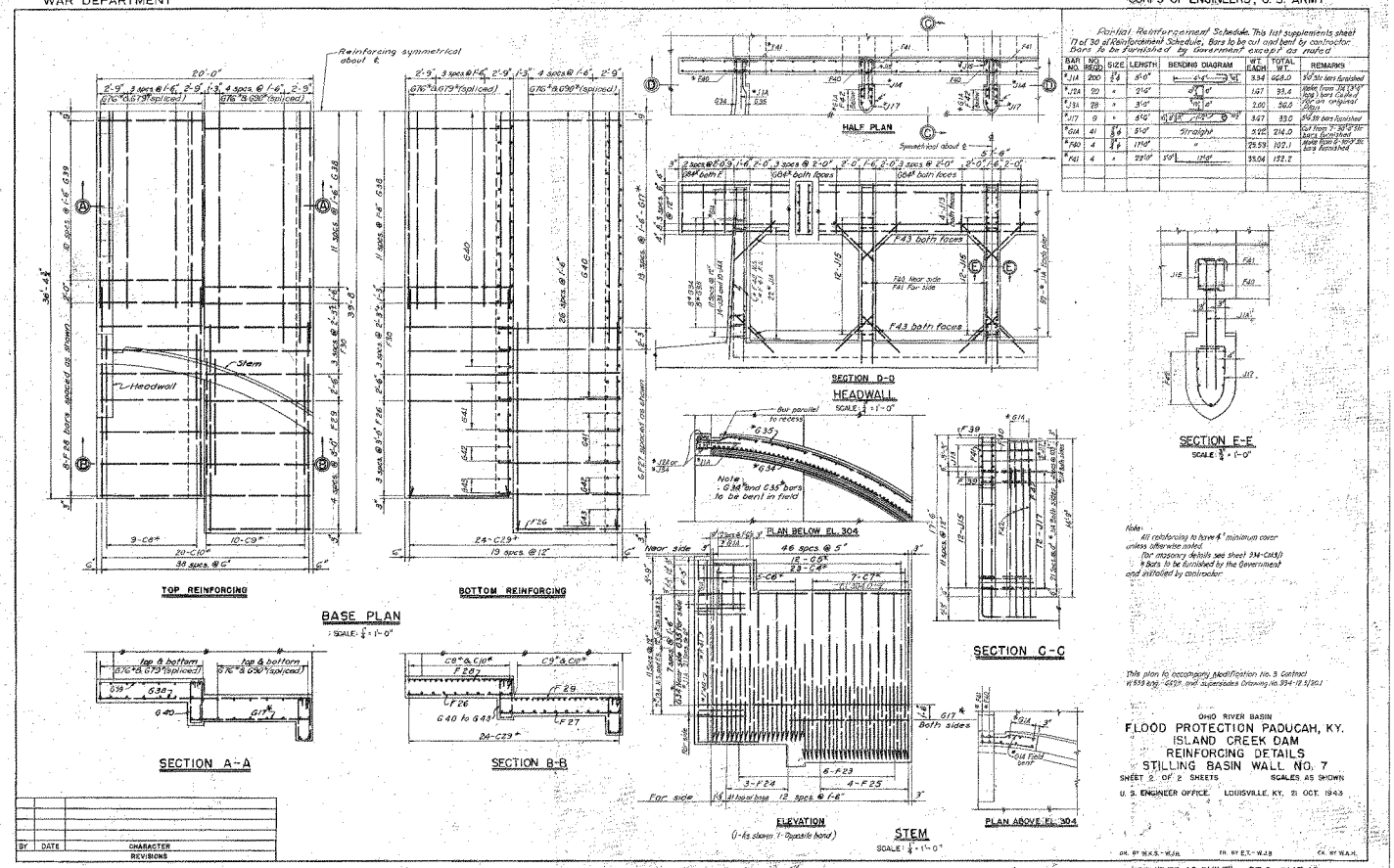
CORPS OF ENGINEERS U.S. ARMY



1177

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Partial Reinforcement Schedule. This list supplements sheet 17 of 30 of Reinforcement Schedule. Bars to be cut and bent by contractor. Bars to be furnished by Government except as noted.

BAR NO.	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.	REMARKS
*J14	200	5/8	8'-0"	4'-0"	3.34	668.0	50 lbs. bars furnished
*J34	100	"	21'-0"	21'-0"	1.67	33.4	Make from 18'-0 1/2" long bars (called for on original plans)
*J31	199	"	8'-0"	8'-0"	2.00	398.0	
*J17	9	"	8'-0"	4'-0" 1'-0" 1'-0" 2'-0"	3.67	33.0	24 lbs. bars furnished
*G34	41	5/8	5'-0"	Straight	5.21	214.0	5.21 from 7'-3 1/2" bars furnished
*F40	4	5/8	17'-0"	"	25.53	102.1	Make from 2-10'-3 1/2" bars furnished
*F41	4	"	22'-0"	10'-0" 12'-0"	33.04	132.2	

Note:
All reinforcing to have 4" minimum cover unless otherwise noted.
For masonry details see sheet 934-CM3/1
* bars to be furnished by the Government and installed by contractor

This plan to accompany Modification No. 5 Contract W 539 eng-6379, and supersedes Drawing No. 934-12.5/20.1

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
STILLING BASIN WALL NO. 7

SHEET 2 OF 2 SHEETS — SCALES AS SHOWN

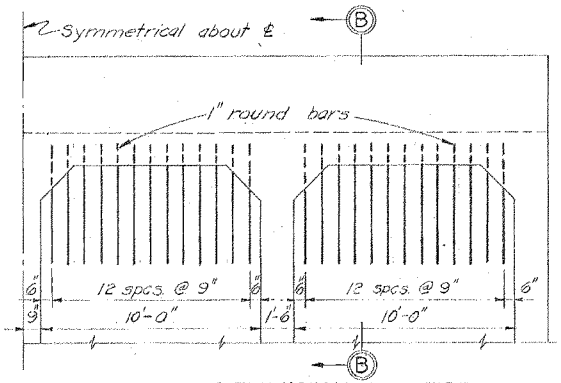
U. S. ENGINEER OFFICE, LOUISVILLE, KY. 21 OCT. 1943

DR. BY W.K.S.-W.J.B. TR. BY E.T.-W.J.B. CK. BY W.A.H.

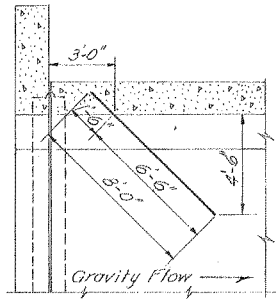
BY	DATE	CHARACTER REVISIONS

"BELIEVED AS BUILT" 934-CM3/2

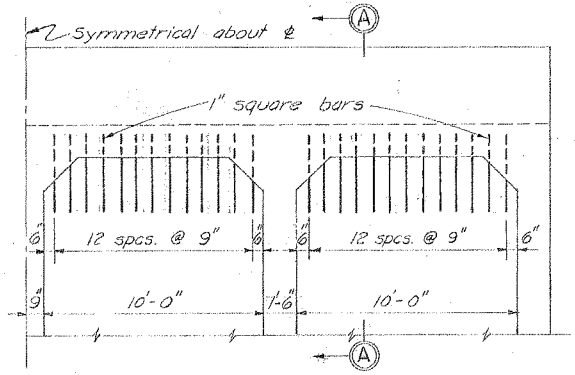
1178



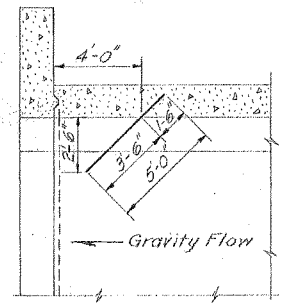
HALF-ELEVATION LANDSIDE



SECTION B-B



HALF-ELEVATION RIVERSIDE



SECTION A-A

This plan to accompany Modification No. 4, Contract W559 eng.-6625

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM

GUARDS FOR MULTIPLE BOX CULVERT

SHEET 1 OF 1 SHEET SCALE: $\frac{1}{4}$" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY.

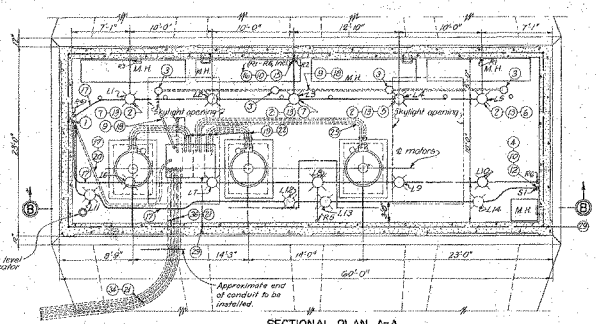
9 DEC. 1943

DR. BY: E.T. TR. BY: E.T. CH. BY: G.G.R.

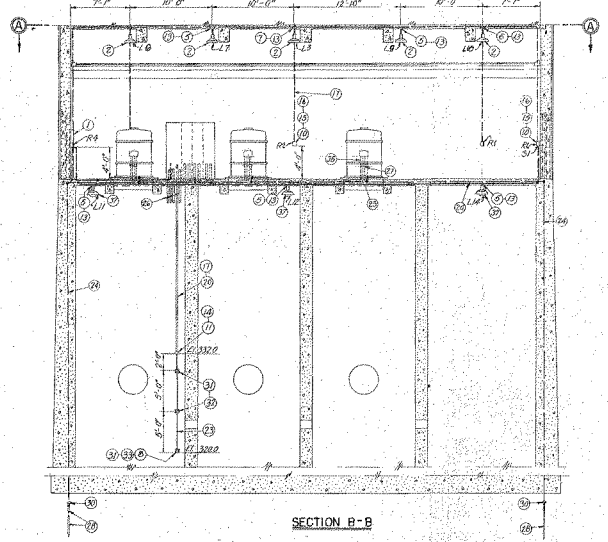
"RELIEVED AS BUILT" 934-CM4/1

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SECTIONAL PLAN A-A

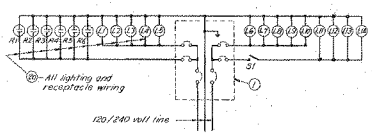


SECTION B-B

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1 *	4 circuit lighting panel (surface type)			1 *
2 *	R.L.M. dome reflector and socket	Wheat	319573	10 *
3	4" floor Box	G.E.	SF8300	4
4 *	Surface Switch Plate			1 *
5	Condulet Outlet	Crouse Hinds	5KCIG	10
6	" "	" "	5KLI12	1
7	" "	" "	5KT12	3
8 *	1/2" electrode			1 *
9 *	#8 1-cond. cable 12,000 lbs. with W.P. braid	"		190'± *
10 *	Condulet outlet	Crouse Hinds	FS161	7 *
11 *	" "	" "	A147	1 *
12 *	Flush Tumbler Switch	Bryant	3951	1 *
13 *	Condulet Cover	Crouse Hinds	5K84	14 *
14 *	" "	" "	1771	1 *
15 *	Duplex plug receptacle			6 *
16 *	Wall surface plate			6 *
17	1/2" electrical metallic tubing (E.M.T.)			380'±
18	1" rigid electrical conduit			60'±
19	1 1/2" rigid electrical conduit			130'±
20 *	#12 type SN insulated copper wire			1140'± *
21 *	500 MCM 1-cond. cable, 6,600 lbs. with 60% rubber jacket			2160'± *
22 *	250 " " " " " " "	Wheatland		420'± *
23 *	#6 H.D. bare solid copper wire			15'± *
24	#2/0 bare stranded copper cable			450'±
25	1 1/2" standard 90° elbow			24
26	Special long radius elbow 3 3/4"x36" radius	G.E.		4
27 *	2" E.M.T. coupling			6 *
28	Copperweld ground rod 3/4"x8'-0" long			4
29	"T" connector for #2/0 stranded cable	Burndy	NT2626	9
30	Connector for #2/0 stranded cable to 3/4" rod	"	GA6436	4
31 *	3" bell circle type insulator	Lapp	13761	3 *
32 *	Bus support fitting Drill to clamp #6 solid wire	Locke	9853	2 *
33 *	Bus support fitting Drill to clamp 3/4" rod	"	9833	4 *
34 *	2" Rigid electrical conduit			630'± *
35 *	Flexible metal conduit 2.5"x20' lg.			6 *
36	3/4" Rigid electrical conduit			80'±
37 *	Vaporite Socket & Reflector	Crouse Hinds	VPM/329	4 *

* These materials not to be furnished or installed under this contract.



WIRING DIAGRAM - LIGHTING CIRCUIT

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

LEGEND

Notes:
Figures in circles refer to part numbers on Bill of Material.
All material shall be of the manufacture, type & catalog number specified, or its equal.
All conduit in floor shall be placed as near the center of same as possible & shall clear opening for pump removal.
Small fittings, conduits, E.M.T. couplings and adapters, etc., not listed shall be furnished as required.
300 watt bulbs shall be furnished and installed in all lights, Under separate contract.

BY	DATE	CHARACTER REVISIONS

Plan to accompany Modification No. 7, Contract No. W 558 eng-6625

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY

ISLAND CREEK DAM

LIGHTING AND POWER SYSTEM

SHEET 1 OF SHEET 1 SCALE 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

DR. BY A.J.Z. TR. BY A.J.Z. CK. BY D.S.

"BELIEVED AS BUILT"

934-CM 7/1

AS BUILT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B" UNIT 2

IN 124 SHEETS

TITLE SHEET

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

MK.	DATE	AUTHORITY	REVISION
(R3)			
(R2)		D.O.	Sheet added
(R1)		D.O.	Sheet deleted
(R)	10-5-62	C.O. #9	Deletion of portion of wall Station 90+75.3 - 92+04.47

AS BUILT REVISIONS

CONTENTS

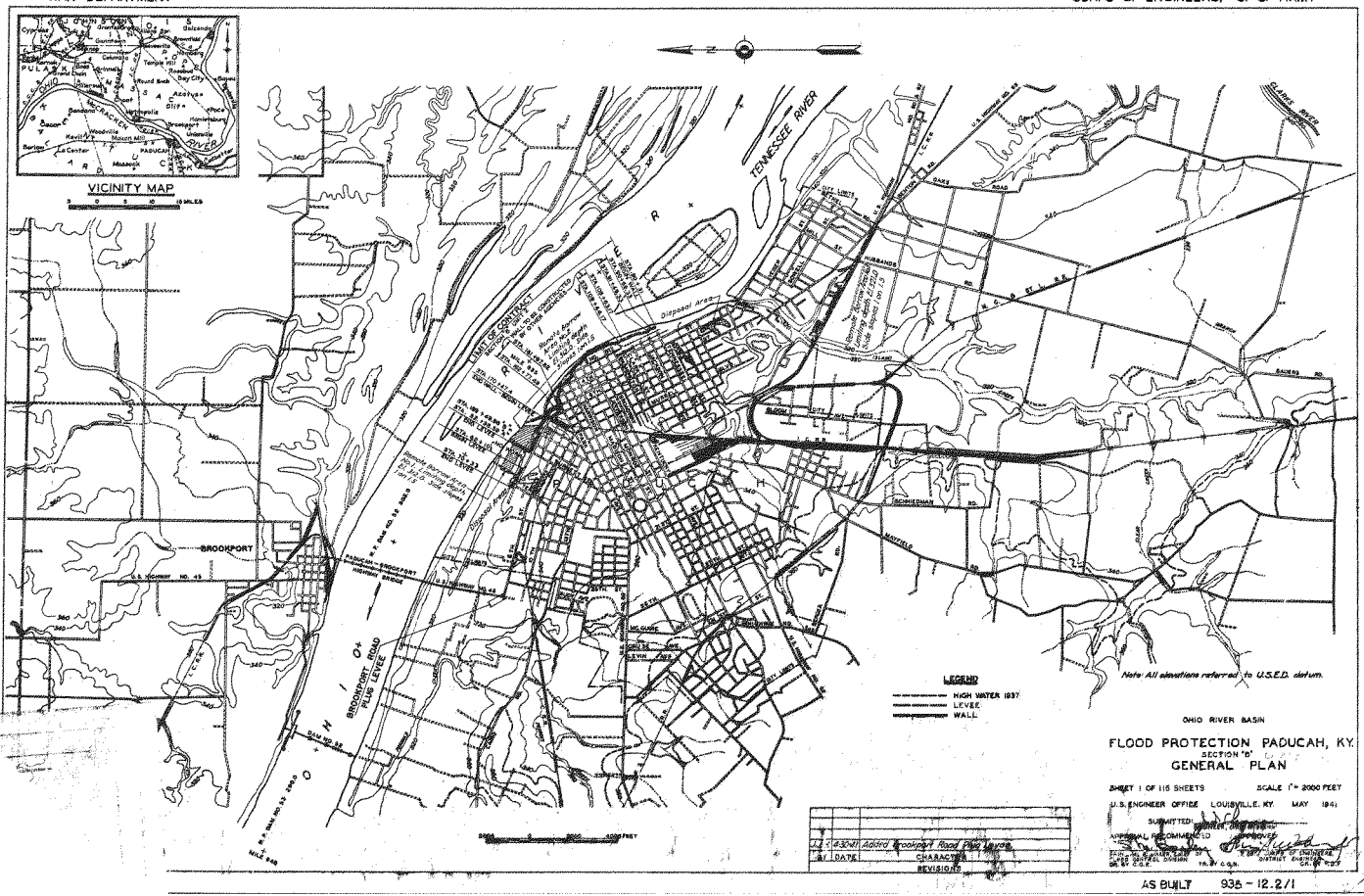
935-12.2/1 GENERAL PLAN
935-12.2/2 PLAN AND PROFILE
935-12.2/3 PLAN AND PROFILE
935-12.2/4 PLAN AND PROFILE
935-12.2/5 PLAN AND PROFILE
935-12.2/6 PLAN AND PROFILE
935-12.2/7 PLAN AND PROFILE
935-12.2/8 PLAN AND PROFILE
935-12.2/9 PLAN AND PROFILE
935-12.2/10 PLAN AND PROFILE
935-12.2/11 PLAN AND PROFILE
935-12.2/12 ILLINOIS CENTRAL RAILROAD REVISIONS
935-12.2/13 ILLINOIS CENTRAL RAILROAD REVISIONS
935-12.2/14 STREET & RAILROAD REVISIONS, FIRST STREET VICINITY
(R2) 935-12.2/15 BORINGS (DELETED)
(R2) 935-12.2/16 BORINGS "
935-12.2/17 BORINGS & TYPICAL SECTION
935-12.2/18 WALL MONOLITHS
935-12.2/19 WALL MONOLITHS
935-12.2/20 WALL MONOLITHS
935-12.2/21 WALL MONOLITHS
935-12.2/22 STRIPPING AND BACKFILL
935-12.2/23 MASONRY & REINFORCING DETAILS MONOLITH NO. 14
935-12.2/24 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 15, 41 & 96
935-12.2/25 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 80 & 167
935-12.2/26 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 115, 131, 132 AND BULKHEAD AND FRAME DETAILS
935-12.2/27 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 144, 151 & 182
935-12.2/28 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 150, 171 & 185
935-12.2/29 MASONRY & REINFORCING DETAILS MONOLITH NO. 194
935-12.2/30 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 204 & 223
935-12.2/31 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 225, 253 & 272
935-12.2/32 MASONRY & REINFORCING DETAILS MONOLITH NO. 245
935-12.2/33 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 280, 281, 195 & 244
935-12.2/34 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 300 & 301
935-12.2/35 MASONRY & REINFORCING DETAILS "T" WALL MONOLITHS
935-12.2/36 MASONRY & REINFORCING DETAILS "T" WALL MONOLITHS
935-12.2/37 MASONRY & REINFORCING DETAILS "T" WALL MONOLITHS
935-12.2/38 MISCELLANEOUS PIPES THRU WALL AND DETAILS
935-12.2/39 MISCELLANEOUS PIPES THRU WALL AND DETAILS
935-12.2/40 GENERAL PLAN WASHINGTON & FIRST ST.
935-12.2/41 GENERAL PLAN KENTUCKY & FIRST ST.
935-12.2/42 GENERAL PLAN BROADWAY & FIRST ST.
935-12.2/43 GENERAL PLAN MADISON & SECOND STREETS
935-12.2/44 GENERAL PLAN THIRD & HARRISON STS.
935-12.2/45 GENERAL PLAN CLAY & THIRD STREETS
935-12.2/46 GENERAL PLAN FOURTH & FIFTH STREETS AT PARK AVE.
935-12.2/47 TUNNEL STA. 117+20± & U.S.G.S. GAGING STATION
935-12.2/48 MASONRY DETAILS MOVABLE CLOSURES STA. 90+41.17 & STA. 103+63.50
935-12.2/49 REINFORCING DETAILS STA. 90+41.17 & STA. 103+63.50 SILL & ABUTMENTS
935-12.2/50 REINF. DETAILS STAS. 90+51.33, 103+73.67 & 106+21.50 STORAGE VAULT
(R) 935-12.2/51 MASONRY DETAILS MOVABLE CLOSURE STA. 81+96.00
935-12.2/52 REINFORCING DETAILS STA. 91+96.00 SILL & ABUTMENTS
935-12.2/53 REINFORCING DETAILS STA. 91+96.00 STORAGE VAULT
935-12.2/54 MASONRY DETAILS MOVABLE CLOSURES STA. 93+57.18 & STA. 94+63.76
935-12.2/55 REINFORCING DETAILS STA. 93+57.18 SILL
935-12.2/56 REINFORCING DETAILS STA. 93+57.18 ABUTMENTS
935-12.2/57 REINFORCING DETAILS STA. 94+63.76 SILL & ABUTMENTS
(R) 935-12.2/58 REINFORCING DETAILS STA. 94+63.76 STORAGE VAULT
935-12.2/59 MASONRY DETAILS MOVABLE CLOSURES STA. 98+88.50 & STA. 108+53.00
935-12.2/60 REINFORCING DETAILS STA. 98+88.50 & STA. 108+53.00 SILL & SOUTH ABUTMENT
935-12.2/61 REINFORCING DETAILS STA. 98+88.50 & STA. 108+53.00 NORTH ABUTMENT & STORAGE VAULT
935-12.2/62 MASONRY DETAILS MOVABLE CLOSURE STA. 106+10.00
935-12.2/63 REINFORCING DETAILS STA. 106+10.00 SILL & ABUTMENTS
935-12.2/64 MASONRY DETAILS MOVABLE CLOSURE STA. 114+98.71
935-12.2/65 REINFORCING DETAILS STA. 114+98.71 SILL & SOUTH ABUTMENT
935-12.2/66 REINFORCING DETAILS STA. 114+98.71 STORAGE VAULT
935-12.2/67 MASONRY DETAILS MOVABLE CLOSURES STA. 119+62.65 & STA. 123+80.40
935-12.2/68 REINFORCING DETAILS STA. 119+62.65 & STA. 123+80.40 SILL & ABUTMENTS
935-12.2/69 MASONRY & REINFORCING DETAILS STA. 120+07.65 & 124+25.40 STORAGE VAULTS
935-12.2/70 MASONRY DETAILS MOVABLE CLOSURE STA. 128+19.75
935-12.2/71 REINFORCING DETAILS STA. 128+19.75 SILL AND EAST ABUTMENT
935-12.2/72 MASONRY DETAILS MOVABLE CLOSURE STA. 132+40.50
935-12.2/73 REINFORCING DETAILS STA. 132+40.50 SILL & ABUTMENTS
935-12.2/74 REINFORCING DETAILS STA. 132+40.50 STORAGE VAULT
935-12.2/75 MASONRY DETAILS MOVABLE CLOSURE STA. 135+22.75
935-12.2/76 REINFORCING DETAILS STA. 135+22.75 SILL AND EAST ABUTMENT
935-12.2/77 REINFORCING DETAILS STA. 128+19.75 AND STA. 135+22.75 STORAGE VAULT AND WEST ABUTMENT
935-12.2/78 MASONRY DETAILS MOVABLE CLOSURE STA. 145+74.30
935-12.2/79 REINFORCING DETAILS STA. 145+74.30 SILL & ABUTMENTS
935-12.2/80 MASONRY DETAILS MOVABLE CLOSURE STA. 158+23.25
935-12.2/81 MASONRY DETAILS MOVABLE CLOSURE STA. 149+87.30
935-12.2/82 REINFORCING DETAILS STA. 149+87.30 & STA. 158+23.25 SILL & ABUTMENTS
935-12.2/83 REINFORCING DETAILS STA. 149+27.80 & STA. 157+65.25 STORAGE VAULT & WALKWAY PLANKING SCHEDULE
935-12.2/84 MASONRY DETAILS MOVABLE CLOSURE STA. 157+26.10
935-12.2/85 REINFORCING DETAILS STA. 157+26.10 SILL & ABUTMENTS
935-12.2/86 REINFORCING DETAILS STA. 156+86.80 STORAGE VAULT
935-12.2/87 MASONRY DETAILS MOVABLE CLOSURE STA. 161+53.15
935-12.2/88 REINFORCING DETAILS STA. 161+53.15 SILL AND ABUTMENTS
935-12.2/89 MASONRY DETAILS MOVABLE CLOSURE STA. 168+48.50
935-12.2/90 REINFORCING DETAILS STA. 168+48.50 SILL & ABUTMENTS
935-12.2/91 REINFORCING DETAILS STA 168+48.50 STORAGE VAULT
935-12.2/92 MASONRY DETAILS MOVABLE CLOSURE STA. 170+04.36
935-12.2/93 REINFORCING DETAILS STA. 170+04.36 SILL AND EAST ABUTMENT
935-12.2/94 REINFORCING DETAILS STA. 170+04.36 STORAGE VAULT & MONOLITH NO. 340
935-12.2/95 MISCELLANEOUS DETAILS
935-12.2/96 MISCELLANEOUS DETAILS
935-12.2/97 MISCELLANEOUS DETAILS
935-12.2/98 STRUCTURAL DETAILS
935-12.2/99 STRUCTURAL DETAILS
935-12.2/100 STRUCTURAL DETAILS
935-12.2/101 STRUCTURAL DETAILS
935-12.2/102 STRUCTURAL DETAILS
935-12.2/103 STRUCTURAL DETAILS
935-12.2/104 STRUCTURAL DETAILS
935-12.2/105 STRUCTURAL DETAILS
935-12.2/106 STRUCTURAL & MISCELLANEOUS DETAILS
935-12.2/107 MISCELLANEOUS STRUCTURAL DETAILS
935-12.2/108 MISCELLANEOUS STRUCTURAL DETAILS
935-12.2/109 MISCELLANEOUS STRUCTURAL DETAILS
935-12.2/110 MASONRY & REINFORCING DETAILS CATCH BASINS AND MISCELLANEOUS DETAILS
935-12.2/111 LOCATION PLANS MANHOLES NOS. 2,7,11 & 12 AND HEADWALL DETAILS STA. 120+61
935-12.2/112 MASONRY & REINFORCING DETAILS MANHOLE NO. 1
935-12.2/113 MASONRY & REINFORCING DETAILS MANHOLES NOS. 2,6,12 & 15
935-12.2/114 MASONRY DETAILS MANHOLE NO. 3
935-12.2/115 REINFORCING DETAILS MANHOLE NO. 3
935-12.2/116 MASONRY AND REINFORCING DETAILS MANHOLES NOS. 4,5,9,10,17,18,19,21 AND 22
935-12.2/117 MASONRY & REINFORCING DETAILS MANHOLES NOS. 6 & 16
935-12.2/118 MASONRY & REINFORCING DETAILS MANHOLES NOS. 7 & 11
935-12.2/119 MASONRY & REINFORCING DETAILS MANHOLES NOS. 13 & 14
935-12.2/120 MASONRY & REINFORCING DETAILS MANHOLE NO. 20
935-12.2/121 SEWER STA. 66+27
935-12.2/122 MASONRY & REINFORCING DETAILS MANHOLE NO. 23
935-12.2/123 MASONRY & REINFORCING DETAILS MANHOLE NO. 24
935-12.2/124 DRAINAGE STRUCTURE STA. 175+40
(R3) 935- 06/1 REINFORCING DETAILS MONOLITHS NOS. 79A & 84A

AS BUILT

1181

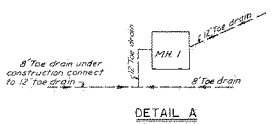
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

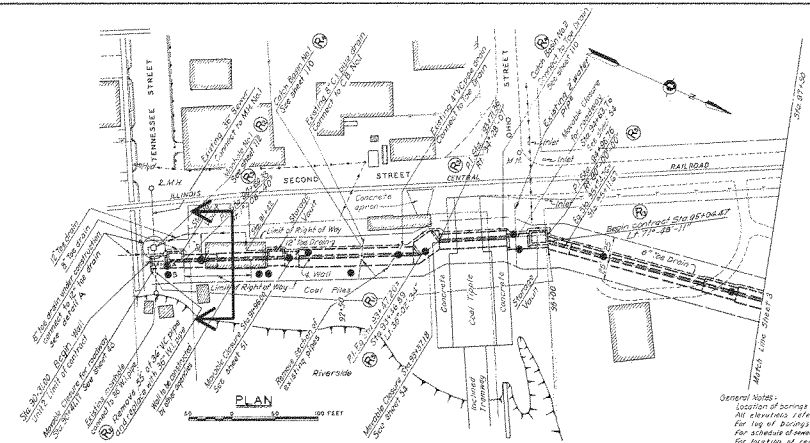


WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

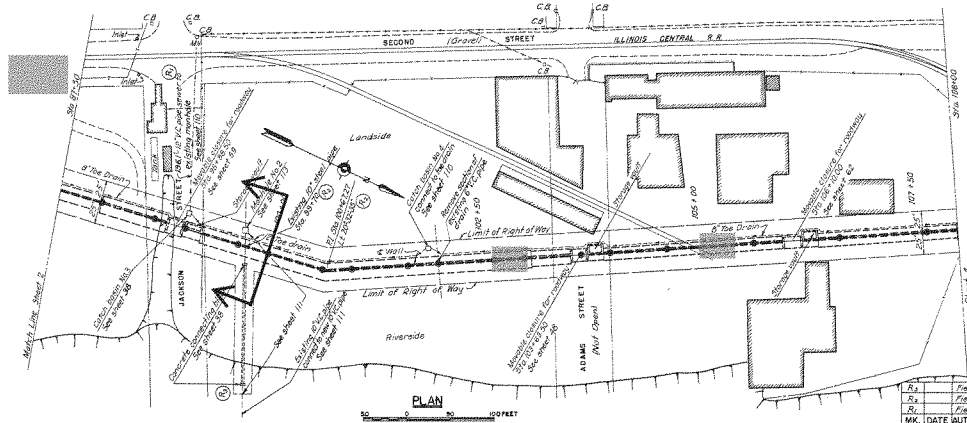


DETAIL A


TENNESSEE STREET
SECOND STREET
CENTRAL AVE.
RAILROAD
ILLINOIS
Concrete apron
Limit of Right of Way
12" Toe Drain
Wall
Coal Piles
Coal Tipple
Concrete
Storage Vault
Inclined Trackway
Riverside
Marsh Line Street
Begin Contract Sta 95+04.47
8" Toe Drain
Sta 97+50
Sta 90+00
Sta 91+50
Sta 93+00
Sta 94+50
Sta 96+00
Sta 97+50
Sta 91+49.33
Sta 92+86.5
Sta 94+48.5
Sta 95+71.87
Sta 97+47.26
Sta 97+68.83
Sta 95+24.76

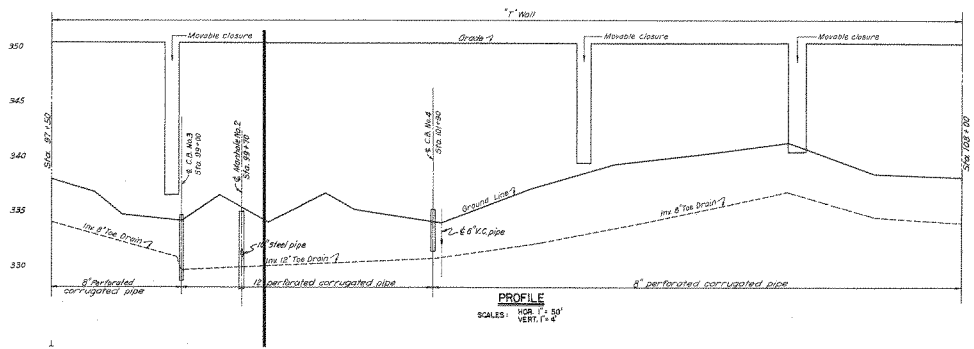
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



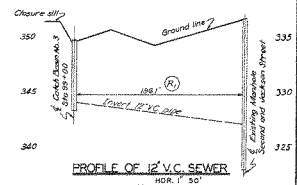
MK.	DATE	AUTHORITY	REVISION
R_3		Field	Concrete connecting block added.
R_2		Field	Station and angle added.
R_1		Field	Dimension changed and added.

AS BUILT REVISIONS



PROFILE

SCALES: HOR. 1" = 50' VERT. 1" = 4'



PROFILE OF 12" V.C. SEWER

SCALES: HOR. 1" = 50' VERT. 1" = 4'

BY	DATE	CHARACTER REVISIONS
WKS	4-1946	Minor revisions.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 3 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY., MAY 1941

SUBMITTED: PROJECT CHIEF OF DESIGN

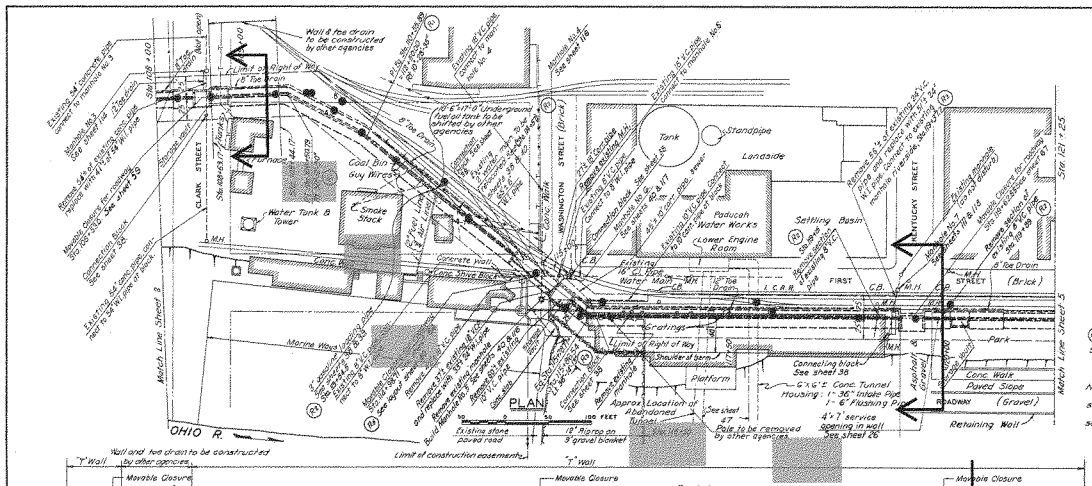
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER CHIEF OF FLOOD CONTROL DIVISION

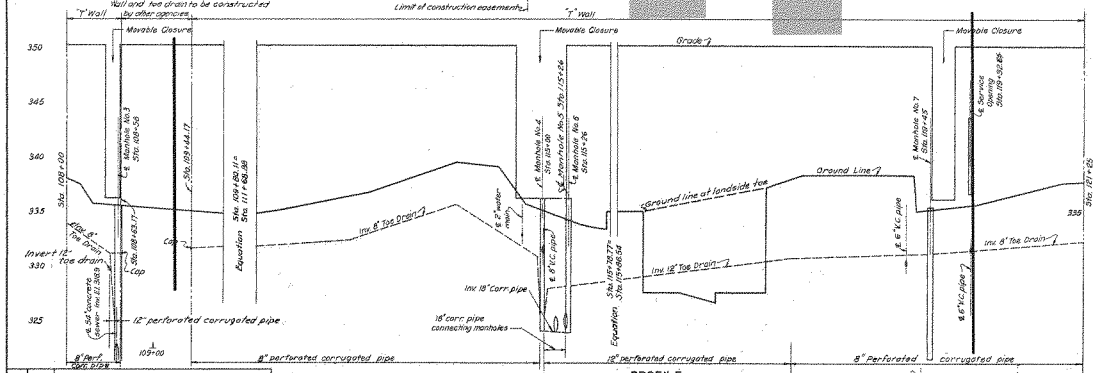
APPROVED: DISTRICT ENGINEER

AS BUILT 935-12.2/3

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





MK.	DATE	AUTHORITY	REVISION
R5		Field	Addition to note
R4		Field	Pipe removed, abandoned
R3		Field	Angle added
R2		Field	Station added
R1	1-9-42	C.O. #6	Relocation portion of wall

AS BUILT REVISIONS

MK.	DATE	CHARACTER
M5	4-30-41	Notes added, and minor corrections

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 4 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: ENGINEER, DIST. OF DESIGN

APPROVAL RECOMMENDED: APPROVED:

DIVISION ENGINEER, FIRST DIV. FLOOD CONTROL DIVISION

DISTRICT ENGINEER, LOUISVILLE DISTRICT

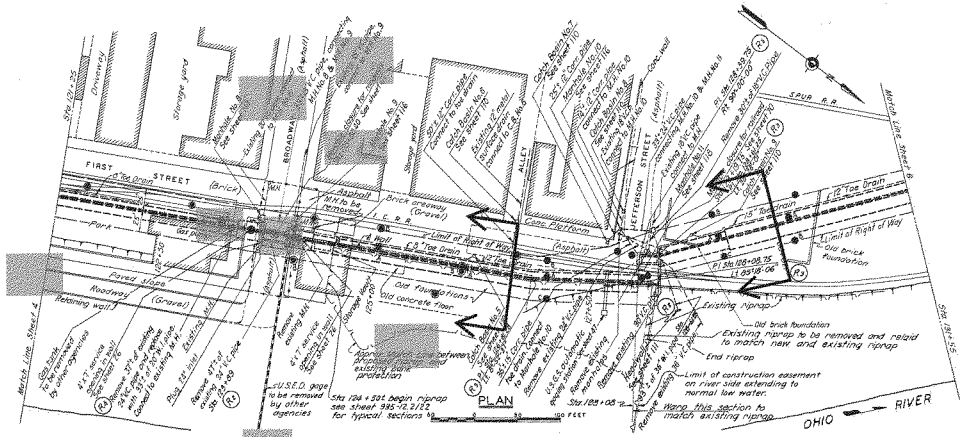
DR. BY E.S. TR. BY A.S.B.-V.S.S. CK. BY V.S.F.

AS BUILT 935-12.2/4

1185

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



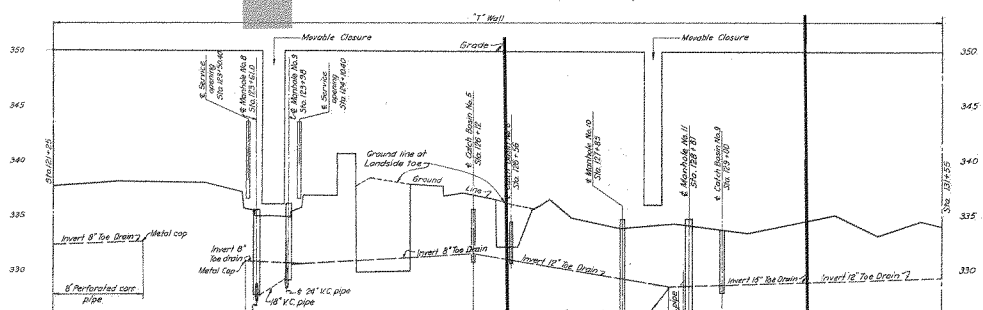
(R1)

Station 121+21.1, 121+43.1, 121+59.6, 121+85.2, 122+07.1, 123+21.6, 123+41.8, 124+1.4, 124+1.8, 124+5.7
6" V.C. Pipes removed, abandoned
Sta. 125+00, 8" C.I.P. removed, abandoned
Sta. 125+70.4, 6" C.I.P. removed, abandoned
Sta. 125+71.4, 6" C.I.P. removed, abandoned

MK	DATE	AUTHORITY	REVISION
R4		Field	Pipe change "size"
R3		Field	Station and angle added
R2		Field	Station added
R1		Field	Pipe removed, abandoned

AS BUILT REVISIONS

Note:
For General Plan at Broadway and First Street see sheet 42.
For railroad revisions and alignment and order of work, Broadway & Jefferson Street, see sheets 12, 13 and 14.



BY	DATE	CHARACTER REVISIONS
W.K.S.	4-30-41	Minor corrections.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE

SHEET 5 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: Engineer, Sub-District

APPROVAL RECOMMENDED: APPROVED:

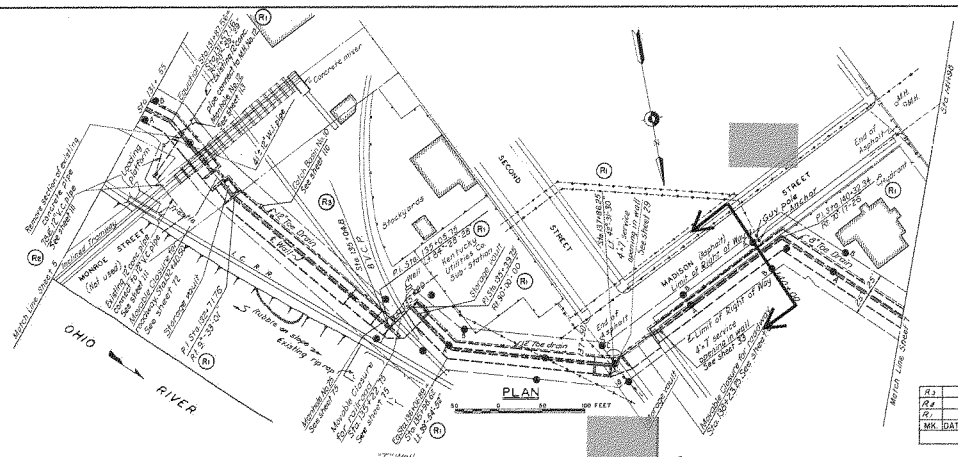
Sub-District Engineer — District Engineer

AS BUILT 936-12.2/5

1186

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R3		Field	Relocation of pipe
R4		Field	Dimension change
R1		Field	Station & angles added
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

N.K.A.	4-30-41	Borings identified and minor revisions
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 6 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [illegible] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

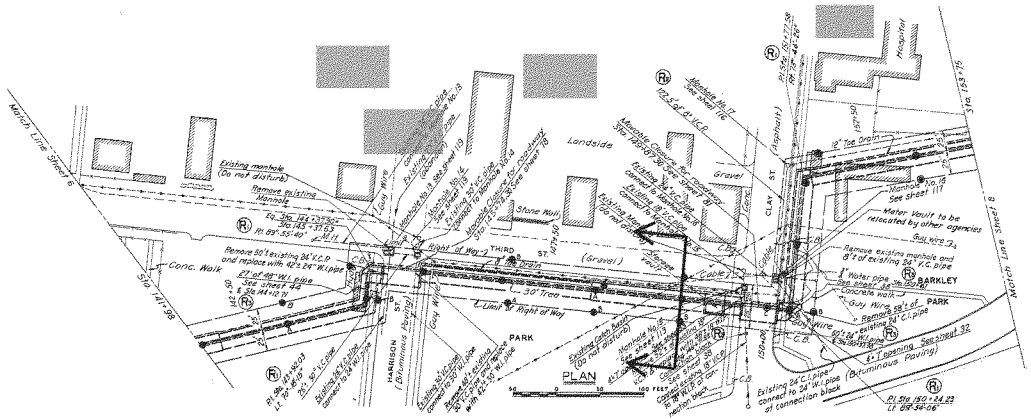
DR. BY O.R.L. TR. BY W.B.S. CK. BY [illegible]

AS BUILT 935-12.2/6

1187

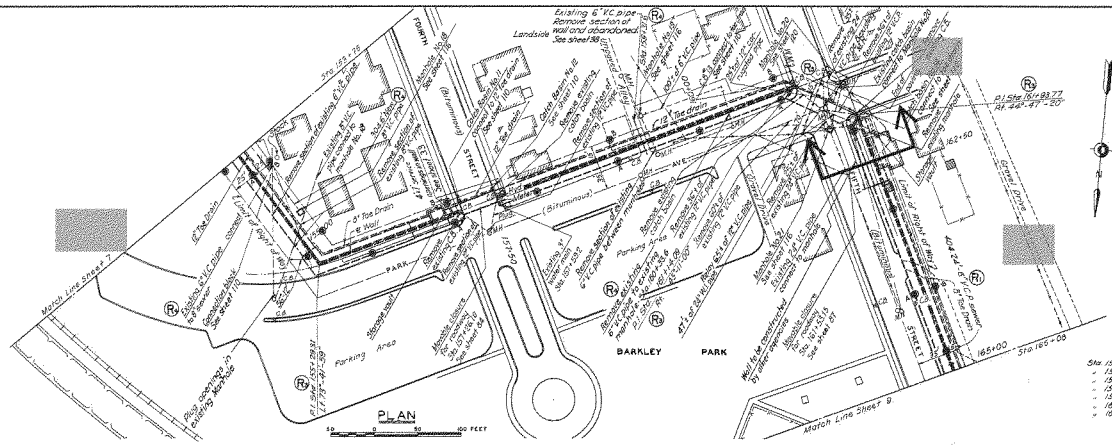
WAR DEPARTMENT

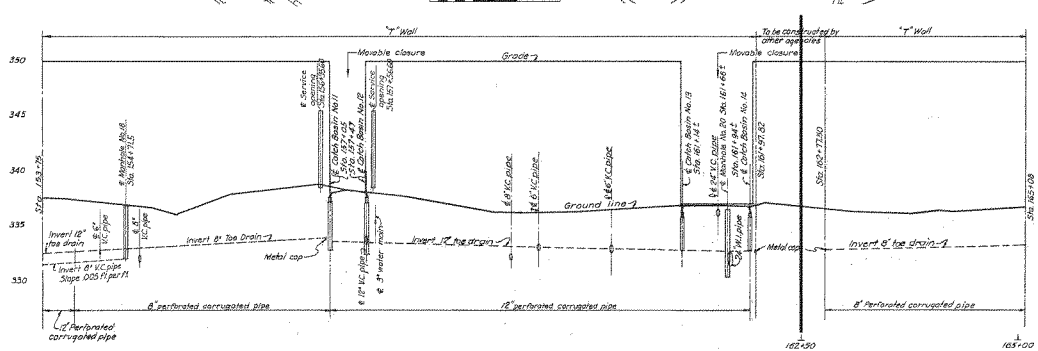
CORPS OF ENGINEERS, U. S. ARMY

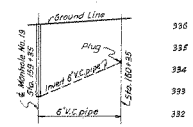

PLAN
Landside
THIRD ST
HARRISON ST
CLAY ST
PARKLEY PARK
Hospital
Gravel
(Gravel)
Stone Wall
Concrete walk
Guy wire
Existing manhole (Do not disturb)
Remove existing manhole
Remove 90' existing 24" V.C.P. and replace with 42" x 24" W.I. pipe
Remove existing manhole and 8' of existing 24" V.C. pipe
Meter Vault to be relocated by other agencies
Existing 24" C.I. pipe caused to 54" W.I. pipe (Bituminous paving)
Existing 24" C.I. pipe caused to 54" W.I. pipe of connection block
Existing Cast Iron Manhole
Existing Manhole
Existing 24" V.C. pipe
Existing 42" x 24" W.I. pipe
Existing 42" x 24" W.I. pipe
Existing 24" V.C. pipe caused to 54" W.I. pipe
Existing 24" V.C. pipe caused to 54" W.I. pipe
Existing 24" V.C. pipe caused to 54

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY







PROFILE OF 6" V.C. PIPE DRAIN

SCALES: HOR. 1"=50' VERT. 1"=2'

PROFILE

SCALES: HOR. 1"=50' VERT. 1"=4'

MK.	DATE	CHARACTER REVISIONS
M.K.1	4-30-41	Minor revisions

MK.	DATE	AUTHORITY	REVISION
R1		Field	3/4" Water line
R2		Field	Note changes
R3		Field	Station and angles added
R4		Field	Pipes removed
R5	7-15-41	C.O. #12	6" V.C. sewer pipe

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 8 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [illegible] DISTRICT ENGINEER

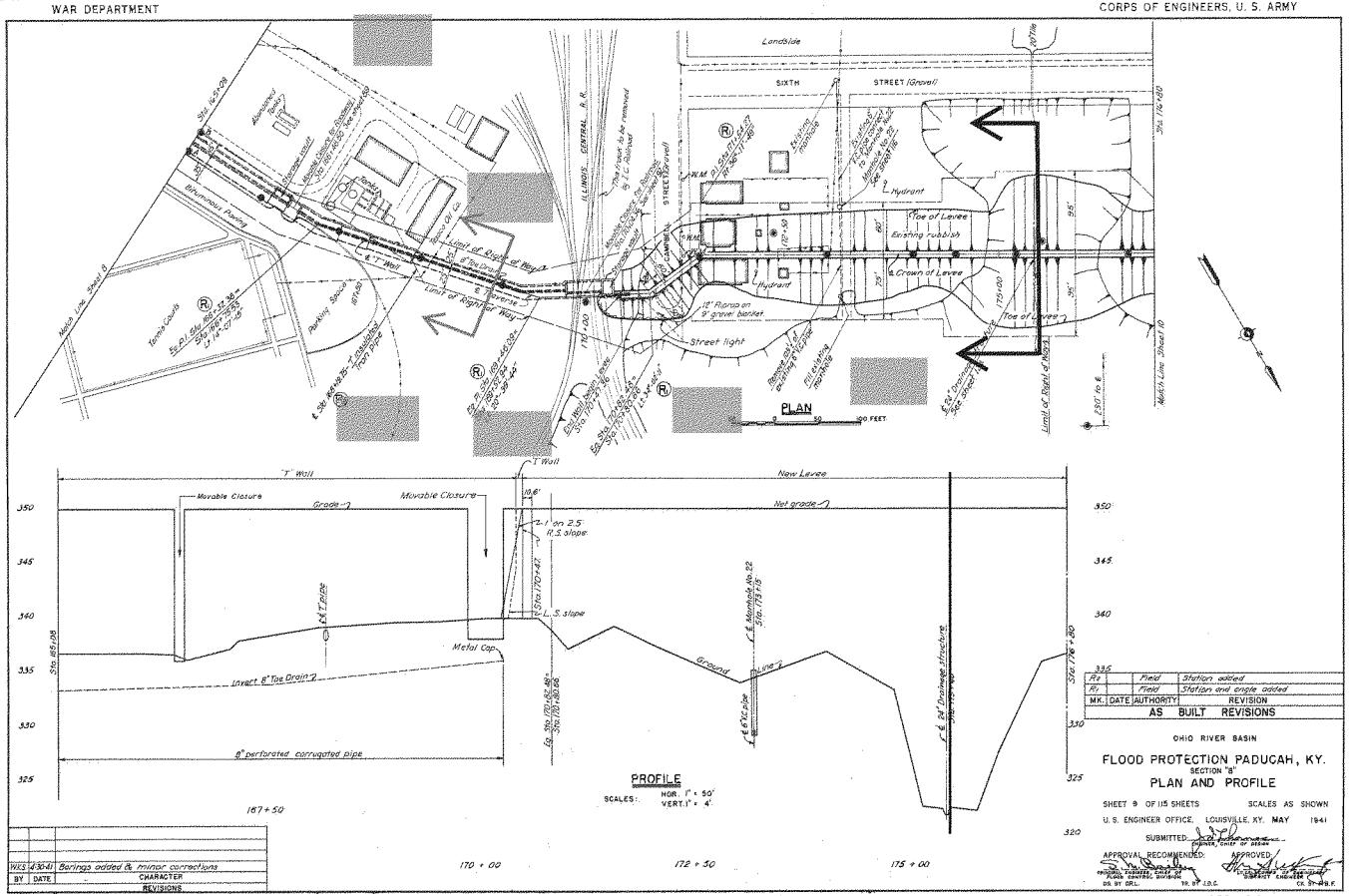
DR. BY D.R.L. TR. BY W.A.S. CK. BY F.B.F.

AS BUILT 938-12.2/8

1189

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK.	DATE	AUTHORITY	REVISION
R2		Field	Station added
R1		Field	Station and angle added

AS BUILT REVISIONS

W13	4-30-41	Borings added & minor corrections
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 9 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: DISTRICT ENGINEER

APPROVAL RECOMMENDED: PRINCIPAL ASSISTANT, CHIEF OF PLANS CONTROL DIVISION DR. BY DR.L. YR. BY J.D.C.

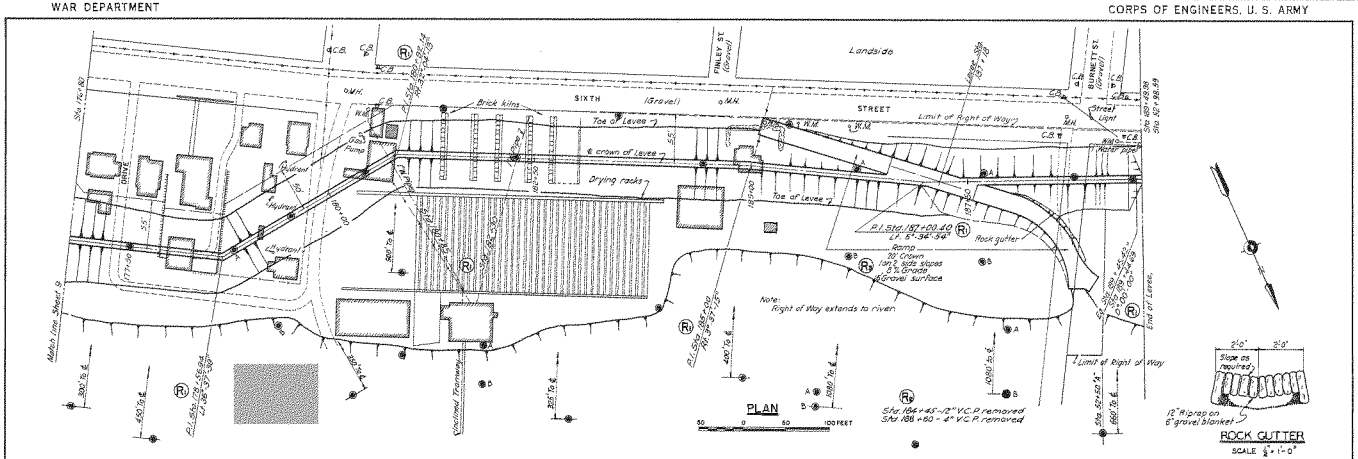
APPROVED: DIVISION ENGINEER DIRECT ENGINEER CK. BY B.F.

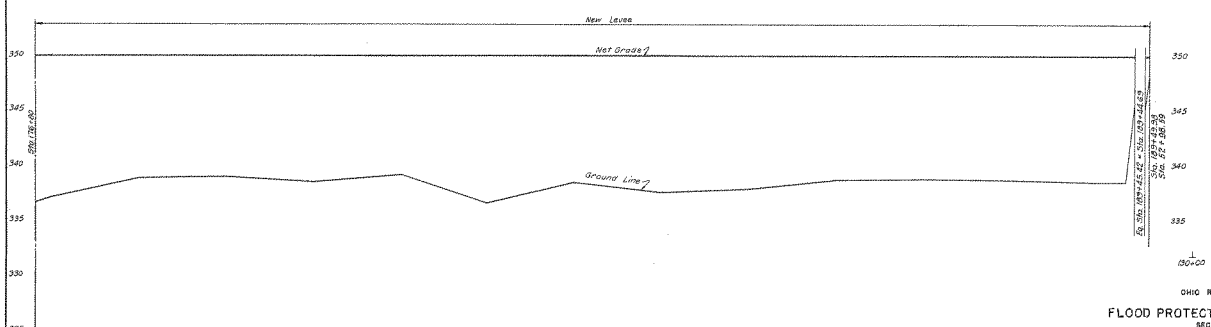
AS BUILT 935-12.2/9

1190

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





PROFILE

SCALES: HOR. 1" = 50'
VERT. 1" = 4'

(R)		Field	Addition to note
(R)		Field	Pipes removed
(R)		Field	Station and angles added
M.K.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

M.K.S.	4-30-40	Borings added
BY	DATE	CHARACTER

REVISIONS

177+50 180+00 182+50 185+00 187+50

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 10 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: J. Lawrence Bell
ENGINEER, DIST. OF DESIGN

APPROVAL RECOMMENDED: J. A. Stevenson
CHIEF, FLOOD CONTROL DIVISION

APPROVED: C. H. Chase
COLONEL, CORPS OF ENGINEERS
DISTRICT ENGINEER

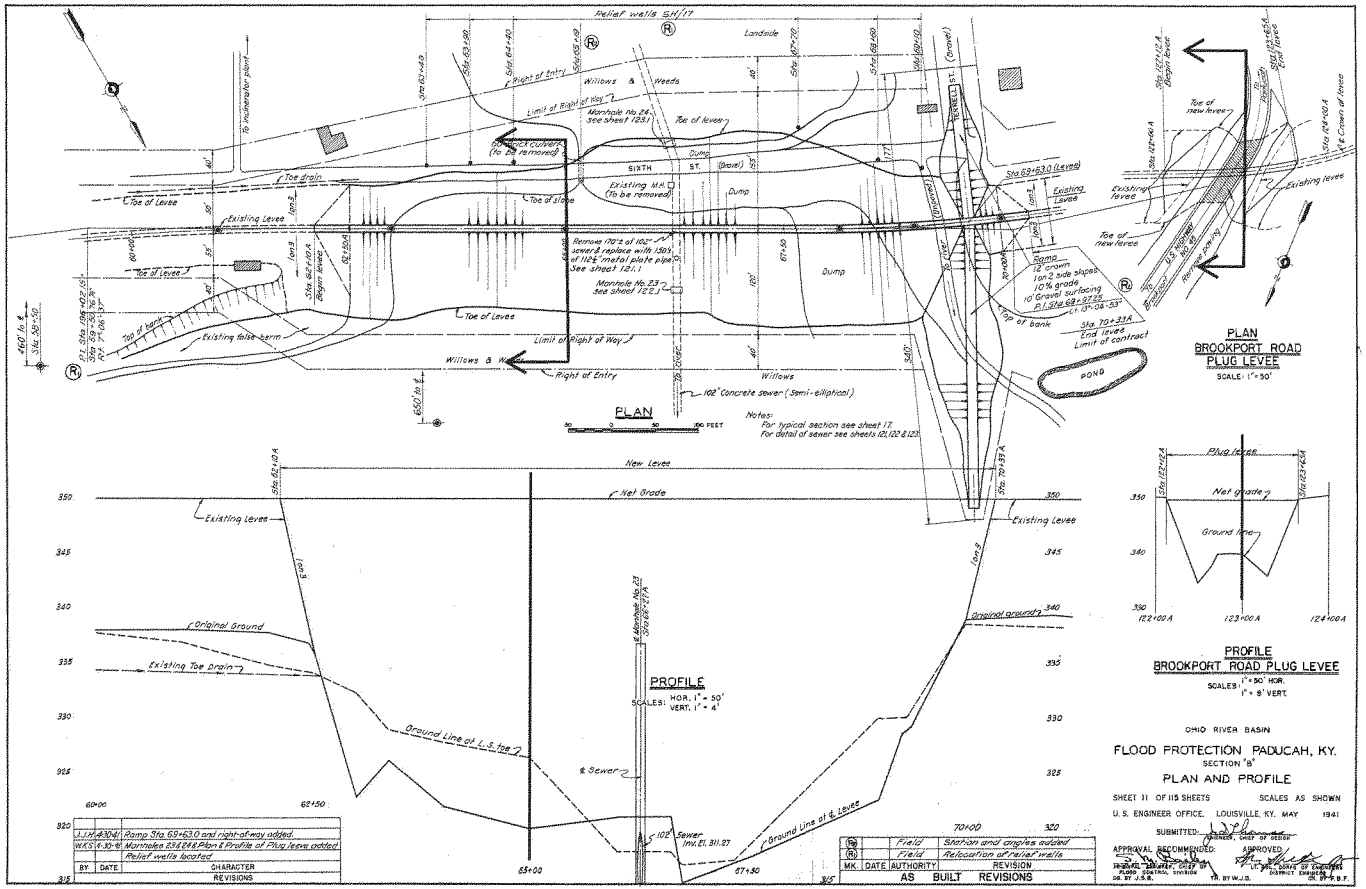
GR. BY E.S. TR. BY D.G. CK. BY M.K.P.

AS BUILT 935-12.2/10

1191

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER REVISIONS
J.J.H.	4-30-41	Ramp Sta. 69+63.0 and right-of-way added.
W.K.S.	4-30-41	Manholes 23 & 24 & Plan & Profile of Plug levee added
		Relief wells located

MK.	DATE	AUTHORITY	REVISION
Rp		Field	Station and angles added
Rp		Field	Relocation of relief wells

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PLOTTING

SHEET 11 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: APPROVED:

PROJECT ENGINEER, CHIEF OF FLOOD CONTROL DIVISION OR. 97 J.S.R. LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER OR. 99 F.S.F.

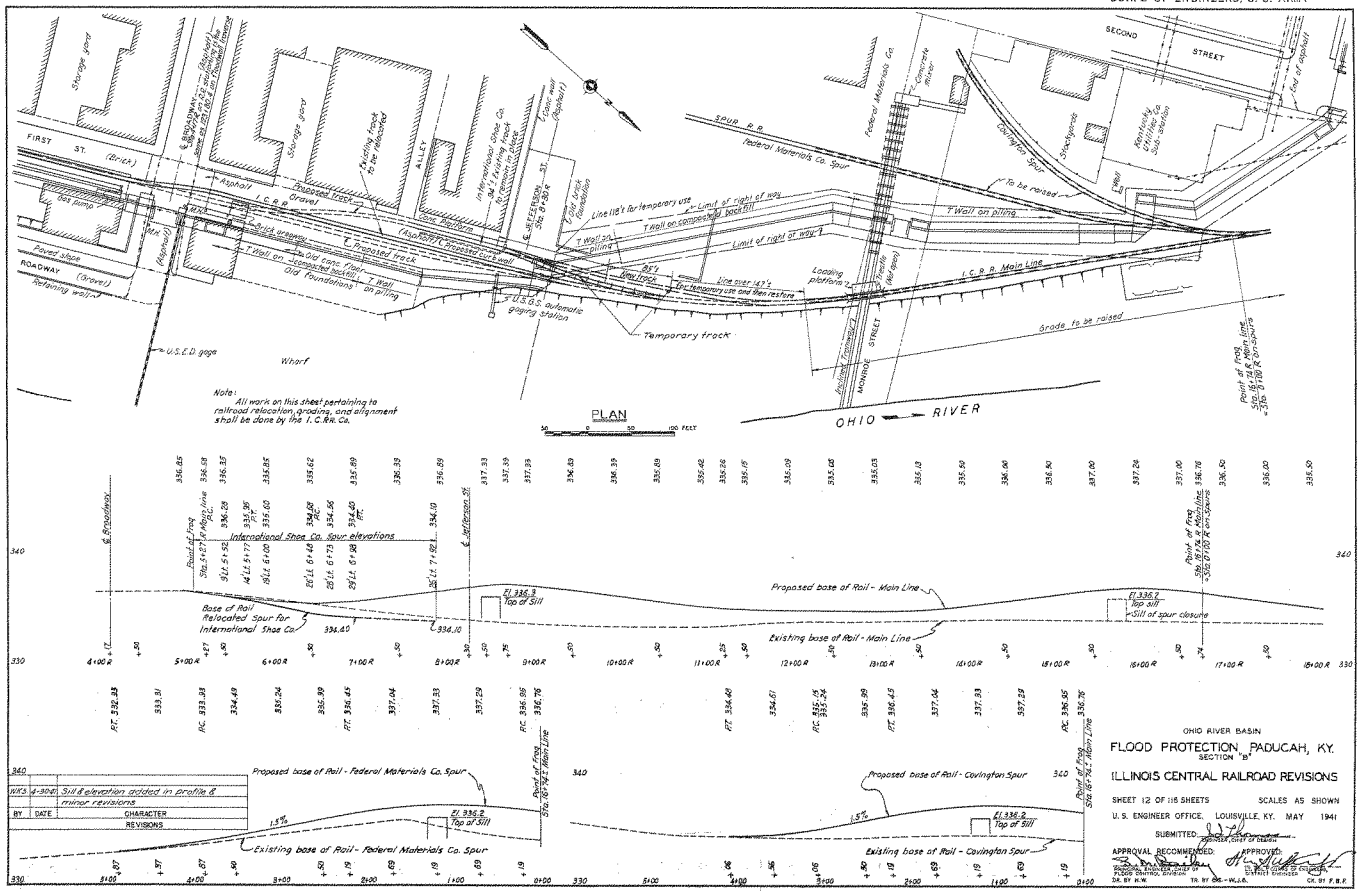
TR. BY W.J.B.

AS BUILT 935-12.2/11

1192

WAR DEPARTMENT

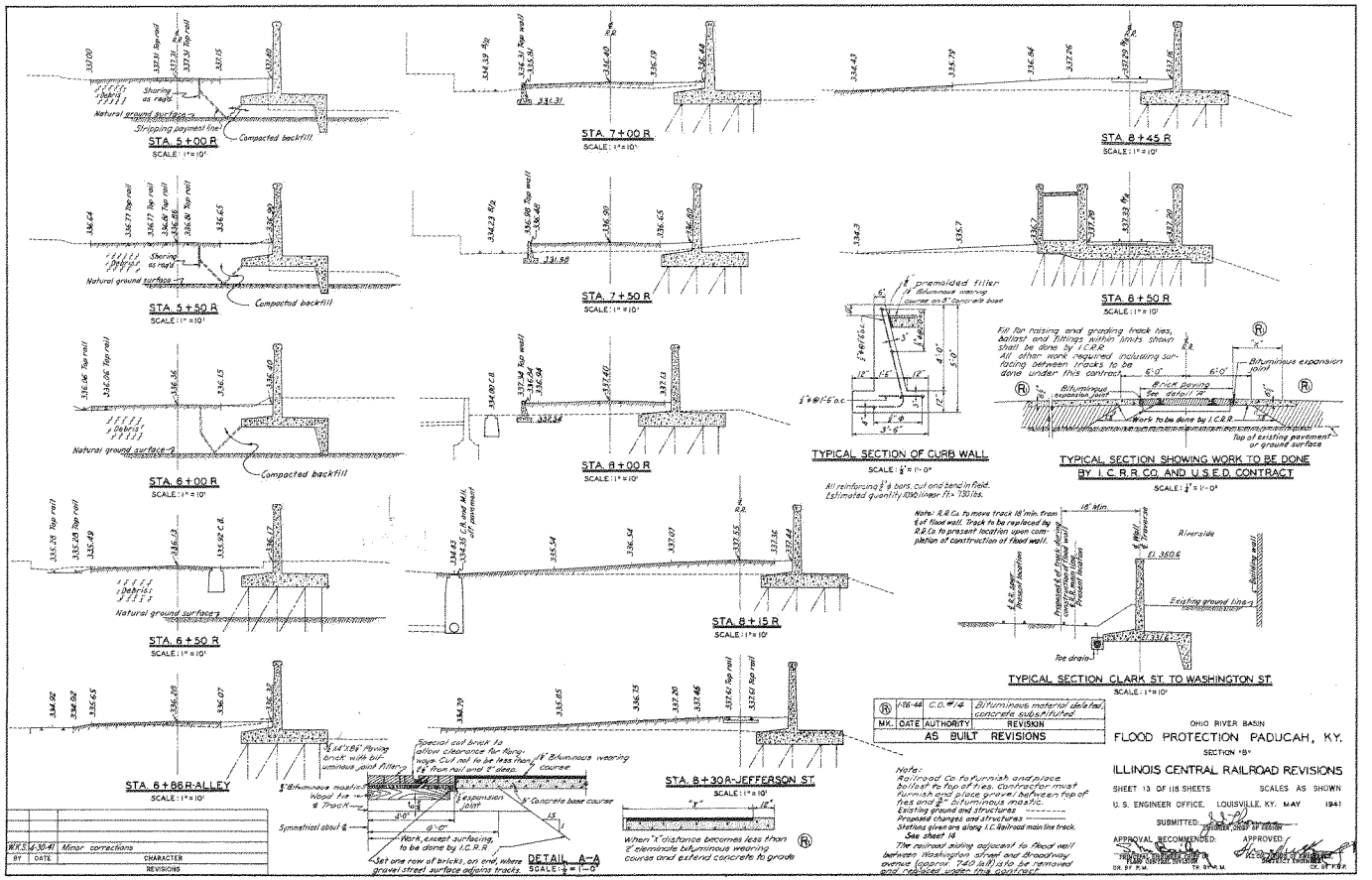
CORPS OF ENGINEERS, U. S. ARMY



1193

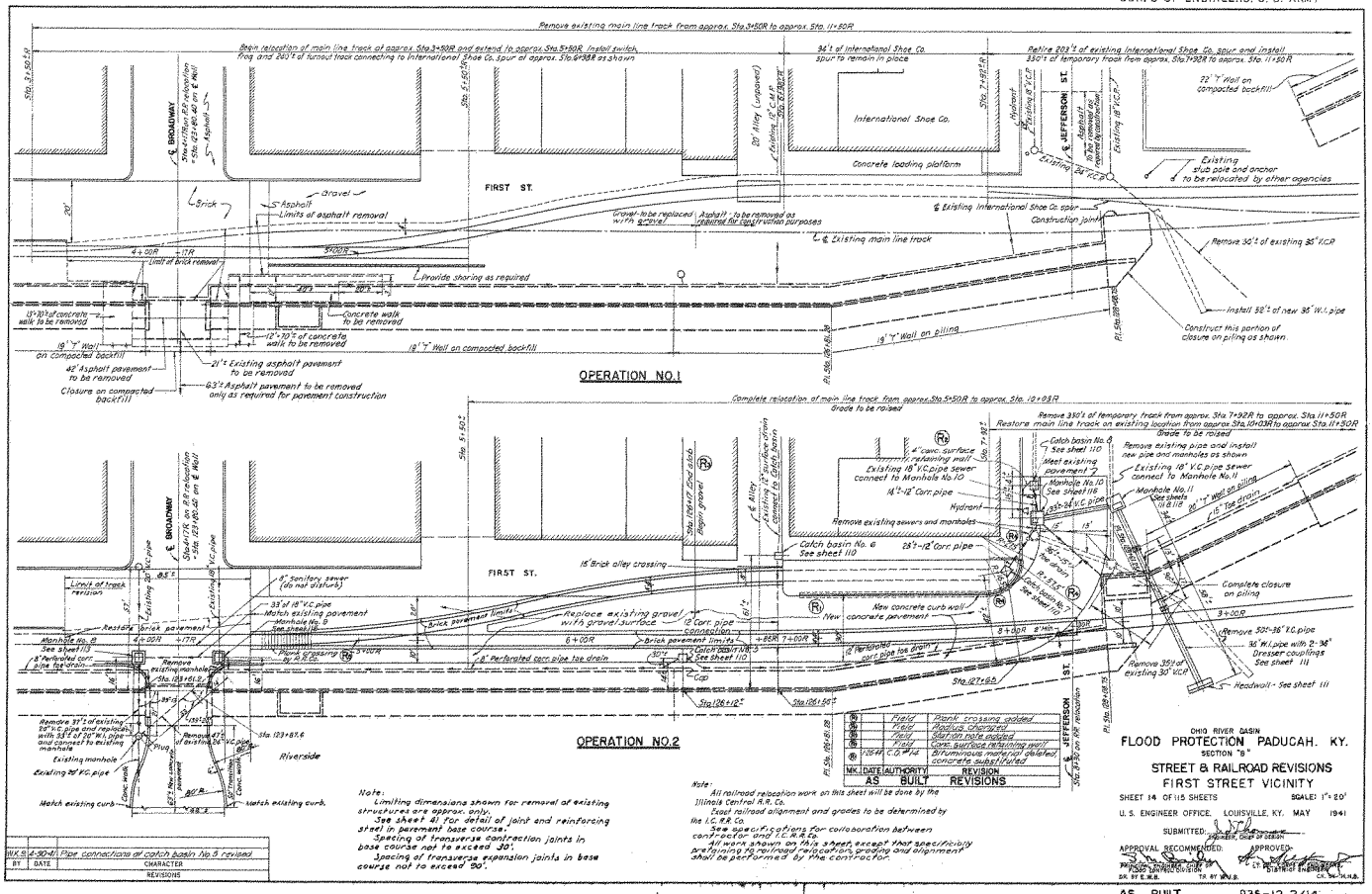
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

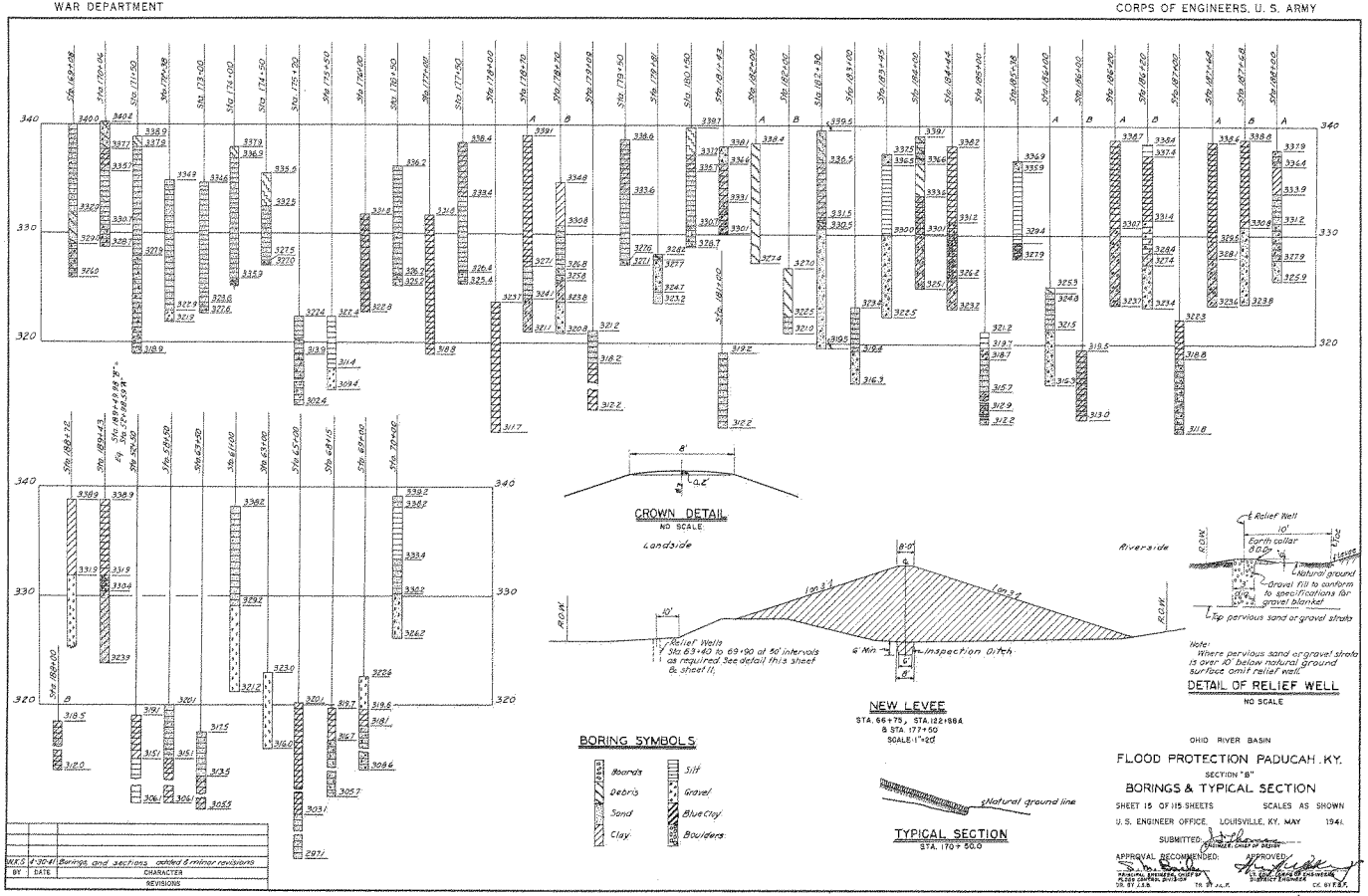


1195

392

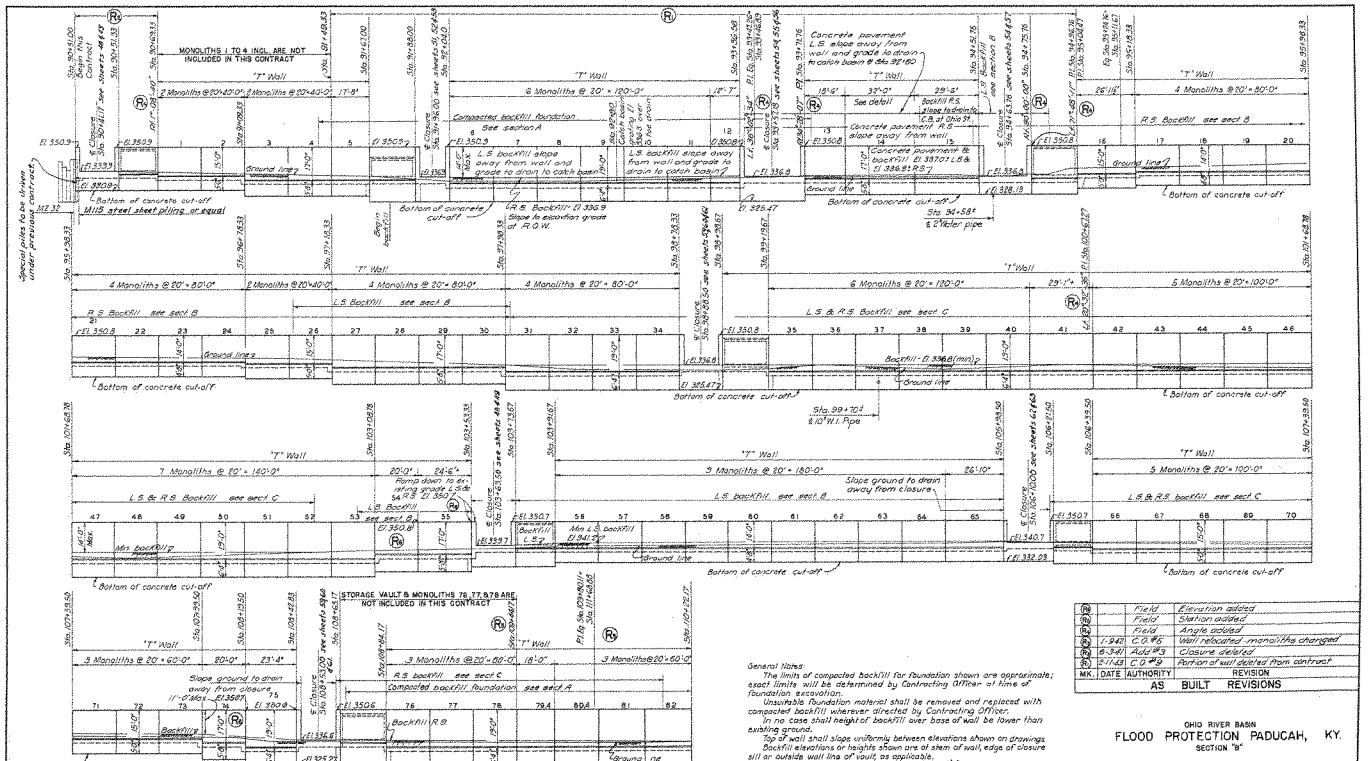
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



General Notes:

The limits of compacted backfill for foundation shown are approximate; exact limits will be determined by Contracting Officer at time of foundation excavation.

Unsuitable foundation material shall be removed and replaced with compacted backfill wherever directed by Contracting Officer.

In no case shall height of backfill over base of wall be lower than existing ground.

Top of wall shall slope uniformly between elevations shown on drawings.

Backfill elevations or heights shown are at stem of wall, edge of closure sill or outside wall line of vault, as applicable.

For stripping and backfill sections A, B, C, D & E see sheet 22.

MK.	DATE	AUTHORITY	REVISION
12		Field	Elevation added
11		Field	Station added
10		Field	Angle added
9	1-9-43	C.O. #5	Wall relocated, monoliths changed
8	6-3-41	Add #3	Closure deleted
7	2-11-43	C.O. #9	Portion of wall deleted from contract

AS BUILT REVISIONS

BY	DATE	CHARACTER REVISIONS
W.K.S.	4-30-41	Minor revisions

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 16 OF 115 SHEETS

SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [signature] DIVISION CHIEF & DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] CHIEF OF ENGINEERS, DISTRICT ENGINEER

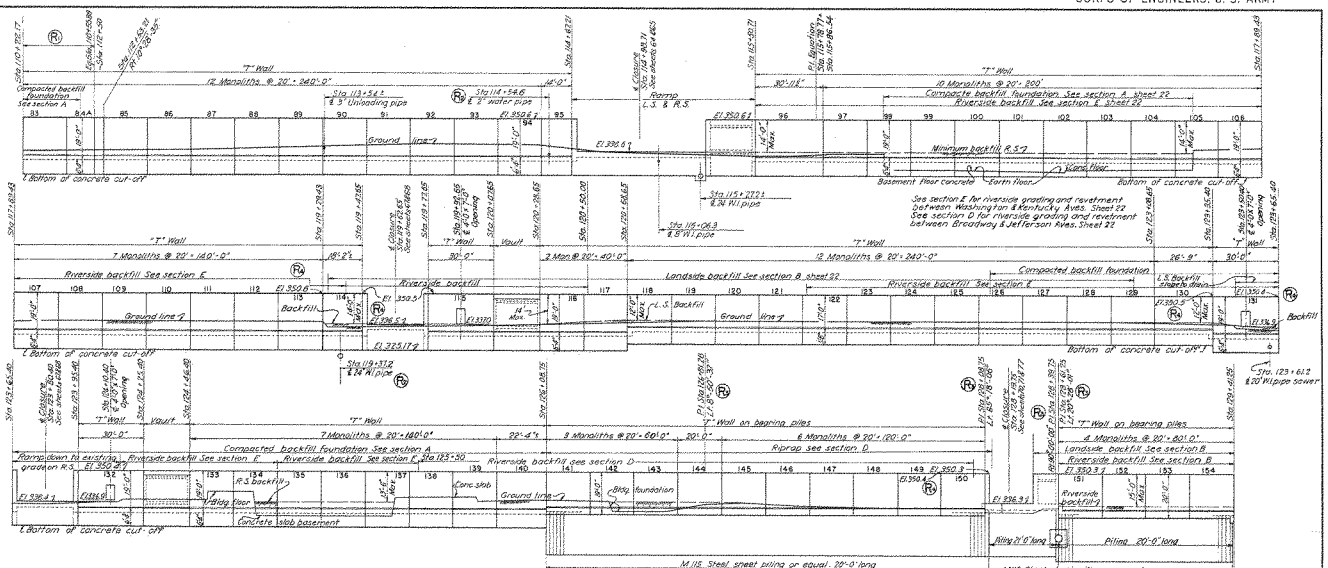
DR. BY O.M. TR. BY W.L. CK. BY T.R.K.

AS BUILT 935-12.2/18

1197

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	AUTHORITY	REVISION
		Field	Elevation change and addition
		Field	Angle added
		Field	Station change
	1-9-42	C.O. #5	Wall relocation - monolith change

AS BUILT REVISIONS

BY	DATE	CHARACTER
W.K.S.	6-30-41	Piling revised & minor corrections

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 17 OF 115 SHEETS SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: ENGINEER, CHIEF OF SECTION

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY D.W. TR. BY A.G. CK. BY F.B.T.

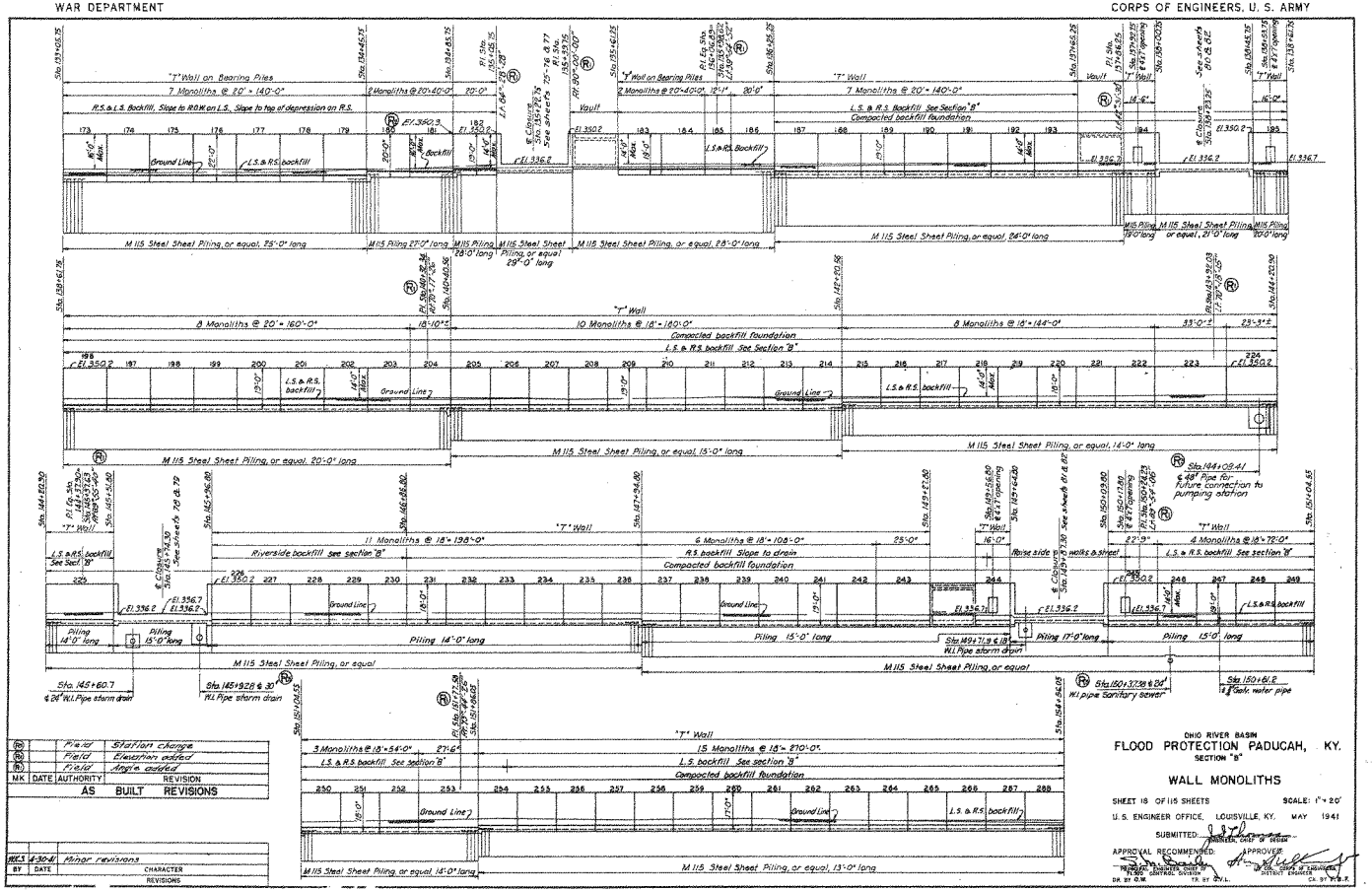
AS BUILT 935-122/19

1198

565

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



(R)		Field	Station change
(R)		Field	Elevation added
(R)		Field	Angle added
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

WKS	4-30-41	Minor revisions
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 18 OF 115 SHEETS SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: Engineer, Chief of Design

APPROVAL RECOMMENDED: Principal Engineer, Chief of Design, Flood Control Division

APPROVED: Col. Corps of Engineers, District Engineer

DR. BY G.M. TR. BY D.V.L. CK. BY W.B.F.

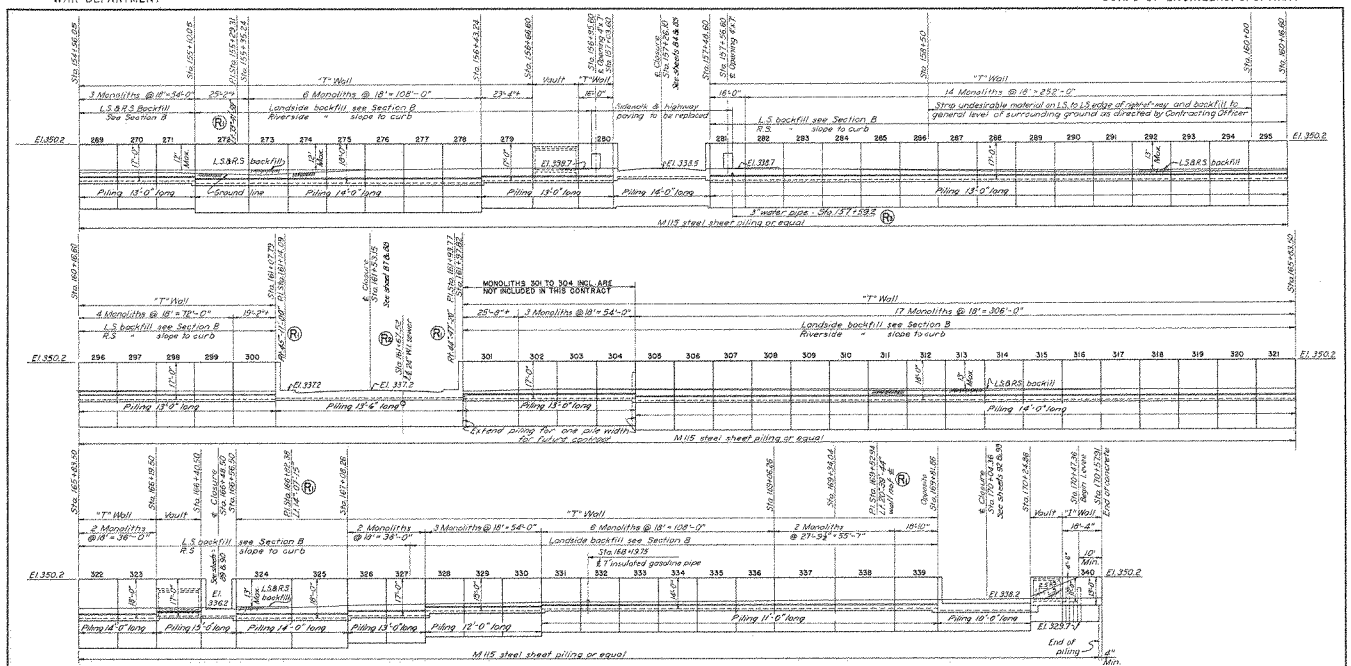
AS BUILT 935-12.2/20

1199

396

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



W.K.S.	4-30-41	24" sewer added
BY	DATE	CHARACTER
		REVISIONS

(R)		Field	Pipe added
(R)		Field	Station change
(R)		Field	Angles added
MK	DATE	AUTHORITY	REVISION
		AS BUILT	REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 19 OF 115 SHEETS

SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CHIEF, SUPPORT BRANCH, DESIGN BRANCH

APPROVED: [illegible] DISTRICT ENGINEER

DR. BY O.J.K. TR. BY H.K.J. CK. BY F.B.F.

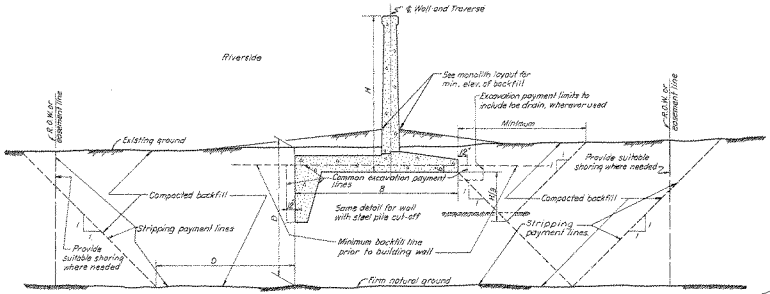
AS BUILT

935-12.2/21

1200

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



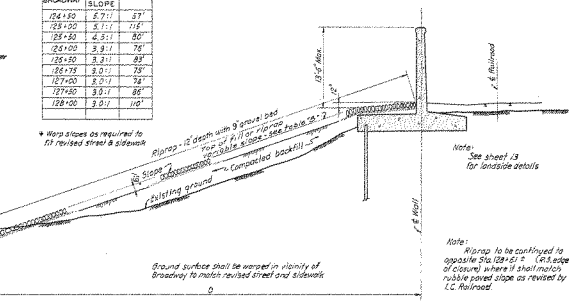
Note: Extend toe slope of compacted backfill to existing ground where width of R.O.W. or easement permits.

SECTION "A"
SCALE: 1/8" = 1'-0"

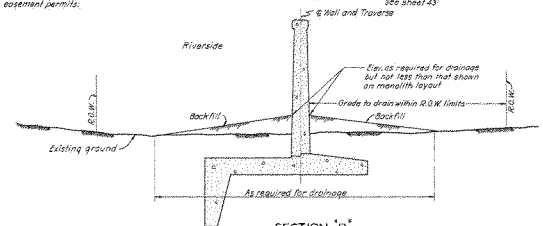
Note: For landside stripping and shoring Sta. 138+55 to 25' west of P.I. Sta. 140+22.34 see sheet 43

TABLE "B"		
STATION	APPROX. SLOPE	APPROX. "D"
BROADWAY	* WARP SLOPE	
124+50	5.7:1	57'
125+00	5.1:1	71'
125+50	4.5:1	80'
126+00	3.9:1	76'
126+50	3.3:1	89'
126+75	3.0:1	79'
127+00	3.0:1	92'
127+50	3.0:1	86'
128+00	3.0:1	110'

* Warp slopes as required to fit revised street & sidewalk

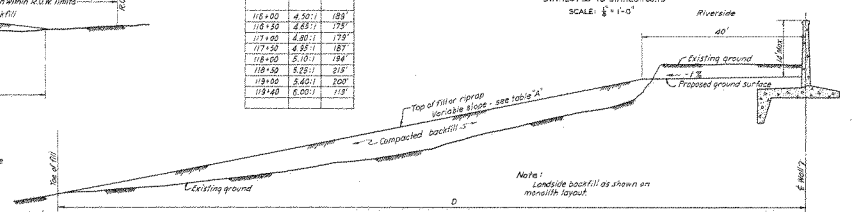


RIPRAP
TYPICAL SECTION "D"
STA. 124+50 TO STA. 128+06.75
SCALE: 1/8" = 1'-0"

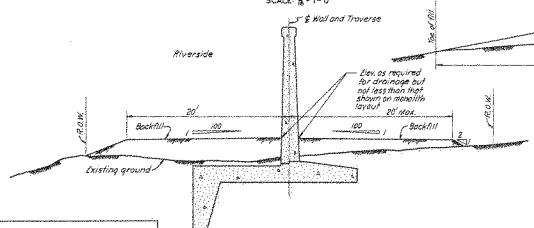


SECTION "B"
SCALE: 1/8" = 1'-0"

TABLE "A"		
STATION	APPROX. SLOPE	APPROX. "D"
115+00	4.50:1	189'
116+50	4.65:1	179'
117+00	4.80:1	179'
117+50	4.95:1	187'
118+00	5.10:1	194'
118+50	5.25:1	213'
119+00	5.40:1	207'
119+40	6.00:1	113'



SECTION "E"
STA. 117+58
SCALE: 1/8" = 1'-0"



SECTION "C"
SCALE: 1/8" = 1'-0"

General Notes:
For closure structure Sta. 115+ to Sta. 116+00 the berm shall be varied so as to provide a 24' min. berm, parallel to wall on back tangent, (see sheet 40) with 5' min. coverage over heel of wall, and the slope varied to match existing road at downstream end of marineways. 12" riprap on 9" gravel blanket to be placed on entire slope and berm between existing road and Sta. 116+50.
For location of sections "A" to "E", see sheets 18 to 21 incl.

M.K.S.	6-30-41	Notes added & minor revisions.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

STRIPPING AND BACKFILL

SHEET 20 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [signature]
ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature]
PADUCAH DISTRICT, CHIEF OF OHIO RIVER DIVISION
DR. BY R.J.B. TR. BY W.J.B.

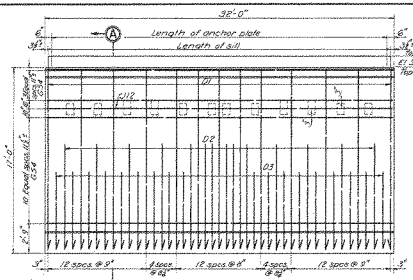
APPROVED: [signature]
LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER. BY F.B.F.

AS BUILT

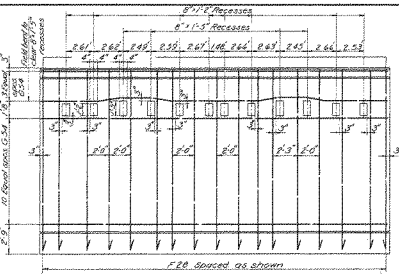
935-12.2/22

1201

378

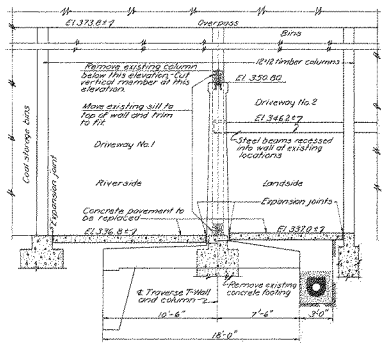


RIVERSIDE STEM REINFORCING

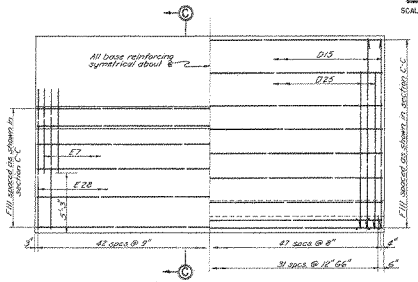


LANDSIDE STEM REINFORCING

ELEVATION
SCALE: 1/4" = 1'-0"

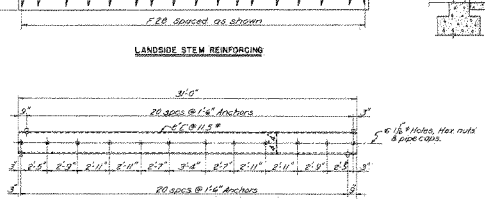


SECTION A-A
Note: For dimensions of 17' T-Wall see typical section sheet 37

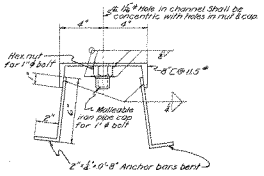


TOP REINFORCING BOTTOM REINFORCING

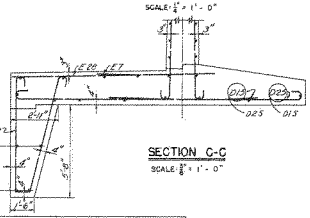
PLAN
SCALE: 1/4" = 1'-0"



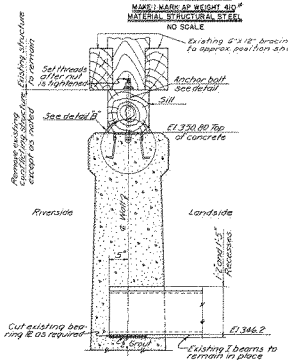
ANCHOR PLATE
MAKE: 1 MARK: AP WEIGHT 410#
MATERIAL STRUCTURAL STEEL
NO SCALE



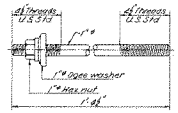
DETAIL "B"
SCALE: 3" = 1'-0"



SECTION C-C
SCALE: 3/8" = 1'-0"



SECTION THRU WALL
SHOWING SILL ANCHORAGE AND BEAM RECESSES
REINFORCING BARS NOT SHOWN
SCALE: 1" = 1'-0"



ANCHOR BOLT
MAKE: 12 MARK: AB-1 WT 6.45# EACH
MATERIAL STRUCTURAL STEEL
SCALE: 3" = 1'-0"

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 14

SHEET 21 OF 115 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: MATERIAL, TRAFFIC, CHIEF OF FLOOD CONTROL DIVISION
APPROVED: DISTRICT ENGINEER
DR. BY K.H.A. TR. BY A.J.Z. CK. BY F.B.F.

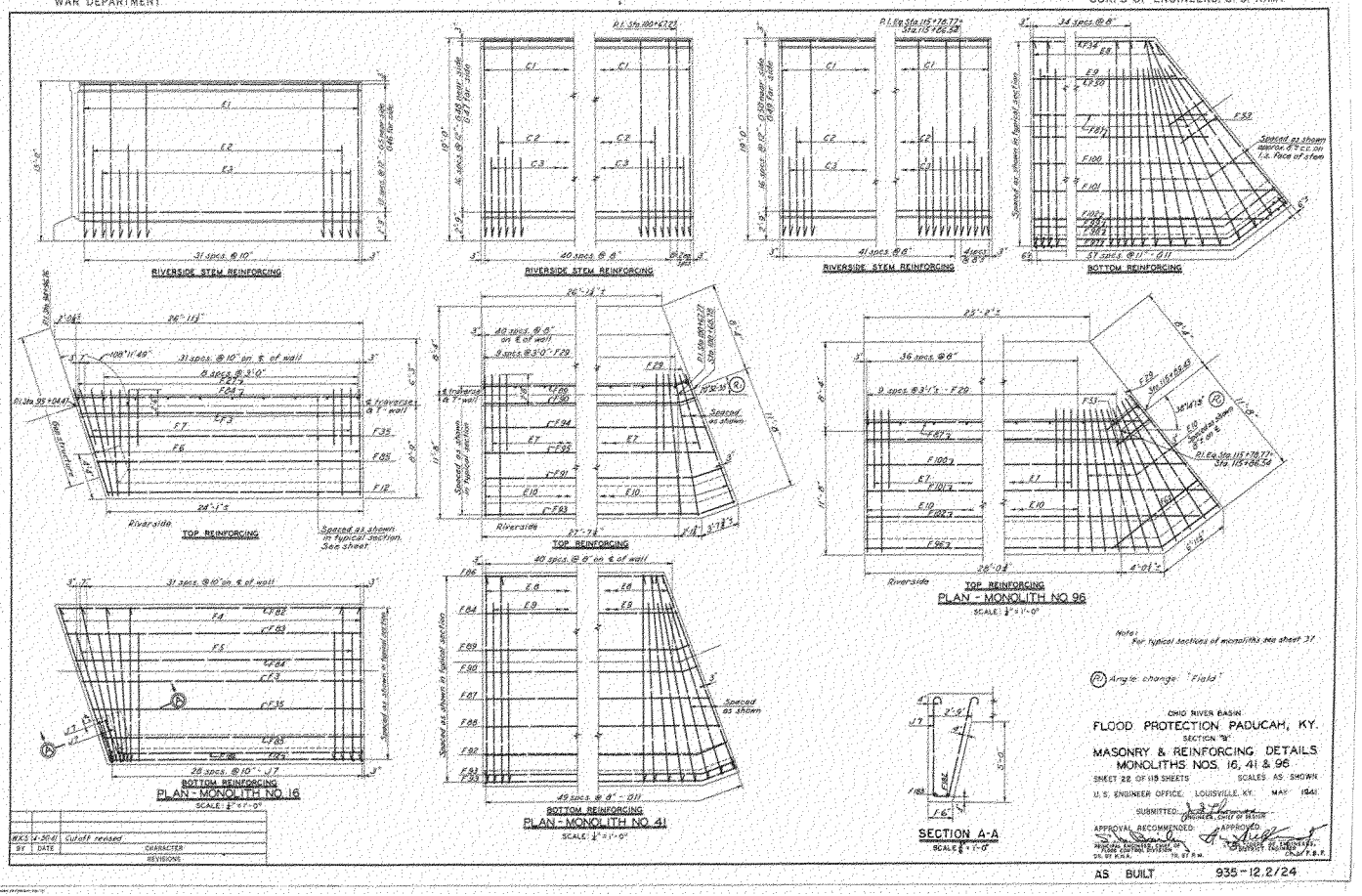
AS BUILT 935 - 12.2/23

1202

377

WAR DEPARTMENT

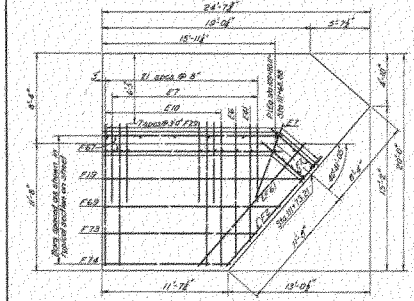
CORPS OF ENGINEERS, U. S. ARMY



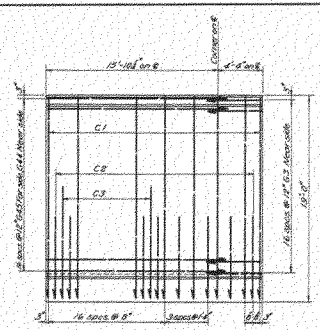
1203

WAR DEPARTMENT

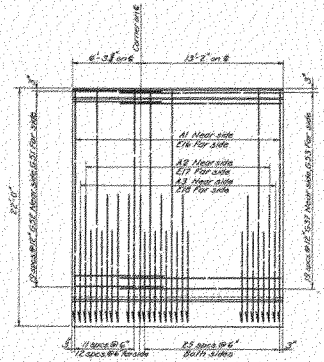
CORPS OF ENGINEERS, U. S. ARMY



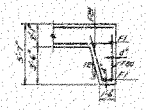
TOP REINFORCING
MONOLITH NO. 80



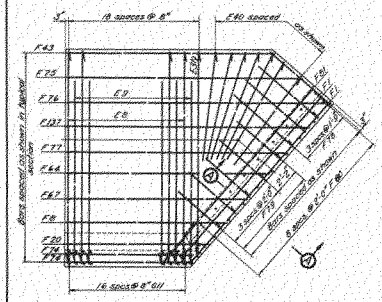
RIVERSIDE STEM REINFORCING
MONOLITH NO. 80



RIVERSIDE & LANDSIDE STEM REINFORCING
MONOLITH NO. 167

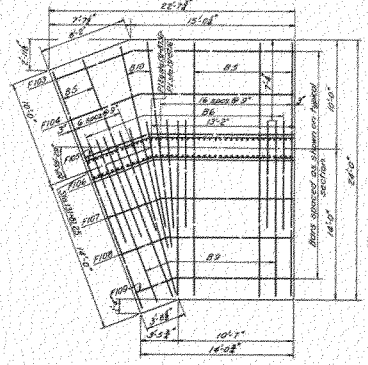


SECTION A-A

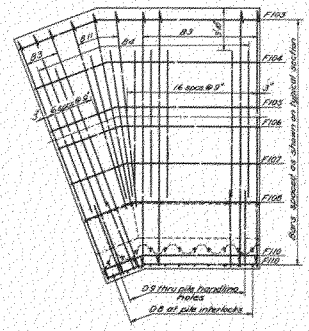


BOTTOM REINFORCING
MONOLITH NO. 80

PLAN MONOLITH NO. 80



TOP REINFORCING
MONOLITH NO. 167



BOTTOM REINFORCING
MONOLITH NO. 167

PLAN MONOLITH NO. 167

Note
For typical section of Monolith "80" see sheet 31.H-18
For typical section of Monolith "167" see sheet 31.H-22

W.K.S.	4-30-41	Piling revised & minor corrections
BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NOS. 80 & 167

SHEET 23 OF 115 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

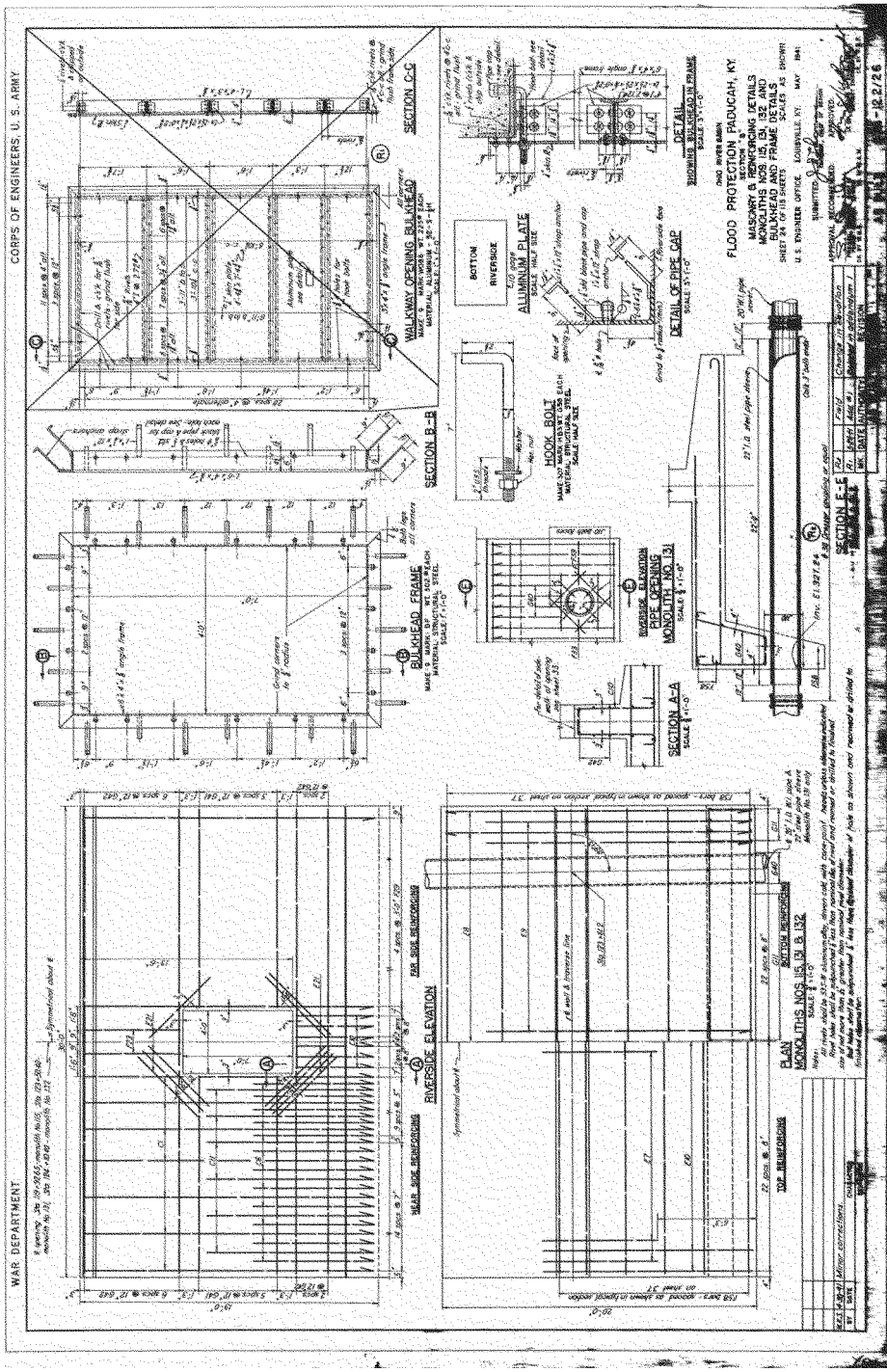
SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

AS BUILT

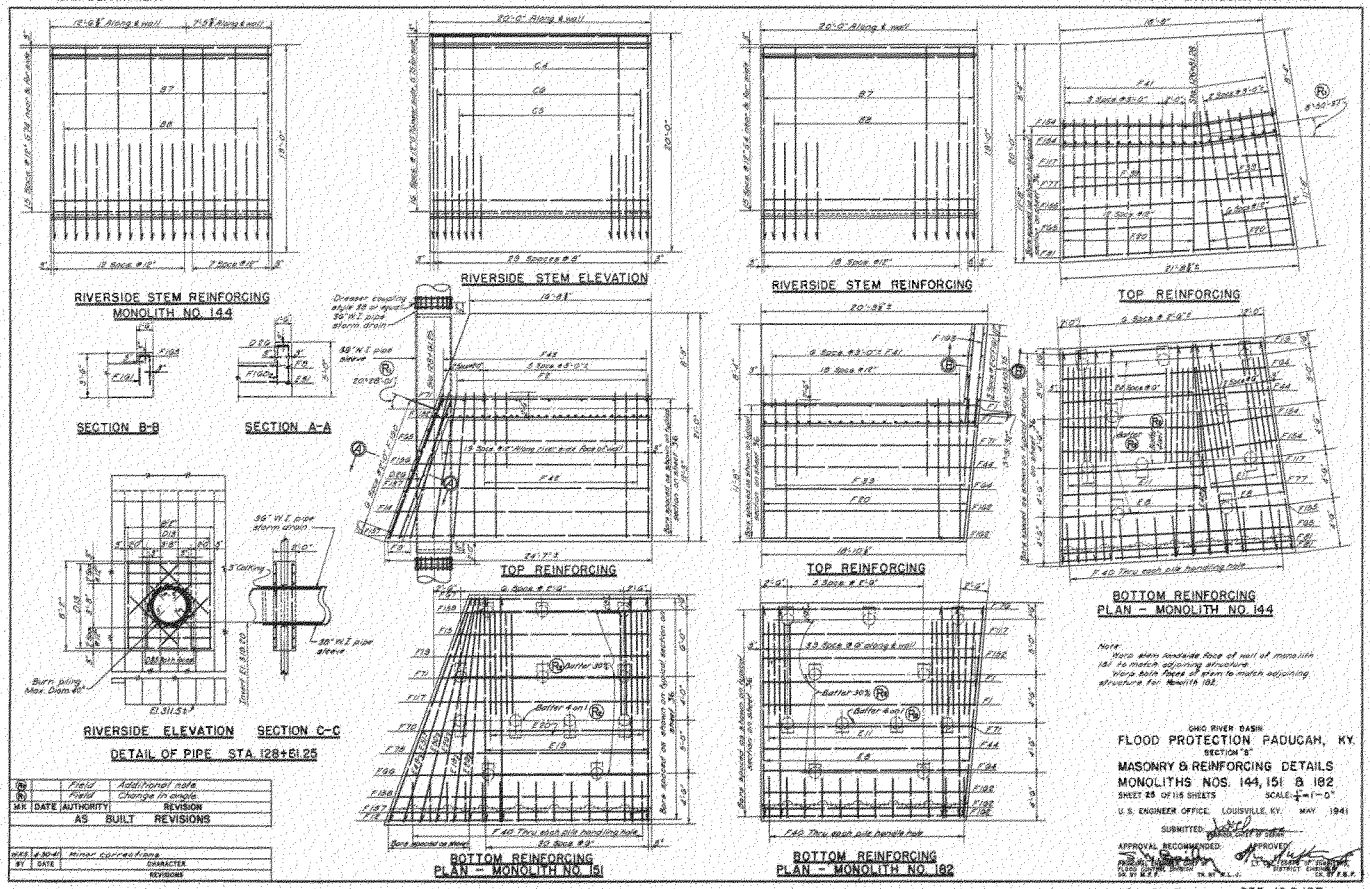
935-12.2/26

1204


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
WALKWAY OPENING BULKHEAD
SECTION C-C
SECTION B-B
BULKHEAD FRAME
RIVERSIDE ELEVATION
PLAN
MONOLITHS NOS. 131 & 132
ALUMINUM PLATE
HOOK BOLT
DETAIL OF PIPE CAP
DETAIL
SECTION A-A
SECTION E-E
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 131 & 132
BULKHEAD AND FRAME DETAILS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
OHIO RIVER BASIN

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	AUTHORITY	REVISION
		Field	Additional note.
		Field	Change in angle.

AS BUILT REVISIONS

BY	DATE	CHARACTER
WES	4-30-41	Minor corrections.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 144, 151 & 182

SHEET 25 OF 115 SHEETS SCALE: 1/4"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

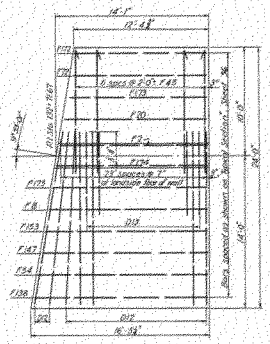
APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

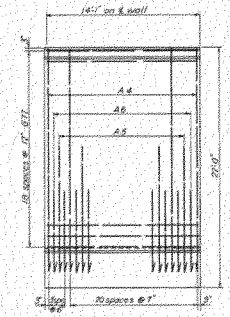
AS BUILT 935-12.2/27

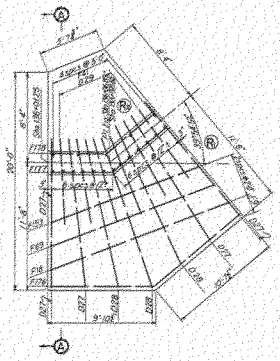
1206

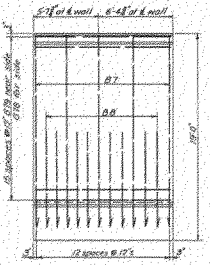
WAR DEPARTMENT

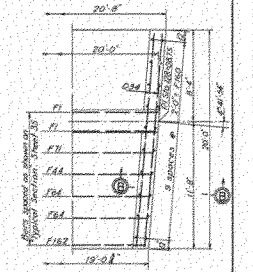
CORPS OF ENGINEERS, U. S. ARMY

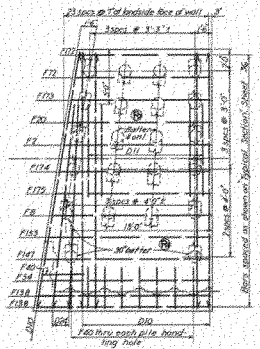




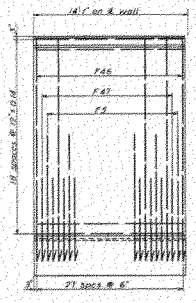


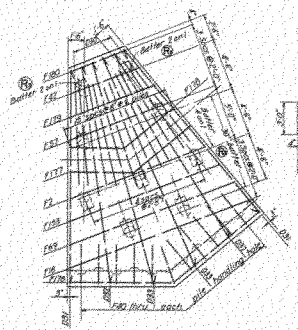


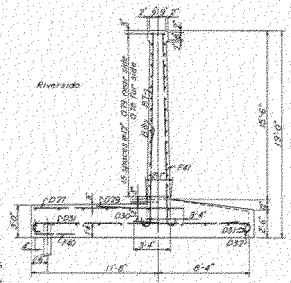


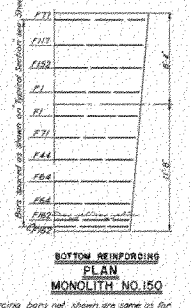


MONOLITH NO. 171









Note:
Reinforcing bars not shown are same as for 20' Monolith of 19' T wall on bearing piles (See sheet 36).
Warp both faces of stem to match adjoining structure.

BY	DATE	CHARACTER REVISIONS
W.K.S.	4-30-41	Minor corrections.

MK	DATE	AUTHORITY	REVISION
2		Field	Note added
1		Field	Station Eq. change
0		Field	Change in angle

AS BUILT REVISIONS

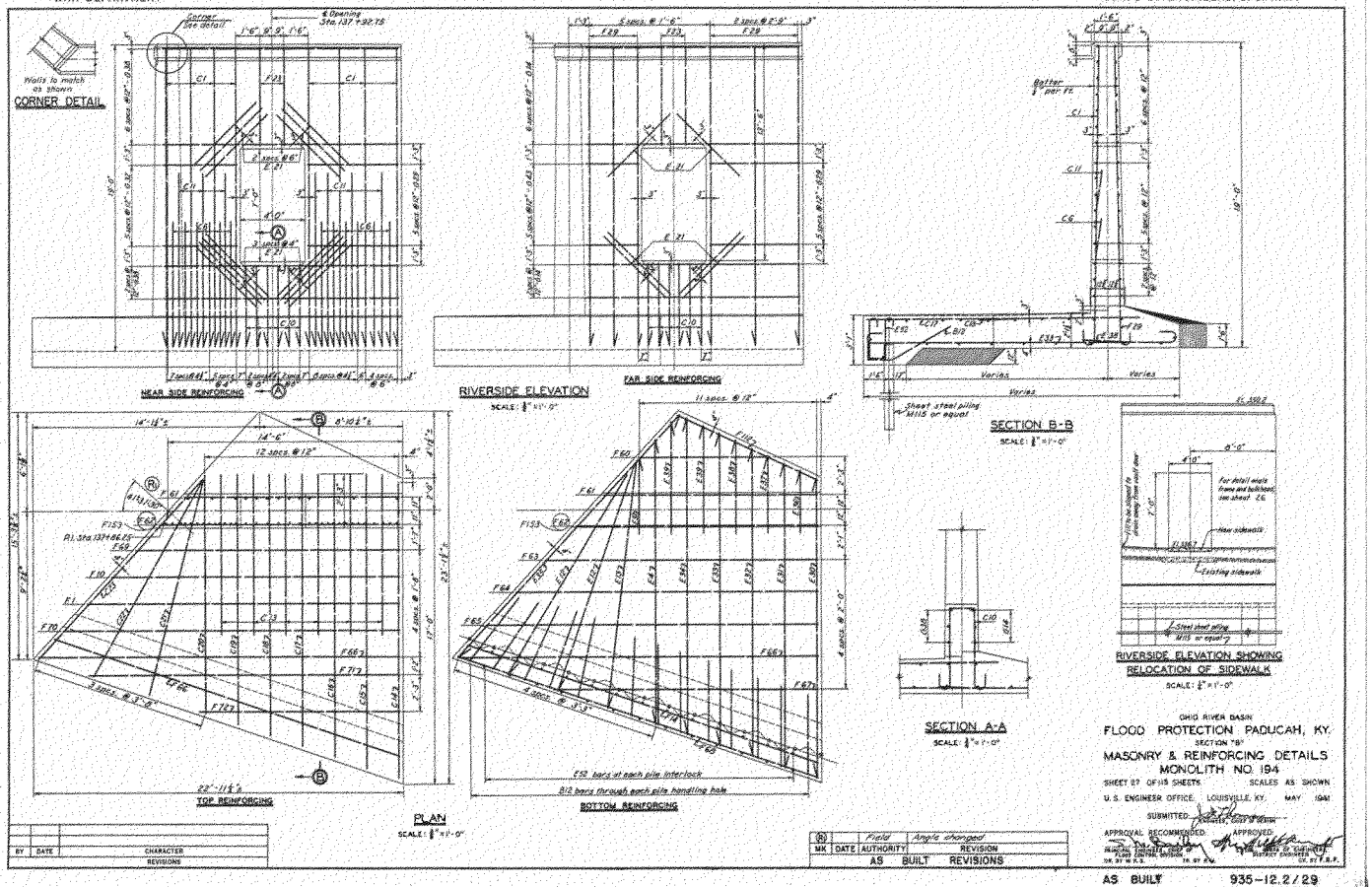
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 150, 171 & 185
SHEET 28 OF 115 SHEETS SCALE 1/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: [illegible]
APPROVAL RECOMMENDED: [illegible]
APPROVED: [illegible]

AS BUILT 935-12.2/28

1207

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 194

SHEET 27 OF 115 SHEETS. SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: DISTRICT ENGINEER

APPROVAL RECOMMENDED: APPROVED:

PRINCIPAL ASSISTANT, FLOOD CONTROL DIVISION, OR BY W.O.S.

CHIEF, DIV. OF ENGINEERING, DISTRICT ENGINEER, OR BY F.R.P.

BY	DATE	CHARACTER
		REVISIONS

MK	DATE	AUTHORITY	REVISION
(B)		Field	Angle changed
		AS BUILT	REVISIONS

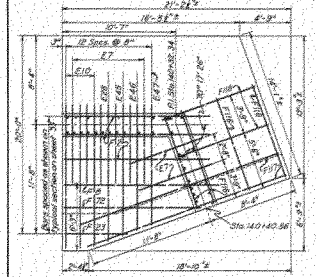
AS BUILT 935-12.2/29

405

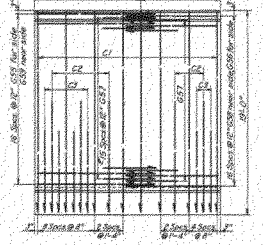
1208

WAR DEPARTMENT

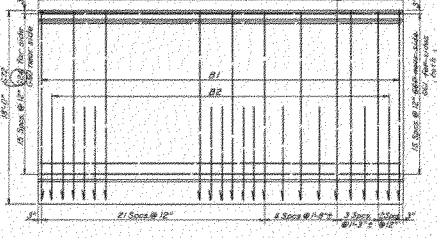
CORPS OF ENGINEERS, U. S. ARMY



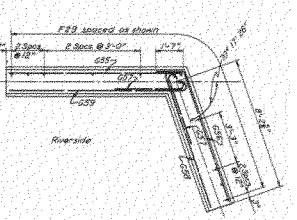
TOP REINFORCING
MONOLITH NO. 204



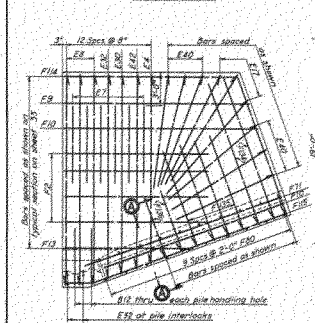
RIVERSIDE STEM REINFORCING
MONOLITH NO. 204
SCALE: 1/4" = 1'-0"



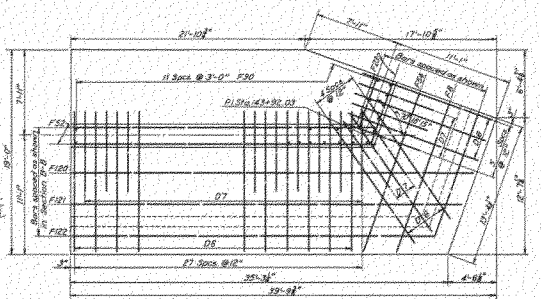
RIVERSIDE STEM REINFORCING
MONOLITH NO. 223
SCALE: 1/4" = 1'-0"



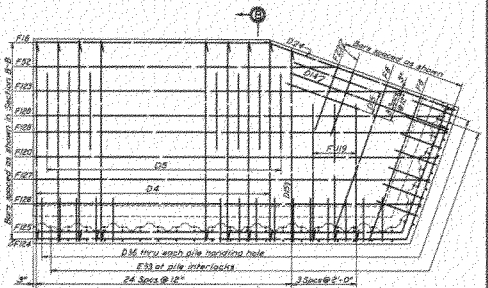
CORNER REINFORCEMENT OF STEM
MONOLITH NO. 204
SCALE: 1/4" = 1'-0"



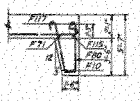
BOTTOM REINFORCING
PLAN-MONOLITH NO. 204
SCALE: 1/4" = 1'-0"



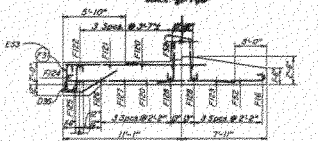
TOP REINFORCING
PLAN-MONOLITH NO. 223
SCALE: 1/4" = 1'-0"



BOTTOM REINFORCING



SECTION A-A
SCALE: 1/4" = 1'-0"



SECTION B-B
SCALE: 1/4" = 1'-0"

W.K.S. 4-30-41	Minor correction.	
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 204 & 223

SHEET 28 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY. 1941

SUBMITTED: [signature] ASSISTANT, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH, FLOOD CONTROL DIVISION — CH. DI W.P.A. — TR. DI W.K.S.

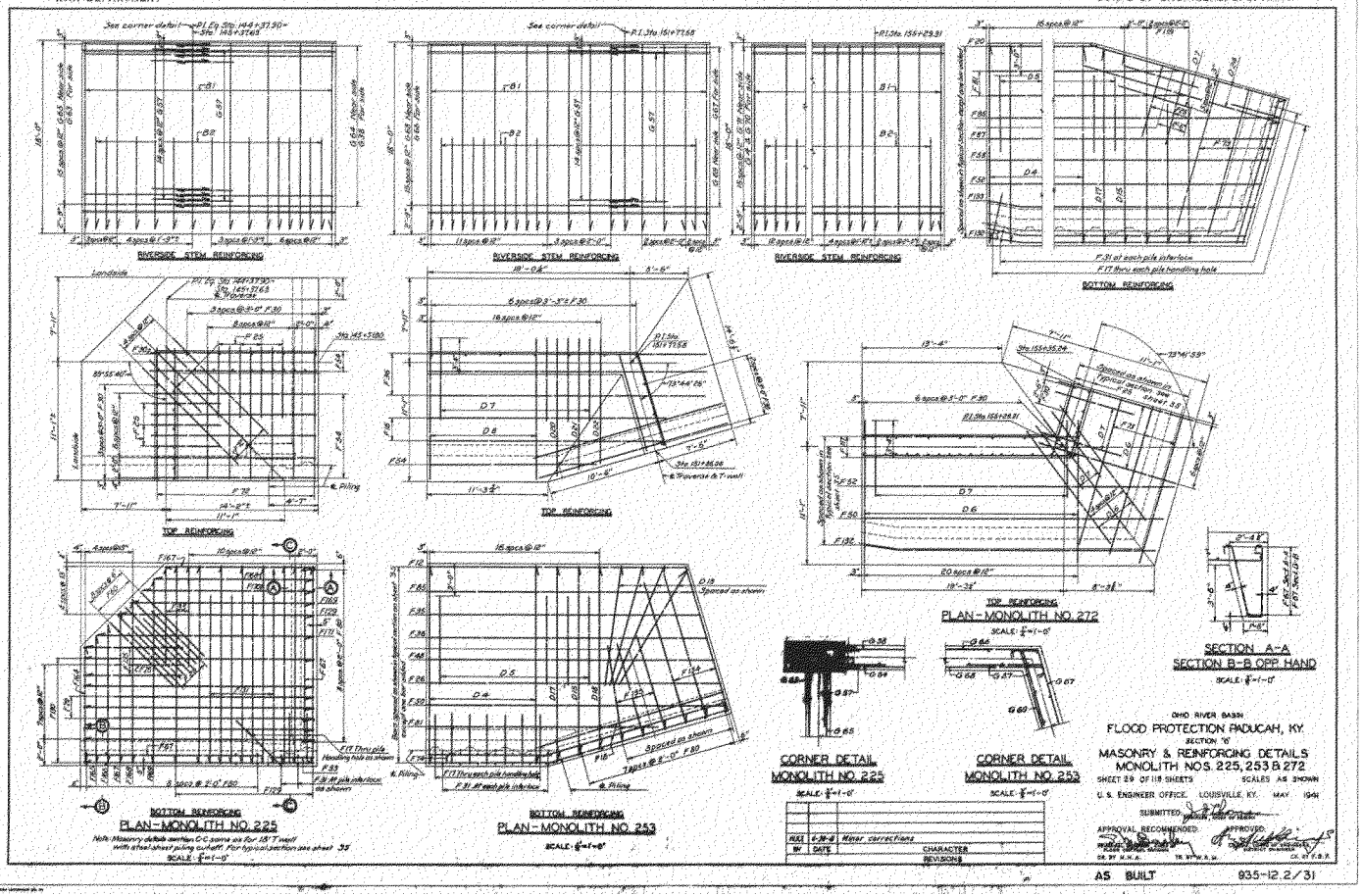
APPROVED: [signature] LOUISVILLE DISTRICT ENGINEER — CH. DI E.D.Y.

AS BUILT

935-12.2/30

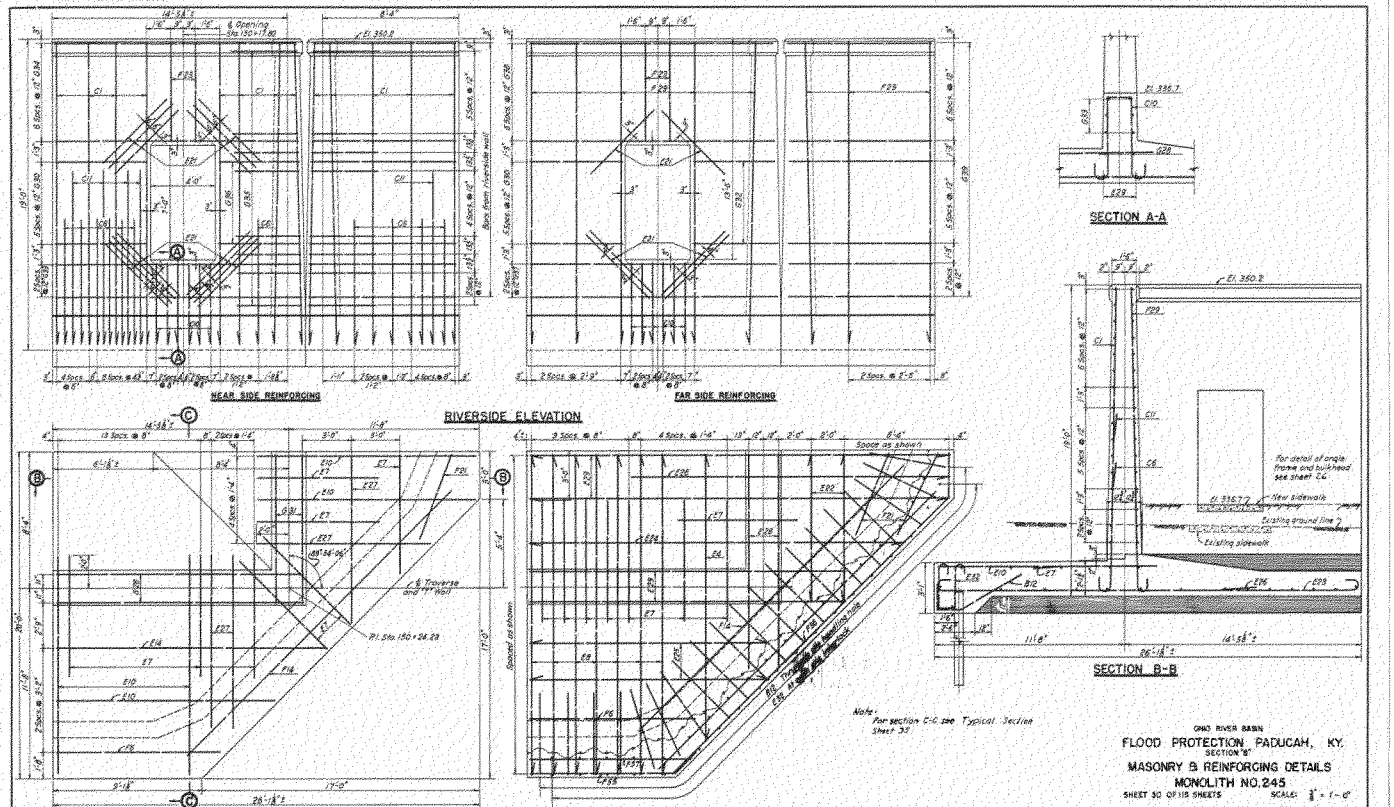
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 245

SHEET 30 OF 115 SHEETS

SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED:

APPROVAL RECOMMENDED:

APPROVED:

DISTRICT ENGINEER

BY	DATE	CHARACTER
		REVISIONS

AS BUILT

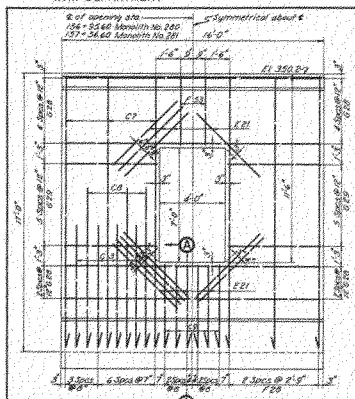
935-12.2/32

1211

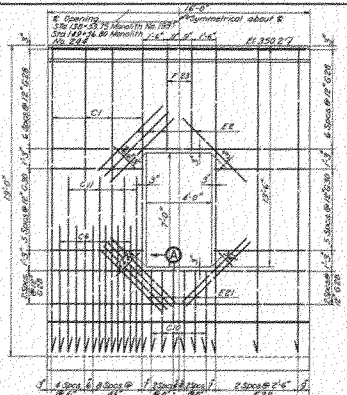
848

WAR DEPARTMENT

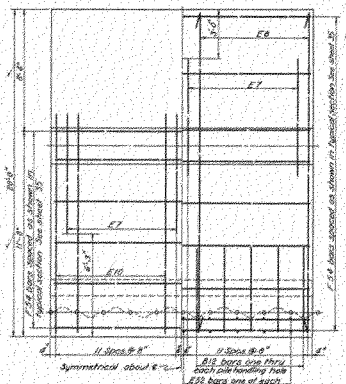
CORPS OF ENGINEERS, U. S. ARMY



RIVERSIDE ELEVATION



RIVERSIDE ELEVATION



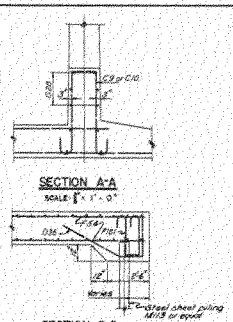
PLAN

MONOLITHS NOS. 195 & 244

PILING LAYOUT IN MONOLITH NO. 195 AS SHOWN

MONOLITH NO. 244 OPPOSITE HAND

SCALE: 1/8" = 1'-0"

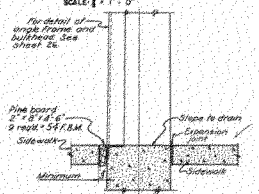


SECTION A-A

SCALE: 1/8" = 1'-0"

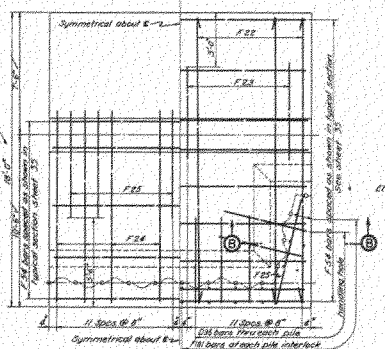
SECTION B-B

SCALE: 1/8" = 1'-0"



DETAIL OF SIDEWALK AT SERVICE OPENINGS

SCALE: 1/8" = 1'-0"

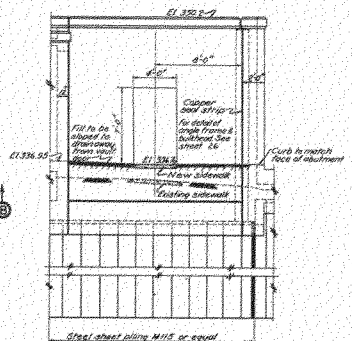


PLAN

MONOLITHS NOS. 280 & 281

MONOLITH NO. 280 AS SHOWN, NO. 281 OPPOSITE HAND

SCALE: 1/8" = 1'-0"



RIVERSIDE ELEVATION MONOLITH NO. 244

SHOWING RELOCATION OF SIDEWALK

SCALE: 1/8" = 1'-0"

Note:
For dimensions of transverse sections see sheet 33.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 280, 281, 195 & 244

SHEET 31 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [illegible] DISTRICT ENGINEER

DR. BY W.K.B. TR. BY J.L.T. CK. BY F.S.K.

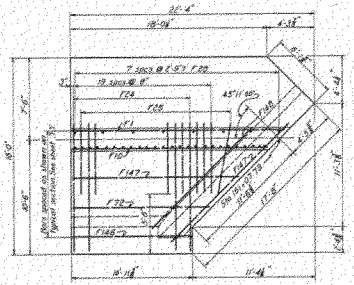
AS BUILT

935-12.2/33

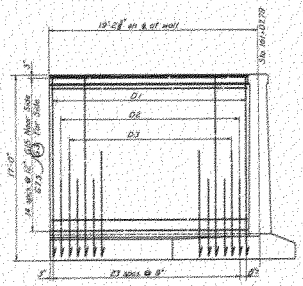
1212

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



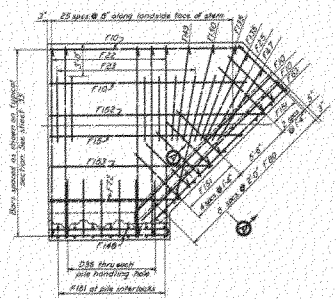
TOP REINFORCING



RIVERSIDE STEM REINFORCING

MONOLITH NO. 300

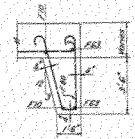
SCALE: 1/4" = 1'-0"



BOTTOM REINFORCING

PLAN - MONOLITH NO. 300

SCALE: 1/4" = 1'-0"



SECTION A-A

SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER REVISIONS
W.F.S.	4-30-41	Monolith No. 301 deleted

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 300 & 301

SHEET 32 OF 115 SHEETS SCALES: AS SHOWN.

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] Project Engr. in Charge

APPROVED: [illegible] District Engr.

APPROVAL RECOMMENDED: [illegible] Chief, Design Branch

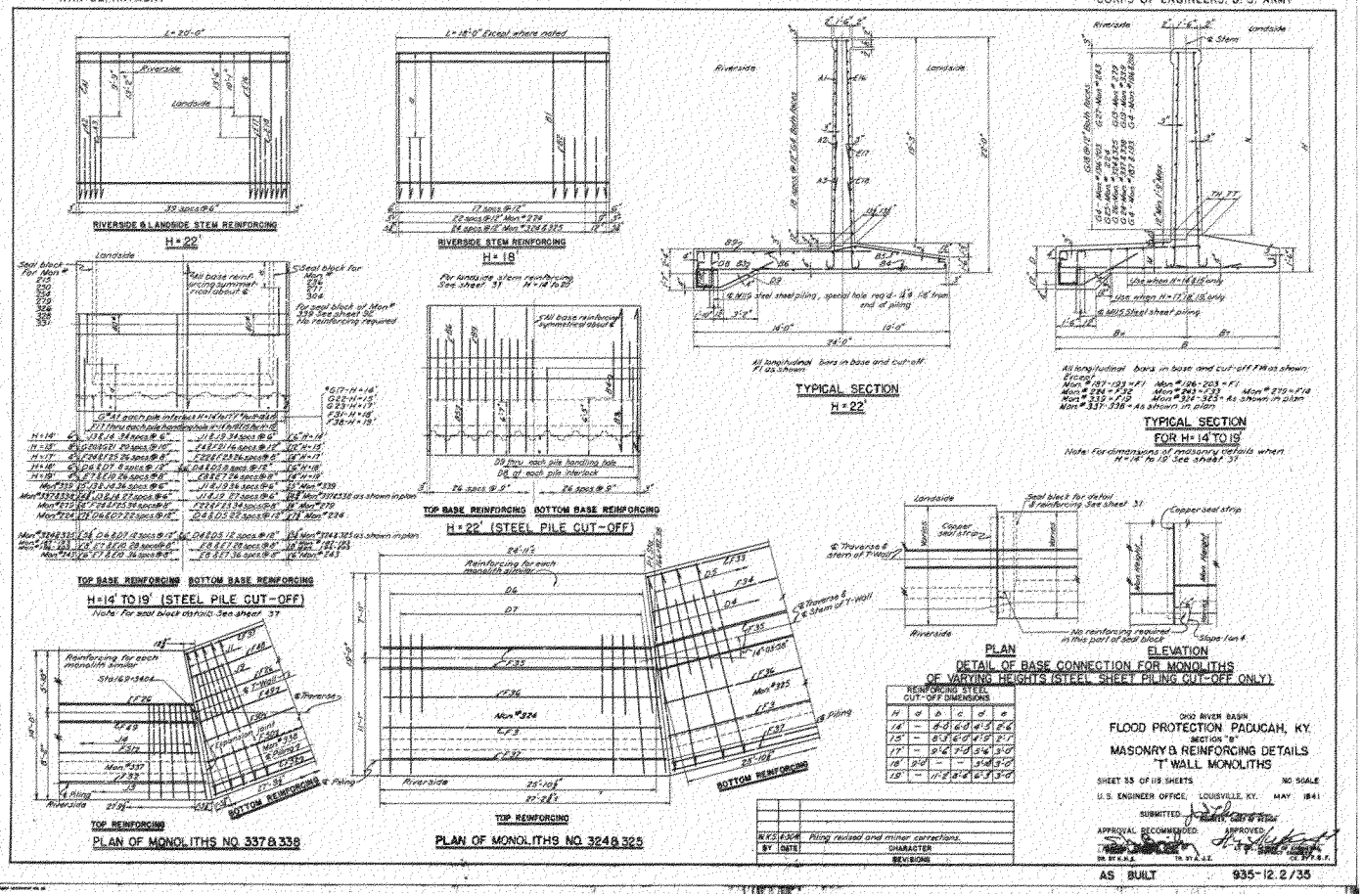
DR. BY: M.F.F. TR. BY: D.C.K. CK. BY: F.B.F.

AS BUILT 935-12.2/34

1213

WAR DEPARTMENT

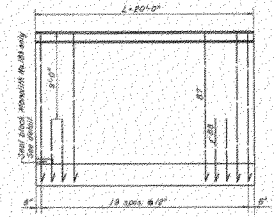
CORPS OF ENGINEERS, U. S. ARMY



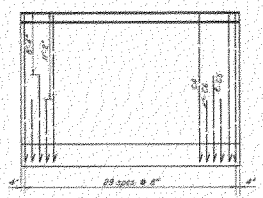
1214

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

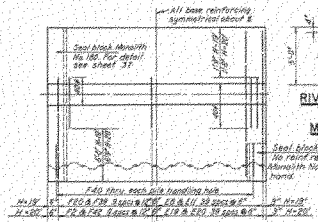


RIVERSIDE STEM REINFORCING
H = 19'

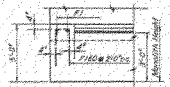


RIVERSIDE STEM REINFORCING
H = 20'

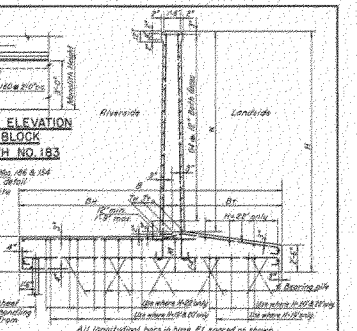
For Landside reinforcing see sheet 37
H = 18' to 20'



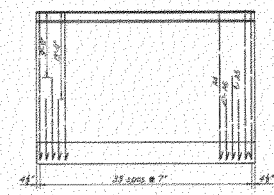
H = 19' & 20'



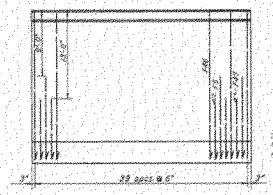
RIVERSIDE ELEVATION
SEAL BLOCK
MONOLITH NO. 183



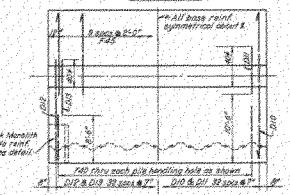
TYPICAL SECTION
H = 19' TO H = 22' ON BEARING PILES
For dimensions of masonry details see sheet 37



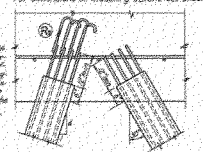
RIVERSIDE STEM REINFORCING
H = 22'



LANDSIDE STEM REINFORCING
H = 22'



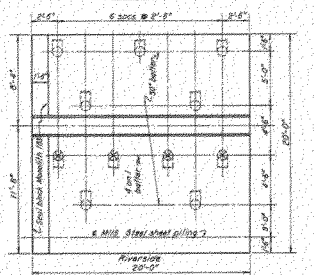
H = 22'



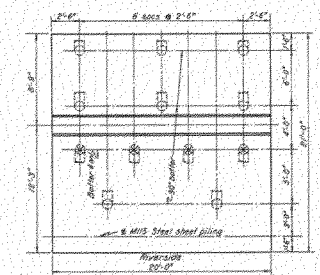
All piles battered 4 on 1 with vertical shall have hooked extension rods 30" long (including hook) welded to the long (radius) pile reinforcing extending into well base with sufficient weld to develop the strength of the bar. Extensions to be made with bar of equal section.

Remove concrete from top of pile. Expand bars from pile to extend a minimum of 18" into base

DETAIL CONCRETE PILES IN BASE "T"-WALL

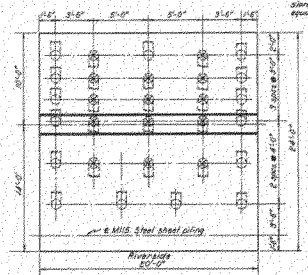


H = 19'



H = 20'

PILING LAYOUT



H = 22'

LEGEND

Piles batter 30" with vertical

Piles batter 4 on 1 with vertical

SEAL BLOCK DETAILS MONOLITH NO. 186
MONOLITH NO. 188 OPPOSITE HAND
MONOLITH NO. 192 OPPOSITE HAND

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
SECTION "A"

MASONRY & REINFORCING DETAILS
"T"-WALL MONOLITHS

SHEET 34 OF 118 SHEETS SCALE: NONE

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] Chief of Design

APPROVAL RECOMMENDED: [illegible] Chief, Design Section

APPROVED: [illegible] District Engineer

DR. BY: E.H.S. TR. BY: E.B. CK. BY: [illegible]

MK	DATE	AUTHORITY	REVISION
		Field	Note and radii added
		Field	Dimension added

AS BUILT REVISIONS

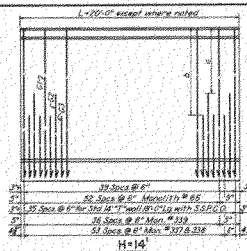
BY	DATE	CHARACTER REVISIONS
MK	5-30-41	Minor corrections.

AS BUILT 935-12.2/36

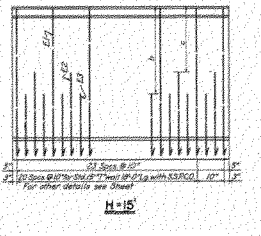
412

WAR DEPARTMENT

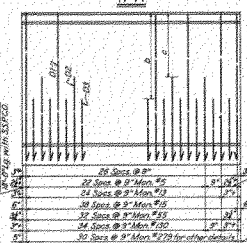
CORPS OF ENGINEERS, U. S. ARMY



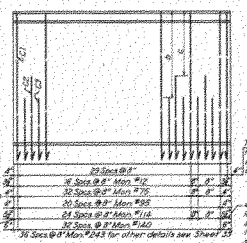
H=14'



H=15'

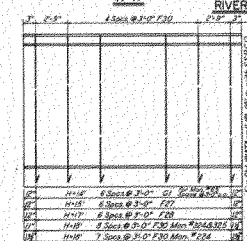


H=17'



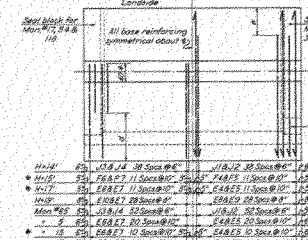
H=19'

RIVERSIDE STEM REINFORCING



H=14' TO H=20'

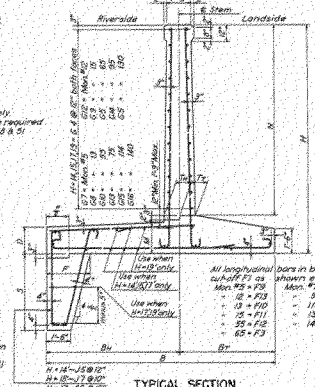
LANDSIDE STEM REINFORCING



H=14' TO H=19'

(CONCRETE CUT-OFF)

* Number of spaces given for half monolith only, all others given for full monolith length.

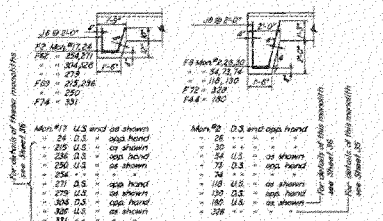


TYPICAL SECTION

DIMENSIONS FOR MASONRY DETAILS WHEN H=14' TO H=22'													
With concrete cutoff L=20' except as noted 75-24, 26-24, 65-26'-0" Long	With steel sheet piling C.O. L=Varies except as noted 331-336, 339 = 18'-10" Lg. 1298,324 = 27'-8" Long	On bearing piles L=20'	H	B	Br	N	M	T=F1	D	F	S		
			14'	14'	9'-2"	5'-0"	11'-8"	1'-11"	1'/8"	1'-9"	2'-8"	4'-8"	
1-2, 23-26, 66-73	328-330		15'	15'	9'-7"	5'-3"	12'-8"	1'-11"	1'/8"	1'-9"	2'-9"	5'-0"	
3-4, 27-30, 74, 74/18-129 5-12'-8" Lg. 13-18'-2" Lg. 19-25'-6" Lg. 55-24'-10" Lg. 130-26'-9" Long	154-271, 282-299, 302-304, 326-327, 273 = 23'-4" Long		17'	18'	10'-6"	7'-6"	14'-6"	2'-0"	1'/8"	1'-11"	2'-11"	5'-8"	
	205-222, 206-236, 250-252, 273-278 305-323 324 = 25'-3" Long 324-325-25'-10" Lg.		18'	19'	11'-1"	7'-11"	15'-6"	2'-1"	1'/8"	2'-0"		Rd	Rd
6-11, 31-40, 43-53, 76-79, 81-94, 97-103, 116-121, 123-129 12 = 10'-7" Lg. 75 = 23'-4" Lg. 95 = 4'-0" Lg. 114 = 18'-2" Lg. 140 = 22'-4" Long	205-214, 237-242, 246-249 187-193 = 20'-0" Lg. 196-203 = 20'-0" Lg. 243 = 25'-0" Long		19'	20'	11'-8"	8'-4"	16'-8"	2'-2"	1'/8"	2'-1"	3'-1"	6'-4"	
		141-143, 145-149, 183-184, 186	19'	20'	11'-8"	8'-4"	15'-6"	3'-1"	1'/8"	3'-0"			
		152-154, 180-181	20'	21'	12'-3"	8'-9"	16'-9"	3'-2"	1'/8"	3'-1"			
		168-170, 172-175	22'	24'	14'-0"	10'-0"	18'-4"	3'-3"	1'/8"	3'-3"			

L = Length of monolith

Note:
Deflection angle at Sta. 90+69.33 = Mon. #1 - Ignored.
Spread base reinforcing to suit.
Warp riverside face of stem to match adjoining structure.



SEAL BLOCK DETAILS

REINFORCING STEEL CUT-OFF DIMENSIONS					
H	a	b	c	d	e
14'	—	9'-0"	6'-0"	9'-5"	2'-8"
15'	—	9'-3"	6'-0"	5'-0"	2'-9"
17'	—	9'-6"	7'-0"	4'-3"	3'-2"
19'	—	11'-2"	8'-4"	6'-3"	2'-8"

Notes:
For details of piles thru monoliths 37, 90, 168, 248 & 247, see Sheet 39; for those thru monoliths 55, 224 & 332, see Sheet 38; for 131 see sheet 26.
Shift bars to clear pipe where required.
For additional bars added see Sheets 38 & 39.
Monoliths 1 to 4, 78 to 79 & 301 to 304 incl. are not to be included in this contract.

BY	DATE	CHARACTER REVISIONS

MK	DATE	AUTHORITY	REVISION
Rd		Field	Dimension deleted
Rn		Field	Addition to note

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "N"

MASONRY & REINFORCING DETAILS

"T" WALL MONOLITHS

SHEET 38 OF 115 SHEETS — NOT TO SCALE

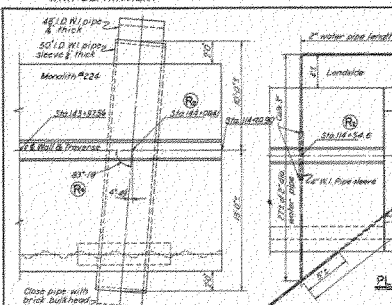
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

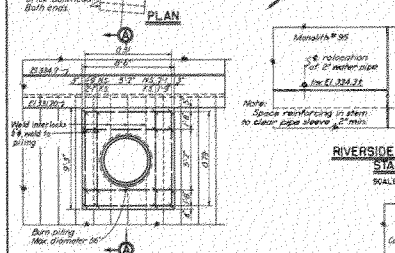
SUBMITTED: [illegible]

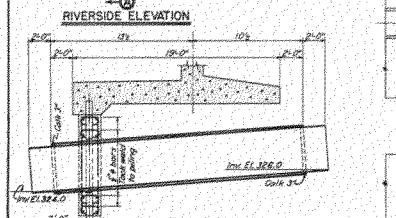
APPROVAL RECOMMENDED: [illegible] LT. COL. C.E. DIST. ENGR.

APPROVED: [illegible] COL. C.E. DIVISION ENGR.

AS BUILT 935-12.2/37





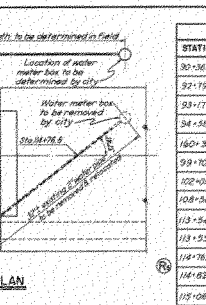


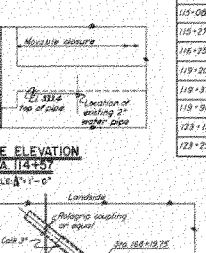
PIPE THRU WALL AT STA. 144+09.41

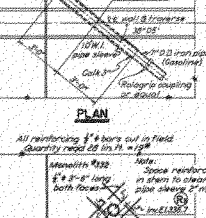
MK	DATE	AUTHORITY	REVISION
1		Field	Change in station and under-it.
2		Field	Change in station, description & remarks
3		Field	Made details
4		Field	Added new sheets
5		Field	Added sheets
6		Field	Deleted

AS BUILT REVISIONS

MK 3	BY	DATE	Revise added connection block manhole No. 3
			CHARACTER
			REVISIONS



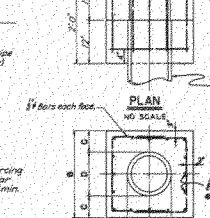




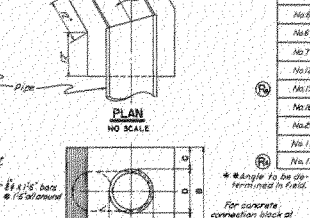
SCHEDULE OF SEWER CONNECTIONS AND PIPES THRU WALL

STATION	DESCRIPTION	OLD ELEV.	NEW ELEV.	REMARKS	STATION	DESCRIPTION	OLD ELEV.	NEW ELEV.	REMARKS
90+36.0	36" V.C. Pipe	F.L. 326.6	Same	Remove 33.1' Replace with 48.8' W.I.R. & 2 seep rings. See typical section sheet 39.	123+61.3	24" V.C. Pipe	F.L. 327.5	F.L. 326.6	Remove 37' Replace with 33'± of 20" W.I. pipe & 22' of 22" W.I. pipe sleeve. Connect to existing MH. See sheet 43 & 46
92+79.4	8" C.I. Pipe	Top 334.4		Connect to Catch Basin No. 1. Remove 4' R.S. of wall & plug.	123+87.6	24" V.C. Pipe	F.L. 328.7		Remove 41' ± See sheet 42.
93+17.1	4" V.C. Pipe	Top 331.1		Connect to fan drain. Remove 4' R.S. of wall and plug.	128+61.75	36" V.C. Pipe	F.L. 319.2	Same	Remove & replace with 33.2' of 36" W.I. pipe & 22' of 38" W.I. pipe sleeve. at Sta. 128+65.7. See sheet 111.
94+58.1	2" Water Pipe	Top 334.1	F.L. 333.8±	Lower to El. 333.3± to pass thru outlet of gas cleaner with 22' of 4" W.I. pipe sleeve. See sheet 56.	131+13.4	12" Conc. Pipe	F.L. 325.0	Same	Remove 172.6'± replace with 46.6'± W.I. pipe & 125.8'± VC. pipe. Using 36" of 14" W.I. pipe sleeve. See sheet 111.
160+39	6" V.C. Pipe	F.L.		Remove 27.7' Plug opening in manhole.	144+08.4	48" I.D. W.I. Pipe	F.L. 324.0		Place 27'± of 42" I.D. W.I. pipe with 23' of 60" W.I. pipe sleeve for future connection to Pump House. See this sheet
99+70	10" V.C. Pipe	F.L. 332.05	F.L. 328.31	Replace with approx. 36' of 10" W.I. pipe from MH No. 2 with 25' of 12" pipe sleeve. See sheet 39	145+60.7	24" V.C. Pipe	F.L. 329.0	F.L. 322.81	Remove 32', replace with 43' of 24" W.I. pipe and 21' of 26" W.I. pipe sleeve. See sheets 39 and 44
102+01	6" V.C. Pipe	F.L. 332.6		Remove 25' Not found	145+92.8	30" V.C. Pipe	F.L. 325.0	F.L. 321.81	Remove 48'±, replace with 42'± of 30" W.I. pipe & 21' of 37" W.I. pipe sleeve. See sheets 39 & 44
108+58.0	54" Cir. Conc. Pipe	F.L. 318.9	Same	Remove 5.4'±. Replace 47.8' of 54" W.I. pipe and 2 seep rings. See typical section sheet 39	149+71.92	15" V.C. Pipe	F.L. 327.8	Same	Remove 49.6' replace with 18' W.I. pipe & 31' of 20" W.I. pipe sleeve. See sheet 45
113+54	8" Gasoline Unloading Pipe	Top 331.51	Raised	Pass thru stem with 6' of 8" W.I. pipe sleeve	150+45.5	24" C.I. Pipe	F.L. 314.3	F.L. 313.95	Remove 74' replace with 60.6' of 24" W.I. pipe and 2 conc. seep rings of Sta. 150+38.5. See sheets 39 & 45
113+55	Underground Tank			To be shifted by other interests	150+61.2	¾" Water Pipe	Top 333.6	¾" 333.6	Raise & pass thru stem with 6' of 3" W.I. pipe sleeve. See sheet 39. Water meter vault to be handled by City.
114+76.6	2" Water Pipe	Top 335.4	F.L. 334.31	Relocate pipe to Sta. 114+34.6 Using 6' of 8" W.I. pipe sleeve. See this sheet & sheet 40.	154+46.0	6" V.C. Pipe	F.L. 332.6		Remove 52.4' & plug R.S.
114+82.61	Water Meter Box			To be removed & relocated by city	154+82.0	8" V.C. Pipe	Top 332.6		Remove 42.8' & divert flow to MH.
115+06.3	8" V.C. Pipe	F.L. 331.5	Same	Replace 66.4' with 8" W.I. & 31' of 10" W.I. pipe sleeve. Remove existing M.H. See sheet 40	157+04.0	10" V.C. Pipe	F.L. 334.5		Remove 18' See sheet 46
115+08.5	18" V.C. Pipe	F.L. 324.4		Remove 49.5' See sheet 40	157+35.0	10" V.C. Pipe	F.L. 334.4		Remove 22.8' See sheet 46
115+27.2	18" V.C. Pipe	F.L. 326.0	Same	Remove 36.0' Replace with 12" W.I. pipe and 5' of 16" W.I. pipe sleeve. See sheet 40 and 44.	157+39.2	3" Water Pipe	Top 336.4		Pipe & fire hydrant to be handled by City.
116+25	Manhole			Bottom +317.5. Remove and backfill.	159+20.0	6" V.C. Pipe			Remove 26.1'
119+20.0	6" V.C. Pipe	F.L. 330.6		Remove 6' landside and plug. Not found	159+37.0	6" V.C. Pipe	F.L. 333.1		Remove 49.1' & plug at M.H.
119+37.6	24" V.C. pipe	F.L. 318.3±	Same	Remove 36'. Replace with 33.6' 24" W.I. pipe & 2 seep rings. See sheet 39.	For pipes at 5th & Park Sts.				See sheet 46
119+94.8	8" V.C. Pipe	F.L. 331.75		Remove and plug at M.H.	168+19.75	T.O.D. Iron Pipe	Top 337.98	F.L. 337.71	Raise to pass thru stem casing. 6' of 10" W.I. pipe sleeve. See this sheet.
123+18	Water Meter Box			To be relocated by City	173+15.0	6" V.C. Pipe	F.L. 329.3		Remove under levee
123+29	Underground Tank	Top 336.9 Bottom 330.0		Remove Tank 3.5' x 3.5' x 3.5'	115+54	10" V.C. Pipe			Remove 64.7' See sheet 40
					051+48	8" V.C. Pipe	318.0	Same	Remove 68' Replace with 33.5' 8" W.I. pipe from M.H. #23 with 6' of 10" W.I. pipe sleeve. See sheet 75.

Note: All water meter boxes and hydrants to be removed and relocated by city.



CONCRETE CONNECTION BLOCK
PIPE-PLAIN END



*CONCRETE CONNECTION BLOCK
PIPE-MITERED END

CONCRETE CONNECTION BLOCKS

MANHOLE	STATION	PIPES	A	B	C	D
No. 2	99+70	10" V.C.P. 10" W.I.	—	2'-0"	6"	12"
No. 3	108+58	54" W.I. 54" Conc.	—	7'-2"	12"	62±
No. 6	115+26.5	8" V.C.P. 8" W.I.	—	1'-10"	6"	10"
No. 8 *	115+66	10" V.C.P. 10" Conc.	**	2'-0"	6"	12"
No. 7	119+45	24" V.C.P. 24" W.I.	—	3'-8"	8"	10"
No. 12 *	131+72.6	12" V.C.P. 12" W.I.	1'-8"* 1'-10"*	2'-2"	6"	14"
No. 15	149+71.8	18" V.C.P. 18" W.I.	—	2'-9"	6"	21"
No. 16	150+60	24" V.C.P. 24" W.I.	—	3'-4"	6"	28"
No. 25	135+00	8" V.C.P. 8" W.I.	Not at 2 street	1'-10"	6"	10"
No. 13	145+60.7	24" V.C.P. 24" W.I.	Not placed	3'-4"	6"	28"
No. 14	145+92.8	30" V.C.P. 30" W.I.	Not placed	3'-11"	6"	35"

* Angle to be determined in field.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS PIPES THRU WALL AND DETAILS

SHEET 39 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.

SUBMITTED: [illegible]

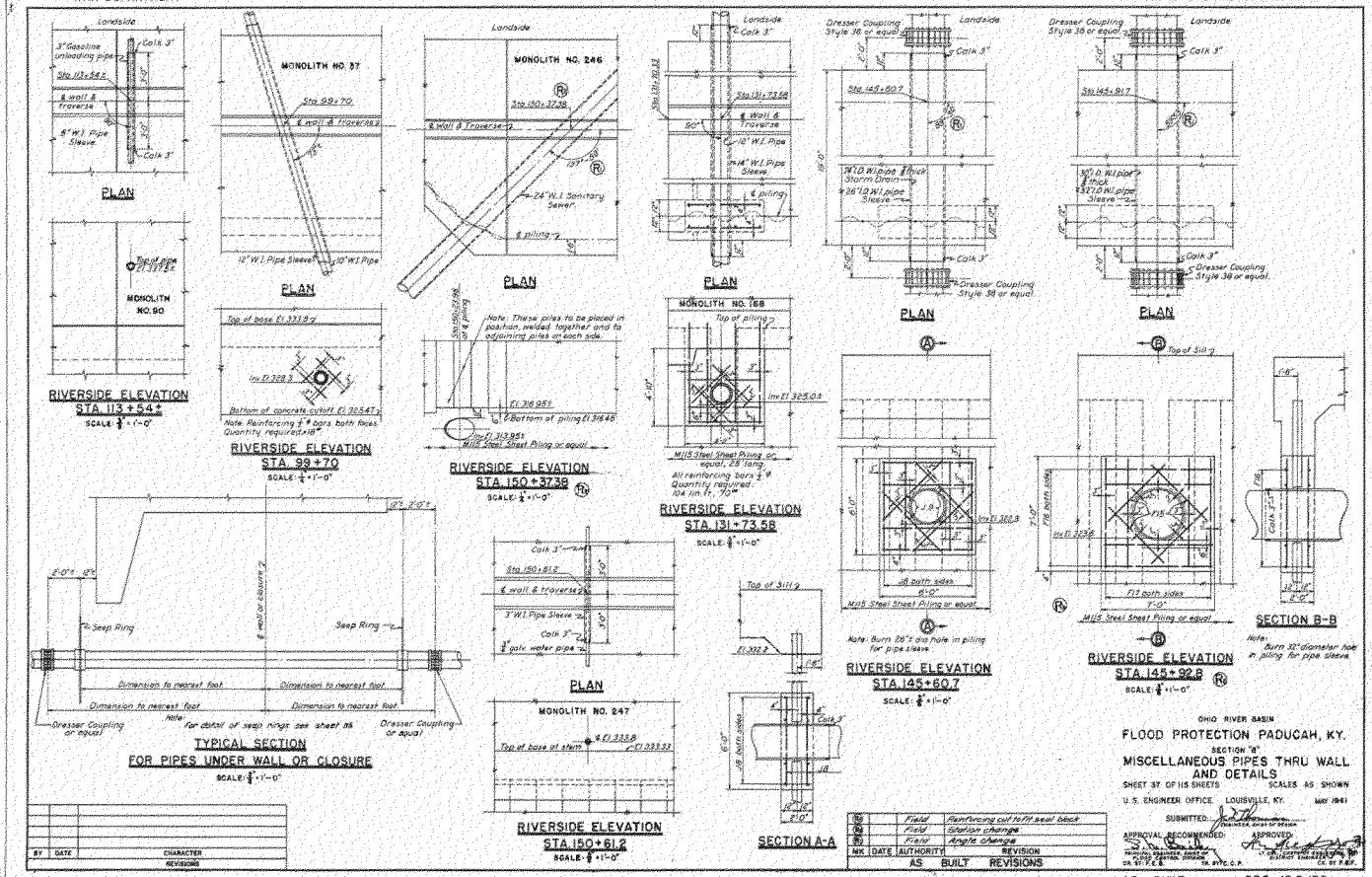
APPROVAL RECOMMENDED: [illegible] MR. BY R.E.S. TR. BY R.E.S.-U.E.S.

APPROVED: [illegible] CA. BY R.E.Y.

AS BUILT 935-12.2/38

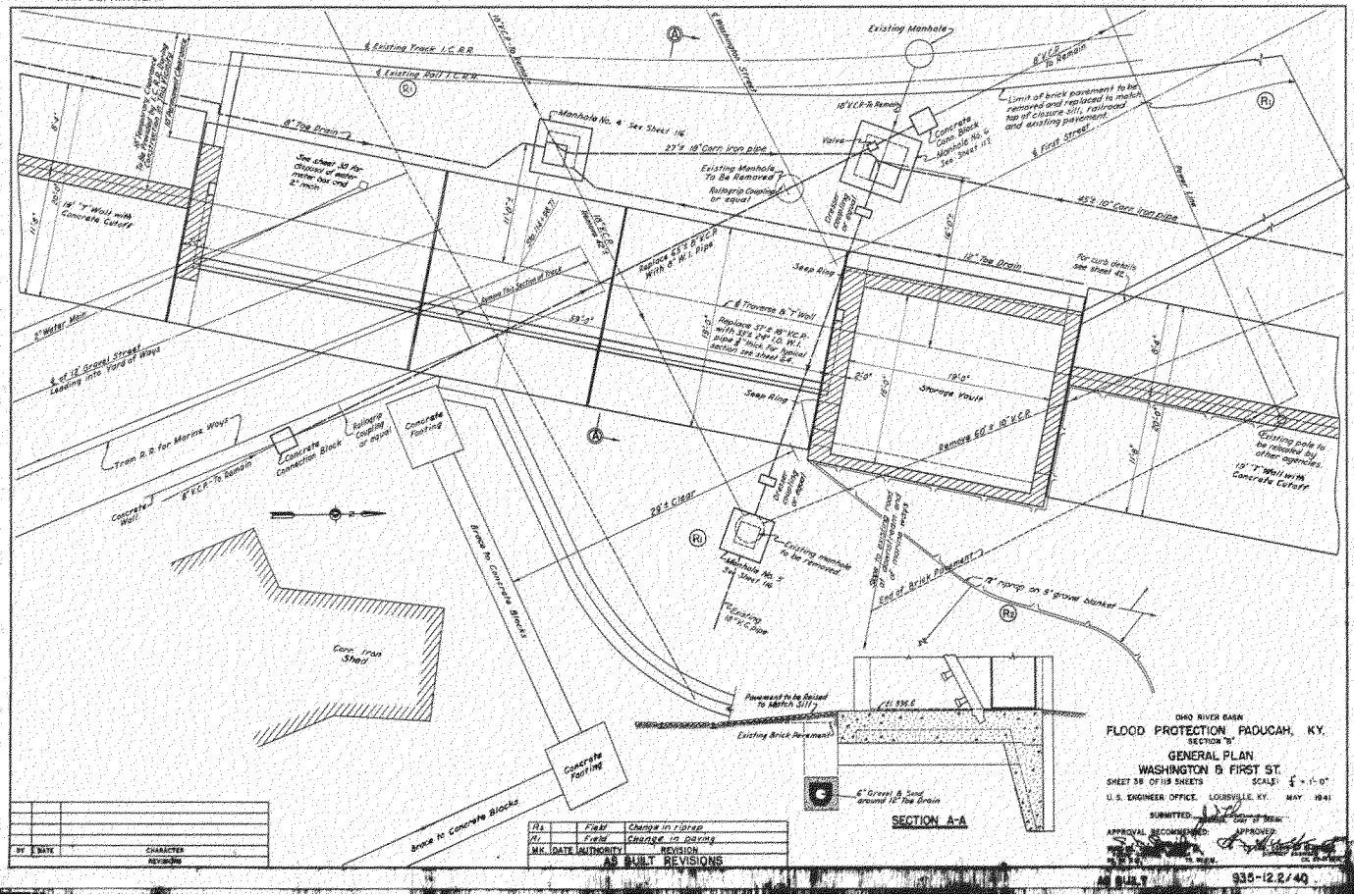
WAR DEPARTMENT

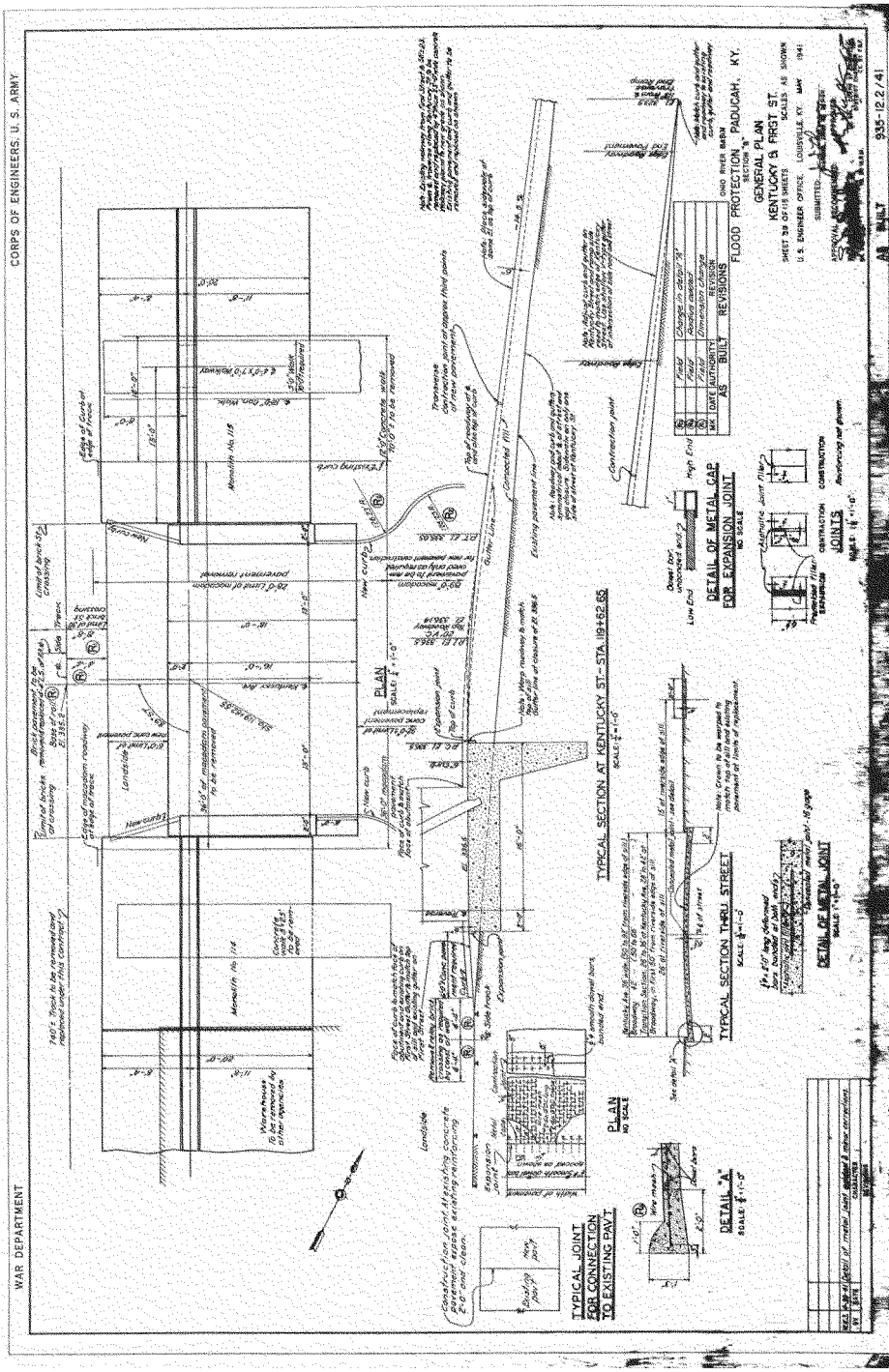
CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

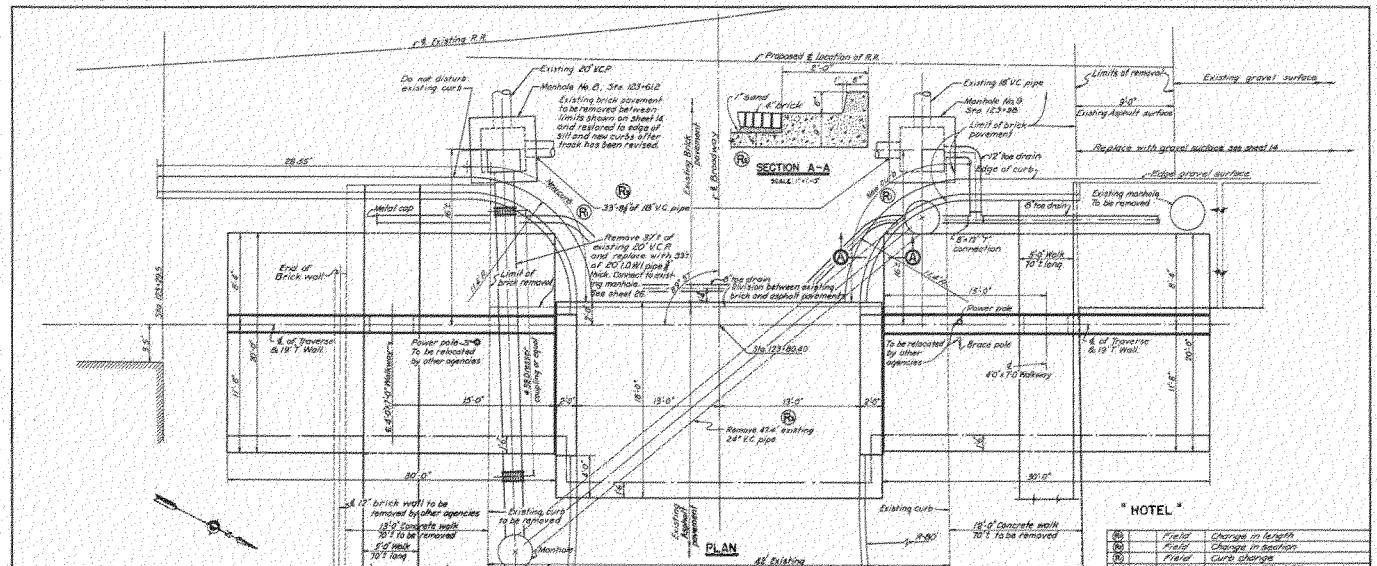
CORPS OF ENGINEERS, U. S. ARMY




WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
TYPICAL SECTION AT KENTUCKY ST.—STA. 189+62.65
TYPICAL SECTION THRU STREET
DETAIL OF METAL CAP FOR EXPANSION JOINT
DETAIL OF METAL JOINT
DETAIL "A"
TYPICAL JOINT FOR CONNECTION TO EXISTING PAVT.
FLOOD PROTECTION, PADUCAH, KY.
GENERAL PLAN
KENTUCKY & FIRST ST.
AS BUILT
935-12.2/41

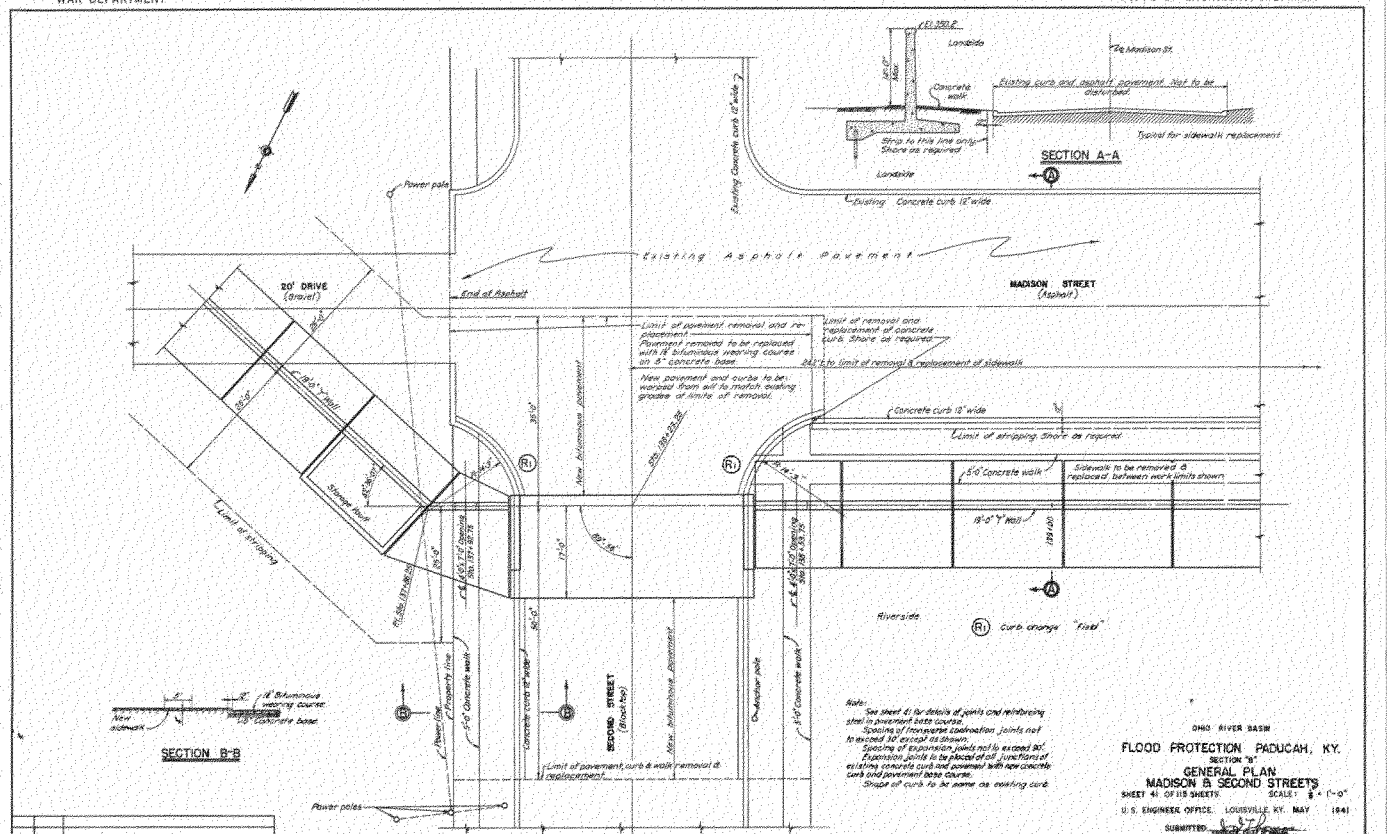
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY.



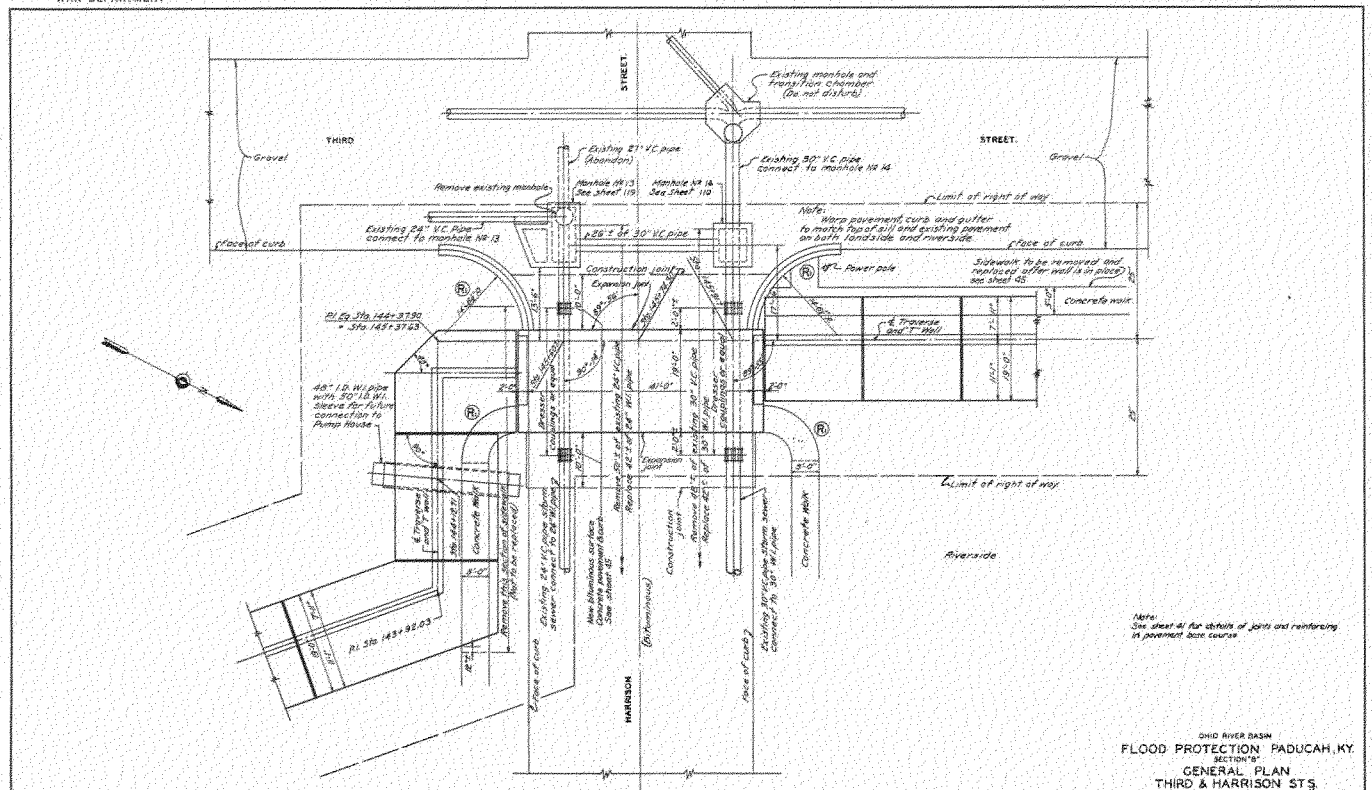
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

GENERAL PLAN

THIRD & HARRISON STS.

SHEET 42 OF 113 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] Maj. Corps of Engrs.

APPROVED: [illegible] Lt. Col. Corps of Engrs.

MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

MK	DATE	AUTHORITY	REVISION
10		Field	Curb and walk changes

AS BUILT REVISIONS

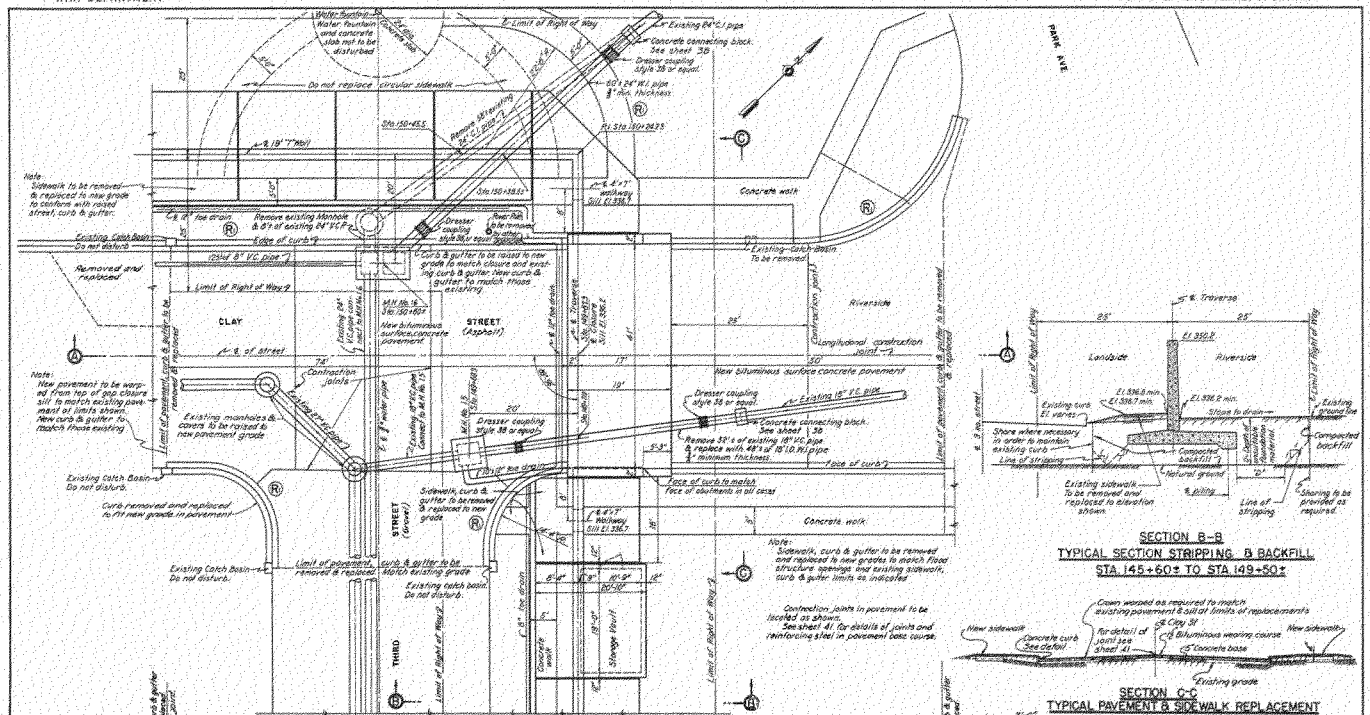
AS BUILT 935-12.2/44

420

1223

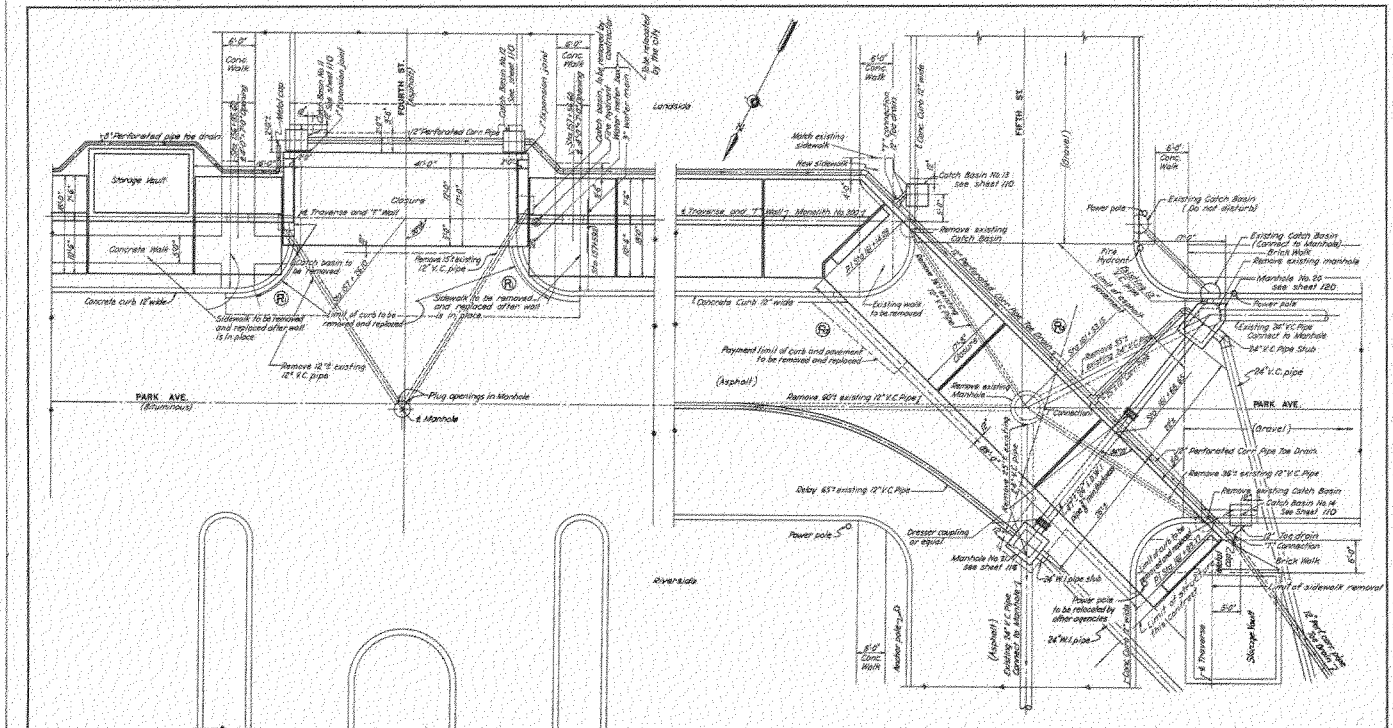
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	CHARACTER	BY
MK3	4-30-46	3" water main and vault added	

REVISIONS

MK	DATE	AUTHORITY
	Field	36" water line added
	Field	Pavement line change
	Field	Curb change

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "U"

GENERAL PLAN

FOURTH & FIFTH STREETS AT PARK AVE.

SHEET 44 OF 118 SHEETS SCALE: 1/4" = 0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

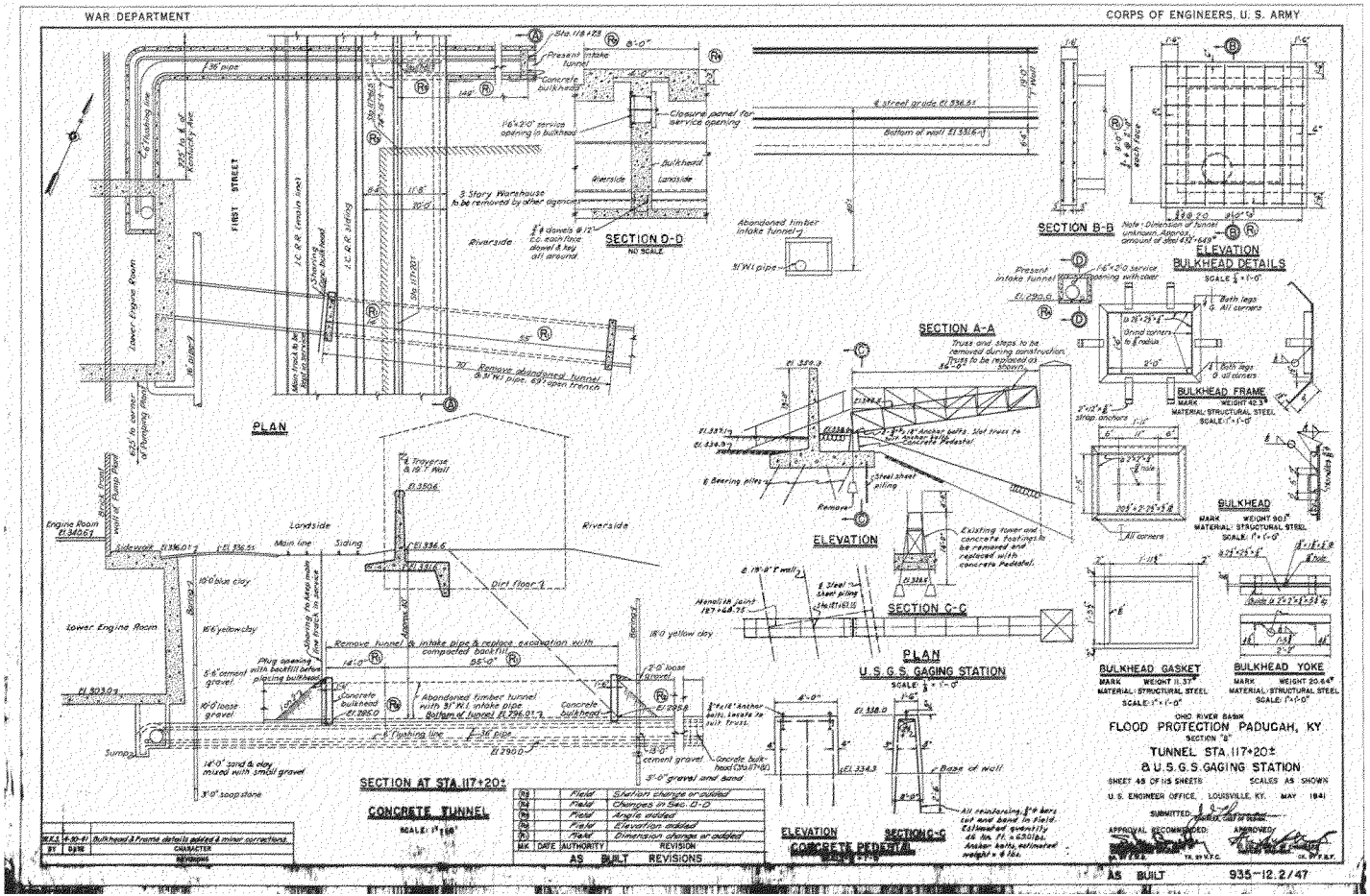
APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

AS BUILT

935-12.2/46

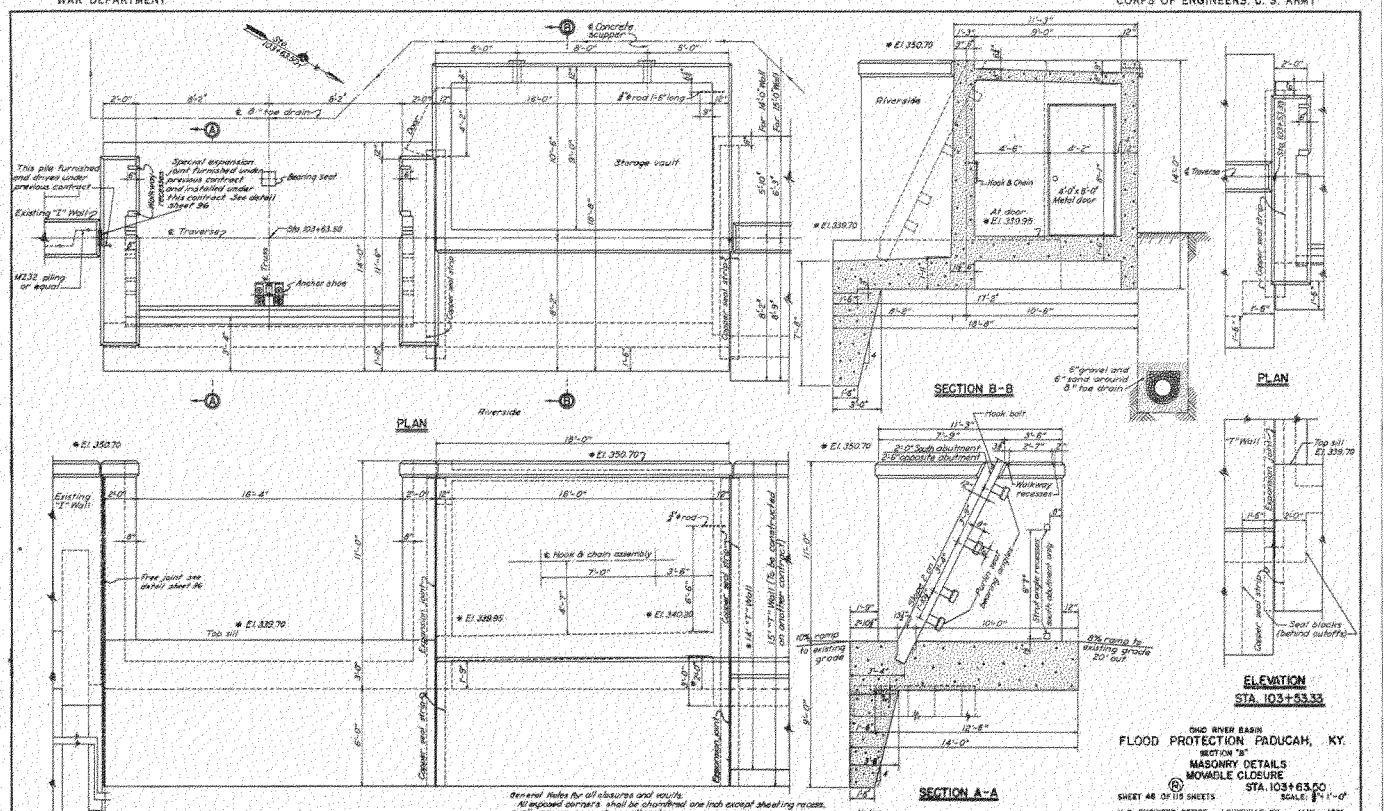
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



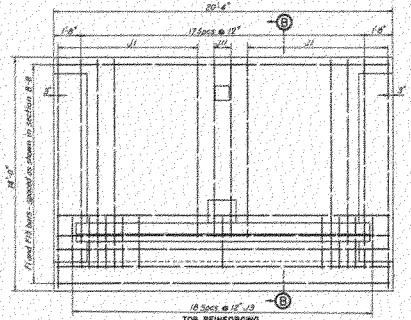
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

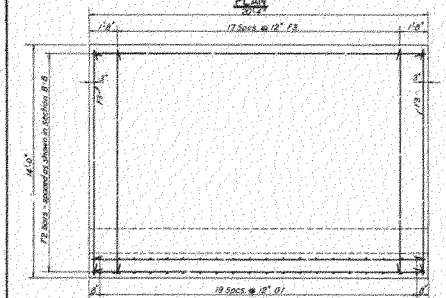


WAR DEPARTMENT

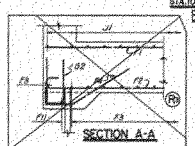
CORPS OF ENGINEERS, U. S. ARMY



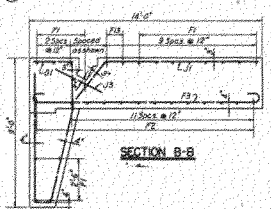
TOP REINFORCING
~~STA. 80+41.17 &~~ STA. 103 + 63.50
PLAN



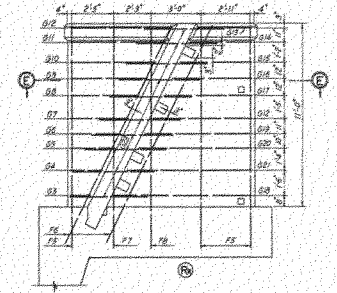
BOTTOM REINFORCING
STA. 103 + 63.50
PLAN



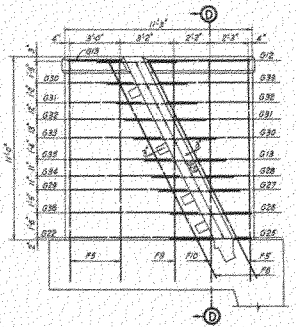
SECTION A-A



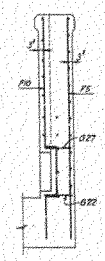
SECTION B-B



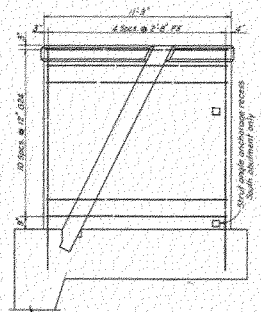
NEAR SIDE REINFORCING
SOUTH ABUTMENT



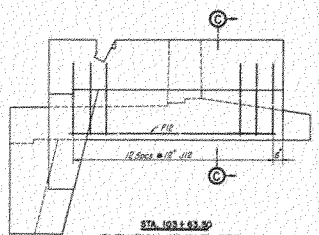
NEAR SIDE REINFORCING
NORTH ABUTMENT



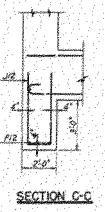
SECTION D-D



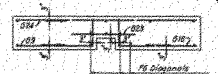
FAR SIDE REINFORCING
NORTH & SOUTH ABUTMENTS



STA. 103 + 63.50
ELEVATION AT CUT-OFF



SECTION C-C



SECTION E-E

Note:
Sta. 103 + 63.50 similar except for cut off of south abutment
For reinforcing in cut-off for Sta. 80+41.17 see plan and section A-A
For Sta. 103 + 63.50 see elevation of cut-off and section C-C
For machinery details see sheet 4B

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS
~~STA. 80 + 41.17 &~~ STA. 103 + 63.50
SILL & ABUTMENTS
SHEET 4A OF 115 SHEETS
SCALE: 3/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: [illegible]
APPROVAL RECOMMENDED: [illegible] CH. OF ENGS.
APPROVED: [illegible] CH. OF ENGS.

MK	DATE	AUTHORITY	REVISION
R3			Section A-A deleted
R2	2-17-43	C.O. #9	Haunch deleted
R1	2-17-43	C.O. #9	Movable closure Sta. 80+41.17 deleted

AS BUILT REVISIONS

BY	DATE	CHARACTER
MFS	7-30-41	Minor corrections

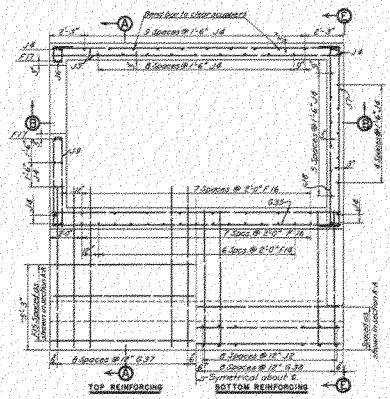
REVISIONS

AS BUILT

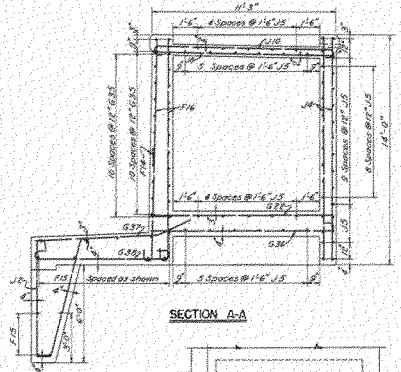
935-122/49

WAR DEPARTMENT

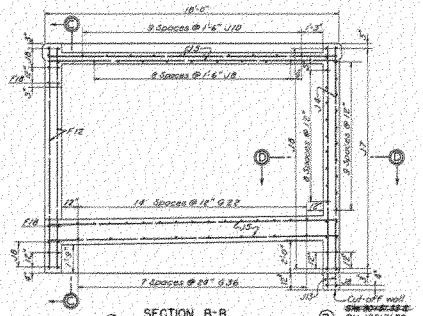
CORPS OF ENGINEERS, U. S. ARMY



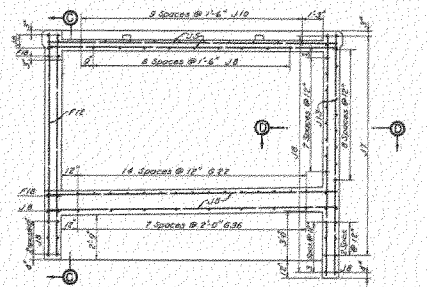
PLAN



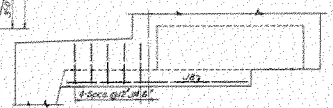
SECTION A-A



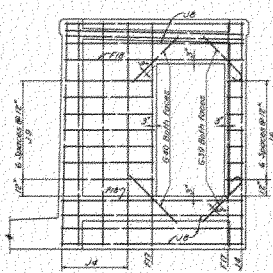
(R) SECTION B-B (R) 103+73.67



SECTION B-B
STA. 106+21.50

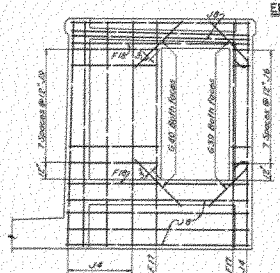


ELEVATION E-E
STA. 106+21.50



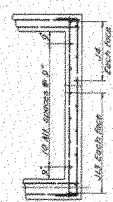
NEAR AND FAR SIDE REINFORCING

SECTION C-C
STA. 80+61.39 & 103+73.67



NEAR AND FAR SIDE REINFORCING

SECTION C-C
STA. 106+21.50



SECTION D-D

Note:
(R) For masonry details of storage vaults ~~Sta. 80+61.39 to 103+73.67~~ see sheet 8B
For masonry details of storage vault sta 106+21.50 see sheet 8E

BY	DATE	CHARACTER REVISIONS

MK	DATE	AUTHORITY	REVISION
(R)	2-11-49	C.O. #9	Movable closure Sta 80+51.33 deleted

AS BUILT REVISIONS

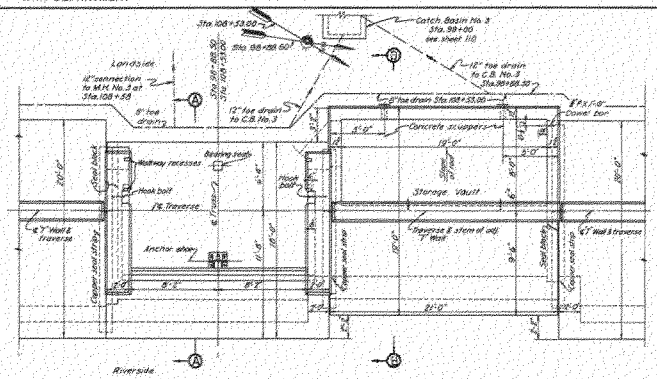
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINF. DETAILS STAS.
(R) ~~80+61.39~~ 103+73.67 & 106+21.50
STORAGE VAULTS
SHEET 48 OF 119 SHEETS SCALE: 1" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: [illegible]
APPROVAL RECOMMENDED: [illegible] Lt. Col. C.E.
APPROVED: [illegible] Col. C.E.

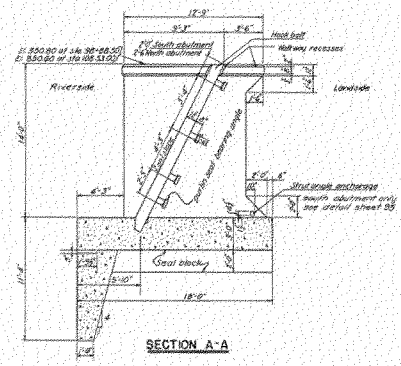
AS BUILT 935-12.2/50

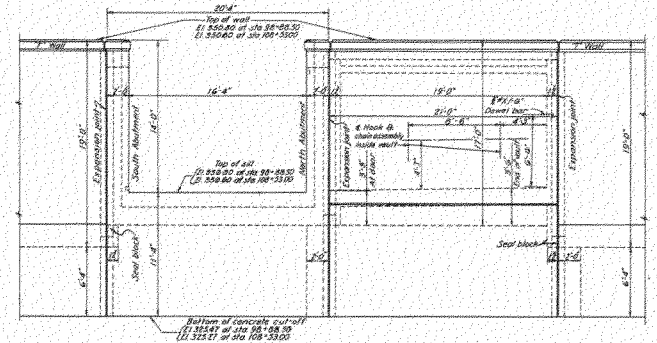
426

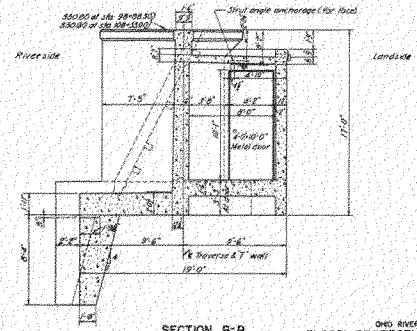
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY









RIVERSIDE ELEVATION

Note:
For reinforcing details see Sheets 60 and 61
Storage vault for Sta. 108+53.00 is not to be included in this contract

OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURES
STA. 98+88.50 & STA. 108+53.00
SHEET 49 OF 115 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:

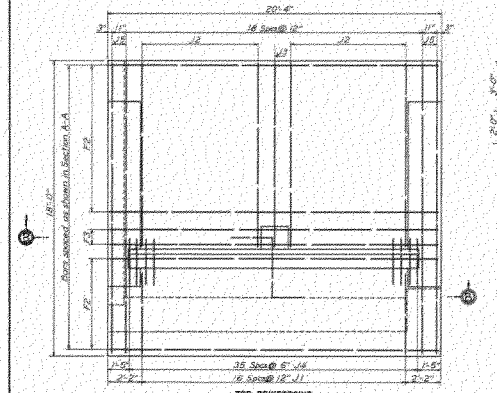
BY	DATE	CHARACTER OF REVISIONS
M.R.S.	4-30-41	Catch Basin No. 3 and connecting toe drains added.

935-12.2/59

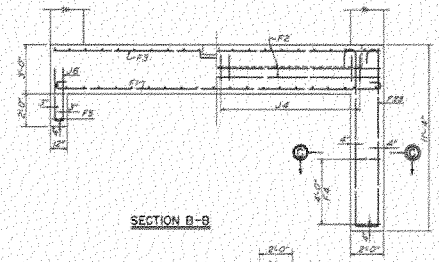
1230

WAR DEPARTMENT

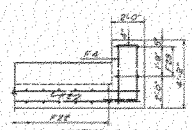
CORPS OF ENGINEERS, U. S. ARMY



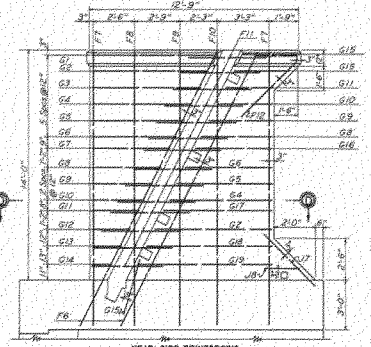
TOP REINFORCING



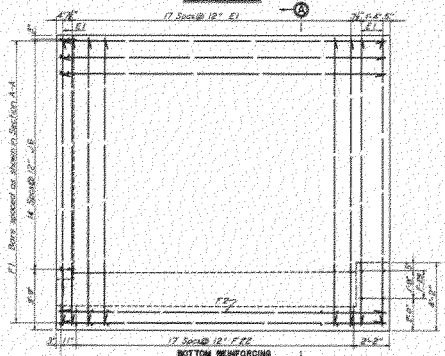
SECTION B-B



SECTION C-C

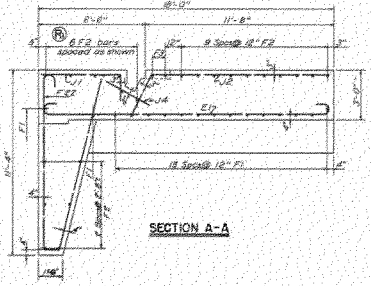


NEAR SIDE REINFORCING

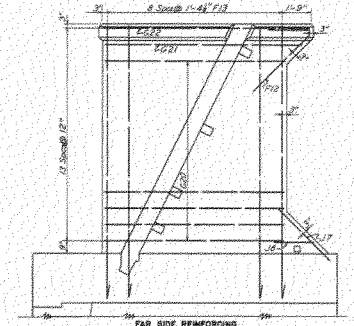


BOTTOM REINFORCING

SILL

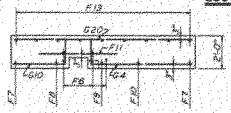


SECTION A-A



FAR SIDE REINFORCING

Note
For masonry details see sheet 58



SECTION D-D

SOUTH ABUTMENT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 98+88.50 & STA. 108+53.00

SILL & SOUTH ABUTMENT

SHEET 50 OF 118 SHEETS

SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: (Signed) Odell W. Nelson

APPROVED: (Signed) Lewis A. Pick

BY	DATE	CHARACTER REVISIONS

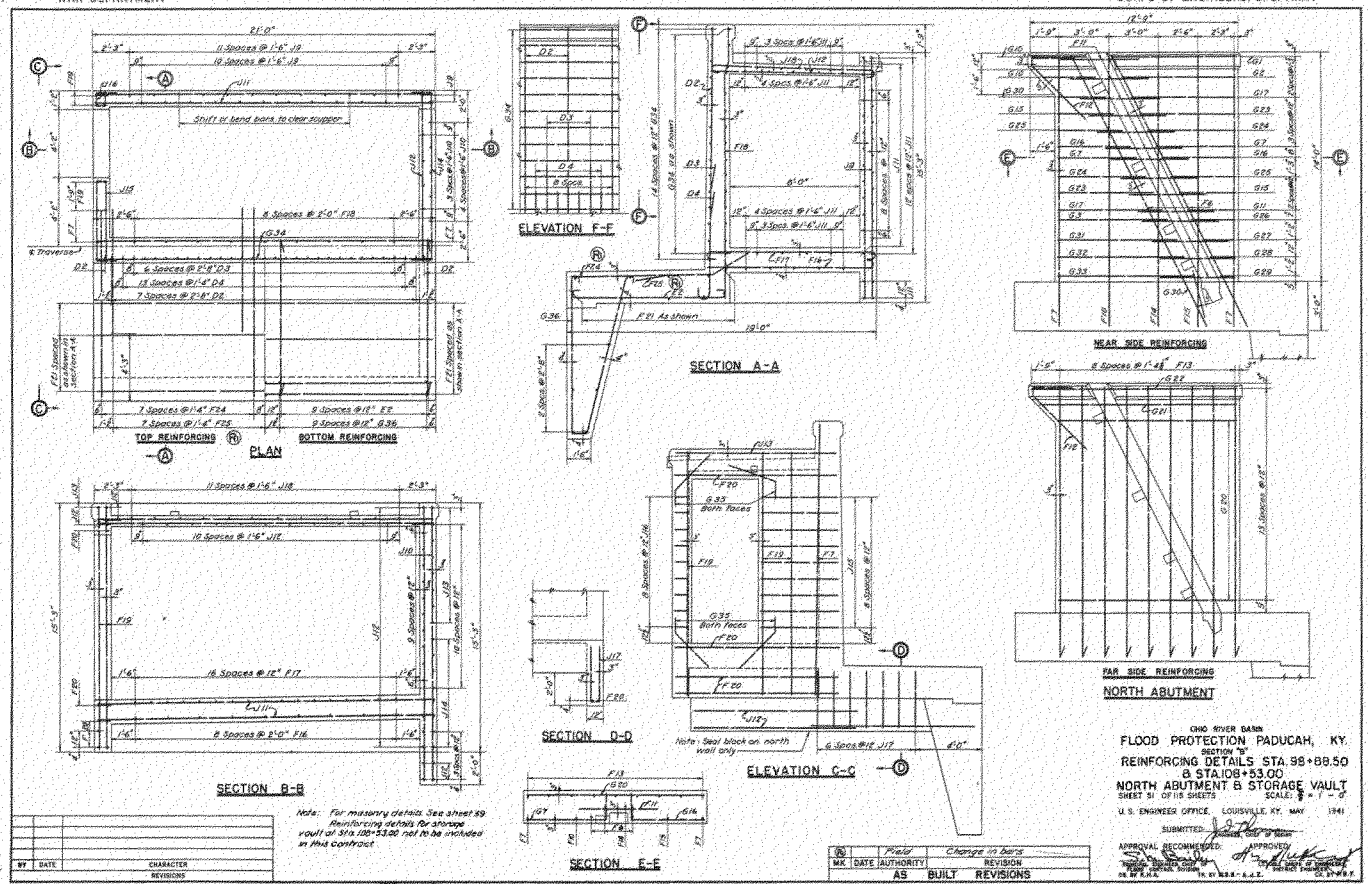
MK	DATE	AUTHORITY	Field Changes in bars REVISION
AS		BUILT	REVISIONS

AS BUILT

935-12.2/60

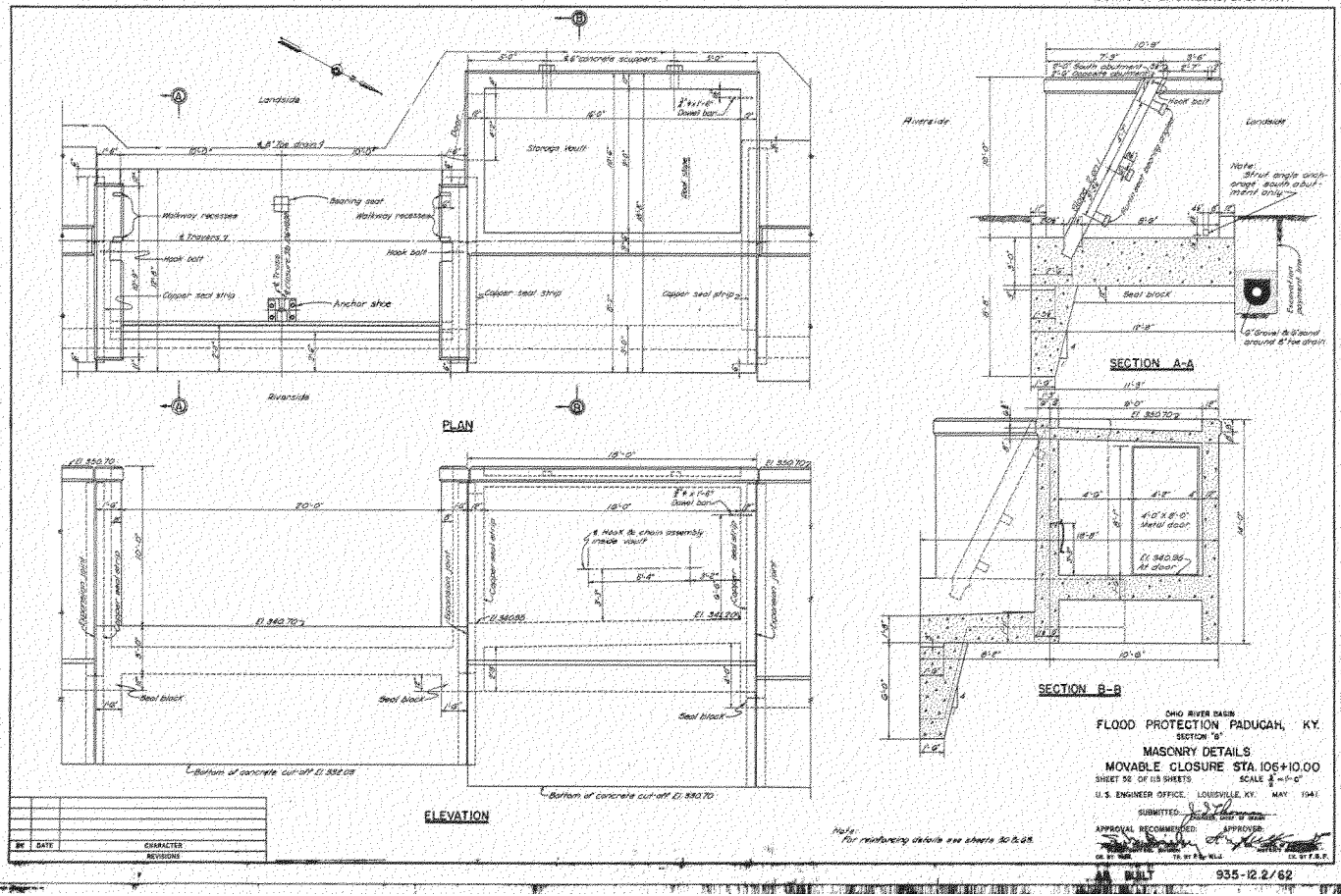
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



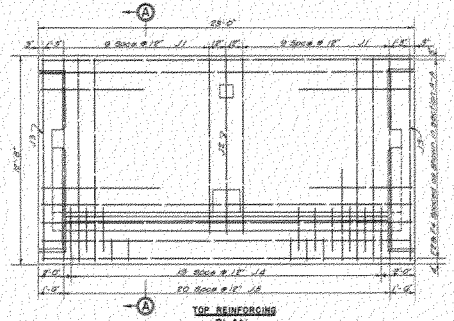
WAR DEPARTMENT

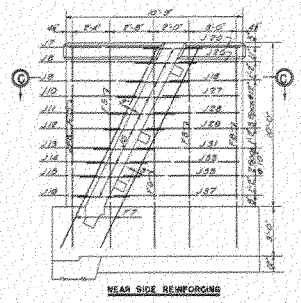
CORPS OF ENGINEERS, U. S. ARMY

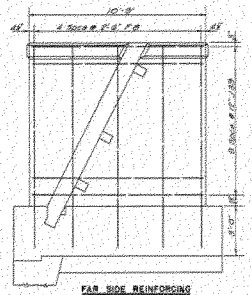


WAR DEPARTMENT

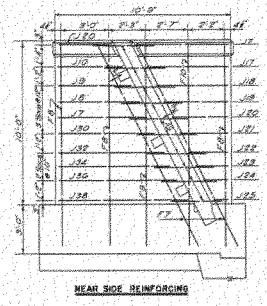
CORPS OF ENGINEERS, U. S. ARMY



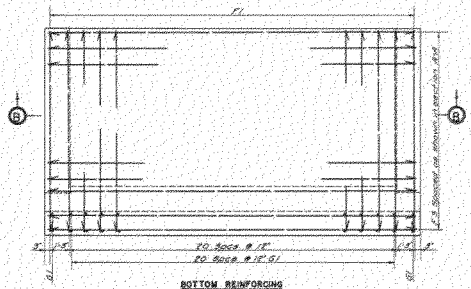


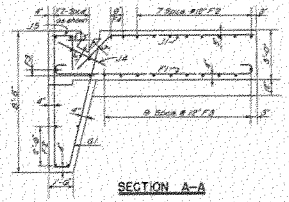


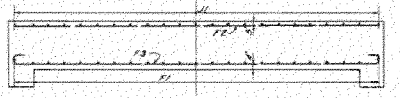
SOUTH ABUTMENT

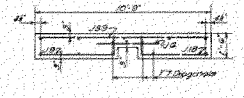


NORTH ABUTMENT









STIFFENER CHAIN ASSEMBLIES REQUIRED

LOCATION-STA.	LENGTH ft.	TOTAL WT.	LOCATION-STA.	LENGTH ft.	TOTAL WT.	LOCATION-STA.	LENGTH ft.	TOTAL WT.
Paducah A 180+45.8	16'-6"	26.4	Paducah B1 9+44.0	8'-6"	16.9	Paducah B2 94+69	16'-6"	26.4
Paducah C 1041+96.19	16'-6"	26.4	" 12+40.0	8'-6"	16.9	" 98+88.3	12'-10"	21.3
Belcovde 10+61.0	20'-6"	35.9	" 25+19.4	12'-10"	21.5	" 103+63.3	12'-10"	21.5
" 18+34.5	8'-3"	10.6	" 28+90.3	16'-6"	26.4	" 106+18	16'-6"	26.4
" 21+05.6	20'-6"	35.9	" 29+80.3	8'-6"	16.9	" 108+33	12'-10"	21.5
Brookport 53+12	20'-6"	35.9	" 31+21.3	8'-6"	16.9	" 114+97	59'-6"	68.3
" 81+90.5	16'-6"	26.2	" 31+51.4	12'-10"	21.5	" 118+62.69	25'-6"	31.7
" 89+49.2	16'-6"	26.2	" 36+94.5	8'-6"	16.9	" 119+80.40	25'-6"	31.7
" 93+69.9	16'-6"	26.4	" 51+07.3	12'-10"	21.5	" 128+19	16'-6"	26.4
" 97+19.5	16'-6"	26.4	" 54+37.6	12'-10"	21.5	" 130+60.3	12'-10"	21.3
" 103+58.0	20'-6"	35.9	" 60+94.3	12'-10"	21.5	" 136+32.6	20'-6"	38.0
" 112+38.54	20'-6"	35.9	" 67+73.4	8'-6"	16.9	" 138+23.33	37'-6"	47.4
" 119+30.7	16'-6"	26.4	" 68+66.4	8'-6"	16.9	" 143+74.3	37'-6"	47.4
Harrisburg 23+73.3	20'-6"	35.9	" 71+74.5	12'-10"	21.5	" 143+87.3	37'-6"	47.4
" 100+81	20'-6"	35.9	" 75+85.1	12'-10"	21.5	" 147+36.1	37'-6"	47.4
" 126+69	20'-6"	35.9	" 89+92.1	29'-6"	39.0	" 150+48.5	8'-6"	16.9
" 165+20	20'-6"	35.9	Paducah B2 90+41.2	12'-10"	21.5	" 170+04	37'-6"	47.4
Paducah B1 4+55.5	11'-6"	20.1	" 91+36	8'-6"	16.9	" 181+83	79'-6"	91.5
" 5+94.5	11'-6"	20.1	" 93+57.18	22'-6"	31.7			

Note:
For masonry details see sheet 82
For details of stiffener chain see sheet 109

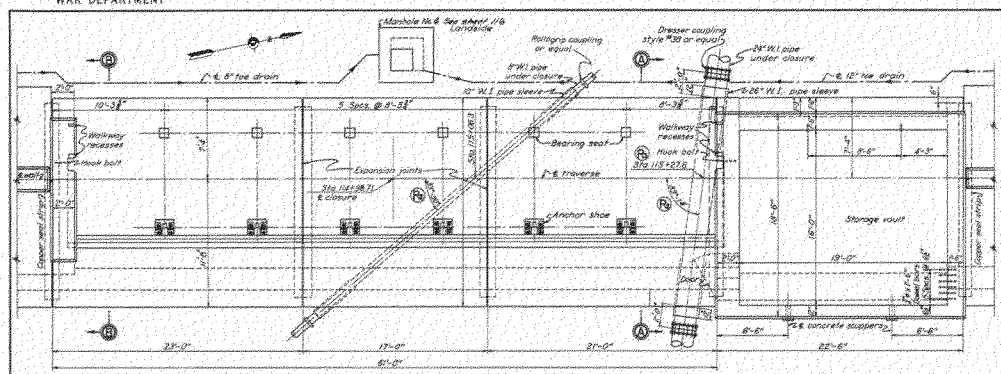
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "D"
REINFORCING DETAILS STA. 106+10.00
SILL AND ABUTMENTS
SHEET 33 OF 115 SHEETS SCALE 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: Robert Lee Moore
APPROVAL RECOMMENDED: APPROVED:
CH. BY W.A.B. TR. BY W.J. CK. BY T.B.F.

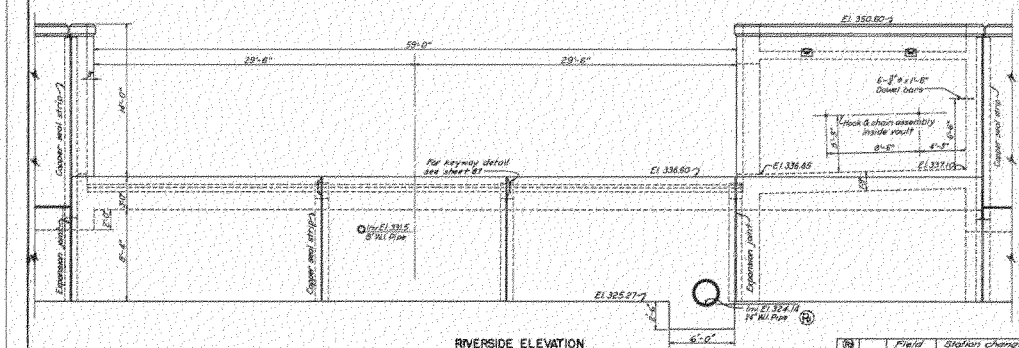
AS BUILT 935-02.2/63

WAR DEPARTMENT

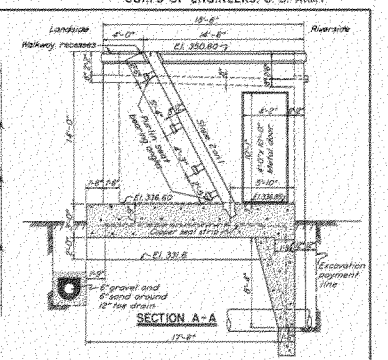
CORPS OF ENGINEERS, U. S. ARMY



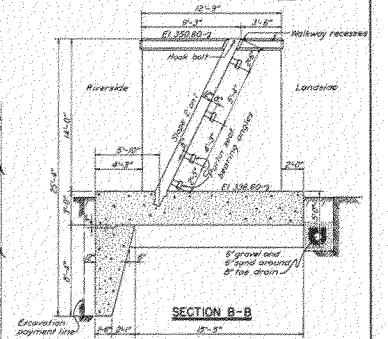
PLAN



RIVERSIDE ELEVATION



SECTION A-A



SECTION B-B

		Field	Station change
		Field	Angle change
		Field	Elevation change
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

Note: For reinforcing details see sheets 05 & 06

WK3	4-30-41	Station changed from Sta. 114+27.7 to Sta. 114+98.71
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 114+98.71

SHEET 54 OF 115 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED:

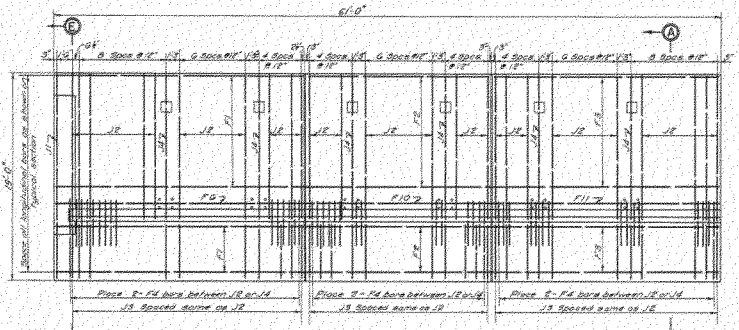
APPROVAL RECOMMENDED: APPROVED:

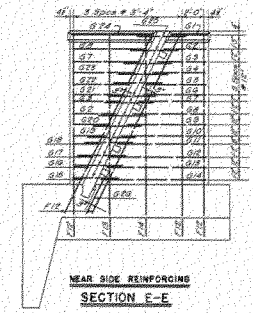
CH. BY TR. BY M.E.S. CK. BY F.S.F.

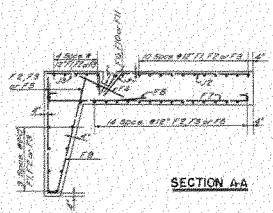
AS BUILT 935-122/64

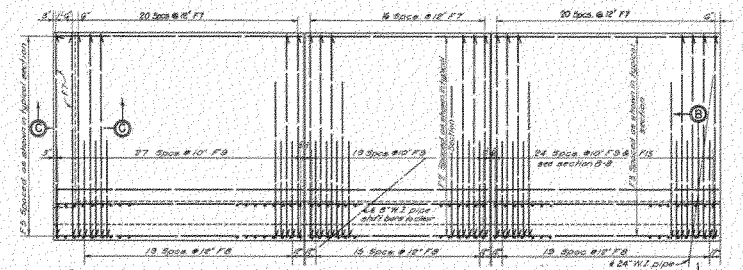
WAR DEPARTMENT

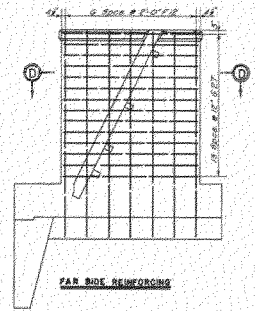
CORPS OF ENGINEERS, U. S. ARMY

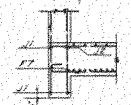


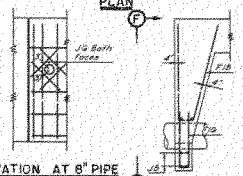


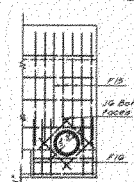












NO.		
1	4-28-61	Station changed from 34+37.7 to 34+38.71
BY	DATE	CHARACTER
REVISIONS		

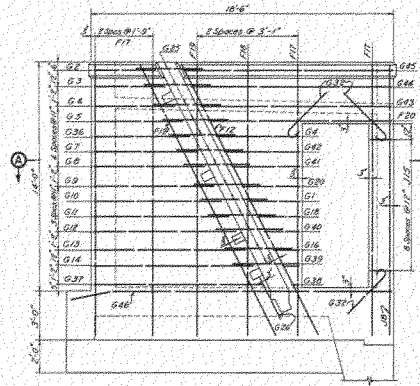
Note
For masonry details see sheet 6d

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 114+98.71
SILL & SOUTH ABUTMENT
SHEET 35 OF 115 SHEETS SCALE 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: Assistant Chief of Design
APPROVAL RECOMMENDED: APPROVED:
PHILIP B. FLEMING, JR. Chief, Flood Control Division
H. W. BUCHANAN, Lt. Colonel, Corps of Engineers, District Engineer
AS BUILT
935-12.2/65

433

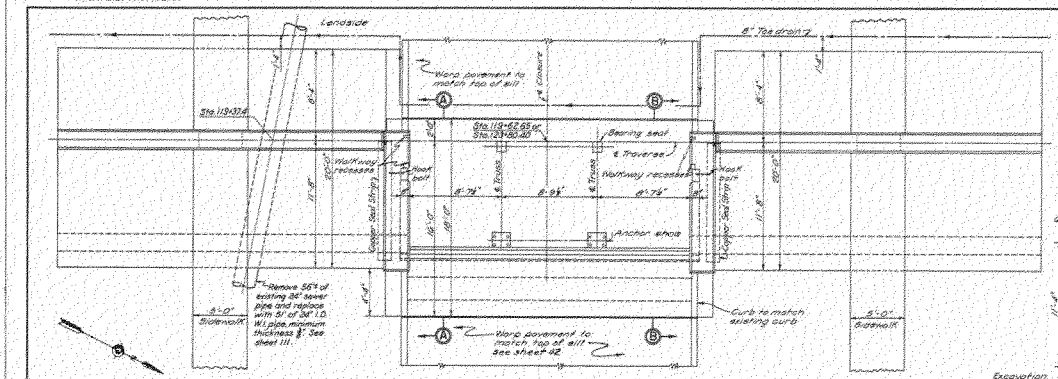
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY


18'-6"
2 Spaces @ 1'-9"
2 Spaces @ 3'-1"
8 Spaces @ 1'-2"
8 Spaces @ 1'-2"
8 Spaces @ 1'-2

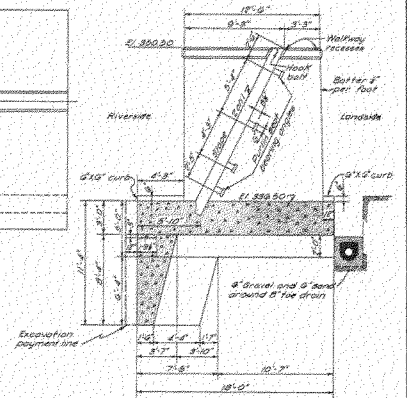
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



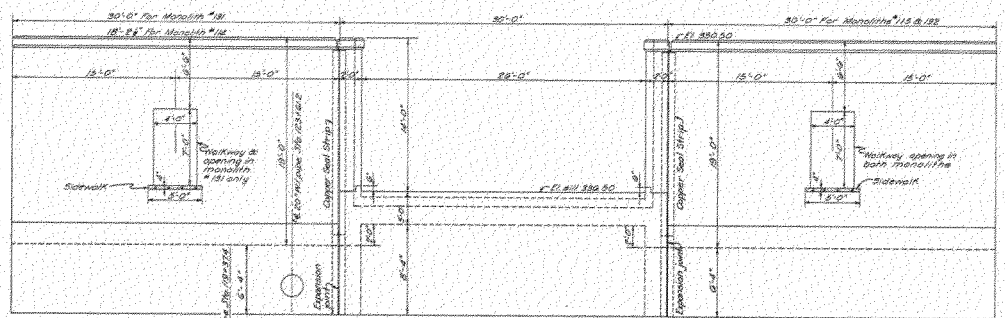
Note: Toe drain at Sta. 119+62.65 shown. Toe drain at Sta. 123+80.40 to flow in opposite direction.

PLAN



SECTION A-A

SECTION B-B IDENTICAL BUT OPPOSITE HAND



RIVERSIDE ELEVATION

Note: All elevations shown hereon are for closure at Sta. 119+62.65. Those at Sta. 123+80.40 are 0.10 ft. less.

For reinforcing details of closure see sheet 68. For reinforcing details of monoliths 114, 115, 180 & 181 see sheets 96 & 97.

For details of walkway opening frame & bulkhead see sheet 69.

W.K.S.	4-30-41	24" sewer pipe added.
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURES STA. 119+62.65 & STA. 123+80.40

SHEET 57 OF 115 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: E. C. Ott
PHYSICAL CHIEF OF DESIGN

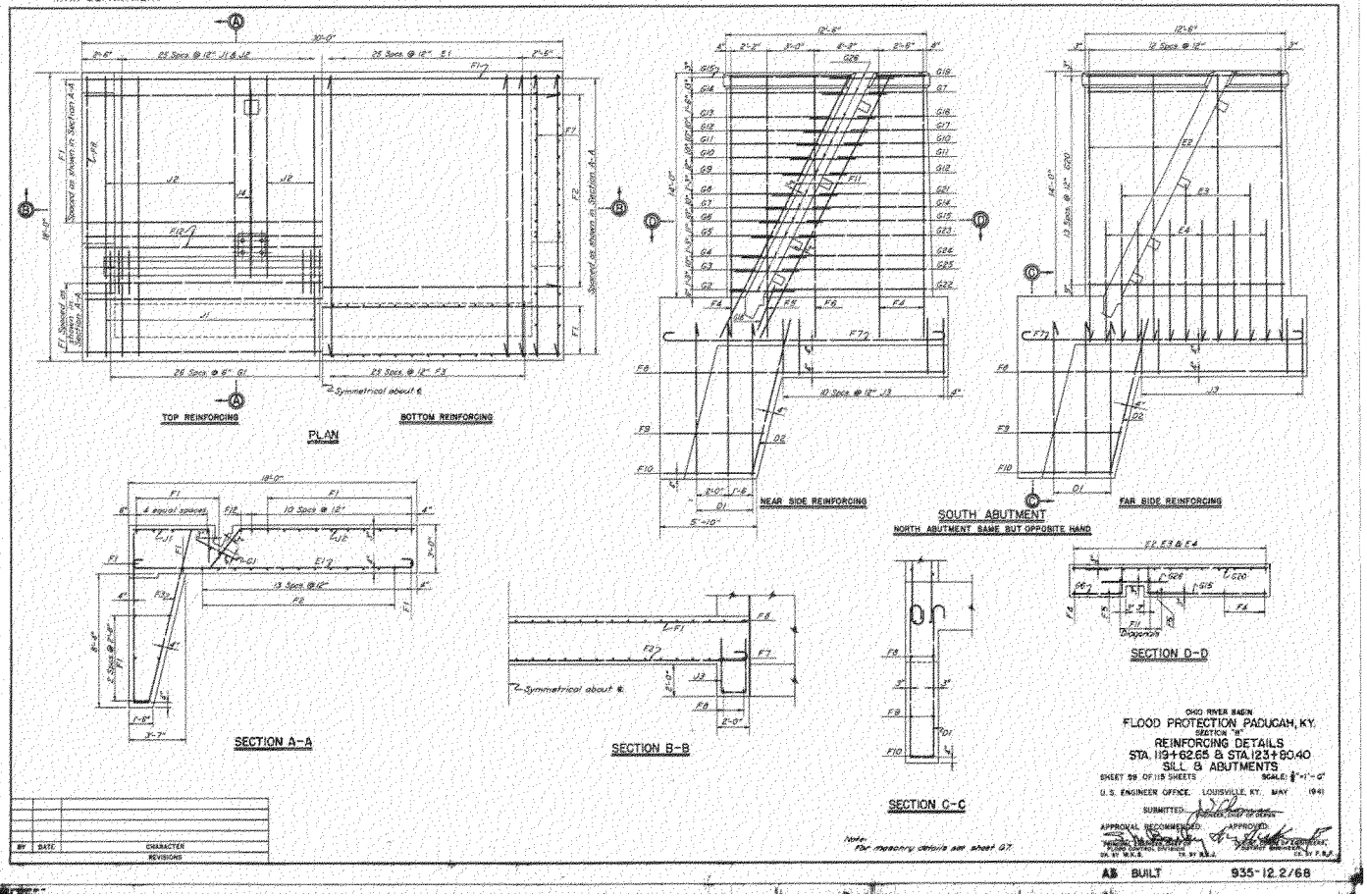
APPROVAL RECOMMENDED: APPROVED:
PHYSICAL CHIEF OF DESIGN — CHIEF OF ENGINEERS
DR. BY G.E.S. — TR. BY W.L.W. — CK. BY F.B.F.

AS BUILT 935-12.2/67

435

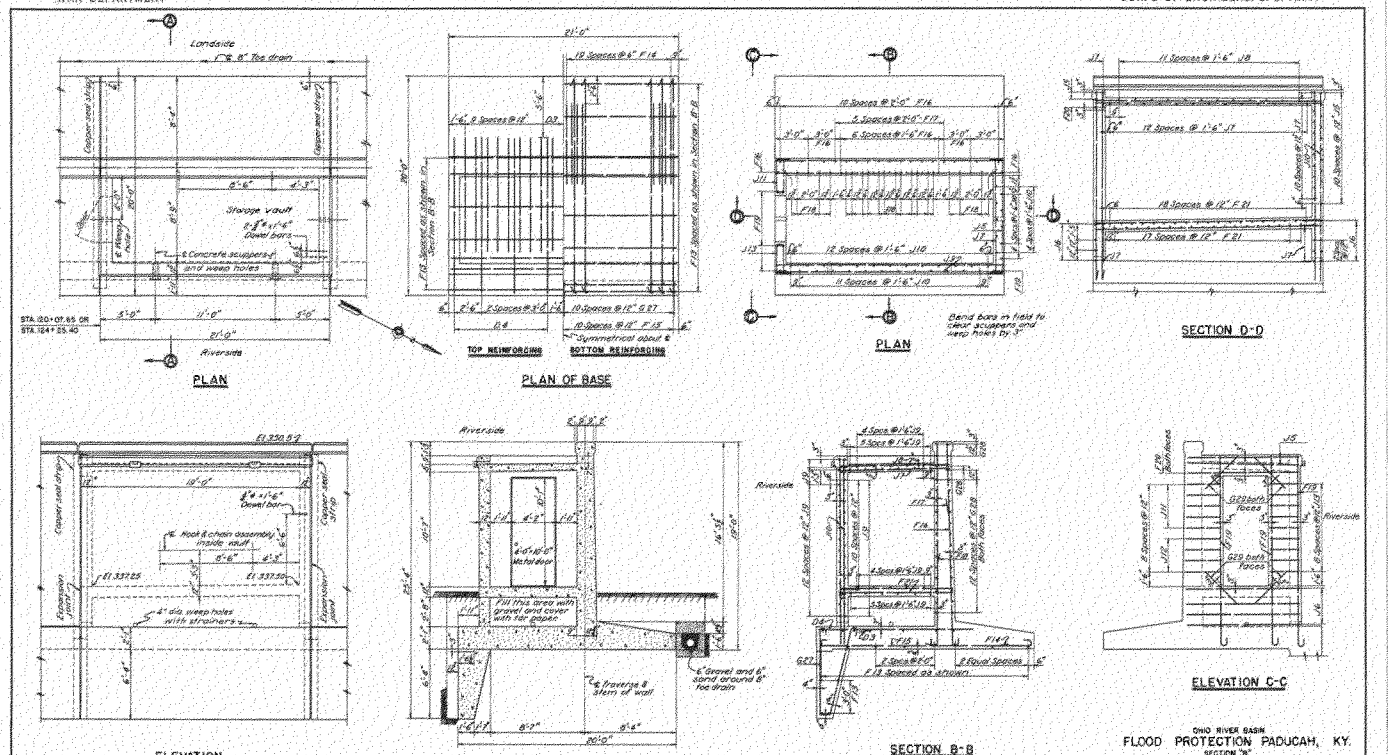
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



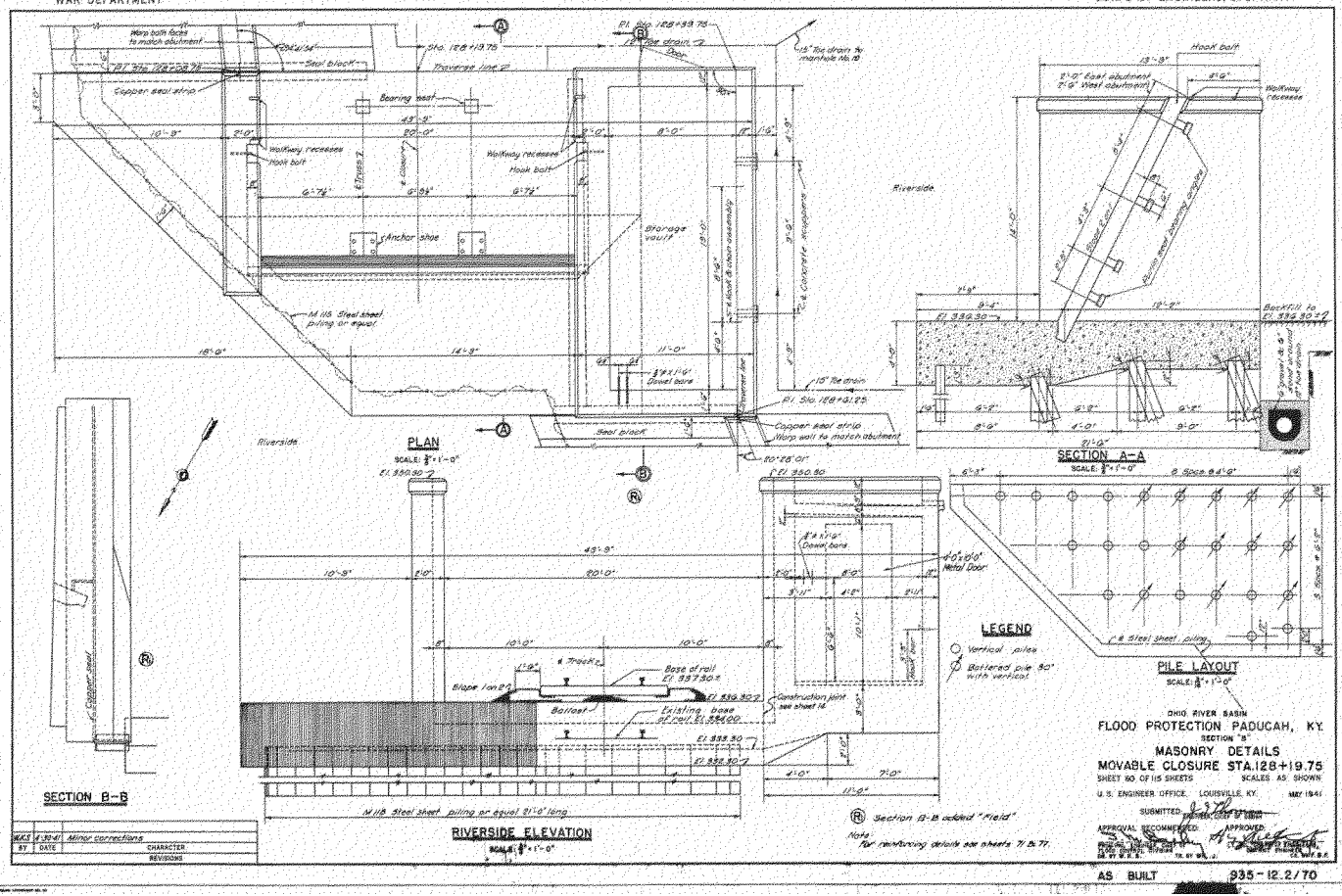
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 128+19.75

SHEET 60 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: DISTRICT ENGINEER

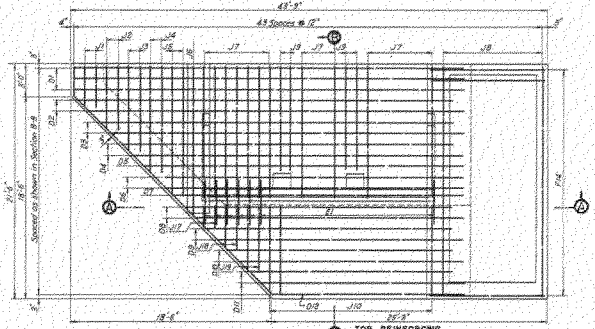
APPROVAL RECOMMENDED: APPROVED:

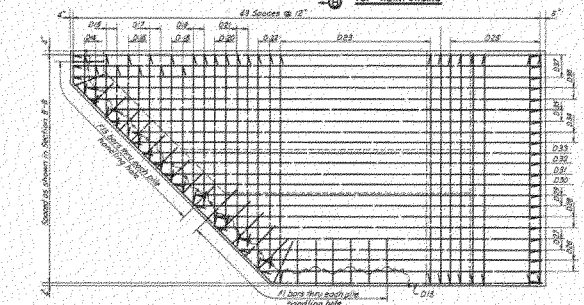
BY	DATE	CHARACTER REVISIONS
WKS	4-30-41	Minor corrections

AS BUILT 935-12.2/70

WAR DEPARTMENT

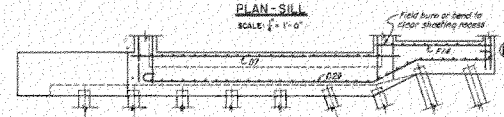
CORPS OF ENGINEERS, U. S. ARMY





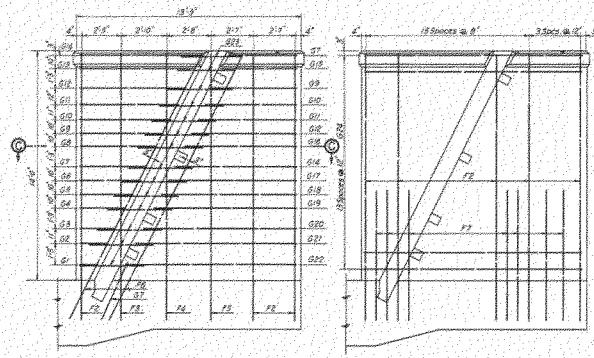
PLAN - SILL

SCALE: 1/4" = 1'-0"



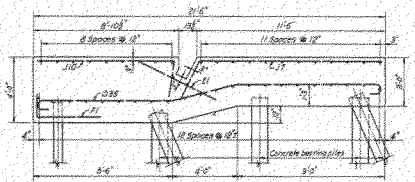
SECTION A-A

SCALE: 1/4" = 1'-0"



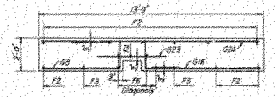
EAST ABUTMENT

SCALE: 1/8" = 1'-0"



SECTION B-B

SCALE: 1/4" = 1'-0"



SECTION C-C

SCALE: 1/4" = 1'-0"

Note:
For reinforcement for west cutoffwall and storage vault see sheet 77.
For pile arrangement detail see sheet 96.
For masonry details see sheet 70.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 128+19.75

SILL AND EAST ABUTMENT

SHEET 61 OF 115 SHEETS — SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED:

APPROVED RECOMMENDED:

APPROVED:

BY	DATE	CHARACTER REVISIONS

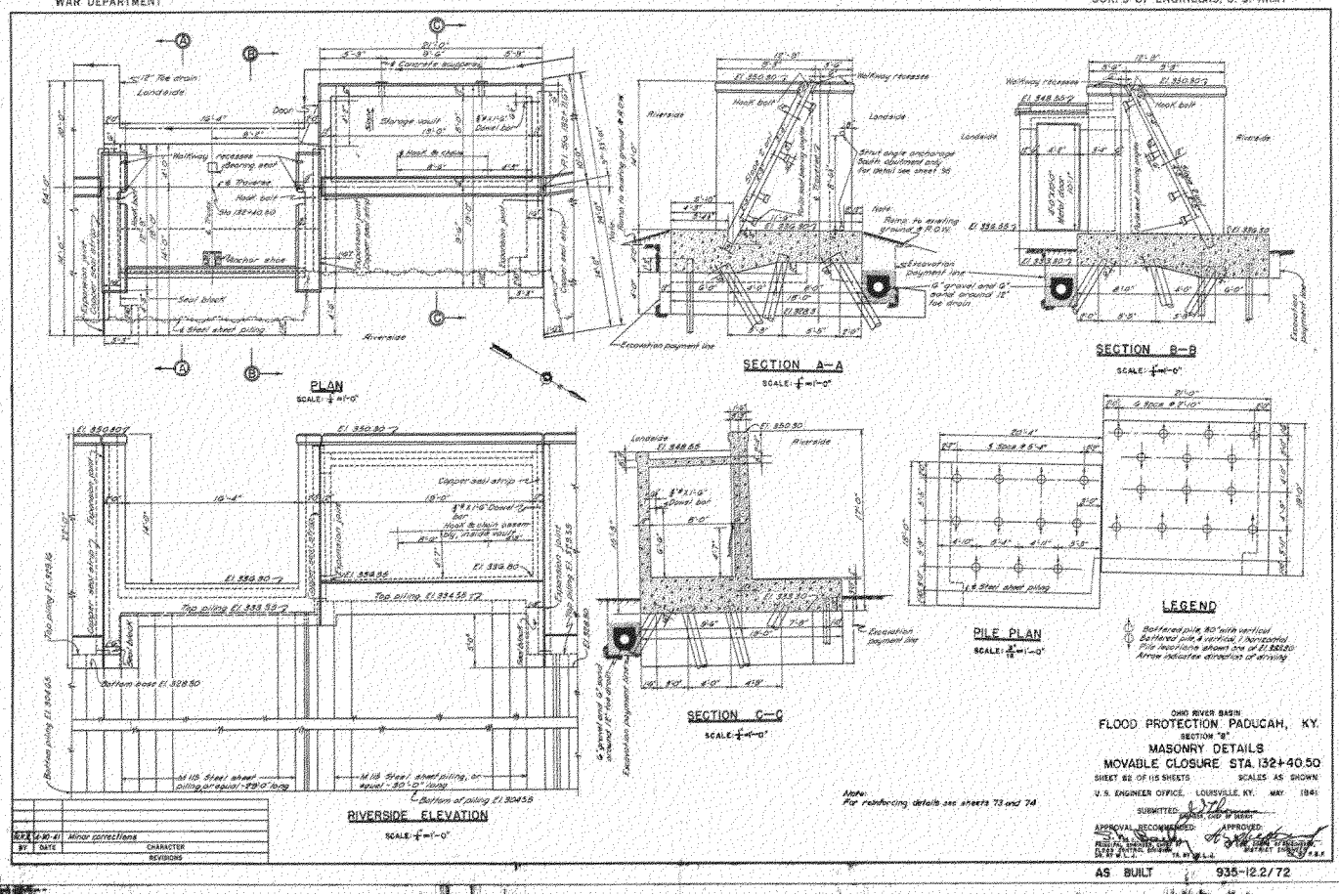
MK	DATE	AUTHORITY	Field Bar change REVISION
			AS BUILT REVISIONS

AS BUILT

935-12.2/71

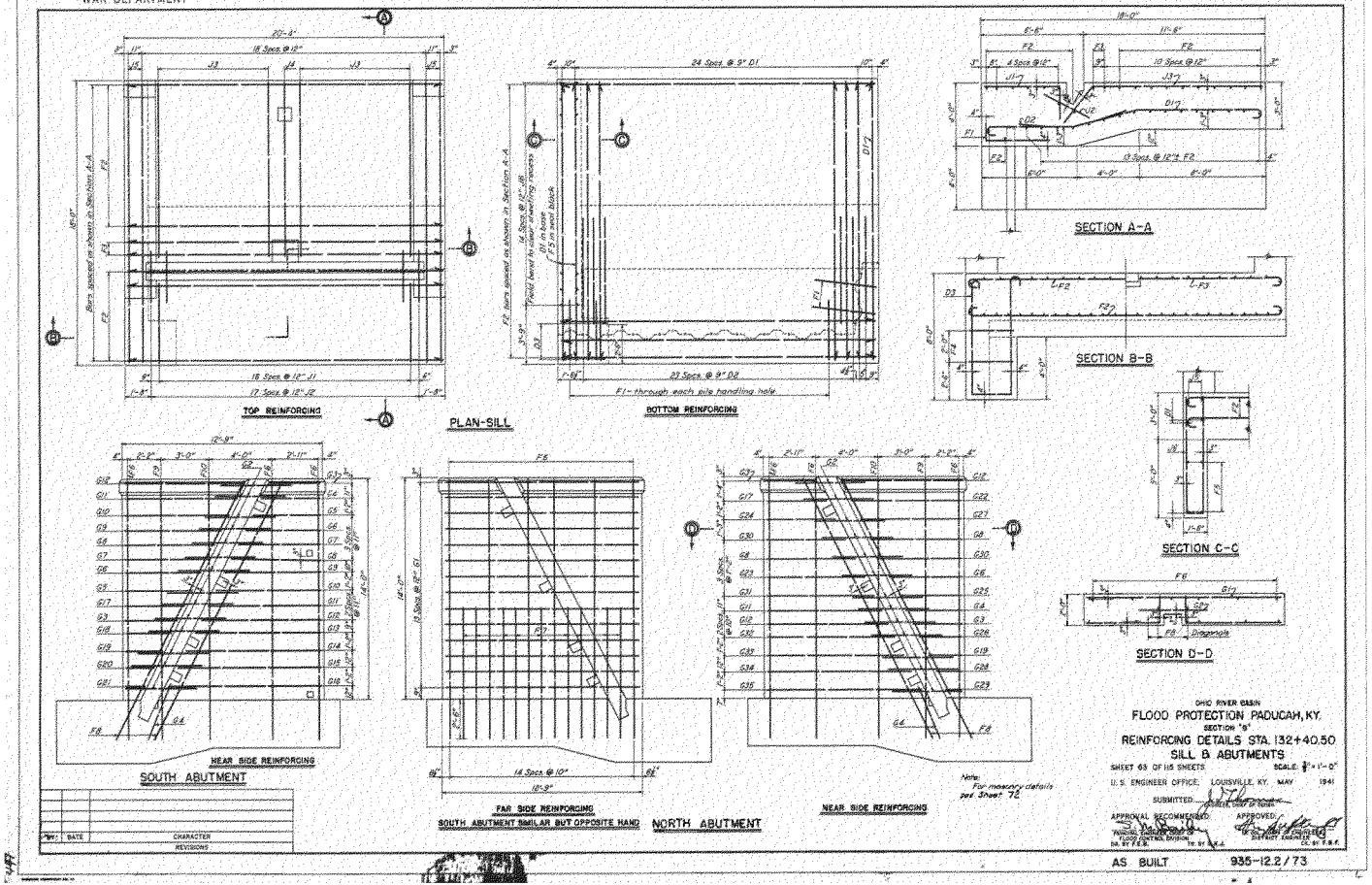
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

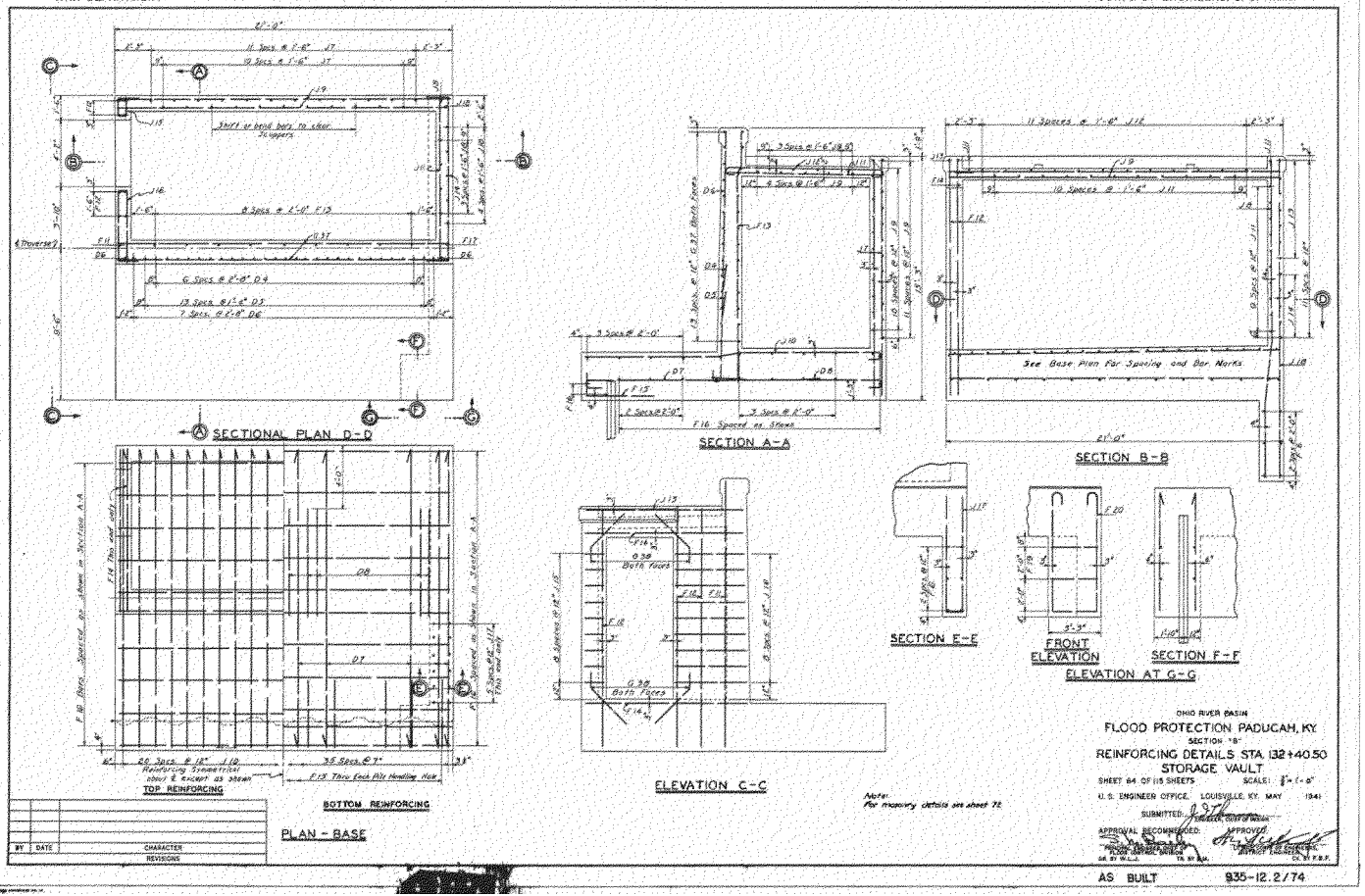


AS BUILT

935-12.2/73

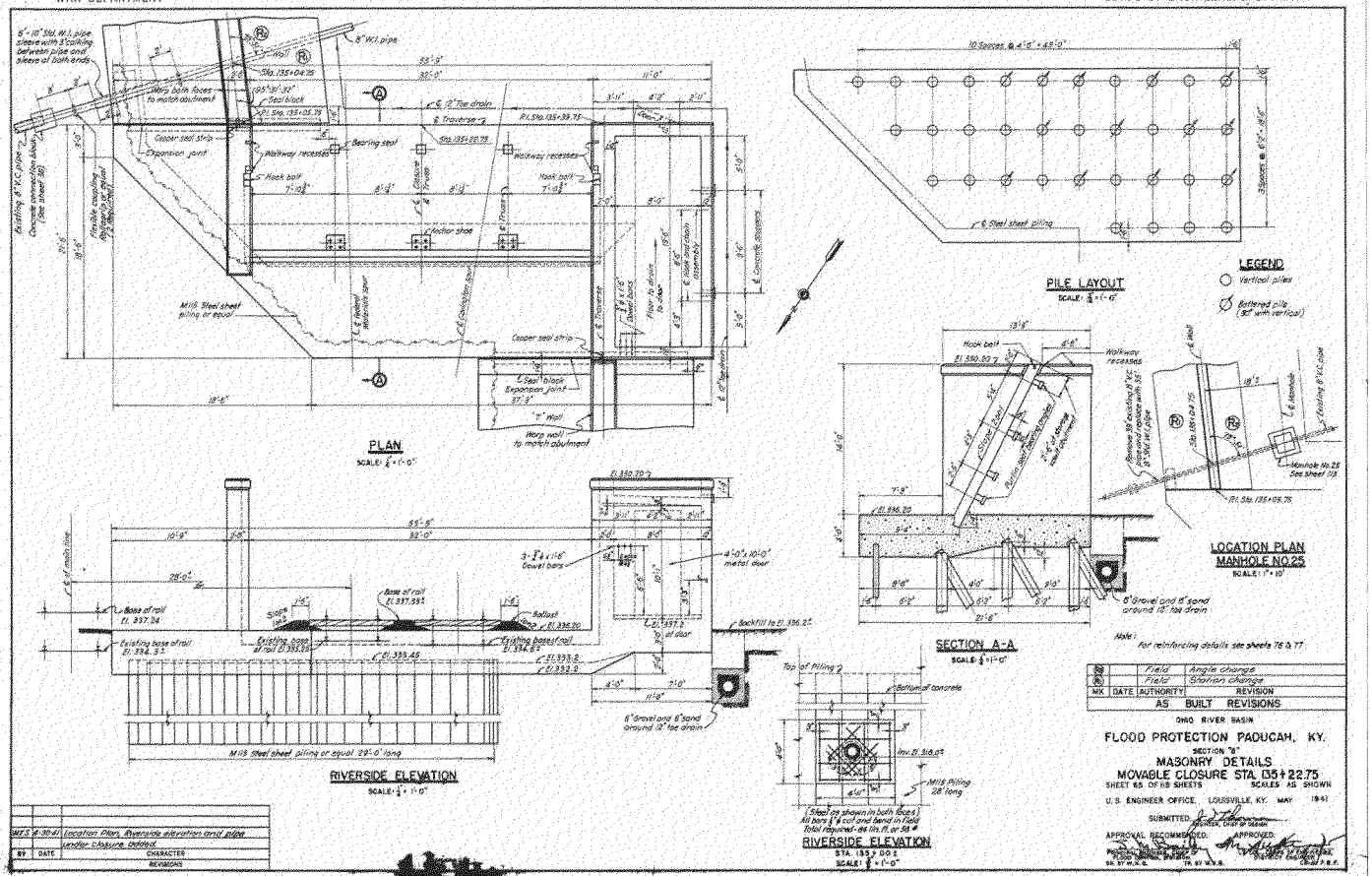
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



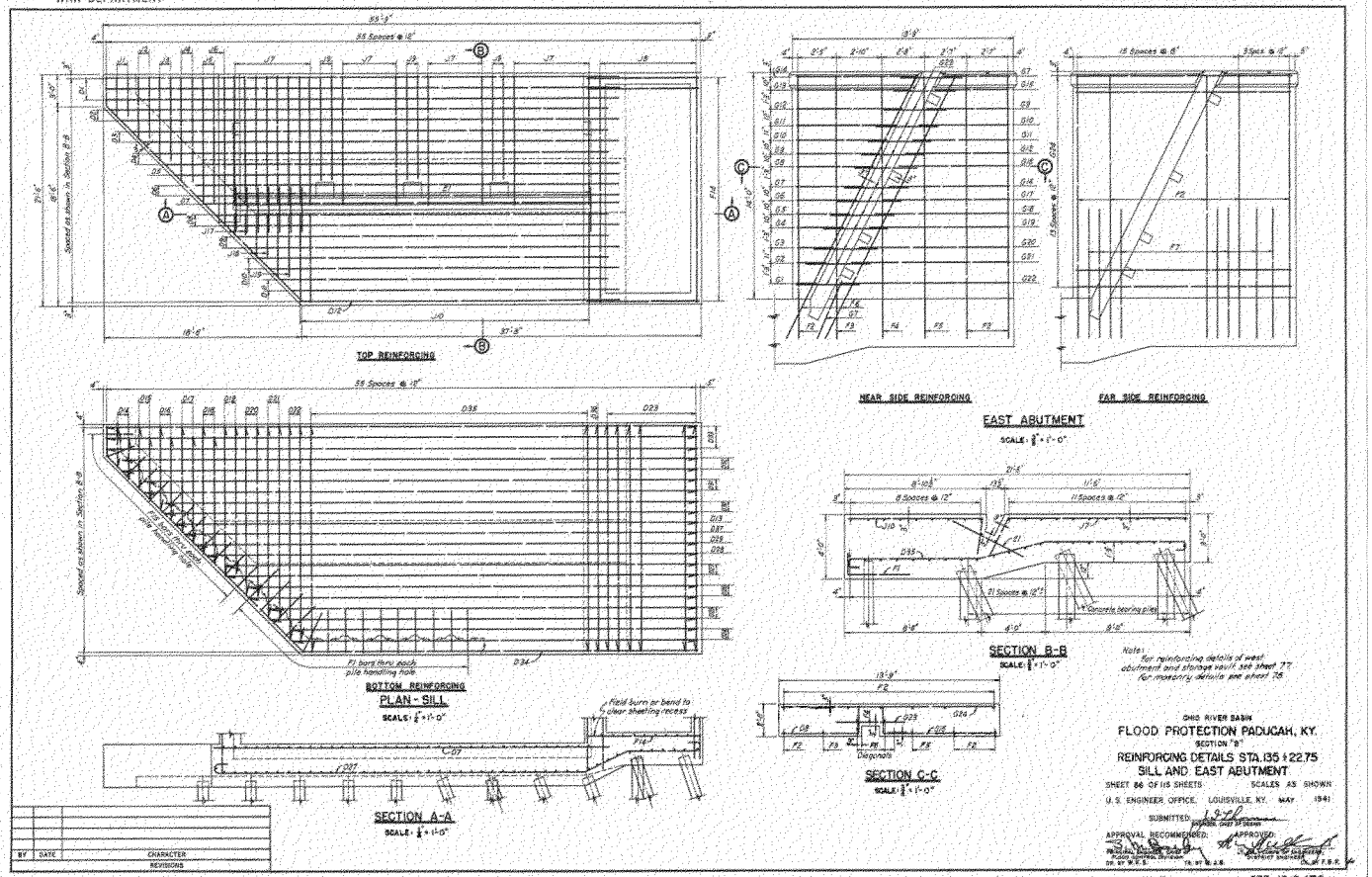
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

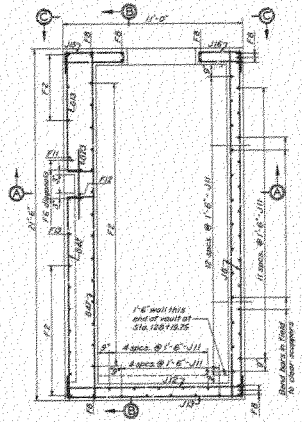
CORPS OF ENGINEERS, U. S. ARMY



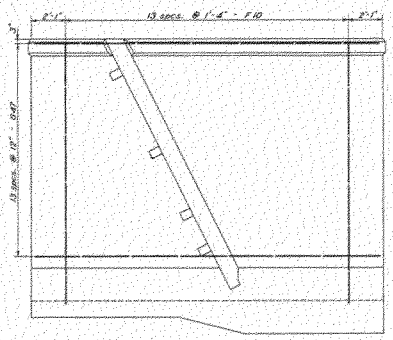
1247

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

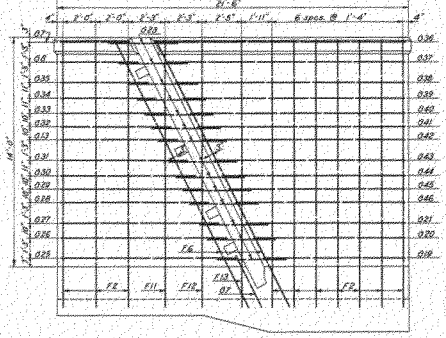


SECTIONAL PLAN

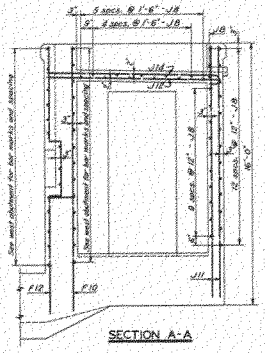


FAR SIDE REINFORCING

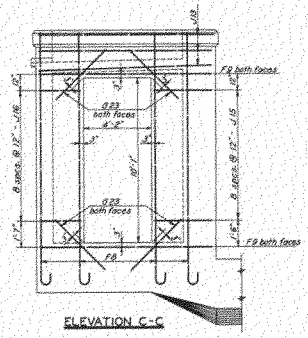
WEST ABUTMENT



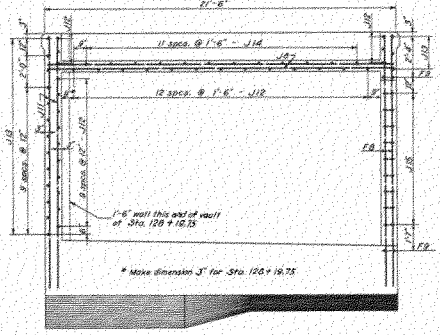
NEAR SIDE REINFORCING



SECTION A-A



ELEVATION C-C



SECTION B-B

Note:
For reinforcing for sill and roof abutment see sheets 71 & 75
For masonry details see sheets 70 & 75

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "KY"

REINFORCING DETAILS

STA. 128 + 19.75 AND STA. 135 + 22.75

STORAGE VAULT AND WEST ABUTMENT

SHEET 87 OF 113 SHEETS SCALE $\frac{1}{8}$" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: 1941 (SIGNATURE), CHIEF OF DESIGN

APPROVAL RECOMMENDED: (SIGNATURE) CHIEF OF FLOOD CONTROL DIVISION, OR, BY M.R.B. TA, BY N.W.

APPROVED: (SIGNATURE) CHIEF, PLANS & REPORTS, DISTRICT ENGINEER, CH. BY F.B.P.

BY	DATE	CHARACTER
		REVISIONS

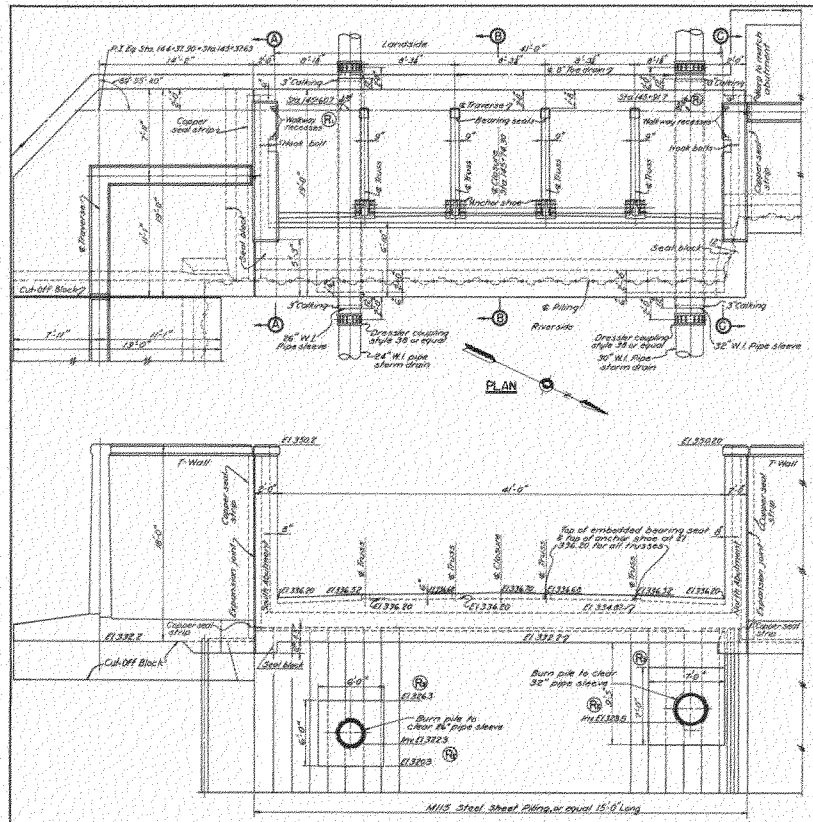
AS BUILT 935-12.2/77

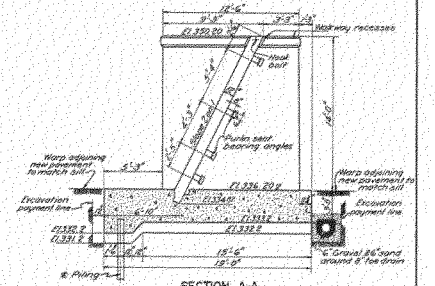
445

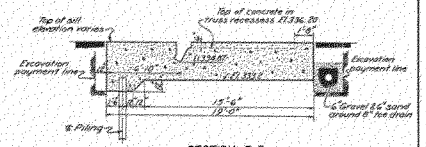
1248

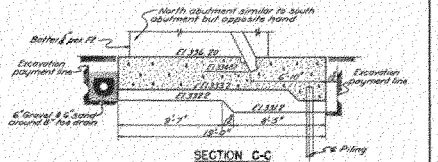
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY









OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 145 + 74.30

SHEET 68 OF 115 SHEETS — SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CH. BY A.S.Z.

APPROVED: [illegible] CH. BY F.B.K.

MK	DATE	AUTHORITY	REVISION
Rx		Field	Dimension added
Ry		Field	Elevation change
Rz		Field	Angle added

AS BUILT REVISIONS

Note: For reinforcing details see sheet 73.

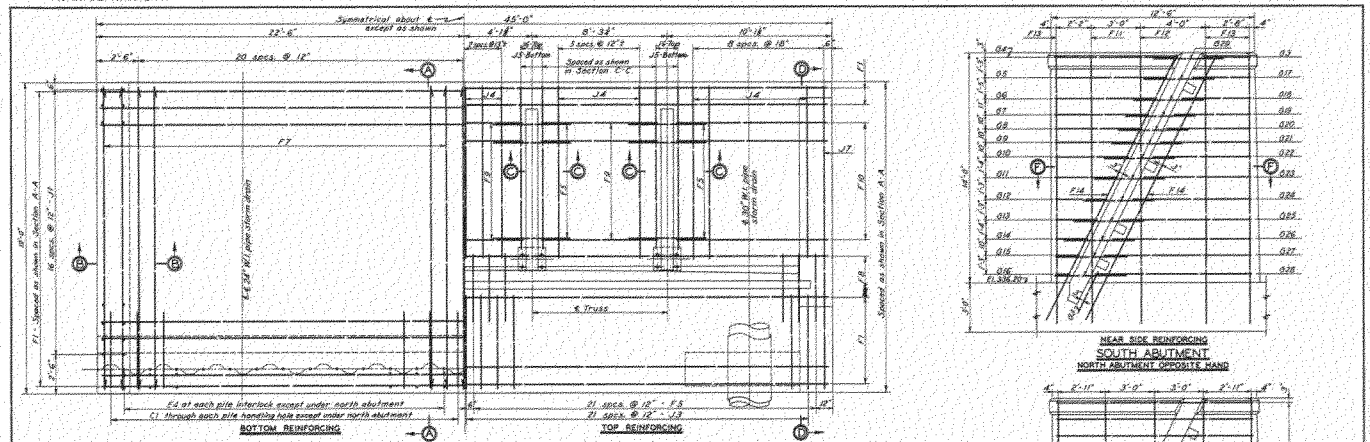
MK	DATE	AUTHORITY	REVISION
3	4-30-8	Minor corrections	

BY	DATE	CHARACTER
		REVISIONS

AS BUILT 935-12.2/78

WAR DEPARTMENT

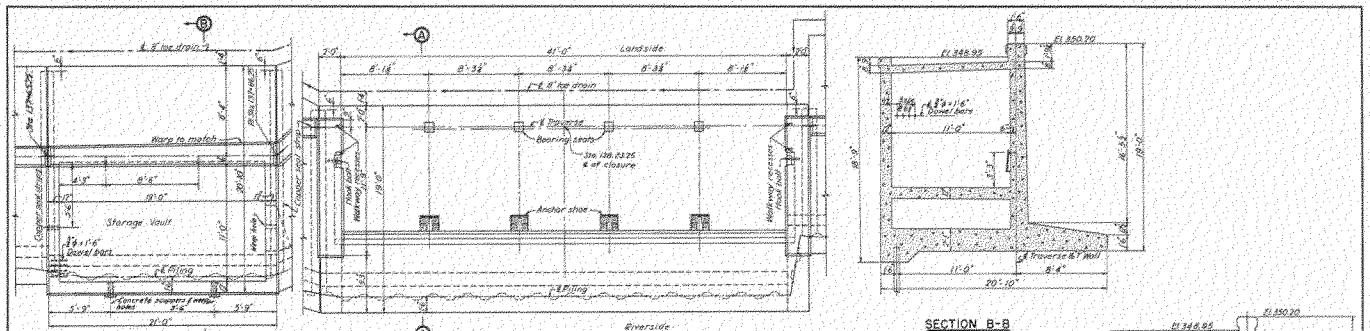
CORPS OF ENGINEERS, U. S. ARMY



PLAN - SILL

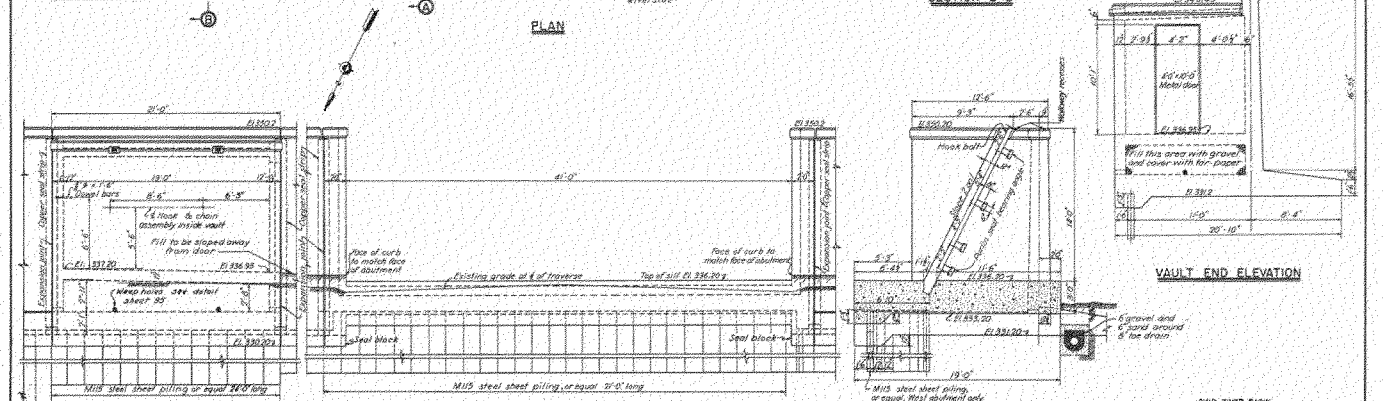
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

SECTION B-B



RIVERSIDE ELEVATION

SECTION A-A

VAULT END ELEVATION

WED	4-30-41	Weep holes added
BY	DATE	CHARACTER
		REVISIONS

Note:
For reinforcing details see sheets 88 to 89
For general plan see sheet 83

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 138 + 23.25
SHEET 70 OF 115 SHEETS
SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] PROJECT ENGINEER DESIGN

APPROVAL RECOMMENDED: [illegible] PROJECT ENGINEER DESIGN

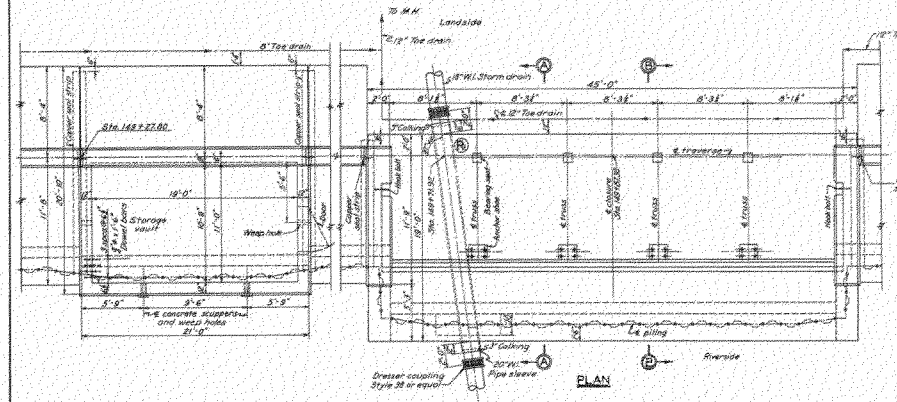
APPROVED: [illegible] DISTRICT ENGINEER

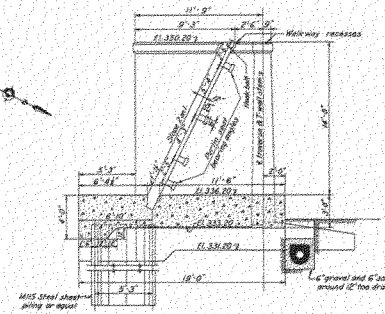
AS BUILT

935-12.2/80

WAR DEPARTMENT

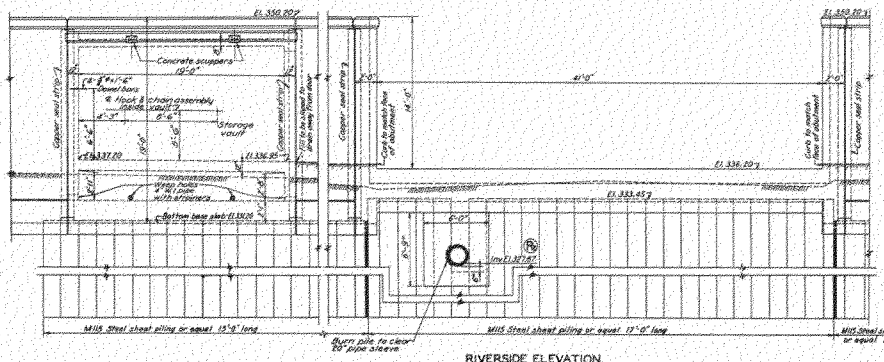
CORPS OF ENGINEERS, U. S. ARMY



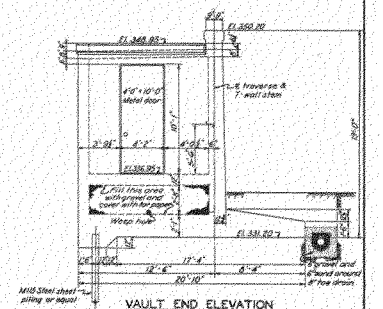


SECTION A-A

SECTION B-B IDENTICAL BUT OPPOSITE HAND



RIVERSIDE ELEVATION



VAULT END ELEVATION

WK.5	4-30-41	Weep holes added under vault	
BY	DATE	CHARACTER	
		REVISIONS	

3		Field	Elevation change
2		Field	Angle change
MK	DATE	AUTHORITY	REVISION
		AS BUILT	REVISIONS

Note:
For details of monolith No. 244 see sheet 39
For reinforcing details see sheets 62 & 63

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 149+87.30

SHEET 71 OF 115 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible]

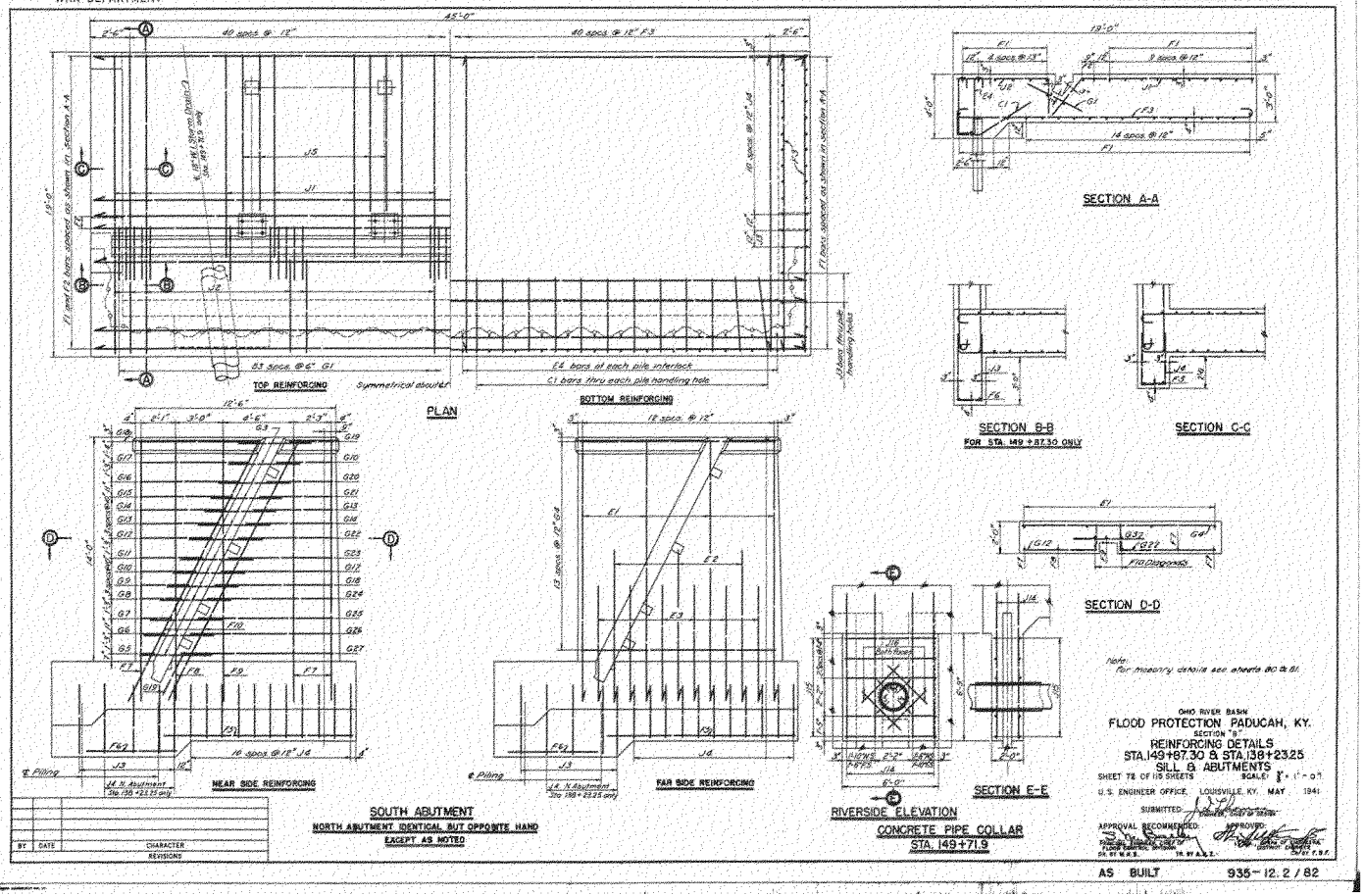
APPROVED: [illegible]

AS BUILT 935-12.2/81

1252

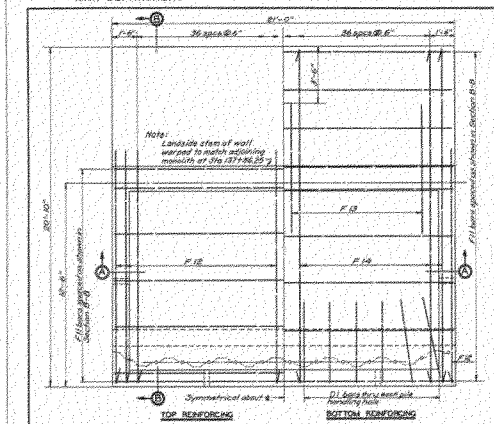
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

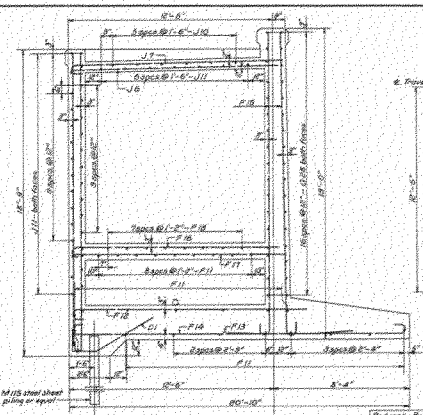


WAR DEPARTMENT

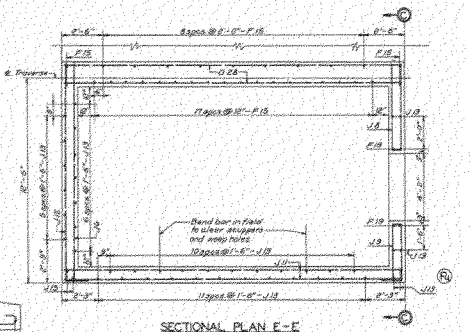
CORPS OF ENGINEERS, U. S. ARMY



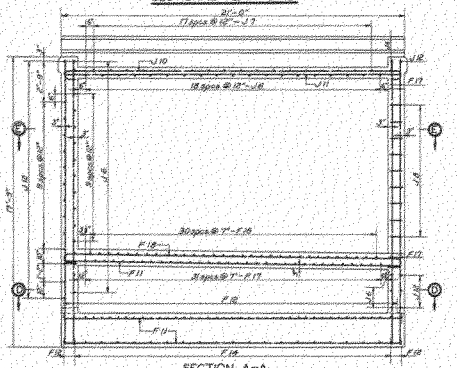
SECTIONAL PLAN D-D



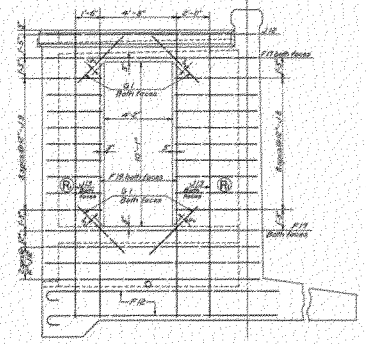
SECTION B-B



SECTIONAL PLAN E-E



SECTION A-A



ELEVATION C-C

Note:
For masonry details see sheets 80 and 81

WALKWAY PLANKING SCHEDULE				
	STATION	NO. REQD.	SIZE	F.B.M. TOTAL
Paducah-B-1	4+29.5	8	2"x8"x8'-6"	90.6
"	5+36.5	8	- - -	-
" " "	9+44.0	4	- - 15'-0"	80.0
" " "	10+80.0	4	2"x8"x15'-0"	80.0
" " "	25+15.6	8	2"x8"x 9'-6"	101.4
" " "	26+90.9	5	2"x8"x 11'-0"	117.3
" " "	29+80.3	4	2"x8"x 15'-0"	80.0
" " "	31+01.3	4	2"x8"x 15'-0"	80.0
" " "	31+51.4	6	2"x8"x 9'-6"	101.4
" " "	36+84.5	4	2"x8"x 15'-0"	80.0
" " "	62+94.3	8	2"x8"x 9'-6"	101.4
" " "	71+74.9	8	2"x8"x 9'-6"	101.4
" " "	75+85.5	8	2"x8"x 9'-6"	101.4
" " "	83+92.1	8	2"x8"x 8'-7"	91.7
Paducah-B-2	90+41.7	8	2"x8"x 9'-6"	101.4
" " "	91+96.0	4	2"x8"x 15'-0"	80.0
" " "	93+57	10	2"x8"x 10'-0"	106.6
" " "	94+63	4	2"x8"x 6'-1"	42.3
" " "	94+63	8	2"x8"x 12'-6"	53.5
" " "	94+63	8	2"x8"x 8'-0"	85.4
" " "	98+88	8	2"x8"x 9'-6"	101.4
" " "	103+83.3	8	2"x8"x 9'-6"	101.4
" " "	108+10	8	2"x8"x 11'-0"	117.33
" " "	108+59	8	2"x8"x 9'-6"	101.4
"		3	2"x10"x 10'-0"	
Harrisburg	100+81	6	2"x12"x 11'-6"	198.0
"		6	2"x12"x 8'-6"	
"	136+99	6	2"x12"x 7'-7"	195.0
"		6	2"x12"x 8'-6"	
"	156+20	6	2"x12"x 8'-6"	204.0
"		6	2"x12"x 8'-6"	
Brookport	81+55.8	6	2"x12"x 8'-6"	114.0
"	88+48.8	6	2"x12"x 8'-6"	114.0
"	97+19.6	3	2"x12"x 11'-0"	198.0
		4	2"x12"x 11'-0"	
"	99+68.9	6	2"x12"x 11'-0"	198.0
"	110+38.0	3	2"x10"x 11'-0"	186.0
		4	2"x12"x 11'-0"	
		3	2"x12"x 11'-0"	
		3	2"x10"x 11'-0"	
"	114+93.8	4	2"x12"x 11'-0"	198.0
		3	2"x12"x 10'-3"	
"	185+90.7	6	2"x12"x 11'-0"	132.0
Paducah "C"	104+98.17	6	2"x12"x 11'-0"	132.0

WALKWAY PLANKING SCHEDULE				
	STATION	NO. REQD.	SIZE	F.B.M. TOTAL
Paducah-A	140+15.4	2	2"x10"x11'-6"	38.33
		2	2"x12"x 11'-6"	46.0
Brookport	53+12	6	2"x10"x 12'-0"	120.0
Paducah-B-2	114+38.71	20	2"x8"x8'-3"	220.0
		8	2"x8"x 7'-6"	101.4
" " "	118+62.65	4	2"x8"x 5'-7"	37.24
		8	2"x8"x10'-0"	106.8
" " "	123+20.40	4	2"x8"x 5'-7"	49.78
		8	2"x8"x 9'-0"	108.8
" " "	128+18.75	4	2"x8"x 4'-7"	30.11
		8	2"x8"x 8'-0"	85.3
" " "	132+40.50	6	2"x8"x 9'-6"	101.4
		6	2"x8"x 7'-0"	83.56
" " "	135+22.75	6	2"x8"x 3'-0"	36.0
		12	2"x8"x 5'-0"	120.0
" " "	138+29	6	2"x8"x 9'-6"	101.4
		12	2"x8"x 8'-0"	128.0
" " "	145+74	12	2"x8"x 9'-6"	101.4
		6	2"x8"x 8'-0"	128.0
" " "	149+87	12	2"x8"x 9'-6"	101.4
		8	2"x8"x 8'-0"	128.0
" " "	157+26	12	2"x8"x 9'-6"	101.4
		6	2"x8"x 8'-0"	128.0
" " "	161+53	12	2"x8"x 9'-6"	101.4
		32	2"x8"x 8'-0"	344.89
" " "	166+48.3	4	2"x8"x 19'-0"	80.0
		8	2"x8"x 9'-6"	101.4
" " "	170.94	12	2"x8"x 8'-0"	128.0
		8	2"x8"x 9'-6"	101.4
Golconda	18+41	6	2"x10"x 12'-0"	120.0
"	21+08.6	3	2"x10"x 12'-0"	60.0
		3	2"x12"x 12'-0"	72.0
			TOTAL	7141.81

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 149+27.80 & STA. 137+85.25 STORAGE VAULT & WALKWAY PLANKING SCHEDULE
SHEET 73 OF 115 SHEETS — SCALE: ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: [illegible]
APPROVAL RECOMMENDED: [illegible] Chief, Design Branch
APPROVED: [illegible] Colonel, Corps of Engineers, District Engineer
DR. BY W. H. S. — TR. BY S. R. W. — CK. BY F. G. F.

MK	DATE	AUTHORITY	REVISION
			Field Bar change
		AS BUILT	REVISIONS

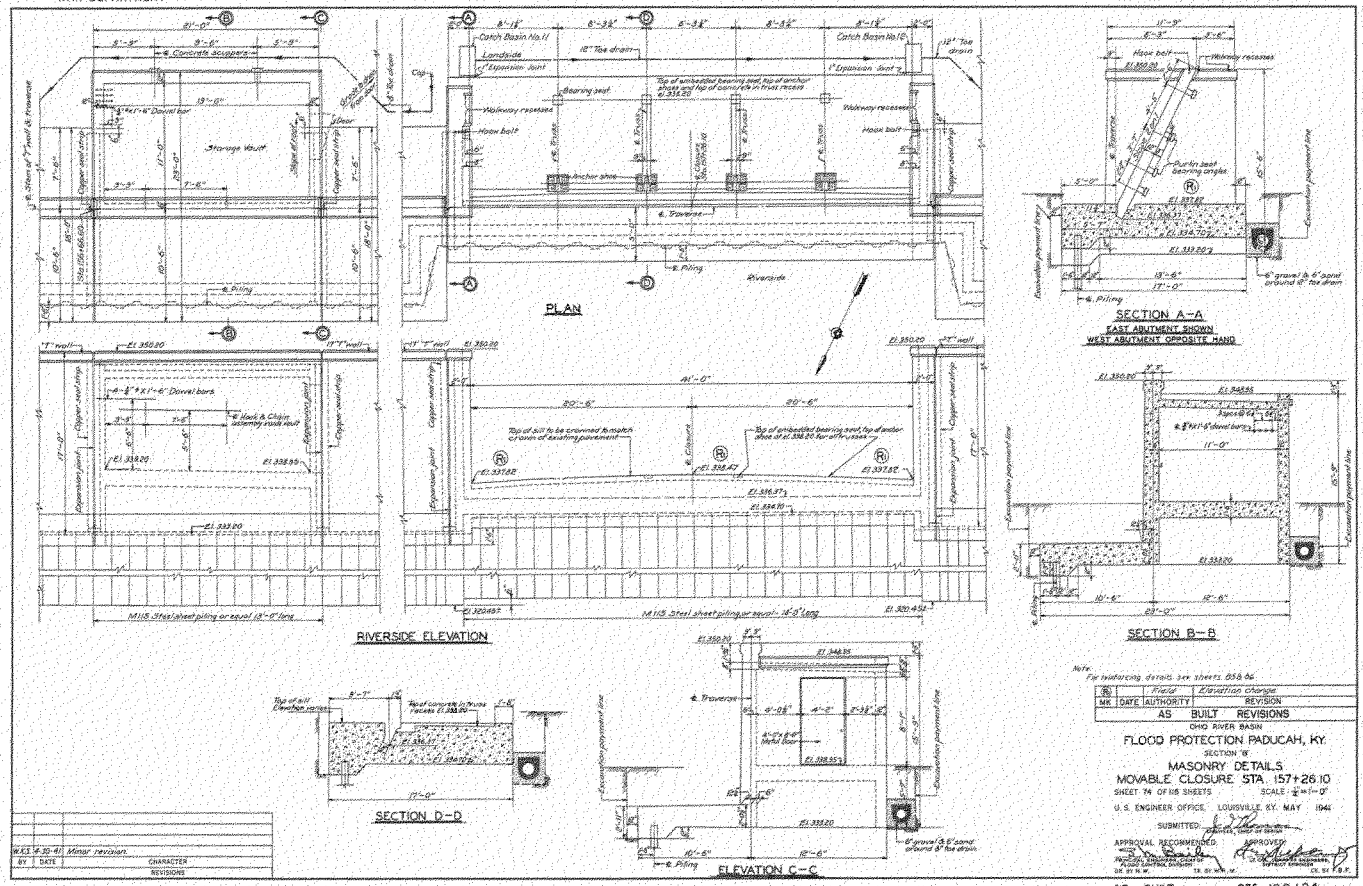
MK	DATE	CHARACTER
		W.K.S. 4-30-41 Weep holes added, minor corrections & title changed
BY	DATE	REVISIONS

AS BUILT

935-12.2/83

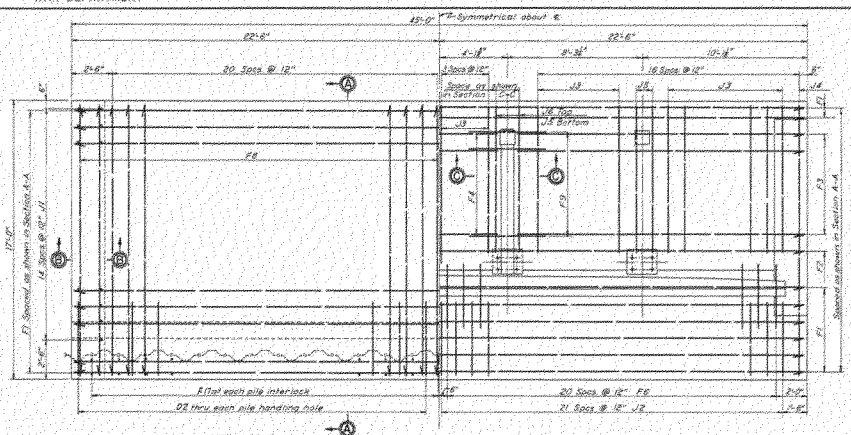
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

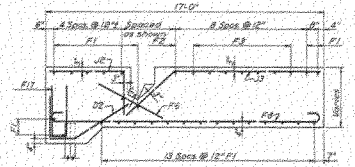
CORPS OF ENGINEERS, U. S. ARMY



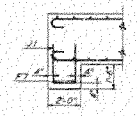
BOTTOM REINFORCING

TOP REINFORCING

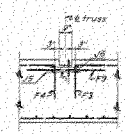
PLAN SILL



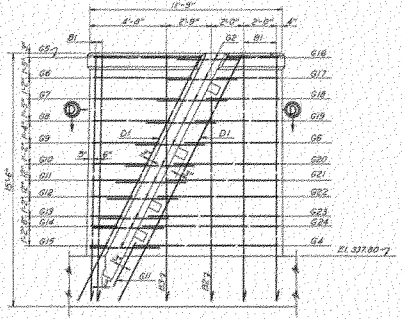
SECTION A-A



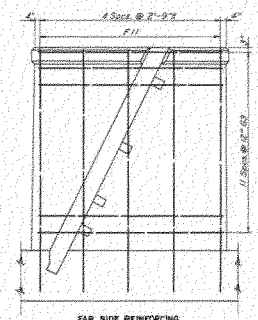
SECTION B-B



SECTION C-C



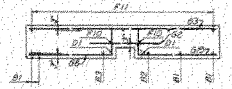
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

EAST ABUTMENT

WEST ABUTMENT SIMILAR BUT OPPOSITE HAND



SECTION D-D

Note:
For masonry detail see sheet 04.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 157+26.10

SILL & ABUTMENTS

SHEET 75 OF 115 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [illegible] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

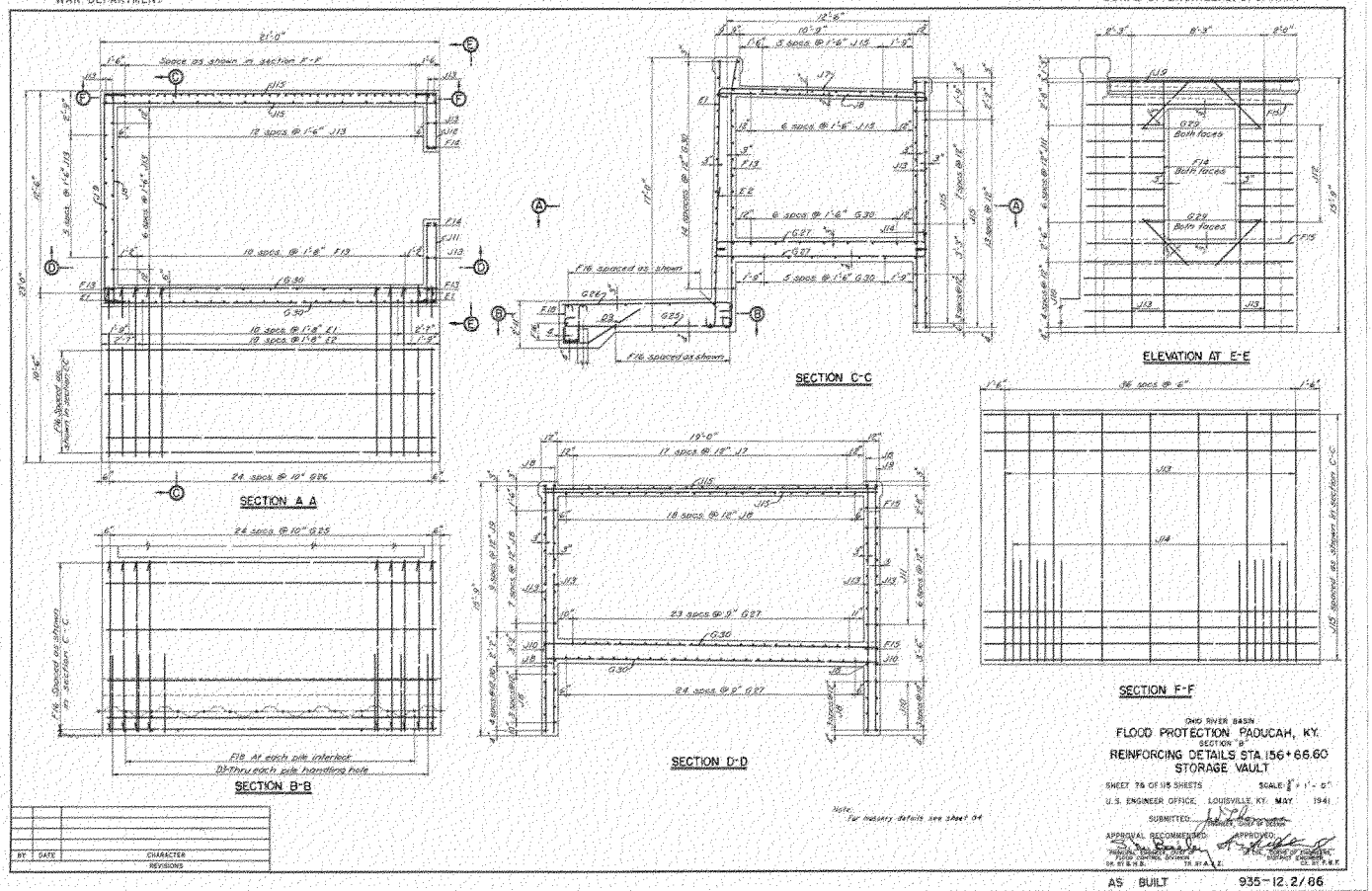
DR. BY: D.R.S. TR. BY: R.K.J. CK. BY: S.F.

BY	DATE	CHARACTER
		REVISIONS

AS BUILT 935 – 12.2 / 85

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 156+66.60

STORAGE VAULT

SHEET 78 OF 115 SHEETS SCALE 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: Assistant District Engineer

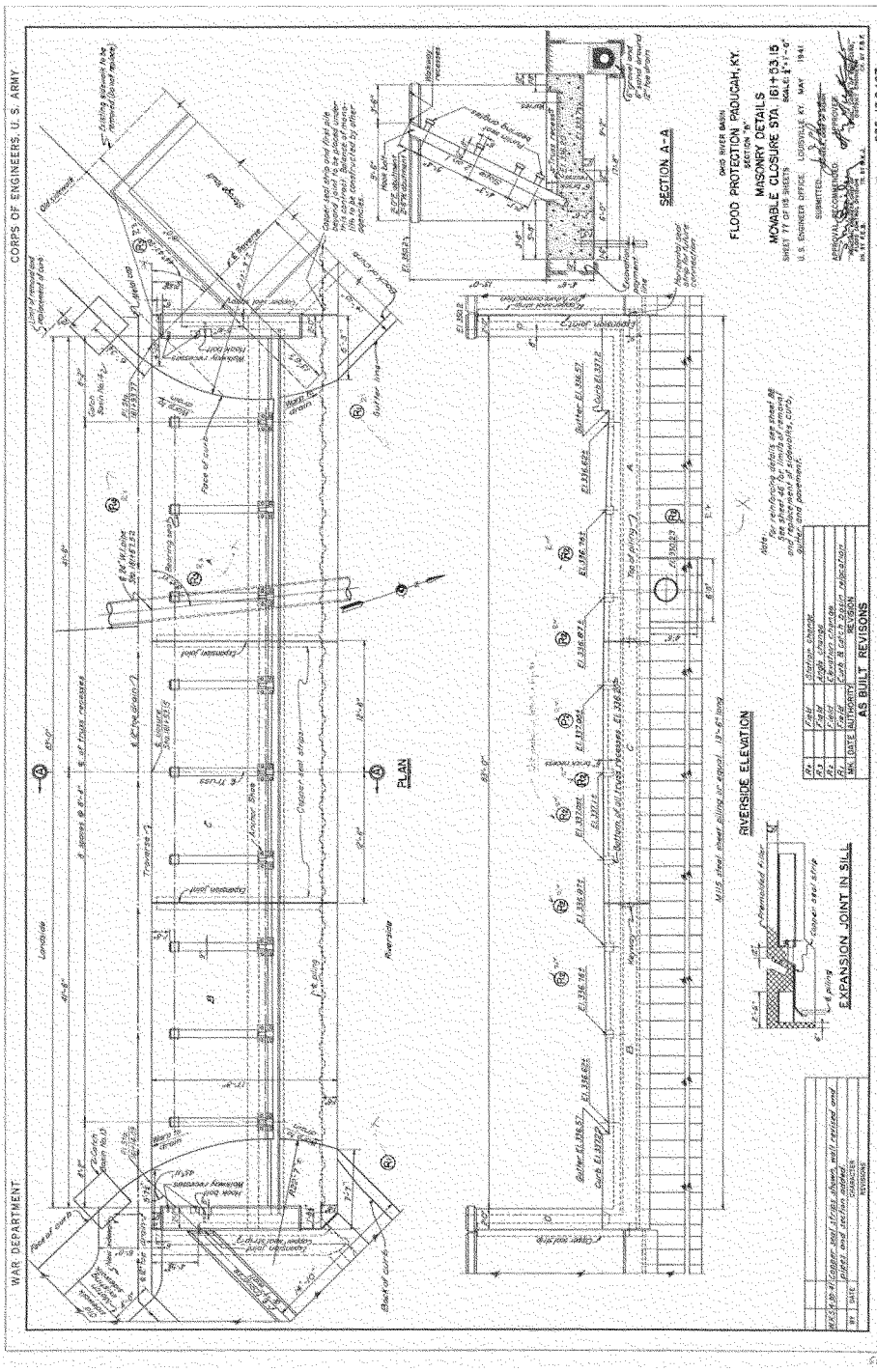
APPROVAL RECOMMENDED: Chief, Design Branch, Flood Control Division

APPROVED: Colonel, Corps of Engineers, District Engineer

DR. BY B.H.B. TR. BY A.L.E. CK. BY F.M.T.

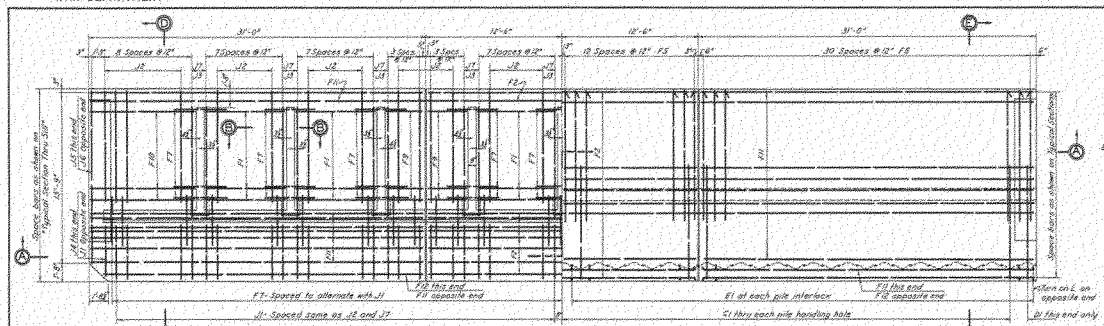
AS BUILT 935-12.2/86

1257

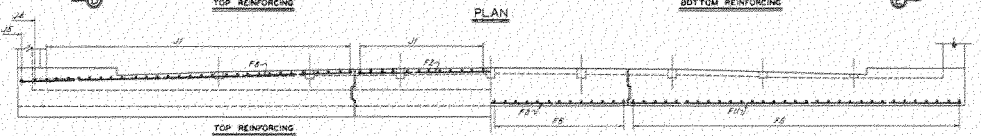

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
SECTION A-A
RIVERSIDE ELEVATION
EXPANSION JOINT IN SILL
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURE STA. 161+53.15
U. S. ENGINEER OFFICE, LOUISVILLE KY. MAY 1941
AS BUILT
935-12.2/87
AS BUILT REVISIONS
REVISIONS
Landside
Riverside

WAR DEPARTMENT

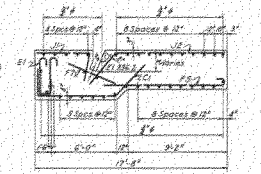
CORPS OF ENGINEERS, U. S. ARMY



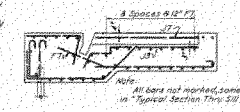
PLAN



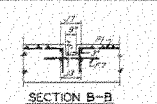
SECTION A-A



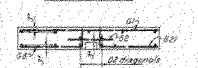
TYPICAL SECTION THRU SILL



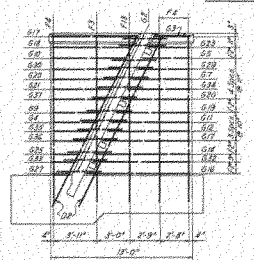
TYPICAL SECTION THRU TRUSS RECESS

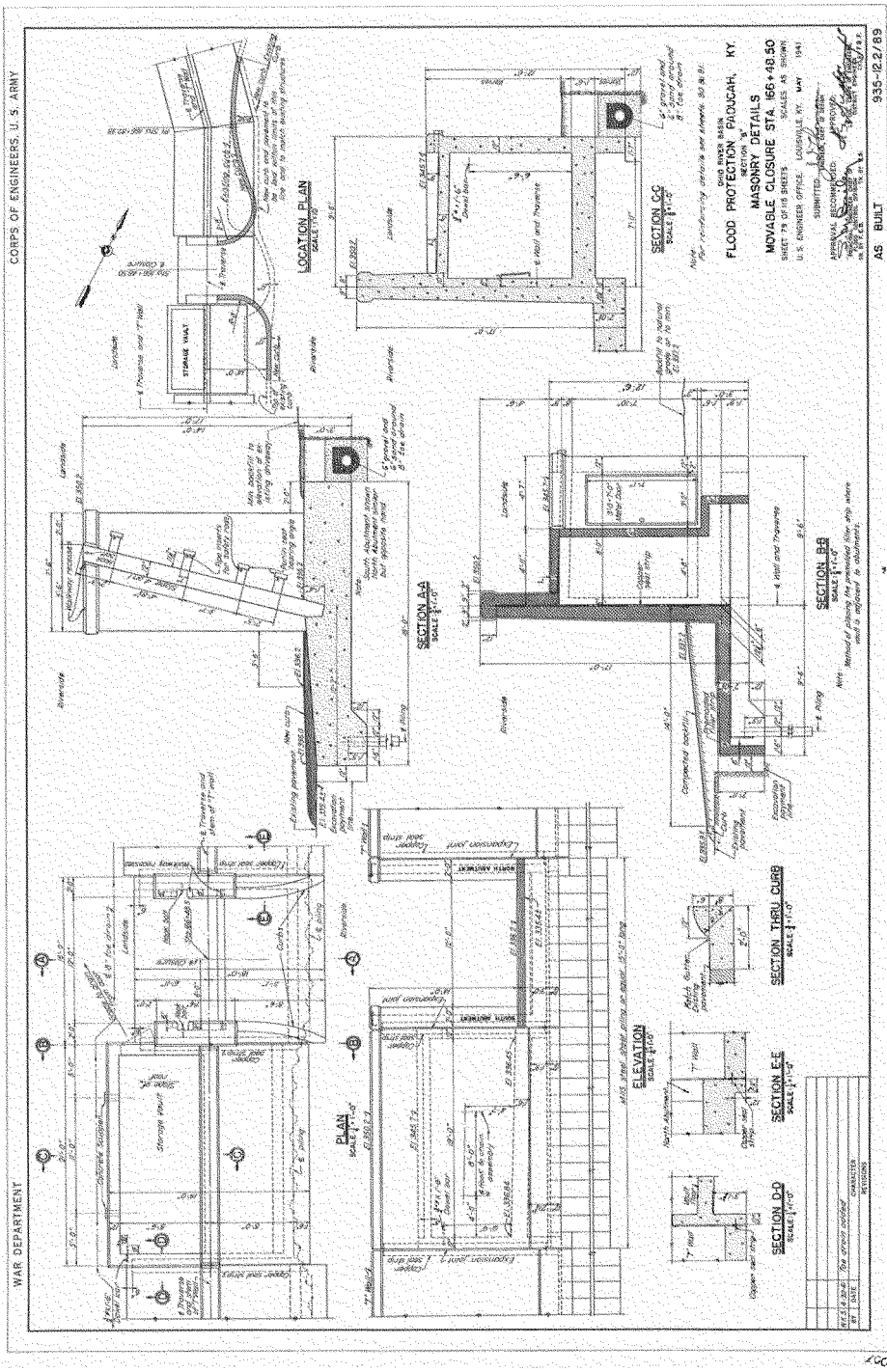


SECTION B-B



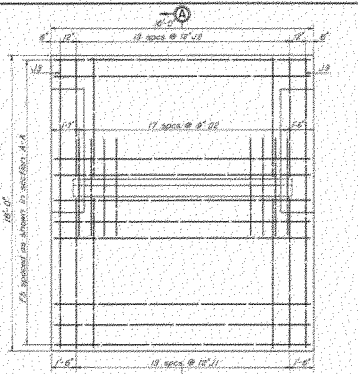
SECTION C-C



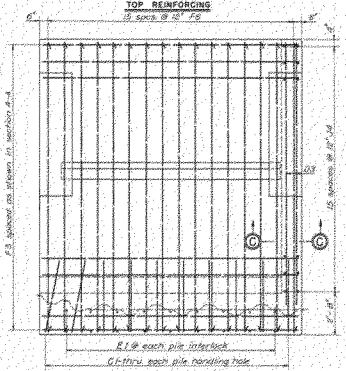

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
LOCATION PLAN
SCALE 1"=100'
STORAGE VAULT
SECTION A-A
SCALE 1/4"=1'-0"
SECTION B-B
SCALE 1/4"=1'-0"
SECTION C-C
SCALE 1/4"=1'-0"
PLAN
SCALE 1/4"=1'-0"
ELEVATION
SCALE 1/4"=1'-0"
SECTION D-D
SCALE 1/4"=1'-0"
SECTION E-E
SCALE 1/4"=1'-0"
SECTION THRU CURB
SCALE 1/4"=1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 166+48.50
SHEET 79 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/89

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

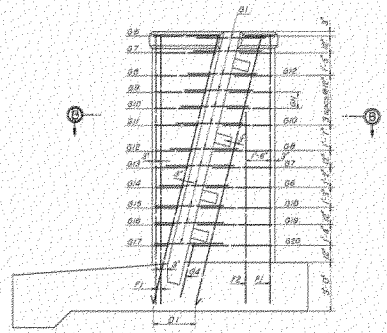


TOP REINFORCING

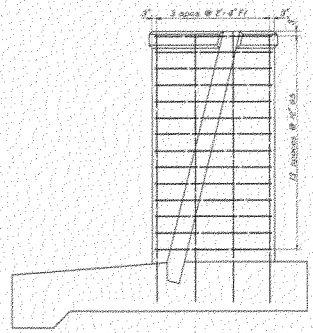


BOTTOM REINFORCING

PLAN - SILL



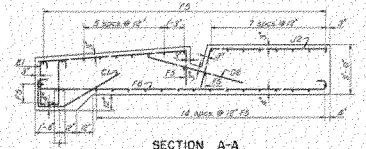
NEAR SIDE REINFORCING



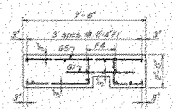
FAR SIDE REINFORCING

SOUTH ABUTMENT

NORTH ABUTMENT IDENTICAL BUT OPPOSITE HAND



SECTION A-A



SECTION B-B

SECTION C-C

Note:
For masonry details see sheet 89.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 166+48.50

SILL & ABUTMENTS

SHEET NO. OF 115 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] APPROVED: [illegible]

CHIEF, DESIGN BRANCH, FLOOD CONTROL DIV. — DISTRICT ENGINEER

DR. BY E.B.B. TR. BY B.A.S. CK. BY F.B.P.

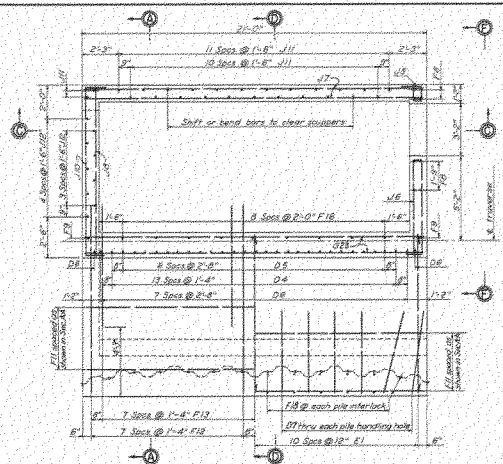
BY	DATE	CHARACTER REVISIONS

AS BUILT

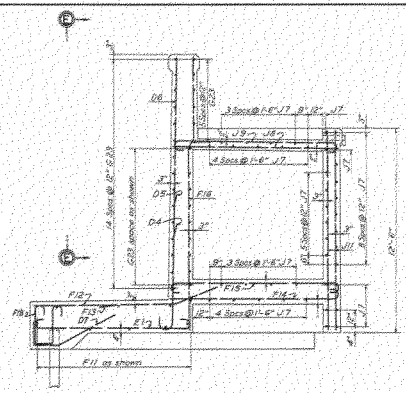
935-12.2/90

WAR DEPARTMENT

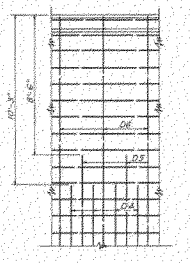
CORPS OF ENGINEERS, U. S. ARMY



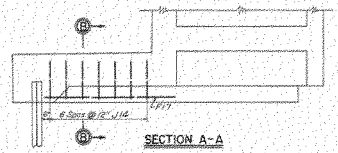
PLAN



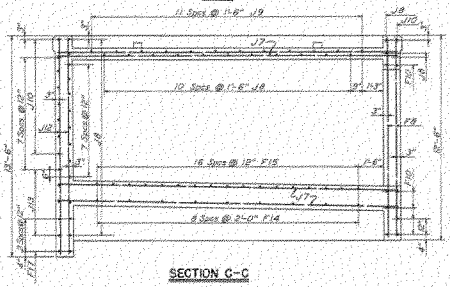
SECTION D-D



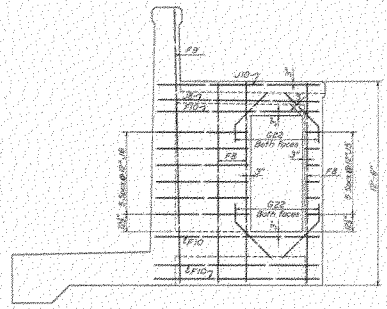
ELEVATION E-E



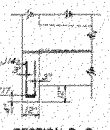
SECTION A-A



SECTION C-C



ELEVATION F-F



SECTION B-B

Note:
For masonry details see sheet 88.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 166+48.50

STORAGE VAULT

SHEET 81 OF 115 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [illegible] DISTRICT ENGINEER

DR. BY R.E.B. TR. BY W.K.J. CK. BY F.B.F.

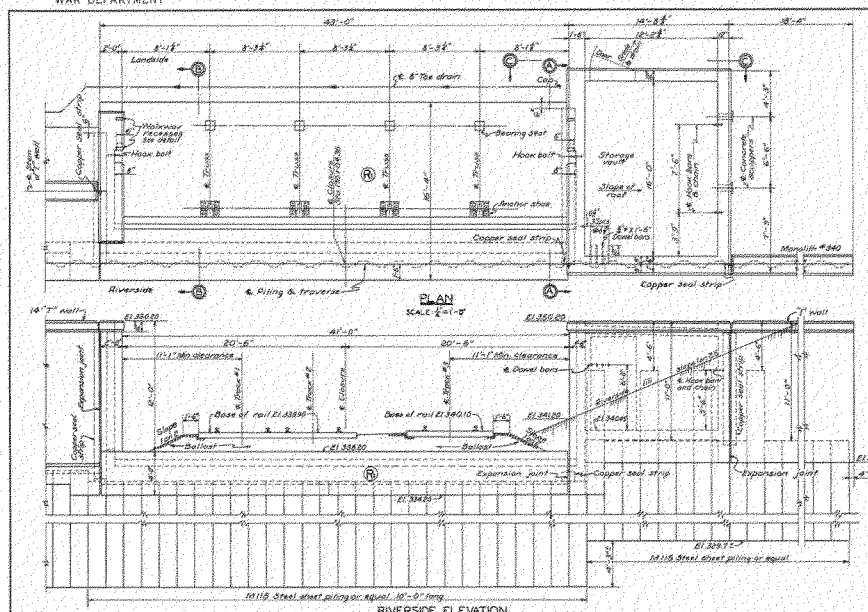
BY	DATE	CHARACTER REVISIONS

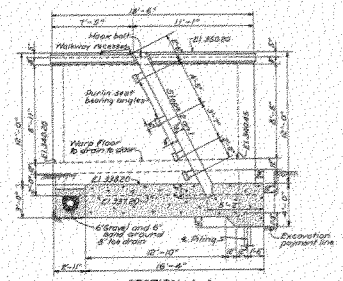
AS BUILT 935-12.2/91

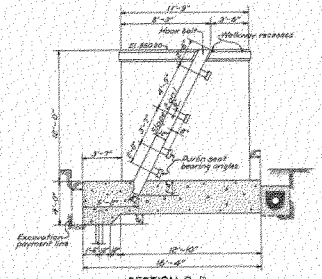
1262

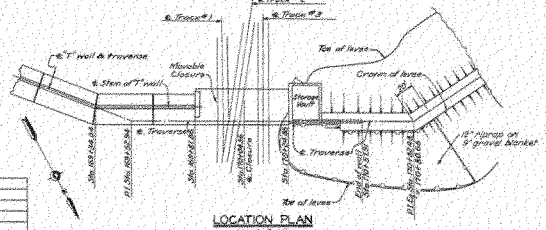
WAR DEPARTMENT

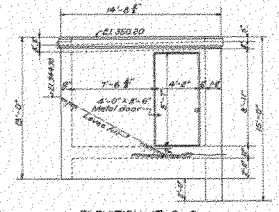
CORPS OF ENGINEERS, U. S. ARMY











MK	DATE	AUTHORITY	REVISION
		Field	Construction joint deleted

AS BUILT REVISIONS

Note:
For reinforcing details see sheets 83 & 84.

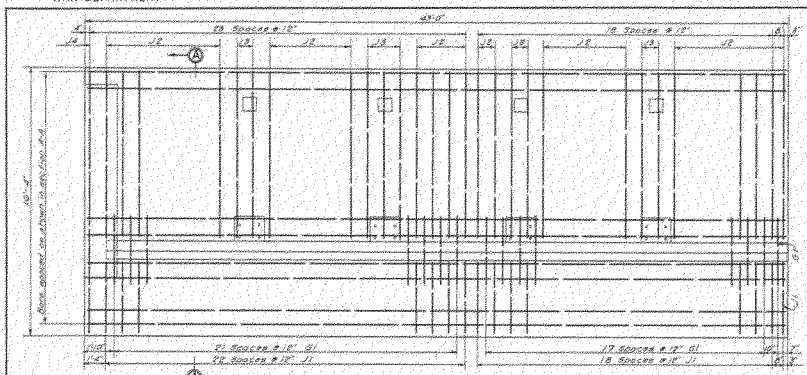
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "D"
MASONRY DETAILS
MOVABLE CLOSURE STA. 170+04.36
SHEET 82 OF 115 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVAL RECOMMENDED: APPROVED:

BY	DATE	CHARACTER REVISIONS

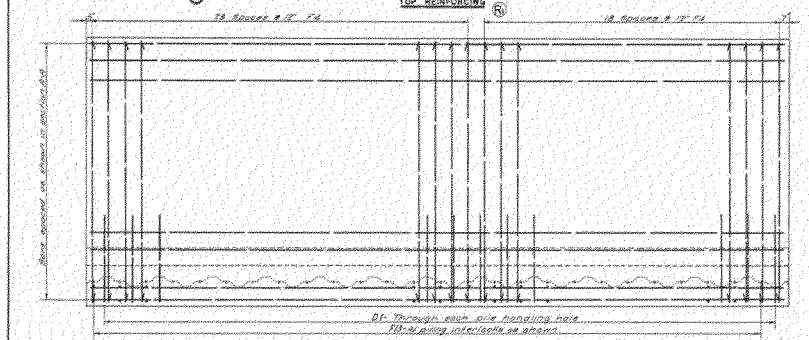
AS BUILT 935-12.2/92

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

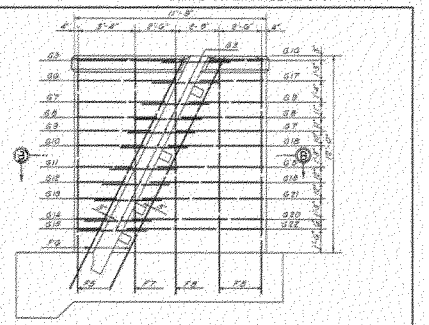


TOP REINFORCING

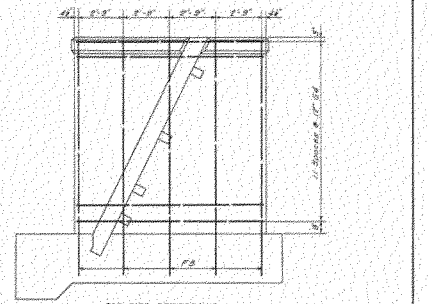


BOTTOM REINFORCING

SILL



NEAR SIDE REINFORCING

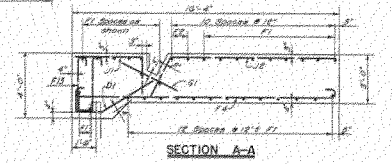


FAR SIDE REINFORCING

EAST ABUTMENT

Note: For masonry details see sheet 98

SECTION B-B



SECTION A-A

BY	DATE	CHARACTER REVISIONS

Construction joint deleted "Field"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION 9

REINFORCING DETAILS STA.170+04.36

SILL AND EAST ABUTMENT

SHEET 83 OF 115 SHEETS SCALE: $\frac{1}{4}$" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible]

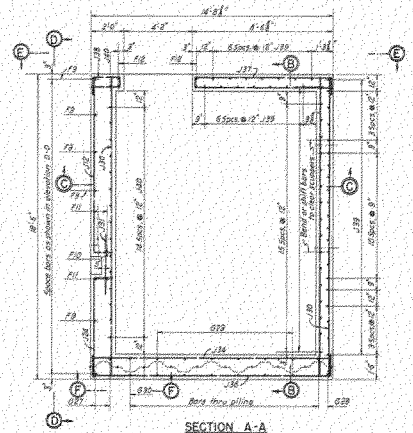
APPROVED: [illegible]

AS BUILT 935-12.2/93

1264

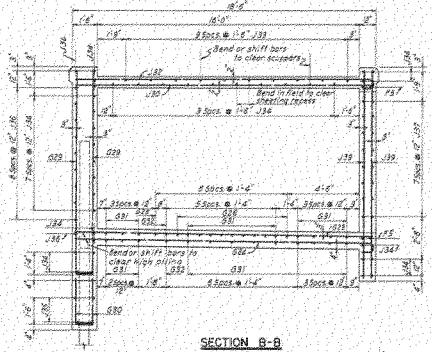
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



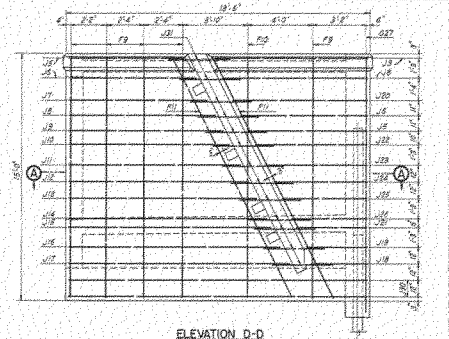
SECTION A-A

SCALE: 3/8" = 1'-0"



SECTION B-B

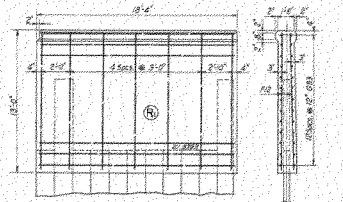
SCALE: 3/8" = 1'-0"



ELEVATION D-D

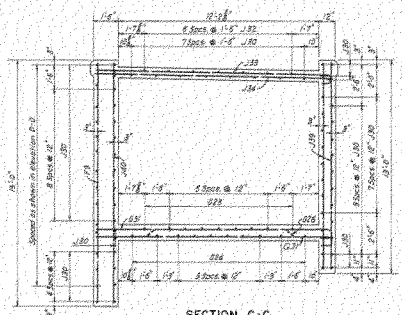
FOR FAR SIDE REINFORCING SEE SECTION A-A & C-C

SCALE: 3/8" = 1'-0"



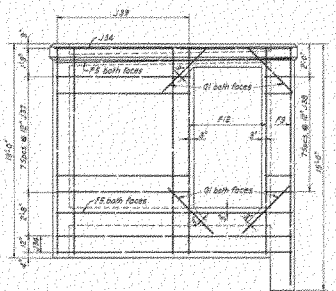
MONOLITH NO 340

SCALE: 3/8" = 1'-0"



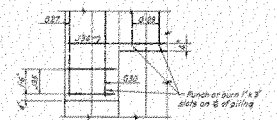
SECTION C-C

SCALE: 3/8" = 1'-0"



ELEVATION E-E

SCALE: 3/8" = 1'-0"



ELEVATION F-F

SCALE: 3/8" = 1'-0"

Note:
For masonry details see sheet 82.
(R) Change in piling "field."

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 170 + 04.36
STORAGE VAULT & MONOLITH NO. 340

SHEET 84 OF 115 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 194

SUBMITTED:

APPROVAL RECOMMENDED: — APPROVED:

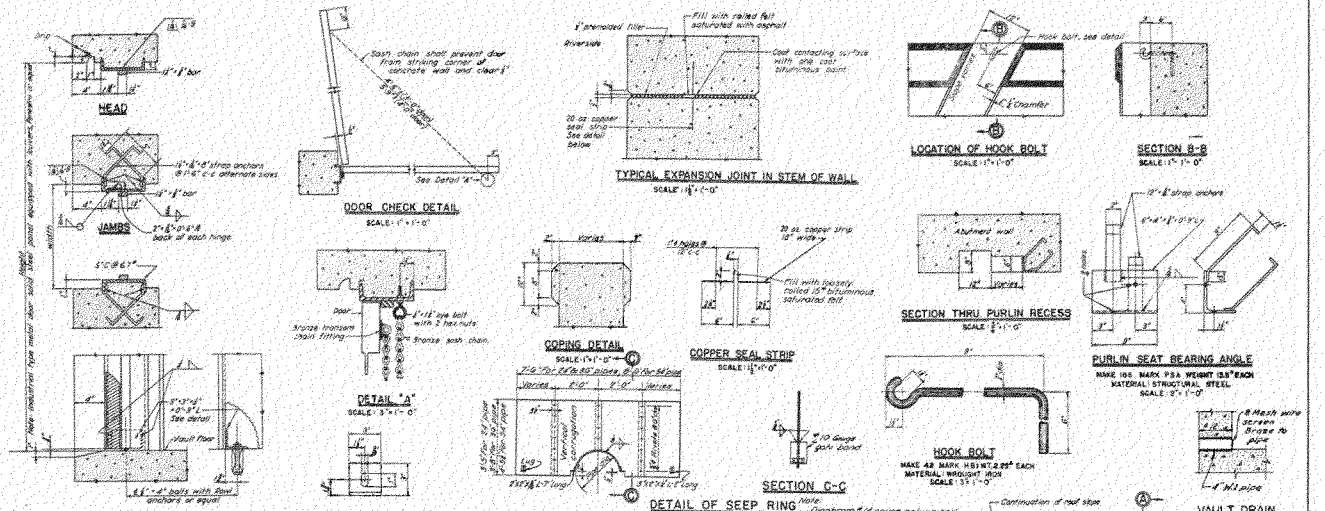
BY	DATE	CHARACTER
		REVISIONS

AS BUILT 935-12.2/94

1265

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



DOOR SCHEDULE			
STATION	HEIGHT	WIDTH
90+51.35	8'-0"	4'-0"
91+97.00	7'-0"	3'-0"
94+75.76	10'-0"	4'-0"
98+38.97	10'-0"	4'-0"
103+78.67	8'-0"	4'-0"
106+81.50	8'-0"	4'-0"
116+28.21	10'-0"	4'-0"
120+07.98	10'-0"	4'-0"
124+23.40	10'-0"	4'-0"
128+98.75	10'-0"	4'-0"
132+00.67	10'-0"	4'-0"
136+48.78	10'-0"	4'-0"
137+25.50	10'-0"	4'-0"
143+27.80	10'-0"	4'-0"
150+99.50	8'-0"	4'-0"
152+19.50	7'-0"	3'-0"
170+25.80	8'-0"	4'-0"

MK	DATE	AUTHORITY	REVISION
12		Field	Lock recess
11	9-11-43	C.O. #9	Deleted

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MISCELLANEOUS DETAILS

SHEET 85 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] Colonel, Corps of Engineers

APPROVAL RECOMMENDED: [illegible] Major, Corps of Engineers

APPROVED: [illegible] Colonel, Corps of Engineers

ST	DATE	CHARACTER
WKS	4-30-41	Vault drain detail added & hasp revised.

REVISIONS

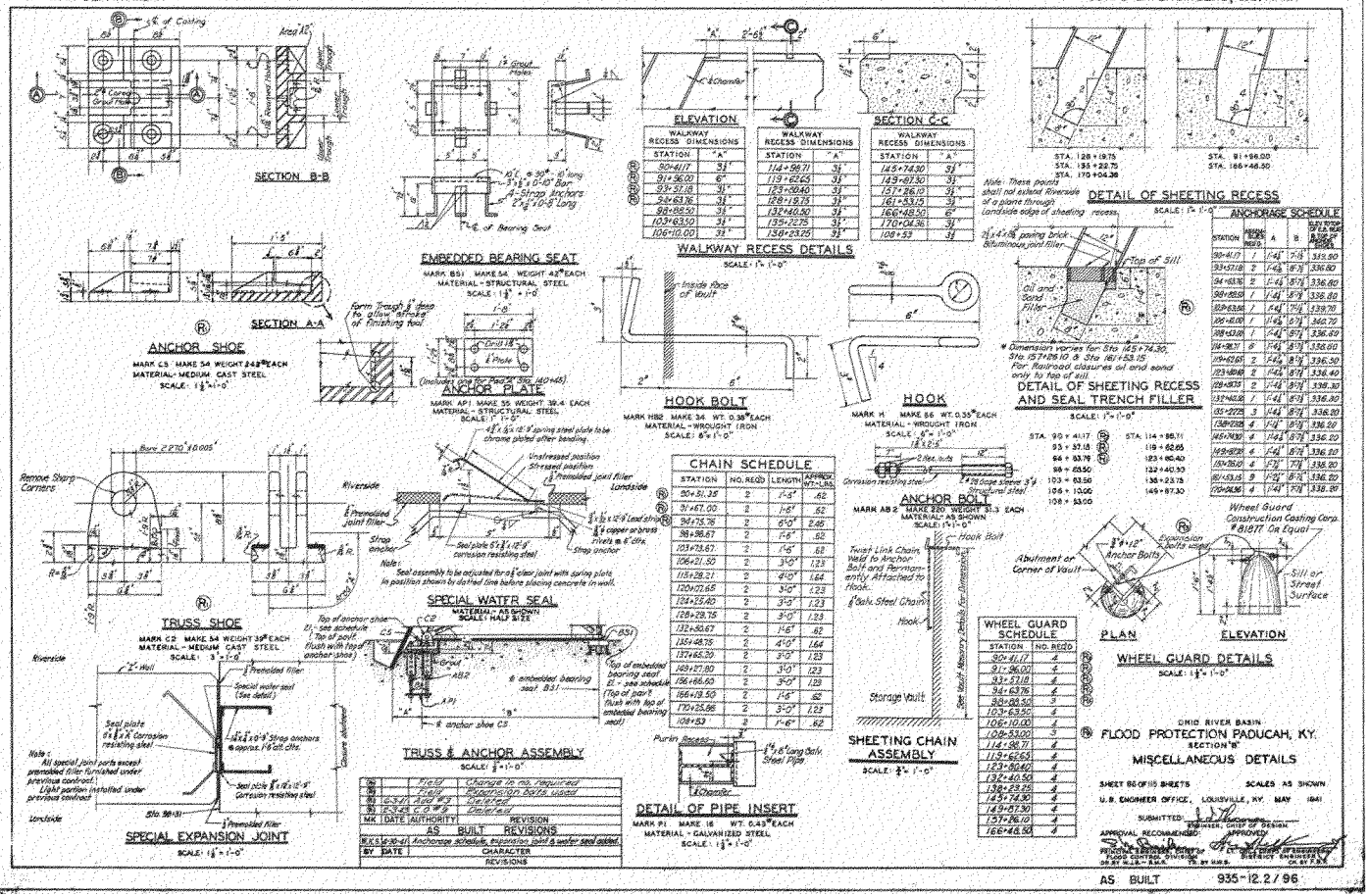
AS BUILT

935-12.2/95

1266

WAR DEPARTMENT

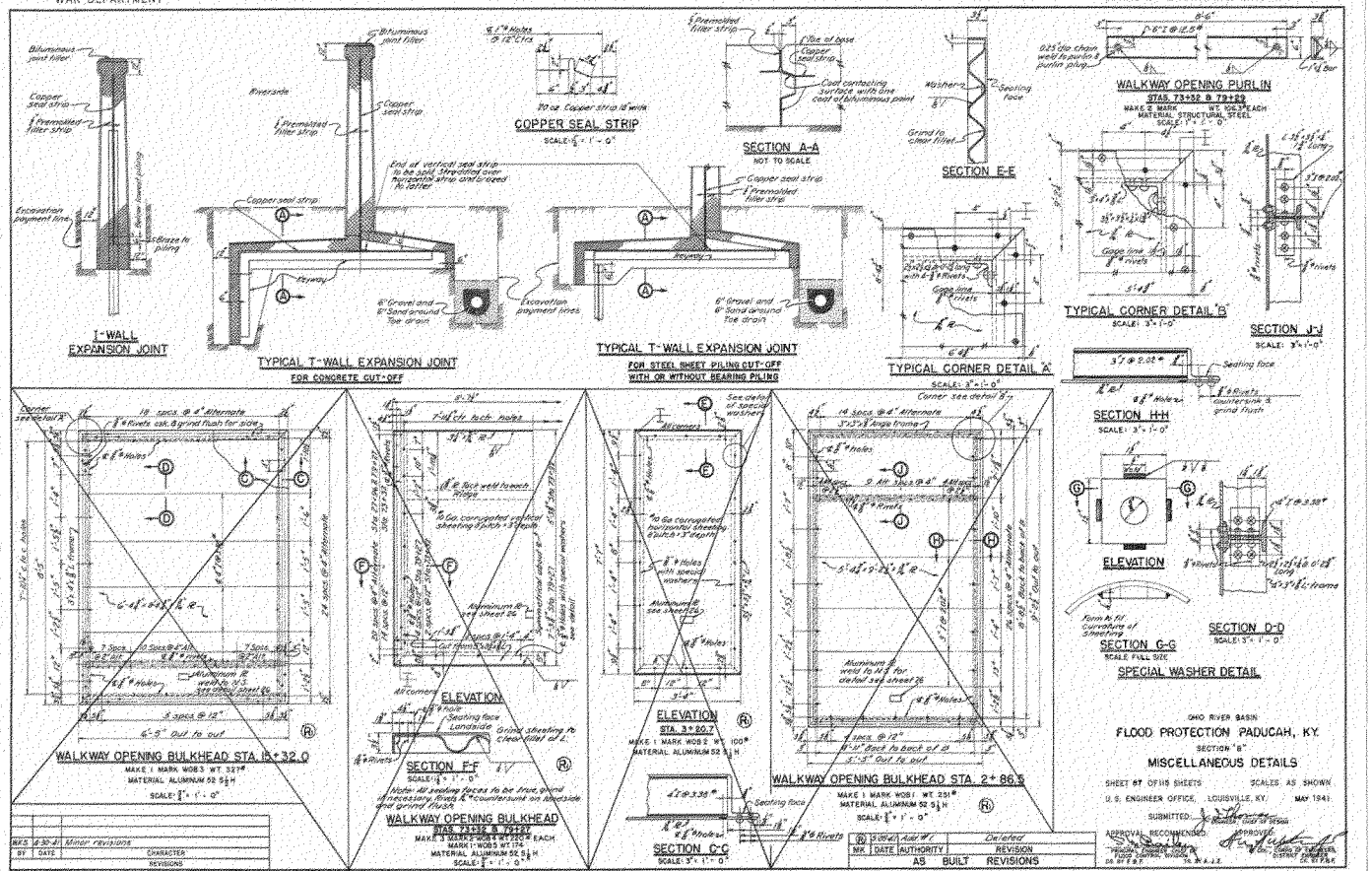
CORPS OF ENGINEERS, U.S. ARMY



1267

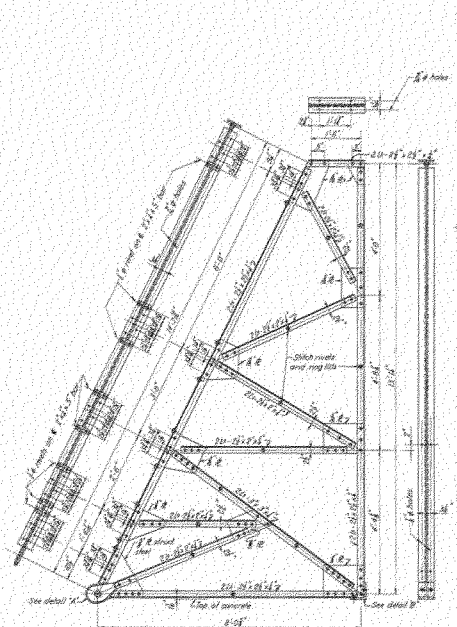
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



TRUSS (R)

HARRISBURG STA. 23+73.8

MATERIAL: NO. 275-T ALUMINUM, EXCEPT AS NOTED

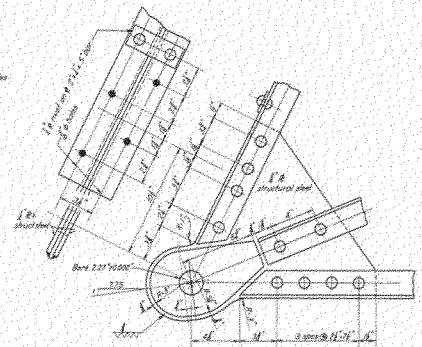
MARK-QTY: NO. REQD: 2

WEIGHT:

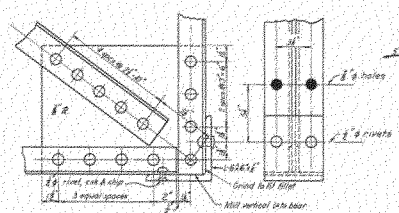
STRUCTURAL STEEL 34 LBS.

ALUMINUM 240 LBS.

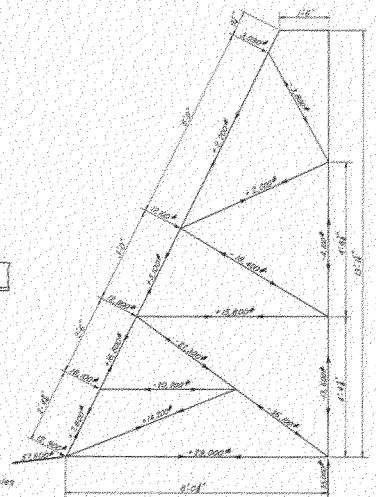
SCALE: $\frac{3}{8}$" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3" = 1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3" = 1'-0"



STRESS DIAGRAM
SCALE: $\frac{3}{8}$" = 1'-0"

R1	5-19-41	Detailed addendum No. 1
MK	DATE	AUTHORITY / REVISION

AS BUILT REVISIONS

General Notes, Structural Steel Trusses.
Rivet holes to be sub-punched $\frac{1}{8}$" less than nominal diameter of rivet and reamed to finished size of not more than $\frac{1}{16}$" greater diameter than the nominal rivet size.
All other holes to be sub-punched $\frac{1}{8}$" less than the finished diameter of the hole as shown and reamed to finished diameter.
Standard gages to be used on all angles except as otherwise indicated.
Minimum rivet pitch for $\frac{3}{4}$" rivets to be 2$\frac{1}{2}$" except as otherwise indicated.
Minimum distance from the center of a rivet to a sheared edge to be 1$\frac{1}{4}$" rivet diameters unless otherwise indicated.
All rivets to be of rivet steel and driven hot.
All rivets to be $\frac{3}{4}$" except as otherwise indicated.

General Notes, Aluminum Alloy Trusses.
Rivet holes to be sub-punched $\frac{1}{8}$" less than nominal diameter of rivet and reamed to finished size of not more than $\frac{1}{16}$" greater diameter than the nominal rivet size.
All other holes to be sub-punched $\frac{1}{8}$" less than the finished diameter of the hole as shown and reamed to finished diameter.
Standard gages to be used on all angles except as otherwise indicated.
Minimum rivet pitch for $\frac{3}{4}$" rivets to be 2$\frac{1}{2}$" except as otherwise indicated.
Minimum distance from the center of a rivet to a sheared edge to be 2 rivet diameters unless otherwise indicated.
All rivets to be $\frac{3}{4}$" rivet steel, driven hot, except as otherwise indicated.
$\frac{3}{4}$" rivets to be 38 S.W. Aluminum alloy, driven cold, and with cone-point heads unless otherwise indicated.

All Aluminum alloys specified in these plans are Aluminum Co. of America or equal.

MK1	4-30-41	Minor revisions
BY	DATE	CHARACTER / REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 88 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [signature] District Engineer

APPROVAL RECOMMENDED: [signature] Flood Control Engineer

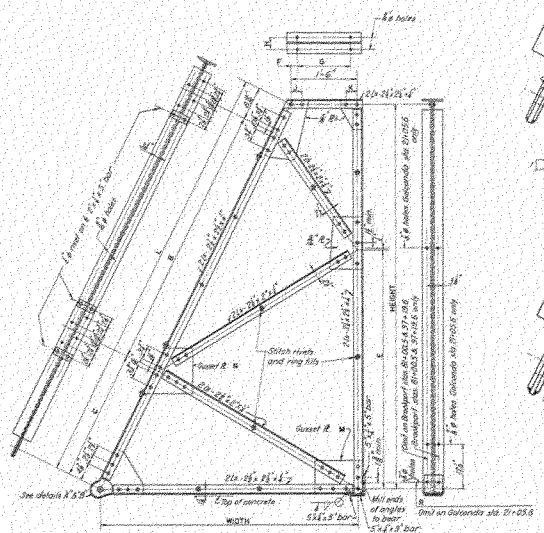
APPROVED: [signature] District Engineer

OR 59 C.A.M. TO 39 C.A.M. CO. 87-T.A.F.

AS BUILT 935-12.2/98

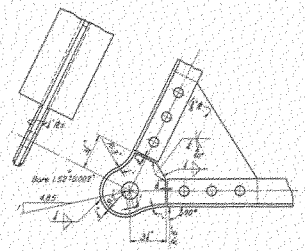
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



TRUSS

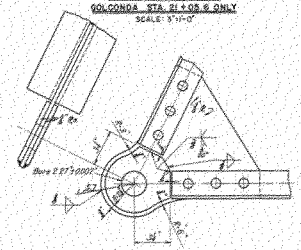
MATERIAL: STRUCTURAL STEEL
WEIGHT: SEE SCHEDULE
MARK: SEE SCHEDULE
NO. REQ'D: SEE SCHEDULE
SCALE: 1"=1'-0"



DETAIL "A" PIN JOINT

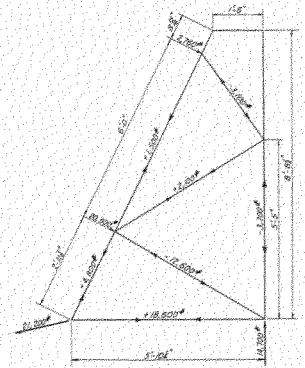
GOLCONDA STA. 21+05.6 ONLY

SCALE: 3"=1'-0"



DETAIL "B" PIN JOINT

SCALE: 3"=1'-0"



STRESS DIAGRAM

GOLCONDA STA. 21+05

SCALE: 1/2" = 1'-0"

TRUSS SCHEDULE																			
LOCATION	NO. REQ'D	WEIGHT	WIDTH		B	C	E	F	G	H	J	K	GUSSET PLATES M	N	R	MARK	WEIGHT
Paducah 2" sta. 104+39.6	1	6'-0½"	5'-0½"	9'-3¼"	5'-6"	2'-10½"	4'-11"	2"	1'-2"	3½"	4"	4"	5"	5"	1"	CT 1	348
Brookport sta. 21+00.5	1	5'-7½"	5'-0½"	9'-3¼"	5'-8"	2'-9"	4'-11"	2"	1'-2"	3½"	4"	4"	5"	5"	1"	CT 3	348
" 59+49.2	1	6'-8½"	5'-0½"	9'-3¼"	5'-8"	2'-9"	4'-11"	2"	1'-2"	3½"	4"	4"	5"	5"	1"	CT 3	348
" 97+19.8	1	6'-3½"	5'-0½"	9'-3¼"	5'-8"	2'-9"	4'-11"	2"	1'-2"	3½"	4"	4"	5"	5"	1"	CT 4	348
" 138+50.7	1	9'-9½"	5'-0½"	9'-3¼"	5'-8"	2'-9"	4'-11"	2"	1'-2"	3½"	4"	4"	5"	5"	1"	CT 4	348
Golconda sta. 21+05.6	2	8'-8½"	4'-0½"	9'-3⅛"	6'-0"	3'-0"	5'-0"	1"	1'-2"	3"	3"	3"	5"	5"	1"	CT 2	348

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 89 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — MAY 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, STRUCTURAL DESIGN BRANCH, STRUCTURAL DESIGN DIV. — DR. BY C.A.R.

APPROVED: [signature] DISTRICT ENGINEER — TR. BY R.A.M. — CK. BY F.A.P.

AS BUILT

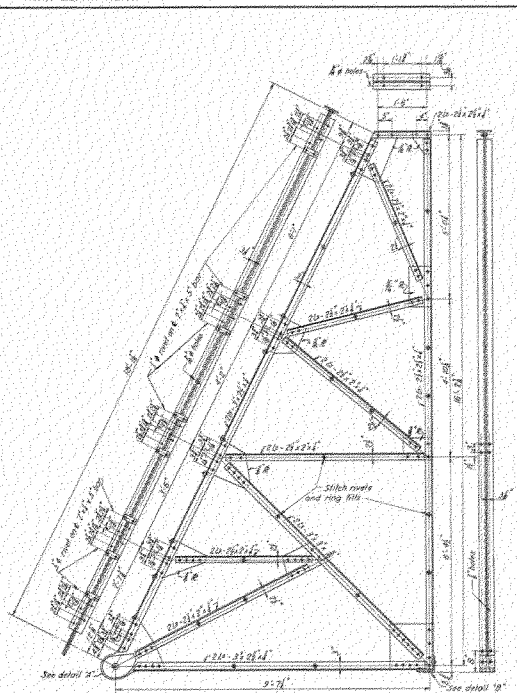
935-12.2/99

017

1270

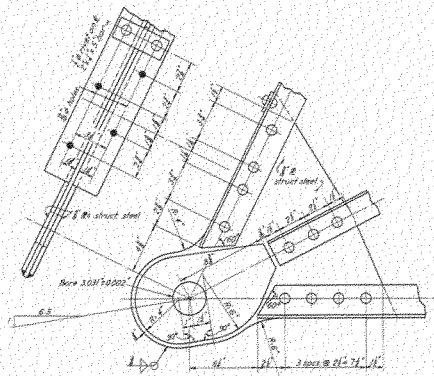
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

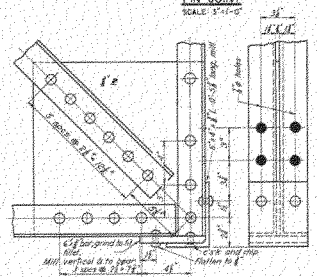


TRUSS FOR STAS. 156+93 & 186+20 HARRISBURG, ILL.

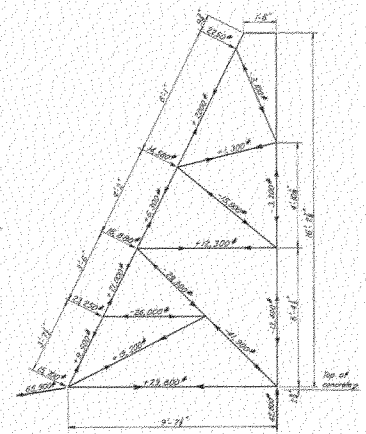
MATERIAL: NO. 275-T ALUMINUM, EXCEPT AS NOTED
MARK: SEE SCHEDULE
NO. REQ'D.: SEE SCHEDULE
WEIGHT:
STRUCTURAL STEEL 46 LBS.
ALUMINUM 296 LBS.
SCALE: ½" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3" = 1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3" = 1'-0"



STRESS DIAGRAM
SCALE: ½" = 1'-0"

TRUSS SCHEDULE			
LOCATION	STATION	NO. REQ'D.	MARK
Harrisburg, Ill.	156+93	3	CT-B
"	186+20	3	CT-B

BY	DATE	CHARACTER REVISIONS

MK	DATE	AUTHORITY	REVISION
(R)	5-29-41	Deleted addendum No. 1	

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 90 OF 115 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: Engineer, Chief of Design

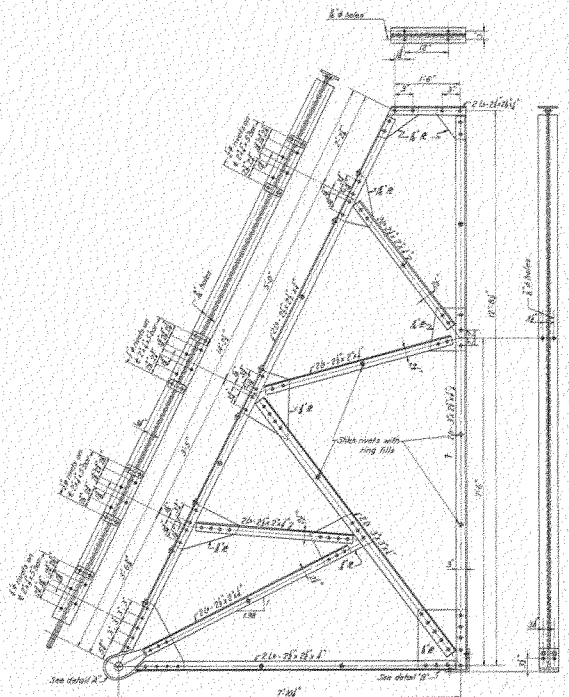
APPROVAL RECOMMENDED: Principal Engineer, Chief of Design

APPROVED: Lt. Col., Corps of Engineers, District Engineer

CK. BY E.A.W. TR. BY E.A.M. CK. BY F.M.T.

AS BUILT 935-12.2/100

1271



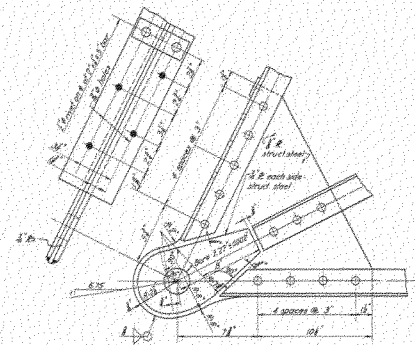
TRUSS FOR STA. 53+12.0 BROOKPORT, ILL.

MATERIAL: NO. 27S-T ALUMINUM, EXCEPT AS NOTED
MARK: 017
NO. REQD: 2

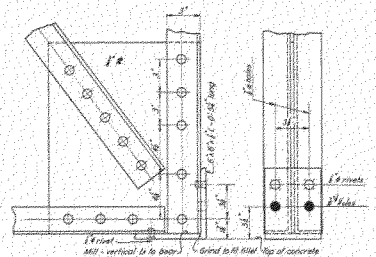
WEIGHT
STRUCTURAL STEEL 37 LBS.
ALUMINUM 214 LBS.

SCALE: 1" = 1'-0"

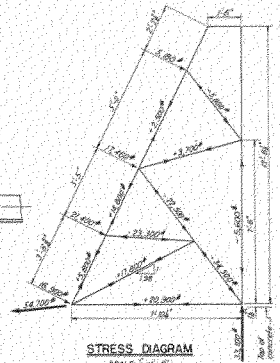
(R)



DETAIL "A"
PIN JOINT
SCALE: 3" = 1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3" = 1'-0"



STRESS DIAGRAM
SCALE: ⅛" = 1'-0"

BY	DATE	CHARACTER
		REVISIONS

(R)	7-26-41	Detailed addendum No. 1
MK	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS		

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "D"
STRUCTURAL DETAILS

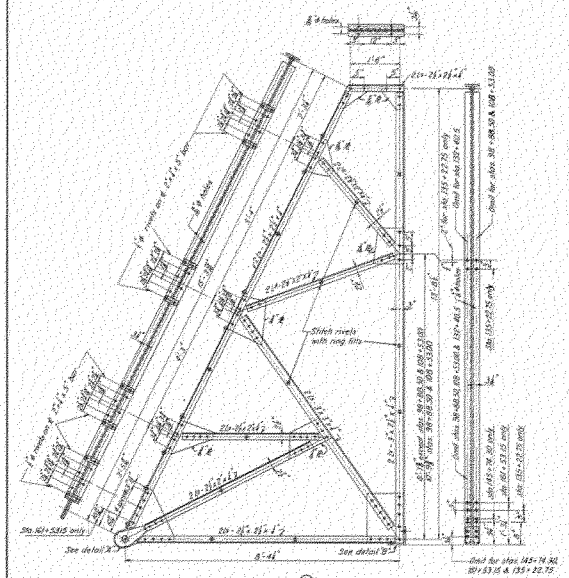
SHEET 9 OF 15 SHEETS. SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: ENGINEER, CHIEF OF SECTION
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION. DV. BY E.A.M. TR. BY R.A.M.
APPROVED: CORPS OF ENGINEERS DISTRICT ENGINEER. CK. BY F.A.P.

AS BUILT 935-12.2/101

1272

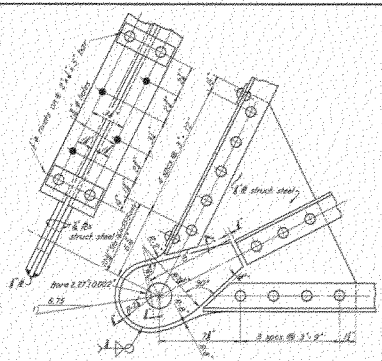
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

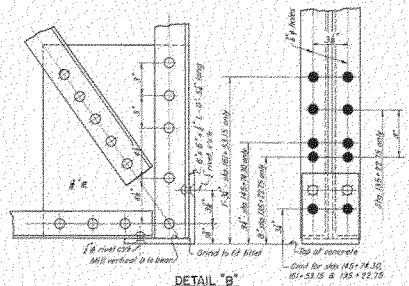


TRUSS

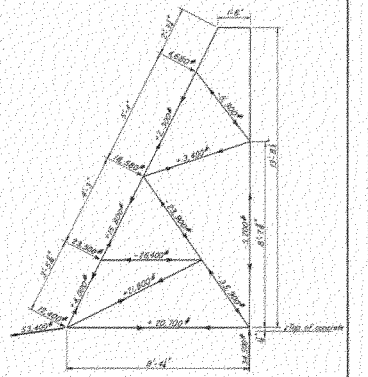
MATERIAL: NO. 375-T ALUMINUM, EXCEPT AS NOTED
MARK: SEE SCHEDULE
NO. REQ'D: SEE SCHEDULE
WEIGHT:
STRUCTURAL STEEL: 38 LBS.
ALUMINUM: 527 LBS.
SCALE: $\frac{1}{4}$" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3" = 1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3" = 1'-0"



STRESS DIAGRAM
STA. 93+57.18
SCALE: $\frac{1}{4}$" = 1'-0"

TRUSS SCHEDULE

LOCATION	STATION	NO. REQ'D.	MARK
Paducah "B-2"	93+57.18	2	CT.8
"	94+63.76	2	CT.9
"	98+88.20	1	CT.10
"	108+53.00	1	CT.11
"	114+98.71	6	CT.12
"	119+62.65	2	CT.13
"	123+60.40	2	CT.14
"	128+19.75	2	CT.15
"	132+40.90	1	CT.16
"	135+22.75	3	CT.17
"	138+23.05	4	CT.18
"	145+74.30	4	CT.19
"	149+87.90	4	CT.20
"	161+53.15	9	CT.21

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 92 OF 115 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF DESIGN

APPROVED: DISTRICT ENGINEER

MK	DATE	AUTHORITY	REVISION
B	12-19-41		Deleted addendum No. 1

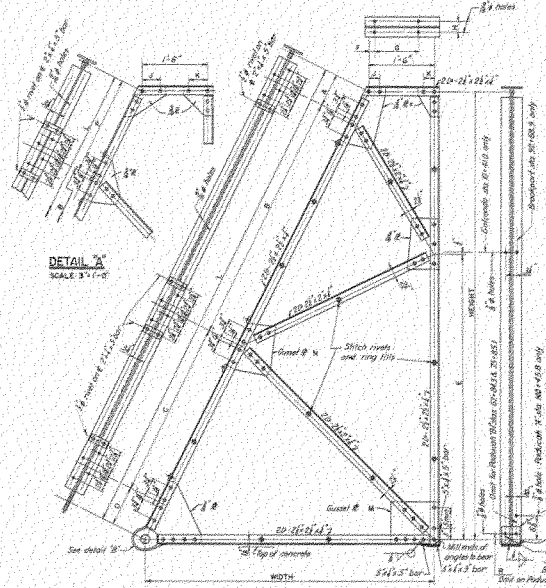
AS BUILT REVISIONS

MK	DATE	CHARACTER
MK	4-30-41	Minor revisions

BY DATE CHARACTER REVISIONS

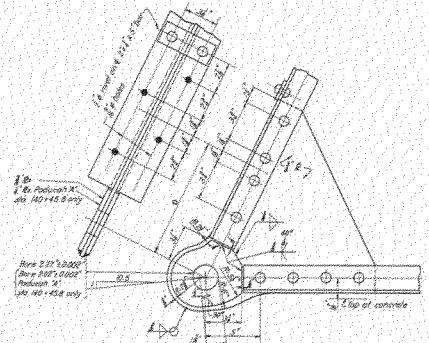
AS BUILT 935-12.2/102

1273

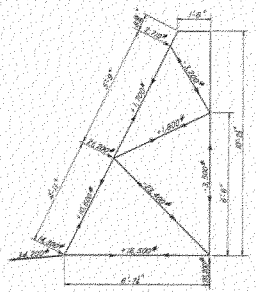


TRUSS

MATERIAL: STRUCTURAL STEEL
WEIGHT: LBS. EACH
MARK: SEE SCHEDULE
NO. REQ'D: SEE SCHEDULE
SCALE: 1" = 1'-0"



DETAIL "B" PIN JOINT
SCALE 3"=1'-0"



STRESS DIAGRAM
PADUCAH A STA 140+45.8
SCALE 1/4" = 1'-0"

TRUSS SCHEDULE

LOCATION	NO. REQ'D	HEIGHT	WIDTH	L	A	B	C	D	E	F	G	H	J	K	GUSSET PLATES M	GUSSET PLATES N	DETAIL "A" P	R	MARK	WEIGHT
Paducah "A" sta 140+45.8	1	10'-2¼	6'-7¾	11'-4⅜	8⅜	5'-9"	4'-0"	11"	6'-6"	⅞	12"	5"	3"	3"	⅜	⅜	—	Omit	CT88	419
Paducah "B" sta 210+90.3	1	9'-8¼	6'-4½	10'-10⅜		4'-7"	3'-8¼	9¾	5'-10"	⅞	12"	5⅝	5"	5"	⅜	⅜	6'-3⅜	⅞	CT89	407
" " " 31+54.1	1	9'-7¼	5'-11	10'-3⅜		4'-3⅜	3'-10¼	9¾	4'-6"	⅞	12"	5⅝	5"	5"	⅜	⅜	5'-9⅜	⅞	CT90	390
" " " 82+44.2	1	9'-7¼	6'-1¼	10'-3⅜		4'-3⅜	3'-10¼	9¾	4'-6"	⅞	12"	5⅝	5"	5"	⅜	⅜	5'-9⅜	⅞	CT90	390
" " " 111+74.5	1	9'-7¼	6'-1¼	10'-3⅜		4'-3⅜	3'-10¼	9¾	4'-6"	⅞	12"	5⅝	5"	5"	⅜	⅜	5'-9⅜	⅞	CT90	390
" " " 151+65.1	1	9'-7¼	6'-1¼	10'-3⅜		4'-3⅜	3'-10¼	9¾	4'-6"	⅞	12"	5⅝	5"	5"	⅜	⅜	5'-9⅜	⅞	CT90	390
" BC " 106+00.0	1	9'-8¼	6'-4½	10'-10⅜		4'-7"	3'-8¼	9¾	5'-10"	⅞	12"	5⅝	5"	5"	⅜	⅜	6'-3⅜	⅞	CT89	407
Brookport sta 92+68.5	1	9'-8¼	6'-4½	10'-10⅜	8⅜	4'-10"	3'-5¼	9¾	5'-10"	⅞	12"	5⅝	5"	5"	⅜	⅜	—	⅞	CT89	407
Colorado sta 10+41.0	2	9'-9¼	6'-1¼	10'-4⅜	8⅜	4'-6"	3'-9"	1⅛	5'-9"	⅞	12"	5"	5"	5"	⅜	⅜	—	⅞	CT88	392

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 93 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

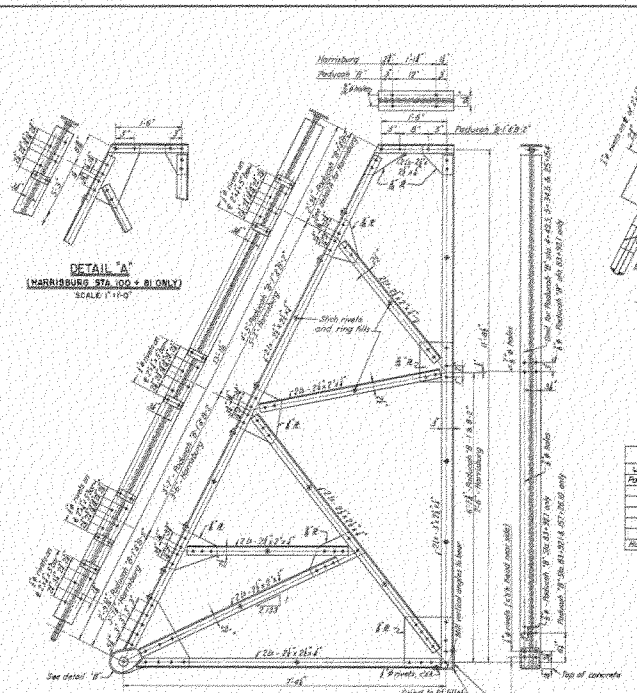
SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF DESIGN 28, 61 C.A.M. 15, 61 C.A.M.

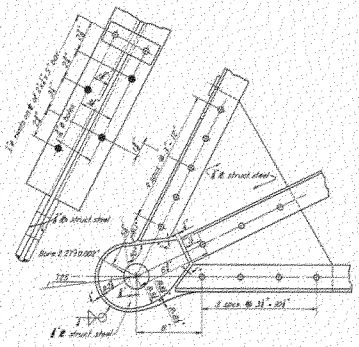
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER U.S.A.E.W.

AS BUILT 935-12.2/103

1274

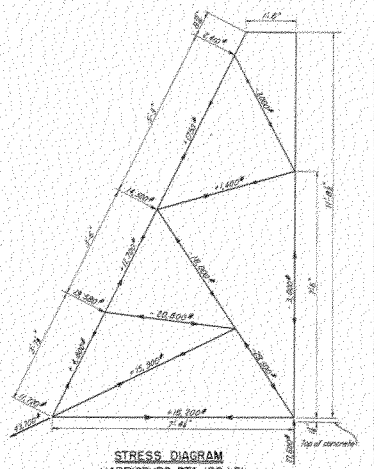


DETAIL "A"
(HARRISBURG STA. 100 + 81 ONLY)
SCALE: 1" = 1'-0"



DETAIL "B"
PIN JOINT
SCALE: 3" = 1'-0"

TRUSS SCHEDULE			
LOCATION	STATION	NO. REQ'D.	MARK
Paducah "B"-1"	4 + 19.5	1	CT 89
" "	5 + 14.5	1	CT 89
" "	25 + 15.4	1	CT 89
" "	83 + 92.1	3	CT 90
" "B"-2"	157 + 26.0	4	CT 91
" "	170 + 04.91	4	CT 88
Harrisburg	100 + 81	2	CT 90



STRESS DIAGRAM
HARRISBURG STA. 100+81
SCALE: 3/8" = 1'-0"

TRUSS

MATERIAL: NO. 27 S-T ALUMINUM, EXCEPT AS NOTED
MARK: SEE SCHEDULE
NO. REQ'D: SEE SCHEDULE
WEIGHT:
STRUCTURAL STEEL 12 LBS
ALUMINUM 192 LBS.
SCALE: 1" = 1'-0"

WKS 4-30-81	Minor corrections	
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY

SECTION "B"

STRUCTURAL DETAILS

SHEET 94 OF 115 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] CHIEF OF DESIGN

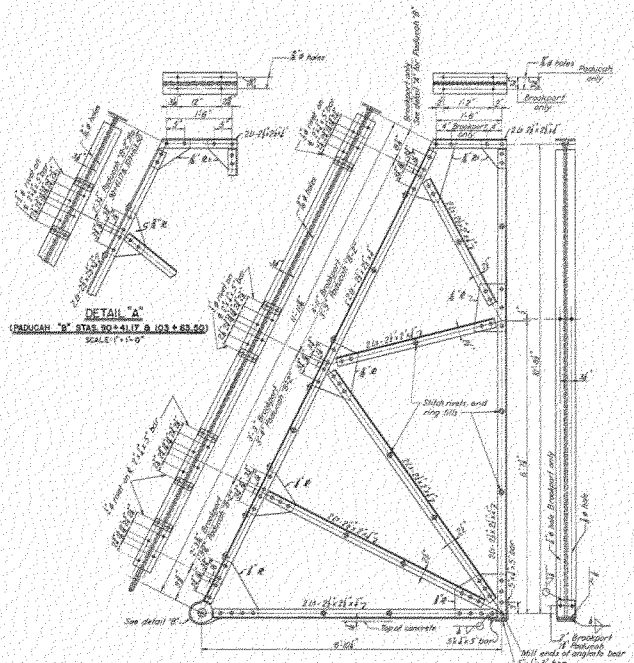
APPROVAL RECOMMENDED: [illegible] HEADING DIVISION, CHIEF OF FLOOD CONTROL DESIGNS DR. BY C.A.N.

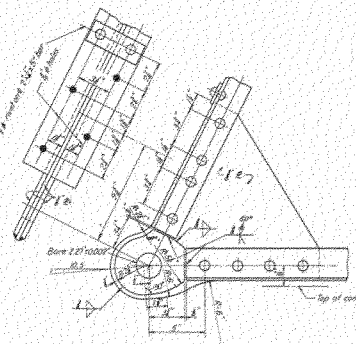
APPROVED: [illegible] U. S. CORPS OF ENGINEERS DISTRICT ENGINEER CK. BY T.B.F.

AS BUILT 935-12.2/104

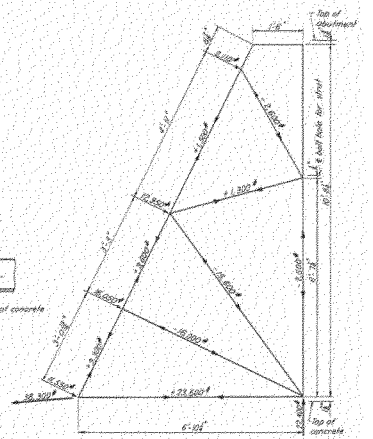
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





TRUSS SCHEDULE			
LOCATION	STATION	NO. REQ'D	MARK
Paducah "B"	90 + 41.17	1	CT 54
"	103 + 63.50	1	CT 54
Brookport	110 + 58.00	2	CT 55
"	114 + 38.54	2	CT 55



STRESS DIAGRAM
BROOKPORT STA. 110 + 58.00
AND STA. 114 + 38.54
SCALE: 3/8" = 1'-0"

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 95 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

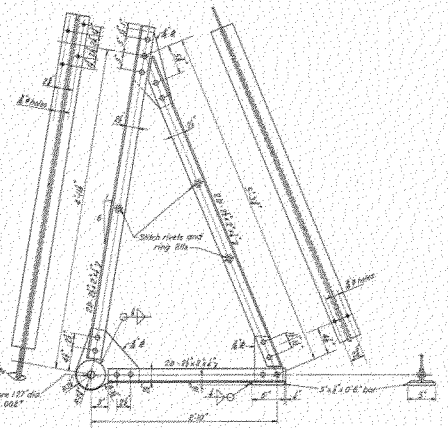
SUBMITTED: L. D. Thomas
ENGINEER, CHIEF OF SECTION

APPROVAL RECOMMENDED: APPROVED:
S. D. Sachs — PRINCIPAL ENGINEER, CHIEF OF DESIGN, OHIO RIVER DIVISION
K. Y. Wallace — COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.A.M. TR. BY G.R.M. CK. BY F.B.F.

AS BUILT 935-12.2/105

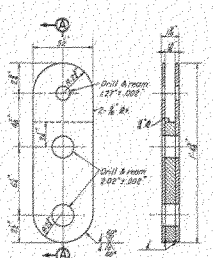
1276



TRUSS

MARK: SEE SCHEDULE
NO. REQ'D: SEE SCHEDULE
WEIGHT: 111 LBS.
MATERIAL: STRUCTURAL STEEL
SCALE: ½" = 1'-0"

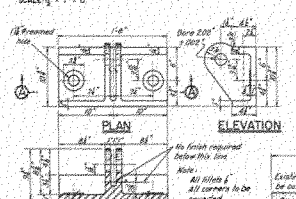
TRUSS SCHEDULE			
LOCATION	STATION	NO. REQ'D	MARK
Paducah "B-1"	51+67.5	2	CT 96
" "	54+37.6	2	CT 97



ELEVATION SECTION A-A

LINK PLATE PADUCAH "B-1" STAS. 51+67.3 & 54+37.6 ONLY

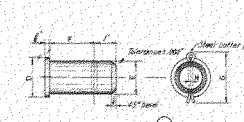
MAKE: 4 MARK: LPT WT. 27 LBS. EACH
MATERIAL: STRUCTURAL STEEL
SCALE: 3" = 1'-0"



PLAN ELEVATION

SECTION A-A (R)

MATERIAL: MEDIUM CAST STEEL
WEIGHT 148 LBS.
NO. REQ'D. 1
SCALE: ½" = 1'-0"

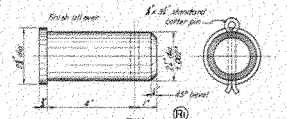


PIN

MATERIAL: NICKEL STEEL
SCALE: NONE

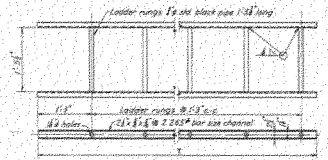
PIN & COTTERPIN SCHEDULE									
LOCATION	NO. REQ'D.	WT. EACH	DIMENSIONS D	E	F	G	N	MARK
Paducah "B-1" 51+67.3	2	1.5#	2"	1"	1¼"	2"	¼"	PT1
" 54+37.6	2	1.5#	2"	1"	1¼"	2"	¼"	PT1
Gallipolis 21+05.0	2	2.0#	2½"	1"	1¼"	2½"	¼"	PT2
Paducah "B-1" 51+67.3	4	3.9#	3½"	2"	1¾"	3"	⅜"	PT3
" 54+37.6	4	3.9#	3½"	2"	1¾"	3"	⅜"	PT3
Paducah "A" 140+45.8	1	4.8#	3½"	2"	3¼"	3"	⅜"	PT4
Harrisburg 156+33	3	13.5#	5½"	3"	4¼"	5"	⅞"	PT5
" 186+20	3	13.5#	5½"	3"	4¼"	5"	⅞"	PT5

For pins for stations not listed above see detail below



PIN (R)

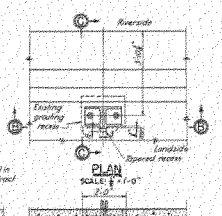
MAKE: 93 MARK: PT 6 WEIGHT: 6.23 LBS.
MATERIAL: NICKEL STEEL
SCALE: HALF SIZE



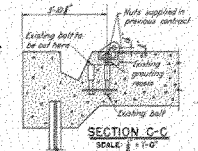
LADDER

MATERIAL: STRUCTURAL STEEL
SCALE: NONE

LADDER SCHEDULE							
LOCATION	NO. REQ'D	WT. EACH	LENGTH T	LOCATION	NO. REQ'D	WT. EACH	LENGTH T
Paducah B1 sta 4+49.5	1	8.5#	16'-2"	Brookport sta 119+83.5	1	20#	14'-0"
" 5+34.5	1	9.5	16'-0"	" 120+20.7	1	23#	11'-0"
" 9+44.0	1	9.5	16'-0"	" 53+12.0	1	9.5	16'-0"
" 10+40.5	1	9.5	16'-0"	Harrisburg sta 73+78.8	1	8.5	17'-0"
" 23+15.0	1	8.5	15'-0"	" 155+61	1	9.5	16'-0"
" 26+30.3	1	7.5	13'-0"	" 156+83	1	12.5	21'-0"
" 29+80.3	1	7.5	13'-0"	" 186+20	1	12.5	21'-0"
" 31+01.3	1	7.5	13'-0"	Paducah B 23+20+40.7	1	8.5	15'-0"
" 34+84.5	1	7.5	13'-0"	" 53+53.8	1	10.5	18'-0"
" 51+17.4	1	7.5	13'-0"	" 54+03.8	1	10.5	18'-0"
" 71+14.3	1	7.5	13'-0"	" 91+96.00	1	10.5	18'-0"
" 75+85.1	1	7.5	13'-0"	" 98+88.50	1	10.5	18'-0"
" 51+87.3	1	4.5	8'-0"	" 103+63.55	1	8.5	15'-0"
" 54+37.6	1	4.5	8'-0"	" 108+03.05	1	8.5	14'-0"
" 62+84.3	1	7.5	13'-0"	" 108+63.05	1	10.5	18'-0"
" 67+73.4	1	7.5	13'-0"	" 114+98.71	1	10.5	18'-0"
" 69+64.4	1	7.5	13'-0"	" 119+63.05	1	10.5	18'-0"
" 83+52.1	1	9.5	16'-0"	" 123+88.40	1	10.5	18'-0"
Gallipolis sta 18+14.3	1	7.5	13'-0"	" 158+18.75	1	10.5	18'-0"
" 10+41.0	1	7.5	13'-0"	" 137+40.55	1	10.5	18'-0"
" 21+05.6	1	7.5	13'-0"	" 133+97.75	1	10.5	18'-0"
Paducah "A" sta 140+45.8	1	7.5	13'-0"	" 138+53.75	1	10.5	18'-0"
" "B" 154+56.5	1	9.5	17'-0"	" 165+74.55	1	10.5	18'-0"
Brookport sta 81+90.5	1	9.5	17'-0"	" 149+87.55	1	10.5	18'-0"
" 88+49.2	1	9.5	16'-0"	" 157+26.11	1	9.5	16'-0"
" 92+84.9	1	7.5	13'-0"	" 161+51.15	1	10.5	18'-0"
" 97+26.8	1	9.5	17'-0"	" 166+48.55	1	10.5	18'-0"
" 101+58.8	1	8.5	14'-0"	" 170+56.55	1	8.5	14'-0"



PLAN
SCALE: ½" = 1'-0"



SECTION C-C
SCALE: ½" = 1'-0"

SECTION B-B
SCALE: ½" = 1'-0"

ANCHORAGE DETAILS PADUCAH "A" STA. 140+45.8

Note: This installation to be made by other agencies.

(R) 2-3-49, C.O. #9	Deleted	
MK	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "A"

STRUCTURAL & MISCELLANEOUS DETAILS

SHEET 96 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: Alfred Cox, Chief of Design

APPROVAL RECOMMENDED: Chief, Design Branch

APPROVED: Lt. Colonel, Corps of Engineers, District Engineer

CH. ST. A.M. CH. ST. C.A.M. CH. ST. F.&V.

MK 5-9-50-#1 Minor corrections.		
BY	DATE	CHARACTER REVISIONS

AS BUILT 935-12.2/106

1277

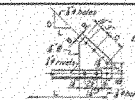
074

PURLINS
MATERIAL STRUCTURAL STEEL
SCALE NONE

0.25" dia. galv. steel chain, 12" long, weld to purlins and purlin plugs. See purlin detail.

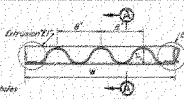
PURLIN PLUG
MARK 8B WITH 8 EACH
MATERIAL STRUCTURAL STEEL
SCALE HALF SIZE

HORIZONTAL BRACING ANGLE
MATERIAL STRUCTURAL STEEL
NO. REQD. TO SEC. SCHEDULE
SCALE NONE



DIAGONAL BRACING ANGLE
MATERIAL STRUCTURAL STEEL
NO. REQD. TO SEC. SCHEDULE
SCALE NONE

STRUT ANGLE
MATERIAL STRUCTURAL STEEL
NO. REQD. TO SEC. SCHEDULES
SCALE NONE



DETAIL "A"
DIAGONAL BRACING
SCALE NONE

Note: Rivet spacing shall be 2.5" or greater.

SECTION B-B

ELEVATION
SCALE 1 1/2" = 1'-0"

EXTRUSION "E1"
SCALE FULL SIZE

EXTRUSION "E2"
SCALE FULL SIZE

SECTION A-A
SCALE 3" = 1'-0"

SHEETING MATERIAL: 1/2 S 1/2 H - ALUMINUM ALLOY
EXTRUSIONS: 1/2 S - T - ALUMINUM ALLOY

PURLIN SCHEDULE

LOCATION	STATION	SECTION	NO. REQ'D	DIMENSIONS A	B	C	J	H	BOLTS & NUTS	WASHERS EACH	WT EACH	REMARKS
Paducah 8-2	108+55.0	8"W@13#	8	7	8'-0"	2 1/2	3 1/4	1/2	20	20	154	Omit purlin plugs
"	119+98.71	5"W@13#	26	7	8'-0"	2 1/2	3 1/4	1/2	106	106	154	" " "
"	119+82.65	8"W@13#	12	7	8'-3 1/2"	2 1/2	3 1/4	1/2	36	36	177	" " "
"	123+80.40	8"W@13#	12	7	9'-3 1/2"	2 1/2	3 1/4	1/2	36	36	177	" " "
"	128+12.05	8"W@13#	12	7	7'-3 1/2"	2 1/2	3 1/4	1/2	36	36	123	" " "
"	132+40.80	8"W@13#	8	7	8'-0"	2 1/2	3 1/4	1/2	20	20	151	" " "
"	135+22.75	8"W@13#	16	7	8'-3 1/2"	2 1/2	3 1/4	1/2	54	54	147	" " "
"	138+21.21	8"W@13#	20	7	8'-9 1/2"	2 1/2	3 1/4	1/2	72	72	150	" " "
"	145+74.30	8"W@13#	20	7	8'-9 1/2"	2 1/2	3 1/4	1/2	72	72	150	" " "
"	149+87.30	8"W@13#	20	7	8'-9 1/2"	2 1/2	3 1/4	1/2	72	72	150	" " "
"	157+66.40	8"W@13#	20	7	8'-9 1/2"	2 1/2	3 1/4	1/2	72	72	150	" " "
"	161+53.15	5"W@13#	40	7	8'-9 1/2"	2 1/2	3 1/4	1/2	162	162	151	" " "
"	168+48.50	12"W@26#	4	7 1/2	12'-0"	---- Omit ----			None	None	322	Purlin plugs
"	170+44.36	8"W@13#	20	7 1/2	8'-9 1/2"	2 1/2	3 1/4	1/2	72	72	150	Omit purlin plugs
Paducah "C"	184+96.17	8"W@13#	4	7 1/2	10'-8"	2 1/2	3 1/4	1/2	12	12	222	" " "
Brentport	59+12.9	8"W@13#	12	7 1/2	10'-3 1/2"	2 1/2	3 1/4	1/2	36	36	224	" " "
"	81+60.1	8"W@13#	4	7 1/2	9'-2"	2 1/2	3 1/4	1/2	12	12	157	" " "
"	82+49.3	8"W@13#	4	7 1/2	9'-2"	2 1/2	3 1/4	1/2	12	12	157	" " "
"	92+69.9	8"W@13#	6	7 1/2	10'-8"	2 1/2	3 1/4	1/2	16	16	225	" " "
"	97+15.6	8"W@13#	4	7 1/2	10'-8"	2 1/2	3 1/4	1/2	12	12	225	" " "
"	110+58.08	8"W@13#	12	7 1/2	10'-3"	2 1/2	3 1/4	1/2	36	36	203	" " "
"	114+88.96	8"W@13#	12	7 1/2	10'-3"	2 1/2	3 1/4	1/2	36	36	203	" " "
"	120+30.7	8"W@13#	4	7 1/2	10'-8"	2 1/2	3 1/4	1/2	12	12	225	" " "
Sokendo	10+41.0	8"W@13#	9	7 1/2	10'-7 1/2"	2 1/2	3 1/4	1/2	28	28	203	" " "
"	18+34.5	5"W@13#	8	7 1/2	8'-0"	---- Omit ----			None	None	169	Purlin plugs
"	21+25.6	8"W@13#	6	7 1/2	10'-7 1/2"	2 1/2	3 1/4	1/2	20	20	224	Omit purlin plugs
Harrisburg	33+73.8	8"W@13#	15	7 1/2	10'-6 1/2"	2 1/2	3 1/4	1	49	48	223	" " "
"	100+81	8"W@13#	12	7 1/2	10'-0"	2 1/2	3 1/4	3/4	36	36	207	" " "
"	156+93	8"W@13#	20	7 1/2	8'-0"	2 1/2	3 1/4	1/2	72	72	136	" " "
"	186+70	8"W@13#	20	7 1/2	8'-0"	2 1/2	3 1/4	1/2	72	72	136	" " "
Paducah "B"	460+65.8	8"W@13#	6	7 1/2	10'-8"	2 1/2	3 1/4	1/2	16	16	225	" " "
Paducah "B-1"	6+49.5	8"W@13#	8	7 1/2	5'-2"	2 1/2	3 1/4	1/2	20	20	140	" " "
"	5+34.5	8"W@13#	8	7 1/2	8'-2"	2 1/2	3 1/4	1/2	20	20	180	" " "
"	9+44.0	10"W@23#	4	9 1/2	12'-0"	---- Omit ----			None	None	296	Purlin plugs
"	10+90.0	10"W@23#	4	9 1/2	12'-0"	---- Omit ----			None	None	296	" " "
"	22+15.6	8"W@13#	8	7 1/2	8'-10"	2 1/2	3 1/4	1/2	20	20	151	Omit purlin plugs
"	28+90.3	8"W@13#	6	7 1/2	10'-8"	2 1/2	3 1/4	1/2	16	16	204	" " "
"	29+80.3	10"W@23#	3	9 1/2	12'-0"	---- Omit ----			None	None	296	Purlin plugs
"	31+01.3	10"W@23#	3	9 1/2	12'-0"	---- Omit ----			None	None	296	" " "
"	31+51.4	8"W@13#	6	7 1/2	8'-2 1/2"	2 1/2	3 1/4	1/2	16	16	151	Omit purlin plugs
"	36+84.5	10"W@23#	3	9 1/2	12'-0"	---- Omit ----			None	None	296	Purlin plugs
"	51+87.3	5"W@13#	3	4 1/2	6'-0"	1 1/2	2 1/4	1/2	12	12	61	Omit purlin plugs
"	54+37.6	5"W@13#	3	4 1/2	6'-0"	1 1/2	2 1/4	1/2	12	12	61	" " "
"	63+84.3	8"W@13#	6	7 1/2	8'-8"	2 1/2	3 1/4	1/2	16	16	147	" " "
"	67+73.4	10"W@23#	2	9 1/2	12'-0"	---- Omit ----			None	None	271	Purlin plugs
"	69+54.6	10"W@23#	2	9 1/2	12'-0"	---- Omit ----			None	None	271	" " "
"	71+74.5	8"W@13#	6	7 1/2	8'-10"	2 1/2	3 1/4	1/2	16	16	151	Omit purlin plugs
"	75+85.5	8"W@13#	6	7 1/2	8'-10"	2 1/2	3 1/4	1/2	16	16	151	" " "
"	83+92.1	8"W@13#	18	7 1/2	8'-10"	2 1/2	3 1/4	1/2	54	54	151	" " "
Paducah "B-2"	90+41.11	8"W@13#	8	7 1/2	8'-10"	2 1/2	3 1/4	1/2	20	20	151	" " "
"	91+96.0	12"W@26#	4	7 1/2	12'-0"	---- Omit ----			None	None	322	Purlin plugs
"	93+37.18	8"W@13#	12	7 1/2	9'-3 1/2"	2 1/2	3 1/4	1/2	36	36	177	Omit purlin plugs
"	94+43.90	8"W@13#	12	7 1/2	7'-3 1/2"	2 1/2	3 1/4	1/2	36	36	123	" " "
"	98+68.80	8"W@13#	8	7 1/2	8'-10"	2 1/2	3 1/4	1/2	20	20	151	" " "
"	103+63.5	8"W@13#	8	7 1/2	8'-10"	2 1/2	3 1/4	1/2	20	20	151	" " "
"	108+18.0	8"W@13#	8	7 1/2	10'-8"	2 1/2	3 1/4	1/2	16	16	204	" " "

SHEETING SCHEDULE

MARK	WIDTH OF PANEL "W"	LENGTH OF PANEL "L"	NO. REQ'D	TOTAL WT.	MARK
TP2	3'-0"	17'-4"	5	1275	C5.2
TP3	3'-0"	17'-4"	13	17080	C5.2
TP3	3'-0"	17'-8"	10	1278	C5.3
TP3	3'-0"	17'-8"	10	1278	C5.3
TP4	3'-0"	17'-4"	8	1022	C5.3
TP1	4'-6"	17'-4"	5	1275	C5.1
TP5	3'-0"	17'-4"	13	1884	C5.3
TP6	5'-3"	17'-4"	9	1847	C5.4
TP6	5'-3"	17'-5"	3	1847	C5.4
TP6	5'-3"	17'-6"	9	1861	C5.4
TP6	5'-3"	17'-7"	9	1861	C5.5
TP7	5'-3"	18'-10"	17	3980	C5.6
TP8	4'-4"	15'-0"	4	945	C5.7
TP6	5'-3"	15'-1"	5	1419	C5.8
TP9	5'-3"	17'-1"	5	1370	C5.9
TP10	5'-2"	16'-1"	7	1826	C5.10
TP11	4'-6"	17'-1"	5	1883	C5.11
TP11	4'-6"	17'-0"	5	1883	C5.11
TP12	5'-3"	12'-10"	5	1370	C5.12
TP9	5'-3"	17'-1"	5	1370	C5.9
TP12	5'-3"	15'-10"	7	1449	C5.13
TP10	5'-2"	13'-10"	7	1449	C5.13
TP13	5'-3"	17'-1"	5	1370	C5.9
TP10	5'-2"	12'-1"	7	1026	C5.14
TP13	3'-0"	18'-4"	4	598	C5.15
TP13	3'-0"	17'-1"	7	1026	C5.16
TP14	5'-2"	16'-10"	7	1886	C5.17
TP15	5'-2"	14'-7"	7	1204	C5.18
TP16	5'-2"	20'-7"	7	1690	C5.19
TP16	5'-2"	20'-4"	7	1669	C5.20
TP9	5'-3"	13'-4"	5	1266	C5.21
TP17	3'-2"	15'-1"	6	489	C5.22
TP17	3'-2"	15'-1"	6	988	C5.22
TP18	4'-4"	13'-0"	4	594	C5.23
TP18	4'-4"	13'-0"	4	594	C5.23
TP1	4'-6"	15'-1"	5	1883	C5.24
TP19	3'-0"	12'-10"	8	760	C5.25
TP18	4'-4"	12'-10"	4	525	C5.26
TP18	4'-4"	12'-10"	4	525	C5.26
TP1	4'-6"	12'-4"	5	1883	C5.27
TP18	4'-4"	12'-10"	4	525	C5.26
TP20	4'-4"	7'-10"	5	416	C5.28
TP20	4'-4"	7'-10"	5	416	C5.28
TP1	4'-6"	12'-4"	5	1883	C5.27
TP21	4'-4"	9'-4"	4	388	C5.29
TP21	4'-4"	9'-4"	4	388	C5.29
TP1	4'-6"	12'-4"	5	1883	C5.27
TP1	4'-6"	12'-4"	5	1883	C5.27
TP22	3'-0"	12'-1"	12	1397	C5.30
TP1	4'-6"	13'-10"	5	1706	C5.23
TP8	4'-4"	15'-10"	4	945	C5.7
TP6	5'-3"	17'-4"	8	1616	C5.3
TP3	3'-0"	17'-4"	10	1278	C5.3
TP1	4'-6"	17'-4"	5	1883	C5.1
TP1	4'-6"	17'-4"	5	1883	C5.1
TP1	4'-6"	15'-10"	5	1706	C5.23
TP19	3'-0"	12'-10"	8	760	C5.25

BRACING ANGLE SCHEDULE

DIAGONAL BRACING ANGLE: SIZE OF ANGLE	F	WT EACH	NO. REQ'D	MARK	HORIZONTAL BRACING ANGLE: SIZE OF ANGLE	L	A	B	C	D	E	WT EACH	NO. REQ'D	MARK
3"x3"x1/4"	1'-9 1/2"	54	6	A8B1	3"x3"x1/4"	8'-3 1/2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	52	6	A8H1
3"x3"x1/4"	1'-9 1/2"	57	2	A8B2	3"x3"x1/4"	8'-9 1/2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	54	2	A8H2
3"x3"x1/4"	1'-9 1/2"	57	2	A8B2	3"x3"x1/4"	8'-9 1/2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	54	2	A8H2
3"x3"x1/4"	2'-4 1/2"	68	2	A8B3	3"x3"x1/4"	6'-9"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	45	2	A8H3
3"x3"x1/4"	1'-9 1/2"	51	4	A8B4	3"x3"x1/4"	7'-0"		1 1/4	2 1/2	1 1/4	*	51	4	A8H4
3"x3"x1/4"	1'-9 1/2"	53	4	A8B5	3"x3"x1/4"	8'-3 1/2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	51	4	A8H5
3"x3"x1/4"	2'-3"	67	4	A8B6	3"x3"x1/4"	8'-3 1/2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	51	4	A8H6
3"x3"x1/4"	1'-9 1/2"	53	4	A8B7	3"x3"x1/4"	8'-3 1/2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	51	4	A8H5
3"x3"x1/4"	2'-3"	46	4	A8B7	3"x3"x1/4"	6'-3"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	41	4	A8H7
3"x3"x1/4"	1'-9"	51	10	A8B8	3"x3"x1/4"	8'-4"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	51	10	A8H8
3"x3"x1/4"	2'-3"	47	4	A8B9	3"x3"x1/4"	8'-3 1/2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	51	4	A8H9
3"x3"x1/4"	1'-9"	68	2	A8B10	3"x3"x1/4"	10'-3"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	67	2	A8H10
3"x3"x1/4"	2'-3"	63	2	A8B11	3"x3"x1/4"	10'-3"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	67	2	A8H11
3"x3"x1/4"	2'-3"	63	2	A8B12	3"x3"x1/4"	10'-3"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	67	2	A8H12
3"x3"x1/4"	1'-9"	60	2	A8B13	3"x3"x1/4"	10'-4"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	64	2	A8H13
3"x3"x1/4"	2'-3"	59	2	A8B14	3"x3"x1/4"	8'-2"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	63	2	A8H14
3"x3"x1/4"	1'-9"	67	2	A8B15	3"x3"x1/4"	10'-6"	3 1/4	1 1/4	2 1/2	1 1/4	3/4	66	2	A8H15
3"x3"x1/4"	2'-6"	43	4	A8B16	3"x3"x1/4"	7'-3"		1 1/4	2 1/2	1 1/4	*	49	4	A8H16
3"x3"x1/4"	2'-6"	43	4	A8B16	3"x3"x1/4"	7'-3"		1 1/4	2 1/2	1 1/4	*	49	4	A8H16

STRUT ANGLE SCHEDULE

SIZE OF ANGLE	M	A	WT EACH	NO. REQ'D	MARK
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.1 **
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.2 *
3"x3"x1/4"	9'-0"	1/4"	59	1	A5.2 *
3"x3"x1/4"	8'-6"	1/4"	43	1	A5.3
3"x3"x1/4"	8'-6"	1/4"	43	1	A5.4 *
3"x3"x1/4"	9'-0"	1/4"	60	2	A5.5
3"x3"x1/4"	10'-0"	1/4"	60	1	A5.5
3"x3"x1/4"	10'-0"	1/4"	60	1	A5.6 *
3"x3"x1/4"	7'-6"	1/4"	38	2	A5.7
3"x3"x1/4"	7'-6"	1/4"	38	2	A5.8
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.9
3"x3"x1/4"	9'-0"	1/4"	60	1	A5.5
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.9
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.9
3"x3"x1/4"	5'-9"	1/4"	23	1	A5.10 ***
3"x3"x1/4"	5'-9"	1/4"	23	1	A5.10 ***
3"x3"x1/4"	8'-2 1/2"	1/4"	41	1	A5.11 *
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.9
3"x3"x1/4"	8'-2 1/2"	1/4"	41	1	A5.11 *
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.9
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.9
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.1 **
3"x3"x1/4"	8'-2 1/2"	1/4"	41	2	A5.9
3"x3"x1/4"	9'-0"	1/4"	60	1	A5.5

* Opposite hand of that shown.
** Use shown - 1 opposite hand.
*** Holes to be 3/4 - Bolts & washers to be 1/2.

* Use detail "A"

(R) 6-26-41	Add #1	Sheeting schedule deleted
(R) 6-26-41	Add #1	Sec. A-A & B-B, Elevation extrusion, E1, E2 deleted

MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

W.K.S.	6-30-41	Minor revisions	
BY	DATE	CHARACTER	

REVISIONS

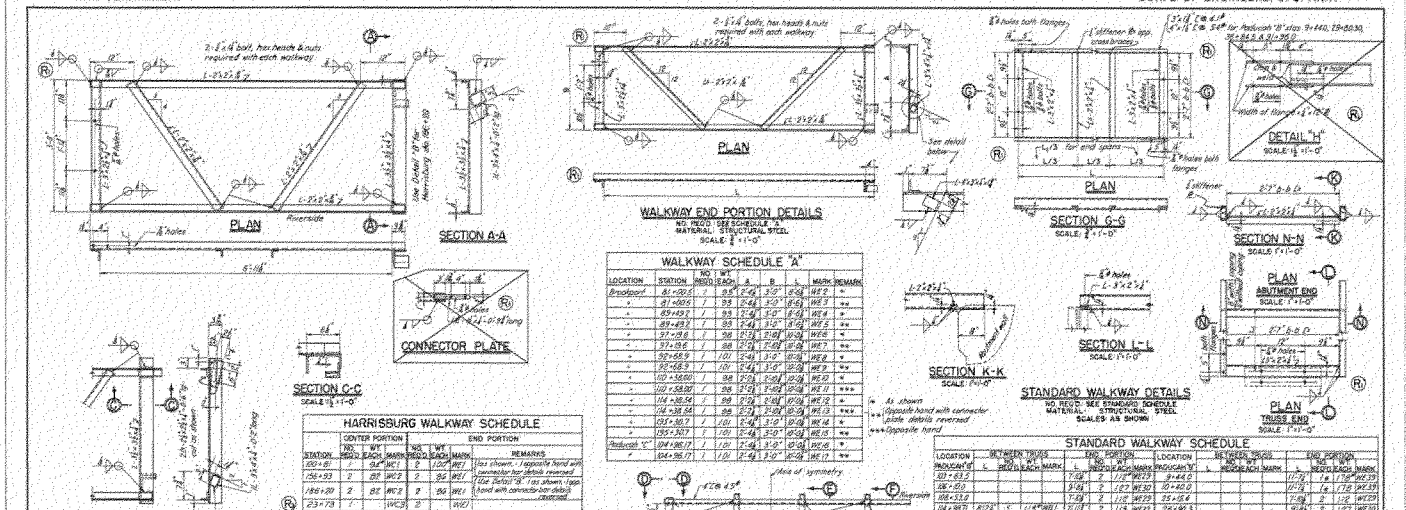
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MISCELLANEOUS STRUCTURAL DETAILS

SHEET 87 OF 115 SHEETS SCALES: AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: [signature] Assistant District Engineer
APPROVAL RECOMMENDED: [signature] Chief, Design Branch, Flood Control Division
APPROVED: [signature] Lt. Colonel, Corps of Engineers, District Engineer
DK. BY C.A.M. TR. BY C.A.M. CK. BY F.G.K.

AS BUILT 935-12.2/107

1278

025



WALKWAY SCHEDULE "A"

LOCATION	STATION	NO. REQ'D.	WT. EACH	A	B	L	MARK	REMARKS
Brookport	81+20.5	1	95	2'-6"	3'-0"	6'-6"	WE 5	*
"	81+80.5	1	95	2'-6"	3'-0"	6'-6"	WE 7	**
"	85+49.5	1	95	2'-6"	3'-0"	6'-6"	WE 4	*
"	89+89.5	1	95	2'-6"	3'-0"	6'-6"	WE 5	**
"	97+98.5	1	98	2'-12"	2'-8"	6'-8"	WE 6	*
"	97+13.6	1	88	2'-0"	1'-6"	6'-8"	WE 7	**
"	92+56.9	1	101	2'-6"	3'-0"	6'-8"	WE 8	*
"	92+56.9	1	101	2'-6"	3'-0"	6'-8"	WE 9	**
"	110+58.61	1	98	2'-0"	2'-6"	6'-8"	WE 10	*
"	110+58.61	1	98	2'-0"	2'-6"	6'-8"	WE 11	***
"	114+38.54	1	98	2'-0"	2'-6"	6'-8"	WE 12	*
"	114+38.54	1	98	2'-0"	2'-6"	6'-8"	WE 13	***
"	135+90.7	1	101	2'-6"	3'-0"	6'-8"	WE 14	*
"	135+90.7	1	101	2'-6"	3'-0"	6'-8"	WE 15	**
Paducah "C"	194+96.17	1	101	2'-6"	3'-0"	6'-8"	WE 16	*
"	194+96.17	1	101	2'-6"	3'-0"	6'-8"	WE 17	**

* As shown
** Opposite hand with connector plate details reversed
*** Opposite hand

HARRISBURG WALKWAY SCHEDULE

STATION	CENTER PORTION NO. REQ'D.	WT. EACH	MARK	END PORTION NO. REQ'D.	WT. EACH	MARK	REMARKS
100+81	2	98#	WE 1	2	107#	WE 1	As shown - Opposite hand with connector for details reversed
156+93	2	88#	WE 3	2	86#	WE 1	Use Detail "B" as shown. Opposite hand with connector for details reversed
186+20	2	88#	WE 3	2	86#	WE 1	
23+73	1		WE 3	2		WE 1	

WALKWAY SCHEDULE "B"

LOCATION	STATION	L	NO. REQ'D.	WT. EACH	MARK	REMARKS
Paducah "A"	140+49.8	11'-0"	1	1.80	WE 18	As shown
"	140+49.8	10'-0"	1	1.80	WE 19	Opp. hand with connector & an 18" C channel
Brookport	53+12.0	10'-0"	1	1.88	WE 20	As shown
"	53+12.0	10'-0"	1	1.88	WE 21	Opp. hand with connector & reversed
"	53+12.0	10'-0"	1	1.48	WE 22	* See note below
Gallonda	10+41.0	10'-0"	1	1.88	WE 23	As shown
"	10+41.0	10'-0"	1	1.88	WE 24	Opposite hand
"	10+41.0	10'-1"	1	1.48	WE 25	* See note below
"	21+05.6	10'-0"	1	1.88	WE 26	As shown
"	21+05.6	10'-0"	1	1.88	WE 27	* Opposite hand
"	21+05.6	10'-1"	1	1.48	WE 28	See note below

* Make right half opposite hand of left half shown, but with connector & an 18" channel at both ends.

STANDARD WALKWAY SCHEDULE

LOCATION PADUCAH "B"	BETWEEN TRUSS L	NO. REQ'D.	WT. EACH	MARK	END PORTION L	NO. REQ'D.	WT. EACH	MARK	LOCATION PADUCAH "B"	BETWEEN TRUSS L	NO. REQ'D.	WT. EACH	MARK	END PORTION L	NO. REQ'D.	WT. EACH	MARK
101+63.5					7'-6"	2	112	WE 29	9+44.0					11'-7"	1	78	WE 39
106+15.0					9'-6"	2	127	WE 30	10+40.0					11'-7"	1	78	WE 39
108+53.0					7'-6"	2	112	WE 29	25+15.4					7'-6"	2	112	WE 29
114+98.7	8'-0"	3	115*	WE 1	7'-0"	2	115	WE 31	28+96.3					9'-6"	2	127	WE 30
119+62.63	8'-0"	1	115	WE 2	6'-3"	2	115	WE 32	29+60.3					11'-7"	1	78	WE 39*
123+86.49	8'-0"	1	115	WE 2	6'-3"	2	115	WE 33	31+01.3					11'-7"	1	78	WE 39*
128+19.76	8'-0"	1	115	WE 2	6'-3"	2	101	WE 34	31+51.4					7'-6"	2	112	WE 29
137+40.55					7'-6"	2	112	WE 29	36+84.5					11'-7"	1	78	WE 39*
139+27.75	7'-6"	2	110	WE 4	7'-6"	2	110	WE 35	62+84.3					7'-6"	2	112	WE 29
138+23.05	8'-6"	3	111	WE 5	7'-9"	2	111	WE 36	71+94.3					7'-6"	2	112	WE 29
145+74.30	8'-6"	3	111	WE 6	7'-9"	2	111	WE 36	75+85.5					7'-6"	2	112	WE 29
149+87.30	8'-6"	3	111	WE 5	7'-9"	2	111	WE 36	83+92.7	8'-6"	2		WE 1	7'-9"	2	112	WE 31
157+26.61	8'-6"	3	111	WE 5	7'-9"	2	111	WE 36	90+41.7					7'-6"	2	112	WE 29
161+53.61	8'-6"	2	112	WE 6	7'-6"	2	112	WE 29	9+96.8					8'-3"	1	78	WE 37*
168+48.50					11'-7"	1	78	WE 39*	93+57.61	8'-6"	1		WE 2	8'-3"	2	112	WE 40
170+94.36	8'-6"	2	111	WE 5	7'-9"	2	111	WE 36	94+93.76	8'-6"	1		WE 3	6'-3"	2	101	WE 34
6+49.5					7'-6"	2	108	WE 38	98+88.56					7'-6"	2	112	WE 29
9+34.5					7'-6"	2	108	WE 38									

* Use abutment end details at both ends.

Note:
Sta. 6+49.5 to Sta. 93+92.1 incl. Paducah "B-1"
Sta. 90+41.7 to Sta. 170+94.36 incl. Paducah "B-2"
for walkway planking schedule see sheet 83.

OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MISCELLANEOUS STRUCTURAL DETAILS

SHEET 98 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [signature]
CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [signature]
CHIEF, DESIGN BRANCH, ENG. DIV.

APPROVED: [signature]
DISTRICT ENGINEER

CH. BY C.A.M. — CH. BY C.A.M. — CH. BY F.S.F.

BY	DATE	CHARACTER OF REVISIONS	MILITARY AUTHORITY	REVISION
				Change in amount required
				Station added
				Dimension change
				Connection detail deleted

AS BUILT REVISIONS

AS BUILT

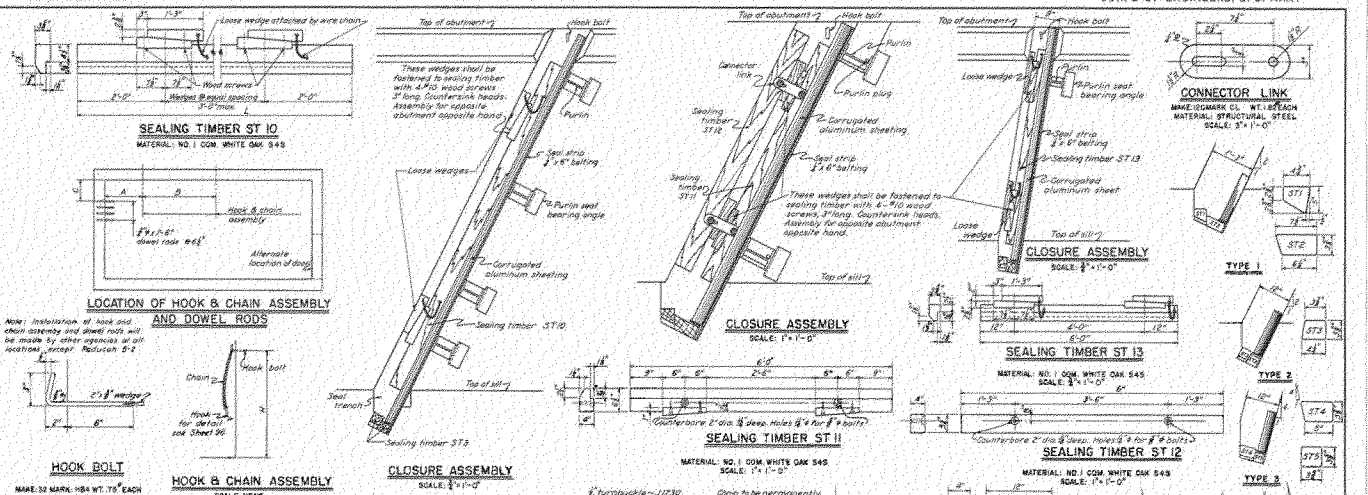
935-12.2/108

1279

320

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



LOCATION	SEAL STRIPS			SEALING TIMBERS					SEAL TRENCH TIMBERS					HOOK & CHAIN ASSEMBLY					DOWEL RODS		
	NO.	LGTH. EACH	TYPE	NO.	LGTH.	MARK	NO.	TYPE	LGTH	LOCATION	SEAL STRIPS NO.	LGTH. EACH	TYPE	SEALING TIMBERS NO.	LGTH	MARK	SEAL TRENCH TIMBERS NO.	TYPE	LGTH	NO.	L	H	A	B	NO.	C	H
Paducah 223+30.4	2	14'-0"	2	11'-0"	ST10	6	2	2	3'-6"	Paducah 8+35.3	2	12'-0"	2	14'-0"	ST10	6	3	2	6'-6"								
" " 31+56	2	16'-0"	2	14'-0"	" "	8	3	2	6'-6"	" " 31+61.1	2	12'-6"	2	12'-6"	" "	8	2	2	5'-0"								
" " 33+57.1	2	17'-6"	2	16'-0"	" "	8	2	3	9'-0"	" " 36+88	2	12'-0"	2	12'-0"	" "	6	3	2	6'-6"								
" " 34+63	2	17'-6"	2	16'-0"	" "	8	2	3	7'-0"	" " 37+87	2	8'-0"	2	8'-0"	" "	4	2	2	5'-0"								
" " 38+83	2	17'-6"	2	14'-0"	" "	8	2	2	8'-6"	" " 38+37	2	8'-0"	2	8'-6"	" "	4	2	2	5'-0"								
" " 103+65	2	16'-0"	2	11'-0"	" "	6	2	2	6'-6"	" " 62+84	2	12'-6"	2	9'-6"	ST10	6	2	2	6'-6"								
" " 106+10	2	13'-0"	2	10'-0"	" "	6	2	3	7'-0"	" " 67+73	2	9'-6"	2	8'-0"	" "	8	2	2	6'-0"								
" " 109+33	2	17'-6"	2	14'-0"	" "	8	2	2	8'-6"	" " 69+64	2	9'-6"	2	9'-0"	" "	6	3	2	6'-6"								
" " 114+38	2	14'-0"	2	14'-0"	" "	8	2	6	7'-0"	" " 71+70	2	11'-6"	2	9'-6"	" "	6	2	2	8'-0"								
" " 119+40	2	17'-6"	2	14'-0"	" "	8	2	3	9'-0"	" " 75+85	2	12'-6"	2	9'-6"	" "	6	2	2	8'-0"								
" " 123+80	2	17'-6"	2	14'-0"	" "	8	2	3	9'-0"	" " 83+30	2	15'-0"	2	12'-0"	" "	8	2	3	10'-4"								
" " 128+19	2	17'-6"	2	14'-0"	" "	8	2	3	7'-0"	Paducah 3.5+40.46	2	13'-6"	2	12'-6"	ST11-E	8	1	3	7'-0"	2	3'-0"	3'-6"	7'-8"	6'-9"	3	1'-2"	6'-6"
" " 130+40	2	17'-6"	2	16'-0"	" "	8	2	2	8'-8"	Paducah 3.5+ 88.46	2	17'-0"	2	9'-6"	" "	8	1	3	7'-0"	2	2'-0"	3'-6"	7'-8"	5'-6"	3	1'-6"	4'-0"
" " 135+22	2	17'-6"	2	14'-0"	" "	8	2	3	11'-0"	Germantown 0+21.1	2	17'-0"	2	12'-6"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	4'-3"	8'-6"	4	1'-11"	7'-0"
" " 139+20	2	17'-6"	2	14'-0"	" "	8	2	6	7'-0"	" " 63+98	2	14'-6"	2	11'-6"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	3'-9"	7'-3"	4	1'-11"	6'-6"
" " 145+76	2	17'-6"	2	14'-0"	" "	8	2	6	7'-0"	" " 156+93.1	2	20'-0"	4	9'-0"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	5'-0"	10'-2"	3	1'-11"	7'-0"
" " 149+97	2	17'-6"	2	16'-0"	" "	8	2	6	7'-0"	" " 166+20.1	2	20'-6"	4	8'-0"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	9'-0"	10'-0"	3	1'-11"	7'-0"
" " 157+26	2	17'-6"	2	12'-0"	" "	8	2	6	7'-0"	Brookport 33+56.1	2	11'-0"	2	9'-6"	" "	8	1	2	9'-0"	2	2'-0"	4'-0"	2'-9"	5'-6"	3	1'-4"	4'-0"
" " 161+33	2	17'-6"	2	12'-0"	" "	8	2	3	9'-0"	" " 89+49.1	2	11'-0"	2	8'-6"	" "	8	1	2	9'-0"	2	2'-0"	4'-0"	2'-9"	5'-6"	3	1'-4"	4'-0"
" " 166+48	2	16'-0"	2	14'-0"	" "	8	2	3	8'-6"	" " 92+68	2	13'-0"	2	10'-0"	" "	8	1	3	7'-0"	2	2'-0"	3'-5"	3'-9"	6'-6"	3	1'-2"	6'-3"
" " 170+04	2	13'-0"	2	12'-0"	" "	8	2	6	7'-0"	" " 97+19	2	11'-0"	2	9'-6"	" "	8	1	3	7'-0"	2	2'-0"	3'-5"	3'-9"	9'-6"	3	1'-4"	4'-0"
Paducah 8.3+44.9	2	15'-0"	2	12'-0"	" "	8	2	3	8'-0"	" " 104+58	2	16'-0"	2	11'-0"	" "	8	1	3	7'-0"	2	2'-0"	3'-5"	3'-0"	7'-0"	4	1'-1"	6'-6"
" " 5+34	2	15'-0"	2	12'-0"	" "	8	2	3	8'-0"	" " 114+38	2	16'-0"	2	11'-0"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	3'-6"	7'-0"	4	1'-1"	6'-6"
" " 9+44	2	14'-0"	2	12'-0"	" "	8	2	3	8'-6"	" " 119+30	2	17'-0"	2	8'-6"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	3'-6"	9'-6"	3	1'-2"	4'-0"
" " 10+40	2	14'-0"	2	12'-0"	" "	8	2	3	8'-6"	" " 53+12	2	13'-0"	2	10'-0"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	4'-0"	8'-0"	4	1'-1"	7'-0"
" " 25+15	2	15'-0"	2	12'-0"	" "	8	2	2	8'-8"	Kaskaskia 3.5+ 10.41	2	12'-6"	2	9'-6"	" "	8	1	3	10'-4"	2	2'-0"	3'-5"	3'-0"	8'-0"	4	1'-1"	6'-3"
" " 26+90	2	13'-0"	2	10'-0"	" "	8	2	3	7'-0"	" " 18+34	2	12'-6"	2	9'-6"	" "	8	1	3	9'-0"	—	—	—	—	—	—	—	—
" " 29+80	2	13'-0"	2	10'-0"	" "	8	2	3	6'-6"	" " 31+08	2	11'-0"	2	8'-0"	ST11-E	8	1	3	10'-4"	2	2'-0"	3'-5"	3'-0"	8'-0"	4	1'-1"	6'-3"

Note: Wedge sets marked thus ® include 1 connector link.

MK	DATE	AUTHORITY	REVISION
			Connector plate deleted

AS BUILT REVISIONS

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS STRUCTURAL DETAILS

SHEET 22 OF 115 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: District Engineer

APPROVAL RECOMMENDED: Chief, Design Branch, Flood Control Division

APPROVED: District Engineer

DR. BY W.R.B. TR. BY R.A.J. CK. BY A.B.K.

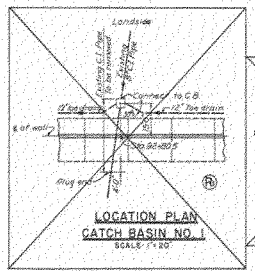
AS BUILT 935-12.2/109

1280

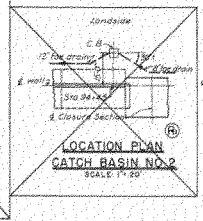
027

WAR DEPARTMENT

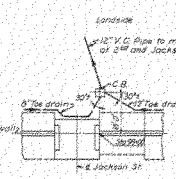
CORPS OF ENGINEERS, U. S. ARMY



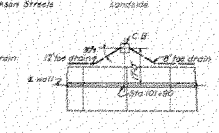
LOCATION PLAN
CATCH BASIN NO. 1
SCALE: 1" = 20'



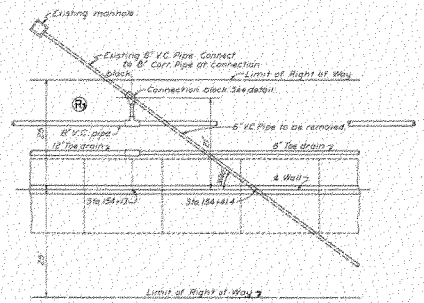
LOCATION PLAN
CATCH BASIN NO. 2
SCALE: 1" = 20'



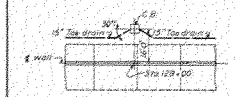
LOCATION PLAN
CATCH BASIN NO. 3
SCALE: 1" = 20'



LOCATION PLAN
CATCH BASIN NO. 4
SCALE: 1" = 20'



LOCATION PLAN
SCALE: 1" = 10'



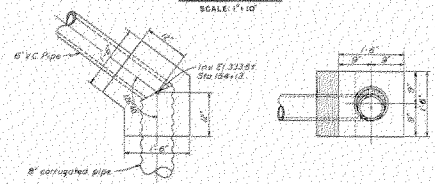
LOCATION PLAN
CATCH BASIN NO. 9
SCALE: 1" = 20'

LOCATION PLAN
CATCH BASIN NO. 10
SCALE: 1" = 20'

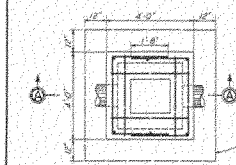
CATCH BASIN SCHEDULE

	NO.	TYPE	STATION	CONNECTIONS	ELEV. INVERT	APPROX. EL. TOP GROUND	REINFORCING ½" ⊕ LIN. FT.	REINFORCING ½" ⊕ LBS.	LOCATION PLAN SHEET NO.
Ⓡ	1	A	92+80.5	8" C.I. pipe	332.0	334.8	163	108	This
				2-12" Corr. pipes	330.7				
Ⓡ	2	A	94+45	12" Corr. pipe	331.7	336.5	151	101	This
				8" Corr. pipe	331.7				
Ⓡ	3	A	99+00	12" Corr. pipe	330.0	335.38	192	128	This
				6" Corr. pipe	330.0				
				12" V.C. pipe	329.9				
	4	C	101+90	12" Corr. pipe	331.0	335.3	148	99	This
				8" Corr. pipe	331.0				
	5	A	126+12	12" Corr. pipe	331.9	335.9	163	109	14
				8" Corr. pipe	331.9				
	6	A	126+56	12" Corr. pipe	332.7	335.0	139	93	14
				12" Corr. pipe	331.8				
	7	A	127+65	12" Corr. pipe	332.3	334.0	138	92	14
Ⓡ	8	A	127+93	12" Corr. pipe	331.3	333.8	139	93	14
	9	C	129+00	15" Corr. pipe	332.0	334.0	163	109	This
				18" Corr. pipe	333.0				
Ⓡ	10	C	133+00	2-12" Corr. Pipes	330.0	332.5	119	80	This
	11	B	137+05	12" Corr. Pipe	334.0	337.8 *	142	95	46
	12	B	137+47	12" Corr. Pipe	333.5	337.6 *	166	111	46
	13	B	161+14	12" Corr. Pipe	334.0	336.5 *	122	82	46
Ⓡ	14	B	161+94	12" Corr. Pipe	334.0	336.2 *	122	82	46

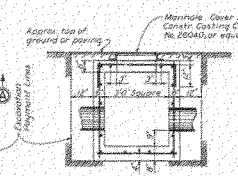
* Bottom of curb



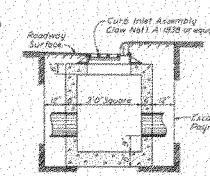
CONCRETE CONNECTION BLOCK
SCALE: 1" = 1'-0"



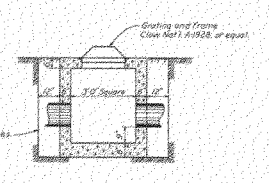
TYPICAL PLAN



SECTION A-A
TYPE "A"



SECTION A-A
TYPE "B"



SECTION A-A
TYPE "C"

TYPICAL CATCH BASINS
SCALE: ½" = 1'-0"

Notes:
All reinforcing bars ½" ⊕ spaces 12" c.c. Cut and bend in field.
Reinforcing and masonry details similar in all types

WKS	4-30-41	Catch basins relocated & schedule revised	
BY	DATE	CHARACTER	
		REVISIONS	

Ⓡ		Field	Pipe added to plan
Ⓡ		Field	Change in elevation "top ground"
Ⓡ	2/1/40	C.O. #9	Deleted
MK	DATE	AUTHORITY	REVISION
		AS BUILT	REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
CATCH BASINS AND
MISCELLANEOUS DETAILS
SHEET 100 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — MAY, 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL DIVISION — DR. 97-S.C.B.

APPROVED: [signature] DIVISION ENGINEER — TR. 97-D.C.P. — CK. 97-1P.S.

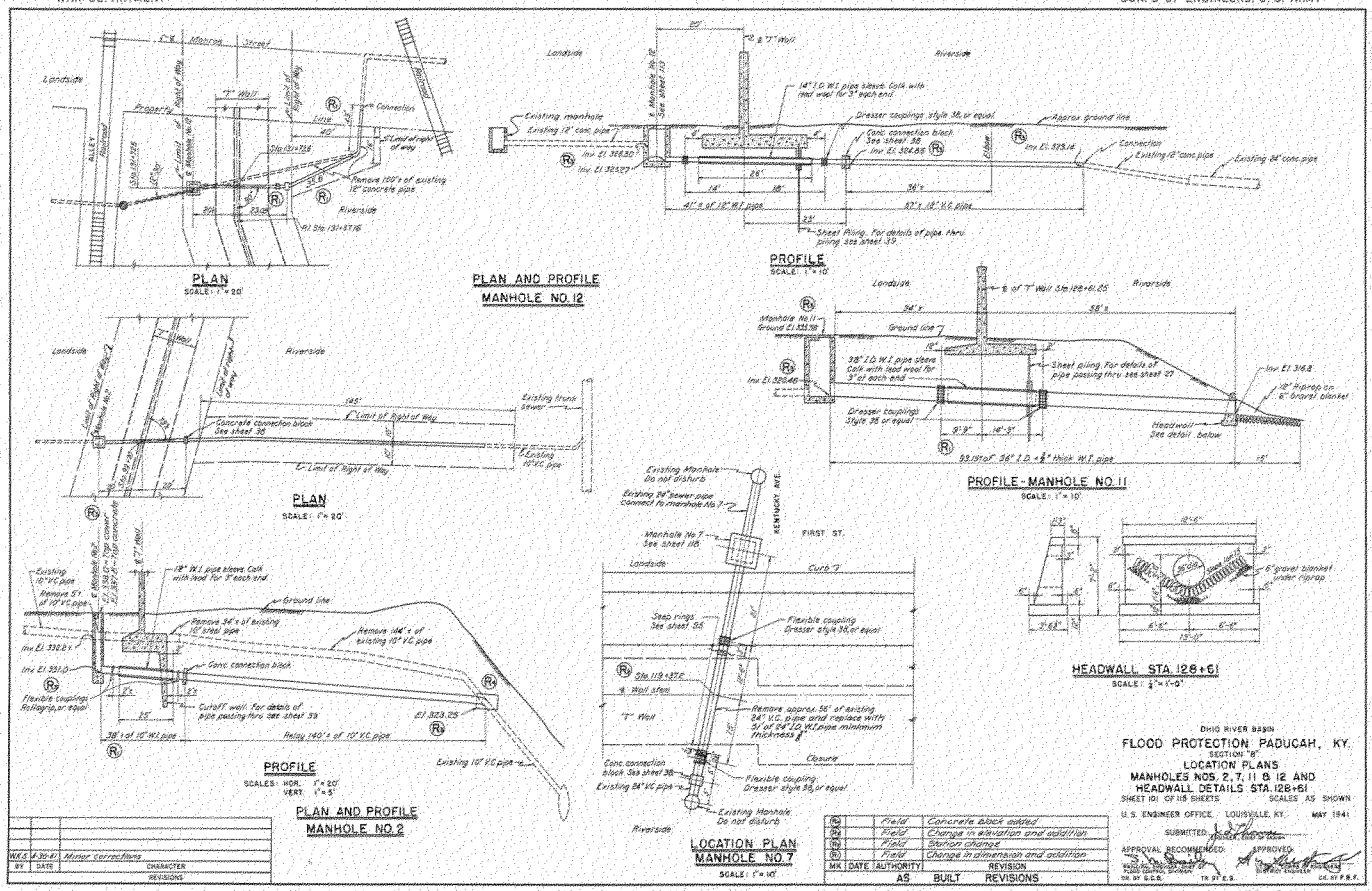
AS BUILT

935-12.2/110

1281

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



W.K.S. 4-30-41	Minor Corrections		
BY	DATE	CHARACTER	
		REVISIONS	

(R)		Field	Concrete block added
(R)		Field	Change in elevation and addition
(R)		Field	Station change
(R)		Field	Change in dimension and addition
MK	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS			

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

LOCATION PLANS

MANHOLES NOS. 2, 7, 11 & 12 AND HEADWALL DETAILS STA. 128+61

SHEET 101 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: [illegible] — APPROVED: [illegible]

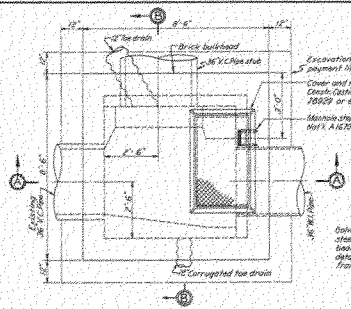
DR. BY G.C.B. — TR. BY E.S. — CK. BY F.B.F.

AS BUILT 935-12.2/111

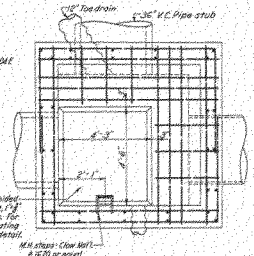
1282

WAR DEPARTMENT

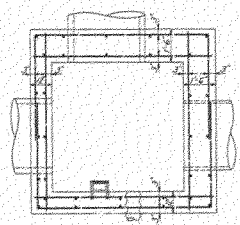
CORPS OF ENGINEERS, U. S. ARMY



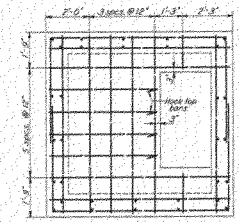
PLAN



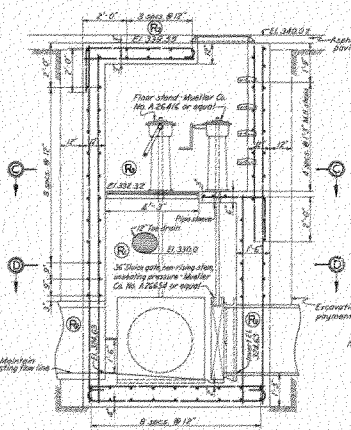
SECTION C-C



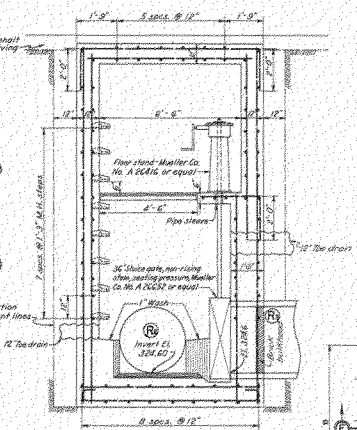
SECTION D-D



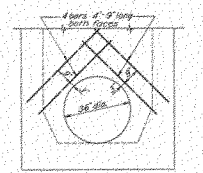
REINFORCING STEEL - TOP



SECTION A-A



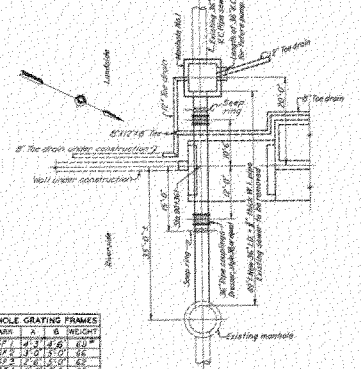
SECTION B-B



ELEVATION AT 36" HOLES

MANHOLE NO. 1

SCALE: 3/8" = 1'-0"

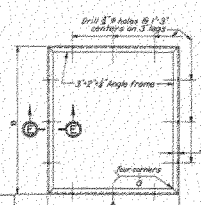


LOCATION PLAN

SCALE: 1" = 10'-0"

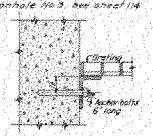
TABLE OF MANHOLE GRATING FRAMES				
MANHOLE NO.	MARK	A	B	WEIGHT
1	MG1	4'-3"	4'-6"	62#
2	MG2	3'-0"	3'-0"	55
3	MG3	1'-6"	3'-0"	63
4	MG4	1'-6"	4'-6"	30
14	MG14	1'-6"	4'-6"	30
16	MG16	3'-0"	4'-0"	37

For grating support details for manhole No. 3 see sheet 114



GRATING FRAME

NO SCALE



SECTION E-E

SCALE: 3" = 1'-0"

Note:
In setting gate frames care shall be taken to leave all movable wedge parts free and accessible. Provide 1/8" ± recess under gate.
All reinforcing shall be 5/8" ϕ, cut and bent in the field. Estimated quantity: 2149 linear ft. = 2235#

MK	DATE	AUTHORITY	REVISION
WKS 4-3041		Floor stand added and minor corrections.	
BY	DATE	CHARACTER	
REVISIONS			

MK			
(R)		Field	Bulkhead not placed
(R)		Field	Elevation change and addition
(A)	10-1-41	C.O. #2	Deleted
MK	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS			

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 1

SHEET 102 OF 115 SHEETS SCALE: 3/8"=1'-0" EXCEPT AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

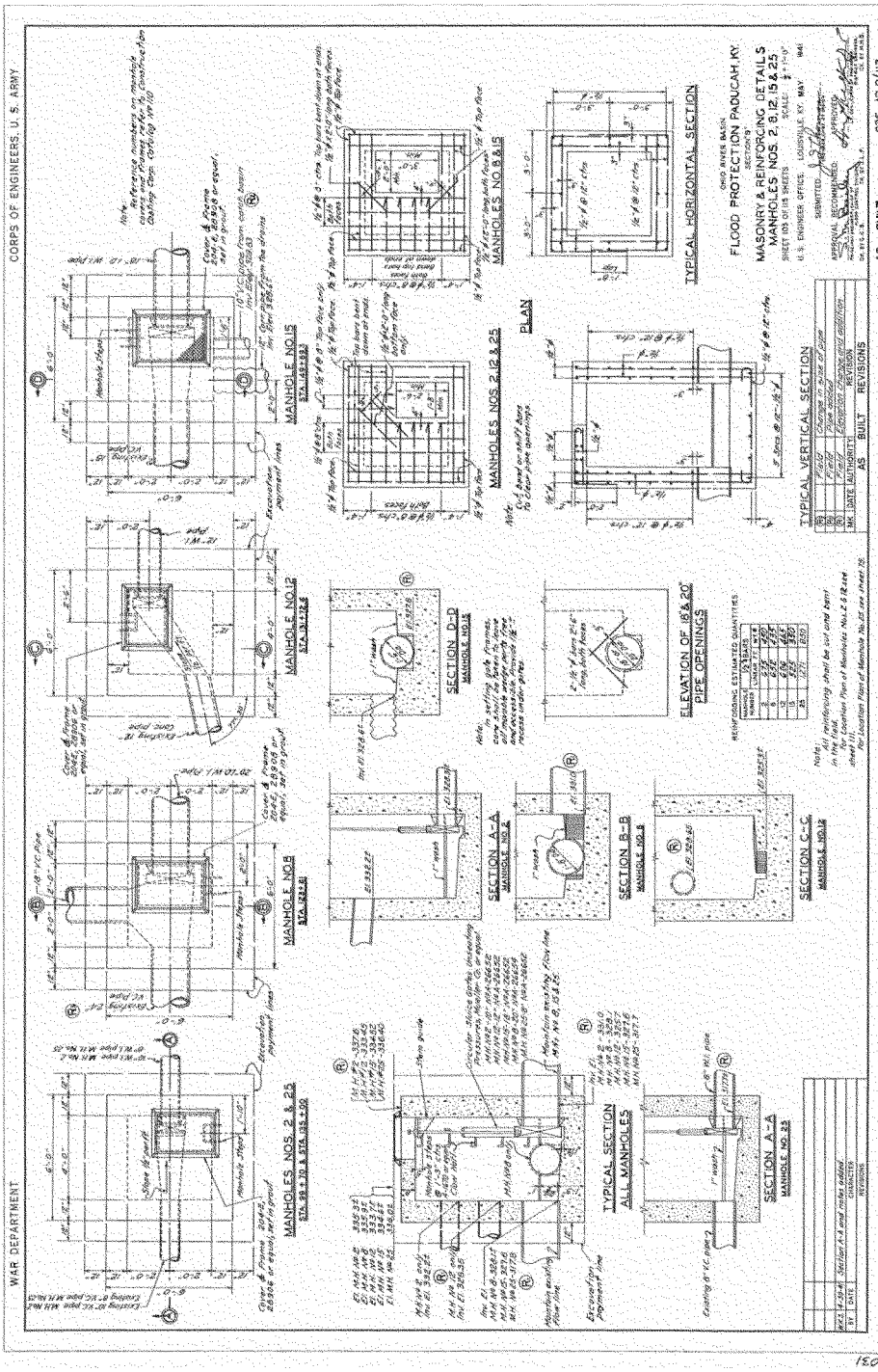
SUBMITTED: Patrick, Corps of Eng.

APPROVAL RECOMMENDED: APPROVED:

CHIEF, FLOOD CONTROL DIVISION — CHIEF, ENGINEERING DIVISION — DISTRICT ENGINEER

DR. BY W.H.M. TR. BY P.W. CK. BY W.H.S.

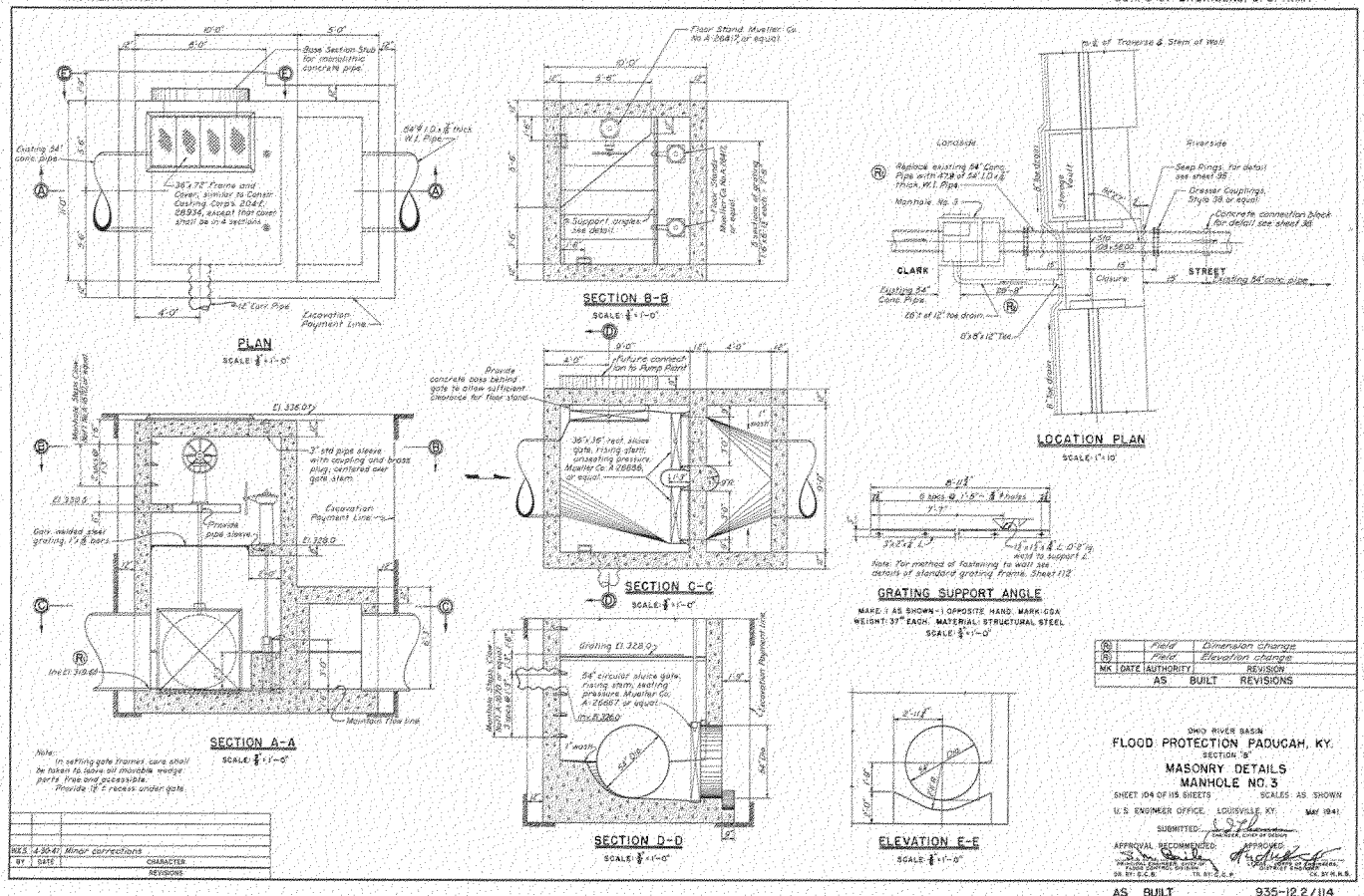
AS BUILT 935-12.2/112


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
MANHOLES NOS. 2 & 22
MANHOLE NO. 8
MANHOLE NO. 12
MANHOLE NO. 15
MANHOLES NOS. 2, 12 & 25
MANHOLES NO. 8 & 15
PLAN
TYPICAL HORIZONTAL SECTION
TYPICAL VERTICAL SECTION
ELEVATION OF 18 & 20" PIPE OPENINGS
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
TYPICAL SECTION ALL MANHOLES
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 2, 8, 12, 15 & 25
AS BUILT
935-12.2/13

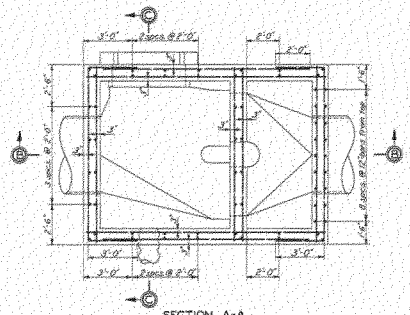
150

WAR DEPARTMENT

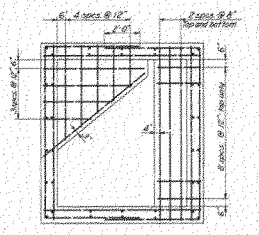
CORPS OF ENGINEERS, U. S. ARMY



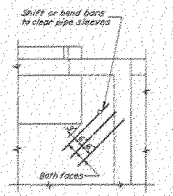
1285



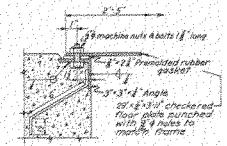
SECTION A-A



SECTION D-D



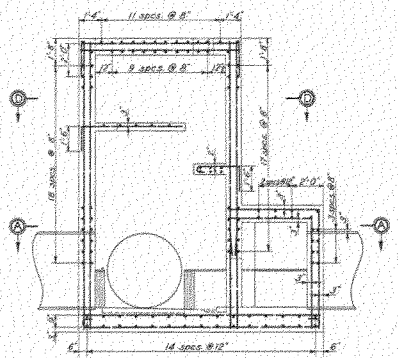
PLAN AT MANHOLE COVER OPENING



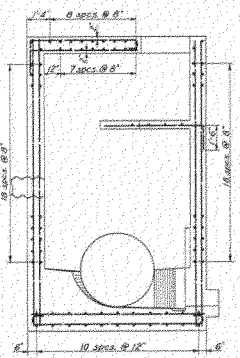
SECTION E-E

SCALE: 3"=1'-0"

Note:
All reinforcing 3/8" ϕ bars cut and bent in the field.
Estimated quantity 3950 linear feet - 4120#.



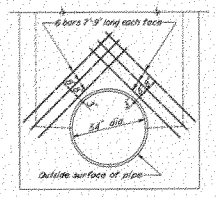
SECTION B-B



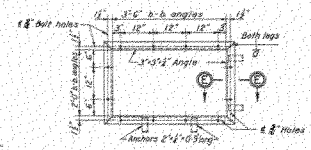
SECTION C-C

MANHOLE NO. 3

SCALE: 3/8"=1'-0"



ELEVATION 54" OPENINGS



FRAME

SCALE: 3/8"=1'-0"

PRESSURE CHAMBER FRAME AND COVER

MAKE 1 - MANHOLE NO. 16 - MK. P.C. - WEIGHT 189#
MATERIAL - STRUCTURAL STEEL

BY	DATE	CHARACTER REVISIONS
WKS	4-30-41	Elevation 12" pipe corrected

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS
MANHOLE NO. 3

SHEET 105 OF 115 SHEETS SCALES AS SHOWN.
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1940

SUBMITTED: [illegible] CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] SPECIAL ENGINEER CHIEF OF FLOOD CONTROL DIVISION, OR BY O.C.E.

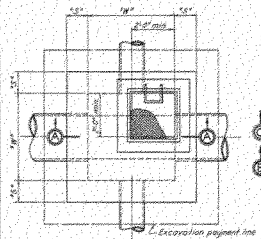
APPROVED: [illegible] CHIEF OF ENGINEERS, DISTRICT ENGINEER, OR BY W.K.E.

AS BUILT 935-12.2/115

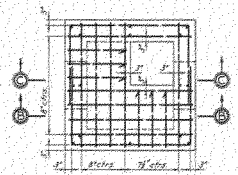
1286

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

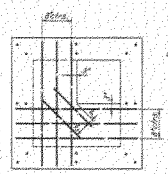


PLAN



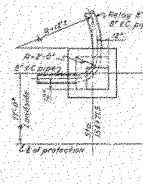
TOP REINFORCING-ROOF

PLAN

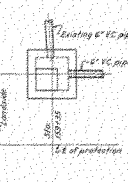


BOTTOM REINFORCING-ROOF

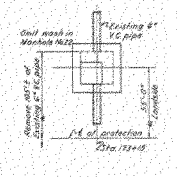
MANHOLE NO. 17



MANHOLE NO. 18



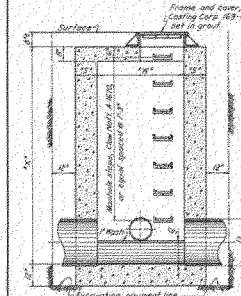
MANHOLE NO. 19



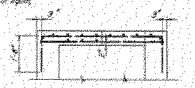
MANHOLE NO. 22

LOCATION PLANS

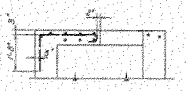
SCALE: $\frac{1}{2}$"=1'-0"



SECTION A-A



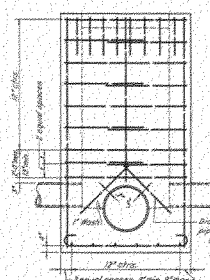
SECTION B-B



SECTION C-C

FAR SIDE REINFORCING

TYPICAL ELEVATION



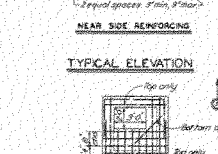
NEAR SIDE REINFORCING

TYPICAL ELEVATION

Install 24" gate originally for manhole #20 by C.O. #5

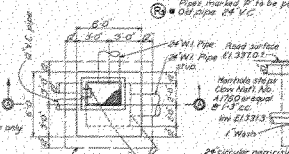
MANHOLE NUMBER	STATION	DIMENSIONS W	S	X	PIPE CONNECTIONS QUAN.	SIZE	KIND	INV. ELEV.	APPROX. GROUND ELEVATION OR TOP OF MANHOLE	NUMBER OF STEPS REQUIRED	QUANTITY OF STEEL REINFORCING FEET	LBS.	FOR LOCATION PLAN SEE
4	115+00	3'-0"	3"	10'-3"	1	18"	V.C.-Existing	323.3	336.0	8	665	445	Sheet 40
					1	18"	Corr.-New	325.1					
					1	12"	Corr.-New(W)	326.0					
					1	8"	Corr.-New(S)	330.0					
5	115+26	4'-0"	3"	10'-4"	1	18"	V.C.-Existing	324.0	336.4	7	860	590	Sheet 40
					1	24"	W.I.-New	324.0					
9	123+98	4'-0"	3"	8'-4"	2	*18"	V.C.-New&Exist	329.6	336.5	4	620	415	Sheet 42
					1	12"	Corr.-New (W)	330.3					
10	127+85	4'-0"	3"	10'-0"	1	12"	V.C.-New	330.25	335.0	8	930	625	Sheet 14
					1	6"	V.C.-New	331.5					
					1	18"	V.C.-Existing	329.3					
					1	18"	Corr.-New (E)	329.35					
17	151+77.5	3'-0"	3"	8'-3"	1	8"	V.C.-New	334.6	339.0	3	445	300	This sheet
18	154+70.5	3'-0"	3"	8'-7"	1	8"	V.C.-Relayed	331.4	339.0	4	475	320	This sheet
					1	8"	V.C.-New	331.4					
19	159+35	3'-0"	3"	8'-4"	1	6"	V.C.-Existing	333.1	339.2	3	373	185	This sheet
					1	6"	V.C.-New	333.1					
21	161+66	4'-0"	12"	6'-2"	1	24"	V.C.-Existing	330.8	337.9	4	610	410	Sheet 46
					1	24"	W.I.-New	330.8					
					1	12"	V.C.-Relayed	330.11					
					1	24"	W.I.-Stub-New	330.88					
22	173+15	3'-0"	3"	5'-5"	1	6"	V.C.-Existing	328.4	336.5	4	430	290	This sheet

Notes: Refer to table for dimensions indicated by the letters "W", "S", and "X".
Manhole flow lines of existing pipes.
All steel reinforcing bars are $\frac{1}{2}$". Cut and bend in field.
Pipes marked "P" to be perforated.
* Old pipe 24" V.C.



REINFORCING DETAILS

SCALE: $\frac{1}{2}$"=1'-0"



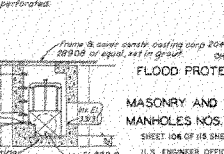
TOP REINFORCING

Note: All bars top & bottom except as noted. All reinforcing $\frac{1}{2}$"

PLAN

SCALE: $\frac{1}{2}$"=1'-0"

SECTION A-A



MASONRY DETAILS

Scale: $\frac{1}{2}$"=1'-0"

MK.	DATE	AUTHORITY	REVISION
R6	12-17-41	C.O. #3	Cutoff added
R5	Field		Addition to note
R4	Field		Elevation change ground & top of MH
R3	Field		Change pipe connection
R2	Field		Invert elevation change
R1	12-17-41	C.O. #3	See Sheet 120

AS BUILT REVISIONS

BY	DATE	CHARACTER
W.K.S.	4-30-41	Minor corrections

REVISIONS

FLOOD PROTECTION PADUCAH, KY.

SECTION 19

MASONRY AND REINFORCING DETAILS

MANHOLES NOS. 4, 5, 9, 10, 17, 18, 19, 21, & 22

SHEET 106 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: J. T. Thomas, Major, Corps of Engineers

APPROVAL RECOMMENDED: Chas. D. Hall, Lt. Colonel, Corps of Engineers, Chief, Flood Control Division

APPROVED: Eugene Reybold, Brig. Gen., U.S.A., Chief of Engineers

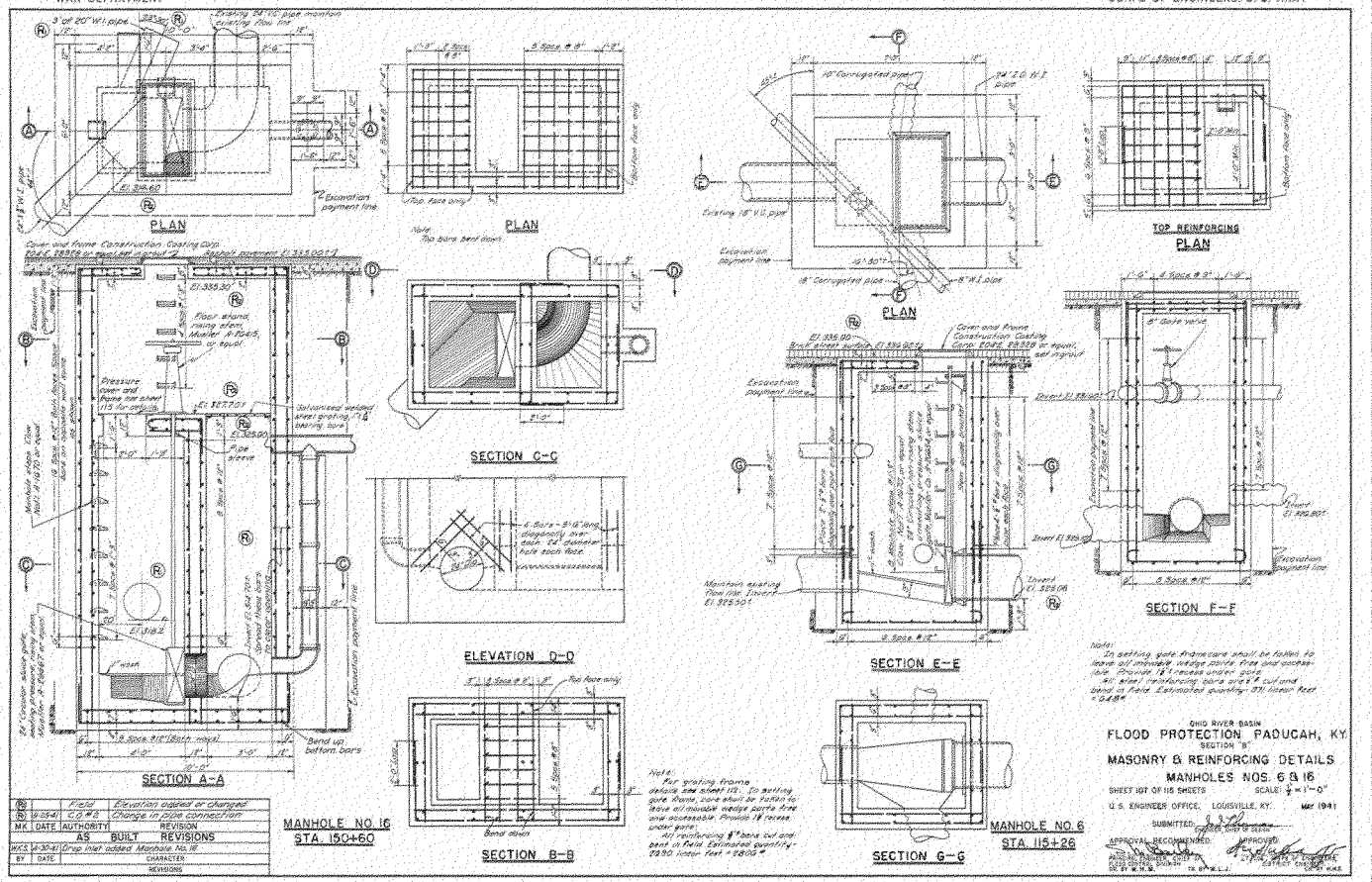
AS BUILT 935-12.2/116

1287

0396

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



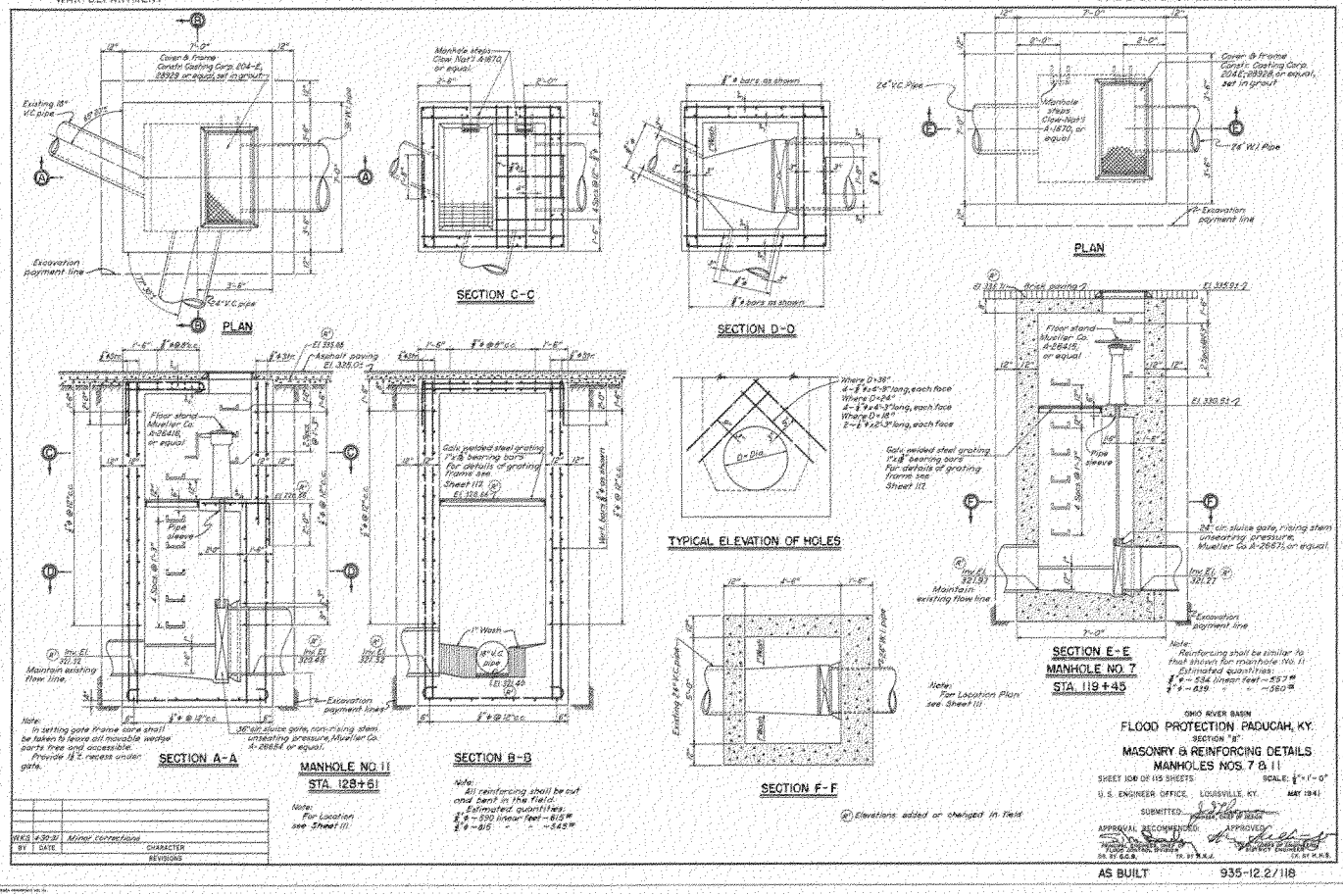
R		Field	Elevation added or changed
R	18-25-41	C.O. #3	Change in pipe connection
MK	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS			
MKS	4-30-41	Drop inlet added Manhole No. 16	
BY	DATE	CHARACTER REVISIONS	

035

1288

WAR DEPARTMENT

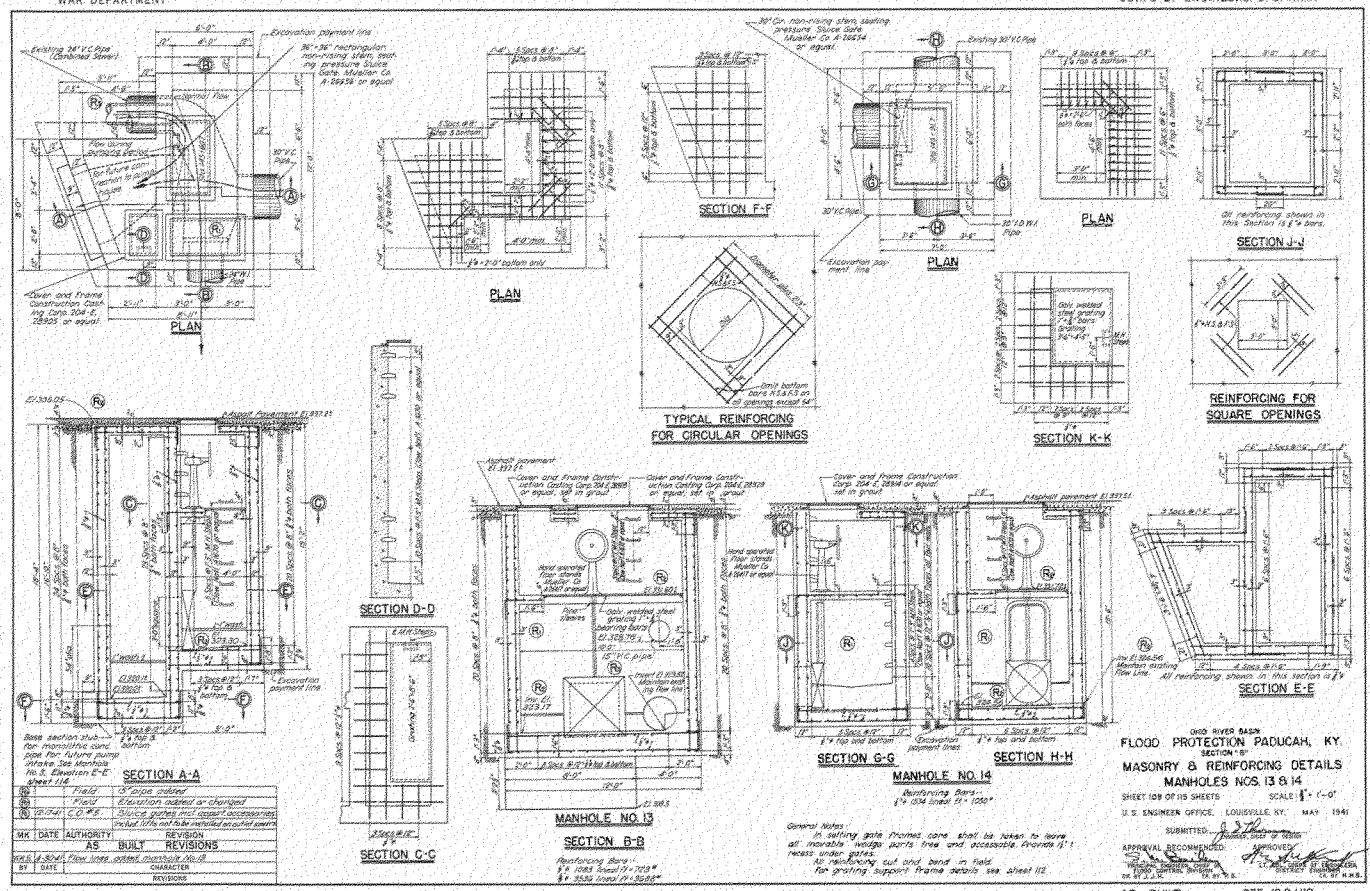
CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER REVISIONS
WKS	4-30-51	Minor corrections

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	AUTHORITY	REVISION
(R)		Field	18" pipe added
(R)		Field	Elevation added or changed
(R)	12-1-41	C.O. #5	Sluice gates incl. appurt. accessories
			Relief lifts at tube installed except seats

AS BUILT REVISIONS

WR 6.4-3041 Flow lines, added manhole No. 13

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLES NOS. 13 & 14

SHEET 109 OF 115 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: R. S. Thompson
CHAIRMAN, DIST. OF ENGRS.

APPROVAL RECOMMENDED: R. S. Thompson
CHAIRMAN, ENGINEER DIST. FLOOD CONTROL DIVISION
TR. BY J.J.K. TR. BY D.S.

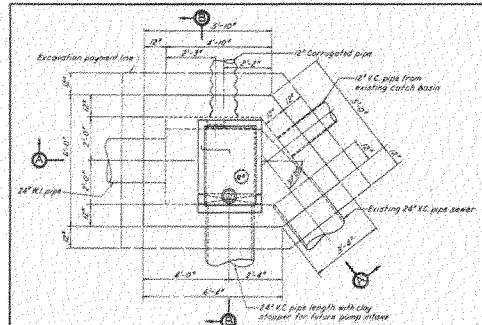
APPROVED: J. S. Hughes
COL., CORPS OF ENGINEERS
DISTRICT ENGINEER
CK. BY H.K.S.

AS BUILT 935-12.2/119

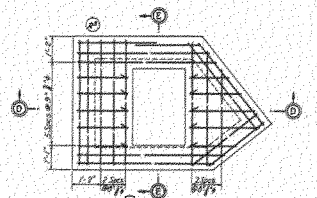
037

WAR DEPARTMENT

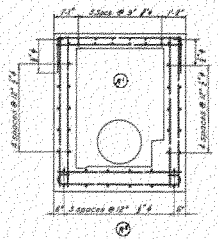
CORPS OF ENGINEERS, U. S. ARMY



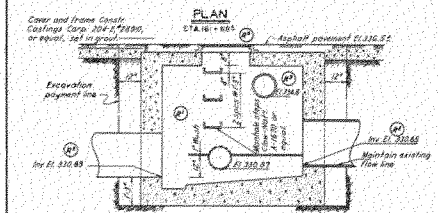
PLAN



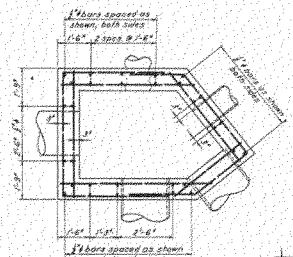
PLAN



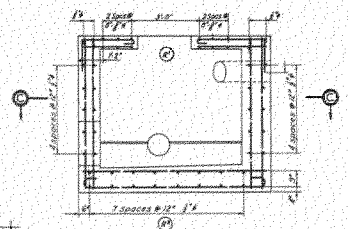
SECTION E-E



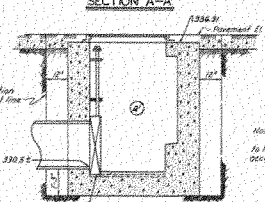
SECTION A-A



SECTION C-C



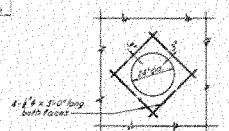
SECTION D-D



SECTION B-B

MASONRY DETAILS

Note:
In setting gate frame care shall be taken to leave all manhole wedge pieces free and accessible. Provide 1/8" recess under gates.



REINFORCING AROUND 24" DIA. HOLES

REINFORCING DETAILS

Note:
All reinforcing cut and bent in the field.
Estimated quantities:
3/4" - Weight 127# Lin. Ft. 170
5/8" - Weight 452# Lin. Ft. 721

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 20

SHEET 110 OF 118 SHEETS SCALE 1/2" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: J. P. Johnson, Colonel, Corps of Engineers

APPROVAL RECOMMENDED: J. E. Spaulding, Principal Engineer, Chief of Flood Control Division, Cir. 97 S. C. R. '39, 97 E. C. C.

APPROVED: H. L. Mitchell, Lt. Col., Corps of Engineers, District Engineer, Cir. 97 H.R.S.

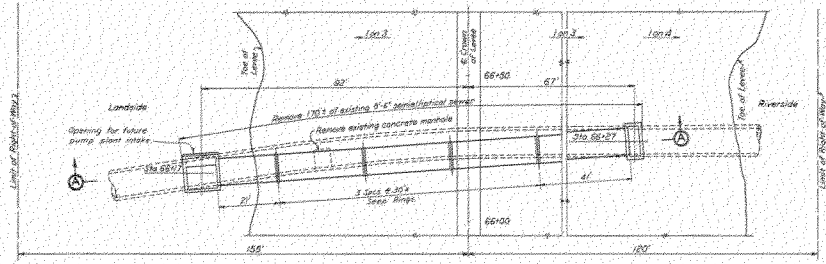
W.K.S.	4-30-41	Minor revisions	
BY	DATE	CHARACTER	
REVISIONS			

(2")		Field	Elevation added or changed
(1")		Field	Change in Plan and Sections
(2")	12-17-41	C.O. No. 5	Sluice gate and appurtenant accessories (incl. lifts (on 36" x 1" lower detail) placed in W.K.P.M.)
MK	DATE	AUTHORITY	REVISIONS
AS BUILT REVISIONS			

AS BUILT 935-12.2/120.1

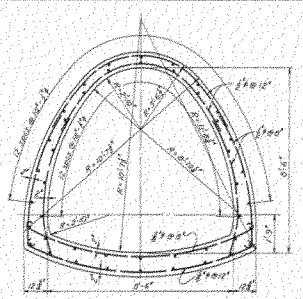
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



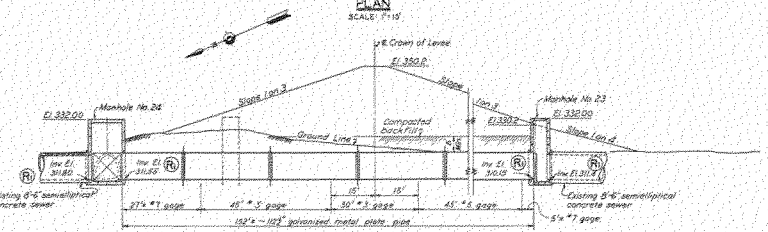
PLAN

SCALE: 1" = 10'



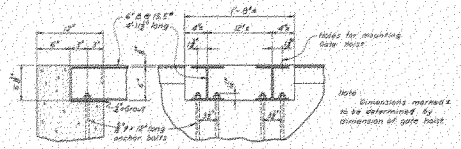
TYPICAL SECTION EXISTING 8'-6" SEMI-ELLIPTICAL CONCRETE SEWER

SCALE: 1/4" = 1'-0"



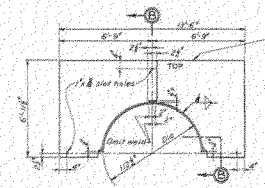
SECTION A-A

SCALE: 1" = 10'



SUPPORT DETAIL FOR GATE HOIST BEAMS

SCALE: 1/2" = 1'-0"



ELEVATION

SECTION B-B

DETAIL OF SEEP RING

SCALE: NONE

Note:
Diaphragm "B" gage galvanized sheet metal. Top half of diaphragm shown, bottom half identical. Four complete seep rings required.

MKS 5-1-41	This sheet supersedes sheet No. 935-12.2/121	
BY	DATE	CHARACTER
		REVISIONS

MK	DATE	AUTHORITY	REVISION
B		Field	Elevation change
AS BUILT REVISIONS			

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION 8

SEWER STA. 66+27

SHEET 111 OF 115 SHEETS SCALES AS SHOWN.

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.

SUBMITTED: [illegible] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEER, CHIEF OF FLOOD CONTROL DIVISION. DR. BY J.H.R. TR. BY J.J.H.

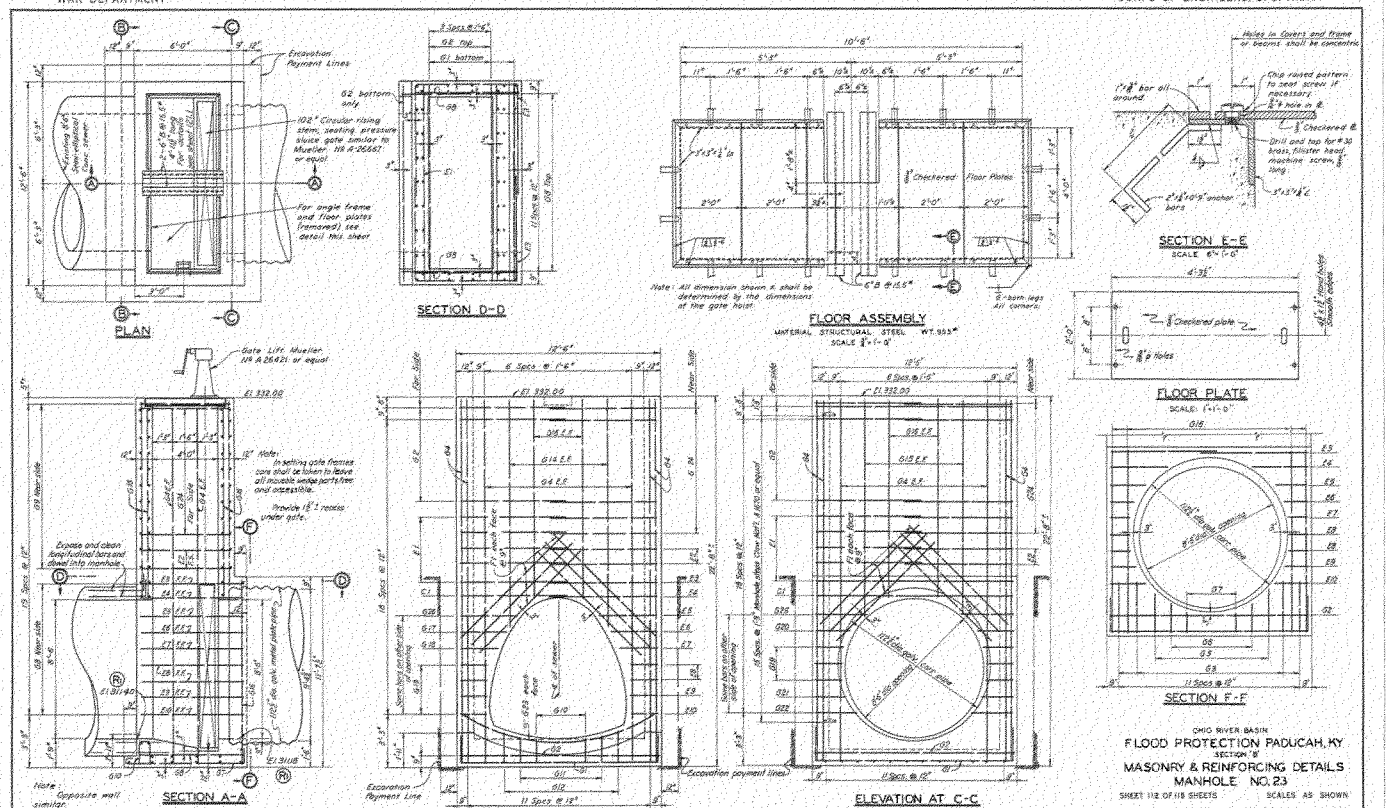
APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER. CK. BY J.A.S.

AS BUILT 935-12.2/121.1

1292

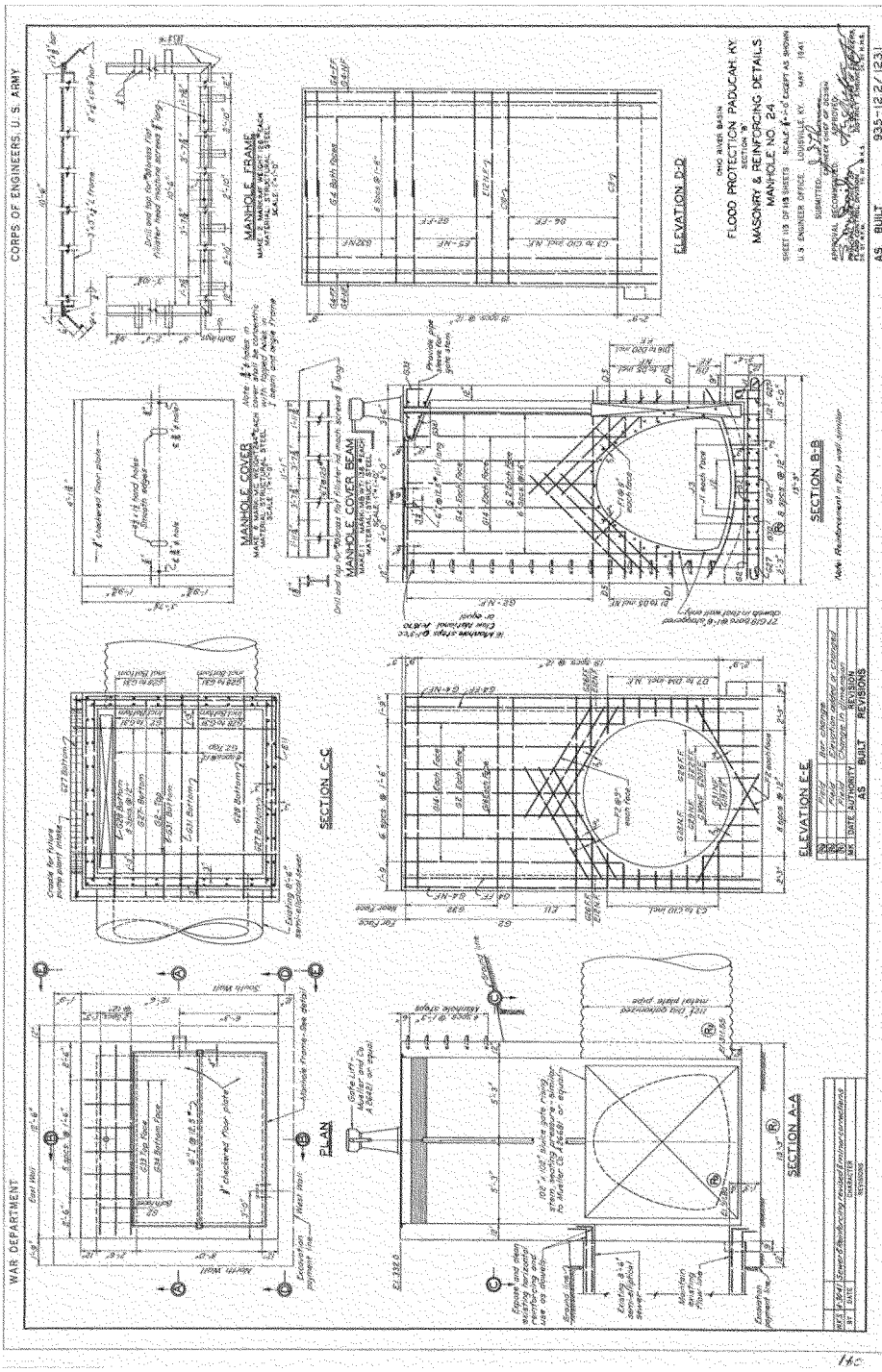
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



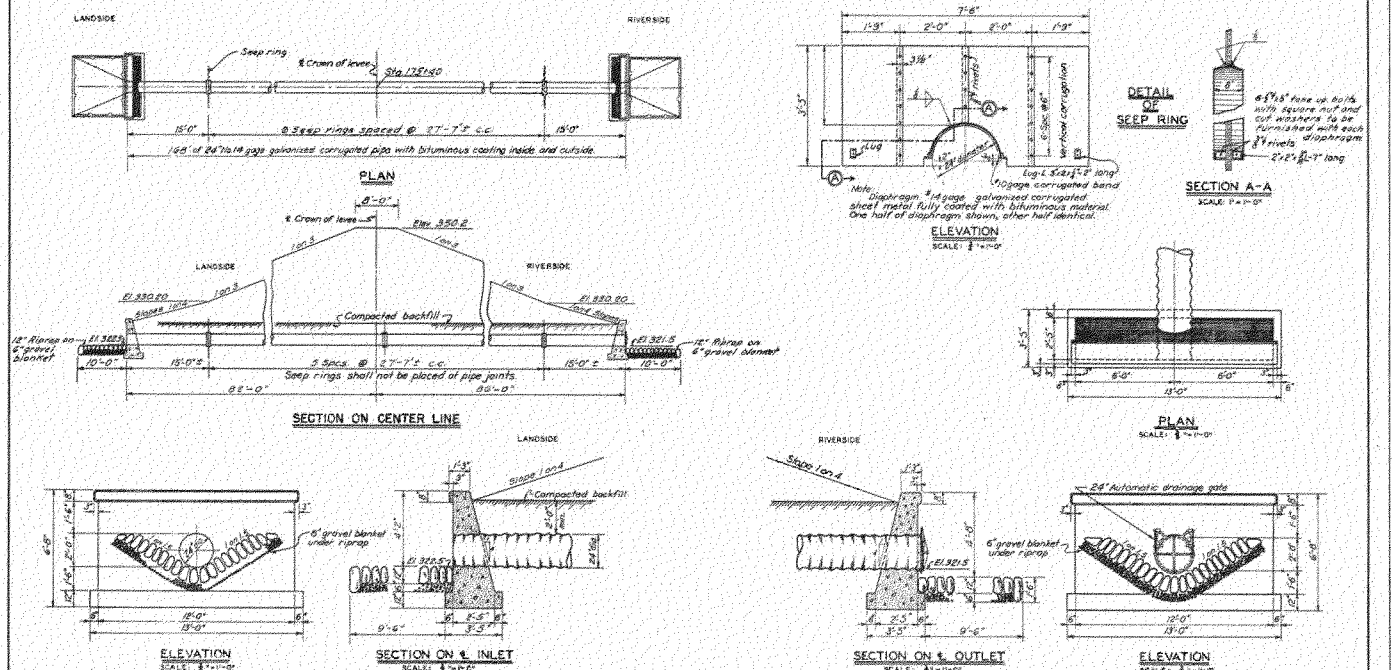
BY	DATE	CHARACTER OF REVISIONS
H.K.S.	4-30-41	Sewers & reinforcing revised and minor corrections

MK	DATE	Field AUTHORITY	Elevation change REVISION
		AS BUILT	REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MANHOLE NO. 24
SHEET 113 OF 119 SHEETS SCALE 1"=0' EXCEPT AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: CHIEF ENGINEER
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: DIVISION ENGINEER
AS BUILT 935-12.2/123.1
MANHOLE FRAME
MANHOLE COVER
MANHOLE COVER BEAM
ELEVATION D-D
SECTION B-B
SECTION C-C
ELEVATION E-E
PLAN
SECTION A-A
AS BUILT REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DRAINAGE STRUCTURE STA. 175+40

SHEET 114 OF 115 — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — MAY 1941.

SUBMITTED: [illegible] — DIVISION ENGINEER

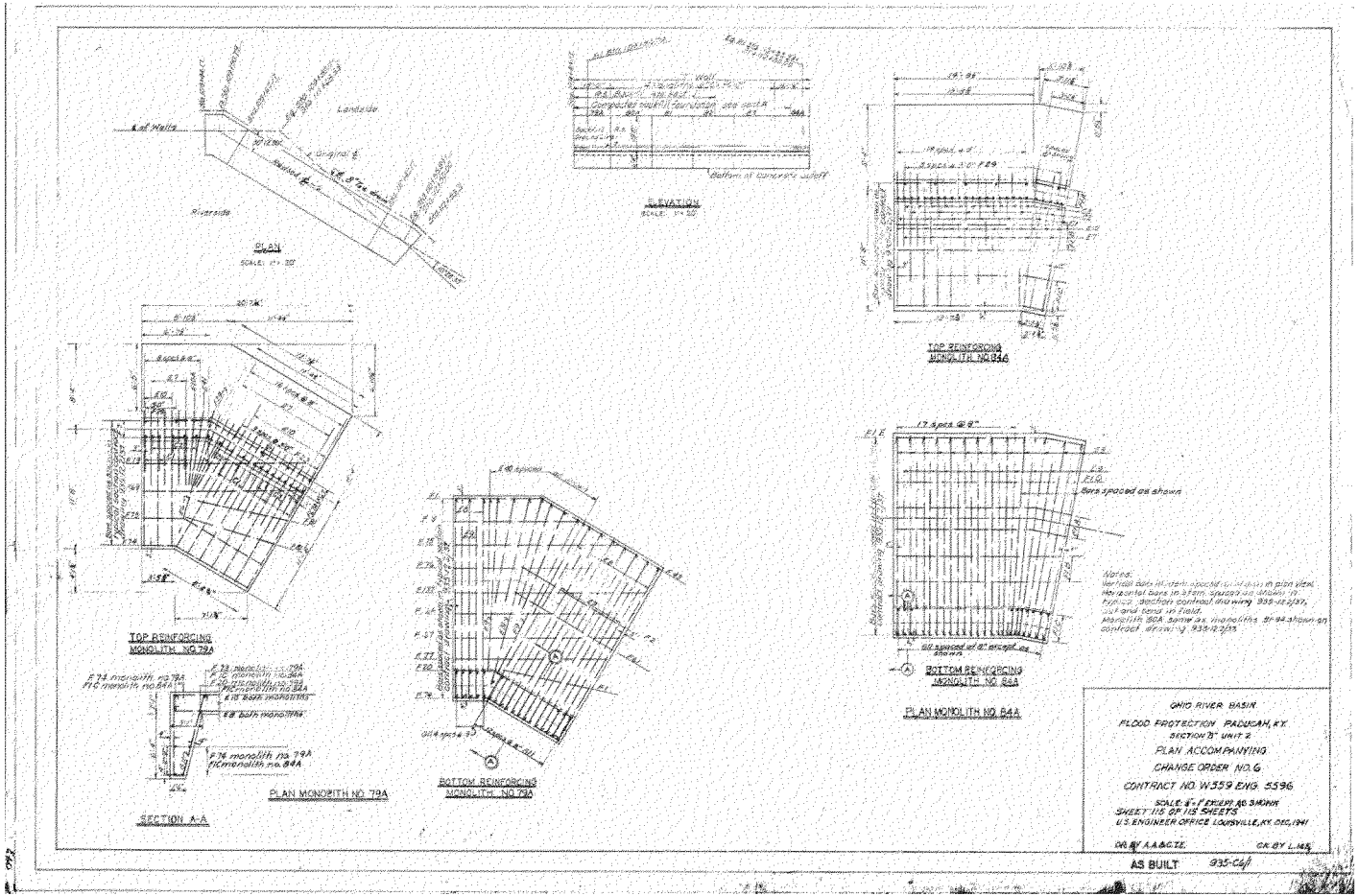
APPROVAL RECOMMENDED: [illegible] — REPRESENTATIVE, CHIEF, FLOOD CONTROL DIV. OR R.C.E.

APPROVED: [illegible] — DISTRICT ENGINEER, OR DIST. ENGR.

TR. BY J.L.P.

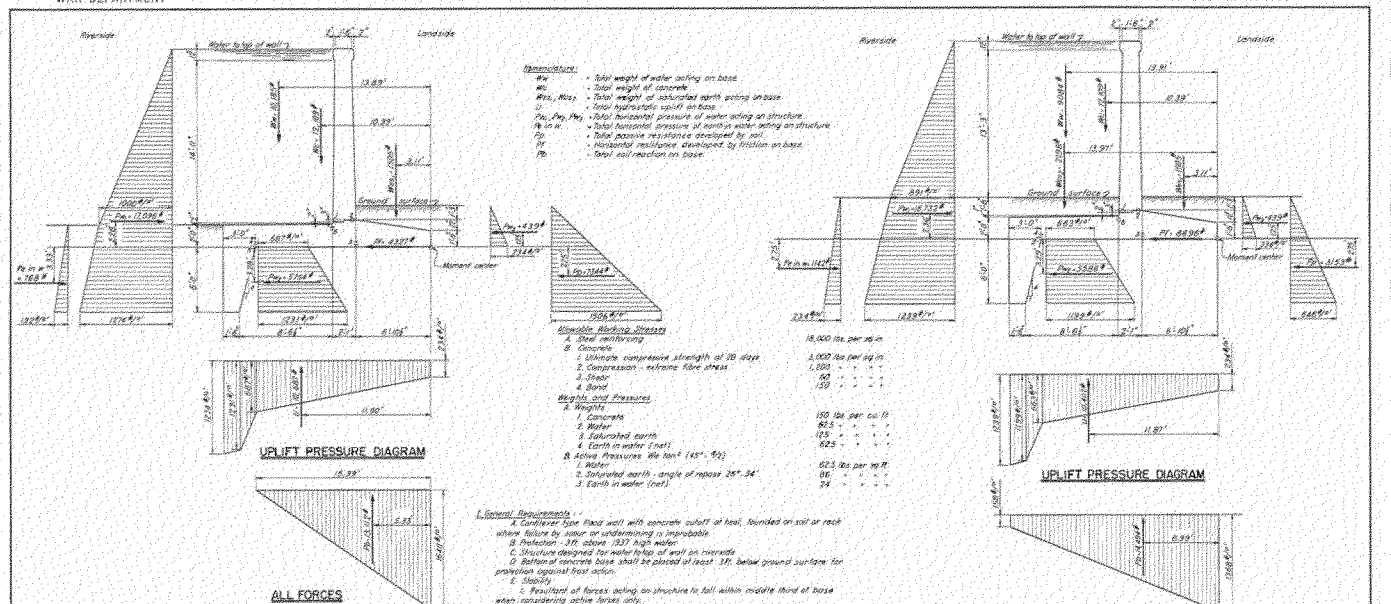
AS BUILT

935-12.2/124


PLAN
SCALE: 1" = 20'
Landside
Riverside
ELEVATION
SCALE: 1" = 20'
Wall
Bottom of concrete wall
TOP REINFORCING
MONOLITH NO. 79A
TOP REINFORCING
MONOLITH NO. 84A
BOTTOM REINFORCING
MONOLITH NO. 79A
BOTTOM REINFORCING
MONOLITH NO. 84A
PLAN MONOLITH NO. 79A
PLAN MONOLITH NO. 84A
SECTION A-A
Bars spaced as shown
Notes:
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B" UNIT 2
PLAN ACCOMPANYING
CHANGE ORDER NO. 6
CONTRACT NO. W559 ENG. 5596
SCALE: 1/8" = 1' EXCEPT AS SHOWN
SHEET 115 OF 115 SHEETS
U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC. 1941
DR. BY A.A.&G.T.E.
CK. BY L.M.S.
AS BUILT
935-C&J

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Nomenclature:

- W_w = Total weight of water acting on base
- W_c = Total weight of concrete
- W_{ss}, W_{cs} = Total weight of saturated earth acting on base
- U = Total hydrostatic uplift on base
- P_{hl}, P_{hp}, P_{hs} = Total horizontal pressure of water acting on structure
- P_h in w = Total horizontal pressure of earth in water acting on structure
- P_p = Total passive resistance developed by soil
- H = Horizontal resistance developed by friction on base
- P_b = Total soil reaction on base

Allowable Working Stresses

- A. Steel reinforcing — 18,000 lbs per sq in
- B. Concrete
  - 1. Ultimate compressive strength at 28 days — 3,000 lbs per sq in
  - 2. Compression - extreme fibre stress — 1,200 " " " "
  - 3. Shear — 60 " " " "
  - 4. Bond — 150 " " " "

Weights and Pressures

- A. Weights
  - 1. Concrete — 150 lbs per cu ft
  - 2. Water — 62.5 " " " "
  - 3. Saturated earth — 125 " " " "
  - 4. Earth in water (net) — 62.5 " " " "
- B. Active Pressures $W_e \tan^2 (45° - \phi/2)$
  - 1. Water — 62.5 lbs per sq ft
  - 2. Saturated earth - angle of repose 28° - 34° — 86 " " " "
  - 3. Earth in water (net) — 34 " " " "

I. General Requirements:

A. Cantilever type floodwall with concrete cutoff at heel, founded on soil or rock where failure by scour or underminning is improbable.

B. Protection - 3 ft. above 1937 high water.

C. Structure designed for water to top of wall on riverside.

D. Bottom of concrete base shall be placed at least 3 ft. below ground surface for protection against frost action.

E. Stability

1. Resultant of forces acting on structure to fall within middle third of base when considering active forces only.

2. Factor of safety against overturning of structure to be not less than 1.25 when considering all forces, including passive resistance.

II. Basic Assumption

A. Active forces on wall to consist of hydrostatic pressure and the equivalent fluid pressure of the saturated earth.

B. Uplift derived from seepage pressure gradient.

C. Passive resistance of soil equal to difference between net active horizontal forces and frictional resistance developed between concrete base and soil, with passive resistance assumed to vary from zero at landside ground surface to a maximum at elevation of bottom of cutoff.

D. Coefficient of friction of concrete base on foundation assumed to vary between the limits of 0.33 to 0.60 for various types of soil. 0.33 used with Case I and 0.60 with Case II in order to produce most severe conditions.

E. Maximum wind pressure not to exceed 30 #/sq ft of stem.

III. Design conditions

A. Case I - Governs design at points 3, 4 & 5

1. Water to top of wall on riverside.
2. Riverside earth scoured to elevation of top of base.
3. Landside earth saturated to ground level.
4. Coefficient of friction of base on foundation = 0.33

B. Case II - Governs design at points 1 & 6

1. Water to top of wall on riverside
2. No scour
3. Landside and riverside earth saturated to ground level.
4. Coefficient of friction of base on foundation = 0.60

C. Case III - (Not shown). Governs design at point 2.

1. Normal river stage. No water against wall.
2. Maximum wind pressure acting on stem from landside.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA

18 FT. "T" WALL

SHEET OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1946

SUBMITTED: [illegible] Chief, Div. of Design

APPROVAL RECOMMENDED: [illegible] Chief, Flood Control Section

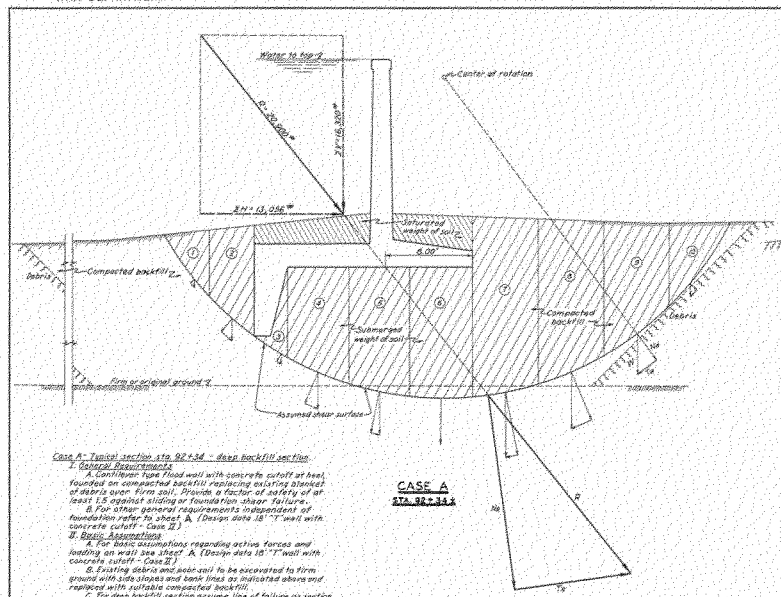
APPROVED: [illegible] Chief, Engineering Division

DR. BY R.H.S. TR. BY C.J.W. CK. BY H.W.

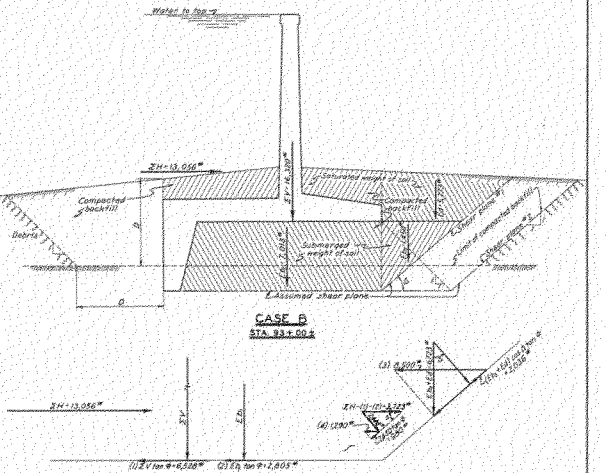
935-12.2/A

"BELIEVED AS BUILT"

1297



CASE A
STA. 92+34 ±



CASE B
STA. 93+00 ±

FORCE DIAGRAM

Case A - Typical section sta. 92+34 - deep backfill section.

I. General Requirements

A. Cantilever type flood wall with concrete cutoff at heel, founded on compacted backfill replacing existing stockpile of debris over firm soil. Provide a factor of safety of at least 1.5 against sliding or foundation shear failure.

B. For other general requirements independent of foundation refer to sheet A. (Design data 18' "T" wall with concrete cutoff - Case II.)

II. Basic Assumptions

A. For basic assumptions regarding active forces and loading on wall see sheet A. (Design data 18' "T" wall with concrete cutoff - Case II.)

B. Existing debris and sub-soil to be excavated to firm ground with side slopes and bank lines as indicated above and replaced with suitable compacted backfill.

C. For deep backfill section assume line of failure as section of circular arc with wall and section of foundation rotating about center of arc. Resultants of active forces on wall and foundation segments are resolved into normal and tangential forces at intersection with shear arc.

D. Factor of safety against sliding = $\frac{\Sigma V \tan \phi + c \cdot L}{\Sigma H}$. For analysis use minimum tan φ = 0.4 and c = 0 (debris and backfill).

Case B - Typical section sta. 93+00 - shallow backfill section.

I. General Requirements - Same as Case A.

II. Basic Assumptions

A. Same as Case A.

B. Same as Case A.

C. For shallow backfill section assume line of failure as shown.

D. Factor of safety against shear failure = $\frac{(\text{Horizontal})}{\Sigma H}$. For analysis use minimum tan φ = 0.4 and c = 0.

SEGMENT	W	H	i*	N	T
1	4.3	3.8	740	500	600
2	4.0	8.1	2075	1,600	1,150
3	1.8	8.3	932	800	500
4	5.5	9.6	3,960	3,100	1,300
5	5.6	11.4	3,990	3,900	800
6	5.7	12.0	4,175	4,270	100
7	6.0	16.0	6,000	5,850	-1100
8	6.0	13.9	5,210	4,800	-2000
9	6.0	10.15	3,805	3,650	-2300
10	5.6	3.75	1,315	800	-900
			Σ = 20,500#	18,000	10,600
			Σ =	46,620	9,150

$\left[\begin{array}{l}\text{Factor of safety}\\ \text{against sliding}\\ \text{(for } \tan\phi = 0.4;\ c = 0)\end{array}\right] = \frac{46,620 \cdot 0.4 + 0}{9150} = 2.04$

Nomenclature

Q = Resultant of all active forces acting on wall.
ΣH = Summation of all active horizontal forces acting on wall.
ΣV = Summation of all active vertical forces acting on wall.
T_Q = Tangential component of Q at failure surface.
N_Q = Normal component of Q at failure surface.
W = Weight of earth segment.
T_W = Tangential component of W at failure surface.
N_W = Normal component of W at failure surface.
ΣD, E_D and E_d = Weight of earth segment.
(1), (2), (3) and (4) = Horizontal forces shown in Force Diagram.
c = Total cohesion along failure surface.
φ = Angle of internal friction for both soil and debris.

Allowable Working Stresses and Weights and Pressures

See sheet (Design data 18' "T" wall with concrete cutoff Case II).

SCALES: DIMENSIONS $\frac{1}{8}$" = 1'-0"
FORCES 1" = 4000#.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
DESIGN DATA
19' "T" WALL ON COMPACTED BACKFILL
SHEET OF SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941
SUBMITTED: [illegible] District Engineer
APPROVAL RECOMMENDED: [illegible] Chief, Flood Control Section
APPROVED: [illegible] District Engineer
DR. BY W. A. H. TR. BY P. B. CK. BY H. M.

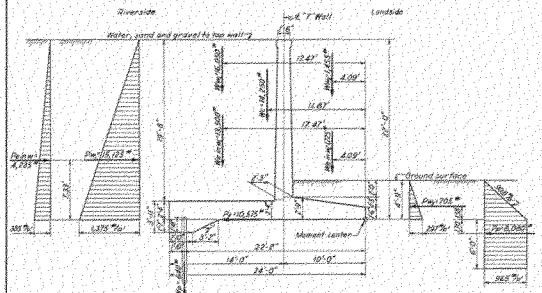
935-12.2/B

1298

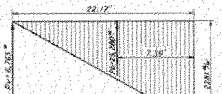
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

CASE III



UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

SCALES: DIMENSIONS 1/8" = 1'-0"
FORCES 1" = 1000#

Nomenclature

$W_w, W_{w'}$ = Total weight of water acting on base
W_c = Total weight of concrete
W_s = Total weight of steel sheet piling
W_s in $W_{s'}$, W_s in $W_{s'}$ = Total weight of sand & gravel in water
$W_s, W_{s'}$ = Total weight of dry sand & gravel
U = Total hydrostatic uplift
$P_w, P_{w'}$ = Total horizontal pressure of water
P_s in $P_{s'}$ = Total horizontal pressure of sand & gravel in water
$P_s, P_{s'}$ = Total horizontal pressure of dry sand & gravel
P_b = Total soil reaction on base
P_p = Total passive resistance developed by soil
P_f = Total resistance developed by friction on base
P_t = Tension or bearing developed by steel sheet piling

Allowable Working Stresses

A. Steel sheet piling	20 000 # per sq. in.
B. Steel reinforcing	18 000 " " " "
C. Concrete	
1. Ultimate compressive strength at 28 days	3 000 " " " "
2. Compression - extreme fibre stress	1 200 " " " "
3. Shear	60 " " " "
4. Bond	150 " " " "

Weights and Pressures

A. Weights	
1. Concrete	150# per cu. ft.
2. Water	62.5# " " "
3. Dry sand & gravel	100# " " "
4. Sand & gravel in water (est)	52.5# " " "
5. Sand & gravel and water	115# " " "
B. Active pressures $W_s \tan^2(45° + \phi/2)$	
1. Water	62.5# per sq. ft.
2. Dry sand & gravel - angle of repose 30°-00'	33# " " "
3. Sand & gravel in water - angle of repose 30°00'	50# " " "
4. Sand & gravel in water (est)	17.5# " " "

Design Conditions

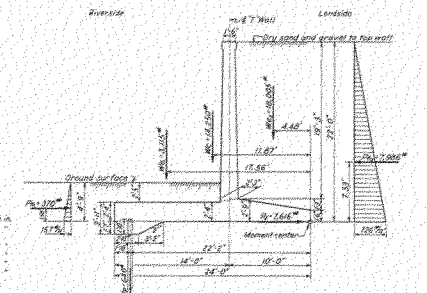
Case I Water to top of wall on riverside. Soil scoured off top of base on riverside. Landside earth assumed to be saturated. Uplift on base.

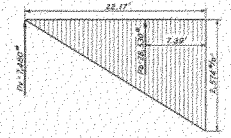
Case II Water to top of wall on riverside. Both riverside and landside earth assumed to be saturated. No scour on riverside. Uplift on base.

Case III Water and sand and gravel to top of wall on riverside and to ground line on landside. Uplift on base.

Case IV Dry sand and gravel to top of wall on landside and to ground line on riverside. No uplift on base.

CASE IV





SOIL PRESSURE DIAGRAM

SCALES: DIMENSIONS 1/8" = 1'-0"
FORCES 1" = 1000#

NO UPLIFT - CASE IV

CASES III & IV

General Requirements

A. Cantilever type flood wall with steel sheet piling cutoff at heel, founded on pervious soil or compacted backfill over pervious soil, and designed to resist flood water to top of wall. In addition the wall must be able to restrain sand & gravel stock piled against wall to top of stem on landside, riverside, or both, either alone or in combination with maximum flood water.

B. Protection - 3 ft. above 1937 high Water.

C. Bottom of concrete base shall be at a minimum of three feet below the ground surface for protection against frost action.

Basic Assumptions

A. Active forces on structure to consist of hydrostatic pressure and the equivalent fluid pressure of sand and gravel, for the given cases.

B. Uplift derived from seepage pressure gradient (haunch neglected).

C. Coefficient of friction = 0.33

D. The passive resistance of the soil is assumed to increase uniformly from zero at the ground line to a maximum at the bottom of concrete and then to act uniformly on haunch and piling to a depth of one-fourth the base width. No passive resistance developed in Case III.

E. Steel sheet piling develops sufficient tension or bearing to make the soil pressure very from zero at piling to maximum at toe.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA-22' "T" WALL
STA. 129+41.25 TO STA. 131+70.33

SHEET OF SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [illegible] DESIGN, CHIEF OF SECTION

APPROVAL RECOMMENDED: [illegible] CHIEF, DESIGN BRANCH

APPROVED: [illegible] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

CH. BY M.H.S. TR. BY M.J.M. CK. BY H.W.

BY	DATE	CHARACTER OF REVISIONS

935-12.2/C

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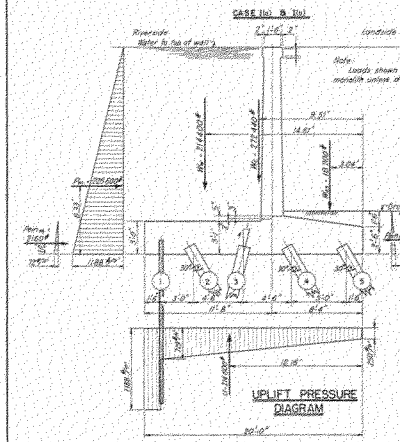
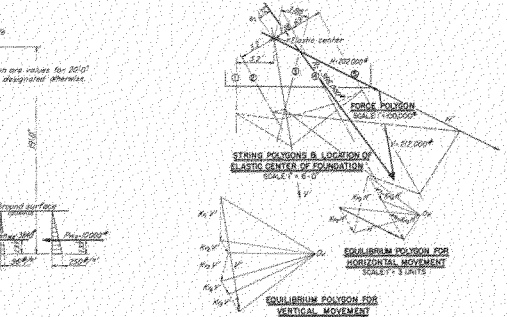




DETERMINATION OF PILE LOADS CASE I(a) FOR 20'-0" MONOLITH

Line	$K_v n$	r	r^2	nr^2	K_v	K_H	$\frac{Mr}{\Sigma nr^2}$	$n \cdot \bar{z}$	$K_v \cdot V$	$K_H \cdot H$	P	p
1	6	3.2	27.0	162.0	.171	.00	-.1168	-15660#	79100#	—	33440#	1672#/ft
2	3	5.2	27.0	54.0	.114	.40	-.1618	-15200#	58300#	80800#	91900#	15940#
3	4	3.861	14.9	59.6	.148	.30	.3541	22960#	57600#	60600#	86440#	21610#
4	3	2.58	6.64	19.9	.114	.42	.3770	15400#	28300#	80800#	114400#	37300#
5	3	6.9	47.6	142.8	.168	.30	0.1106	30300#	39450#	121200#	190750#	31580#

$\Sigma nr^2 = 437.7$ (+) compression (-) tension

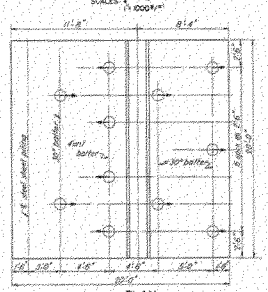
Nomenclature:
- K = Relative stiffness of each line of piles.
- n = Number of piles in each line.
- r = Perpendicular distance from elastic center to line of piles.
- K_v = Proportion of total load (V) induced in each line of piles due to a unit vertical movement.
- K_H = Proportion of total load (H) induced in each line due to a unit horizontal movement.
- $\bar{z}$ = Perpendicular distance of reaction from elastic center.
- M = Moment due to rotation of reaction about elastic center.
- P = Load per line of piles.
- p = Load per pile.

PILE LOADS PER PILE

CASE	LINE 1	2	3	4	5
I(a)	1672#/ft	6594#/ft	21610#	37300#	63580#
I(b)	—	37800#	19900#	37600#	37500#

(+) compression (-) tension

Note: Case I(b)
The elastic center is determined by point of intersection of resultant for steel loads only and resultant for live load condition. Piles battered at 30° to vertical are located so that the center of gravity of these piles passes thru the elastic center. Therefore there is zero eccentricity and pile loads are equal.



Nomenclature:
- W_w = Total weight of water acting on base
- W_c = Total weight of concrete
- W_{es} = Total weight of saturated earth acting on base
- U = Total hydrostatic uplift acting on base
- P_H, P_{HW} = Total horizontal pressure of water acting on structure
- P_{EHW}, P_{EHW} = Total horizontal pressure of earth in water acting on structure

Allowable Working Stresses:
- A. Steel sheet piling 20,000 lbs per sq in.
- B. Steel reinforcing 18,000 " " "
- C. Concrete
  - 1. Ultimate compressive strength at 28 days 3000 " " "
  - 2. Compression - extreme fibre stress 1200 " " "
  - 3. Shear 60 " " "
  - 4. Bond 150 " " "

Weights and Pressures
- A. Weight:
  - 1. Concrete 150 lbs per cu ft
  - 2. Water 62.5 " " "
  - 3. Dry sand & gravel 100 " " "
  - 4. Sand & gravel in water (net) 37.5 " " "
  - 5. Sand, gravel & water 135 " " "
  - 6. Dry earth 100 " " "
  - 7. Saturated earth 125 " " "
  - 8. Earth in water (net) 62.5 " " "

Design Conditions:
- Case I(a) & I(b). Water to top of wall on riverside. Soil scoured off top of base on riverside. Landside earth assumed to be saturated. Uplift on base.
- Case II(a) & II(b) Water to top of wall on riverside. Both riverside and landside earth assumed to be saturated. No pour on riverside. Uplift on base.
- Case III(a) & III(b). Water, sand and gravel to top of wall on riverside and to ground line on landside. Uplift on base.
- Case IV(a) & IV(b). Dry sand and gravel to top of wall on landside and to ground line on riverside. No uplift on base.
- Case V(a) & V(b). Dry sand to top of wall both riverside and landside. No uplift on base.
- Case VI(a) & VI(b). Dead load of structure with a minimum of 4'-0" dry earth both landside and riverside over bottom of base. No uplift.

Basic Assumptions:
- A. Active forces on structure to consist of hydrostatic pressure and the equivalent fluid pressure of sand and gravel, for the given cases.
- B. Uplift derived from seepage pressure gradient.
- C. Base of "T" wall considered rigid.
- D. For all design cases marked (a) steel sheet piling considered to take a proportionate amount of load depending on its relative stiffness to that of the concrete pile.
- E. For all design conditions marked (b), sheet piling ignored as a load bearing member.
- F. Bearing piles considered pinned at base and at some point below the base which has the same vertical distance below the base for all piles.

Weights and Pressures (cont)
- B. Equivalent Fluid Pressures
  - Active Pressure = Ma γ=f (45° - φ/2)
  - 1. Water 62.5 lbs per sq ft
  - 2. Dry sand & gravel - angle of repose 30°00' 33 " " "
  - 3. Sand & gravel in water - angle of repose 30°00' 80 " " "
  - 4. Sand & gravel in water (net) 17.5 " " "
  - 5. Dry earth 33 " " "
  - 6. Saturated earth - angle of repose 26° 34' 86 " " "
  - 7. Earth in water (net) 24 " " "

Note:
Design cases III(a), III(b), IV(a), IV(b), V(a) & V(b) used for 22'-0" special "T" wall on bearing piles only.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
DESIGN DATA
19' "T" WALL ON BEARING PILES

SHEET OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PROJECT ENGINEER, CHIEF OF PUBLIC WORKS DIVISION. DR. BY: A.M.J. TR. BY: G.R.M.

APPROVED: [signature] DISTRICT ENGINEER. CK. BY: H.W.

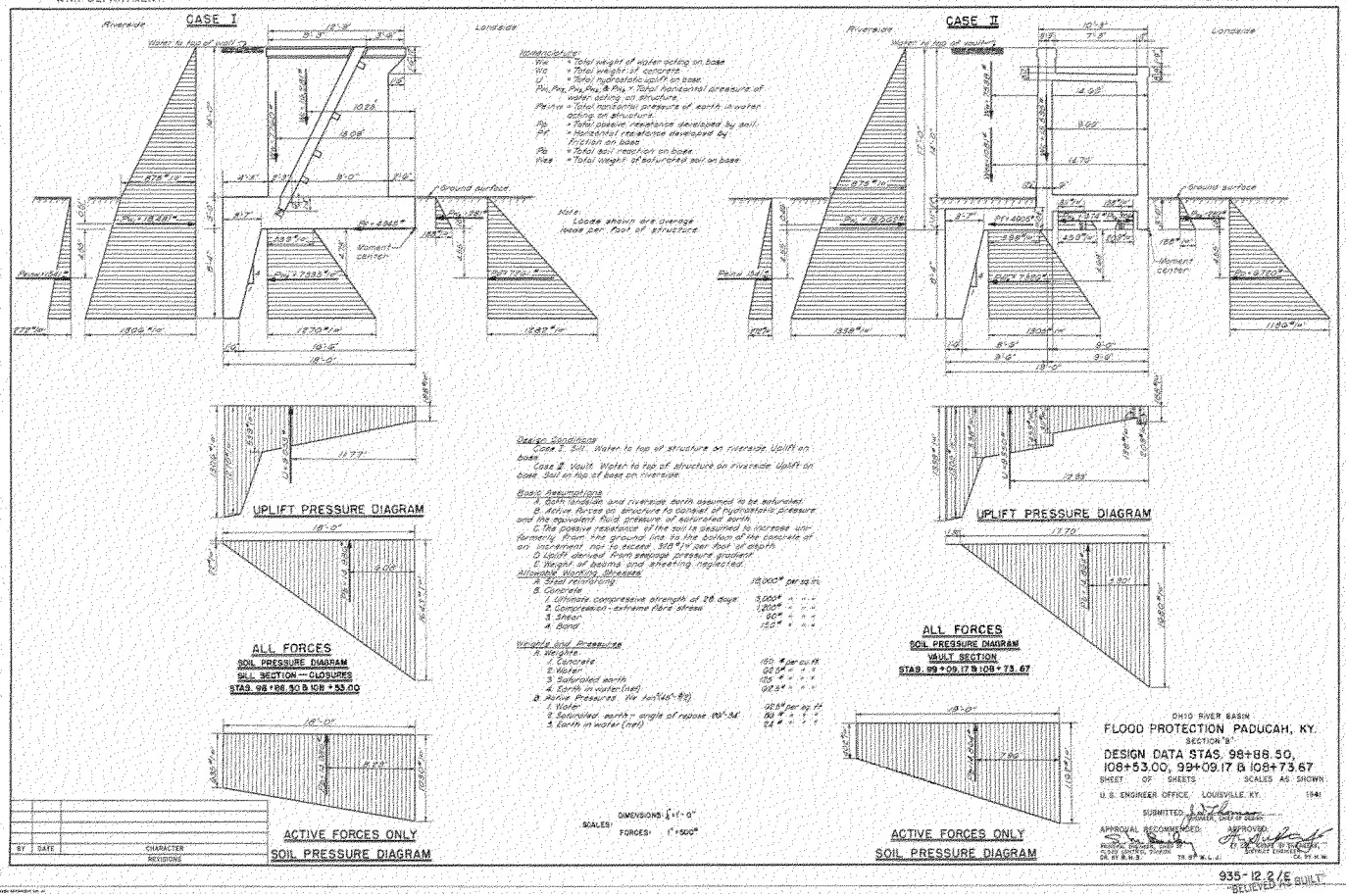
BY	DATE	CHARACTER
		REVISIONS

935-12.2/D
"RETRIEVED AS BUILT"

1300

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

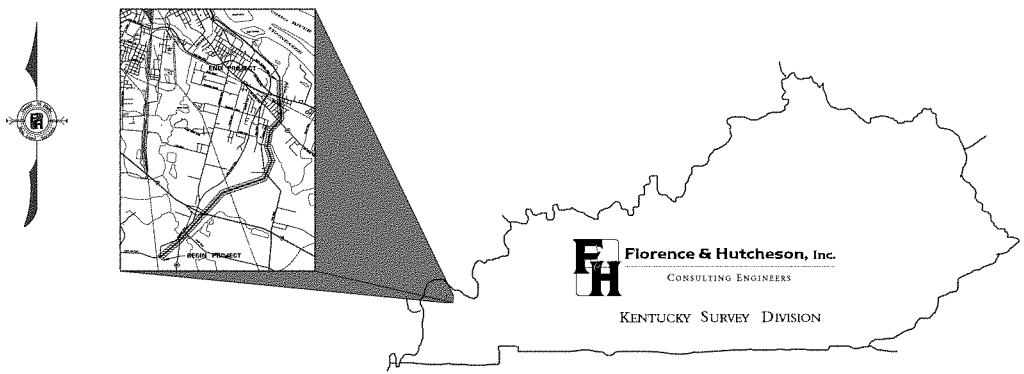


OHIO RIVER SHORELINE, PADUCAH, KENTUCKY LFPP RECONSTRUCTION FEASIBILITY REPORT VOLUME 4 APPENDIX C

SECTION 5
SECTION A AND C RIGHT-OF-WAY DRAWINGS

April 2011
Final Submittal

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C" FROM CLARKLINE ROAD TO WEST OF TULLY STREET PADUCAH, McCRACKEN COUNTY, KENTUCKY



Project 07074
REVISED ISSUE
WITH COMPLETE ALIGNMENT
MAY 29, 2009

REPLACES SIGNED ISSUE OF APRIL 14, 2009

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE KGS GPSQ SOLUTION METHODS. THE COORDINATES SHOWN ARE NORTHCOAST STATE PLANE 3601H ZONE NAD83(2011). THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 5, 2007 ON THE MONUMENTS SHOWN AS TW1 THROUGH TW4.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THIS TRAVERSE WAS ONE FOOT IN MORE THE BEARINGS AND DISTANCES SHOWN HEREON WERE ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SEAMAN ALBERT).

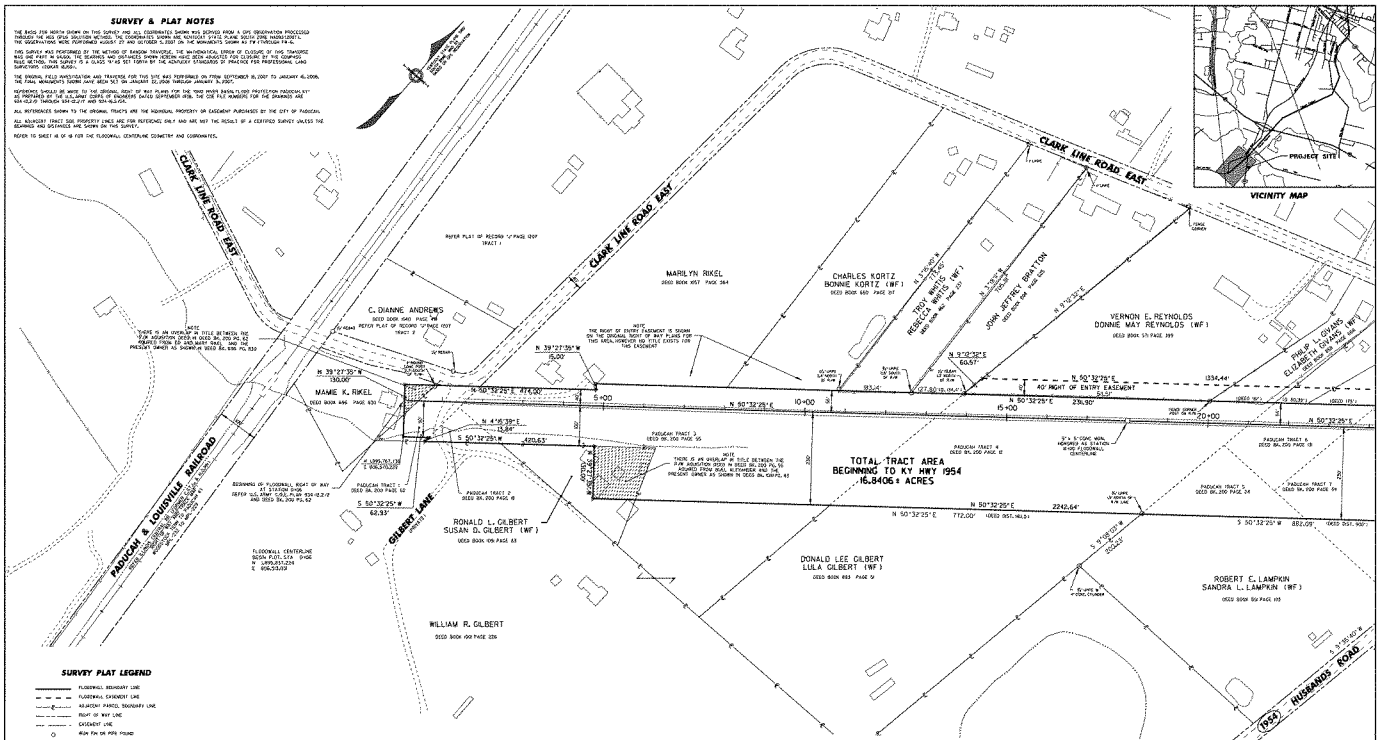
THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY SEPTEMBER 16, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 15, 2008 THROUGH JANUARY 16, 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAT OF WAY PLANS FOR THE "ROAD MAPS BASIN/FLOOD PROTECTION PADUCAH KY" DATED 1/1/1960 AND THE "PADUCAH FLOODWALL" DATED SEPTEMBER 1978. THE CDE FILE NUMBERS FOR THE DRAWINGS ARE 5-24-02.07 THROUGH 5-24-02.17 AND 5-24-02.20.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SOR PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 14 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.



SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR IRON FOUND
- IRON PIN WITH/ALUMINUM CAP SET STAMPED FBK LS 2547
- 30" IRON PIN WITH 30/ ALUM.CAP SET STAMPED FBK LS 2547
- 30" IRON PIN IN CONC.W/REV ALUM CAP GPS CONTROL PTS.
- STREAM OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET

SURVEYORS CERTIFICATE

I, GERALD W. BRIGHT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY DIRECTION AND THAT THE SURVEY WAS MADE AND SURVEY A PLAT COMPLIED TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. BRIGHT
KY REG. LAND SURVEYOR 2547
2550 PARK CLUB DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF
COUNTY OF

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____

MY COMMISSION EXPIRES — NOTARY

RECOMMENDATION FOR FINAL APPROVAL

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HELD _____, 20____

CHAIRMAN, MCCRACKEN COUNTY
PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

JUDGE MCCRACKEN CO. PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN

I, _____, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE ____ DAY OF _____, 20____

BY _____, D.C.
CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5-29-09	CHANGED TOTAL SHEETS FROM 18 TO 20	DMK

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
3500 PARK CLUB DRIVE PADUCAH, KY. 42001
TELEPHONE 270-898-7506

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

DESIGN STATION 0+00 AT CLARK LINE ROAD TO DESIGN STATION 22+00 SOUTH OF HUSBANDS ROAD
MCCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Checked:	Mechanical:	Electrical:	Project No.: 07074	1 of 20
Check: G.M.K.	Project Engr.: G.M.K.	Approved:	Date: 2/08/2008	Scale: 1" = 100'	

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS PRESERVATION PROCESSED BY THE KENTUCKY TRANSPORTATION CABINET (KYTC) USING THE KYTC VRS NETWORK. THE PRESERVATION WAS PERFORMED AUGUST 27 AND OCTOBER 9, 2008 ON THE NAD83(2011) DATUM, EPOCH 2010.00 FOR STANDARD ERROR.

THE SURVEY WAS PERFORMED BY THE METHOD OF AZIMUTH TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THE TRAVERSE WAS ONE PART IN 86,600. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (201KAR 18.001).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 13, 2007 TO JANUARY 16, 2008. THE TWAS MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 30, 2008 THROUGH JANUARY 31, 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE 1949 PADUCAH FLOOD PROTECTION PADUCAH,KY AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1939. THE CORE PLAT NUMBERS FOR THE DRAWINGS ARE 934-G2-D THROUGH 934-G2-F7 AND 934-H2-F2-6.

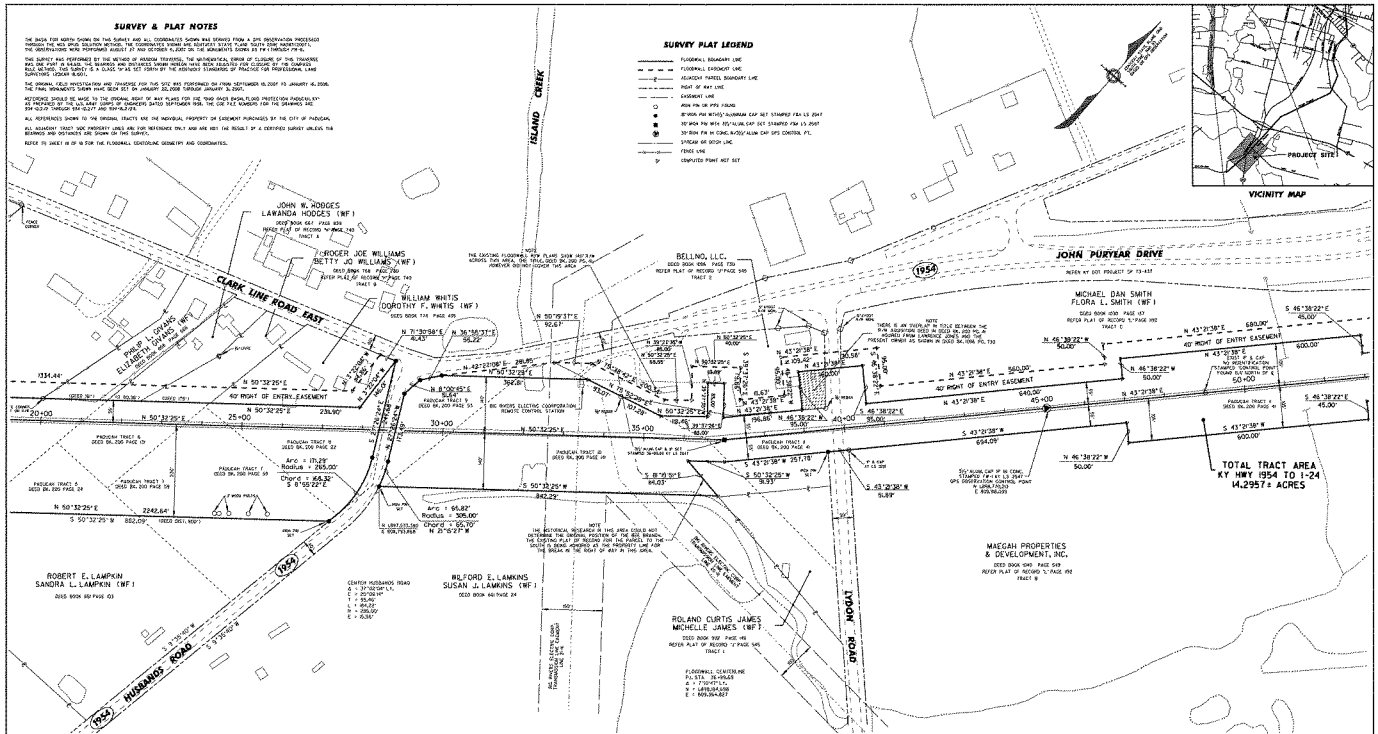
ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT NOT PROPERLY LABELED ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 19 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 1/2"IRON PIN WITH 1"ALUMINUM CAP SET STAMPED FEA LS 2547
- 1/2"IRON PIN WITH 1"ALUMINUM CAP SET STAMPED FEA LS 2547
- 1/2"IRON PIN IN CONC.W/1"ALUM CAP SPC CONTROL PT.
- SPIGOT OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET


ISLAND CREEK
JOHN W. HODGES
LAWANDA HODGES (WF)
DEED BOOK 664 PAGE 606
REFER PLAT OF RECORD "C" PAGE 240
TRACT A
ROGER JOE WILLIAMS
BETTY JO WILLIAMS (WF)
DEED BOOK 798 PAGE 280
REFER PLAT OF RECORD "C" PAGE 240
TRACT B
WILLIAM WHITIS
DOROTHY F. WHITIS (WF)
DEED BOOK 734 PAGE 426
CLARK LINE ROAD EAST
PHILIP L. EVANS
ELIZABETH J. EVANS (WF)
DEED BOOK 684 PAGE 346
BELLNO, LLC.
DEED BOOK 1084 PAGE 730
REFER PLAT OF RECORD "D" PAGE 340
TRACT D
JOHN PURYEAR DRIVE
(1954)
MICHAEL DAN SMITH
FLORA L. SMITH (WF)
DEED BOOK 1030 PAGE 127
REFER PLAT OF RECORD "E" PAGE 192
TRACT E
40' RIGHT OF ENTRY EASEMENT
TOTAL TRACT AREA
KY HWY 1954 TO I-24
14.2957± ACRES
PROJECT SITE
VICINITY MAP
ROBERT E. LAMPKIN
SANDRA L. LAMPKIN (WF)
DEED BOOK 80 PAGE 03
HUSBANDS ROAD
(1954)
WILFORD E. LAMKINS
SUSAN J. LAMKINS (WF)
DEED BOOK 46 PAGE 24
ROLAND CURTIS JAMES
MICHELLE JAMES (WF)
DEED BOOK 932 PAGE 16
REFER PLAT OF RECORD "J" PAGE 549
TRACT I
LINDON ROAD
MAEGAH PROPERTIES
& DEVELOPMENT, INC.
DEED BOOK 1040 PAGE 049
REFER PLAT OF RECORD "L" PAGE 192
TRACT B
BIG RIVERS ELECTRIC CORPORATION
REMOTE CONTROL STATION
PADUCAH TRACT A
DEED BK. 205 PAGE 29
PADUCAH TRACT B
DEED BK. 205 PAGE 59
PADUCAH TRACT C
DEED BK. 206 PAGE 22
PADUCAH TRACT D
DEED BK. 206 PAGE 10
PADUCAH TRACT E
DEED BK. 206 PAGE 13
PADUCAH TRACT F
DEED BK. 290 PAGE 59
PADUCAH TRACT G
DEED BK. 300 PAGE 6
PADUCAH TRACT H
DEED BK. 300 PAGE 8
PADUCAH TRACT I
DEED BK. 300 PAGE 6
N 50°32'25" E
S 50°32'25" W
N 43°23'38" E
S 43°23'38" W
N 46°38'22" W
S 46°38'22" E
N 50°59'37" E
N 50°32'25" E
N 43°23'38" E
S 43°23'38" W
N 46°38'22" W
S 46°38'22" E
N 43°23'38" E
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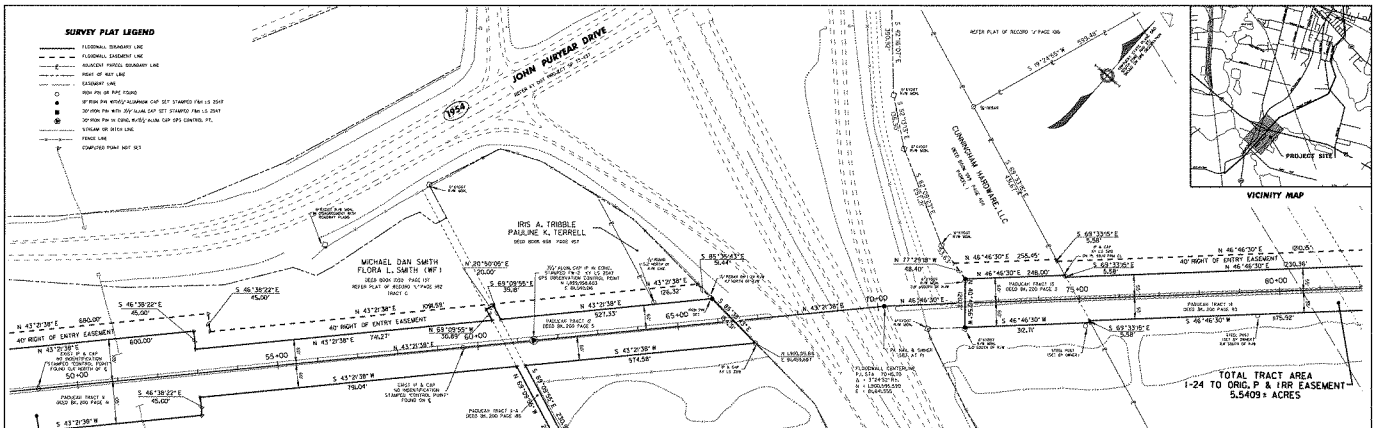
S 50°32'25" W
N 50°32'25" E
S 50°32'25" W

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 18" IRON PIN W/CAP/ALUMINUM CAP SET STAMPED FBH LS 2547
- 30" IRON PIN WITH 3½" ALUM. CAP SET STAMPED FBH LS 2547
- 30" IRON PIN W/ CONC. W/3½" ALUM. CAP GPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS SPCS SOLUTION METHOD, THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001). THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 5, 2007 ON THE MONUMENTS SHOWN AS PR-1 THROUGH PR-5.

THIS SURVEY WAS PERFORMED BY THE USE OF RANDOM TRAVERSE, THE MATHEMATICAL ERROR OR CLOSURE OF THE TRAVERSE WAS ONE PART IN 21,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD TO ACHIEVE A CLASS "A" (U) SURVEY BY THE NORTHERN STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SURVEY BLOCK).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 8, 2007 TO JANUARY 8, 2008 THE FINAL MONUMENTS SHOWN HERE WERE SET ON JANUARY 29, 2008 THROUGH JANUARY 31, 2008.

REFERENCE SHALL BE MADE TO THE ORIGINAL PLAT OF WAY PLANS FOR THE TOMS RIVER REGIONAL FLOOD PROTECTION PADUCAH, KY AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1978. THE CORE FILE NUMBERS FOR THE DRAWINGS ARE: 554-02-02 THROUGH 554-02-27 AND 554-42-29A.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT DEED PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 19 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

_____ _____
MAYOR OF THE CITY OF PADUCAH DATE

SURVEYORS CERTIFICATE

I, GERALD W. WRIGHT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE LINE DIMENSIONS, BEARINGS, AREAS AND MONUMENTS SHOWN HEREON ARE CORRECT PER THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

_____ _____
DATE GERALD W. WRIGHT
KY REG. NO. 2547 LAND SURVEYOR 2547
2500 IRON CLAD DRIVE
PADUCAH, KY 42003

NOTE: THE DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL OF AUTHORITY HAS BEEN APPLIED TO THE DOCUMENT. ANY ALTERATIONS TO ELECTRONIC MEDIA IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

RECOMMENDATION FOR FINAL APPROVAL

HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF MODIFICATIONS, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION VOTE _____ 20 _____

_____
CHAIRMAN MCCRACKEN COUNTY
PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF MODIFICATIONS, IF ANY, AS NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

_____
JUDGE MCCRACKEN CO. PLANNING COMMISSION

CERTIFICATE OF NOTARY

STATE OF _____
COUNTY OF _____
SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ___ DAY OF _____, 20 _____

_____ _____
MY COMMISSION EXPIRES NOTARY

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN
I, JEFF ARNOLD, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE WITHIN PLAT WAS LODGED FOR RECORD ON THE ____ DAY OF _____ AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE ____ DAY OF _____, ____

BY _____ D.C.
CLERK

RECORDED IN PLAT SET: _____ PAGE _____

GRAPHIC SCALE
1" = 100'

DATE	REVISION	BY
DATE	REVISION	BY
5/29/08	CHANGED TOTAL SHEETS FROM 18 TO 20	GWW

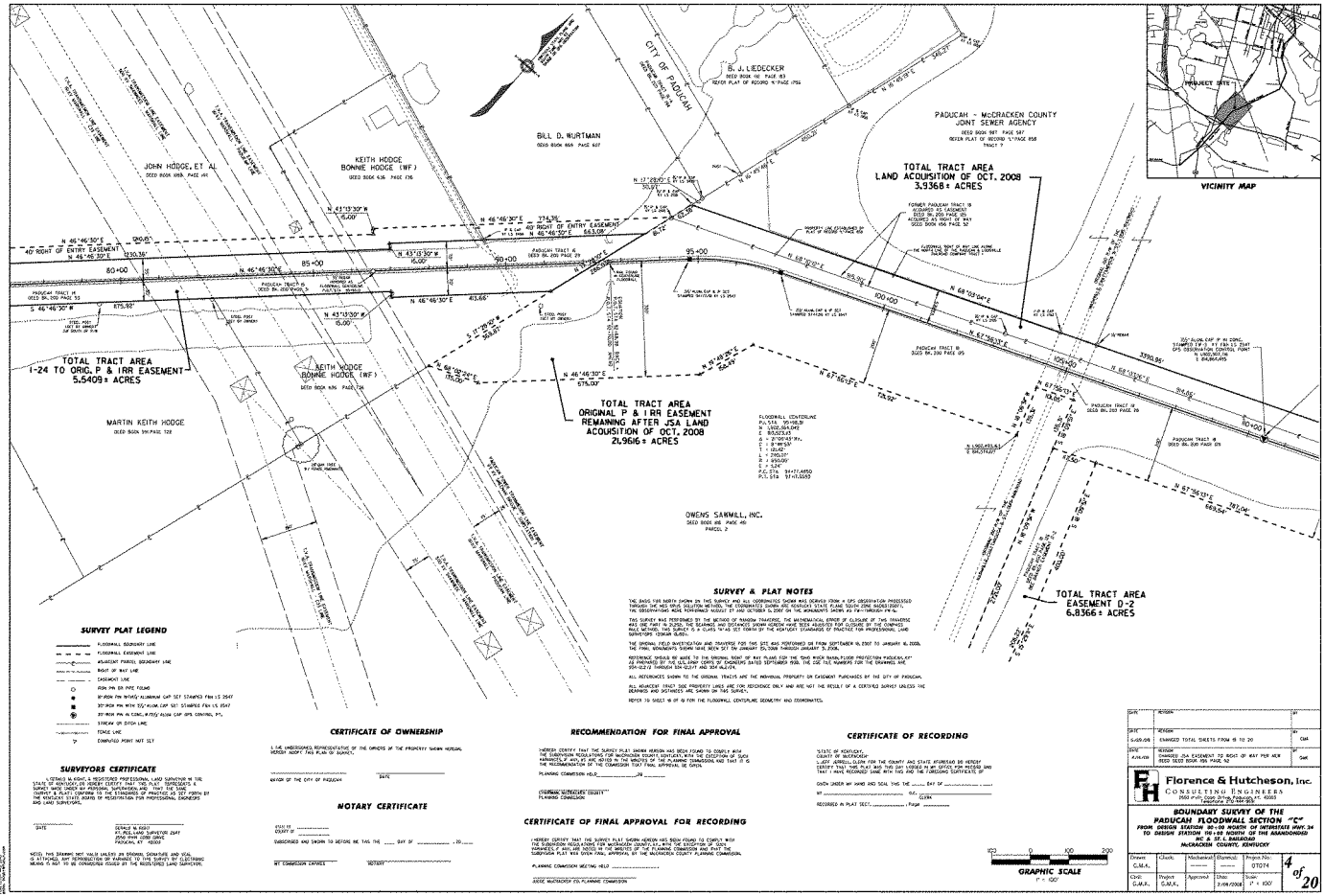
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2500 Iron Clad Drive, Paducah, KY 42003
Telephone 270-443-0506

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

FROM DESIGN STATION 50+00 NORTH OF LYDON ROAD TO DESIGN STATION 80+00 NORTH OF INTERSTATE HWY. 24

McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.S.	Check:	Mechanical: ———	Electrical: ———	Project No: 07074	3 of 20
Date: G.M.S.	Project: G.M.S.	Approved:	Date: 5-29-2008	Scale: 1" = 100'	



SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 30"IRON PIN W/1"ALUMINUM CAP SET STAMPED FBH LS 2047
- 30"IRON PIN WITH 3½"ALUM.CAP SET STAMPED FBH LS 2047
- 30"IRON PIN IN CONC.W/3½"ALUM CAP DPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET

SURVEYORS CERTIFICATE

I CERTIFY TO KENT A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE SAME CONFORMS TO THE MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

DONALD W. HUNTER
KY. REGISTERED SURVEYOR 2047
2000 IRON CORE DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR REPRESENTATION OF THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 19____

MY COMMISSION EXPIRES — NOTARY

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED BY THE NATIONAL GEODETIC SURVEY (NGS) OPUS PROGRAM. THE GPS OBSERVATION WAS PERFORMED ON OCTOBER 31, 2008. THE OBSERVATIONS WERE PERFORMED RIGHT IT AND BETWEEN 11:00AM ON THE MONUMENTS SHOWN AS FB-1 THROUGH FB-4.

THIS SURVEY WAS PERFORMED BY THE METHODS OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THE TRAVERSE WAS ONE PART IN 21,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SEE NOTE 1).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 18, 2007 TO JANUARY 18, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 31, 2008 THROUGH JANUARY 5, 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE CITY WHICH DEPARTMENT PROTECTION PADUCAH, KY AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1966. THE CAD FILE NUMBERS FOR THE DRAWINGS ARE 954-02.12 THROUGH 954-02.17 AND 954-06.01A.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT DOG PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 6 OF 6 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

FLOODWALL CENTERLINE
P.I. STA. 90+98.38
N 1,602,584.042
E 882,621.87
Δ = 21°00'49" RT.
D = 0°-30'-00"
T = 20.00'
L = 2160.03'
R = 6900.00'
C = 5.23'
P.C. STA. 94+77.4850
P.C.T. STA. 97+10.5350

RECOMMENDATION FOR FINAL APPROVAL

HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT I AM RECOMMENDING THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HELD _____, 20____

CHAIRMAN, MCCRACKEN COUNTY
PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

JUDGE MCCRACKEN FIS. PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN

I, JEFF APPELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING AND ATTACHED PLAT WAS LODGED FOR RECORDING ON _____ AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, _____

BY _____, D.C. — CLERK

RECORDED IN PLAT SECT. _____, PAGE _____

DATE	REVISION	BY
DATE	REVISION	BY
5-05-09	ENHANCED TOTAL SHEETS FROM 19 TO 20	CMA
DATE	REVISION	BY
4-14-09	CHANGED 3½A EASEMENT TO BEGIN OF WAY PER WEB REED SEED BOOK 986 PAGE 62	GMK

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
1900 Irvin Cobb Drive, Paducah, KY 42003
Telephone 270 444-9511

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STATION 90+98 NORTH OF INTERSTATE HWY. 24
TO DESIGN STATION 110+08 NORTH OF THE ABANDONED
RR & ST.L. RAILROAD
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check:	Mechanical:	Electrical:	Project No.: 070274	4 of 20
Civil: G.M.K.	Project Engr.: G.M.K.	Approved:	Date: 2-09/2008	Scale: 1" = 100'	

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- MEANDERS PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- 4000 PVC OR PIPE FOUND
- 5/8"IRON PIN W/YELLOW ALUMINUM CAP SET STAMPED FWA LS 2547
- 3/4"IRON PIN WITH 2"X2"ALUM.CAP SET STAMPED FWA LS 2547
- 3/4"IRON PIN W CONC.W/2X2 ALUM CAP GPS CONTROL PT.
- STREAM OR DITCH LINE
- TRACT LINE
- COMPUTED POINT NOT SET

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83/2011. THE OBSERVATIONS WERE PERFORMED AUGUST 21 AND OCTOBER 5, 2007 ON THE MONUMENTS SHOWN AS T4-1 THROUGH T4-5.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL CLOSURE OF CLOSURE OF THE TRAVERSE WAS ONE FOOT IN 31,000. THE BEARINGS AND DISTANCES SHOWN HEREON WERE ADJUSTED FOR CLOSURE BY THE COMPASS RULE. THE FIELD WORK MEETS OR EXCEEDS THE 0 CLASS "A" 40 SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (CHAPTER 201 KAR 18A).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 18,2007 TO JANUARY 16,2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 28,2008 THROUGH JANUARY 30,2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAT OF WEST PLANS FOR THE "OHIO RIVER BASIN,FLOOD PROTECTION PADUCAH,KY" AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1966. THE CGS FLY TRAVERSE FOR THE DRAWINGS ARE 934-UL2-01 THROUGH 934-UL2-17 AND 934-UL2-19A.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SIZE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET # OF 8 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEYORS CERTIFICATE

GERALD M.FOXY, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY,DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION, AND THAT THE SAME WAS MADE TO COMPLY WITH THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD M.FOXY
KY. REG. LAND SURVEYOR 2547
2001 JENN CARR DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL APPEARS ON THE SURVEYOR'S CERTIFICATE. ANY COPIES OF THIS DRAWING MEANS IS NOT TO BE CONSIDERED ISSUED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED,REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____

MY COMMISSION EXPIRES _____ NOTARY

RECOMMENDATION FOR FINAL APPROVAL

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION AGE.S _____ DAY _____

CHAIRMAN,MCCRACKEN COUNTY PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY,KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY,AS NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING DE.D _____

JURIS MCCRACKEN CO.PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN

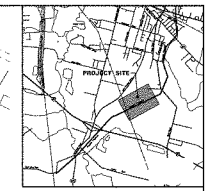
I, _____, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING AND THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE ____ DAY OF _____, ____

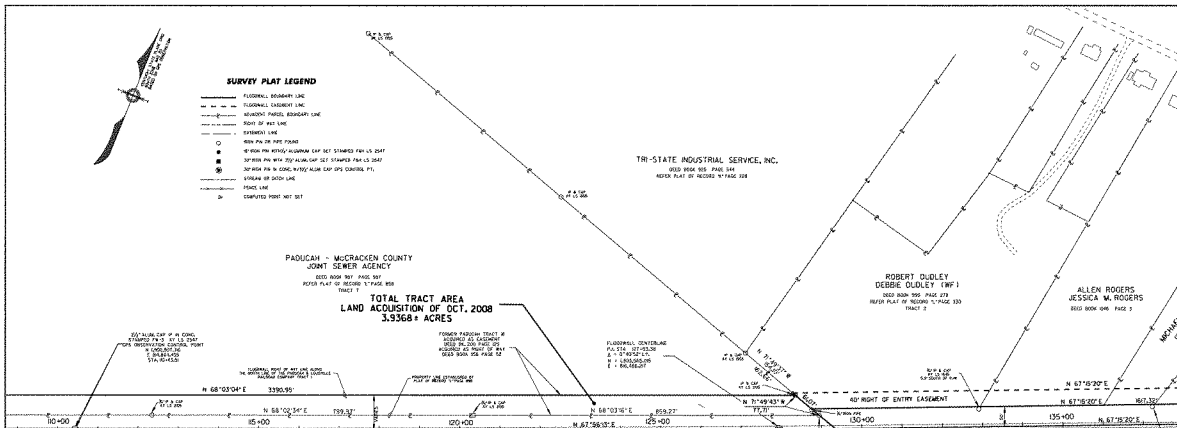
BY _____ D.C. _____ CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

GRAPHIC SCALE
1" = 100'



VICINITY MAP

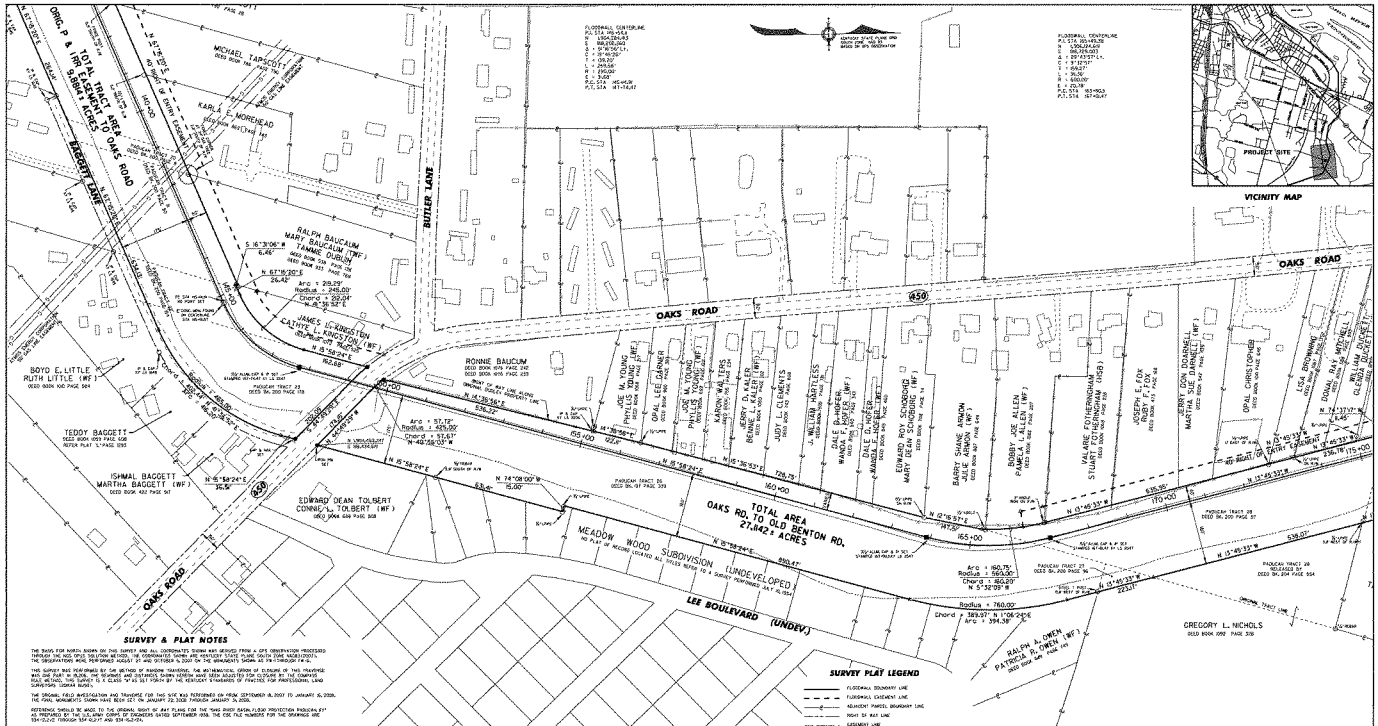


DATE	REVISION	BY
5-23-09	CHANGED TOTAL SHEETS FROM 19 TO 20	DMK
8-24-08	CHANGED JSA EASEMENT TO RIGHT OF WAY PER NEW DEED DEED BOOK 1759 PAGE 52	DMK

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2950 Irvin Cobb Drive,Paducah,KY. 42003
Telephone 270-443-0395

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STATION 134+00 NORTH OF THE ABANDONED NC & ST. L RAILROAD
TO DESIGN STATION 140+00 SOUTH OF OAKS ROAD (KY HWY 450)
McCRACKEN COUNTY, KENTUCKY

Drawn: C.M.K.	Check:	Mechanical:	Electrical:	Project No: 01074	5 of 20
Civil: G.M.K.	Project: S.M.K.	Approved:	Date: 2-08-07/08	Scale: 1" = 100'	



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN ARE DERIVED FROM A GPS OBSERVATION PROCEDURE THROUGH THE NGS OPUS SOLUTION METHODS. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001). THE OBSERVATIONS WERE PERFORMED AUGUST 31 AND OCTOBER 4, 2007 ON THE MONUMENTS SHOWN AS PA-1 THROUGH PA-4.

THE SURVEY WAS PERFORMED BY SAN SOUTHERN OF RANDOM TRAVERSE, THE MATHEMATICAL CLOSURE OF CLOSURE OF THE TRAVERSE WAS ONE PART IN 50,000. THE BEARINGS AND DISTANCES SHOWN HEREIN WERE ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THE SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SEMAR BOOK).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY SEPTEMBER 28, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN WERE SET ON JANUARY 22, 2008 PARADUCAH, LANDMARK IN 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAT OF ALL PLANS FOR THE "OAKS RIDGE" BATON FLOOD PROTECTION PROJECT, PARTS 1 THROUGH 4 (PLANS) DATED SEPTEMBER 1974, THE CDS FILE NUMBERS FOR THE DRAWINGS ARE 10-01-0102 THROUGH 10-01-0117 AND 10-01-0124.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PARCELS OF EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEYORS CERTIFICATE

I, GERALD W. KOCH, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A TRUE AND ACCURATE SURVEY PERFORMED UNDER MY DIRECTION. THE SURVEY & PLAT CONFORM TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. KOCH
101 MILL LAND SURVEYOR 2547
2850 JOHN DEERE DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING DOES NOT VOID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED ISSUED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20__.

MY COMMISSION EXPIRES _____ NOTARY _____

RECOMMENDATION FOR FINAL APPROVAL

HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HELD _____, 20__.

CHAIRMAN, MCCRACKEN COUNTY PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

JUDGE-EXECUTIVE, CO. PLANNING COMMISSION

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- NEAREST PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- IRON PIN WITH/ ALUMINUM CAP SET STAMPED PLS LS 2547
- 30"-IRON PIN WITH 30/ ALUM.CAP SET STAMPED PLS LS 2547
- 30"-IRON PIN W/ CONC. W/ALUM/ ALUM CAP SET STAMPED PLS
- STREAM OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN:

I, JEFF JORDELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, _____.

BY _____ TO WIT: _____ CLERK

RECORDED IN PLAT SECT. _____, PAGE _____

DATE	REVISION		BY		
DATE	REVISION		BY		
DATE	REVISION		BY		
5-29-09	CHANGED TOTAL SHEETS FROM 16 TO 20		GMK		

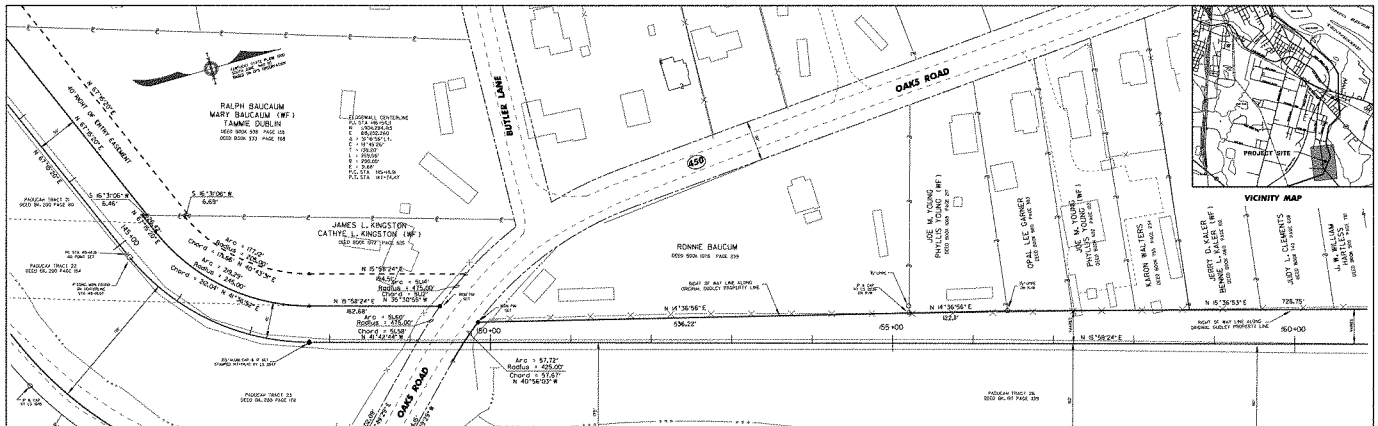
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
3500 FRANKLIN AVENUE 42003
TELEPHONE 270-443-5326

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

FROM: DESIGN STA. 140+50 SOUTH OF OAKS ROAD (KY HWY 450) TO DESIGN STATION 173+00 SOUTH OF HORSE BRANCH
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check: —	Mechanical: —	Electrical: —	Project No.: 07074	6 of 20
Cadd: G.M.K.	Project: G.M.K.	Approved:	Date: 2-08-2008	Scale: 1" = 100'	

1309



SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- MONUMENT PIN METHOD ALUMINUM CAP SET STAMPED PAH LS 2547
- SO-MOON PIN WITH 3/8" ALUM CAP SET STAMPED PAH LS 2547
- SO-MOON PIN IN CONC W/3/8" ALUM CAP GPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET

SURVEYORS CERTIFICATE

I, GERALD W. KOHLY, II REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY DIRECTION AND THAT THE SURVEY MEETS THE STANDARDS OF SURVEY & PLAT CONTAINED IN THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. KOHLY
KY. REG. LAND SURVEYOR 2547
2550 AVON CORE DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR TRANSFER TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE _____ DAY OF _____, 20_____.

MY COMMISSION EXPIRES _____ NOTARY

RECOMMENDATION FOR FINAL APPROVAL

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HELD _____, 20 _____

CHAIRMAN, MCCRACKEN COUNTY PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

_____
JUDGE MCCRACKEN CO. PLANNING COMMISSION

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001). THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 9, 2007 ON THE MONUMENTS SHOWN AS PK-1 THROUGH PK-4.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THIS TRAVERSE WAS 1:30,000. THE BEARINGS AND DISTANCES SHOWN HEREON WERE BOTH ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS. (SOKAP 6.00).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 18, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 22, 2008 THROUGH JANUARY 31, 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE "OAKS ROAD (NORTH BLUFF) PROTECTION PADUCAH, KY" PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT, DATED SEPTEMBER 1974. THE CADD FILE NUMBERS FOR THE DRAWINGS ARE 1314-12-C12 THROUGH 1314-12-C17 AND 1314-12-C21.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE NEWSOUL PROPERTIES OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT DEED PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN

I, JEFF JARNELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS LODGED IN MY OFFICE ON THE _____ DAY OF _____, 20_____ AND THAT I HAVE RECORDED SAME WITH THE AND THE PLANNING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, 20_____.

BY _____, D.C. _____ CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

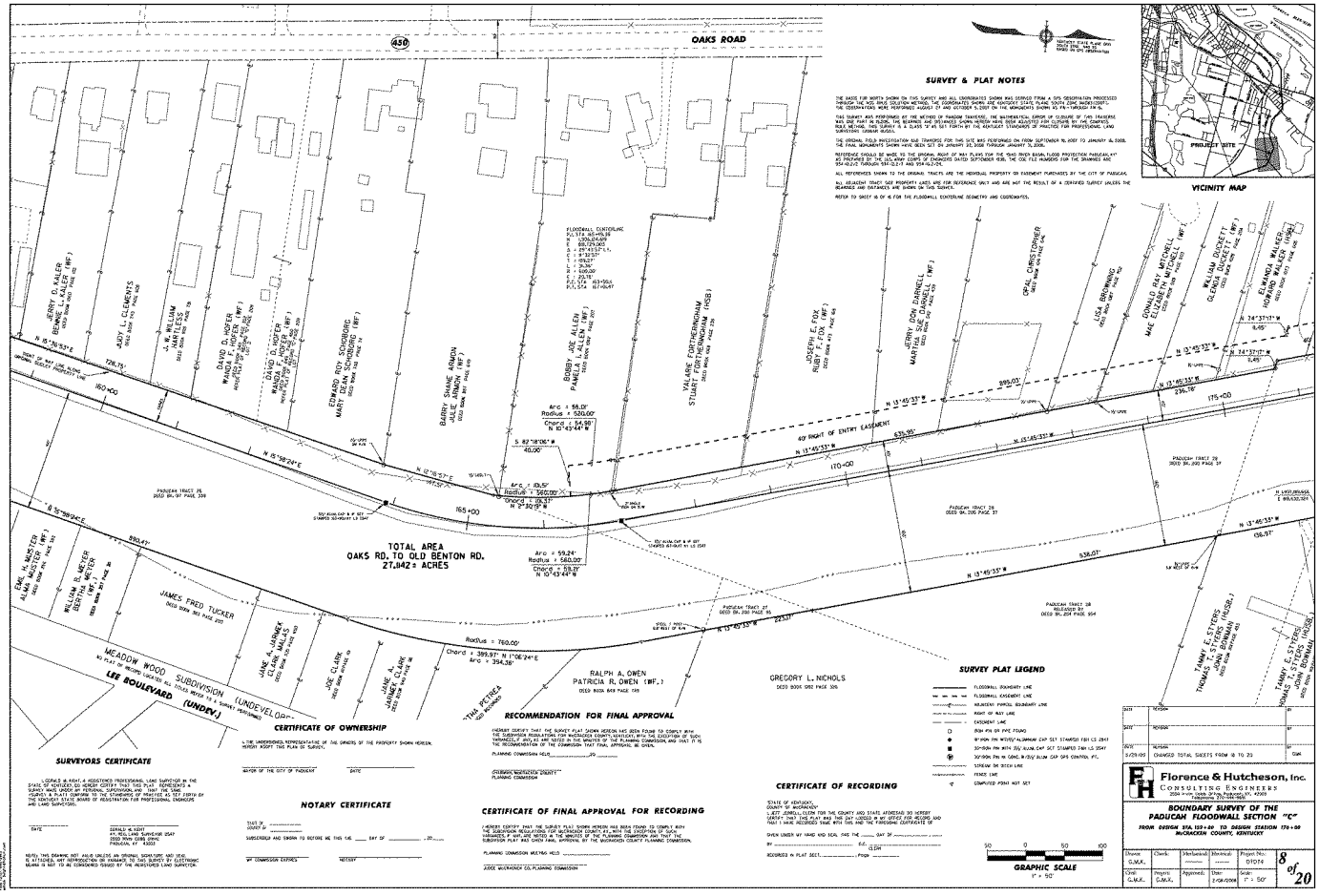
50 0 50 100
GRAPHIC SCALE
(1" = 50')

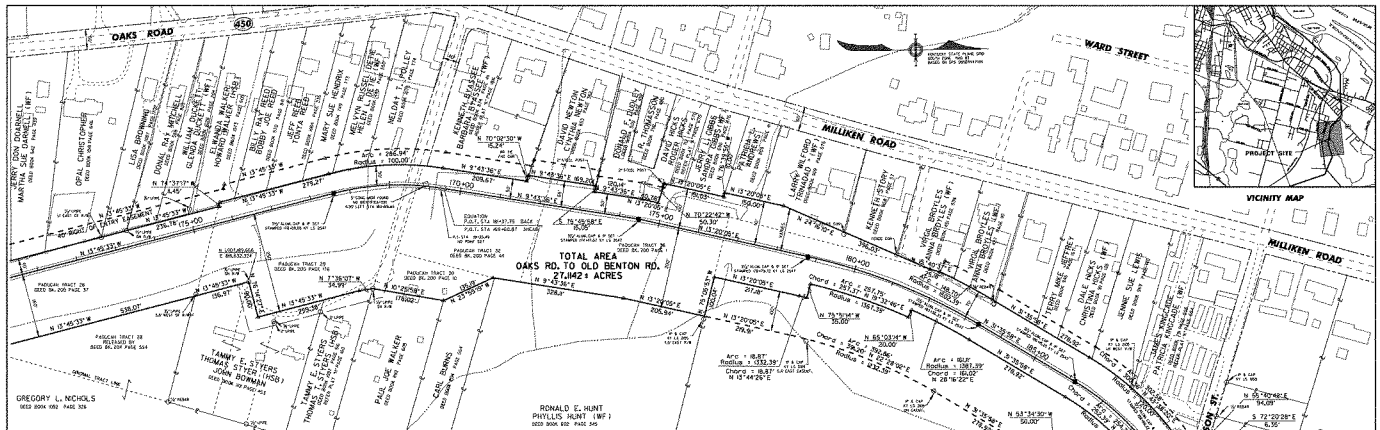
DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5/23/09	ENGINEED TOTAL SHEETS FROM 18 TO 20	GWK

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
3550 AVON CORE DR. PADUCAH, KY. 42003
PHONE: (270) 898-8800

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA. 142+00 TO DESIGN STATION 160+00
MCCRACKEN COUNTY, KENTUCKY

Drawn: G.W.K.	Check:	Mechanical:	Electrical:	Project No: 07074	7 of 20
Chk'd: G.W.K.	Project: G.W.K.	Approved:	Date: 2-08-2008	Scale: 1" = 50'	


OAKS ROAD
450
SURVEY & PLAT NOTES
THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS PAGE SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2011). THE OBSERVATIONS WERE PERFORMED AGAINST ITT AND VICTOR'S DISPLAY ON THE MONUMENTS SHOWN AS PA-1 THROUGH PA-4.
THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL CLOSURE OF CLOSURE OF THE TRAVERSE WAS 1:10,000 AFTER ADJUSTMENT. THE FIELD MEASUREMENTS WERE MADE WITH A TOTAL STATION AND A SOKKIA DIGITAL TAPE. THIS SURVEY IS A CLASS "D" SURVEY SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SOKKIA DIGITAL).
THE ORIGINAL FIELD REFORESTATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 16, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 23, 2008 THROUGH JANUARY 31, 2008.
REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAN OF WAY PLANS FOR THE OHIO RIVER BASIN FLOOD PROTECTION PADUCAH, KY AS PREPARED BY THE US ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1938, THE COE FILE NUMBERS FOR THE DRAWINGS ARE 554-A2.01 THROUGH 554-D2.17 AND 554-G.2-2C.
ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.
ALL ABLACKIN TRACT SUB PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.
REFER TO SHEET 16 OF 16 FOR THE FLOODWALL CONTOURS (DEPICTED) AND COORDINATES.
VICINITY MAP
PROJECT SITE
JERRY D. KAILER BONNIE L. KAILER DEED BOOK 1001 PAGE 108
JUDY L. CLEMENTS DEED BOOK 970 PAGE 108
J. W. WILLIAM MARTLESS DEED BOOK 1000 PAGE 126
DAVID D. HOFER MARGARET A. HOFER DEED BOOK 1000 PAGE 200
DAVID D. HOFER MARGARET A. HOFER DEED BOOK 1000 PAGE 200
EDWARD ROY SCHOENBERG MARY DEE SCHOENBERG DEED BOOK 1000 PAGE 74
BARRY SHANE ADAMS JULIE ANN ADAMS DEED BOOK 1000 PAGE 210
BOBBY JOE ALLEN PAMELLA J. ALLEN DEED BOOK 1000 PAGE 200
VALARIE FORTHENBERRY STUART FORTHENBERRY DEED BOOK 1000 PAGE 226
JOSEPH E. FOX RUBY F. FOX DEED BOOK 1000 PAGE 108
JOHN W. JON DARNELL MARTHA W. DARNELL DEED BOOK 1000 PAGE 108
OPAL CHRISTOPHER DEED BOOK 1000 PAGE 108
LISA BROWNING DEED BOOK 1000 PAGE 108
DONALD RAY MITCHELL MAE ELIZABETH MITCHELL DEED BOOK 1000 PAGE 108
WILLIAM DUSKETT OLEDA DUSKETT DEED BOOK 1000 PAGE 108
ELMANDO WALKER HOWARD WALKER (1/2) DEED BOOK 1000 PAGE 108
FLOODWALL CONTOURLINE
P.C. STA 40+49.98
N 666,729.903
E 1,000,824.999
Δ = 89°45'53" L.T.
D = 4°00'00"
T = 49.00'
L = 78.36'
R = 1,432.39'
P.T. STA 41+28.34
Arc = 94.00'
Radius = 520.00'
Chord = 94.88'
N 80°43'44" W
S 82°18'06" W
40.00'
Arc = 10.15'
Radius = 360.00'
Chord = 10.15'
N 83°30'19" W
Arc = 59.24'
Radius = 560.00'
Chord = 59.21'
N 10°43'44" W
40 RIGHT OF ENTRY EASEMENT
N 13°45'33" W
N 15°18'24" E
N 15°26'53" E
726.75'
160+00
165+00
170+00
175+00
395.03'
639.95'
236.18'
PADUCAH TRACT 25 DEED BK. 97 PAGE 339
PADUCAH TRACT 26 DEED BK. 200 PAGE 37
PADUCAH TRACT 28 DEED BK. 200 PAGE 37
PADUCAH TRACT 28 RELEASED BY DEED BK. 204 PAGE 954
PADUCAH TRACT 27 DEED BK. 200 PAGE 95
PADUCAH TRACT 38 RELEASED BY DEED BK. 204 PAGE 954
TOTAL AREA
OAKS RD. TO OLD BENTON RD.
27.1142 ACRES
EDWARD L. MASTER ALICE MASTER DEED BOOK 994 PAGE 331
WILLIAM D. MYER BERTHA MYER DEED BOOK 1000 PAGE 38
JAMES FRED TUCKER DEED BOOK 1000 PAGE 200
JANE A. JANNEC CLARK DALE S. DEED BOOK 1000 PAGE 400
JOE CLARK DEED BOOK 1000 PAGE 10
JANE A. JANNEC CLARK DEED BOOK 1000 PAGE 18
MEADOW WOOD SUBDIVISION (UNDEVELOPED)
NO PLAT OF RECORD. CREATED ALL TITLES PRIOR TO 1 JANUARY 1960 (UNPLATTED)
LEE BOULEVARD (UNDEV.)
Radius = 760.00'
Chord = 399.97' N 1°06'24" E
Arc = 394.38'
N 13°45'33" W
N 13°46'33" W
836.07'
226.37'
TIM PETRICA DEED BOOK 1000
RALPH A. OWEN PATRICIA R. OWEN (WF.) DEED BOOK 1000 PAGE 108
GREGORY L. NICHOLS DEED BOOK 1000 PAGE 108
TAMY E. STYERS THOMAS T. STYERS (WF.) JOHN STYERS DEED BOOK 1000 PAGE 108
TAMY E. STYERS THOMAS T. STYERS (WF.) JOHN STYERS DEED BOOK 1000 PAGE 108
SURVEY PLAT LEGEND
FLOODWALL BOUNDARY LINE
FLOODWALL EASEMENT LINE
ABLACKIN PARCEL BOUNDARY LINE
RIGHT OF WAY LINE
EASEMENT LINE
IRON PIN OR PIPE FOUND
IRON PIN WITH 1/2" ALUMINUM CAP SET STAMPED FBH LS 2547
IRON PIN WITH 3/4" BLUE CAP SET STAMPED FBH LS 2547
IRON PIN IN CONC. W/3/4" BLUE CAP GPS CONTROL PT.
UTILITY OR DITCH LINE
FENCE LINE
COMPUTED POINT NOT SET
CERTIFICATE OF OWNERSHIP
I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.
MAYOR OF THE CITY OF PADUCAH
DATE
RECOMMENDATION FOR FINAL APPROVAL
HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS OF THE MCCRACKEN COUNTY FISCAL COURT AND THE CITY OF PADUCAH, AND, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT I'M THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.
PLANNING COMMISSION HELD _____ 20 _____
CHAIRMAN MCCRACKEN COUNTY PLANNING COMMISSION
SURVEYORS CERTIFICATE
I, GERALD W. KOHT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY DIRECTION AND SUPERVISION AND THAT THE SURVEY IS A CLASS "D" SURVEY AS THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.
DATE
GERALD W. KOHT
KY. REG. LAND SURVEYOR 2547
2800 NEW CORD DRIVE
PADUCAH, KY 42003
NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED SIGNED BY THE REGISTERED LAND SURVEYOR.
NOTARY CERTIFICATE
STATE OF _____
COUNTY OF _____
SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____
MY COMMISSION EXPIRES
NOTARY
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS OF THE MCCRACKEN COUNTY FISCAL COURT AND THE CITY OF PADUCAH, AND, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.
PLANNING COMMISSION MEETING HELD _____
JUDGE MCCRACKEN CO. PLANNING COMMISSION
CERTIFICATE OF RECORDING
STATE OF KENTUCKY,
COUNTY OF MCCRACKEN
I, JEFF JERNELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE PLAT AND THE LANDS IN ARE DEPICTED HEREON WERE FILED AND RECORDED THAT PLAT AND THE CERTIFICATE OF OWNERSHIP CERTIFICATE OF
GIVEN UNDER MY HAND AND SEAL THIS THE ____ DAY OF _____, _____
BY _____ D.C.
CLERK
RECORDED IN PLAT SECT. _____ PAGE _____
0 50 100
GRAPHIC SCALE
1" = 50'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2504 HOLLOWAY DRIVE
PADUCAH, KY. 42003
TELEPHONE: 270-554-7800
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA. 159+00 TO DESIGN STATION 170+00
MCCRACKEN COUNTY, KENTUCKY
Drawn: G.M.K.
Check:
Merkaband:
Revised:
Project No.: 07074
Unit: G.M.K.
Prepd: G.M.K.
Approved:
Date: 2-04-2008
Scale: 1" = 50'
8 of 20



SURVEY & PLAT NOTES

THE BASIS FOR BEARING SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WERE DERIVED FROM A GPS OBSERVATION PROCEDURE THROUGH THE KY3 RTKS SOLUTION NETWORK. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001). THE OBSERVATIONS WERE CONDUCTED AUGUST 27 THRU OCTOBER 5, 2007 ON THE MONUMENTS SHOWN AS FB-1 THROUGH FB-16.

THE SURVEY WAS PERFORMED BY THE METHOD OF RANDOM COORDINATES. THE METHODICAL CORNER OF CLOSURE OF THE TRAVERSE WAS ONE PART IN 15,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR ELEVATION BY THE COMPUTED RULE METHOD. THIS SURVEY IS A CLASS "A" SUI FOLLOW THE MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS 201KAR 18A001.

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY SEPTEMBER 18, 2007 TO JANUARY 15, 2008. THE FINAL MONUMENTS SHOWN WERE SET ON JANUARY 22, 2008 THROUGH JANUARY 25, 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAT OF ABT PLANS FOR THE "OAKS RIDGE SUBDIVISION PADUCAH, KY" DATED SEPTEMBER 1, 1994 AND THE PLAT OF ABT PLANS DATED SEPTEMBER 1, 1994. THE CDC PLAT NUMBERS FOR THE SUBDIVISION ARE 1994-0000 THROUGH 1994-0007 AND 1994-0009.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL BOUNDARY TRACT 2006 PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

FLOODWALL CENTERLINE
P.I. STA. 13+00.57
N 1,000,414.67
E 968,993.063
α = 23°39'10" RT.
C = 8°48'53"
T = 258.24'
L = 516.24'
R = 650.00'
E = 15.90'
P.C. STA. 7+42.33
P.T. STA. 12+58.57

FLOODWALL CENTERLINE
P.I. STA. 21+47.57
N 1,004,254.67
E 968,993.063
α = 17°36'39" RT.
H 1,005,153.382
E 968,490.709

FLOODWALL CENTERLINE
P.I. STA. 19+05.38
N 1,004,254.67
E 968,993.063
α = 31°05'51" RT.
C = 6°29'00"
T = 235.26'
L = 466.67'
R = 883.35'
E = 31.90'
P.C. STA. 16+69.72
P.T. STA. 21+36.39

FLOODWALL CENTERLINE
P.I. STA. 27+00.00
N 1,004,254.67
E 968,993.063
α = 24°30'48" RT.
C = 6°48'53"
T = 258.24'
L = 516.24'
R = 650.00'
E = 15.90'
P.C. STA. 25+41.76
P.T. STA. 30+58.00

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ABUTTER / PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 1/2" IRON PIN WITHOUT ALUMINUM CAP SET STAMPED F&H LS 2947
- 1/2" IRON PIN WITH 2½" ALUM. CAP SET STAMPED F&H LS 2947
- 1/2" IRON PIN W/ CONC. W/2½" ALUM. CAP GPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET

GRAPHIC SCALE
1" = 100'

SURVEYORS CERTIFICATE

I, STANLEY N. GOOD, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE SURVEY MEETS OR EXCEEDS THE CURRENT MINIMUM STANDARDS OF PRACTICE SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE _____ SIGNATURE & SEAL
STANLEY N. GOOD
KY REGISTERED LAND SURVEYOR 2547
3900 JOHN CODY DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING MAY HOLD VALUES ON ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED COPIES BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH _____ DATE _____

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE _____ DAY OF _____, 20____

MY COMMISSION EXPIRES _____ NOTARY _____

RECOMMENDATION FOR FINAL APPROVAL

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS MAY BE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HELD _____, 20____

CHAIRMAN MCCRACKEN COUNTY
PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT HAS BEEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

JUDGE MCCRACKEN CO. PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN

I, JEFF JARRELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT AND THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, _____
BY _____ D.C. _____ CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5/20/09	CHANGED TOTAL SHEETS FROM 18 TO 20	CMC

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2550 Lone Oak Road, Suite 100, Paducah, KY 42003
Phone (270) 443-0395 Fax (270) 443-0399

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

FROM DESIGN STATION 173+00 SOUTH OF HORSE BRANCH TO DESIGN STATION 301+00 SOUTH OF OLD BENTON ROAD
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Checked:	Mechanical:	Electrical:	Project No.: 07074
Date: G.M.K.	Revision:	Approved:	Date: 2/28/2008	Scale: 1" = 100'

9 of 20

Drawing Name: C:\Projects\07074\Dwg\07074-FL-1.DWG
Layout Name: 07074-FL-1
Plotted By: Chris Mitchell
Plot Date: 5/20/2009
Plot Time: 11:00:00 AM
Plot Scale: 1:1
Plot Device: DWG To PDF.pc3

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001). THE OBSERVATIONS WERE PERFORMED AUGUST 21 AND OCTOBER 5, 2007 ON THE MONUMENTS SHOWN AS #4 AND #5 ON PAGE #4 &.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL CLOSURE OF CLOSURE OF THE TRAVERSE WAS ONE PART IN MORE. THE BEARINGS AND DISTANCES SHOWN HEREON WERE ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A SLAND "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (201KAR 18A001).

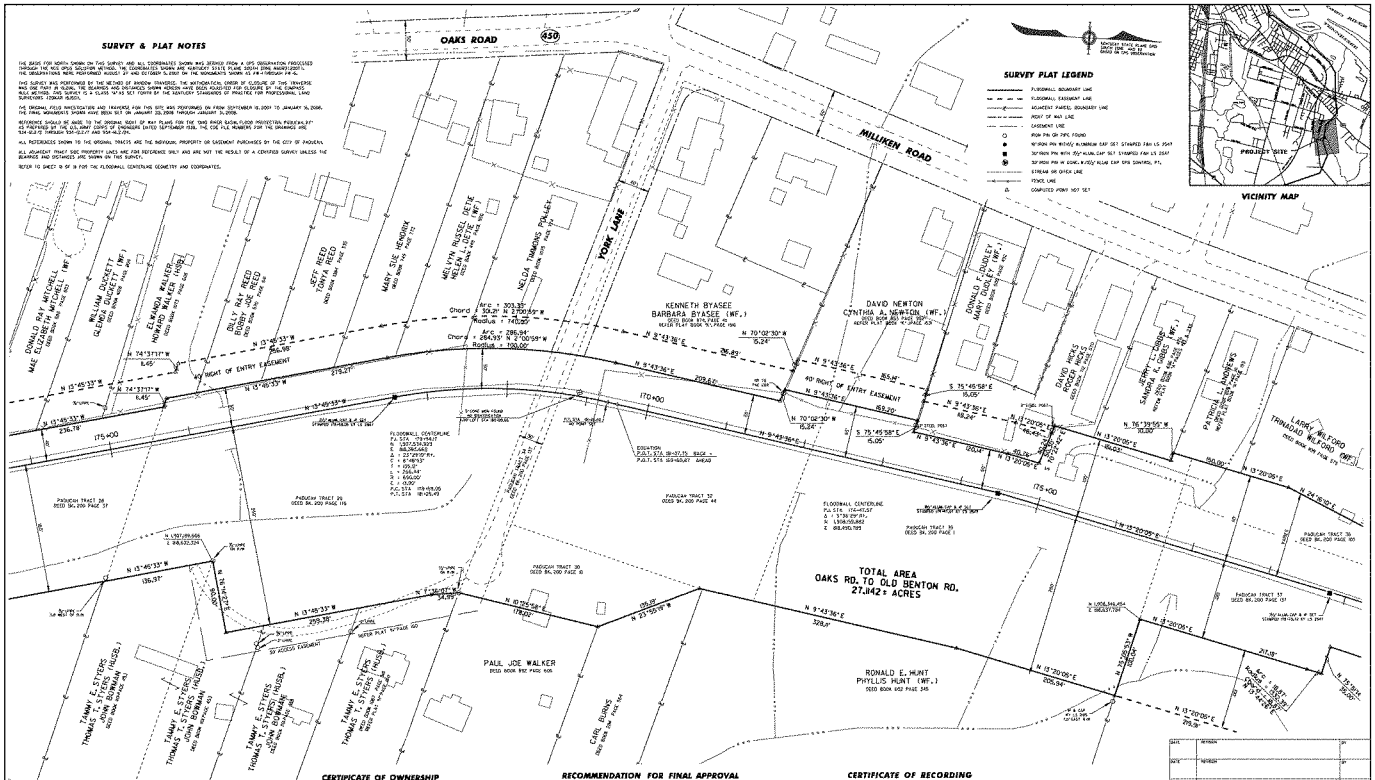
THE ORIGINAL FIELD INVESTIGATIONS AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 18, 2001 TO JANUARY 16, 2006. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 22, 2008 THROUGH JANUARY 31, 2008.

REFERENCE BASIS OF BEARING TO THE ORIGINAL PLAT OF WAY PLANS FOR THE TWO RIVER FLOOD/FLOOD PROTECTION PROJECT, 37" PADUCAH TRACT 26 DEED BK. 200 PAGE 116 AND PADUCAH TRACT 27 DEED BK. 200 PAGE 116 DATED SEPTEMBER 1986. THE CORE FILE NUMBERS FOR THE DRAWINGS ARE: 524-422-02 THROUGH 524-422-07 AND 524-443-04.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT DEED PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 10 OF 19 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.



SURVEYORS CERTIFICATE

I, DONALD W. NIGHT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS SURVEY, MAP, REPORT & SURVEY PLAT WERE PREPARED BY PERSONAL SUPERVISION AND THAT THE SURVEY, REPORT & PLAT CONFORM TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

DONALD W. NIGHT
KY. REG. LAND SURVEYOR 2547
1700 JACKSON STREET
PADUCAH, KY. 42001

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANTS OF THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____.

MY COMMISSION EXPIRES — NOTARY

RECOMMENDATION FOR FINAL APPROVAL

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HELD _____, 20____

CHAIRMAN, MCCRACKEN COUNTY PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____, 20____

JUDGE MCCRACKEN COUNTY PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN

I, JOY JENNELL CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS DULY LODGED IN MY OFFICE FOR RECORD AND THAT I AMM RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL, THIS THE _____ DAY OF _____, 20____.

BY _____, D.C.
CLERK

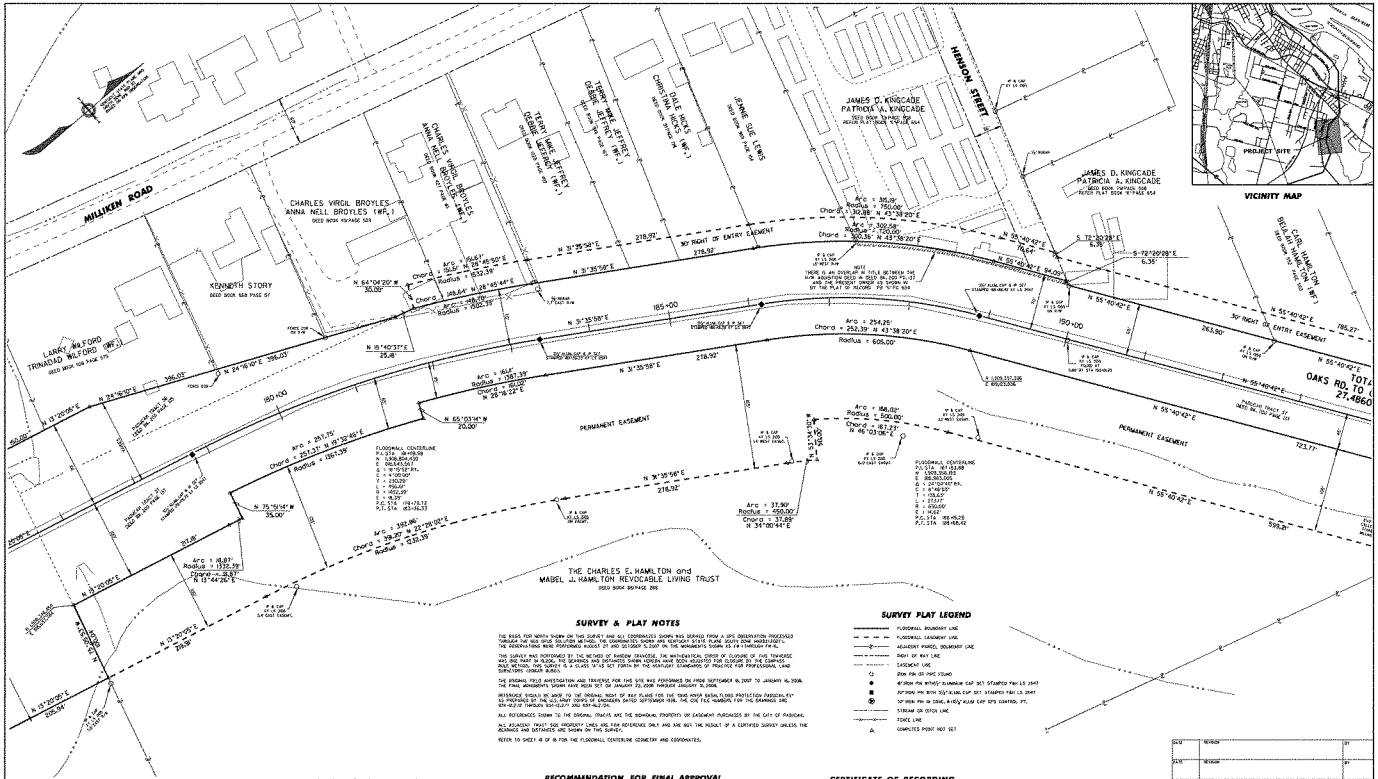
RECORDED IN PLAT BOOK _____, PAGE _____

DATE	REVISION	BY	
DATE	REVISION	BY	
DATE	REVISION	BY	
5-23-08	CHANGED TOTAL SHEETS FROM 18 TO 20	GWK	

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2908 Ky. Route 3, Paducah, KY. 42003
Telephone 270-554-9208

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA 170+00 TO DESIGN STATION 179+00
MCCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check:	Mechanical: ———	Electrical: ———	Project No.: 01074	10 of 20
Calc: G.M.K.	Project: G.W.N.	Approved:	Date: 5-08-2008	Scale: 1" = 50'	



SURVEYORS CERTIFICATE

I, GERALD W. HUGHES, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, HEREBY CERTIFY THAT THIS PLAT OF SURVEY WAS MADE UNDER MY PERSONAL SUPERVISION AND THAT THE SAME (SURVEY & PLAT) CONFORMS TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. HUGHES
KY. REG. LAND SURVEYOR 2547
1900 W. KENTUCKY ST.
PADUCAH, KY 42001

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE OF THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED ISSUED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS ___ DAY OF _____, 19__

MY COMMISSION EXPIRES — NOTARY

RECOMMENDATION FOR FINAL APPROVAL

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HELD _____, 19 ____

CHAIRMAN, MCCRACKEN COUNTY
PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

JUDGE MCCRACKEN CO./PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN
I, JEFF KAMUEL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING AND ATTACHED PLAT WAS LODGED IN MY OFFICE FOR RECORDING AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, ____

BY _____ D.C.
CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED USING THE NGS OPUS SOFTWARE. THE COORDINATES ARE EXPRESSED IN THE KENTUCKY STATE PLANE COORDINATE SYSTEM, NAD 83, THE BEARING WERE PERFORMED AUGUST 27 AND SEPTEMBER 5,2007 ON THE MONUMENTS SHOWN AS #4 = CHARLES PK-6.

THE SURVEY WAS PERFORMED BY THE METHODS OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THIS TRAVERSE WAS ONE PART IN 45,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A"-83 SET FORTH BY THE MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (1996)(P-38,861).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 10, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 23, 2008 THROUGH JANUARY 31, 2008.

REFERENCE BASIS OF BEARING FOR THE ORIGINAL RIGHT OF WAY PLANS FOR THE TRIMS RIVER BASIN/FLOOD PROTECTION PARCEL 61 IS PROVIDED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1978. THE CORS FILE NUMBERS FOR THE DRAWINGS ARE 65N-42.0 TWRDS 65N-45.0 AND 65N-42.0A.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE DOWNTOWN PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 4 OF 8 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- 20M PIN OR 20MC STUMP
- 40"X20M PK WITH/ ALUMINUM CAP SET STAMPED PAH LS 2547
- 30"X20M PK WITH SQ"ALUM CAP SET STAMPED PAH LS 2547
- 30"X20M PIN W CAP, A WELY ALUM CAP SET STAMPED PT.
- STREAM OR DITCH LINE
- FENCE LINE
- COMPUTED POINT NOT SET

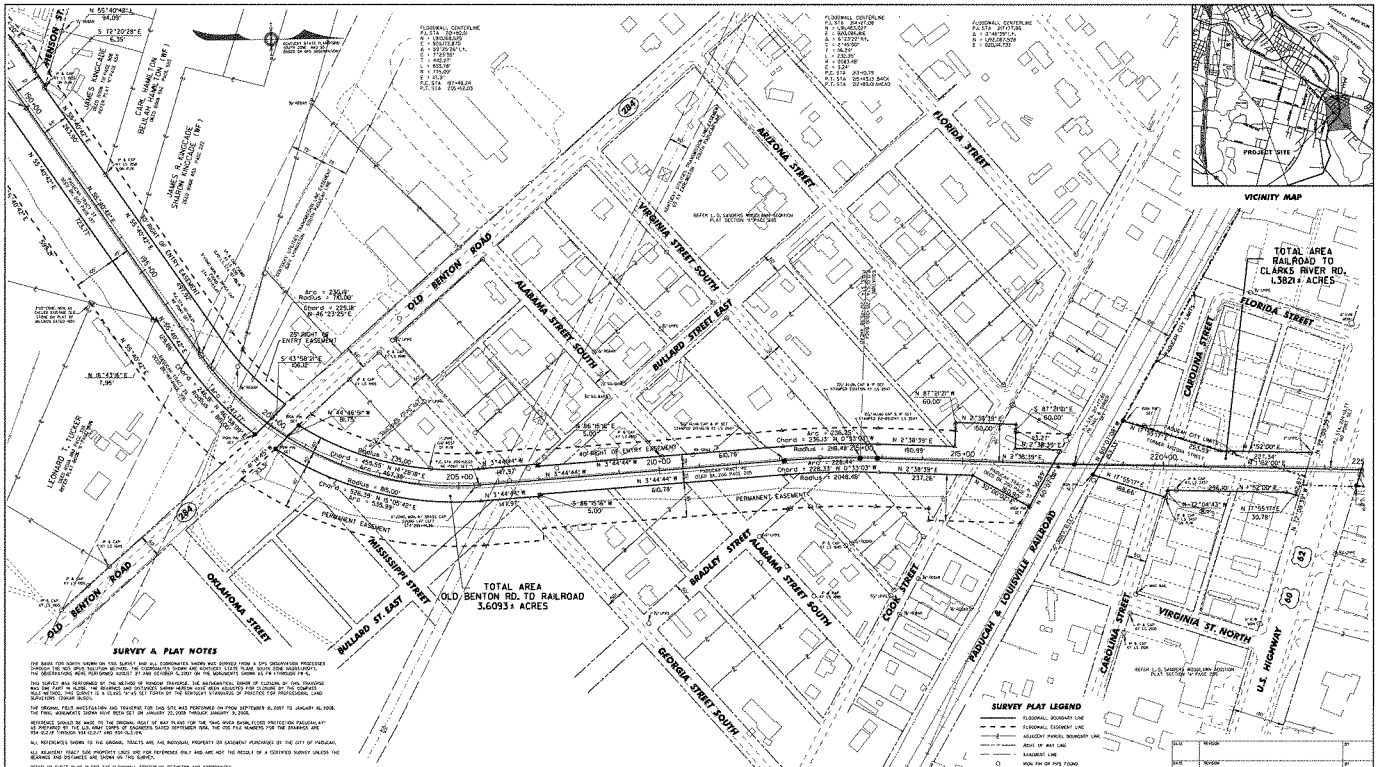
DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5-23-08	CHANGED TOTAL SHEETS FROM 8 TO 20	CWK

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
1900 W. KY. STREET, PADUCAH, KY. 42001
TELEPHONE 270-443-0395

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

FROM DESIGN STA. 17+00 TO DESIGN STATION 193+00
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check:	Mechanical:	Electrical:	Project No.: 07074	11 of 20
Cad: G.M.K.	Project: G.M.K.	Approved:	Date: 2/08/2008	Scale: 1" = 50'	



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2011). THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 1, 2007 ON THE MONUMENTS SHOWN AS F14 THROUGH F14.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL CLOSURE OF CLOSURE OF THIS TRAVERSE WAS 1 PART IN 10,000 OR GREATER. THE ANGULAR ERROR OF THE TRAVERSE WAS 5 SECONDS PER ANGLE. THE ANGULAR ERROR WAS DISTRIBUTED. THE ACCURACY OF THE SURVEY WAS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYING (SEMAR 16/2011).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 16, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 22, 2008 THROUGH JANUARY 31, 2008.

REFERENCE BARGES WERE MADE TO THE ORIGINAL PLAT OF MAP TO AND FOR THE FARO RIVER BUNKLEYSEED PROTECTION PADUCAH, KY AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1974. THE ODE FILE NUMBERS FOR THE DRAWINGS ARE 104-02.F0 THROUGH 104-02.F7 AND 104-02.F14.

ALL REFERENCES SHOWN TO FIVE ORIGINAL TRACTS AND THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEYORS CERTIFICATE

I, GERALD W. BOYD, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THE PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE SAME (SURVEY & PLAT) CONFORM TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE _____ GERALD W. BOYD
KY. REG. PROFESSIONAL SURVEYOR 2547
2020 BLUE HERON DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS APPLIED. NO REPRODUCTION OR CHANGE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED ISSUED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SUBDIVISION.

MAYOR OF THE CITY OF PADUCAH _____ DATE _____

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 19 ____

MY COMMISSION EXPIRES _____ NOTARY _____

RECOMMENDATION FOR FINAL APPROVAL

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED THEREON, AND HAVE RECEIVED THE APPROVAL OF THE MCCRACKEN COUNTY PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION NO.3 _____ DATE _____

CHAIRMAN, MCCRACKEN COUNTY PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED THEREON, AND HAVE RECEIVED THE APPROVAL OF THE MCCRACKEN COUNTY PLANNING COMMISSION, AND THAT THE SUBDIVISION PLAT WAS GRANTED FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING NO.3 _____

JODIE MCCRACKEN CO. PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN

I, JEFF JARRELL CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

OWNER UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, ____

BY _____ D.C. _____ CLERK

RECORDED IN PLAT BOOK _____ PAGE _____

GRAPHIC SCALE
1" = 100'

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5-05-09	CHANGED TOTAL SHEETS FROM 18 TO 20	DAK

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2020 BLUE HERON DRIVE
PADUCAH, KY 42003

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

FROM DESIGN STATION 190+00 SOUTH OF OLD BENTON ROAD TO DESIGN STATION 228+00 AT CAROLINA STREET
McCRACKEN COUNTY, KENTUCKY

Drawn:	Check:	Mechanical:	Electrical:	Project No.:	12 of 20
G.M.K.				D7074	
Civil:	Project:	Approved:	Date:	Scale:	
G.M.K.	G.M.K.		7-08-2008	1" = 100'	

SURVEY & PLAT NOTES

THE DATUM FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS RESOLUTION PROCESSED USING THE NGS OPUS SOFTWARE. THE ORIGINAL FIELD WORK WAS PERFORMED ON JANUARY 16, 2008 THROUGH JANUARY 31, 2008. THE RECONNAISSANCE WORK PERFORMED AUGUST 31 AND OCTOBER 15, 2007 FOR THE MONUMENTS SHOWN AS FOUND THROUGH THE

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE INSTRUMENTAL CHECK OF CLOSURE OF THE TRAVERSE WAS ONE THAT IN NOTE, THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SEPARATE BLOCK).

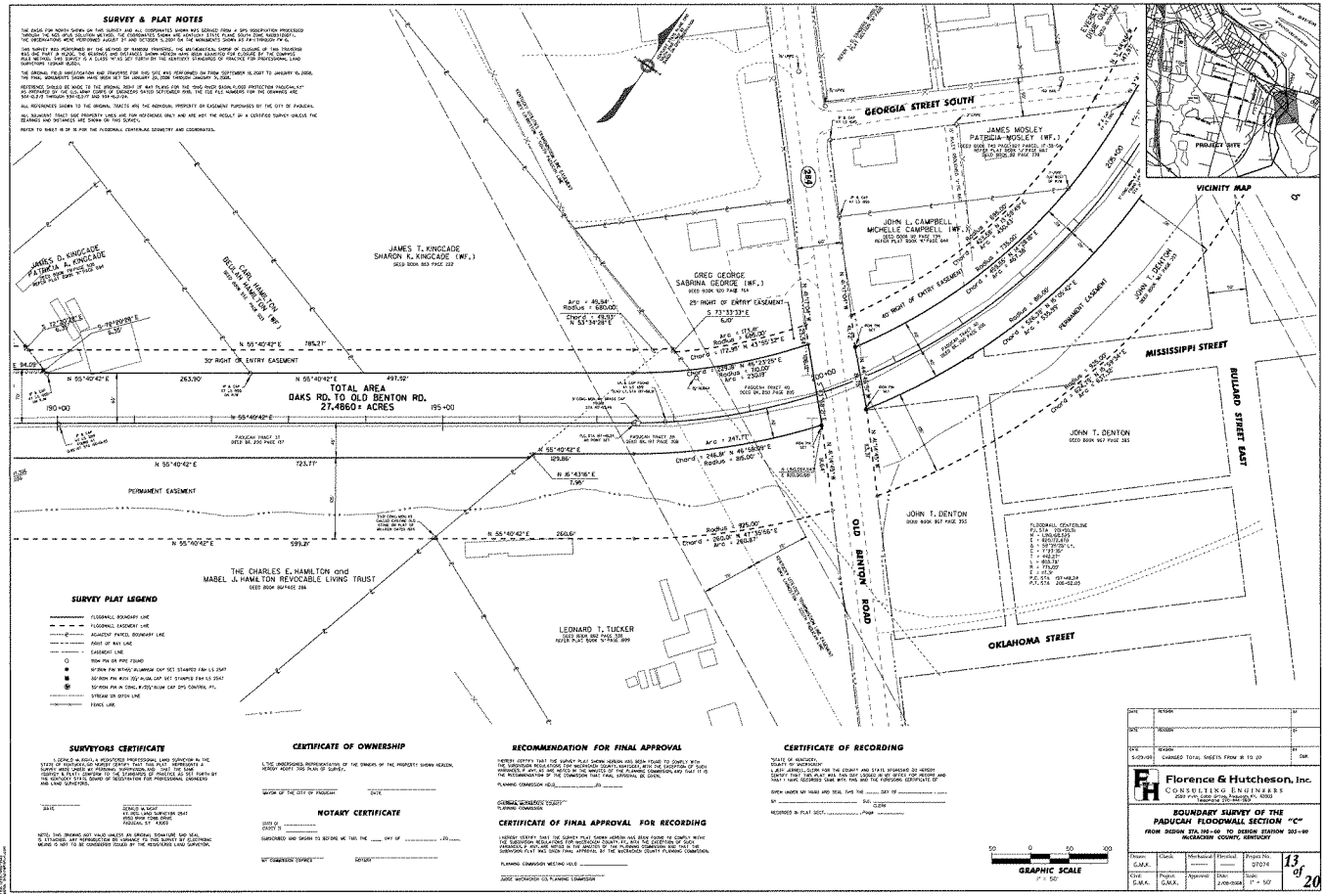
THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY SEPTEMBER 16, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN WERE SET ON JANUARY 16, 2008 THROUGH JANUARY 31, 2008.

REFERENCE DATUM IS MADE TO THE ORIGINAL DATA OF MAPS PLANS FOR THE OHIO RIVER BASIN, FLOOD PROTECTION PADUCAH, KY" AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1986. THE TIE FILE NUMBERS FOR THE DRAWINGS ARE 504-02-2.B THROUGH 504-02-27 AND 504-16-2-2A.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE ENDROSUS PROPERTY OR EASEMENT PURCHASED BY THE CITY OF PADUCAH.

ALL SUBJECT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.



SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- TEMP PIN OR PIPE FOUND
- 5/8"REBAR PIN WITH2" ALUMINUM CAP SET STAMPED FAH LS 2547
- 5/8"REBAR PIN WITH 2(5)" ALUM. CAP SET STAMPED FAH LS 2547
- 5/8"REBAR PIN IN CONC. W/2(5)" ALUM CAP DPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE

SURVEYORS CERTIFICATE

I, DONALD M. BOGGS, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION, AND THAT THE SAME CONFORMS TO THE MINIMUM STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

DONALD M. BOGGS
KY. REG. LAND SURVEYOR 2547
FRED HAAS CONN DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED ISSUED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATION OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____.

MY COMMISSION EXPIRES — DATE

RECOMMENDATION FOR FINAL APPROVAL

THEREIN CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION HEAD _____ DATE _____

CHAIRMAN, MCCRACKEN COUNTY
PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT THE SUBDIVISION PLAT HAS BEEN FINAL APPROVED BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

JUDGE MCCRACKEN CO. PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN
I, ANY JENNELL CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING AND WITHIN THE CERTIFICATE WAS FILED FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THIS CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____

BY _____ D.C.

RECORDED IN PLAT BOOK _____ PAGE _____

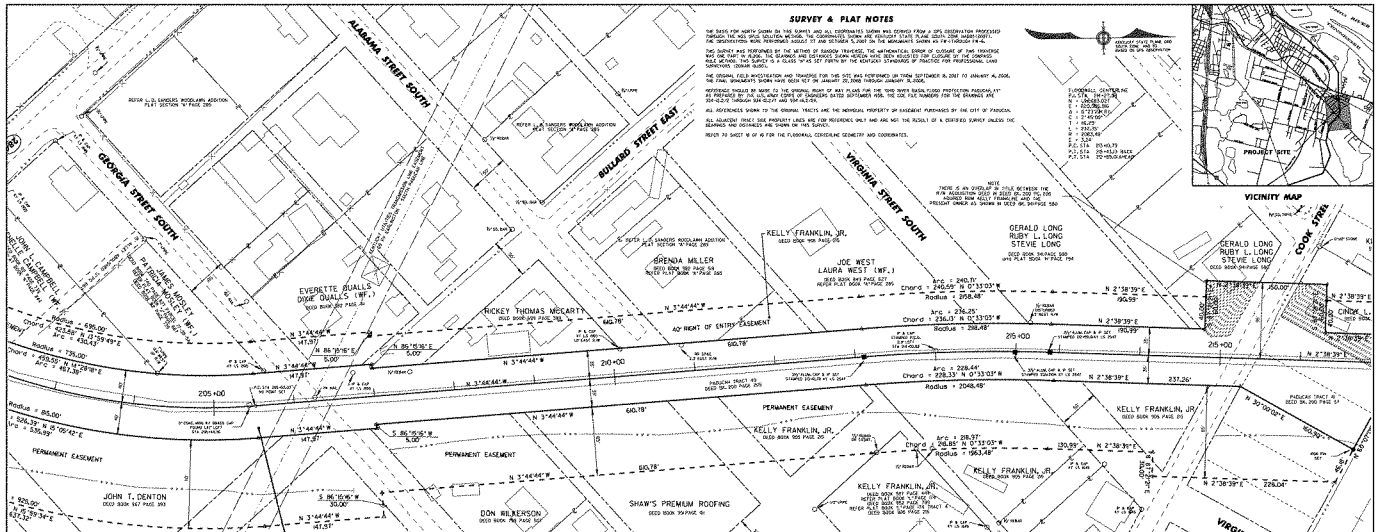
GRAPHIC SCALE
1" = 50'

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5-23-08	CHANGED TOTAL SHEETS FROM 18 TO 20	DMB

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2529 Irvin Cobb Drive, Paducah, KY. 42003
TELEPHONE: (270) 443-8326

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM SIGNIN STA. 192+00 TO SIGNIN STATION 203+00
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check:	Mechanical:	Electrical:	Project No.: 07074	13 of 20
Date: G.M.K.	Project: G.M.K.	Approved:	Date: 2-08-2008	Scale: 1" = 50'	



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROVIDED THROUGH THE NGS REAL-TIME SOLUTION METHOD. THE COORDINATES SHOWN ARE REFERENCE STATE PLANE (2011) (NAD83(2011)). THE OBSERVATIONS WERE PERFORMED AUGUST 17 AND SEPTEMBER 5, 2007 ON THE MONUMENTS SHOWN AS PA-1 THROUGH PA-4.

THE SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THE TRAVERSE WAS ONE PART IN 40,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE OF THE COMPUTED FIELD METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (201KAR 18A001).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON THOSE SEPTEMBER 18, 2007 TO JANUARY 16, 2008. THE FINAL BENCHMARKS SHOWN HAVE BEEN SET ON JANUARY 22, 2008 THROUGH JANUARY 31, 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAN OF WAY PLANS FOR THE "NORTH BANK FLOOD PROTECTION PADUCAH, KY" AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1958. THE CODE FILE NUMBERS FOR THE DRAWINGS ARE 304-6-21-5 THROUGH 304-6-21-7 AND 304-6-21-9.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OF BASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT PARCEL DATA SHOWN PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 10 OF 10 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

NOTE:
THERE IS AN OVERLAP IN TITLE BETWEEN THE R/W ACQUISITION DEED IN DEED BK. 200 PG. 205 PADUCAH TRACT #2 AND KELLY FRANKLIN, JR. PADUCAH TRACT #1 SHOWN IN DEED BK. 317 PAGE 594

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 1/2"-IRON PIN WITH/ALUMINUM CAP SET STAMPED F&H LS 2547
- 3/2"-IRON PIN WITH 3/2"-ALUM.CAP SET STAMPED F&H LS 2547
- 3/2"-IRON PIN IN CONC. W/3/2" ALUM CAP GPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE

FLOODWALL CENTERLINE
P.C. STA. 197+00.00
N = 1,109,685.805
E = 1,355,177.870
A = 93°39'25" L.T.
C = 1°22'55"
T = 496.37'
L = 992.70'
R = 715.00'
D = 7°00'00"
P.C. STA. 193+48.74
P.T. STA. 208+92.03

SURVEYORS CERTIFICATE

I, GEORGE W. HUTCHESON, REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THE PLAT HEREON REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION, AND THAT THE SAME CORRECT & PLAT COMPLYING TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE _____ GEORGE W. HUTCHESON
REGISTERED LAND SURVEYOR 2547
FLORENCE & HUTCHESON
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR TRANSFER TO THE SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED ISSUED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH _____ DATE _____

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____

MY COMMISSION EXPIRES _____ NOTARY _____

RECOMMENDATION FOR FINAL APPROVAL

HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.

PLANNING COMMISSION VEL1 _____ ON _____

CHAIRMAN, MCCRACKEN COUNTY
PLANNING COMMISSION

CERTIFICATE OF FINAL APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT HAS BEEN FINAL APPROVED BY THE MCCRACKEN COUNTY PLANNING COMMISSION.

PLANNING COMMISSION MEETING HELD _____

JUDGE MCCRACKEN CO./PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN

I, JEFF JERRELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE ____ DAY OF _____, ____

BY _____ D.C. CLERK _____

RECORDED IN PLAT VOLT. _____ PAGE _____

GRAPHIC SCALE
1" = 50'

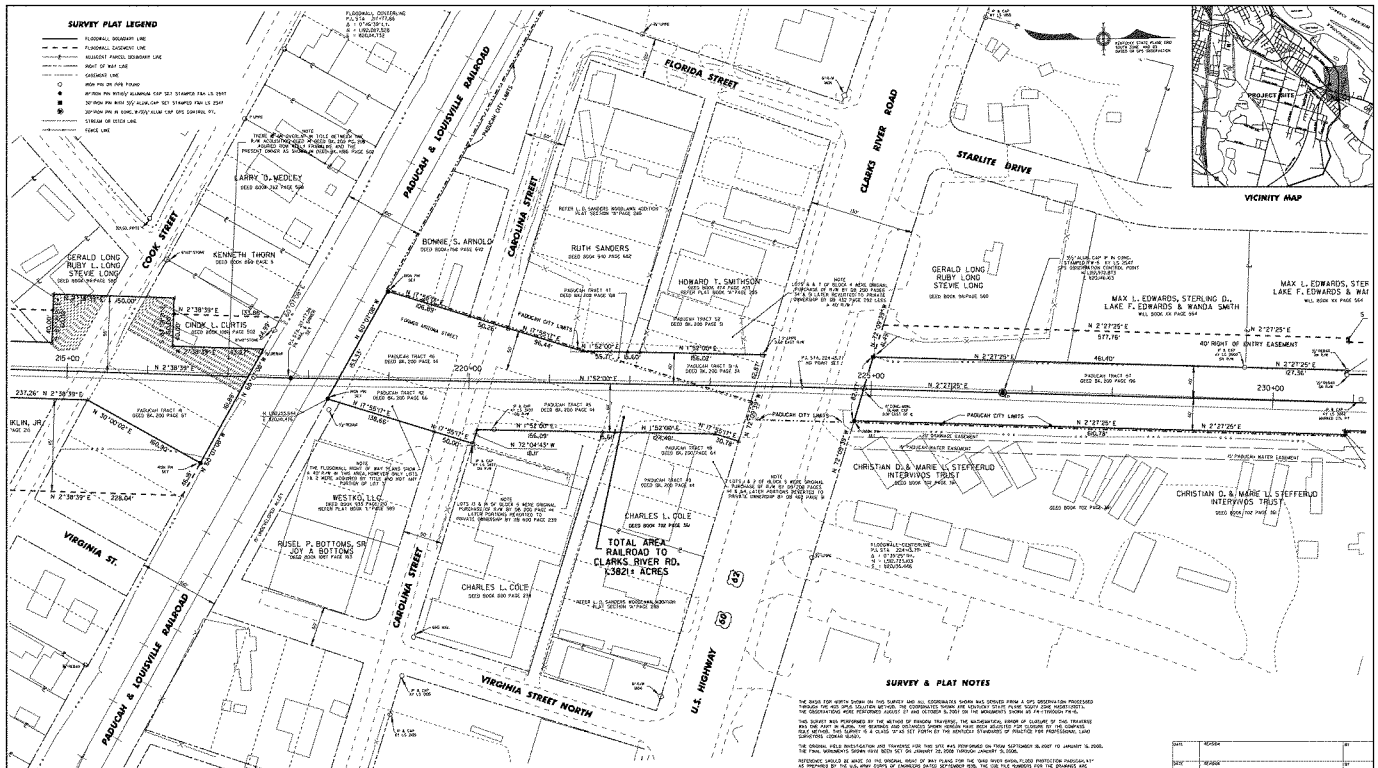
DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5-23-09	CHANGED TOTAL SHEETS FROM 18 TO 20	GWH

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2050 Irvine Drive, Paducah, KY. 42003
Telephone (270) 554-9100

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA. 202+00 TO DESIGN STATION 216+00
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check:	Methodical:	Electrical:	Project No.: 07024	14 of 20
Chk: G.M.K.	Project: G.M.K.	Approved:	Date: 2/08/2008	Scale: 1" = 50'	

1317



SURVEYORS CERTIFICATE

I, GERALD B. WOLFF, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION, AND THAT THE SURVEY WAS MADE IN ACCORDANCE TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. WOLFF
KY. REG. LAND SURVEYOR 2547
2000 THAN CORBI DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR ALTERATION TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20 ____

MY COMMISSION EXPIRES — NOTARY

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 82 AND 100, SUBDIVISION REVISED STATUTES OF KENTUCKY, THIS PLAT IS HEREBY APPROVED BY THE CITY OF PADUCAH, THIS PLAT WAS DULY GIVEN APPROVAL AND ACCEPTED AT FIELD.

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 20 ____

CHAIRMAN PADUCAH PLANNING COMMISSION

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS SPCS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE NAD27 ZONE MASER(FEET). THE OBSERVATIONS WERE PERFORMED AUGUST 31 AND OCTOBER 16,2001 ON THE MONUMENTS SHOWN AS FA-1 THROUGH FA-6.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MECHANICAL ERROR OF CLOSURE OF THE TRAVERSE WAS 1 PART IN 10,000 AND THE ANGULAR ERROR WAS 5 SECONDS PER STATION. THE ANGLES WERE MEASURED BY THE ROUND WALK METHOD. THE SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (CORNER GUIDE).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 26,2007 TO JANUARY 18,2008. THE FINAL MONUMENTS SHOWN WERE SET ON JANUARY 22,2008 THROUGH JANUARY 31,2008.

REFERENCE SPHERE DE WAVE ON THE ORIGINAL PLAT OF BIG FLOWS FOR THE OHIO RIVER BASIN,FLOOD PROTECTION PADUCAH,KY AS PREPARED BY THE U.S.ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1978. THE CGS FILE NUMBERS FOR THE DRAWINGS ARE 51F-2,2-0 THROUGH 51F-2,2-7 AND 51A-6,2-0.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASED BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 16 OF 19 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN:

I, JEFF JERRELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, _____

BY _____ D.C. — CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

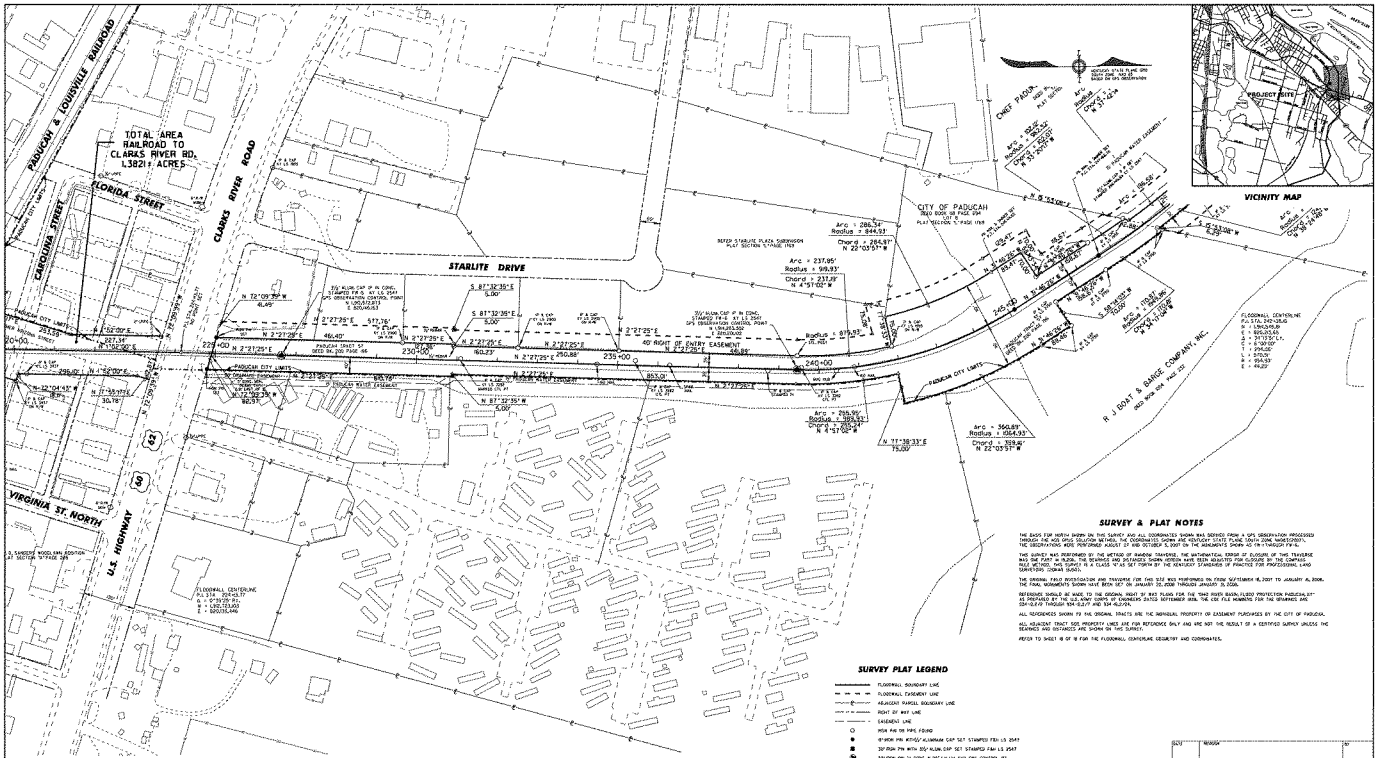
GRAPHIC SCALE
1" = 50'

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5-29-09	CHANGED TOTAL SHEETS FROM 19 TO 20 ADDED SURVEY PLAT ADDED PADUCAH WATER EASEMENT	GWK

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2100 Irvin Cobb Drive, Paducah, KY 42003
Telephone 270-443-0395

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA. 203+00 TO DESIGN STATION 231+00
McCRACKEN COUNTY, KENTUCKY

Drawn G.W.K.	Checked	Mechanical	Electrical	Project No. 07074	15 of 20
Date G.W.K.	Project G.W.K.	Approved	Date 2-26-2008	Scale 1" = 50'	



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001). THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 5, 2007 ON THE MONUMENTS SHOWN AS TIN-1 THROUGH TW-6.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE, THE MATHEMATICAL ERROR OF CLOSURE OF THE TRAVERSE WAS ONE FOOT IN 16,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SOPLS).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY SEPTEMBER 14, 2007 TO JANUARY 14, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 25, 2008 THROUGH JANUARY 31, 2008.

REFERENCE DATUMS AT MAKE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE TWO MILES BASIN/LEVEE PROTECTION PADUCAH, KY AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1974. THE CDE FILE NUMBERS FOR THE BENCHMARKS ARE 024-01-FV THROUGH 024-01-FY AND 024-01-FZ.

ALL REFERENCES SHOWN FOR THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT AND PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 18 OF 19 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCELL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- MON PAR OR PIPE FOUND
- 18"MON PIN WITH 1½" ALUM. CAP SET STAMPED FBI LS 2547
- 30" MON PIN WITH 3½" ALUM. CAP SET STAMPED FBI LS 2547
- 30" MON PIN IN CONC. W/3½" ALUM. CAP GPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE

SURVEYORS CERTIFICATE

I, GERALD W. HOLT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, HAVE CAUSED THE LAND SHOWN HEREON TO BE SURVEYED AND SURVEYED UNDER MY PERSONAL SUPERVISION AND THAT THE LAND SURVEY IS ACCURATE AND CONFORMS TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. HOLT
KY REG. LAND SURVEYOR 2547
FLORENCE & HUTCHESON
PADUCAH, KY 42001

NOTE: THIS DRAWING MAY HAVE BEEN ALTERED BY THE SURVEYOR IN THE PROCESS OF REPRODUCTION OR PLACING IT INTO ELECTRONIC FORMAT. THE ORIGINAL DOCUMENT BEARING THE SURVEYOR'S SEAL AND SIGNATURE IS THE OFFICIAL DOCUMENT.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____

MY COMMISSION EXPIRES _____ NOTARY _____

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 82 AND 100 KENTUCKY REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 20 _____

CHAIRMAN PADUCAH PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN

I, JEFF JERNIGAN, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT AND THE CERTIFICATES THEREON WERE LODGED FOR RECORD AND THAT I HAVE RECORDED SAME, WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE ____ DAY OF _____, 20____

BY _____ D.C. _____ CLERK

RECORDED IN PLAT SECT. _____, PAGE _____

DATE	REVISION	BY
00/00/00	REVISION	BY
00/00/00	REVISION	BY
9-25-09	REVISED TOTAL SHEETS FROM 18 TO 20 ADDED SITE DEVELOPED, BY APPROVAL ADDED PADUCAH WATER EASEMENT	GWH

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
1700 W. Kentucky Avenue, Paducah, KY. 42001
Telephone: (270) 442-7621

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

FROM DESIGN STATION 220+00 AT CAROLINA STREET TO DESIGN STATION 247+00 NORTH OF CLARKS RIVER ROAD

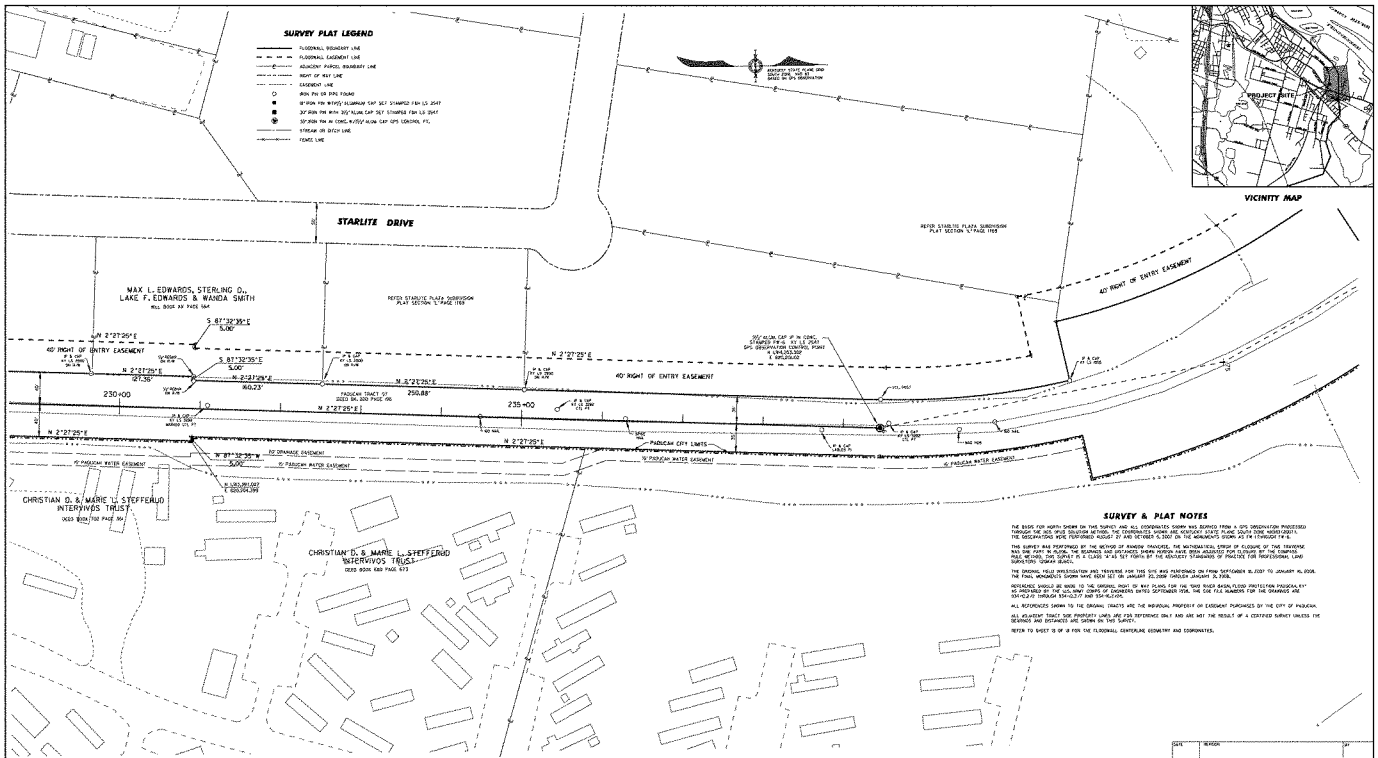
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check:	Mathematical:	Checked:	Project No.: D7074	16 of 20
Cost:	Project: G.M.K.	Approved:	Date: 2-08-2008	Scale: 1" = 100'	

Plotted By: G.M.K.
Plot Date: 9-25-2009
Plot Time: 10:00 AM
Plot Scale: 1:1
Plot Device: Adobe PDF
Drawing Name: D:\Projects\D7074\Survey\D7074 Sheet 16 - Boundary Survey.dwg

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 18" IRON PIN WITH2" ALUMINUM CAP SET STAMPED FBH LS 2547
- 30" IRON PIN WITH 2½" ALUM CAP SET STAMPED FBH LS 2547
- 30" IRON PIN W/ CONC.W/3½" ALUM CAP GPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE



VICINITY MAP

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED USING THE NATIONAL GEODETIC SURVEY'S ONLINE POSITIONING USER SERVICE (OPUS) AND ADJUSTED TO THE KY STATE PLANE COORDINATES. THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND SEPTEMBER 5, 2007 ON THE MONUMENTS SHOWN AS FB 1 THROUGH FB 4.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THE TRAVERSE WAS ONE FOOT IN 41,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS 'A' AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SEAKY BEACH).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY SEPTEMBER 28, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN WERE SET ON JANUARY 22, 2008 THROUGH JANUARY 31, 2008.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAT OF WAY PLANS FOR THE "OHIO RIVER BASIN FLOOD PROTECTION PROJECT, KY" AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1958. THE CAD FILE NUMBERS FOR THE DRAINAGE ARE 554-12.2-0 THROUGH 554-12.2-7 AND 554-14.2-0.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OF EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SUBDIVISIONS PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 13 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEYORS CERTIFICATE

I, GERALD W. KENT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE SAID SURVEY IS A CLASS 'A' AS SET FORTH BY THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. KENT
REGISTERED LAND SURVEYOR 2547
3900 SHAW PARK DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OF THIS DOCUMENT IN ANY FORM OR ELECTRONIC MEDIUM IS NOT TO BE CONSIDERED SEALED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____

MY COMMISSION EXPIRES — NOTARY

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTER 100 AND SUBSEQUENT REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH, PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 20____.

CHAIRMAN PADUCAH PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN

I, JOHN HORNELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS _____ DAY OF _____, 20____

BY _____ D.C.
CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

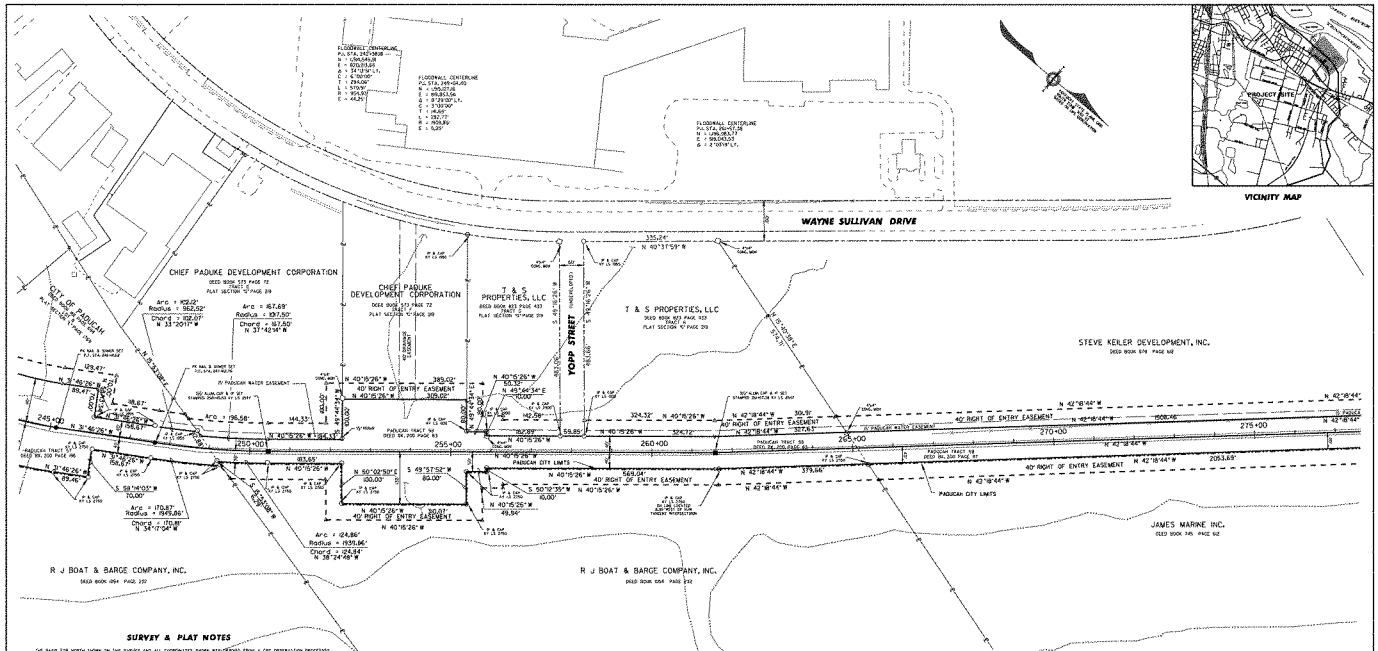
GRAPHIC SCALE
50 0 50 100
1" = 50'

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
1/23/09	CHANGED TOTAL SHEETS FROM 18 TO 20. ADDED CITY CERTIFICATES OF APPROVAL AROUND PADUCAH WATER EASEMENT.	DAW

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
1559 U.S. 60W, SUITE 3, PADUCAH, KY. 42001
PHONE: (270) 443-8300

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA. 229+00 TO DESIGN STATION 339+45
MCCRACKEN COUNTY, KENTUCKY

Drawn: D.W.K.	Check:	Mechanical:	Electrical:	Project No: 07074	
Chk: G.W.K.	Project: S.W.K.	Approved:	Date: 2-08-2008	Scale: 1" = 50'	17 of 20



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS OBTAINED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001), THE ORTHOMETRIC HEIGHTS WERE PROPAGATED ACCORDING TO NGS OCTOBER, 2001 ON THE MONUMENTS SHOWN AS PK-1 PADUCAH PK2.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE (E-54) EXCEEDED THE ALLOWABLE. THE ANGLES AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPUTER. ALL MEASURED AND ADJUSTED DATA TO A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (URBAN MINOR).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM MAY 5, 2005 TO MAY 12, 2005. ALL FINAL MONUMENTS SHOWN HAVE BEEN SET IN JUNE 2006.

REFERENCE BASIS OF BEARING TO THE ORIGINAL PLAT OF WAY PLANS FOR THE FLOOD WALL PROJECT PROTECTION PADUCAH, KY" DATED SEPTEMBER 1966 AND THE ORIGINAL PROPERTY SURVEYS STATES SEPTEMBER 1966. THE CGS FILE NUMBERS FOR THE DRAWINGS ARE 554-G2-H2 THROUGH 554-G2-T7 AND 554-H2-D4.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OF EASEMENT PURCHASED BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT 100 PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 20 OF 20 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEYORS CERTIFICATE

I, GERALD W. KOURT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION, AND THAT THE SAME CORRECTLY & ACCURATELY CONFORMS TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. KOURT
KY REG. LAND SURVEYOR 2947
2508 HWY 1045 ROAD
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VOID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR ALTERATION TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED SIGNED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____.

MY COMMISSION EXPIRES — NOTARY

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 82 AND 100 KENTUCKY REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 20____.

CHAIRMAN PADUCAH PLANNING COMMISSION

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- 0 — 0500 PIN OR PIPE FOUND
- 10'-0500 PIN WITH/ALUMINUM CAP SET STAMPED LS 2947
- 30'-0500 PIN WITH 1½" ALUM. CAP SET STAMPED LS 2947
- 30'-0500 PIN IN CONC. 8x12½" ALUM. CAP GPS CONTROL PT.
- WATER LINE OR FLOW LINE
- FENCE LINE

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF McCRACKEN

I, JEFF JERRELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING AND ATTACHED CERTIFICATE WAS LODGED FOR RECORD AND THAT I HAVE RECORDED SAME WITH THE WITHIN THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, 20____.

BY _____ D.C. CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

GRAPHIC SCALE
1" = 100'

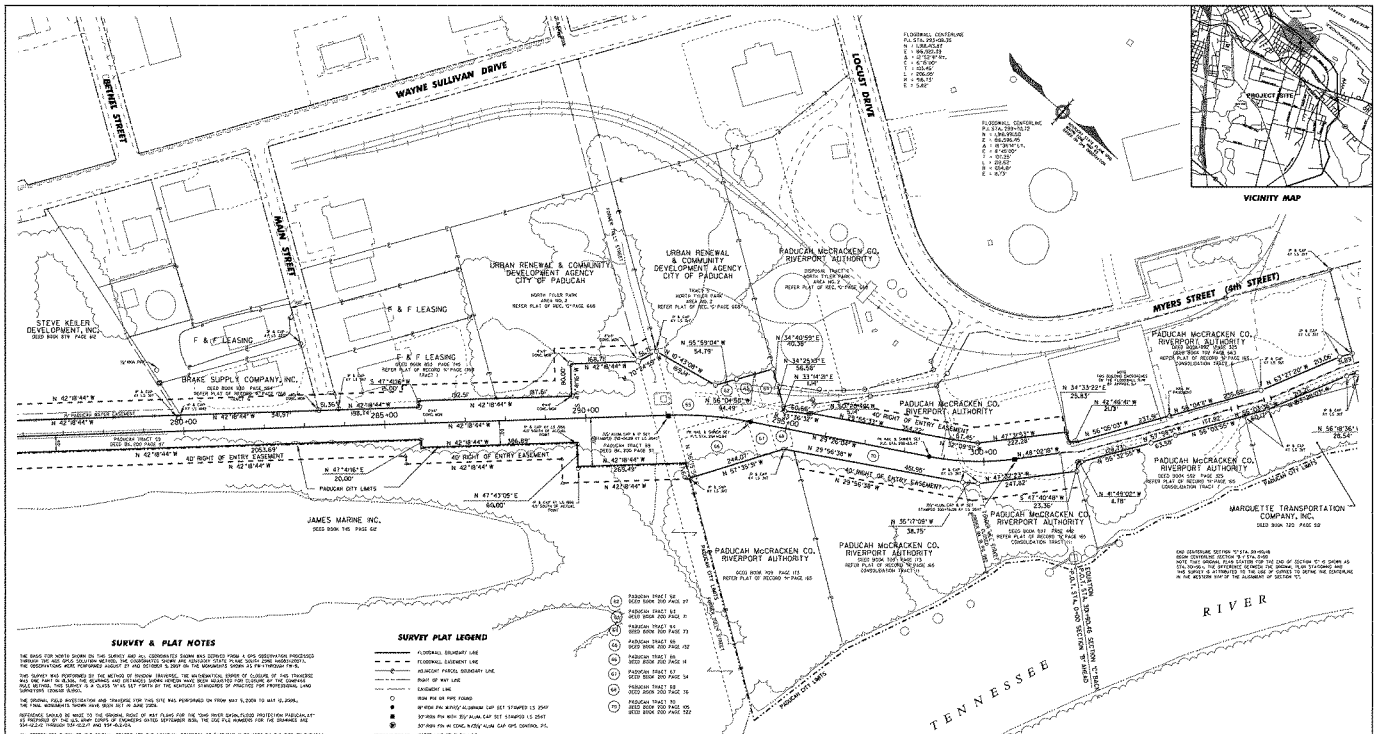
DATE	REVISION	BY	
DATE	REVISION	BY	
DATE	REVISION	BY	

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2508 HWY 1045 ROAD, PADUCAH, KY 42003
PHONE/FAX (270) 442-7621

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STATION 247+00 TO DESIGN STATION 273+00
McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.K.	Check:	Mechanical:	Electrical:	Project No.: 07014	18 of 20
Dist: G.M.K.	Project: G.M.K.	Approved:	Date: 3-09-2006	Scale: 1" = 100'	

1321



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THE SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE ADS GPSLA SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83/2001. THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 5, 2004 ON THE MONUMENTS SHOWN AS PM1-THROUGH PM 6.

THIS SURVEY WAS PERFORMED BY THE METHOD OF FIGURE TRAVERSE. THE MEASUREMENTS ERROR OF CLOSURE OF THE TRAVERSE WAS ONE PART IN 45,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE. THE SURVEY IS A CLASS "B" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (STATUTORY SURVEY).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM MAY 5, 2004 TO MAY 12, 2004. THE FINAL MONUMENTS SHOWN WERE SET IN JUNE 2004.

REFERENCE SHOULD BE MADE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE TOMS RIVER DAM/FLOOD PROTECTION PARIGLATE-33 PREPARED BY THE US ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1939, THE CDC FILE NUMBERS FOR THE DRAWINGS ARE 54-42-2 THROUGH 57-42-17 AND 57-42-24.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASED BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 19 OF 20 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 18" IRON PIN W/YELLOW ALUMINUM CAP SET STAMPED LS 2947
- 30" IRON PIN WITH 1½" ALUM. CAP SET STAMPED LS 2947
- 30" IRON PIN W/ CONC. W/2½" ALUM. CAP GPS CONTROL PT.
- WATER LINE OR FLOW LINE
- FENCE LINE

(50) Paducah TRACT 50 DEED BOOK 200 PAGE 27
(51) Paducah TRACT 51 DEED BOOK 200 PAGE 31
(52) Paducah TRACT 52 DEED BOOK 200 PAGE 33
(53) Paducah TRACT 53 DEED BOOK 200 PAGE 152
(54) Paducah TRACT 54 DEED BOOK 200 PAGE 14
(55) Paducah TRACT 55 DEED BOOK 200 PAGE 34
(56) Paducah TRACT 56 DEED BOOK 200 PAGE 36
(57) Paducah TRACT 57 DEED BOOK 200 PAGE 40
(58) Paducah TRACT 58 DEED BOOK 200 PAGE 42
(59) Paducah TRACT 59 DEED BOOK 200 PAGE 182

SURVEYORS CERTIFICATE

I, GERALD W. HUNT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY DIRECTION AND THAT THE SURVEY MEETS OR EXCEEDS THE CURRENT STANDARDS OF PRACTICE FOR LAND SURVEYING IN THE COMMONWEALTH OF KENTUCKY AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. HUNT
KY. REGISTERED SURVEYOR 2947
2500 NEW LONE OAK DRIVE
PADUCAH, KY 42003

NOTE: THIS DRAWING MUST HOLD UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED SIGNED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____.

MY COMMISSION EXPIRES _____ NOTARY _____

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 82 AND 100 KENTUCKY REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 19____.

DATE _____

CHAIRMAN PADUCAH PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF PADUCAH

I, JEFF ARNOLD, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THE AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, 19____.

BY _____ B.C. _____
CLERK

RECORDED IN PLAT SECT. _____, PAGE _____

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2550 THIRD AVENUE, PADUCAH, KY. 42003
TELEPHONE: 270-443-0395

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"

FROM DESIGN STATION 272+00 TO DESIGN STATION 315+96.66 END OF SECTION "C"

McCRACKEN COUNTY, KENTUCKY

Drawn: G.M.S.	Check:	Mechanical:	Electrical:	Project No.: 03674
Date: G.M.S.	Project: S.M.K.	Approved:	Date: 5-29-2009	Scale: 1" = 100'

19 of 20

1322

Floodwall Section C Centerline

		EAST (X)	NORTH (Y)
P.O.T.	0+06.0000	N 50°32'25.00" E	806913.0390	1895637.2242
P.O.T.	18+00.0000	N 50°32'25.00" E	807898.0274	1896977.3751
P.O.T.	28+60.6886	N 50°32'25.00" E	808777.060	1897651.4855
P.I.	36+89.6939	N 43°21'38.5" E	809364.6270	1898854.6983

P.I. = 36+89.6939
Delta = 7°10'46.85" Left

P.O.T.	45+26.4362	N 43°21'38.5" E	809918.0390	1898770.9106
P.O.T.	61+93.5702	N 43°21'38.5" E	810410.060	1899586.6000
P.I.	70+15.6894	N 46°46'29.68" E	810645.5555	1900595.5901

P.I. = 70+15.6894
Delta = 3°24'51.3" Right

P.O.T.	86+55.1287	N 46°46'29.68" E	812836.1565	1902718.3799
P.O.T.	92+68.8786	N 46°46'29.68" E	813283.4498	1902938.7849
Eq.Bk.	92+68.8786	----- EQUATION -----	813283.4501	1902938.7852
Eq.Ah.	92+70.0000	----- EQUATION -----		
P.I.	95+98.9066		813523.133	1902584.0465
P.C.	84+77.4950	N 46°46'29.68" E	813414.6379	1902280.8946
P.T.	97+47.5593	N 67°56'12.59" E	813615.6424	1902403.6506
M.O.C.	95+97.5231		813529.783	1902354.374
Rod Pt			813575.8009	1902607.2495

P.I. = 95+98.9066
Delta = 21°09'42.9" Right

D	8°48'53.05"
T	= 1[illegible].4096
L	= 26.4286
R	= 650.0000
E	= 0.2435

P.O.T.	110+43.510	N 67°56'12.59" E	814864.4950	1902907.1160
P.I.	127+93.3751	N 67°56'20.27" E	816466.2170	1903565.0550

P.I. = 127+93.3751
Delta = 0°40'52.37" Left

P.I.	146+54.404		818202.2595	1904284.4135
P.C.	145+14.9086	N 67°15'29.27" E	818073.083	1904230.9956
P.T.	147+74.4125	N 15°58'24.02" E	818240.5662	1904418.2398
M.O.C.	146+44.689		818118.1169	1904305.4165
Rod Pt			818241.1631	1904418.2493

P.I. = 146+54.404
Delta = 51°16'55.20" Left

D	9°45'39.25"
T	= 3[illegible].4096
L	= 104.9428
R	= 587.0000
E	= 2.6782

P.I.	165+95.385		818724.0034	1906124.5993
P.C.	163+80.67	N 15°58'24.02" E	818585.1740	1905971.4998
P.T.	167+24.4708	N 13°45'33.38" W	818616.022	1906275.3486
M.O.C.	165+45.792		818706.726	1906225.0207
Rod Pt			818616.3401	1906316.629

P.I. = 165+95.385
Delta = 29°43'53.28" Left

D	9°32'57.47"
T	= 15.2699
L	= 34.3536
R	= 600.0000
E	= 0.1793

P.I.	179+94.713		818383.6525	1907534.9233
P.C.	178+59.0542	N 13°45'33.38" W	818415.7892	1907403.6834
P.T.	181+25.4946	N 9°43'36.29" E	818406.4924	1907668.0983
M.O.C.	179+82.2741		818347.3490	1907535.402
Rod Pt			818241.1483	1907558.284

P.I. = 179+94.713
Delta = 23°29'05.05" Right

D	8°48'53.05"
T	= 15.917
L	= 31.8145
R	= 650.0000
E	= 0.1895

P.O.T.	184+37.7503	N 9°43'36.29" E	818438.5610	1907680.1780

Floodwall Section C Centerline (after Overlap Equation)

		EAST (X)	NORTH (Y)
P.O.T.	169+40.870	N 9°43'36.29" E	818408.560	1907680.1780
P.I.	174+47.572	N 13°20'05.11" E	818490.7887	1908859.8825

P.I. = 174+47.572
Delta = 3°16'24.2" Right

P.I.	181+09.9791		818543.5669	1910834.4304
P.C.	178+73.7187	N 13°20'05.11" E	818530.4594	1908580.3780
P.T.	183+38.1339	N 3°35'57.78" E	818516.280	1909003.3506
M.O.C.	181+08.0259		818660.5605	1910707.4028
Rod Pt			818584.2350	1910820.0092

P.I. = 181+09.9791
Delta = 18°05'52.47" Right

D	4°00'00.00"
T	= 250.2604
L	= 498.6443
R	= 1432.3944
E	= 16.3894

P.I.	187+53.8844		818583.3052	1912354.1927
P.C.	186+15.2549	N 3°35'57.78" E	818553.3665	1912238.374
P.T.	189+88.401	N 55°42'41.73" E	818597.4811	1912434.5174
M.O.C.	187+15.8380		818595.5848	1912346.0041
Rod Pt			818463.3912	1912607.0325

P.I. = 187+53.8844
Delta = 24°54'43.87" Right

D	8°48'53.05"
T	= 118.6295
L	= 213.8662
R	= 650.0000
E	= 16.688

P.I.	201+80.5075		820172.8700	1910683.5251
P.C.	197+48.2422	N 55°42'41.73" E	819807.6099	1909993.584
P.T.	205+12.6769	N 3°44'43.85" W	820413.7790	1910619.8457
M.O.C.	203+00.548		820061.1990	1910719.832
Rod Pt			819710.5343	1910983.389

P.I. = 201+80.5075
Delta = 59°25'25.40" Left

D	7°23'34.91"
T	= 462.264
L	= 823.7839
R	= 775.0000
E	= 67.336

P.I.	214+27.3764		820886.863	1911813.0270
P.C.	213+45.7820	N 3°44'43.85" W	820594.432	1911356.980
P.T.	219+13.0797	N 2°38'38.54" E	820782.09	1911935.975
M.O.C.	214+25.9559		820630.0592	1911833.0582
Rod Pt			820713.4459	1911903.0846

P.I. = 214+27.3764
Delta = 6°42'04.90" Right

D	2°46'22.02"
T	= 25.5944
L	= 51.1889
R	= 2063.4829
E	= 0.2483

P.O.T.	246+12.4804	N 2°38'38.54" E	820904.6965	1913868.2615

FLOODWALL CENTERLINE RECTIFICATION TO ORIGINAL PROJECT

SOUTHERN THREE TANGENTS
THE LAST TANGENT WAS ESTABLISHED (1977) AT SEVERAL CENTERLINE STATION 8+00. THIS POINT WAS HELD FOR THE BASIS OF THE SOUTHERN SECTION STATIONING.

THE FIRST TANGENT WAS A BEST FIT LINE THROUGH THE ABOVE MENTIONED MONUMENT AND A SERIES OF IN CENTERLINE OF LEVEE TOPOGRAPHY SHEETS.

THE SECOND TANGENT WAS ESTABLISHED BETWEEN THE CONTROL MONUMENTATION PRIOR FOR CONTROL MONUMENTS 1 AND 2.

THE FIRST POINT THE INTERSECTION OF THE ABOVE TWO TANGENTS, THE RESULTING STATION OF THE PI IS 15+19.40 THE PLAN PRINTOUT SHOWS AT 27+00.

THE THIRD TANGENT WAS ESTABLISHED BY MEMORIES THE FIRST + MORE RECENT 1979 AND 1 WAS OVER THE CENTERLINE OF A CROSS DRAIN.

THE SECOND PRESTABLISHED WAS THE INTERSECTION OF THE SECOND AND THIRD TANGENTS.

THE ENDING STATION AT THE BRIDGE FOUND (4+73) BY FOLLOWING THE SIDE MONUMENT AS THE BASIS RESULTED IN 8+00.00. THE PLAN PRINTOUT ORIGINALLY WAS 10+73. THIS RESULTED IN A MISTRANSLATION OF 1+27.00 MORE BETWEEN THIS SURVEY AND THE ORIGINAL REF SURVEY.

ANOTHER ENDING LOCATION WAS THE BRIDGE LOCATED 70' RIGHT OF STATION 8+00. THE RECALCULATED STATION FOR THIS WAS 9+59.00.

Notes

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2001). THE OBSERVATIONS WERE PERFORMED AUGUST 31 AND OCTOBER 6, 2004 ON THE MONUMENTS SHOWN AS M-1 THROUGH M-6.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THREE INDIVIDUAL TRAVERSES WERE PERFORMED. THE FIRST TRAVERSE CLOSED WITH A 1:10,000 PRECISION. THE SECOND TRAVERSE CLOSED WITH A 1:5,000 PRECISION. THE FIRST 4 SHOTS OF THE FIRST TRAVERSE CLOSED WITH A 1:2,000 PRECISION. THE REMAINING TRAVERSE CLOSURE WAS THE FIRST 4 SHOTS. THE REMAINING TRAVERSE CLOSURE WAS WITHIN 0.01 WITH ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (EDWIN BURR).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 4, 2007 TO JANUARY 4, 2008 THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 16 2008 THROUGH JANUARY 18, 2008

REFERENCE DRAWINGS BE MADE TO THE ORIGINAL PROJECT OF MAP PLANS FOR THE YEAR RIVER BASIN/FLOOD PROTECTION PADUCAH, KY WE PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1976. THE CODE FILE NUMBERS FOR THE DRAWINGS ARE 954-02-C THROUGH 954-02-F7 AND 954-02-F8.

Floodwall Section C Centerline (after Second Overlap Equation)

		EAST (X)	NORTH (Y)
P.O.T.	22+89.000	N 2°38'38.54" E	820092.81	1915589.1975
P.I.	21+77.8607	N 1°31'53.99" E	82044.1322	1920287.5278

P.I. = 21+77.8607
Delta = 2°46'38.56" Left

P.I.	224+10.7732	N 2°27'24.72" E	820035.4462	1922723.0028

P.I. = 224+10.7732
Delta = 0°35'24.33" Right

P.O.T.	226+63.7732	N 2°27'24.72" E	820048.6830	1922972.8730
P.I.	242+38.1548		820203.6524	1924545.8074
P.C.	239+44.0954	N 2°27'24.72" E	820203.0471	1924253.0023
P.T.	245+44.601	N 3°46'26.20" W	820058.822	1924795.7534
M.O.C.	242+29.3558		820170.8431	1924534.6097
Rod Pt			819246.3952	1924292.9575

P.I. = 242+38.1548
Delta = 34°05'24.7" Left

D	6°59'00.00"
T	= 294.0554
L	= 570.1527
R	= 954.9297
E	= 44.2486

P.I.	249+04.3966		819853.5639	1925272.8620
P.C.	247+43.7569	N 3°46'26.20" W	819829.609	1925105.7843
P.T.	250+45.0247	N 40°15'25.59" W	819762.0298	1925325.2693
M.O.C.	249+04.0378		819849.335	1925214.8777
Rod Pt			819334.562	1924920.0725

P.I. = 249+04.3966
Delta = 8°28'53.71" Left

D	3°00'00.00"
T	= 146.2457
L	= 282.7738
R	= 1909.8593
E	= 5.2454

P.I.	261+57.3733	N 42°18'44.36" W	819045.5324	1926083.7692

P.I. = 261+57.3733
Delta = 2°03'16.77" Left

P.I.	293+08.349		819322.3900	1928463.8673
P.C.	292+04.8825	N 42°18'44.36" W	819393.0358	1928377.9608
P.T.	294+01.5093	N 29°26'05.84" W	819371.5473	1928523.9798
M.O.C.	293+07.9059		819271.057	1928417.2775
Rod Pt			819169.3970	1928354.4768

P.I. = 293+08.349
Delta = 12°44'27" Right

D	8°00'00.00"
T	= 103.4593
L	= 206.2488
R	= 716.7325
E	= 5.876

P.I.	299+70.7129		819596.4547	1929954.4380
P.C.	298+63.4604	N 29°26'03.84" W	819549.026	1929858.0898
P.T.	302+16.2774	N 48°02'18.20" W	819361.7025	1930182.2309
M.O.C.	299+69.7589		819589.486	1929936.0382
Rod Pt			819318.8150	1929576.2592

P.I. = 299+70.7129
Delta = 18°36'38.36" Left

D	8°48'53.05"
T	= 106.2525
L	= 212.2549
R	= 650.0000
E	= 8.7254

P.O.T.	302+05.2556	N 48°02'18.20" W	819420.6464	1930143.5834

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SUBDIVI.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE _____ DAY OF _____, 20 ____

MY COMMISSION EXPIRES _____ NOTARY _____

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 100 AND 100.037 KENTUCKY REVISED STATUTES, HEREBY CERTIFY THAT THE PLANNING COMMISSION OF THE CITY OF PADUCAH, THIS PLAT THE BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 20 _____

CHAIRMAN PADUCAH PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF _____

I, _____, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, 20 _____

BY _____ D.C. _____ CLERK

RECORDED IN PLAT SECT. _____, PAGE _____

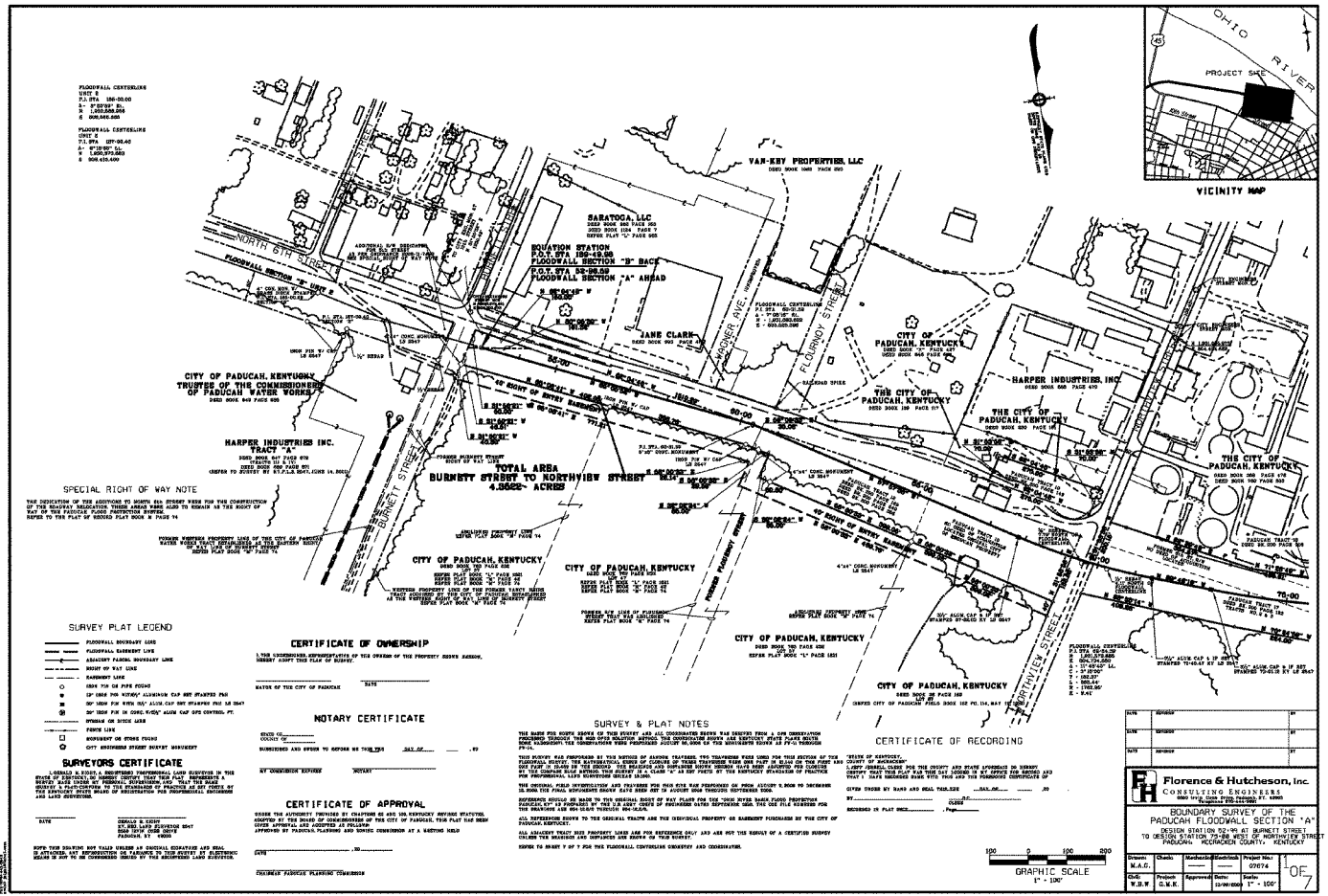
DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY
5-29-08	REMOVED STATEPLANE DATA FROM STA.239 TO 302 REVISED SHEET NUMBERS	G.M.K.

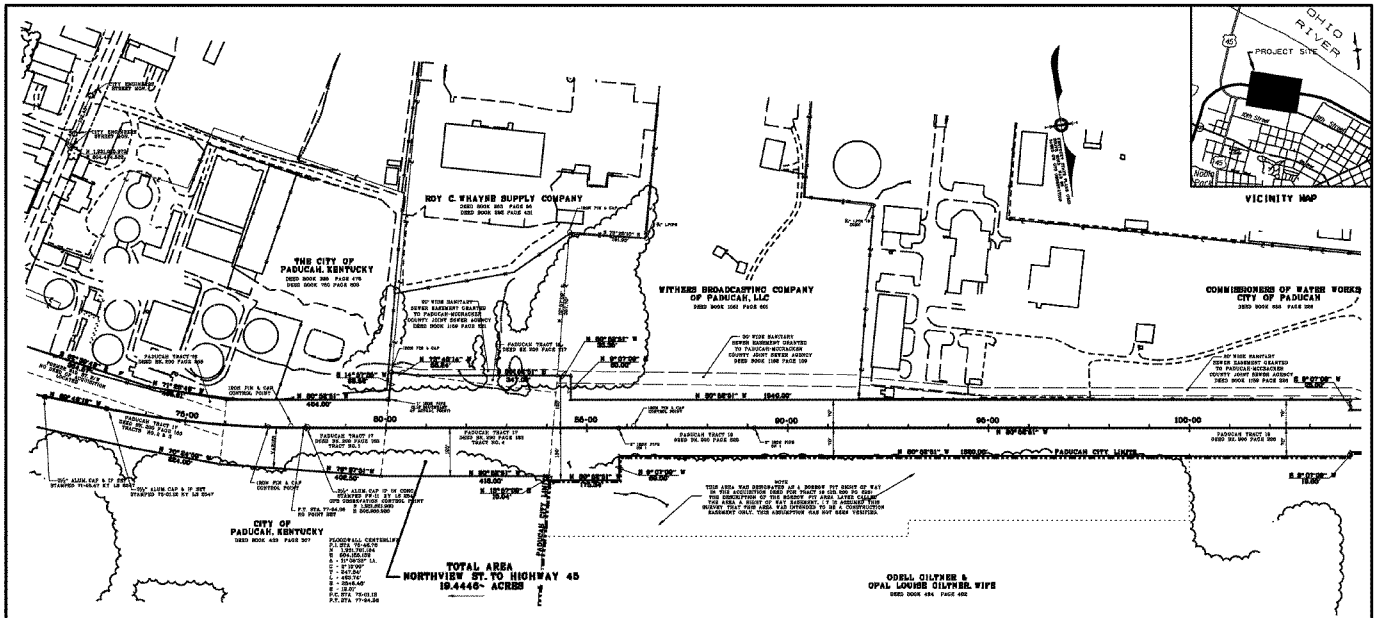
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2004 11th Street, Paducah, Kentucky 42001
"Serving Ky-Tenn"

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FLOODWALL CENTERLINE GEOMETRY

Drawn: G.M.K.	Check: —	Mechanical: —	Electrical: —	Project No.: 07074	20 of 20
Date: G.M.K.	Project:	Approved:	Date: 8.09.2008	Scale: 1:10	

1323


VICINITY MAP
OHIO RIVER
PROJECT SITE
VAN-KEY PROPERTIES, LLC
SARATOGA, LLC
JANE CLARK
CITY OF PADUCAH, KENTUCKY
HARPER INDUSTRIES, INC.
THE CITY OF PADUCAH, KENTUCKY
CITY OF PADUCAH, KENTUCKY TRUSTEE OF THE COMMISSIONERS OF PADUCAH WATER WORKS
HARPER INDUSTRIES INC. TRACT "A"
TOTAL AREA
BURNETT STREET TO NORTHVIEW STREET
4.5522+ ACRES
NORTH 6TH STREET
BURNETT STREET
NORTHVIEW STREET
FLOURNOY STREET
MAGNOLIA AVE.
SPECIAL RIGHT OF WAY NOTE
SURVEY PLAT LEGEND
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
CERTIFICATE OF APPROVAL
SURVEY & PLAT NOTES
CERTIFICATE OF RECORDING
GRAPHIC SCALE
1" = 100'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "A"
DESIGN STATION 72+95 AT BURNETT STREET
TO DESIGN STATION 79+88 WEST OF NORTHVIEW STREET
PADUCAH, McCRACKEN COUNTY, KENTUCKY
Drawn: M.A.G.
Checked: W.D.W.
Approved: C.M.K.
Project No.: 07074
Scale: 1" = 100'
1 OF 7



SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 1/2" IRON PIN W/YELLOW ALUMINUM CAP SET STAMPED PLS
- 30" IRON PIN W/1½" ALUM. CAP SET STAMPED PLS LS 3547
- 30" IRON PIN IN CONC. W/3½" ALUM. CAP SPW CONTROL PT.
- STEEL OR PATCH LINE
- FENCE LINE

SURVEYORS CERTIFICATE

I GERALD W. KIRBY, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE MAKE, TIME AND MANNER OF MAKING IS THE STANDARD OF PRACTICE AS SET FORTH BY THE KENTUCKY BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. KIRBY
KY. REG. LAND SURVEYOR 3547
3600 SOUTH OLD DIXIE
PADUCAH, KY 42003

NOTE: THIS DRAWING BOTH VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE IN THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PERTAINED BY CHAPTER 91 AND ARE CURRENT REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH. THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS

APPROVED BY PADUCAH, PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE , 19 .

CHAIRMAN PADUCAH PLANNING COMMISSION

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNER OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

DATE

MAYOR OF THE CITY OF PADUCAH

NOTARY CERTIFICATE

STATE OF
COUNTY OF

SUBSCRIBED AND SWORN TO BEFORE ME THIS DAY OF , 19

MY COMMISSION EXPIRES NOTARY

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PERFORMED THROUGH THE NGS GPS STATION STATION "THE COMMISSION WATER" AND KENTUCKY STATE PLANE NORTH ZONE NAD83/HARN. THE COORDINATES WERE PERFORMED AUGUST 31, 2000 OF THE NORTHWEST CORNER AS PK-11 THROUGH PK-14.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RADIAL TRAVERSE. THE TRAVERSES WERE USED FOR THE DETAILS OF THE FLOODWALL SURVEY. THE MATHEMATICAL ERROR OF CLOSURE OF THESE TRAVERSES WERE ONE FOOT IN 45,000 AS THE CROW FLIES AND ONE FOOT IN 10,000 FOOT FOR THE TOTAL TRAVERSE. THE ANGLE ERROR OF CLOSURE WAS 0.0 SECONDS. THE ANGLE ERROR WAS DISTRIBUTED EQUALLY AND DETERMINED BEFORE WORKING. THESE WERE ADJUSTED FOR CLOSURE PER PROFESSIONAL LAND SURVEYORS GUIDELINES.

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY AUGUST 6, 2000 TO DECEMBER 18, 2000. THE FINAL ADJUSTMENTS SHOWN HERE WERE SET UP IN AUGUST AND THROUGH SEPTEMBER 2000.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAT OF WAY PLANS FOR THE "OHIO RIVER BASIN FLOOD PROTECTION PADUCAH, KY" AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1968. THE THE FILE NUMBER FOR THE DRAWINGS ARE 100-S-5-3 THROUGH 100-S-5-9.

ALL REFERENCE SHOWN TO THE ORIGINAL TRACTS AND THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASED BY THE CITY OF PADUCAH, KENTUCKY.

ALL ADJACENT TRACT BOUNDARIES, LINES AND POC REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 7 OF 7 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

CERTIFICATE OF RECORDING

"STATE OF KENTUCKY,
COUNTY OF MCCRACKEN"

I, JEFF ASSELL CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY ADMITTED IN MY OFFICE FOR RECORD AND THAT I HAVE ATTACHED HERE WITH THIS AND THE PERTINENT CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS DAY OF , 20

BY , D.C.
CLERK

RECORDED IN PLAT BOOK , PAGE

GRAPHIC SCALE
1" = 100'

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
3600 Julian Drive, Paducah, Ky. 42003
Registered FIRM #F-1127

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "A"
DESIGN STATION 75+00 WEST OF NORTHVIEW STREET TO DESIGN STATION 102+00
PADUCAH, MCCRACKEN COUNTY, KENTUCKY

Drawn: M.A.C.	Check: —	Mathcad: —	Sheet/Unit: —	Project No.: 07074	2 OF 7
Clk: W.B.W.	Project: C.W.K.	Approved:	Date: 10/09/2000	Scale: 1" = 100'	

1325

SURVEY PLAT LEGEND

- FLOODWALL MOISTURE LINE
- FLOODWALL BAYONET LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- BAYONETT LINE
- IRON PIN OR PIPE FOUND
- 1/2" IRON PIN WITH "CITY" ALUMINUM CAP SET STAMPED PWS
- 30" IRON PIN WITH 1/4" ALUM. CAP SET STAMPED PWS LS 3847
- 30" IRON PIN IN CONC. W/DIV. ALUM. CAP SPB CONTROL PT.
- OVERALL OR DITCH LINE
- FENCE LINE

SURVEYORS CERTIFICATE

I, GERALD W. EDDY, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, HAVE PREPARED THE PLAT SHOWN HEREON FROM A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE BASIC SURVEY & PLAT CONFORMS TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD W. EDDY
KY. REGISTERED SURVEYOR 3847
2000 TRIGG STREET
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR VARIANCE TO THIS DRAWING BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED BEARER OF THE UNDERSIGNED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNER OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE _____ DAY OF _____, 20__

MY COMMISSION EXPIRES _____ NOTARY

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SURVEY OF THIS DEPICT AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCEDURE THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE NORTH ZONE, NAD83(2001). THE OBSERVATIONS WERE PERFORMED AUGUST 20, 2004 ON THE MONUMENTS SHOWN AS PP-01 THROUGH PP-04.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE TRAVERSES WERE USED FOR THE METHOD OF THE PADUCAH FLOODWALL SECTION "A" RECONSTRUCTION. BOUNDS OF CORNERS OF TRACTS TRAVERSED WERE FOUND OR SET AT THE TOP OF THE FLOOD WALL AND THE PARTS OF BEARS ON THE BOUNDS. THE BEARINGS AND DISTANCES SHOWN WERE DERIVED BASED ON CLOSURES OF THE COMPUTER FIELD METHOD. THIS SURVEY IS A CLASS "C" AS PER PARTS 8 OF THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS REGULAR 10.2000.

THE ORIGINAL FIELD INFORMATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY, AUGUST 6, 2004 TO DECEMBER 16, 2004. THE FINAL MONUMENTS SHOWN WERE SET IN AUGUST 2004 THROUGH SEPTEMBER 2004.

REFERENCE SHOULD BE MADE TO THE ORIGINAL SHEET OF RAY PLANS FOR THE OHIO RIVER BASIN FLOOD PROTECTION PADUCAH, KY. AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1965. THE CDS FILE NUMBERS FOR THE SEARCH ARE 004-01A1 THROUGH 004-01A5.

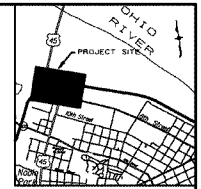
ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASED BY THE CITY OF PADUCAH, KENTUCKY.

ALL ADJACENT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A COMPUTED SURVEY UNLESS THE BEARINGS AND DISTANCE ARE SHOWN ON THIS SURVEY.

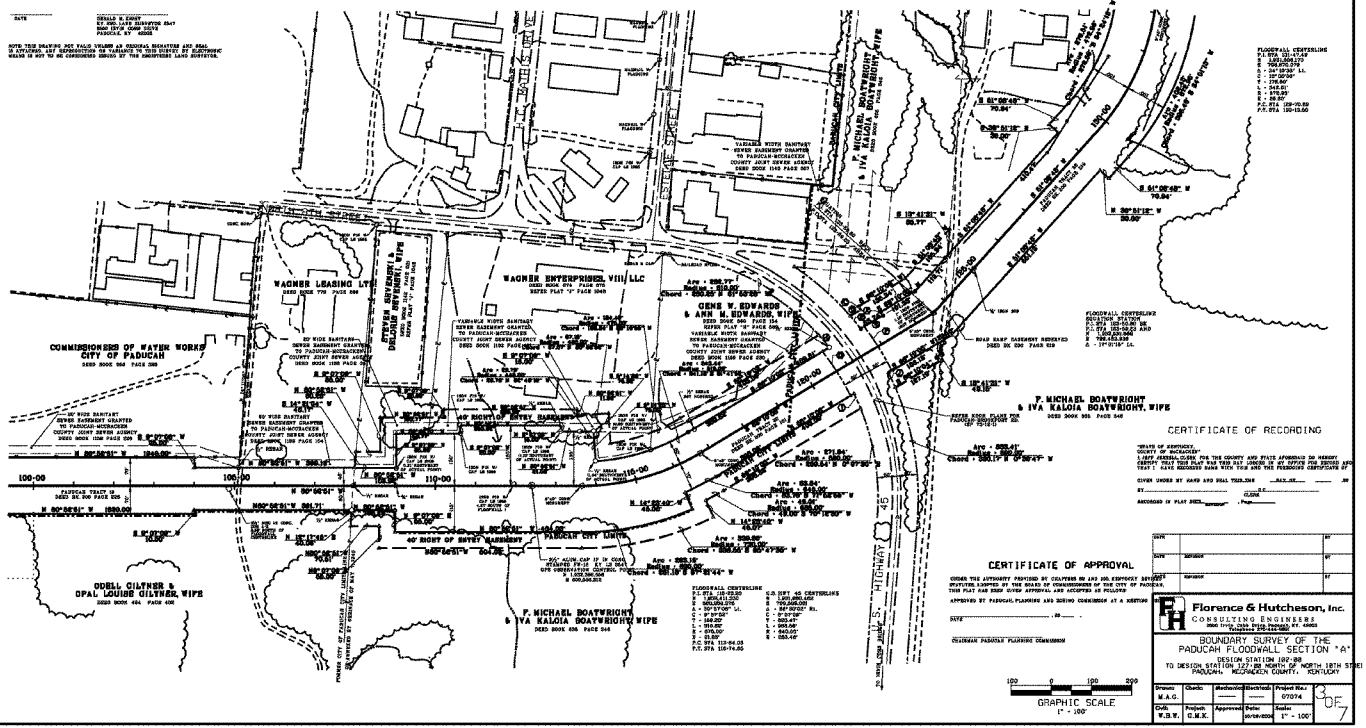
REFER TO SHEET 7 OF 7 FOR THE FLOODWALL CENTERLINE COORDINATES AND COORDINATES.

LINE TABLE

①	N 21°42'27" W 10.00'
②	N 89°10'00" W 60.87'
③	N 21°49'27" W 16.00'
④	N 89°10'00" W 89.87'
⑤	ARC = 40.42' RADIUS = 950.00' CHORD = 40.42' S 80°11'14" E
⑥	ARC = 108.82' RADIUS = 900.00' CHORD = 108.09' S 89°00'00" W
⑦	ARC = 108.82' RADIUS = 600.00' CHORD = 108.09' N 89°00'00" E
⑧	ARC = 40.42' RADIUS = 950.00' CHORD = 40.42' S 81°19'12" E
⑨	ARC = 40.42' RADIUS = 950.00' CHORD = 40.42' S 10°48'00" W
⑩	ARC = 40.42' RADIUS = 950.00' CHORD = 40.42' N 10°48'00" W



VICINITY MAP



CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF MCCRACKEN:
I, JEFF RUSSELL, CLERK OF THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE WITHIN PLAT WAS LODGED FOR RECORDING IN MY OFFICE AND THAT I HAVE RECORDED SAME WITH THIS AND THE PRECEDING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, 20__

BY _____ D.C.
CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 89 AND 100, KENTUCKY REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING

DATE _____, 20 _____.

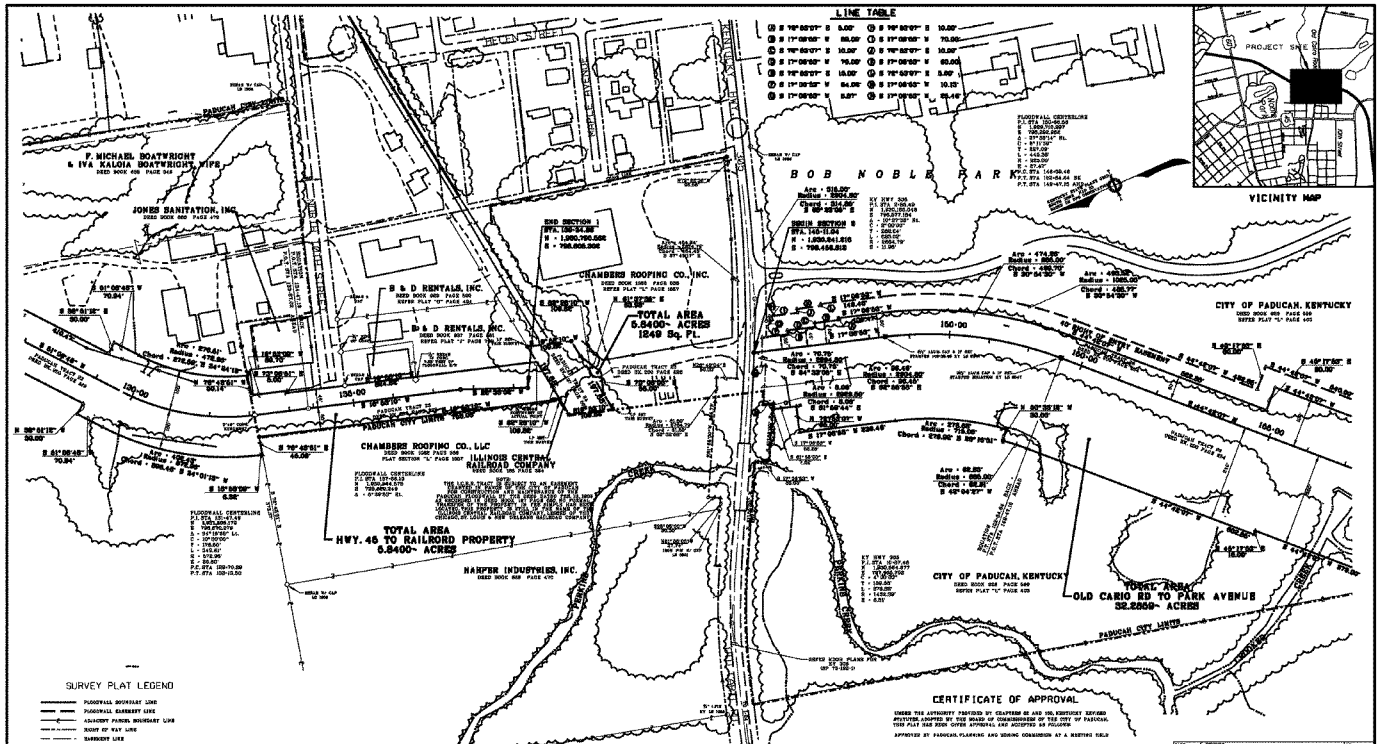
CHAIRMAN PADUCAH PLANNING COMMISSION

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2000 TRIGG STREET PADUCAH, KY 42003
(270) 443-8300

BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "A"
DESIGN STATION 107+00
TO DESIGN STATION 137+00 NORTH OF NORTH 18TH STREET
PADUCAH, MCCRACKEN COUNTY, KENTUCKY

Drawn:	Checked:	Reviewed:	Electronic:	Project No.:	
M.A.G.		—	—	07074	3 OF 7
Crew:	Project:	Approved:	Date:	Scale:	
W.B.W.	G.M.K.		05/08/2008	1" = 100'	



SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- IRON PIN OR PIPE FOUND
- 1/2" IRON PIN FOUND/ ALUMINUM CAP NOT STAMPED PLS
- 1/2" IRON PIN SET/ 1½" ALUM. CAP NOT STAMPED PLS LS 3847
- 1/2" IRON PIN IN CONC.POST/ ALUM. CAP NOT STAMPED PLS CENTRAL PT.
- STREAM OR DITCH LINE
- FENCE LINE

SURVEYORS CERTIFICATE

I, GERALD R. BOOKS, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION AND THAT THE MARK DEPICTED HEREON DO MEET THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE — GERALD R. BOOKS
KY. REG. LAND SURVEYOR 3847
BOOK BOOKS GROUP, INC.
PADUCAN, KY. 42003

NOTE: THIS DRAWING MAY VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL APPEARS ON THE FACE OF THE DOCUMENT. ANY ALTERATION OF THIS DOCUMENT MEANS IT MAY BE NO LONGER CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNER OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAN — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

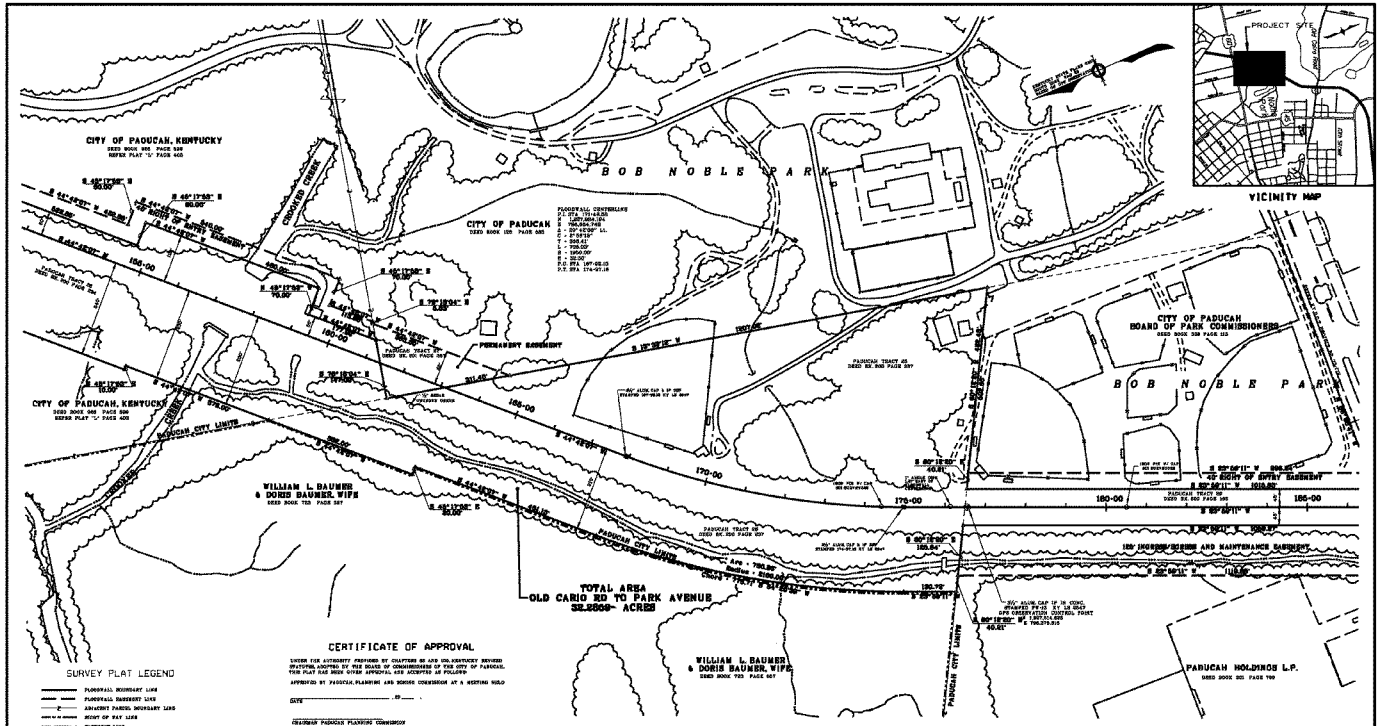
SUBSCRIBED AND SWORN TO BEFORE ME THIS THE _____ DAY OF _____, 20

MY COMMISSION EXPIRES _____ (SEAL)

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS OBTAINED FROM A GPS OBSERVATION TAKEN ON THE PROJECT SITE. THE COORDINATES WERE ADJUSTED TO THE KENTUCKY STATE PLANE COORDINATE SYSTEM, NAD83(2011). THE COORDINATES WERE PROPORTIONED AGAINST NG MONS ON THE ADJACENT BRIDGE, LS PN 15 TARGETS PN 16.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. TWO TRAVERSES WERE USED FOR THIS SECTION OF THE PADUCAN RIVERFRONT. THE MATHEMATICAL ERROR OF CLOSURES OF THESE TRAVERSES WERE FOR EAST OF ELLIOT ON THE FIRST AND SECOND STREET. THE ERROR OF CLOSURE FOR THE FIRST TRAVERSE WAS 1 FOOT IN 12,000 AND THE SECOND WAS 1 FOOT IN 15,000



SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- 1000 FIR OR IRON FOUND
- 18" IRON PIN WITH "ALUMINUM CAP NOT STAMPED FOR
- 30" IRON PIN WITH 1½" ALUM.CAP NOT STAMPED PLS LS 3547
- 30" IRON PIN IN CONC.W/1½" ALUM. CAP CPS CONTROL PT.
- STREAM OR DITCH LINE
- FENCE LINE

SURVEYORS CERTIFICATE

I, GERALD M. KIGHT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY DO HEREBY CERTIFY THAT THIS PLAT, REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION, AND THAT THE RESULTS OF SUCH SURVEY ARE CORRECT TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE CURRENT STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GERALD M. KIGHT
KY. REG. LAND SURVEYOR 3547
3600 IRVIN CROSS DRIVE
PADUCAH, KY 42001

NOTE: THIS DRAWING MAY FALL VOLUME AS ORIGINAL DRAWINGS AND SEAL IS APPLIED. ANY REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED ISSUED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 89 AND 100, KENTUCKY REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 19____.

CHAIRMAN PADUCAH PLANNING COMMISSION

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED REPRESENTATIVE OF THE OWNER OF THE PROPERTY KNOWN HEREBY, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS DAY _____ DAY OF _____, 19__

MY COMMISSION EXPIRES _____ NOTARY _____

SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATE POINTS WAS DERIVED FROM A GPS OBSERVATION PERFORMED THROUGH THE RGN GPS SOLUTION METHOD. THE COORDINATES SHOWN ARE CONTINUOUS STATE PLANE SOUTH ZONE NAD83(93) THE OBSERVATIONS WERE PERFORMED AUGUST 30, 2000 ON THE EQUIPMENT SHOWN AS PER G TECHNICAL PROC.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RADIAL TRAVERSE; THE TRAVERSE WAS CLOSED ON THE SECTION OF THE PADUCAH FLOODWALL SURVEY. THE ANTICIPATED ERROR OF CLOSURE OF THIS TRAVERSE WAS ONE POINT IN EIGHT ON THE PLAT AND ONE POINT IN EIGHT ON THE GROUND. THE BEARINGS AND DISTANCES FOUND ERRORS HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THE SURVEY IS A CLASS "A" AS SET FORTH BY THE CURRENT STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS GREATER THAN.

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FRIDAY, AUGUST 4, 2000 TO DECEMBER 15, 2000. THE FINAL ADJUSTMENTS SHOWN HAVE BEEN NOT IN AUGUST 2000 TRAVERSE COMPARED HERE.

REFERENCE SHOULD BE MADE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE "OLD CARIO ROAD-PADUCAH PROTECTION PADUCAH, KY" AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1966. THE CORE PLAN NUMBERS FOR THE DRAWINGS ARE 804-08-N/S TERRACE 804-08-N/S.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASED BY THE CITY OF PADUCAH, KENTUCKY.

ALL ADJACENT TRACT SIZE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE FOR THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS ARE DEPICTED AS SHOWN ON THIS SURVEY.

REFER TO SHEET 7 OF 7 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

CERTIFICATE OF RECORDING

"STATE OF KENTUCKY,
COUNTY OF McCRACKEN"

I, JEFF JOHNELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS DAY OF _____, 19__

BY _____ D.C.
CLERK

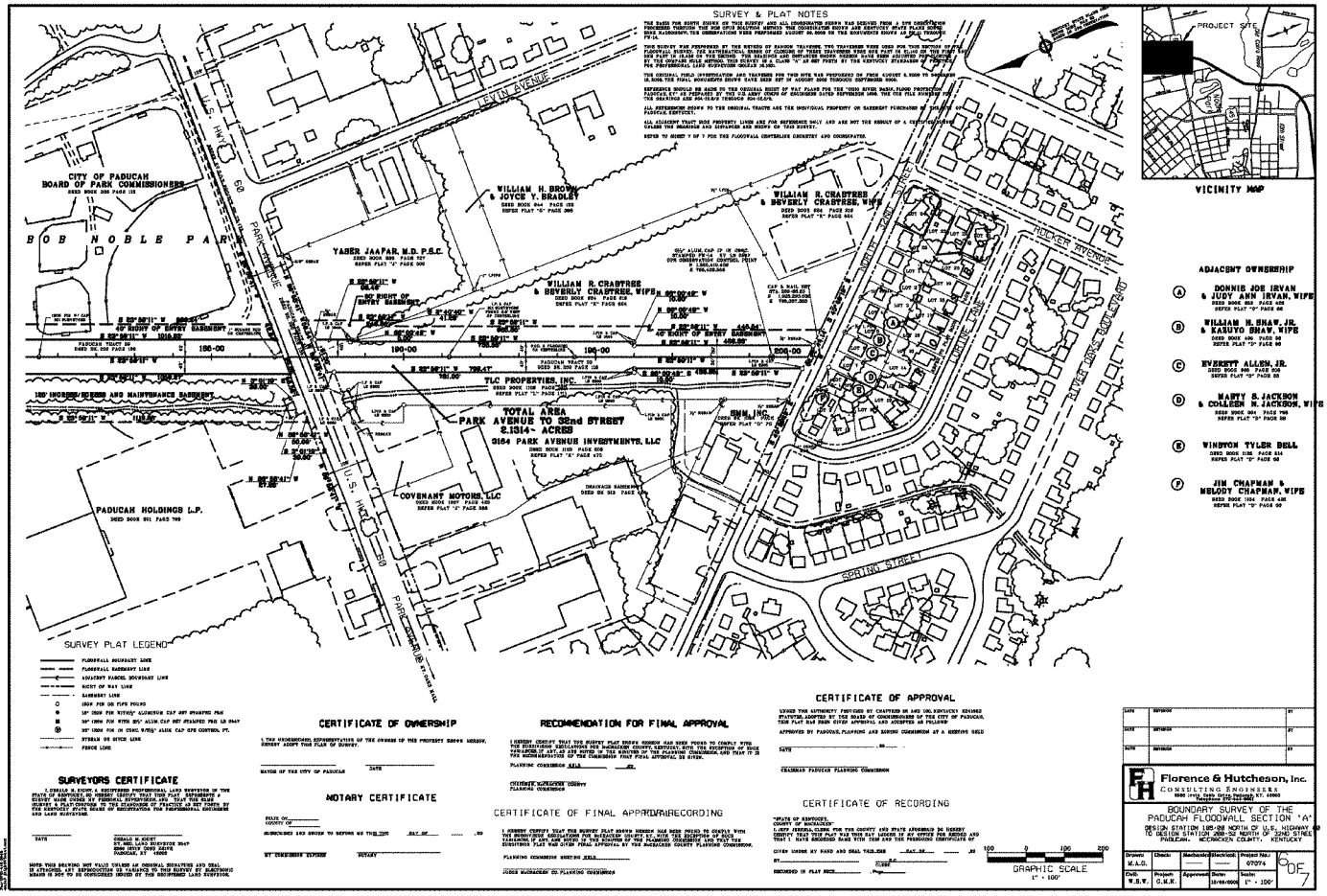
RECORDED IN PLAT BOOK _____, Page _____

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
3600 Irvin Cross Drive Paducah, KY. 42001
Telephone 270-443-0395

BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "A"
DESIGN STATION 157+88 NORTH OF CROOKED CREEK
TO DESIGN STATION 180+88 NORTH OF U.S. HIGHWAY 60
PADUCAH, McCRACKEN COUNTY, KENTUCKY

Drawn: M.A.C.	Check:	Reviewed:	Electrical:	Project No.: 07074
Civil: W.B.W.	Project: C.M.K.	Approved:	Date: 10/30/2000	Scale: 1" = 100'


SURVEY & PLAT NOTES
VICINITY MAP
PROJECT SITE
ADJACENT OWNERSHIP
(A) DONNIE JOE IRVAN & JUDY ANN IRVAN, WIFE
(B) WILLIAM H. SHAW, JR. & KASUYO SHAW, WIFE
(C) EVERETT ALLEN, JR.
(D) MARTY S. JACKSON & COLLEEN M. JACKSON, WIFE
(E) WINSTON TYLER BELL
(F) JIM CHAPMAN & MELODY CHAPMAN, WIFE
CITY OF PADUCAH BOARD OF PARK COMMISSIONERS
BOB NOBLE PARK
WILLIAM H. BROWN & JOYCE Y. BRADLEY
WILLIAM R. CRABTREE & BEVERLY CRABTREE, WIFE
YASER JAAFAR, M.D. P.S.C.
TLC PROPERTIES, INC.
TOTAL AREA
PARK AVENUE TO 32nd STREET
2.1314- ACRES
3164 PARK AVENUE INVESTMENTS, LLC
COVENANT MOTORS, LLC
PADUCAH HOLDINGS L.P.
SHW, INC.
PARK AVENUE
ROCKER AVENUE
SPRING STREET
RIVER OPEN SURVEY
SURVEY PLAT LEGEND
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF APPROVAL
CERTIFICATE OF RECORDING
GRAPHIC SCALE
1" = 100'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION 'A'
DESIGN STATION 108+00 NORTH OF U.S. HIGHWAY 60 TO DESIGN STATION 208+32 NORTH OF 32ND STREET
PADUCAH, MCCRACKEN COUNTY, KENTUCKY
Drawn: M.A.G.
Project No.: 07074
Scale: 1" = 100'
Sheet 6 OF 7

1329

FLOODWALL SECTION A CENTERLINE BURNETT STREET TO SOUTH OF OLD CAIRO ROAD

EAST (X) NORTH (Y)

P.O.T. 62-89.7003 N 85°06'51.80" W 806195.2398 1930776.5435

P.I. 60-31.5900 N 57°57'35.80" W 806523.3956 1931053.5221

P.I. - 60-31.5900
Delta - 7°09'16.00" Right

P.I. 69-54.3930 804754.8785 1931575.9952

P.C. 67-83.0252 N 57°57'35.80" W 804659.2686 1931481.9369
P.T. 71-45.4361 N 69°46'18.63" W 804583.5648 1931541.7405

M.O.C. 69-83.7488 804730.5358 1931570.2368
Rad Pt 903941.0041 1958087.5563

P.I. - 69-54.3930
Delta - 11°49'45.93" Left
C - 3°15'00.00"
T - 152.3679
L - 303.4430
R - 1756.9471
E - 9.4074

P.I. 75-48.7649 804195.1357 1931751.1936

P.C. 73-01.1181 N 69°46'18.63" W 804417.5095 1931695.3581
P.T. 77-94.3921 N 80°52'31.32" W 803940.8839 1931820.4320

M.O.C. 75-47.9988 804152.0056 1931759.5820
Rad Pt 805537.0406 1962306.1879

P.I. - 75-48.7649
Delta - 11°06'32.69" Left
C - 2°15'00.00"
T - 247.2448
L - 489.7370
R - 2548.4791
E - 12.0134

P.O.T. 75-04.8624 N 80°52'31.32" W 803230.9860 1931621.9930

P.I. 115-23.2288 800250.3749 1932411.3237

P.C. 113-54.0236 N 80°52'31.32" W 800416.8625 1932306.0867
P.T. 118-74.6464 S 68°10'03.15" W 800111.0027 1932352.1243

M.O.C. 115-19.3381 800325.4327 1931818.3660 802251.7700 1932339.6309
Rad Pt

P.I. - 115-23.2288
Delta - 20°37'35.53" Left
C - 2°37'21.14"
T - 158.1898
L - 310.8196
R - 573.0000
E - 21.5318

P.O.T. 116-74.7477 S 68°10'03.15" W 800111.4857 1932362.0853

P.I. 123-50.8000 S 51°26'47.80" W 799483.9261 1932100.6687

P.I. - 123-50.8000
Delta - 17°06'15.30" Left

Eq.Bk. 123-50.8001 ----- EQUATION ----- 799483.9260 1932100.6686
Eq.Ah. 123-59.2323 ----- EQUATION -----

P.I. 131-47.4285 798971.0769 1931668.1763

P.C. 129-79.9818 S 51°08'47.80" W 799007.6043 1931718.9547
P.T. 133-15.4991 S 15°52'38.52" W 798916.7832 1931437.1875

M.O.C. 131-42.1950 798892.1234 1931591.2907
Rad Pt 799267.0375 1931270.7617

P.I. - 131-47.4285
Delta - 34°16'38.80" Left
C - 10°00'00.00"
T - 176.2992
L - 342.8594
R - 573.5079
E - 26.5979

Eq.Bk. 134-47.1900 ----- EQUATION ----- 798779.9500 1931509.2549
Eq.Ah. 133-57.0200 ----- EQUATION -----

P.I. 137-85.1341 S 23°53'02.46" W 798859.2468 1930944.5776

P.I. - 10137-85.1341
Delta - 5°39'52.30" Right

P.O.T. 139-34.8796 S 22°53'02.46" W 798805.3080 1930790.5922

FLOODWALL SECTION A CENTERLINE OLD CAIRO ROAD TO NORTH 32ND STREET

EAST (X) NORTH (Y)

P.O.T. 145-11.0691 S 17°06'55.10" W 798434.4834 1930841.2181

P.I. 150-66.5548 798292.9818 1929710.2973

P.C. 149-39.4650 S 17°06'02.13" W 798359.8119 1929927.3328
P.T. 152-84.8400 S 44°42'06.52" W 798133.2414 1929645.2859

M.O.C. 150-62.1525 798286.4144 1929724.4086
Rad Pt 797475.7724 1932196.5477

P.I. - 150-66.5548
Delta - 57°36'13.72" Right
C - 5°11'30.90"
T - 227.0025
L - 445.2750
R - 925.0000
E - 27.4662

Eq.Bk. 152-54.8400 ----- EQUATION ----- 798133.2414 1929645.2859
Eq.Ah. 149-47.1500 ----- EQUATION -----

P.I. 171-45.5342 798354.7475 1927924.1944

P.C. 167-92.1262 S 44°42'06.52" W 798835.4301 1928237.5183
P.T. 174-97.1592 S 23°50'10.32" W 798439.8916 1927658.5669

M.O.C. 171-44.6412 798811.4191 1927925.2703
Rad Pt 795221.4837 1929653.5039

P.I. - 171-45.5342
Delta - 90°42'55.84" Left
C - 2°26'17.00"
T - 358.4560
L - 705.0321
R - 1950.0000
E - 32.3030

P.O.T. 250-52.5742 S 23°59'10.32" W 798400.9945 1928323.7339

U.S. HIGHWAY 45 (8TH STREET)

EAST (X) NORTH (Y)

P.O.T. 100-00.0000 N 75°09'58.11" W 800388.2832 1931745.7458

P.I. 109-18.7899 798809.0358 1931980.4816
P.C. 108-89.1838 N 75°09'58.11" W 800111.0801 1931830.8008
P.T. 112-81.5800 N 13°57'32.18" E 798852.3248 1932527.2436
M.O.C. 107-87.5194 799728.8184 1932113.7281
Rad Pt 800875.7310 1932438.4710

P.I. - 109-18.7899
Delta - 89°30'57.26" Right
C - 5°07'26.92"
T - 313.6230
L - 625.7352
R - 840.0000
E - 251.5958

P.O.T. 185-23.9492 N 13°57'32.18" E 799939.6168 1933795.7453

KENTUCKY HWY. 305 - OLD CAIRO ROAD

EAST (X) NORTH (Y)

P.O.T. 0-00.0000 N 72°22'37.95" W 793646.4188 1930099.5243

P.I. 2-82.4596 795677.1242 1930185.0477
P.C. 0-23.2484 N 72°22'37.95" W 795867.1164 1930108.6544
P.T. 5-43.3731 N 61°55'00.17" W 795345.2181 1930306.4669

M.O.C. 2-81.7658 795581.3369 1930196.6852
Rad Pt 799934.4308 1932535.9997

P.I. - 2-82.4596
Delta - 23°27'37.78" Right
C - 2°00'00.00"
T - 292.2412
L - 583.0267
R - 2864.7590
E - 11.9777

P.I. 10-97.4596 797866.7017 1930664.8773
P.C. 9-47.3757 N 61°55'00.17" W 797328.1158 1930463.5823
P.T. 12-29.4596 N 73°24'12.45" W 797731.8765 1930506.4972

M.O.C. 10-97.0177 797963.0934 1930556.3621
Rad Pt 797314.8103 1932235.3758

P.I. - 10-97.4596
Delta - 11°09'29" Left
C - 4°00'00.00"
T - 158.8541
L - 279.5240
R - 1432.3945
E - 8.5143

P.O.T. 18-11.9774 N 73°24'12.45" W 797383.4472 1932717.5413

NOTES

THE BASIS FOR NORTH BEARS ON THIS SURVEY AND ALL COORDINATED SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH, NAD83(2001). THE OBSERVATIONS WERE PERFORMED JANUARY 8 AND 9,2008 ON THE NAVIGATION SERVE AS ITS ID VERSION 19-04

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE TWO INDIVIDUAL TRAVERSES WERE PERFORMED THE ARITHMETICAL MEANS OF PLACING OF THE FIRST TRAVERSE WAS USED FOR THE BEARING AND THE PART IN ACCORDANCE WITH THE MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS CHAPTER 18:020.

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM AUGUST 31,2000 TO OCTOBER 26,2000 THE FINAL COORDINATE SHOWN HAVE BEEN SET ON -------,2008 THROUGH -------,2008

REFERENCE SHOULD BE MADE TO THE ORIGINAL SHEET OF RAY PLATS FOR THE "OHIO RIVER BARGE FLOOD PROTECTION PADUCAH KY" AS PREPARED BY THE U.S ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1988 THE CAD FILE NUMBER FOR THE SURVEYOR IS 834-ALS/SURVEYOR 834-ALS/S

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2500 Irvin Cobb Drive Paducah, KY. 42003
Telephone 270-442-8402

BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "A"
FLOODWALL CENTERLINE GEOMETRY

Drawn: M.A.C.	Chkd.:	Mechanical: ——	Electrical: ——	Project No.: 07074	1/OE
Chk: W.B.F.	Project: G.M.K.	Approved:	Date: 10/08/2008	Scale: N/A	

1330