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Chas. R. Haile Associates, Inc. Consulting Engineers

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

No 13 TOWN OF BAYSIDE, TEXAS

BULKHEADING OF BAYFRONT PARK

NOAA GRANT NO. NA-79-AA-D-CZ039

JANUARY, 1980

JOB #679006

RECEIVED
APR 20 1981
Budget/Planning

TOWN OF BAYSIDE, TEXAS

BULKHEADING OF BAYFRONT PARK

NOAA GRANT NO. NA-79-AA-D-CZ039

JANUARY, 1980

JOB #679006

TC225.B39T69 1980

MAYOR: BILLY PAUL FRICKS

COUNCIL: TOM BUCHANAN
HOPE VEGA
JOHN R. ROBERTS
BILL BLUEMEL
ANN JENKINS

CITY SECRETARY: C. W. CHICK, JR.

CHAS. R. HAILE ASSOCIATES, INC.

Houston - Corpus Christi - Texas City - Nederland

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STANDARD FORM OF AGREEMENT

1

STATE OF Texas)

COUNTY OF Refugio)

THIS AGREEMENT, MADE AND ENTERED INTO THIS 29th DAY OF February A.D., 19 80, by and between the Town of Bayside

thereunto duly authorized so to do, Party of the First Part, hereinafter called OWNER, and Vermillion Construction Co., Inc.

of the City of Fulton County of Aransas

and the State of Texas Party of the Second Part, hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Party of the First Part, (OWNER), and under the conditions expressed in the bond bearing every date herewith, the said Party of the Second Part (CONTRACTOR), hereby agrees with said Party of the First Part, (OWNER,), to commence and complete the construction of certain improvements described as follows: Bulkhead and Steps noted as Alternate Bid Item # 1 for $184,871.00

and all extra work in connection therewith, under the terms as stated in the General Conditions of the Agreement, and at his (or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said construction, in accordance with the conditions and prices stated in the Proposal attached hereto, and in accordance with all the General Conditions of the Agreement, and in accordance with the Plans, which include all maps, plats, blueprints and other drawings and printed or written explanatory matter thereof, and the specifications therefor, as prepared

by Chas. R. Haile Associates, Inc., Consulting Engineers, herein entitled the Engineer, each of which has been identified by the endorsement of the CONTRACTOR and the ENGINEER thereon, together with the CONTRACTOR'S written approval, and the General Conditions of the Agreement, and the Construction Bonds hereto attached, all of which are made a part hereof and collectively evidence and constitute the entire contract.

The CONTRACTOR hereby agrees to commence work within ten (10) days after the date written notice to do so shall have been given to him, and to substantially complete same within 140 working days, after the date of the written notice to commence work.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the Contract in accordance with the proposal submitted therefor, subject to additions and deductions as provided in the General Conditions of the Agreement, and to make payments on account thereof as provided therein.

IN WITNESS WHEREOF, the parties of these presents have executed this Agreement in quadruplicate in the year and day first above written.

Vermillion Construction Co., Inc.
PARTY OF THE SECOND PART (CONTRACTOR)
Charles E. Vermillion, Pres.
Charles E. Vermillion
P.O. Drawer 159
Fulton, Texas 78358
(ADDRESS)

Town of Bayside
PARTY OF THE FIRST PART (OWNER)
Billy P. Fricks, Mayor
Billy P. Fricks

Seal
ATTEST: Laura Leisenheimer

ATTEST: [illegible]

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT Vermillion Construction Co., Inc.

as Principal, hereinafter called CONTRACTOR, and Aetna Casualty & Surety Co.

as Surety, hereinafter called SURETY, are held and firmly bound

unto the Town of Bayside

as OBLIGEE, hereinafter called OWNER, in the amount of One hundred eighty-four thousand eight hundred seventy-one and no/100 DOLLARS ($184,871.00),

for the payment whereof CONTRACTOR AND SURETY bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, CONTRACTOR has written agreement dated February 29, 1980

entered into a contract with OWNER for Bulkhead and Steps noted as Alternate Bid Item # 1

in accordance with drawings and specifications prepared by Chas. R. Haile Associates, Inc., Consulting Engineers, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW,THEREFORE, THE CONDITION OF THIS OBLIGATION is such that,if CONTRACTOR shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

The SURETY hereby waives notice of any alteration or extension of time made by the OWNER.

Whenever CONTRACTOR shall be, and declared by OWNER to be in default under the Contract, the OWNER having performed OWNER'S obligations thereunder, the SURETY may promptly remedy the default, or shall promptly (1) complete the Contract in accordance with its terms and conditions; or (2) obtain a bid or bids for submittal to OWNER for completing the Contract in accordance with its terms and conditions, and upon determination by OWNER and SURETY of the lowest responsible bidder, arrange for a contract between each bidder and OWNER, and make available as work progresses (although there should be a default, or a succession of defaults, under the contract, or contracts, of completion arranged under this paragraph) sufficient funds to pay the cost of completion, less the balance of the contract price, but not exceeding,

PERFORMANCE BOND (Continued)

including other costs and damages for which the SURETY may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean total amount payable by the OWNER to CONTRACTOR under the Contract and any amendments thereto, less the amount properly paid by OWNER to CONTRACTOR.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accure on this bond to or for the use of any person or corporation other than the OWNER named herein or the heirs, executors, administrators, or successors of OWNER.

Signed and sealed this 26 day of March A.D., 19 80.

IN THE PRESENCE OF:

Laura Lesenheimer

Vermillion Construction Co., Inc.
(PRINCIPAL) (SEAL)

(TITLE)

Aetna Casualty & Surety Co.
(SURETY) (SEAL)

(TITLE) J. D. Morgan, Atty in fact
925 Nueces Bldg., P. O. Box 465
Corpus Christi, Texas 78403

LABOR AND MATERIAL PAYMENT BOND

NOTE: This Bond is issued simultaneously with another bond in favor of the OWNER conditioned for the full and faithful performance of the Contract.

KNOWN ALL MEN BY THESE PRESENTS:

THAT Vermillion Construction Co., Inc.

as Principal, hereafter called Principal, and Aetna Casualty & Surety Co.

as Surety, hereinafter called Surety, are held and firmly bound unto the Town of Bayside, Texas

as Obligee, hereinafter called OWNER, for the use and benefit of claimants as hereinafter defined, in the amount of One hundred eighty-four thousand eight hundred seventy-one and no/100 DOLLARS ($ 184,871.00)

for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has written Agreement dated February 29, 1980 entered into a Contract with OWNER for Bulkhead and Steps noted as Alternate Bid Item # 1

in accordance with drawings and specifications prepared by Chas. R. Haile Associates, Inc., Consulting Engineers, which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly make payment to all claimants as hereinafter defined for all labor and materials used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject, however, to the following condition:

LABOR AND MATERIAL PAYMENT BOND (Continued)

1. A claimant is defined as one having a direct contract with the Principal or with a subcontractor or the Principal for labor, material, or both, used or reasonably required for use in the performance of the contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone services or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the OWNER that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The OWNER shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant.

(a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: The Principal, the OWNER, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, OWNER, or Surety, at any place where an office is regularly maintained for the transaction of business or served in any manner in which legal process may be served in the state in which the aforesaid project is located, except that such service need not be made by a public officer.

(b) After the expiration of one (1) year following the date on which the Principal ceased work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

(c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

LABOR AND MATERIAL BOND (Continued)

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement whether or not claim for the smount of such lien be presented under and against this bond.

Signed and sealed this 26 day of March A.D., 19 80.

IN THE PRESENCE OF:

Laura Lisenbrener

Vermillion Construction Co., Inc.
(PRINCIPAL) (SEAL)

(TITLE)

Aetna Casualty & Surety Co.
(SURETY) (SEAL)

(TITLE) J. D. Morgan, Atty in fact
925 Nueces Bldg. P. O. Box 46
Corpus Christi, Texas 78403

Ætna
LI[illegible] CASUALTY

THE ÆTNA CASUALTY AND SURETY COMPANY
Hartford, Connecticut 06115

POWER OF ATTORNEY AND CERTIFICATE OF AUTHORITY OF ATTORNEY(S)-IN-FACT

KNOW ALL MEN BY THESE PRESENTS, THAT THE ÆTNA CASUALTY AND SURETY COMPANY, a corporation duly organized under the laws of the State of Connecticut, and having its principal office in the City of Hartford, County of Hartford, State of Connecticut, hath made, constituted and appointed, and does by these presents make, constitute and appoint J. D. Morgan - -

of Corpus Christi, Texas, its true and lawful Attorneys-in-Fact, with full power and authority hereby conferred to sign, execute and acknowledge, at any place within the United States, or, if the following line be filled in, within the area there designated , the following instrument(s):

by his sole signature and act, any and all bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any and all consents incident thereto not exceeding the sum of FIVE HUNDRED THOUSAND ($5[illegible],000.00) DOLLARS - -

and to bind THE ÆTNA CASUALTY AND SURETY COMPANY, thereby as fully and to the same extent as if the same were signed by the duly authorized officers of THE ÆTNA CASUALTY AND SURETY COMPANY, and all the acts of said Attorneys-in-Fact, pursuant to the authority herein given, are hereby ratified and confirmed.

This appointment is made under and by authority of the following Standing Resolutions of said Company which Resolutions are now in full force and effect:

VOTED: That each of the following officers: Chairman, Vice Chairman, President, Any Executive Vice President, Any Senior Vice President, Any Vice President, Any Assistant Vice President, Any Secretary, Any Assistant Secretary, may from time to time appoint Resident Vice Presidents, Resident Assistant Secretaries, Attorneys-in-Fact, and Agents to act for and on behalf of the Company and may give any such appointee such authority as his certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors may at any time remove any such appointee and revoke the power and authority given him.

VOTED: That any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the Chairman, the Vice Chairman, the President, an Executive Vice President, a Senior Vice President, a Vice President, an Assistant Vice President or by a Resident Vice President, pursuant to the power prescribed in the certificate of authority of such Resident Vice President, and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary or by a Resident Assistant Secretary, pursuant to the power prescribed in the certificate of authority of such Resident Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact pursuant to the power prescribed in his or their certificate or certificates of authority.

This Power of Attorney and Certificate of Authority is signed and sealed by facsimile under and by authority of the following Standing Resolution voted by the Board of Directors of THE ÆTNA CASUALTY AND SURETY COMPANY which Resolution is now in full force and effect:

VOTED: That the signature of each of the following officers: Chairman, Vice Chairman, President, Any Executive Vice President, Any Senior Vice President, Any Vice President, Any Assistant Vice President, Any Secretary, Any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof; and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached.

IN WITNESS WHEREOF, THE ÆTNA CASUALTY AND SURETY COMPANY has caused this instrument to be signed by its Secretary, and its corporate seal to be hereto affixed this 2nd day of July, 1974.

THE ÆTNA CASUALTY AND SURETY COMPANY

By B. I. Radding
Secretary

State of Connecticut
County of Hartford } ss. Hartford

On this 2nd day of July, 1974, before me personally came B. I. RADDING to me known, who, being by me duly sworn, did depose and say: that he is Secretary of THE ÆTNA CASUALTY AND SURETY COMPANY, the corporation described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; and that he executed the said instrument on behalf of the corporation by authority of his office under the Standing Resolutions thereof.

Mary J. Kingston
My commission expires March 31, 1975. Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of THE ÆTNA CASUALTY AND SURETY COMPANY, a stock corporation of the State of Connecticut, DO HEREBY CERTIFY that the foregoing and attached Power of Attorney and Certificate of Authority remains in full force and has not been revoked; and furthermore, that the Standing Resolutions of the Board of Directors, as set forth in the Certificate of Authority, are now in force.

Signed and Sealed at the Home Office of the Company, in the City of Hartford, State of Connecticut. Dated this 26 day of March, 19 80

By [illegible]
Assistant Secretary

Certificate of Insurance

acord

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES LISTED BELOW.

NAME AND ADDRESS OF AGENCY

J. D. MORGAN COMPANY
P. O. BOX 465
CORPUS CHRISTI, TEXAS 78403

NAME AND ADDRESS OF INSURED

VERMILLION CONSTRUCTION COMPANY
P. O. Drawer 158
Fulton, Texas 78358

COMPANIES AFFORDING COVERAGES

COMPANY LETTER A	Aetna Insurance Company
COMPANY LETTER B	Aetna Casualty & Surety
COMPANY LETTER C	
COMPANY LETTER D	
COMPANY LETTER E	

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time.

COMPANY LETTER	TYPE OF INSURANCE	POLICY NUMBER	POLICY EXPIRATION DATE	Limits of Liability in Thousands (000)	EACH OCCURRENCE	AGGREGATE
	GENERAL LIABILITY [X] COMPREHENSIVE FORM [X] PREMISES—OPERATIONS [X] EXPLOSION AND COLLAPSE HAZARD [X] UNDERGROUND HAZARD [X] PRODUCTS/COMPLETED OPERATIONS HAZARD [X] CONTRACTUAL INSURANCE [X] BROAD FORM PROPERTY DAMAGE [X] INDEPENDENT CONTRACTORS [X] PERSONAL INJURY	CG908207	7/25/80	BODILY INJURY	$500,000	$ 500,000
				PROPERTY DAMAGE	$100,000	$ 100,000
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	$	$
				PERSONAL INJURY		$
A	**AUTOMOBILE LIABILITY** [X] COMPREHENSIVE FORM [X] OWNED [X] HIRED [X] NON-OWNED	CG908207	7/25/80	BODILY INJURY (EACH PERSON)	$250,000	
				BODILY INJURY (EACH ACCIDENT)	$500,000	
				PROPERTY DAMAGE	$100,000	
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	$	
	EXCESS LIABILITY [ ] UMBRELLA FORM [ ] OTHER THAN UMBRELLA FORM			BODILY INJURY AND PROPERTY DAMAGE COMBINED	$	$
B	**WORKERS' COMPENSATION and EMPLOYERS' LIABILITY**	18CT28439CCA	7/25/80	STATUTORY		
					$ 100,000.00 (ACCIDENT)	
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES

State of Texas- All Operations
FOR: BULKHEAD & STEPS

Cancellation: Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail 10 days written notice to the below named certificate holder, but failure to mail such notice shall impose no obligation or liability of any kind upon the company.

NAME AND ADDRESS OF CERTIFICATE HOLDER:

Town of Bayside
c/o Chas. R. Haile Associates, Inc.,
3837 South Padre Island Drive
Corpus Christi, Texas 78415

DATE ISSUED: 3/25/80

J. D. Morgan
J. D. Morgan AUTHORIZED REPRESENTATIVE

ACORD 25 (Ed. 11-77)

TOWN OF BAYSIDE, TEXAS

BULKHEAD PROJECT

JANUARY, 1980

SAI No. 8-11-50-030

NOAA GRANT NO. NA-79-AA-D-CZ039

CHAS. R. HAILE ASSOCIATES, INC. JOB # 679006

I. BASE BID

Furnish and install concrete bulkhead complete with cap, upset rods, cut-off walls, backfill and seeding of the slope and all other items necessary to have a complete and usable structure. The base bid is composed of the following:

A. Concrete Bulkhead includes cap, upset rods with turnbuckles, bearing plates, deadmen, concrete piles and corner/angle piles and earthwork of in-situ materials, and repair of any damage to Copano Bay Drive, complete and in place based on a unit bid price per linear foot of bulkhead

for Eighty dollars

and eighty-three cents

($ 80.83 /L.F.)

B. Fill material hauled in as required in order to provide the proper slope on the area behind the proposed bulkhead, includes an estimated 7100 compacted CY of hauled in material for a lump sum bid (NO UNIT PRICE - TOTAL LUMP SUM)

for Forty-four thousand five hundred seventeen dollars

and - 0 - cents

($ 44,517.00 /Lump Sum)

C. Seeding of slope complete and in place at a unit price per square yard.

for Two dollars

and Three cents

($ 2.03 /S.Y.)

D. Cut-off Walls complete and in place at a unit price per linear foot

for Ninty-eight dollars

and Sixty-four cents

($ 98.64 /L.F.)

NOTE: BID PRICE MUST BE WRITTEN IN WORDS AND THESE SHALL PREVAIL.

RE-CAP OF BASE BID:

A. BULKHEAD 910 L.F. @ $ 80.83 /L.F. = $ 73,555.30

B. FILL, LUMP SUM $ 44,517.00

C. SEEDING 3327 S.Y. @ $ 2.03 /S.Y. = $ 6,753.81

D. CUT-OFF WALL 45 L.F.@$ 98.64 /L.F. = $ 4,438.80

GRAND TOTAL BASE BID $ 129,264.91

The base bid shall be completed in 90 working days.

II. ALTERNATE BID ITEM #1

Furnish and install the 910 feet of bulkhead, noted as item A and the Cut-off walls noted as item D in the base bid and the following alternates to be constructed in conjunction with these two items.

A. Reinforced concrete walk and steps, including all bearing piles, expansion joint material and other items required to construct this walk and steps at a unit price per linear foot

for Eighty-six dollars

and Seventy-two cents

($ 86.72 /L.F.)

B. Fill material hauled in as required in order to provide the proper slope on the area behind the proposed concrete walk and steps and remainder of bulkhead includes an estimated 8600 compacted CY of hauled in material for a lump sum bid (NO UNIT PRICE-TOTAL LUMP SUM)

for Fifty six thousand two hundred dollars

and - 0 - cents

($ 56,200.00 Lump Sum)

C. Seeding of slope complete and in place at a unit price per square yard.

for Two dollars

and Three cents

($ 2.03 /S.Y.)

NOTE: BID PRICE MUST BE WRITTEN IN WORDS AND THESE SHALL PREVAIL.

RE-CAP OF ALTERNATE BID ITEM #1:

	BULKHEAD FROM BASE BID	$ 73,555.30
	CUT-OFF WALLS FROM BASE BID	$ 4,438.80
A.	WALK AND STEPS ~~390~~ 520' L.F. @ $ 86.72 /L.F. =	$ 45,094.00 45,094
B.	FILL LUMP SUM	$ 56,200.00
C.	SEEDING 2750 S.Y. @ $ 2.03 /S.Y. =	$ 5,582.50
	GRAND TOTAL ALTERNATE BID #1	$ 184,870.60 184,871

The alternate bid item #1 shall be completed in 140 working days.

III. ALTERNATE BID ITEM #2

This item includes all fill, base material, two-course surface treatment, concrete flat work, guard rails, drain box and pipe required to raise the elevation of Copano Bay Drive as shown on the plans for a lump sum bid.

for Thirty-eight thousand one hundred eighty-eight dollars

and Twenty-seven cents

($ 38,188.27 . Lump Sum)

NOTE: BID PRICE MUST BE WRITTEN IN WORDS AND THESE SHALL PREVAIL

The alternate bid item #2 shall be completed in 30 working days.

IV. ALTERNATE BID ITEM #3

This item includes a new parking lot and appurtenances. The bid item for this alternate are as follows:

A. Base and two course surface treatment at a unit price per square yard (payment based on SY of surface treatment)

for Ten dollars

and Seventy-three cents

($ 10.73 /S.Y.)

B. Barrier posts complete and in place at a unit price per each.

for Thirty-two dollars

and Twelve cents

($ 32.12 /each)

C. Concrete vehicle stops complete and in place at a unit price per each.

for Sixteen dollars

and Sixty-seven cents

($ 16.67 /each)

D. Painting parking lot lump sum.

for Two hundred forty-three dollars

and Seventy-five cents

($ 243.75 /Lump sum)

RE-CAP OF ALTERNATE BID ITEM #3:

A. BASE AND SURFACE TREATMENT
1287 S.Y. @ $ 10.73 /S.Y. = $ 13,809.51

B. BARRIER POSTS
100 @ $ 32.12 /Each = $ 3,212.00

C. VEHICLE STOPS
28 @ $ 16.67 /Each = $ 466.76

D. PAINTING PARKING LOT LUMP SUM = $ 243.75

TOTAL ALTERNATE BID ITEM #3 $ 17,732.02

NOTE: BID PRICE MUST BE WRITTEN IN WORDS AND THESE SHALL PREVAIL.

The alternate bid item #3 shall be completed in 30 working days.

V. ALTERNATE BID ITEM #4

A. Furnish and install per linear foot "Elevate Existing Pier" approximately 500 feet long

for Twenty-five dollars

and - 0 - cents

($ 25.00 /L.F.)

B. Furnish and install per linear foot "Elevate and Install New Pier" approximately 500 feet long.

for Thirty-five dollars

and - 0 - cents

($ 35.00 /L.F.)

C. Furnish and install handrails at a lump sum price.

for One thousand dollars

and - 0 - cents

($ 1,000.00 /lump sum)

RE-CAP OF ALTERNATE BID ITEM #4

A. ELEVATE EXISTING PIER
500 linear feet @ $ 25.00 /L.F. = $ 12,500.00

B. ELEVATE AND INSTALL NEW PIER
500 linear feet @ $ 35.00 /L.F. = $ 17,500.00

C. HANDRAILS, Lump Sum = $ 1,000.00

GRAND TOTAL ALTERNATE BID ITEM #4 $ 31,000.00

The alternate bid item #4 shall be completed in 45 working days.

VI. ALTERNATE BID ITEM #5

Furnish and install concrete tables and slabs, B-B-Q grills and concrete benches.

A. Concrete table and slab at a unit price per each.

for One thousand-one hundred-three dollars

and Twenty-three cents

($ 1,103.23 /Each)

B. B-B-Q Grills at a unit price per each.

for One hundred-fifty dollars

and - 0 - cents

($ 150.00 /Each)

C. Benches at a unit price per each.

for Seven hundred-thirty-three dollars

and Fifty-four cents

($ 733.54 /Each)

NOTE: BID PRICE MUST BE WRITTEN IN WORDS AND THESE SHALL PREVAIL.

RE-CAP OF ALTERNATE BID ITEM #5:

A.	TABLES AND SLAB	3 @ $ 1,101.23	/each =	$ 3,303.69	1107.23 / 3309.69
B.	B-B-Q GRILLS	3 @ $ 150.00	/each =	$ 450.00	
C.	BENCHES	3 @ $ 733.54	/each =	$ 2,200.62	
	TOTAL ALTERNATE BID ITEM #5			$ 5,954.31	5960.31

NOTE: BID PRICE MUST BE WRITTEN IN WORDS AND THESE SHALL PREVAIL.

The alternate bid item #5 shall be completed in 15 working days.

The undersigned agrees to commence work within ten (10) days after the date of written notice to commence work and to substantially complete the work on which he has bid within the working days shown on this bid proposal. Enclosed herewith is a certified check, cashier's check or bid bond in the sum of 5% of the greatest amount bid which it is agreed shall be collected and retained by the Owner as liquidating damages in the event this proposal is accepted by the Owner within Thirty (30) days after the date advertised for the reception of bids and the undersigned fails to execute the contract and the required bond with the Owner, under the conditions hereof, within ten (10) days after the date said proposal is accepted, otherwise said check or bond shall be returned to the undersigned upon demand.

CONTRACTOR VERMILLION CONSTRUCTION CO.

BY Charles E. Vermillion Jr.

TITLE President

ADDRESS P. O. Drawer 159

Fulton, Texas 78358

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

CERTIFICATION BY PROPOSED SUBCONTRACTOR REGARDING EQUAL EMPLOYMENT OPPORTUNITY

NAME OF PRIME CONTRACTOR	PROJECT NUMBER
VERMILLION CONSTRUCITON COMPANY	679006

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

When the certification indicates that the subcontractor has not filed a compliance report due under applicable instructions, such subcontractor shall be required to submit a compliance report before the owner approves the subcontract or permits work to begin under the subcontract.

SUBCONTRACTOR'S CERTIFICATION

NAME AND ADDRESS OF SUBCONTRACTOR *(Include ZIP Code)*

K. F. HUNT CONTRACTOR INC.: P. O. Box 625, Taft, Texas 78390
SHIRLEY BROS.: P. O. Box "R", Highway 1069, Aransas Pass, Texas 78336

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

   ☒ Yes ☐ No

2. Compliance reports were required to be filed in connection with such contract or subcontract.

   ☒ Yes ☐ No

3. Bidder has filed all compliance reports due under applicable instructions, including SF-100.

   ☒ Yes ☐ No ☐ None Required

4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended?

   ☐ Yes ☒ No

NAME AND TITLE OF SIGNER *(Please type)*

CHARLES E. VERMILLION, President

SIGNATURE	DATE
Charles E. Vermillion	02-26-80

Replaces Form HUD-4238.CD-2, which is Obsolete

HUD-950.2 (11-78)

CERTIFICATION OF COMPLIANCE WITH THE REQUIREMENTS

FOR

NONDISCRIMININATION, EQUAL EMPLOYMENT OPPORTUNITY AND NONSEGREGATED FACILITIES

BULKHEADING OF BAYFRONT PARK

BAYSIDE, TEXAS

NOAA GRANT NO. NA-79-AA-D-CZ039

SAI NO. 8-11-50-030

CHR # 679006

NONDISCRIMININATION, Title VI of the Civil Rights Act of 1964 (P.L.88-352), as amended, (42 USC 2000d) and the requirements imposed by the Regulations of the Department of Commerce (15 CFR Part 8) issued pursuant to that Title.

In accordance herewith, I certify that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under this Federally financed project; and I will immediately take any measures to effectuate this agreement.

CERTIFIED Charles E. Vermillion

TITLE President

COMPANY VERMILLION CONSTRUCTION CO.

ADDRESS P. O. Drawer 159

Fulton, Texas 78358

EQUAL EMPLOYMENT OPPORTUNITY, Executive Order 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Chapter 60)

During the performance of this contract, I agree to the following:

a. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not limited to, the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

b. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants without regard to race, color, religion, sex, or national origin.

c. The contractor will send to each labor union or representative of workers with which he has had a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union of workers' representatives of the contractor's commitment under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

e. The contractor will firnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will access to his/her books, records, and accounts by NOAA and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

f. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract of with any of such rules, regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or Federally assisted construction contract procedures authorized in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

EQUAL EMPLOYMENT OPPORTUNITY (Continuation)

g. The contractor will include the portion of the sentence immediately preceding paragraph a. and the provisions of paragraph a. through g. in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as NOAA may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by NOAA, the contractor may request the United States to enter into such litigation to protect the interest of the United States.

CERTIFIED Charles E. Vermillion

TITLE President

COMPANY VERMILLION CONSTRUCTION CO.

ADDRESS P. O. Drawer 159

Fulton, Texas 78358

CERTIFICATION OF NONSEGREGATED FACILITIES as required by the May 9,1967, Order(32 F.R. 7439, May 9,1967) on ELIMINATION OF SEGREGATED FACILITIES, by the Secretary of Labor.

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location,under my control where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I, the bidder, offeror, applicant or subcontractor agree that a breach of this certification is a violation of the Equal Opportunity clause of this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, resturant and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis on the basis of race, creed, color or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications from proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractor have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS ON NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R.7439, May 19,1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The Certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE

The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

CERTIFICATION OF NONSEGREGATED FACILITIES (Continuation)

CERTIFIED Charles E. Schmelkin

TITLE President

COMPANY VERMILLION CONSTRUCTION CO.

ADDRESS P. O. Drawer 159

Fulton, Texas 78358

BULKHEADING OF BAYFRONT PARK

TOWN OF BAYSIDE, TEXAS

SAI NO. 8-11-50-030

NOAA GRANT NO. NA-79-AA-D-CZ039

JOB NO. 679006

ADDENDUM # 1

NOTE: CONTRACTOR MUST SIGN THIS ADDENDUM AND RETURN IT WITH HIS SEALED BID.

ACKNOWLEDGED BY: _____

CONTRACTOR: VERMILLION CONSTRUCTION COMPANY

BY: Charles E. Vermillion

TITLE: President

ADDRESS: P. O. Drawer 159

Fulton, Texas 78358

ADDENDUM # 1

1. The bearing piles required to support the concrete steps of Alternate Bid Item # 1 shall be twelve (12) feet on center.

2. Tie rods shall be threaded rods minimum 7/8" diam. steel (no turnbuckles) and shall be P.V.C. encased. Rods shall be tensioned to a minimum of 50 foot-lbs. torque.

3. All expansion joints for concrete shall be 3/4" premolded expansion joints.

4. The alignment tolerance shall be changed to $\pm 1\frac{1}{2}$" in fifty (50) feet.

5. The concrete steps of Alternate Bid Item # 1 shall be four (4) inches thick instead of six (6) inches thick as previously specified, and reinforcement shall be 6 X 6 X #6 WWF.

6. The cast-in-place cap shall have three (3) inches of clear cover over reinforcement as shown on the attached sketch. Also, note the changes in the stirrups and the location of expansion joints as shown.

7. A copy of the boring logs results from the soils report is attached, so that the Bidder can see the underlying soil strata to be encountered in driving piles.

8. Sheet pile widths shall be a maximum of six (6) feet and a minimum of two (2) feet. The Contractor may not vary widths in a run of piles, but he may use a narrower pile (no less than two (2) feet) at the beginning or end of a run as required to meet the dimensions shown on the plans.

9. Expansion joints on the steps shall match the expansion joints on the bulkhead.

10. All work holes in concrete shall be filled with grout after use.

11. The concrete slope of Alternate Bid Item # 2 (Concrete Flat Work) runs from STA 2+00 to STA 4+00 as shown on sheet 6 of 10 on the plans.

12. Concrete shall be Type I as specified.

13. Changes and requirements for sheet piles are noted on the attached sketches.

14. Sealant shall be Mirafi 140S by Celanese or approved equal.

15. Lifting and placement of the sheet piles will be the Contractors responsibility to insure that no cracking or damage to the piles will occur. Cracked and/or non-usable sheet piles become the property of the Contractor.

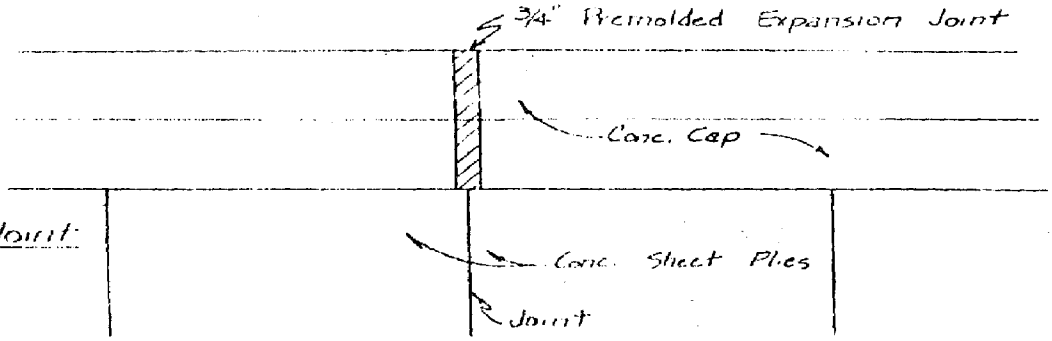
ADDENDUM # 1 (Continuation)

16. Corner piles and/or bearing piles if precast shall use # 5 bars in lieu of ½" ø prestress strands. Spiral reinforcement shall remain the same or equivalent steel reinforcement shall be provided.

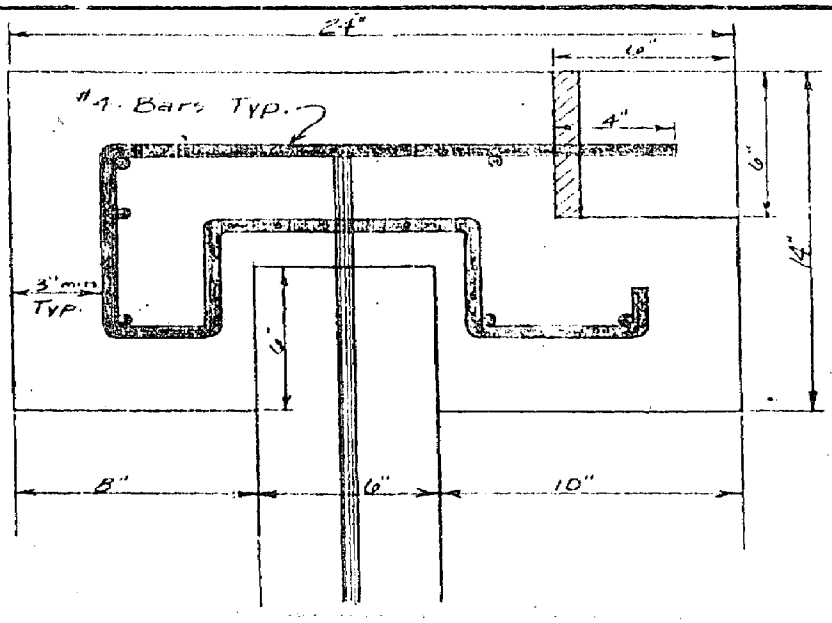
17. Bearing piles shall be a minimum of 12" square.

18. Sheet piles shall be jetted into place. Bearing piles must be driven.

Expansion Joint Detail

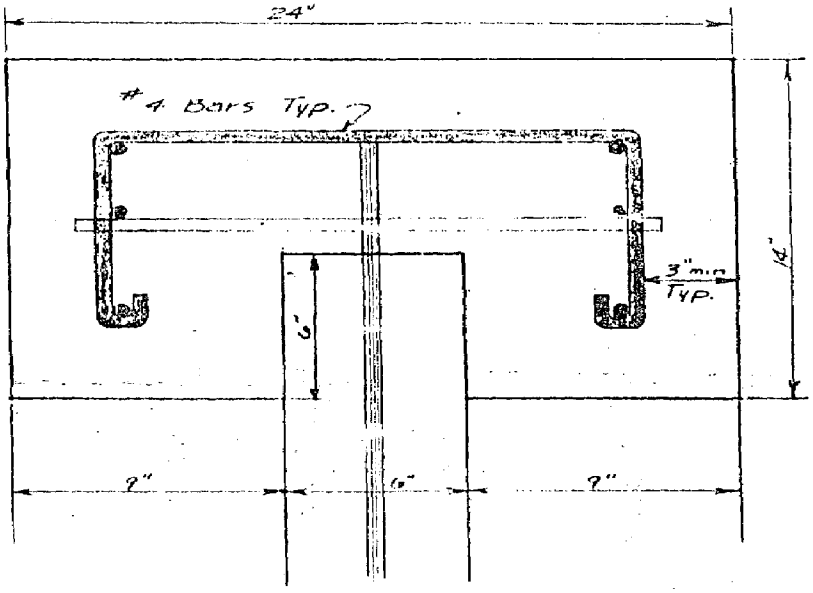


Cap Detail B



Note: Conc. Walk shall be 6" thick at joint with cap, 4" elsewhere

Cap Detail A



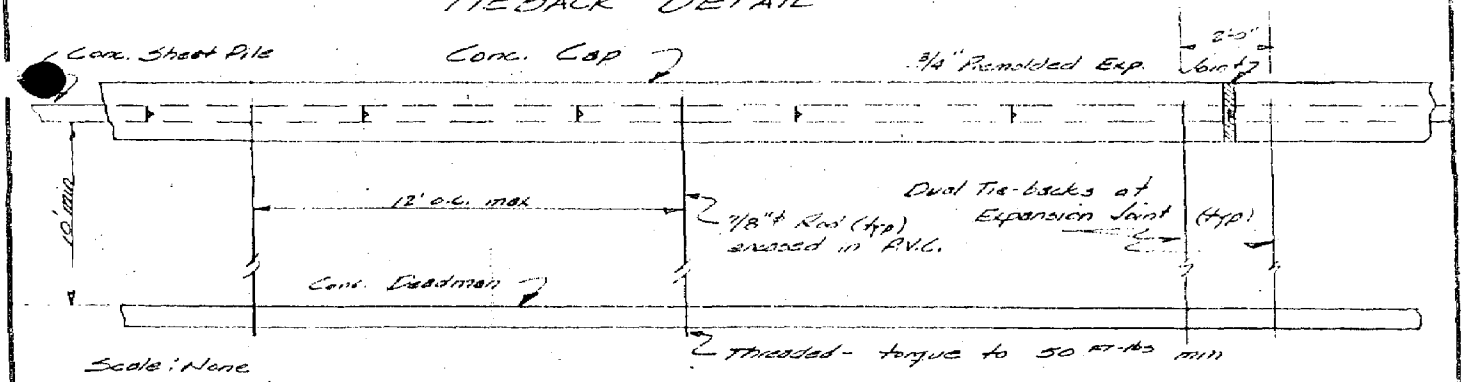
ADDENDUM NO. 1
Bayside Bulkhead

Scale: 1" = 6" Date: 2-14-80 Job: 679006

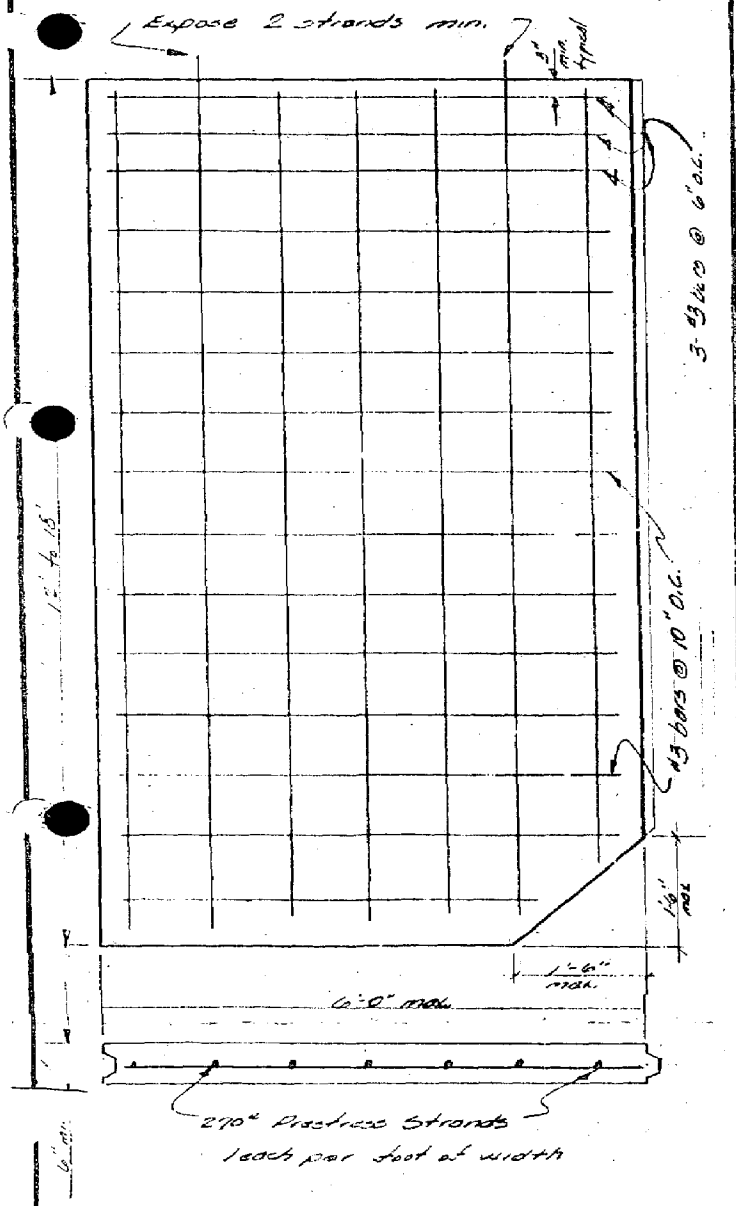
CHAS. R. HAILE ASSOCIATES, INC.
consulting engineers
CORPUS CHRISTI, TEXAS

4/5

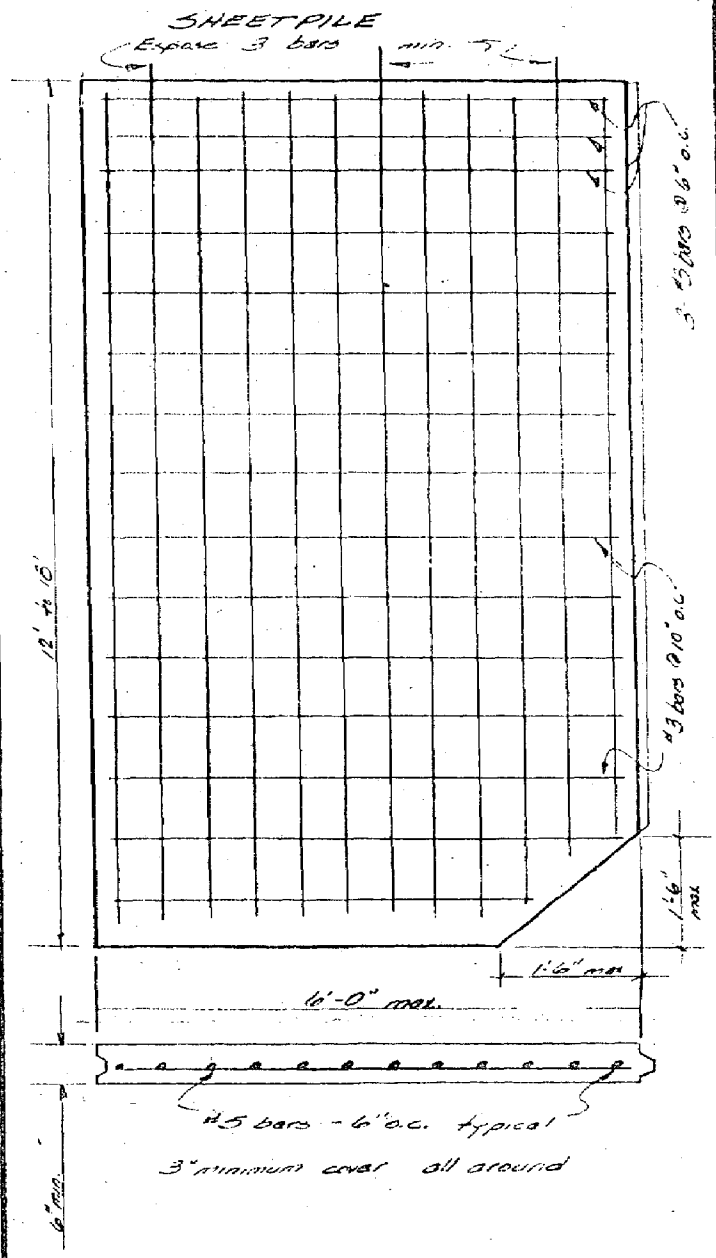
TIEBACK DETAIL



PRESTRESSED CONC. SHEETPILE



PRECAST CONC. SHEETPILE



ADDENDUM No. 1

BAYSIDE BULKHEAD

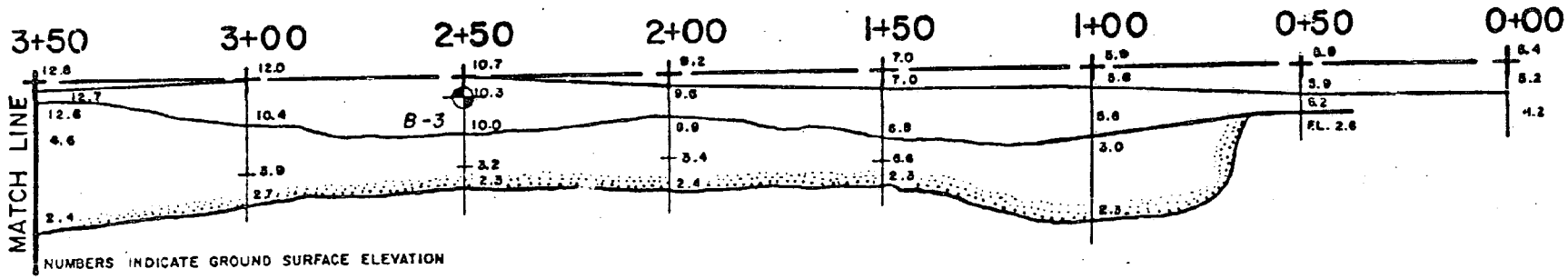
Scale: 1" = 20' Date: 2-14-80 Job: 674006

CHAS. R. HAILE ASSOCIATES, INC.

consulting engineers

CORPUS CHRISTI, TEXAS

5/5



COPANO BAY

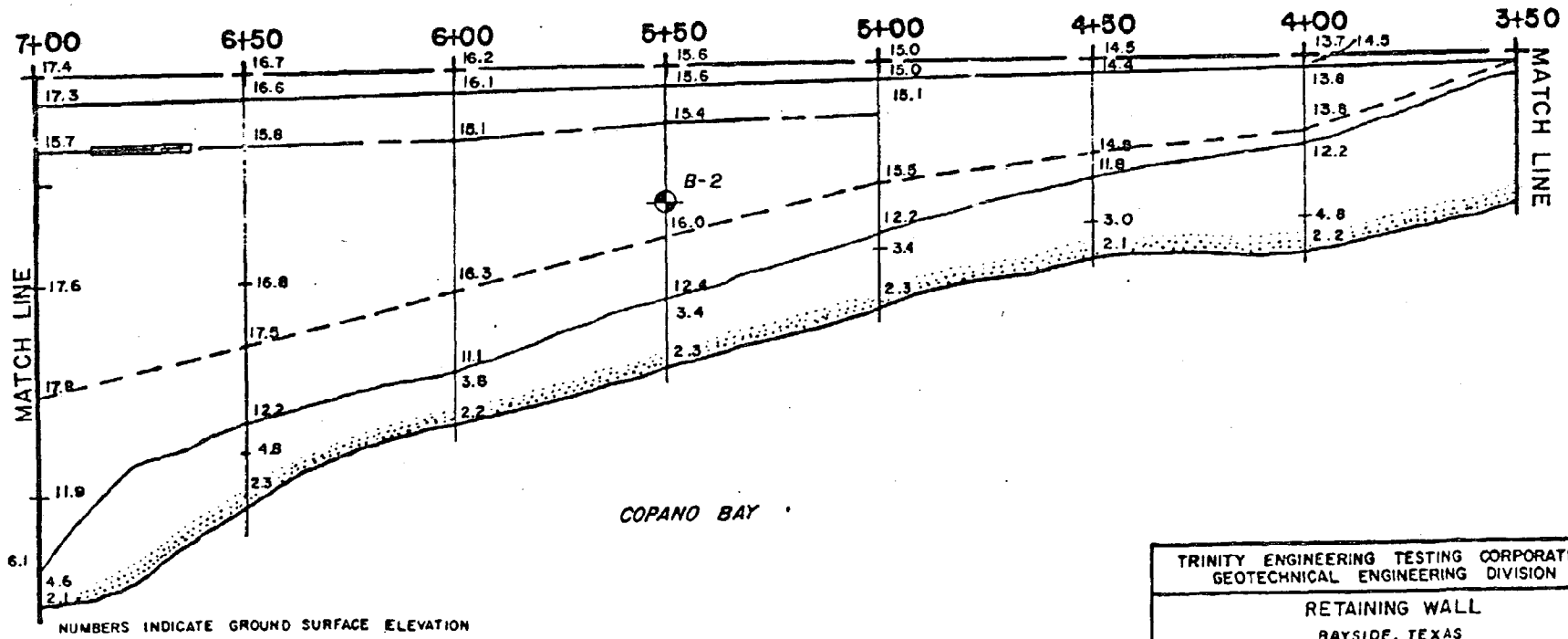
TRINITY ENGINEERING TESTING CORPORATION
GEOTECHNICAL ENGINEERING DIVISION

RETAINING WALL

BAYSIDE, TEXAS

LOCATION OF BORINGS

SCALE: 1" = 40'	DA[redacted]/15/79	PLATE: I
DRAWN BY: AAK		

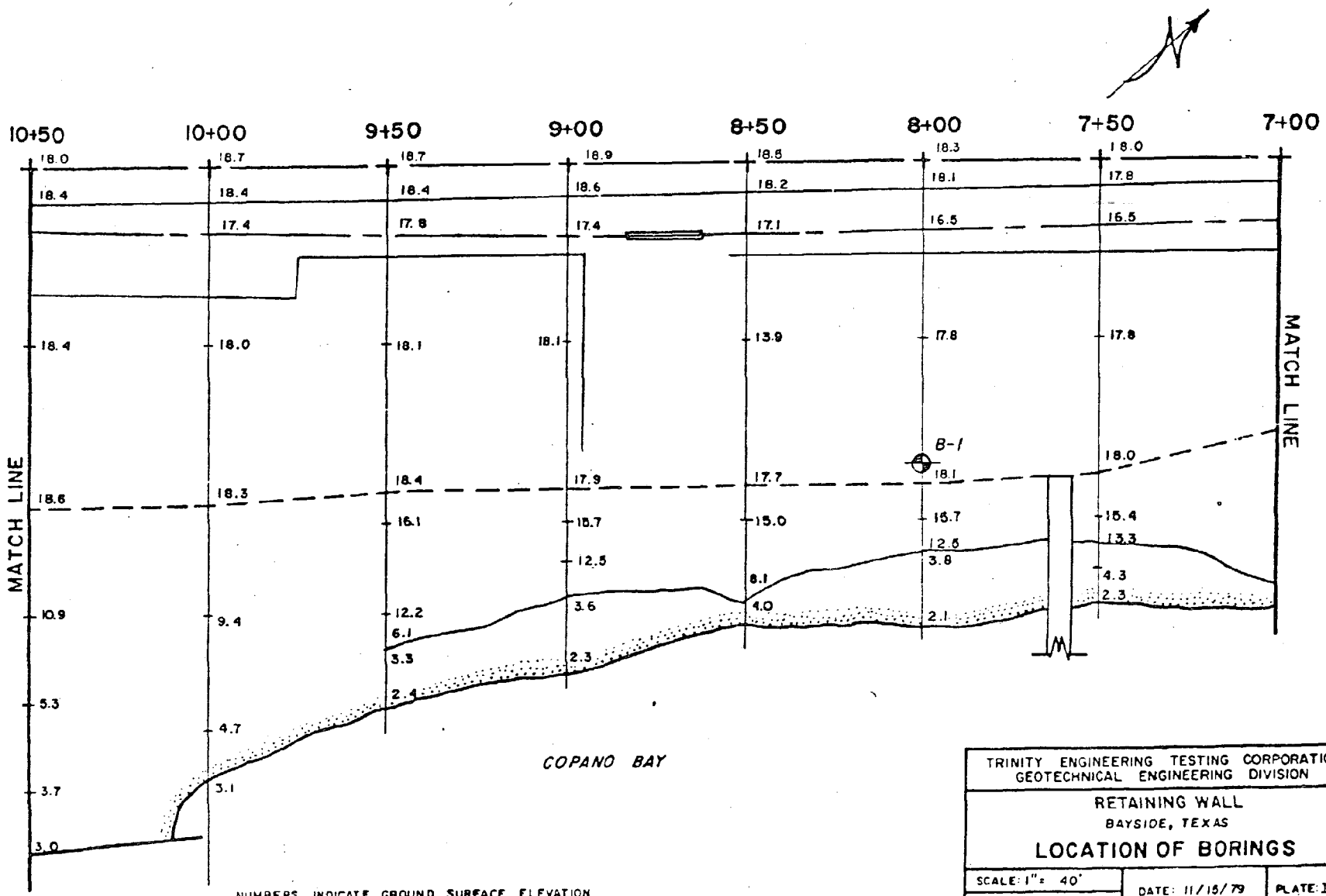


TRINITY ENGINEERING TESTING CORPORATION
GEOTECHNICAL ENGINEERING DIVISION

RETAINING WALL
BAYSIDE, TEXAS

LOCATION OF BORINGS

SCALE: 1" = 40'	DATE: 11/15/79	PLATE II
DRAWN BY: AAK		

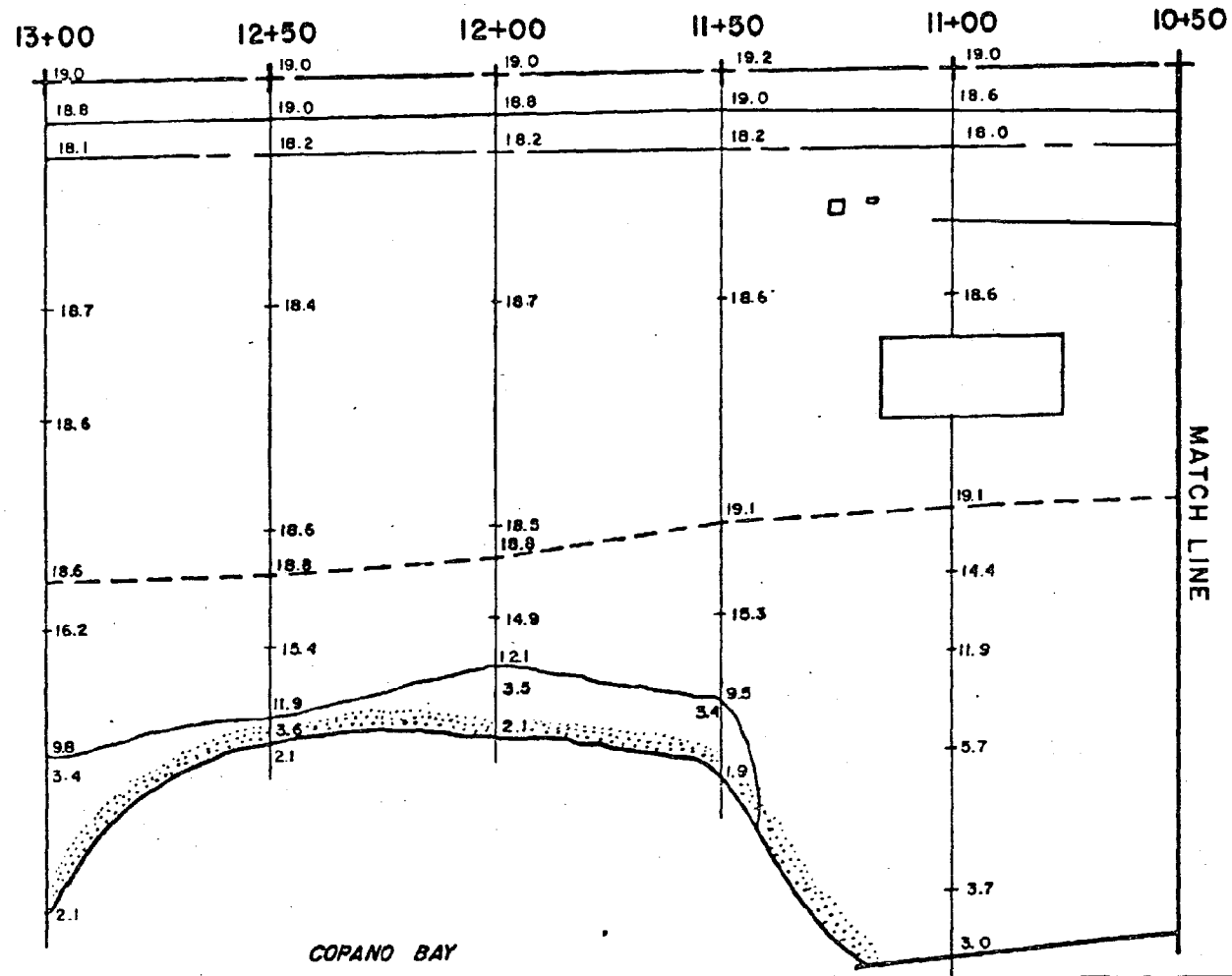


TRINITY ENGINEERING TESTING CORPORATION
GEOTECHNICAL ENGINEERING DIVISION

RETAINING WALL
BAYSIDE, TEXAS

LOCATION OF BORINGS

SCALE: 1" = 40'	DATE: 11/15/79	PLATE: III
DRAWN BY: AAK		



NUMBERS INDICATE GROUND SURFACE ELEVATION

TRINITY ENGINEERING TESTING CORPORATION
GEOTECHNICAL ENGINEERING DIVISION

RETAINING WALL

BAYSIDE, TEXAS

LOCATION OF BORINGS

SCALE: 1" = 40'	DATE: 11/15/79	PLATE IX
DRAWN BY: AAK		

BULKHEAD

BAYSIDE, TEXAS

SUMMARY OF CLASSIFICATION TESTS

Boring No.	Depth ft.	Liquid Limit %	Plasticity Index %	% Passing 200-Mesh %	Natural M.C. %	Classification	Description
1	1.5- 3.0	42.1	20.4	65.1	15.8	CL	Dark Gray Sandy Clay
1	3.0- 4.5	----	----	49.8	13.2	SC-CL	Dark Gray Clayey Sand
1	4.5- 6.0	22.6	1.0	27.5	9.5	SM	Light Tan Silty Sand
1	6.0- 7.5	----	----	43.4	13.4	SC	Light Tan Clayey Sand
1	12.0-16.5	82.3	49.3	97.8	27.6	CH	Dark Tan Clay
1	20.0-21.5	----	----	63.6	23.8	CL	Dark Tan Sandy Clay
2	3.0- 4.5	----	----	62.3	17.5	CL	Light Gray Sandy Clay
2	10.5-12.0	----	----	36.8	20.7	SC	Light Gray Clayey Sand
3	0.0- 1.5	----	----	50.6	13.2	CL-SC	Light Gray Sandy Clay
3	3.0- 4.5	----	----	60.9	11.8	CL-SC	Dark Tan Sandy Clay
3	20.0-21.5	----	----	41.9	20.6	SC-CL	Light Tan Clayey Sand

TRINITY ENGINEERING TESTING CORPORATION

BULKHEAD

BAYSIDE, TEXAS

SUMMARY OF UNIT WEIGHT, MOISTURE CONTENT AND UNCONFINED COMPRESSION TEST RESULTS

Boring No.	Depth in Feet	U.D.W. Lbs./Cu.Ft.	M.C. %	Saturation %	Strain %	Qu Tons/Sq/Ft.	Description
1	0.0- 1.5	113.6	15.4	85.8	2.94	8.33	Dark Gray Sandy Clay
2	6.0- 7.5	106.8	20.5	95.9	5.05	2.01	Light Gray Sandy Clay
2	20.0-21.5	92.0	30.3	98.6	2.16	1.62*	Light Gray Clay
2	25.0-26.5	106.8	20.5	95.9	5.19	1.75*	Light Gray Clay
3	9.0-10.5	87.3	35.4	100.0	3.21	1.67*	Light Tan Clay
3	12.0-13.5	98.8	22.4	85.6	4.68	2.43	Light Tan Clay
3	13.5-15.0	92.7	24.1	79.5	2.62	1.83*	Light Tan Clay

*Sample failed along a slickensided fracture plane.

PLATE VII

BULKHEAD

BAYSIDE, TEXAS

GEOLOGIC PROFILES

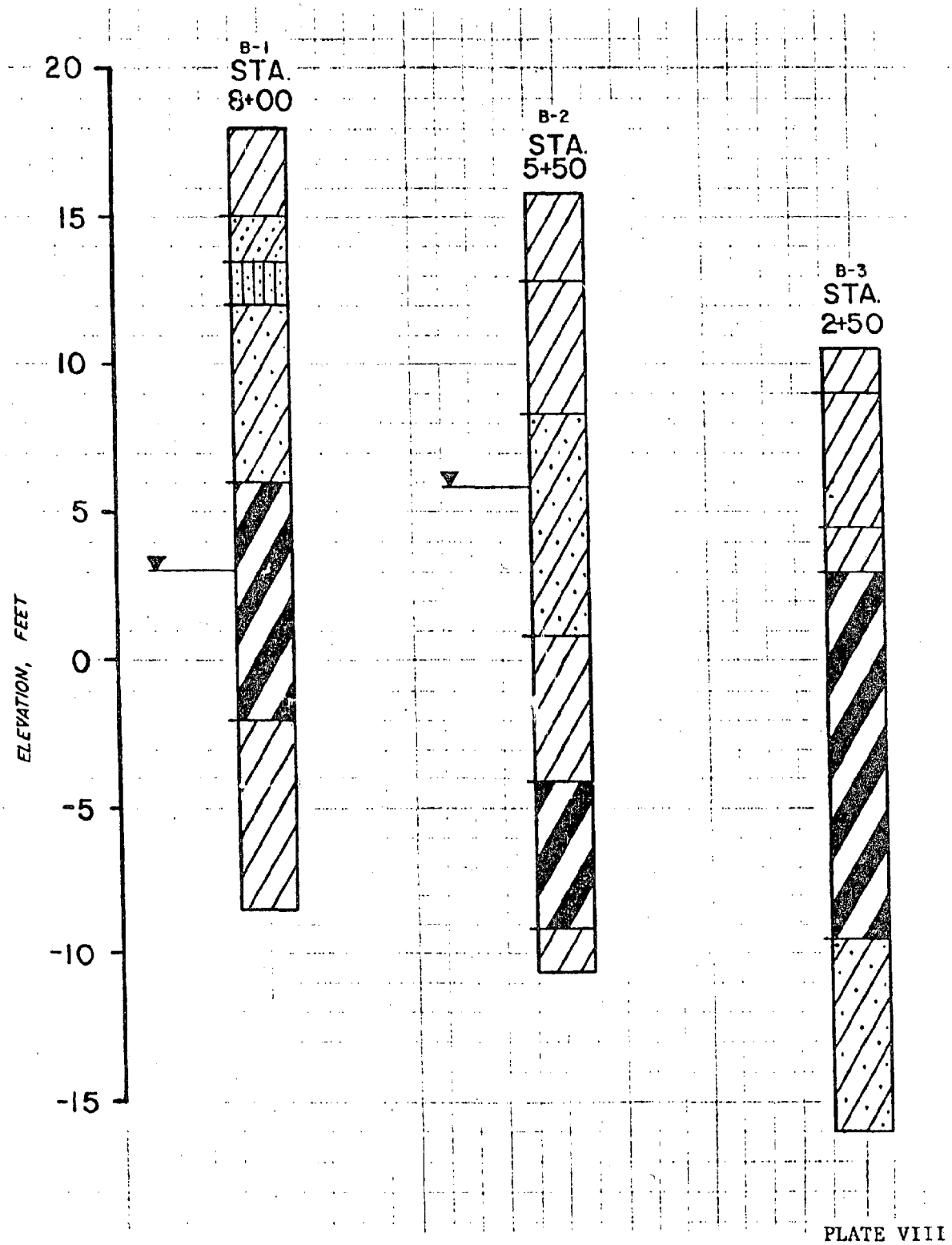


PLATE VIII

EXPLANATION OF SYMBOLS USED ON LOGS OF BORINGS

DEPTH FEET	SYMBOL	SAMPLE	N-BLOWS PER FOOT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED
	(SEE KEY TO CLASSIFICATION BELOW)			Undisturbed Shelby Tube Sample		
			3.5	Pocket Penetrometer Test		
				Disturbed Sample		
5			15	Standard Penetration Test and Sample		
				Wash Boring - No Sample Recovery		
10				NX Core Drilling - Testable Sample	5.0'	5.0'

KEY TO CLASSIFICATION USED ON LOGS

MAJOR DIVISIONS			GROUP SYMBOLS	DESCRIPTIONS
COARSE-GRAINED SOILS More Than Half of Material is LARGER Than No. 200 Sieve Size.	GRAVELS More Than Half of Coarse Fraction is LARGER Than No. 4 Sieve Size.	Clean Gravels (Little or no Fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or no Fines.
			GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or no Fines.
		Gravels With Fines (Appreciable Amount of Fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures.
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures.
	SANDS More Than Half of Coarse Fraction is SMALLER Than No. 4 Sieve Size.	Clean Sands (Little or no Fines)	SW	Well-Graded Sands, Gravelly Sands, Little or no Fines.
			SP	Poorly-Graded Sands, Gravelly Sands, Little or no Fines.
		Sands With Fines (Appreciable Amount of Fines)	SM	Silty Sands, Sand-Silt Mixtures.
			SC	Clayey Sands, Sand-Clay Mixtures.
FINE-GRAINED SOILS More Than Half of Material is SMALLER Than No. 200 Sieve Size.	SILTS and CLAYS Liquid Limit Less Than 50		ML	Inorganic Silts & Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity.
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays.
			OL	Organic Silts & Organic Silty Clays of Low Plasticity.
	SILTS and CLAYS Liquid Limit Greater Than 50		MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Soils, Elastic Silts.
			CH	Inorganic Clays of High Plasticity, Fat Clays.
			OH	Organic Clays of Medium to High Plasticity, Organic Silts.
Highly Organic Soils			Pt	Peat & Other Highly Organic Soils

LOG OF BORING
FOR
BULKHEAD

DATE: October 25, 1979 **BORING NO.** 1
PROJECT LOCATION: Bayside, Texas **TYPE:** Core **LOCATION:** Station 8+00

DEPTH FEET	SYMBOL	SAMPLE	N-BLOWS PER FOOT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION	DEPTH SCALE
				Estimated Surface Elevation = 18.0'				
			4.5+	Dark Gray Sandy Clay w/shells and sand lenses				
			4.5+	LL=42.1 PI=21.1 (-)200=61.5%			15.0	
			4.5+	Dark Gray Clayey Sand w/shell particles			13.5	
5			3.0	(-)200=49.8% and tan sand lenses			12.0	
			4.5	Light Tan Silty Sand				
			4.5	LL=22.6 PI=1.0 (-)200=27.5%				
				(-)200=43.4%				
10			3.5	Light Tan Clayey Sand w/sand lenses			6.0	
			25	LL=82.3 PI=40.0 (-)200=97.8%				
				▼W.S. 10/25/79			3.0	
15			15	Dark Tan Clay			-2.0	
20			20	(-)200=63.6%				
				Dark Tan Sandy Clay w/sand lenses				
25			22				-8.5	

Total Depth = 26.5'

NOTE: Boring was advanced to 26.5 feet below the ground surface prior to using drilling fluid and groundwater was encountered above that depth at the 15.0 foot depth. After 10 minutes, no signs of groundwater were observed.

LOG OF BORING
FOR
BULKHEAD

DATE: October 26, 1979 BORING NO. 1A
PROJECT LOCATION: Bayside, Texas TYPE: Hand Auger LOCATION: Beach

DEPTH FEET	SYMBOL	SAMPLE	N-BLOWS PER FOOT	MATERIAL DESCRIPTION Estimated Surface Elevation = 2.3'	CORE DRILLED	CORE RECOVERED	ELEVATION	DEPTH SCALE
				Shell Fragments			2.1	
1			1.1					
2								
3			1.8	Tan Clay				
4								
5			0.8					
6							-3.7	

Total Depth = 6.0'

NOTE: Boring was advanced to 6.0 feet below the ground surface without using drilling fluid and groundwater was not encountered above that depth.

LOG OF BORING
FOR
BULKHEAD

DATE: October 25, 1979 BORING NO. 2
PROJECT LOCATION: Bayside, Texas TYPE: Core LOCATION: Station 5+50

DEPTH FEET	SYMBOL	SAMPLE	N-BLOWS PER FOOT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION	DEPTH SCALE
				Estimated Surface Elevation = 15.8'				
			4.5+	Dark Gray Sandy Clay w/shells and sand lenses				
			4.5+				12.8	
			4.2	(-)200=62.3%				
5			4.5	Light Gray Sandy Clay w/sand lenses				
			4.0				8.3	
			2.5	Light Gray Clayey Sand w/calcareous particles ▼W.S. 10/25/79			5.8	
10			1.7	(-)200=36.8%				
15							0.8	
			2.6	Light Gray Clay w/sand lenses				
20							-4.2	
			3.5	Light Gray Clay				
25							-9.2	
			4.0	Light Gray Clay w/sand lenses			-10.7	

Total Depth - 26.5'

NOTE: Boring was advanced to 26.5 feet below the ground surface without using drilling fluid and groundwater was encountered above that depth at the 10.0 foot depth. After 10 minutes, no groundwater was observed.

LOG OF BORING
FOR
BULKHEAD

DATE: October 26, 1979 BORING NO. 2A
PROJECT LOCATION: Bayside, Texas TYPE: Hand Auger LOCATION: Beach

DEPTH FEET	SYMBOL	SAMPLE	N-BLOWS PER FOOT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION	DEPTH SCALE
				Estimated Surface Elevation = 2.3'				
				Shell Fragments			2.1	
1			1.0	Tan Clay w/some sand lenses				
2							0.1	
3			1.4	Tan Clay				
4								
5			1.3					
6							-3.7	

Total Depth = 6.0'

NOTE: Boring was advanced to 6.0 feet below the ground surface without using drilling fluid and groundwater was not encountered above that depth.

TRINITY ENGINEERING TESTING CORPORATION

LOG OF BORING
FOR
BULKHEAD

DATE: October 26, 1979 | BORING NO. 3

PROJECT LOCATION: Bayside, Texas | TYPE: Core | LOCATION: Station 2+50

DEPTH FEET	SYMBOL	SAMPLE	N-BLOWS PER FOOT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION	DEPTH SCALE
				Estimated Surface Elevation = 10.5'				
			4.5+	Light Gray Sandy Clay w/sand lenses and scattered gravel			9.0	
				(-)200=50.6%				
			3.9	Dark Tan Sandy Clay w/shells and sand lenses				
			2.2	(-)200=60.9%				
5			3.5				4.5	
			2.9	Light Tan Clay w/sand lenses			3.0	
			2.9					
10			2.5					
			3.2					
			4.5	Light Tan Clay				
			2.5					
15			3.2					
							-9.5	
20			3.5	(-)200=41.9%				
				Light Tan Clayey Sand				
25			3.8				-16.0	
				Total Depth = 26.5'				

NOTE: Boring was advanced to 26.5 feet below the ground surface without using drilling fluid and groundwater was not encountered above that depth.

LOG OF BORING
FOR
BULKHEAD

DATE: October 26, 1979 **BORING NO.** 3A
PROJECT LOCATION: Bayside, Texas **TYPE:** Hand Auger **LOCATION:** Beach

DEPTH FEET	SYMBOL	SAMPLE	N-BLOWS PER FOOT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION	DEPTH SCALE
				Estimated Surface Elevation = 2.3'				
				Shell Fragments			2.1	
1			1.4					
2								
3			1.0	Tan Clay				
4								
5			1.0					
6							-3.7	

Total Depth = 6.0'

NOTE: Boring was advanced to 6.0 feet below the ground surface without using drilling fluid and groundwater was not encountered above that depth.

Vermillion Const

BULKHEADING OF BAYFRONT PARK

TOWN OF BAYSIDE, TEXAS

SAI NO. 8-11-50-030

NOAA GRANT NO. NA-79-AA-D-CZ039

JOB NO. 679006

ADDENDUM # 2

NOTE: CONTRACTOR MUST SIGN THIS ADDENDUM AND RETURN IT WITH HIS SEALED BID.

ACKNOWLEDGED BY:

CONTRACTOR: VERMILLION CONSTRUCTION COMPANY

BY: Charles E. Vermillion

TITLE: President

ADDRESS: P. O. Drawer 159

Fulton, Texas 78358

ADDENDUM # 2

1. Tie-back rods are to be placed within the concrete bulkhead cap.

2. Two additional 2" X 8" stringers are required on the T-head Sections of the pier. These stringers are to be centered between those shown on Page 10 of the plans.

3. P.V.C. encasement as noted on Addendum # 1 is to be used in lieu of galvanizing on the tie-back rods.

4. Item A, Re-cap of Alternate Bid Item # 1, Page 3 of 6 of the bid sheet should be changed to read:

   A. WALK AND STEPS 520 L.F. @ $_____/L.F.=$_____

Ætna & CASUALTY

BID BOND

THE ÆTNA CASUALTY AND SURETY COMPAN'
Hartford, Connecticut 06115

KNOW ALL MEN BY THESE PRESENTS,

That we, Vermillion Construction Co., Inc.

as Principal, hereinafter called the Principal, an

THE ÆTNA CASUALTY AND SURETY COMPANY, of Hartford, Connecticut, a corporation duly organized under the laws of th

State of Connecticut, as Surety, hereinafter called the Surety, are held and firmly bound unto

City of Bayside, Texas

as Obligee, hereinafter called the Obligee, i

the sum of Five per cent (5%) of total aggregate bid Dollar

($), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bin ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for Bulkheading of Bayfront Park

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with th Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contrac Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor an material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give suc bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amour specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform th Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this 26 day of February, 19 80.

Roberta B. Drennan (Witness)

Laura Leisenheimer (Witness)

Vermillion Construction Co., Inc. (Principal) (Sea

Charles E. Vermillion Pres (Titl

THE ÆTNA CASUALTY AND SURETY COMPAN

By J. D. Morgan (Attorney-in-Fac

AIA DOCUMENT A310
BID BOND
FEBRUARY 1970 ED.
THE AMERICAN INSTITUTE OF ARCHITECTS

CAT. 227841
PRINTED IN U.S.A.

THE ÆTNA CASUALTY AND SURETY COMPANY
Hartford, Connecticut 06115

POWER OF ATTORNEY AND CERTIFICATE OF AUTHORITY OF ATTORNEY(S)-IN-FACT

NOW ALL MEN BY THESE PRESENTS, THAT THE ÆTNA CASUALTY AND SURETY COMPANY, a corporation duly organized under the laws of the State of Connecticut, and having its principal office in the City of Hartford, County of Hartford, State of Connecticut, hath made, constituted and appointed, and does by these presents make, constitute and appoint J. D. Morgan - -

Corpus Christi, Texas, its true and lawful Attorneys-in-Fact, with full power and authority hereby conferred to sign, execute and acknowledge, at any place within the United States, or, if the following line be filled in, within the area there designated, the following instrument(s):

by his sole signature and act, any and all bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any and all consents incident thereto not exceeding the sum of FIVE HUNDRED THOUSAND (500,000.00) DOLLARS - -

and to bind THE ÆTNA CASUALTY AND SURETY COMPANY, thereby as fully and to the same extent as if the same were signed by the duly authorized officers of THE ÆTNA CASUALTY AND SURETY COMPANY, and all the acts of said Attorneys-in-Fact, pursuant to the authority herein given, are hereby ratified and confirmed.

This appointment is made under and by authority of the following Standing Resolutions of said Company which Resolutions are now in full force and effect:

VOTED: That each of the following officers: Chairman, Vice Chairman, President, Any Executive Vice President, Any Senior Vice President, Any Vice President, Any Assistant Vice President, Any Secretary, Any Assistant Secretary, may from time to time appoint Resident Vice Presidents, Resident Assistant Secretaries, Attorneys-in-Fact, and Agents to act for and on behalf of the Company and may give any such appointee such authority as his certificate of authority may describe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors may at any time remove any such appointee and revoke the power and authority given him.

VOTED: That any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the Chairman, the Vice Chairman, the President, an Executive Vice President, a Senior Vice President, a Vice President, an Assistant Vice President or by a Resident Vice President, pursuant to the power prescribed in the certificate of authority of such Resident Vice President, and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary or by a Resident Assistant Secretary, pursuant to the power prescribed in the certificate of authority of such Resident Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact pursuant to the power prescribed in his or their certificate or certificates of authority.

This Power of Attorney and Certificate of Authority is signed and sealed by facsimile under and by authority of the following Standing Resolution voted by the Board of Directors of THE ÆTNA CASUALTY AND SURETY COMPANY which Resolution is now in full force and effect:

VOTED: That the signature of each of the following officers: Chairman, Vice Chairman, President, Any Executive Vice President, Any Senior Vice President, Any Vice President, Any Assistant Vice President, Any Secretary, Any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached.

IN WITNESS WHEREOF, THE ÆTNA CASUALTY AND SURETY COMPANY has caused this instrument to be signed by its Secretary, and its corporate seal to be hereto affixed this 2nd day of July, 1974.

THE ÆTNA CASUALTY AND SURETY COMPANY

By B. I. Radding
Secretary

State of Connecticut
County of Hartford } ss. Hartford

On this 2nd day of July, 1974, before me personally came B. I. RADDING to me known, who, being by me duly sworn, did depose and say: that he is Secretary of THE ÆTNA CASUALTY AND SURETY COMPANY, the corporation described in and which executed the above instrument; that he knows the seal of said corporation, that the seal affixed to the said instrument is such corporate seal; and that he executed the said instrument on behalf of the corporation by authority of his office under the Standing Resolutions thereof.

Mary J. Kingston
Notary Public

My commission expires March 31, 1975.

CERTIFICATE

I, the undersigned, Assistant Secretary of THE ÆTNA CASUALTY AND SURETY COMPANY, a stock corporation of the State of Connecticut, DO HEREBY CERTIFY that the foregoing and attached Power of Attorney and Certificate of Authority remains in full force and has not been revoked, and furthermore, that the Standing Resolutions of the Board of Directors, as set forth in the Certificate of Authority, are now in force.

Signed and Sealed at the Home Office of the Company, in the City of Hartford, State of Connecticut Dated this 26 day of FEB. 1980

By
Assistant Secretary

GENERAL CONDITIONS OF THE AGREEMENT

1. OWNER
Whenever the word OWNER,or expression Party of the First Part,or First Party, is used in this contract, it shall be understood as referring to the

_____

2. CONTRACTOR
Whenever the word CONTRACTOR, or the expression Party of the Second Part, or Second Party, is used, it shall be understood to mean the person, persons, co-partnership or corporation,to-wit:_____
who has agreed to perform the work embraced in this contract, or his or their legal representatives.

3. ENGINEER
Whenever the word ENGINEER, is used in this contract, it shall be understood as referring to CHAS. R. HAILE ASSOCIATES,INC., Consulting Engineers, Houston, Texas City, Nederland, Corpus Christi, ENGINEER of the OWNER, or such other ENGINEER, supervisor or inspector as may be authorized by said OWNER to act in any particular.

4. INTERPRETATION OF PHRASES
Whenever the words "Directed"."Required","Permitted", " Designed","Considered Necessary", "Prescribed", or words of like import are used, it shall be understood that the direction,requirement,permission,order,designation, or prescription, of the ENGINEER is intended; and similarly, the words "Approval", "Acceptable","Satisfactory", or words of like import shall mean approved by or acceptable or satisfactory to the ENGINEER.

Whenever in the specifications or drawings accompanying this Agreement, the terms or description of various qualities relative to finish,workmanship, or other qualities of similar kind which cannot, from their nature, be specifically and clearly described and specified, but are necessarily described in general terms, the fulfillment of which must depend on individual judgement, then, in all such cases, any question on the fulfillment of said specifications shall be decided by the ENGINEER, and said work shall be done in accordance with his interpretations of the meaning of the words, terms or clauses defining the character of the work.

5. EXHIBITS

All work shall be done and all materials furnished in strict conformity with the appended advertisement(Notice to Bidders),"Instructions to Bidders", "Proposal","Specifications", and plans for said improvements as prepared by CHAS. R. HAILE ASSOCIATES, INC.Consulting Engineers, all of which are hereto attached (or considered as is attached) and are hereby made a part of this contract.

6. KEEPING OF PLANS AND SPECIFICATIONS ACCESSIBLE
The CONTRACTOR shall be furnished with two (2) copies of all plans, profiles, and specifications without expense to him, and shall keep one copy of same constantly accessible on the work.

7. RIGHT OF ENTRY
The OWNER reserves the right to enter the property of location on which the works herein contracted for are to be constructed or installed, by such agent or agents as it may elect, for the purpose of supervising and inspecting the work, or for the purpose of constructing or installing such collateral work

as said OWNER may desire.

8. QUANTITIES AND MEASUREMENTS
No extra or customary measurements of any kind will be allowed, but the actual length, area, solid contents, number and weight only shall be considered unless otherwise specifically provided.

9. LINES AND GRADES
The ENGINEER will furnish control for alignment and convenient bench marks, when required for control of grades. Any additional stakes required by the CONTRACTOR shall be set at his expence. Whenever necessary, work shall be suspended to permit this work, but such suspension will be as brief as practicable and the CONTRACTOR shall be allowed no extra compensation therefor. The CONTRACTOR shall give the ENGINEER ample notice of the time and place where control lines and bench marks will be needed. All control stakes,marks,etc., shall be carefully preserved by the CONTRACTOR, and in case of careless destruction or removal by him or his employees, such stakes, marks,etc., shall be replaced by the ENGINEER at the CONTRACTOR'S expense.

10. SUPERINTENDENCE AND INSPECTION
It is agreed by the CONTRACTOR that the OWNER shall be and is hereby authorized to appoint from time to time such ENGINEERS, supervisors or inspectors as the said OWNER may deem proper to inspect the material furnished and the work done under this agreement, and to see that said material is furnished, and said work is done in accordance with the specifications therefor. The CONTRACTOR shall furnish aid and assistance required by the ENGINEER, supervisors, or inspectors for the proper inspection and examination of the directions and instructions of any Engineers, supervisors or inspectors so appointed, when the same are consistent with the obligations of this Agreement and the accompanying specifications, provided, however, should the CONTRACTOR object to any order by any subordinate ENGINEER, supervisor or inspector, the CONTRACTOR may within six (6) days make written appeal to the ENGINEER for his decision.

11. DISCREPANCIES AND OMISSIONS
It is further agreed that it is the intent of this contract that all work must be done and all materials must be furnished in accordance with the generally accepted practice, and in the event of any descrepancies between the plans and specifications, or otherwise, or in the event of any doubt as to the meaning and intent of any portion of the contract, specifications or plans, the ENGINEER shall define which is intended to apply to the work.

12. COLLATERAL CONTRACTS
The OWNER agrees to prove by separate contract or otherwise, all labor and material essential to the completion of the work that is not included, in this contract, in such manner as not to delay its programs or damage said CONTRACTOR.

13. DAMAGES
In the event the CONTRACTOR is damaged in the course of the completion of the work by the act, neglect,omission, mistake or default of the OWNER, or of the ENGINEER, or of any other contractor employed by the OWNER upon the work, thereby causing loss to the CONTRACTOR, the OWNER agrees that he will reimburse the CONTRACTOR for such loss. In the event the OWNER is damaged in the course of the work by act, negligence, omission,mistake or default of the CONTRACTOR or, should the CONTRACTOR unreasonably delay the progress of the work being done by others on the job, so as to cause loss for which the OWNER becomes liable, then the CONTRACTOR shall reimburse the OWNER for such loss.

14. LOSSED FROM NATURAL CAUSES
All loss or damage arising out of the nature of the work to be done, or from the action of the elements, or from any unforseen circumstances in the prosecution of the same, or from unusual obstructions or difficulties which may be encountered in the prosecution of the work shall be sustained and borne by the CONTRACTOR at his own cost and expense.

15. ESTIMATED QUANTITIES
This agreement, including the specifications, plans and estimate, is intended to show clearly all the work to be done and material to be furnished hereunder. The estimated quantities of the various classes of work to be done and material to be furnished under this contract are approximate and are to be used only as a basis for estimating the probable cost of the work and for comparing the proposals offered for the work. It is understood and agreed that the actual amount of work to be done and material to be furnished under that contract may differ somewhat from these estimates, and that the basis for payment under this contract shall be the actual amount of such work done and the material furnished.

The CONTRACTOR agrees that he will make no claim for damages, anticipated profits or otherwise on account of any differences which may be found between the quantities of work actually done, the material actually furnished under the contract and the estimated quantities contemplated and contained in the proposals provided however that in case the actual total of the contract should become as much as 25% more than,or 25% less than, the estimated or contemplated total of the contract, then either party to this Agreement, upon demand, shall be entitled to a revised consideration upon the portion of the work above or below 25% of the estimated total; such revised consideration to be determined by agreement between the parties, otherwise by the terms of the Agreement, as provided under EXTRA WORK.

16. CHANGES AND ALTERATIONS
The CONTRACTOR further agrees that the OWNER may make such changes and alterations as the OWNER may see fit, in the line, grade, form dimensions, plans or materials for the work herein contemplated, or any part thereof, either before or after the beginning of the contract construction, without affecting the validity of this contract and the accompanying bond.

If such changes or alterations diminish the quantity of the work to be done, they shall not constitute the basis for a claim for damages, or anticipated profits on the work may be dispensed with.

If they increase the amount of the work, and the increased work can fairly be classified under the specifications, such increase shall be paid for according to the quantity actually done and at the unit price established for such work under this contract; otherwise, such additional work shall be paid for as provided under EXTRA WORK. In case the OWNER shall make such changes or alterations as shall make useless any work already done, or material already furnished or used in said work, then the OWNER shall recompense the CONTRACTOR for any material or labor so used, and for any actual loss occasioned by such damage due to actual expenses incurred in preparation for the work as originally planned.

17. EXTRA WORK
The term "Extra Work" as used in this contract shall be understood to mean and include all work that may be required by the ENGINEER or OWNER and to

be done by the CONTRACTOR to accomplish any change, alteration or addition to the work shown upon the plans, or reasonably implied by the specifications, and not covered by the CONTRACTOR'S Proposal except as provided under Changes and Alterations in Paragraph 16 herein above.

It is agreed that the CONTRACTOR shall perform all Extra Work under the direction of the ENGINEER when presented with a written Work Order signed by the ENGINEER: Subject, however to the right of the CONTRACTOR to require a written confirmation of such Extra Work Order by the OWNER. It is also agreed that the compensation to be paid the CONTRACTOR for performing said Extra Work shall be determined by one or more of the following methods:

Method (a)	By agreed unit prices; or
Method (b)	By agreed lump sum; or
Method (c)	If neither Method(a) nor Method(b) can be agreed upon before the Extra Work is commenced, then the CONTRACTOR shall be paid the "actual field cost" of the work plus fifteen (15) percent.

In the event said Extra Work be performed and paid for under Method (c), then the provisions of this paragraph shall apply and the "actual field cost" is hereby defined to include the cost of all workmen, such as foremen, timekeepers, mechanics, and laborers, and materials, supplies, teams, trucks, rentals on machinery and equipment for the time actually employed or used on such Extra Work plus actual transportation charges necessarily incurred, if the kind of equipment or machinery be not already on the job, together with all power, fuel, lubricants, water and similar operating expenses, also all necessary incidental expenses incurred directly on account of such Extra Work, including Social Security, Old Age Benefits, and other payroll taxes, and a rateable proportion of premiums on Construction and Maintenance Bonds, Public Liability and Property Damage and Workmen's Compensation, and all other insurance as may be required by any law or ordinance, or directed by the ENGINEER or OWNER, or by them agreed.

The ENGINEER may direct the form in which accounts of the "actual field cost" shall be kept and may also specify in writing, before the work commences, the method of doing the work and the type and kind of machinery and equipment to be used, otherwise these matters shall be determined by the Contractor. Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be determined by using the one hundred (100) percent of the actual hourly or daily rate (for the time used plus time in moving to and from job) of the latest schedule of Equipment Ownership Expense adopted by the Associated General Contractors of America. Where practicable, the terms and prices for the use of machinery and equipment shall be incorporated in the Written Extra Work Order. The fifteen (15) percent of the "actual field cost" to be paid the CONTRACTOR shall cover and compensate him for his profit, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced within the "actual field cost" as herein defined, save that where the CONTRACTOR'S Camp or Field Office must be maintained primarily on account of such Extra Work, then the cost to maintain and operate same shall be included in the "actual field cost."

No claim for extra work of any kind will be allowed unless ordered in writing by the ENGINEER. In case any orders or instructions, either oral or written, appear to the CONTRACTOR to involve extra work for which he should receive

compensation, he shall make written request to the ENGINEER for written order authorizing Extra Work. Should a difference of opinion arise as to what does or does not constitute extra work, or as to the payment therefor, and the ENGINEER insists upon its performance, the CONTRACTOR shall proceed with the work after making written order and shall keep an accurate account of the "actual field cost" thereof, as provided under Method (c). The CONTRACTOR will thereby preserve the right to submit the matter of payment to arbitration, as herein provided.

18. PRELIMINARY APPROVAL

No Engineer, supervisor or inspector shall have any power to waive the obligations of this contract for the furnishing by the CONTRACTOR of good materials, and of his performing good work as herein described, and in full accordance with the plans and specifications. No failure or omission by any Engineer, supervisor or inspector to condemn any defective work or material shall release the CONTRACTOR from the obligations to at once tear out, remove and properly replace the same at any time prior to final acceptance upon discovery of said defective work, or material; provided, however, that the ENGINEER, his assistants or inspector, shall, upon request of the CONTRACTOR, inspect or reject any material furnished and in the event that the material has been once accepted by the ENGINEER, his assistant or inspector, such acceptance shall be binding on the OWNER, unless it can be clearly shown that such material furnished does not meet the specifications for this work.

Any questioned work may be ordered taken up, or removed for re-examination by the ENGINEER prior to final acceptance, and if found not in accordance with the specifications for said work, all expense for removing, re-examination and replacement shall be borne by the CONTRACTOR; otherwise, the expense thus incurred shall be allowed as EXTRA WORK, and shall be paid for by the OWNER.

19. DEFECTS AND THEIR REMEDIES

It is further agreed that if the work or any part thereof, or any material bought on the ground for use in the work or selected for the same, shall be deemed by the ENGINEER as unsuitable or not in conformity with the specifications, the CONTRACTOR shall, after receipt of written notice thereof from the ENGINEER, forthwith remove such material and rebuild or otherwise remedy such work so that it shall be in full accordance with this contract.

20. TIME AND ORDER OF COMPLETION

It is the meaning and intent of this contract, unless otherwise herein specifically proveded, that the CONTRACTOR shall be allowed to prosecute his work at such times and seasons, in such order of precedence, and in such manner as shall be most conducive to economy of construction; provided, however, that the order and time of prosecution shall be such that the work shall be substantially completed as a whole and in part, in accordance with this Contract, plans and specifications, and within the time of completion hereafter designated; provided, also, that which the OWNER is having other work done, either by contract or by his own force, the ENGINEER may direct the time and matter of constructing the work under this contract, so that conflict will be avoided and the construction of various works being done for the OWNER shall be harmonized.

The CONTRACTOR further agrees that he will commence work within ten (10) days after the date written notice to do so shall have been given to the CONTRACTOR, and will progress therewith so that the work shall be substantially completed in accordance with the terms of this Agreement within _____ working days after the date of written notice to commence work.

A "Working Day" is defined as a calendar day, not including Sundays or any legal holiday, in which either weather or other conditions, not under the control of the CONTRACTOR, will permit construction of the principal units of the work for a continuous period of not less than seven (7) hours between 7:00 A.M. and 6:00 P.M.

By the term "substantially completed" is meant that the structure has been made suitable for use or occupancy and is in condition to serve its intended purpose, but still may require minor miscellaneous work and adjustment.

21. EXTENSION OF TIME
Should the CONTRACTOR be delayed in the completion of the work by an act or neglect of the OWNER or ENGINEER, or by any employee of either, or by other CONTRACTORS employed by the OWNER, or by changes ordered in the work, or by strikes, lockouts, fire, or unusual delays by common carriers, or unavoidable cause or causes beyond the CONTRACTOR'S control, or by any cause which the ENGINEER shall decide justified the delay, then an extension of time shall be allowed for completing the work, sufficient to compensate for the delay, the amount of the extension to be determined by the ENGINEER, provided, however, that the CONTRACTOR shall give the ENGINEER prompt notice in writing of the cause of such delay.

22. HINDRANCES AND DELAYS
No charge shall be made by the CONTRACTOR for hindrance or delays from any cause (except when the work is stopped by order of the OWNER during the progress of any portion of the work empraced in this contract). In case said work shall be stopped by the act of the OWNER, then such expense as in the judgement of the ENGINEER is caused by stopping of said work shall be paid by the OWNER to the CONTRACTOR.

23. PRICE FOR WORK
In consideration of the furnishing of all the necessary labor, equipment, and material, and the completion of all work by the CONTRACTOR, and on the completion of all work and of the delivery of all material embraced in this contract in full conformity with the specifications and stipulations herein contained, the OWNER agrees to pay the CONTRACTOR the prices set forth in the Proposal hereto attached and marked "Exhibit C", which has been made a part of this contract. And the CONTRACTOR hereby agrees to receive such prices in full for furnishing all material and all labor required for the aforesaid work, also for all expenses incurred by hum, and for well and truly performing the same and the whole thereof in the manner and according to this Agreement, the attached specifications and requirements of the ENGINEER.

24. PARTIAL PAYMENTS
On or before the first day of each month, the ENGINEER shall prepare a statement showing as completely as practicable the total value of the work done by the CONTRACTOR up to and including the last day of the preceding month; said statement shall also include the value of all sound materials delivered on the ground that are to be fabricated into the work.

The OWNER shall then pay the CONTRACTOR on or before the 10th day of the current month the total amount of the ENGINEER"S statement, less _____ of the amount thereon which _____, shall be retained until final payments, and further less all previous Payments, and further less all further

sums that may be retained by the OWNER under the terms of this agreement. It is understood, however, that in case the whole work is near to completion and some unexpected and unusual delay occurs due to no fault or neglect on the part of the CONTRACTOR, the WONER may, upon written recommendation of the ENGINEER, pay a reasonable and equitable portion of the retained percentage to the CONTRACTOR; or, the CONTRACTOR at the OWNER'S option, may be relieved of the obligation to fully complete the work, and thereupon the CONTRACTOR shall receive payment of the balance due hum under the contract subject only to the conditions stated in Paragraph 26 hereof.

25. FINAL COMPLETION AND ACCEPTANCE
Within ten(10) days after the CONTRACTOR has given the ENGINEER written notice that the work has been completed, or substantially completed, the ENGINEER and the OWNER shall inspect the work and within said time, if the plan be found to be completed or substantially completed in accordance with plans and specifications, the ENGINEER shall issue to the OWNER and the CONTRACTOR his Certificate of Completion, and thereupon it shall be the duty of the OWNER with said ten (10) days to issue a Certificate of Acceptance of the work of the CONTRACTOR.

26. FINAL PAYMENT
Upon the issuance of the Certificate of Completion, the ENGINEER shall proceed to make final measurements and prepare final statement of the value of all work performed and material furnished under the terms of the Agreement and shall certify same to the OWNER, who shall pay to the CONTRACTOR on or before the 15th day after the date of the Certificate of Completion the balance due the CONTRACTOR under the terms of this Agreement, provided he has fully performed his contractual obligations under the terms of this contract; and said payment shall become due in any event upon said performance by the CONTRACTOR.

27. DELAYED PAYMENTS
Should the OWNER fail to make payment to the CONTRACTOR of the sum named in any partial or final statement, when payment is due, or should the ENGINEER fail to issue any statement on or before the date above provided, then the OWNER shall pay to the CONTRACTOR, in addition to the sum shown as due by such statement interest thereon at the rate of six (6) percent per annum from date due as provided in Paragraphs 24 and 26, until fully paid, which shall fully liquidate any injury to the CONTRACTOR growing out of such delay in payment, but the right is expressly reserved to the CONTRACTOR, in the event payments are not made promptly as proveded in Paragraph 24, to at any time thereafter treat the contract as abandoned by the OWNER and recover compensation, as proveded by Paragraph 44 of this contract.

28. ENGINEER'S AUTHORITY AND DUTY
It is mutually agreed between the parties to this Agreement that the ENGINEER shall supervise all work included herein. He has the authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the contract. In order to prevent delays and disputes and to discourage litigation, it is further agreed by and between the parties to this contract that if it cannot be otherwise agreed, the ENGINEER shall in all cases determine the amounts and quantities of the several kinds of work, which are to be paid for under this contract, and he shall determine all questions in relation to said work and the construction thereof, and he shall

in all cases decide every question which may arise relative to the execution of this contract on the part of said CONTRACTOR, that his estimates and findings shall be the conditions precedent to the right of the parties hereto to arbitrate or to any action on the contract, and to any rights of the CONTRACTOR to receive any money under this contract; provided, however, that should the ENGINEER render any decision or give any direction which, in the opinion of either party hereto, is not in accordance with the meaning and intent of this contract, the CONTRACTOR may file with said ENGINEER within thirty (30) days his written objection to the decision or question so rendered, and by such action may reserve the right to submit the question so raised to arbitration as herein provided. It being the intent of this Agreement that there shall be no delay in the execution of the work, and the decision or directions of the ENGINEER as rendered, shall be promptly carried out, and any claim arising therefrom shall be thereafter adjusted by arbitration as herein after provided.

The Engineer shall, within a reasonable time, render and deliver to both the Owner and the Contractor a written decision on all claims of the parties hereto and on all questions which may arise relative to the execution of the work or the interpretation of the contract, specifications and plans. Should the Engineer fail to make such decision within a reasonable time, an appeal to arbitration may be taken as if his decision has been rendered against the party appealing.

29. CONTRACTOR'S DUTY
The Contractor shall give personal attention to the faithful prosecution and completion of this work and shall be present either in person or by duly authorized representatives on the site of the work continually during its progress. He shall maintain an office on or adjacent to the site of the work.

30. CONTRACTOR'S AGENT
The Contractor during his absence from the work shall keep a competent superintendent or foreman upon the work, fully authorized to act for him in his absence, and to receive such orders as may be given for the proper continuance of the work notice to do any work, to alter work, to cease work which the Contractor is obligated to do, or concerning any imperfections in work or any materials furnished when given to any foreman or agent of the Contractor in charge of any operation of the work in the absence of the Contractor shall be considered as notice to the Contractor, provided any notice given under this paragraph shall be in writing.

31. CHARACTER OF WORKMEN
The Contractor agrees to employ only orderly, competent and skillful men to do the work, and that whenever the Engineer shall inform him in writing that any man or men on the work are, in his opinion, incompetent, unfaithful or disorderly, such man or men shall be discharged from the work and shall not again be employed on same without the Engineer's written consent.

32. CONSTRUCTION PLANT
The Contractor shall provide all labor, tools, equipment, machinery and material necessary in the prosecution and completion of this contract where it is not otherwise specifically provided that the Owner shall furnish the same, and it is also understood that the Owner shall not be held responsible for the care, preservation, conservation, or protection of any material, tools or machinery or any part of the work until it is finally completed and accepted.

33. RIGHT OF ENGINEER TO MODIFY METHODS AND EQUIPMENT
If at any time the methods or quipment used by the Contractor are found to be inadequate to secure the quality of work or the rate of progress required under this contract, the Engineer may order the Contractor in writing to increase their safety or improve their character and efficiency, and the Contractor shall comply with such order.

If at any time the working force of the Contractor is inadequate for securing the progress herein specified, the Contractor shall, if so ordered in writing, increase his force or equipment, or both, to such an extent as to give reasonable assurance of compliance with the schedule of progress.

34. SANITATION
Necessary sanitary conveniences for the use of laborers on the work, properly secluded from public observance, shall be constructed and maintained by the Contractor in such manner and at such points as shall be approved by the Engineer, and their use shall be strictly enforced.

35. CONTRACTOR'S BUILDINGS
The building of structures for housing men, or the eraction of tents or other forms of protection will be permitted only at such places as the Engineer shall direct, and the sanitary conditions of the grounds in or about such structures shall at all times be maintained in a manner satisfactory to the Engineer.

36. PROTECTION AGAINST ACCIDENT TO EMPLOYEES AND THE PUBLIC
The Contractor shall maintain such insurance as will protect the Contractor, the Owner and the Engineer from claims under Workmen's Compensation Acts, and any amendments thereof, and from any other claims for damages from personal injury, including death, which may arise from operations under this Agreement, whether such operations be by himself or by a subcontractor or by anyone directly or indirectly employed by either of them. Certificates of such insurance shall be filed with the Owner, if so required, and shall be subject to his approval from adequacy of protection.

37. PROTECTION OF ADJOINING PROPERTY
The said Contractor shall take proper means to protect the adjacent or adjoining property or properties in any way encountered, or which might be injured or seriously effected by a process of construction to be undertaken under this Agreement, from any damage or injury by reason of said process of construction and he shall be liable for any and all claims for such damage on account of his failure to fully protect all adjoining property.

38. PROTECTION AGAINST CLAIMS OF SUBCONTRACTORS, LABORERS, MATERIALMEN AND FURNISHERS OF MACHINERY, EQUIPMENT AND SUPPLIES
The Contractor agrees that he will indemnify and waive the Owner harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, materialmen and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performing of this contract. When so desired by the Owner, the Contractor shall furnish satisfactory evidence that all obligations of the nature herein above designated have been paid, discharged or vaived. If the Contractor fails to do so, then the Owner may, at the option of the Contractor, either pay unpaid bills, of which the Owner has written notice, direct, withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to liquidate any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payments to the Contractor shall be resumed in full,

in accordance with the terms of this contract, but in no event shall the provisions of this sentence by construed to impose any obligation upon the Owner to either the Contractor of his Surety.

39. PROTECTION AGAINST ROYALTIES OR PATENTED INVENTIONS
The Contractor shall protect and save harmless the Owner from all and every demand for damages, royalties or fees for any patented invention used by him in connection with the work done or material furnished under this contract; provided, however, that if any patented material, machinery, appliance or invention is clearly specified in this contract, then in that event, the cost of procuring the rights of use and the legal release or Indemnity shall be borne and paid by the Owner direct unless such cost is determined and directed to be included in the bid price at the time the proposal is submitted.

40. LAWS AND ORDINANCES
The Contractor shall at all times observe and comply with all Federal, State and Local Laws, ordinances and regulations which in any manner affect the contract or the work, and shall indemnify and save harmless the Owner against any claim arising from the violation of any such laws and ordinances, whether by the Contractor or his employees. In case the Owner is a body politic and corporate, the laws from which it derives its powers, insofar as the same regulates the objects for which, or manner in which, or the conditions under which, the Owner may enter into this contract, shall be controlling and shall be considered as part of this contract, to the same effect as though embodied herein.

41. LIQUIDATED DAMAGES FOR DELAY
And the Contractor agrees that time is of the essence of this contract and that for each delay of a day beyond the number of working days herein agreed upon the completion of the work herein specified and contracted for (after due allowance for such extension of time as is provided for under Extension of Time herein above) the Owner may withhold permanently from the Contractor's total compensation the sum of Fifty Dollars and no/100 ($50.00) as stipulated liquidated damages for such delay.

42. ASSIGNMENT AND SUBLETTING
The Contractor further agrees that he will retain personal control and will give his personal attention to the fulfillment of this contract and that he will not assign by Power of Attorney, or otherwise, not sublet said contract without the written consent of the Owner and that no part or feature of the work will be sublet to anyone objectionable to the Engineer or the Owner. The Contractor further agrees that the subletting of any portion or feature of the work or materials required in the performance of this contract shall not relieve the Contractor from his full obligation to the Owner as provided by the Agreements. All conditions as set out herein shall apply to subcontractors as well as the prime Contractor.

43. ABANDONMENT BY CONTRACTOR
In case the Contractor should abandon or fail or refuse to resume work within ten (10) days after written notification from the Owner or the Engineer, or if the Contractor fails to comply with the orders of the Engineer when such orders are consistant with this contract or this Agreement or with the specifications hereto attached, then and in this case, the Surety on the bonds shall be notified in writing and directed to complete the work, and a copy of said notice shall be delivered to the Contractor.

After receiving said notice of abandonment, the Contractor shall not remove from the work any machinery, equipment, tools, materials or supplies then on the job, but the same, together with any materials and equipment under contract for the work, may be held for use on the work by the Owner or the Surety on the contract bond, or another contractor, in completion of the work; and the Contractor shall not receive any rental or credit therefor (except when used in connection with extra work, where credit shall be allowed as provided for under Paragraph 17, Extra Work). It being understood that the use of such equipment and materials will ultimately reduce the cost to complete the work and be reflected in the final settlement.

In case the Surety should fail to commence compliance with the notice for completion herein before provided for within ten (10) days after services of such notice, then the Owner may provide for completion of the work in either of the following elective manners:

(a) The Owner may thereupon employ such force of men and use such machinery euipment, tools, materials, and supplies as said OWNER may deem necessary to complete the work and charge the expense of such labor, material,equiment, tools, and supplies to said Contractor and the expense so charged shall be deducted amd paid by the OWNER out of such work as may be due, or that may thereafter at any time become due to the Contractor under and by virtue of this Agreement. In case such expence is less than the sum which would have beenpayable under this contract if the same had been completed by the Contractor, then said Contractor shall recieve the difference. In case such expence is greater than the sum which would have been payable under this contract, if the same had been completed by the Contractor, then the Contractor and/or his Surerty shall apy the amount of such excess to the Owner; or

(b) The Owner, under sealed bids, after five(5)days notice published one or more times in a newspaper having a circulation in the county of the location of the work, may let the contract for compensation of the work under substantially the same terms and conditions which are provided in this contract. In case of any increase in cost to the Owner under the new contract as compared to what would have been the cost under this contract, such increase shall be charged to the Contractor and the Surety shall be and remain bound therefore. However, should the cost to complete any such new contract prove to be less than what would have been the cost to complete under this contract, the Contractor and/or his Surety shall be credited therewith.

When the work shall have been substanially completed, the Contractor and his Surety shall be so notified and Certificates of Completion and Acceptance shall be issued as provided in Paragraph 23 hereinabove, a complete itemized statement of the contract accounts, certified to by the Engineer as being correct, shall then be prepared and delivered to the Contractor and his Surety,whereupon the Contractor and/or his Surety, or the Owner, as the case may be, shall pay the balance due as reflected by said statement within fifteen(15) days after the date of such Certificate of Completion.

In the event the statement of the account shows that the cost to complete the work is less than that which would have been the cost to the Owner had the work been completed by the Contractor under the terms of this contract anf when the Contractor and/or his Surety shall pay the balance shown to be due by them to the Owner, than all machinery,equipment,tools materials or supplies left on the site of the work shall be turned over to the Contractor and/or his Surety.

Should the cost to complete the work exceed the contract price and the Contractor and/or his Surety fail to pay the amount due the Owner within the time designed hereinabove, and there remains any machinery, equipment, tools, materials or supplie on the site of the work, notice thereof, together with an itemized list of such equipment and materials shall be mailed to the Contractor and his Surety at the respective addresses designated in this contract provided, however, that actual written notice given in any manner will satisfy this condition. After mailing or otherwise giving of such notice, such property shall be held at the risk of the Contractor and his Surety subject only to the duty of the Owner to exercise ordinary care to protect such property. After fifteen(15) days from the date of said notice, the Owner, may sell such machinery, equipment, tools,materials, or supplies and apply the net sum derived from such sale to the credit of the Contractor, or without notice, as the Owner may elect. The Owner shall release any machinery, equipment, tools, materials or supplies, which remain on the work and belong to persons other than the Contractor or his Surety, to their proper owners.

44. ABANDONMENT BY THE OWNER

In case the Owner shall fail to comply with the terms of this contract and should fail to comply with said terms within ten(10) days after written notification by the Contractor, then the Contractor may suspend or wholly abandon the work, and may remove therefrom all machinery,tools and equipment, and all materials on the ground that have not been included in payments to the Contractor and have not been brought into work. And thereupon the Engineer shall make an estimate of the total earned by the Contractor, which estimate shall include the value of all work actuallt completed by said Contractor at the prices stated in the attached proposal(Exhibit C), the value of all partially completed work at a fair and equitable price, and the amount of all extra work performed at the prices agreed upon, or provided for by the terms of this contract, and a reasonable sum to cover the cost of any provisions made by the Contractor, to carry the whole work to completion and which cannot be utilized. The Engineer shall then make a final statement on the balance due the Contractor by deduction from the above estimate all previous payments by the Owner, all other sums and shall certify same to the Owner who shall pay to the Contractor on or before thirty(30)days after the date of notification by the Contractor, the balance shown by said final statement as due the Contractor under the terms of this Agreement.

45. BONDS

It is further agreed by the parties of this contract that the Contractor shall execute a performance dond and a payment bond, each in the sum of one hundred (100) percent in the forms provided for this purpose and it is agreed that this contract shall not be in effect until such bonds are furnished and approved by the Owner.

46. TIME OF FILING CLAIMS

It is further agreed by both parties hereto that all questions of dispute or adjustment presented by the Contractor shall be in writing and filed with the Engineer within a reasonable time after the Engineer has given any directions, order, or instruction to which the Contractor desires to take exception. The Engineer shall reply to such written exceptions by the Contractor and render his final desicion in writing. In case the Contractor objects to the work by the Owner and the acceptance by the Contractor of the final payment shall be a bar to any claims by either party, except as follows: No exceptions.

47. ADEQUACY OF DESIGN

It is understood that the Owner has selected the Engineer named in this Agreement to prepare the plans and specifications and all supplements thereto; and agreed that the Owner will be reponsible for the adequacy of the design sufficiency of the plans and specifications, and the safety of the structure, provided the Contractor has complied with said plans and specifications, all modifications thereof and additions and alterations thereto, approved by the Engineer. The burden of proof shall be upon the Contractor to show that he has complied with this contract, said plans and specifications and all modifications thereof, and all additions and alterations thereto.

48. ARBITRATION

All questions of dispute under this Agreement shall be submitted to arbitration at the request of either party to the dispute. The parties may agree upon one arbiter, otherwise there shall be three, one named in writing by each party and a third chosen by the two arbiters so selected; or if the arbiters fail to select a third within ten(10) days, he shall be chosen by the_____

_____

Should the party demanding arbitration fail to name an arbiter within ten(10) days of the demand, his right to arbitrate shall lapse, and the decision of the ENGINEERS shall be final and binding on him. Should the other party fail to choose an arbiter within ten(10)days the ENGINEER shall appoint an arbiter. Should either party refuse or neglect to supply the arbiters with any papers or information demanded in writing the arbitors are empowered by both parties to take ex parte proceedings.

The arbiters shall act with promptness. The decision of any two shall be binding on both parties to the contract. The decision of the arbiters upon any question submitted to arbitration under this contract shall be a condition precedent to any right of legal action. The decision of arbiter or arbiters may be filed in court to carry it into effect.

The arbiters, if they deem the case demands it, are authorized to award the party whose contention is sustained as they deem proper for the time, expense and trouble incident to the appeal, and if the appeal was taken without reasonable cause, they shall fix their own compensation unless otherwise provided by agreement, and shall assess the cost and charges of the arbitration upon either or both parties. The award of the artibers must be made in writing, and shall not be open to objection on account of the form of proceedings or award.

The Contractor and/or his Surety will be required by the Owner to repair, replace, restore, and/or to make to comply strictly in all things with this contract and the plans and specifications and any and all od said work and/or materials, which within a period of one year from and after the date of the passing,approval, and/or acceptance of any such work or material, are found to be defective or to fail in any way to comply with this contract or with the plans and specifications.

SUPPLEMENTAL GENERAL CONDITIONS

1. All Contractors must comply with sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor regulations (29 CFR, Part 5).

Under section 103 of the Act, each contractor shall be required to compute the wages of every mechanic and laborer on the basis of a standard work day of 8 hours and a standard work week of 40 hours. Work in excess of the standard work day or work week is permissible provided that the worker is compensated at a rate of not less than 1-1/2 times the basic rate of pay for all hours worked in excess of 8 hours in any calendar day or 40 hours in the work week.

Section 107 of the act is applicable to construction work and provides that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction, safety and health standards promulgated by the Secretary of Labor. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

2. All Contractors must comply with all applicable standards of the clean Air Act of 1970.

3. "Anti-Kick Back" Clause: Each Contractor or sub-contractor shall be prohibited from inducing, by any means, any person employed in the construction, completion or repair of public work, to give up any part of the compensation to which he is otherwise entitled.

BOND AND INSURANCE REQUIREMENTS

1. Bid Guarantee: A bid guarantee of five percent (5%) of the bid shall be required of each bidder. This guarantee shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified.

2. Performance and Payment Bonds: If the total Contract Price exceeds $2,000.00, the Contractor, prior to the signing of the contract, shall shall execute in accordance with the provisions of Article 5160, Vernon's Civil Statutes, the following bonds to the Owner:

   A. Performance Bond in the amount of 100% of the Contract price conditioned upon the faithful performance of the Contract. This bond is solely for the protection of the Owner.

   B. Payment Bond in the amount of 100% of the contract price, solely for the protection of those supplying labor and materials in the prosecution of the Contract.

Each bond shall be executed by a corporate surety or corporate sureties duly authorized to do business in the State of Texas, acceptable to the Owner, and on forms approved by the Attorney General of Texas. If any surety upon any bond furnished in connection with this Contract becomes insolvent, or otherwise not authorized to do business in this State, the Contractor shall promptly furnish equivalent security to protect the interests of the Owners and of persons supplying labor or materials in the prosecution of the Work contemplated by this Contract.

3. Insurance: The Contractor shall not commence Work under this Contract until he has obtained all the insurance required hereunder and certificates of such insurance have been filed with and approved by the Owner. Approval of the insurance by the Owner shall not relieve or decrease the liability of the Contractor.

   The Contractor shall provide and maintain, until the Work covered in this Contract is completed and accepted by the Owner, the minimum insurance coverages as follows:

Type of Coverage	Limits of Liability	
1. Workmen's Compensation	Statutory	
2. Employer's Liability	$100,000	$300,000
3. Comprehensive General Liability		
a. Bodily Injury	$300,000 Each Person	$500,000 Each Occurrence
b. Property Damage	$100,000 Each Occurrence	$300,000 Aggregate

4. Comprehensive Automobile Liability

a. Bodily Injury	$300,000 Each Person	$500,000 Each Occurrence
b. Property Damage	$300,000 Each Occurrence	

CONCRETE

DESCRIPTION

This item governs the materials used, storing and handling of materials and for the proportioning and mixing of concrete. Concrete shall be composed of Portland cement, aggregates (coarse and fine), admixtures if desired or required, and water, proportioned and mixed as hereinafter provided.

MATERIALS

A. Cement shall be Type I Portland cement, as conforming to ASTM C-150-70

B. Aggregate - Coarse aggregate shall consist of durable particles of gravel, crushed stone, or combinations thereof; free from frozen material or injurious amounts of salt, alkali, vegetable matter, or other objectionable material either free or as an adherent coating; and its quality shall be reasonably uniform throughout. It shall not contain more than 0.25% by weight of clay lumps, nor more than 1.0% by weight of shale, nor more than 5% by weight of laminated and/or friable particles.

The size shall be not larger than one-half (1/2) of the narrowest dimension between forms of the member for which the concrete is to be used nor larger than three-fourths (3/4) of the minimum clear spacing between reinforcing bars.

Fine aggregate shall consist of clean, hard, durable, and uncoated particles of natural or manufactured sand or a combination thereof, with or without mineral filler. It shall be free from objectionable material and shall not contain more than 5% by weight of clay lumps.

C. Mixing water shall be clean and free from injurious amounts of oil, acid, alkalis, organic matter or other deleterious substances. It shall contain no more than 5% salt.

MIX DESIGN

"Class A" concrete shall be required, with a minimum of five (5) bags of cement per cubic yard of concrete, and a maximum water/cement ratio of 6.5 to 1. It shall have a minimum 28 day compressive strength of 3000 psi, maximum allowable slump shall be four (4) inches.

It shall be the responsibility of the Contractor to furnish the mix design, using the requirements herein provided by the Engineer. It shall also be the responsibility of the Contractor to determine and measure the batch quantity of each ingredient, including all water, so that the mix conforms to these specifications and any other requirements shown on the plan. Contractor shall submit written data for Engineer's approval before using admixtures other than air entraining.

HANDLING

Mixing and handling shall comply with Texas Highway Department Specification Item #421, and transportation operations shall conform to ASTM C-94 (latest revision).

No water shall be added to mix after the truck has left the plant, unless

CONCRETE (cont'd.)

authorized by the Engineer, and no concrete which has been held in the mixer for more than two (2) hours shall be used. Retempering of partially hardened concrete will not be permitted.

MEASUREMENT

Measurement of concrete shall be by the cubic yard of concrete, in place.

PAYMENT

Payment shall be made by the cubic yard of concrete, complete in place, and shall be that quantity shown on the contract plans and in the proposal. Unit prices bid for this item shall be full compensation for furnishing, hauling, and mixing all concrete material; placing, curing and finishing all concrete; furnishing and placing expansion joint material required and for all forms, falsework, labor, tools, equipment and incidentals necessary to complete the work.

SPECIFICATIONS FOR REINFORCING STEEL

DESCRIPTION

This item shall provide for the furnishing and placing of reinforcing steel of the type, size and quantity designated for use in paving, curb and gutter, sidewalks and other structures as shown on the plans and in accordance with these specifications.

MATERIAL

Throughout this item, when the Standard Specifications of the American Society for Testing Materials (A.S.T.M.) are specified, the latest standard or tentative specifications issued by the Society prior to the date of receipt of bids on which the contract is awarded shall govern.

All bar reinforcement shall be open hearth new billet steel of structural or intermediate grade.

New billet steel shall conform to the requirements of the Standard Specifications for Billet Steel Concrete Reinforcement Bars, A.S.T.M. Designation A-15.

Unless otherwise shown on the plans, all reinforcing bars shall be deformed bars. Twisted bars are not considered as deformed and shall not be used. The forms of deformed bars shall be used as to provide a net sectional area at all points equivalent to that of plain square bars of equal nominal size.

Wire for fabric reinforcement shall be cold drawn from rods hot rolled from open hearth billets. Wire shall conform to the requirements of the Standard Specifications for Cold Drawn Wire for Concrete Reinforcements, A.S.T.M. Designation A-62.

In cases where the provisions of this item are in conflict with the provisions of the A.S.T.M. Designations to which reference is made, the provisions of this item shall govern.

The nominal size and area and the theoretical weight of reinforcing steel bars covered by these specifications are as follows:

(NOTE: Whenever bars of a given diameter or size are specified herein or shown on the plans, bars other than round or square but providing an equivalent nominal area and weight will be considered acceptable unless specifically noted otherwise on plans.)

REINFORCING STEEL (cont'd)

SIZE	BAR	NOMINAL AREA SQUARE INCH	WEIGHT PER LINEAR FOOT
1/4" Round	2	0.049	0.167
3/8" Round	3	0.110	0.376
1/2" Round	4	0.196	0.668
5/8" Round	5	0.307	1.043
3/4" Round	6	0.442	1.502
7/8" Round	7	0.601	2.044
1" Round	8	0.785	2.670
1/2" Square		0.250	0.850
1" Square	9	1.000	3.400
1-1/8" Square	10	1.266	4.303
1-1/4" Square	11	1.563	5.313

The weight on any lot (see note) of bars shall not vary more than three and one-half (3-1/2) percent under the theoretical weight for bars three-eights (3/8) inch and over in nominal size or diameter, or more than five (5) percent under theoretical weight for bars under three-eights (3/8) inch in nominal size or diameter. The weight of any individual bar shall not vary more than six (6) percent under the theoretical weight for bars three-eights (3/8) inch and over in size or diameter, or more than ten (10) percent under the theoretical weight for bars under three-eights (3/8) inch in size or diameter. The theoretical weight of deformed bars shall be the same as the theoretical weight of plain round or square bars of the same nominal size. Bars or lots which vary more than the above limits shall be rejected.

(Note: The term "lot" in the above paragraph shall mean all of the bars of the same nominal weight per linear foot in a carload or in a consignment if less than a carload.)

When wire is ordered by gauge numbers, the following relation between number and diameter, in inches, shall apply unless otherwise specified:

GAUGE NUMBER	EQUIVALENT DIAMETER IN.	GAUGE NUMBER	EQUIVALENT DIAMETER IN.
0	.3065	8	.1620
1	.2830	9	.1483
2	.2625	10	.1350
3	.2437	11	.1205
4	.2253	12	.1055
5	.2070	13	.0915
6	.1920	14	.0800
7	.1770		

The dimensions of the wire on any diameter shall not vary more than 0.0003 inches from the specified nominal diameter. The difference between the maximum and minimum diameters, as measured on any given cross section of wire, shall not be greater than 0.003 inches. Wire having a diameter which varies more than the theoretical diameter shall be rejected.

REINFORCING STEEL (cont'd)

BENDING

The reinforcement shall be bent cold to shapes indicated on the plans. Bends shall be true to the shapes indicated and irregularities in bending shall be cause for rejection.

Unless otherwise shown on the plans, the bends for stirrups and ties shall be made around a pin having a diameter of not less than two (2) times the minimum thickness of the bar.

STORING

Steel reinforcements shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust. When placed in the work, it shall be free from dirt, scale, dust, paint, oil, or other foreign material.

SPLICES

No splicing of bars, except when shown on the plans, will be permitted without the written approval of the ENGINEER. Splices which are permitted shall be as indicated on the plans. If not indicated on the plans, all splices shall be in accordance with the Manual of Standard Practices of American Concrete Institute (ACI-315-57), except in the case of welded splices, and shall be well distributed or else located at points of low tensile stress. No splices other than welded splices will be permitted at points where the section is not sufficient to provide a minimum distance of two (2) inches between the splice and the nearest adjacent bar or the surface of the concrete. The bars shall be rigidly clamped or wired at all splices in a manner approved by the ENGINEER.

Where shown on the plans or required by the provisions of this item or other pertinent specifications, welded bar splices shall be used. In general, such splices shall be so located that not more than two (2) bars in any twelve (12) inch width of the member shall be spliced at any one point. Bars to be welded shall be placed side by side and a fillet weld made on each side for the length of the splice. All welds and welding operations shall conform to the Specifications for Arc Welding.

PLACING

Steel reinforcements shall be placed in the exact position as shown on the plans and held securely in place during the placing of the concrete. Vertical stirrups shall always pass around the main tension members and be securely attached thereto. The reinforcing steel in all concrete walls shall be spaced its proper distance from the face of the forms by means of approved galvanized metal spacers or approved precast mortar or concrete blocks.

Unless provision for welding is made, all reinforcing steel shall be wired together at all intersections. Before any concrete is placed, all mortar shall be cleaned from the reinforcement. Precast mortar or concrete blocks to be used for holding steel in position adjacent to formed surfaces shall be cast

REINFORCING STEEL (cont'd.)

in individual molds meeting the approval of the ENGINEER and shall be cured by covering with wet burlap until aged sufficiently to be removed from the molds at which time the blocks shall be immersed in water for the remainder of at least a four (4) day curing period. The blocks shall be preferably cast with the sides beveled and in such a manner that the sizes of the block increase away from the area to be placed against the forms. Blocks in the form of a frustrum of a cone or pyramid are preferred. A suitable tie wire shall be provided in each block, such wire to be used for anchoring the block to the steel in order to avoid displacement in placing the concrete. Except in unusual cases, and when specifically otherwise authorized by the ENGINEER, the size of the surface to be placed adjacent to the forms shall not exceed two and one-half (2-1/2) inches square, or the equivalent thereof in cases where circular or rectangular areas are provided. Blocks shall be accurately cast to the thickness required and the surface to be placed adjacent to the forms shall be a true plane free of surface imperfections.

Sheets of wire mesh or fabric shall overlap each other sufficiently to maintain a uniform strength and shall be securely fastened at the ends and edges.

No concrete shall be deposited until the ENGINEER shall have inspected the placing of the reinforcing steel and given permission to place concrete.

MEASUREMENT AND PAYMENT

All work performed and materials furnished as prescribed herein will not be paid for directly but shall be included in the unit price bid for "Structural Concrete", "Concrete Pavement", "Integral Curb", etc. Payment shall be full compensation for furnishing, bedding, fabricating, welding and placing the reinforcement, for all clips, blocks, metal spacers, chains, ties, wire, or other materials used for fastening reinforcements in place, and for all tools, labor, equipment and incidentals necessary to complete the work.

SHOP DRAWINGS

The CONTRACTOR shall provide the ENGINEER with five copies of fabrication drawings for approval and correction, and after final approval, four (4) corrected and approved sets are to be furnished.

SPECIFICATIONS FOR CONCRETE STRUCTURES

DESCRIPTION:

These specifications shall govern the construction of culverts, retaining walls and abutments, and incidental structures involving the use of concrete.

All concrete structures shall be constructed in accordance with the design requirements and details shown on the plans, conforming to the pertinent provisions of the specifications for "Structural Excavation", "Reinforcing Steel", "Concrete for Structures", and other incidental items of the specifications which are applicable to the completed structure, and in conformity with the requirements herein.

MATERIALS:

A. Concrete - All concrete shall conform to the provisions of the specifications, "Concrete for Structures" or "Concrete Structures", whichever item is applicable to the contract as may be indicated on the plans or in the pertinent specifications.

B. Expansion Joint Material:

1. Premolded Material - Bituminous premolded material shall be of dimensions specified or shown on the plans and shall be of asphaltic or tar composition. The material shall be of such character that it will not be deformed by ordinary handling during hot weather or become hard and brittle during cold weather. Not over two (2) thin strips of stiffener will be allowed. The bitumen shall be uniformly impregnated with a suitable filler to reduce its brittleness at low temperature to a minimum. The bitumen by weight in the joint material shall be not less than seventy-two (72) percent for material one (1) inch or less in thickness and not less than seventy-seven (77) percent for material more than one inch in thickness. The bitumen by weight in rock asphalt joint material shall be not less than forty (40) percent. The physical properties of the material shall be as follows:

Absorptions - not more than 5%
Distortion - not more than 1-1/2
Brittleness - The material shall not crack or shatter when subjected to the test for brittleness.

One (1) sample eighteen (18) inches long, and the width of the material, not to exceed twelve (12) inches, shall be submitted from each thickness in each consignment and shall be tested in accordance with the following methods:

a. Absorption: A sample of two (2) inches by six (6) inches shall be taken from the joint material in such a manner that all edges are freshly cut. The specimen shall be weighed and then immersed in water for twenty-four (24) hours, removed, and the surface water wiped off with a slightly dampened cloth. The specimen then shall be quickly weighed and the percentage of absorption computed.

CONCRETE STRUCTURES (continued)

b. Brittleness: A sample of two (2) inches by six (6) inches shall be cut from the joint material parallel to the lay of the fibre and shall be placed in water and maintained at a temperature of from 4 to 6° Centigrade for at least two (2) hours prior to testing. Then it shall be clamped between two (2) boards held in any suitable support so that the expansion joint cantilevers three and one-half (3-1/2) inches. A cast iron ball weighing 0.95 pounds and having a diameter of 1.875 inches shall be suspended by a cord which is tied to an eyelet soldered to the ball. For samples having a thickness of five-sixteenths (5/16) inch or less, the ball shall be suspended six (6) inches above the center of the projected portion of the specimen. For samples over five-sixteenths (5/16) inch but nine-sixteenths (9/16) inch or less in thickness, the ball shall be suspended one (1) foot above the specimen. For samples over nine-sixteenths (9/16) inch in thickness, the ball shall be suspended two (2) feet above the specimen. The ball shall be released by turning the string above the eyelet.

c. Distortion: A sample two (2) inches by six (6) inches, absolutely flat and straight, which has been cut parallel to the lay of the fibre, shall be clamped between two blocks so that the expansion joint cantilevers three and one-half (3-1/2) inches. The clamp with the expansion joint shall then be placed in an oven and maintained at 125° Fahrenheit for two (2) hours. The deflection from the horizontal shall then be measured.

2. Poured Joint Material - Asphalt for use in poured joints shall be homogeneous, shall be free from water, and shall not foam when heated to 200° Centigrade (392° Fahrenheit). It shall conform to the following requirements:

Flash point (open cup) not less than 200° C. (392° F.)	
Softening point (ring and ball method) 65° to 100° C. (149° to 230° F.)	
Penetration at 0° C. (32° F.), 200 gms., 60 seconds, not less than	10
Penetration at 25° C. (77° F.), 100 gms., 5 seconds	30 to 50
Penetration at 46° C. (115° F.), 50 gms., 5 seconds, not more than	110
Loss on heating at 163° C. (325° F.), 50 gms., 5 hours, not more than	1.0%
Penetration at 25° C. (77° F.), 100 gms., 5 seconds, of residue after heating at 163° C. (325° F.) as compared with penetration of asphalt before heating, not less than	60.0%
Ductibility at 25° C. (77° F.), not less than	3.0 cm.
Proportion of bitumen soluble in carbon tetrachloride, not less than	99.0%
Total bitumen (soluble in carbon disulphide) not less than	99.0%

CONCRETE STRUCTURES (continued)

3. Other Materials - All other materials such as reinforcing steel and structural steel shall conform to the requirements of pertinent specification.

GENERAL CONSTRUCTION REQUIREMENTS:

Before starting work, the CONTRACTOR shall inform the ENGINEER fully as to the methods of construction he proposes to follow and as to the amount and character of the equipment he proposes to use, the adequacy of which shall be subject to the approval of the ENGINEER.

Concurrence on the part of the ENGINEER in any proposed construction methods, approval of equipment, or approval of form and falsework plans shall not be considered as relieving the CONTRACTOR of the responsibility for the safety or correctness of his methods and adequacy of his equipment, or from carrying out the work in full accordance with the contract.

Unless otherwise provided, the following requirements shall govern the time sequence in which construction operations may be carried on and for the opening of completed structures to traffic.

Forms for walls or columns shall not be erected on concrete footings until the concrete in the footing has cured for at least two (2) curing days. Concrete may be placed in the wall or column as soon as the forms and reinforcing steel placement are approved.

The use of completed portions of a structure as the site for mixing operations or for storage of materials will not be permitted until the particular portion of the structure has aged for at least ten (10) curing days.

A curing day shall be as defined in section, "Removal of Forms and Falsework". In continued cold weather, the construction operations may be authorized at the end of a period of calendar days equal to twice the number of curing days specified above.

Structures shall not be opened to construction traffic or to the traveling public until authorized by the ENGINEER. Such authorization may be given when the last concrete placed has cured at least ten (10) curing days but not until the requirements for form and falsework removal have been fulfilled. This authorization shall cover only such traffic that complies with legal road limitations.

FOUNDATIONS:

Excavation for foundations shall be made in accordance with the requirements of pertinent specifications.

EXPANSION JOINTS AND DEVICES:

Expansion joints and devices to provide for expansion and contraction shall be constructed where and as indicated on the plans.

CONCRETE STRUCTURES (continued)

Premolded materials, if specified, shall be used in expansion of contraction joints in abutment walls, wing walls and retaining walls. Metal flashing strips for the prevention of water seepage through wall joints shall be provided and installed in accordance with the plans provisions.

Premolded materials, wherever used, shall be anchored to the concrete on one side of the joint by means of copper wire not lighter than No. 12B and S. gauge. Such anchorage shall be sufficient to preclude the tendency of the material to fall out of the joint.

Careful workmanship shall be exercised in the construction of all joints to insure that the concrete sections are completely separate by an open joint or by the joint materials and to insure that the joints will be true to the outline indicated. Immediately after the removal of forms and again where necessary after finishing, all projecting concrete shall be removed along the exposed edges of premolded materials in order to secure full effectiveness of the expansion joint.

Where roofing felt or premolded materials are specified by horizontal joints, the materials shall, if practicable, extend two (2) inches beyond the form for the top member. The projecting portions shall be subsequently trimmed to the face of the member after the forms are removed.

CONSTRUCTION JOINTS:

The joint formed by placing plastic concrete in direct contract with concrete that has attained its initial set shall be deemed a construction joint. When concrete in a structure or a portion of a structure is specified to be placed monolithic, the term monolithic shall be interpreted to mean that the manner and sequence of concrete placing shall be such that construction joints will not be incurred.

Construction joints shall be of the type and spacing shown on the plans. Additional joints shall not be provided without written authorization from the ENGINEER. Any additional construction joints shall have details equivalent to those shown on the plans for joints in similar locations.

Unless otherwise provided, construction joints shall be square and normal to the forms. Bulkheads shall be provided in the forms for all joints except horizontal joints.

The top surface of a concrete placement which terminates at a horizontal construction joint shall have the surface cement film removed and shall be thoroughly roughened as soon as practicable after the concrete has attained its initial set. The surfaces at bulkheads shall be roughtened as soon as bulkhead forms are removed.

Before joining plastic concrete to concrete that has already set, the surface of the concrete in place shall be free from all loose material, laitance, dirt or foreign matter, shall be washed and scrubbed clean with stiff brooms and thoroughtly drenched with water until saturated, and shall be kept wet

CONCRETE STRUCTURES (continued)

until the plastic concrete has been placed. Immediately prior to the placing of additional concrete, all forms shall be drawn tight against the concrete in place, and the surface of the concrete in place shall be brushed with a coating of grout mixed in the proportions of one part of cement to two parts of sand.

If shown on the plans, construction joints shall be provided with concrete keyways, reinforcing steel dowels, and/or metal flashing strips. The method of forming keys in keyed joints shall be such as to permit the easy removal of forms without chipping, breaking, or damaging the concrete in any manner.

FALSEWORK:

All falsework shall be designed and constructed so that no excessive settlement or deformation will occur, and so that the necessary rigidity shall be provided. Details of falsework construction shall be subject to review and approval by the ENGINEER in accordance with the provisions of section, "General Constructions Requirements".

All timber used in falsework centering shall be sound, in good condition, and free from defects which will impair its strength. All timber for wedges shall be hardwood.

FORMS:

Forms shall be built mortar-tight and of material sufficient in strength to prevent bulging between supports and shall be set and maintained to the lines designated until the concrete is sufficiently hardened to permit form removal. During the elapsed time between the building of the forms and the placing of the concrete, the forms shall be maintained in a manner to eliminate warping and shrinking. All details of form construction shall be subject to the approval of the ENGINEER and permission to place concrete will not be given until all of such work is complete to his satisfaction.

If, at any stage of the work, the forms show signs of bulging or sagging, that portion of the concrete causing such condition shall be immediately removed, if necessary, and the forms shall be reset and securely braced against further movement.

Lumber for forms shall be properly seasoned and of good quality. It shall be free from loose or unsound knots, knot holes, twists, shakes, decay, and other imperfections which would affect its strength or impair the finished surface of the concrete. The lumber used for facing or sheathing shall be surfaced on at least one side and two edges and shall be sized to uniform thickness.

Nominal one (1) inch thickness lumber will be permitted for general use on other portions of the structure if backed by a sufficient number of studs and wales.

Timber forms for exposed concrete surfaces which are required to be surface

CONCRETE STRUCTURES (continued)

finished in accordance with these specifications shall be face lined with approved type of form lining material such as masonite or plywood or equal. If desired by the CONTRACTOR, facing for such surfaces may be constructed of three-fourths (3/4) inch thick plywood backed by adequate studs and wales, and in this case form lining will not be required.

Forms or form lumber to be reused shall be maintained clean and in good condition as to accuracy, shape, strength, rigidity, tightness, and smoothness of surface. Any lumber which is split, warped, bulged, marred, or has defects that may produce work inferior to that resulting from using new material shall not be reused.

Studs shall not be less than two (2) inches by four (4) inches nominal section and shall be spaced center to center not more than twenty (20) times the actual thickness of the facing lumber. Wherever practicable, studs shall be capped at the top with a plate of not less than two (2) inches by six (6) inches nominal size, carefully selected as to straightness. All joints in plates shall be scabbed at least four (4) feet each way to provide continuity.

Wales shall be spaced at such intervals as to hold forms securely to the designated lines. All wales shall be scabbed at least four (4) feet on each side of joints to provide continuity. A row of wales shall be placed within six (6) inches of the bottom of each placement.

Forms shall be rigidly braced to prevent movement while placing the concrete.

All face form material shall be fastened to all studs and shall have true horizontal and vertical joints. Facing material on horizontal and other surfaces shall be placed with parallel and square joints.

Molding specified for chamfer strips or other uses shall be made of redwood, cypress or pine materials of such grade that will not split when nailed and which can be maintained to a true line without warping. The molding shall be mill cut and dressed on all faces. Unless otherwise provided, forms shall be filleted at all sharp corners and edges with triangular chamfer strips. The strips shall be three-fourths (3/4) inch measure on the sides.

Forms for railings and ornamental work shall be constructed to standard equivalent to first class mill work. All moldings, panel work, and bevel strips shall be straight and true with neatly mitered joints out of such design that the finished work shall be true, sharp, and clean cut.

All forms shall be so constructed as to permit removal without damage to the concrete. Particular and special care must be exercised in framing forms for copings, offsets, railing and all ornamental work so that there will be no damage to or marring of the concrete when the forms are removed. If desired by the CONTRACTOR, the forms may be given a slight draft to permit ease of removal.

Metal form ties of an approved type shall be used to hold forms in place. Such ties shall be of a type especially designed for use in connection with concrete work, and they shall have provision to permit ease of removal of the

CONCRETE STRUCTURES (continued)

metal as hereinafter specified. The use of wireform ties will not be permitted except for minor or special form areas where the use of rigid type metal ties would be impracticable.

All metal appliances used inside of forms to hold them in correct alignment shall be removed to a depth of at least one-half (1/2) inch from the surface of the concrete and shall be so constructed that the metal may be removed without undue injury to the surface by chipping or spalling. Such devices, when removed, shall lease a smooth opening in the concrete surface. Burning off rods, bolts, or ties will not be permitted.

Metal ties shall be held in place by devices attached to wales. Each device shall be capable of developing the strength of the tie.

Pipe spreaders will not be permitted.

Metal and wooden spreaders which are separate from the forms shall be entirely removed as the concrete is being placed.

Where wire ties are used, all wires, upon removal of the forms, shall be cut back at least one-half (1/2) inch from the face of the concrete with a sharp chisel or nippers.

All cavities produced by the removal of metal ties shall be carefully cleaned and completely filled with retempered sand cement mortar mixed in proportion of one to three and the concrete shall be left smooth and even.

Whenever practicable, forms shall be erected completely before the reinforcement is placed.

For narrow walls and other locations where access to the bottom of the forms is not readily attainable otherwise, adequate clean cut openings shall be provided.

At the time of placing concrete, the forms shall be clean and entirely free from all chips, dirt, sawdust, and other extraneous matter.

The facing of all forms shall be treated with oil before concrete is placed. In hot weather, both sides of face forms may be required to be treated with oil to prevent warping and to secure tight joints. The oil must be applied before the reinforcement is placed. The oil used for this purpose shall be a light clear oil which will not discolor or otherwise injuriously affect the concrete surface.

In general, all forms shall be thoroughly wetted before the concrete is placed therein.

The foregoing specifications for "Forms" in regard to design, mortar-tightness, filleted corners, beveled projections, bracing, alignment, removal, reuse, oiling and wetting shall apply with equal force to metal forms.

CONCRETE STRUCTURES (continued)

The metal used for forms shall be of such thickness that the forms will remain true to shape. All bolt and rivet heads on the facing sides shall be countersunk.

Clamps, pins, or other connecting devices shall be designed to hold the forms rigidly together and to allow removal without injury to the concrete. Metal forms which do not present a smooth surface or line up properly shall not be used. Special care shall be exercised to keep metal free from rust, grease or other foreign material such as will tend to discolor the concrete.

PLACING REINFORCEMENT:

Reinforcement in concrete structures shall be carefully and accurately placed and rigidly supported as provided in item, "Reinforcing Steel".

PLACING CONCRETE - GENERAL:

The CONTRACTOR shall give the ENGINEER sufficient advance notice before starting to place concrete in any unit of the structure to permit the inspection of forms, the reinforcing steel placement, and preparations for casting. Unless authorized by the ENGINEER, no concrete shall be placed in any unit prior to the completion of the form work and the placement of the reinforcement. No concrete shall be placed before the completion of all operations which might prive detrimental to the concrete.

Whenever it is necessary to continue the mixing, placing, and finishing of concrete after the daylight hours, the site of the work shall be brilliantly lighted so that all operations are plainly visible. In general, concrete placing shall be so regulated as to permit finishing operations to be completed in the daylight hours.

The ENGINEER reserves the right to order postponement of the placing operations when, in his opinion, impending weather conditions may result in rainfall or low temperatures which will impair the quality of the finished work. In case rainfall should occur after placing operations are started, the CONTRACTOR shall provide ample covering to protect the work. In case of drop in temperature, the provisions set forth in the section, "Placing Concrete in Cold Weather", shall be applied.

The sequence of placing concrete shall be as provided on the plans or in specifications. The operation of depositing and compacting the concrete shall be conducted so as to form a compact, dense, impervious mass of uniform texture which shall show smooth faces on all surfaces. The placing shall not exceed the loads used in the design of forms.

The method and manner of placing shall be such as to avoid the possibility of segregation or separation of the aggregate or the displacement of the reinforcement. Concrete shall not have a free fall of more than three (3) feet except in the case of thick walls, such as culvert walls. The spattering of forms or reinforcement bars shall be prevented if the concrete so spattered will dry or harden before being incorporated in the mass.

CONCRETE STRUCTURES (continued)

Each part of the forms shall be filled by depositing concrete directly as near its final position as possible. The coarse aggregate shall be worked back from the face and the concrete forced under and around the reinforcement bars without displacing them. Depositing large quantities at one point in the forms and running or working it along the forms will not be allowed.

After the concrete has taken initial set, the forms shall not be jarred or any strain placed on projecting reinforcement.

Chutes, troughs, or pipes used as aids in placing concrete shall be arranged and used so that the ingredients of the concrete will not be separated. When steep slopes are necessary, the chutes shall be equipped with baffle boards or be made in short lengths that reverse the direction of movement. Open troughs and chutes shall extend, if necessary, down inside the forms or through holes left in the forms, or the ends of such chutes shall terminate in vertical downspouts. All chutes, troughs, and pipes shall be kept clean and free from coatings of hardened concrete by a thorough flushing with water before and after each placement. Water used for flushing shall be discharged clear of the concrete in place. The use of chutes in excess of thirty-five (35) feet total length for conveying concrete will not be permitted except by specific authorization from the ENGINEER.

Where the CONTRACTOR'S operations involve the placing of concrete from above, that is, directly into an excavated area or through the completed forms, particularly in the case of abutments and retaining walls, and except thin walls such as culvert walls, all concrete so placed shall be deposited through a vertical sheet metal or other approved pipe not less than six (6) inches or more than ten (10) inches in diameter. The pipe shall be made in sections so that the outlet may be adjusted to proper heights during placing operations.

Concrete shall be placed in continuous horizontial layers approximately twelve (12) inches in thickness. Not more than one hour shall elapse between the placing of successive layers of concrete in any portion of the structure included in the continuous placement. The CONTRACTOR shall avoid unauthorized construction joints by placing required portion of walls or superstructures in one continuous operation. Laitance or foreign matter of any kind shall not be permitted to accumulate inside the forms, and openings in forms necessary for removal of same shall be provided.

All concrete shall be well compacted and the mortar flushed to the surface of the forms by continuous working with concrete spacing implements or mechanical vibrators of an approved type. Vibrators of the type which operated by attachment to forms or reinforcement will not be permitted. The vibrators shall be applied to the concrete immediately after deposit and shall be moved throughout the mass, thoroughly working the concrete around the reinforcements, embedded fixtures, and into the corners and angles of the forms until it has been reduced to a plastic mass. The mechanical vibrator shall not be operated so that it will penetrate or disturb layers placed previously which have become partially set or hardened. The vibration shall be of sufficient duration to accomplish thorough compaction and complete embedment or reinforcement and fixtures but shall not be done to an extent that will cause segrega-

CONCRETE STRUCTURES (continued)

tion. Vibration shall be supplemented by hand spading if necessary to insure the flushing of mortar to the surface of all forms.

PLACING CONCRETE IN COLD WEATHER:

No concrete shall be placed when the atmospheric temperature is at or below 40° F. (taken in the shade away from articifial heat) unless permission to do so is given in writing by the ENGINEER. When such permission is given or in cases where the temperature drops below 40° F. after the concrete operations have been started, the CONTRACTOR shall furnish sufficient canvas and framework or othertype of housing to enclose and protect the structure in such a way that the air around the forms and fresh concrete can be kept at a temperature not less than 50° F. for a period of five days after the concrete is placed. Sufficient heating apparatus such as stoves, salamanders, or steam equipment and fuel to furnish all required heat shall be supplied. The treatment of mixing water and aggregates used in mixing concrete shall be as specified in "Concrete for Structures".

It is understood that the CONTRACTOR is responsible for the protection of concrete placed under any and all weather conditions. Permission given by the ENGINEER to place concrete during freezing weather will, in no way, relieve the CONTRACTOR of the responsibility for satisfactory results. Should concrete placed under such conditions prove unsatisfactory, it shall be removed and replaced.

PLACING CONCRETE IN WATER:

Concrete should be deposited in water only when specified on the plans or with the permission of the ENGINEER. The forms shall be sufficiently tight to prevent any water current passing through the space in which the concrete is being deposited. Pumping will not be permitted while the concrete is being placed, nor until it has set for at least thirty-six (36) hours.

The concrete shall be carefully placed in a compact mass by means of a tremie, closed bottom dumping bucket, or other approved method that does not permit the concrete to fall through the water without adequate protection. The concrete shall not be disturbed after being deposited. Depositing shall be regulated to maintain approximately horizontal surfaces at all times.

When a tremie is used, it shall consist of a tube having a diameter of not more than ten (10) inches, constructed in sections having water tight connections. The means of supporting the tremie shall permit the movement of the discharge end over the entire top surface of the work and shall permit the tremie to be rapidly lowered when necessary to choke off or retard the flow. The number of times it is necessary to shift the location of the tremie, for any continuous placement of concrete, shall be held to a minimum. During the placing of concrete, the tremie tube shall be kept full to the bottom of the hopper. When a batch is dumped into the hopper, the tremie shall be slightly raised, but not out of the concrete at the bottom, until the batch discharges to the level of the bottom of the hopper. The flow shall then be stopped by lowering the tremie. The placing operations shall be continuous until the work is complete.

CONCRETE STRUCTURES (continued)

When concrete is placed by means of a bottom dump bucket, the bucket shall have a capacity of not less than one-half (1/2) cubic yard. The bucket shall be lowered gradually and carefully until it rests upon the concrete already placed. It shall then be raised very slowly during the discharge travel, the intent being to maintain, as nearly as possible, still water at the point of discharge and to avoid agitating the mixture.

PLACING CONCRETE IN BOX CULVERTS:

In general, the base slab, curtain walls, lower haunches, and the bottom portion of the sidewalls up to a height of approximately one (1) inch above the haunches, or sidewalls to a height of approximately four (4) inches above the base slab when no haunch is provided, shall be placed as a monolith. The top surface of the base slab and the top surface of the slabs which do not carry direct traffic shall be accurately finished by hand floating methods before the concrete has attained its initial set. Before concrete is placed in the sidewalls, the footing area joining the walls shall be thoroughly cleaned of all shavings, sticks, sawdust, or other extraneous material.

In the construction of box culverts less than four (4) feet in clear height, the sidewalls and top slab generally shall be placed monolithic. When box culverts are greater than four (4) feet in clear height, a construction joint may, if shown on the plans, be provided between the sidewalls and the top slab. In case no joint is provided, an interval of not less than one (1) hour or more than two (2) hours shall elapse between the placing of concrete in the walls, and concrete in the haunches and top slab, such interval to allow for shrinkage in the wall concrete. Curbs and haunches at tops of walls shall be placed monolithic with the top slab.

The tops of culvert slabs which are intended to carry direct traffic shall be finished and surface tested in accordance with the provisions for finishing roadway slabs.

PLACING CONCRETE IN FOUNDATIONS AND STRUCTURES:

Concrete shall not be placed until the depth and character of the foundation has been inspected by the ENGINEER and permission has been given to proceed.

The placing of concrete will be permitted after the excavations are free from water and properly cleaned. Any necessary pumping or bailing during the concreting operations shall be done from a suitable sump located outside the forms.

All temporary wales or braces shall be constructed or adjusted as the work proceeds to the end that construction joints in addition to those shown on the plans will not be necessary.

TREATMENT AND FINISHING OF HORIZONTAL SURFACES:

All upper surfaces not covered by forms shall be completed by placing excess material in the forms and removing or striking off such excess with a wooded

CONCRETE STRUCTURES (continued)

template forcing the coarse aggregate below the mortar surface. The use of mortar topping for surfaces under this classification will not be permitted.

CURING CONCRETE:

Careful attention shall be given by the CONTRACTOR to the proper curing of all concrete in the structure. All upper surfaces not formed shall be covered by cotton mat coverings immediately following the floating operations and shall be kept thoroughly wet for a period of four (4) curing days. Intermission will be permitted as needed to allow the surfaces to be finished. The mats shall be held in direct contact with the concrete. Water used for curing shall be free from injurious amounts of oil, acid, alkali, salt, or other deleterious substances.

Immediately following the finishing operations, all concrete shall be covered with wet cotton mats or with a temporary covering of canvas or burlap.

The canvas or burlap covering material shall weigh not less than ten (10) ounces per square yard, and the sections shall be placed with a lap at the edges of at least eight (8) inches. The material shall be saturated with water previously to placing and shall be kept saturated as long as it remains in place. Care shallbe exercised in the placing of the cover material in order that the concrete surface shall not be disturbed.

When a temporary covering is used, it shall remain in place only until the concrete has sufficiently hardened that a cotton mat covering can be substituted without disturbing or marring the finish of the concrete. Cottom mats shall be thoroughly saturated before placing and shall be maintained in a saturated condition for a period of at least eight (8) curing days after the concrete is placed.

Cotton mats shall meet the following requirements:

1. Mats shall be of a size convenient for handling and shall be composed of a single layer of cotton filler completely enclosed in a cover of cotton cloth.

2. The filler may be of a low grade cotton, cottom linters, or such cotton waste as comer noils or card flat strips.

3. Mats shall contain not less than three-fourths (3/4) of a pound of cotton filler per square yard of mat, uniformly distributed.

4. The cloth used for covering material shall be Osnaburg weighing not less than six and three-tenths (6-3/10) ounces per square yard.

5. All mats shall be stitched longitudinally with continuous parallel rows of stitching at intervals of not more than three (3) inches. The sewing will not be done so tightly that the mat, when saturated with water, will not contact the surface of the slab at all points.

CONCTETE STRUCTURES (continued)

6. To insure the complete covering of the slabs where the mats fit together, there shall be a flap extending all along the one side of each mat. The flap shall be composed of two thicknesses of the cover material and shall be approximately six (6) inches wide. The flap shall be strongly stitched along the edge.

7. Ponding may be used for curing top slabs of culverts instead of the cotton mat covering above described.

REMOVAL OF FORMS AND FALSEWORK:

Except as hereinafter provided, forms for surfaces required to be finished shall be removed when the concrete has aged not less than one-half (1/2) nor more than two (2) curing days after the concrete is placed.

Forms and falsework for the portions of structure which do not require surface finish may be removed when the concrete has aged for the minimum number of curing days set forth in the following table:

Forms for walls, columns and sides of beans ..... 2 days

The term "curing days" will be interpreted as any calendar day on which the temperature is above 50° F. for at least nineteen (19) hours. Colder days may be counted if satisfactory provision is made to maintain the air temperature adjacent to the concrete constantly above 50° F. throughout the entire day. In continued cold weather, when artificial heat is not provided, the ENGINEER may permit the removal of forms and falsework at the end of a period of calendar days equal to twice the number of curing days stated in the above table. Test specimens may be made at the option of the ENGINEER for the purpose of determining a satisfactory time of form and falsework removal in cold weather, and when tests made on specimens cured under like conditions to the curing of the structure indicate that strengths equivalent to the seven day strengths as given in "Concrete for Structures" have been attained, the forms and falsework may be removed. In no event shall this removal be done in less time than the curing period given in the above table.

DEFECTIVE WORK:

An defective work discovered after the forms have been removed shall be repaired immediately. If the surface of the concrete is bulged, uneven or shows excess honeycombing or form marks, which defect, in the opinion of the ENGINEER, connot be repaired satisfactorily, the entire section shall be removed and replaced. In repairing honeycombed areas, all loose material shall be removed before the repair work is started. No extra compensation will be allowed for the extra work or materials involved in repairing or replacing defective concrete.

FINISHING EXPOSED SURFACES:

All abutments, retaining walls and culverts, which are exposed to view after backfill and roadway embankments are placed shall be surface finished. The

CONCRETE STRUCTURES (continued)

area inside of culvert barrels including both sidewalls and the underside of the top slab for a distance equal to one-third (1/3) the clear height but not less than eighteen (18) inches shall be considered as exposed to view. The remaining surface inside of culvert barrels and the bottoms of slab spans will not be required to be surface unless such surfaces are not true or have porous spots of honeycombed areas. In case these defects occur, the areas shall be given a first surface rubbing. Such rubbing shall extend over a sufficient area around the blemished portions to provide for a neat blending with the surrounding unfinished surface.

The operation of surface finishing shall be in accordance with the following provisions:

1. As soon as forms are removed, all necessary pointing shall be done. When the pointing has set sufficiently to permit it, all surfaces requiring surface finish shall be wet with a brush and given a first surface rubbing with a No. 16 Carborundum Stone or an abrasive of equal quality. The rubbing shall be continued sufficiently to bring the surface to a paste, to remove all form marks and projections, and to produce a smooth dense surface without pits or irregularities. The use of cement to form a surface paste will not be permitted. The material which has been ground to a paste in this process shall be carefully spread or brushed uniformly over the surface and allowed to take a reset.

2. In general, chamfered corners shall not be rubbed in the first surface rubbing.

3. During the process of conditioning the completed structure for final acceptance, the surfaces of the entire structure requiring finish shall be cleaned free from drop marks and discolorations and shall be given a final finish rubbing with a No. 30 carborundum Stone or an abrasive of equal quality. On completion of this rubbing, the surface shall be neatly striped with a brush, and the mortar on the surface shall be allowed to take a reset. The surface shall then be washed down with clean water. The entire structure shall be left with a clean, neat, and uniform appearing finish and shall be uniform in color.

SPECIAL SURFACE FINISHED:

When so specified, special surface finishes shall be employed. In general, the method and manner of performing this work will be fully provided for in the plans or special provisions to these specifications.

MEASUREMENT AND PAYMENT:

No direct compensation will be made for "Concrete Structures". Measurement and payment for quantities of concrete, reinforcement, excavation and other proposed items which constitute the completed and accepted structures will be made in accordance with the provisions of pertinent specifications.

NOTE: The last page of this specification shall be pertinent only when Testing Laboratory Services are required.

CONCRETE STRUCTURES (continued)

TESTING LABORATORY SERVICES:

A. An independent testing laboratory, experienced and well qualified in the design of concrete mixtures and in concrete testing shall be employed and paid by the CONTRACTOR to perform for him the services set forth below for all concrete used for the project. The testing laboratory shall be selected by the ENGINEER.

B. The testing laboratory shall design the proportions to be used for concrete mixtures to attain the unit compressive strengths specified and the workability or plasticity appropriate for the various conditions of concrete use. Determination by the testing laboratory of water-cement ratios and proportions of cement, sand and gravel to be used shall be based on experimental determinations, using in each case samples of the actual cement, sand and gravel to be used for the project.

C. The testing laboratory shall furnish reports to the ENGINEER and the CONTRACTOR on all of its design-of-mix determinations, all of its services and all of its cylinder check tests.

D. The CONTRACTOR shall collaborate with the testing laboratory to the end that its functions and services may be properly performed so as to insure the proportioning and handling of the concrete materials in such manner as to result in the strengths specified and in desirable workability.

E. The testing laboratory shall perform all services necessary for design-of-mix and redesign whenever changes are made in the aggregates or in the plasticity or workability of the concrete.

F. The CONTRACTOR, under the supervision of the ENGINEER'S representative, shall take sample specimens of the concrete in cylindrical containers at the point of deposit as follows:

1. One sampling, consisting of two cylinders, shall be made for each pouring operation involving any change in the aggregates used or water-cement ratio change and not less than one sampling for each 50 cubic yards of concrete used in any event. Each time that samples are so taken, two sample cylinders shall be taken at the same time: one cylinder to be used for a 7 day test and one for a 28 day test. All cylinders as above shall be taken to the laboratory and the 7 day and the 28 day tests shall be performed in accordance with the current A.S.T.M. specifications for handling and testing.

2. The testing laboratory shall submit a report on each cylinder check test; these reports are to show all of the data customarily listed by the laboratory in reporting on such check tests.

G. Forms of reports on each of the testing laboratory services (design, control and check tests) shall be submitted for the ENGINEER'S approval and approved forms shall henceforth be used for the reports required above.

SPECIFICATIONS FOR PRESTRESSED CONCRETE PILING (SHEET PILES AND SQUARE PILES)

SCOPE:

This section includes the complete work of Structural Prestressed Concrete Piling, which includes all types of concrete sheet piling and square corner piles.

RELATED WORK:

The following are specified under other sections:

A. Concrete

B. Driving Piles

REFERENCE SPECIFICATIONS:

This work is to be governed by the current edition of the following to the extent they are applicable.

A. Chapter 26 of the American Concrete Institute Standard 318-63.

B. Chapter 15 of American Concrete Institute Standard 301-66.

C. Tentative Standards for Prestressed Piles - A.S.S.H.O.

D. Manual for Inspection of Prestressed Concrete - P.C.I.

MATERIALS:

A. Concrete
   a) Cover - Thickness over reinforcing at least two inches
   b) Strength - At least 5,000 psi in 28 days
   c) Slump - 1 to 2 inches

B. Portland Cement - ASTM C-150 or C-175, Type I

C. Aggregate - ASTM C-33

D. Water - Clean, potable, and free from deleterious matter

E. All crete mix materials shall be weigh-batched and discharged into the mixer pan by way of clean chutes or other handling equipment in such a manner that loss of mix ingredients is prevented.

F. Prestressing Strands - They shall be uncoated seven-wire stress-relieved strands, conforming to the requirements of ASTM A 416, Grade 270. Strands shall have a nominal diameter of one-half inch (1/2").

G. Air-entraining cements and/or suitable admixtures may be used to increase workability and durability of concrete. Neither calcium chloride nor any admixture containing any chloride shall be used in the concrete. All admixture will be as designated in the approved mix design.

SPECIFICATIONS FOR PRESTRESSED CONCRETE PILING (cont'd)

H. Unless otherwise specified, all materials used shall meet the requirements of Section Concrete.

FABRICATION:

A. General - Except as otherwise specified herein the piles shall be cast of concrete controlled, made, placed, and cured in accordance with the provisions of Section Concrete. The 28-day compressive strength of prestressed concrete shall be 5,000 psi. The Contractor shall be responsible for the design of mixes for precast, prestressed piles and for meeting the strength requirements. Mixes and the preposed and curing operation shall be submitted for approval prior to casting of piles.

B. Prestressing - Before placing any concrete in form, all prestress strands shall be stressed to 28,910 pounds per strand. Stress shall be applied by properly calibrated hydraulic jacks and the elongation measured to verify the tensioning load. Suitable means shall be provided for measuring the elongation of steel and the results shall check within 5%. Strands and reinforcing steel shall be accurately placed in position. Care shall be exercised to keep strands and reinforcing clean of form oil or other substances harmful to bond. Where strand placement locations are not specifically shown on the drawings, one strand shall be placed in each pile corner with the remaining strands placed in layers on the bayside and landside so that the center of gravity of the strands coincide with the center of gravity of the pile cross section. The minimum clear spacing between strands in a layer shall be three times the diameter of the strand, but at least 1-1/3 times the maximum size of aggregate. The clear distance between layers shall be as small as practicable, but shall be not less than one inch. Exterior layers shall be filled with as many strands as is practicable before interior layers are used. Strands in interior layers shall be placed directly in line with those on the outside layers.

C. Releasing of Strands - Maintain full tension in strands until concrete has attained a compressive strength of at least 4,000 psi after which strands shall be cut off flush with ends of unit and ends shall be painted with a black asphaltic base paint to prevent corrosion except where the strands are required to project beyond the concrete. The force in the prestressing steel shall be transferred to the concrete by releasing all strands simultaneously or in a sequence that will not result in high tensile or compressive concrete stresses that will damage the pile.

D. Reinforcing - The reinforcing system shall be rigidly wired or fastened and held to true position in the forms by approved devices or methods. Strands shall be held to within 1/4 inch of the true position and spirals or ties shall be positioned to within 1/6 of their planned spacing from their true planned position.

E. Forms - They shall be smooth and arranged to provide ample working room and easy access for carrying out all operations required for the proper placing, consolidation, and finishing of the concrete for the piles. The design

SPECIFICATIONS FOR PRESTRESSED CONCRETE PILING (cont'd)

of the forms shall be such that their removal can be accomplished without damage to the completed piles. Steel forms shall be used for typical standard sheet piles and square bearing piles. Special, filler and corner piles may be used wood forms provided the piling finishes conform. Side forms shall remain in place until the piles have reached 4,000 pounds per square inch strength. Forms shall be so designed and aligned that they will not restrict the longitudinal movement of the casting when the prestressing force is transferred.

F. Casting - Piles shall be cast on level, tight platforms, constructed to prevent settlement during the casting and curing operations. Piling shall be cast in a horizontal position. Casting in tiers will not be permitted. When casting is once started, it shall be carried on as a continuous operation until the pile is completed. All concrete shall be thoroughly compacted by internally vibrating, spading, and rodding during the placing operation, and it shall be thoroughly worked around the reinforcement and into the corners of the forms. The intensity of vibration shall be sufficient to cause the concrete to flow and settle into place. Vibration shall be applied uniformly over the length of the pile and shall be a sufficient duration to insure thorough compaction of the concrete. Spading and rodding during the placing operation shall supplement the vibration. Surfaces shall be free from detrimental porosity or honeycomb. Each pile shall be marked with the date of its casting, and its pile mark; pick up points shall be marked on each pile.

G. Curing - Concrete piles cured as specified in Section Concrete shall be carefully cured for a period of not less than fourteen (14) days; however, piles cured with an approved steam curing system may be removed from the forms at concrete strength of 4,000 psi. The proposed method of curing shall be approved by the ENGINEER prior to the start of pile casting. Concrete test cylinders shall be cured at the same location, under identical conditions, and by the idential method used to cure the piles cast of the same concrete pours from which the samples were taken.

H. Storage and Handling - The methods used for storage and handling of the piles shall be such that the piling will not be subjected to overstress, spalling, or other injury. Provision shall be made for all required lifting and handling devices to be so placed as not to weaken or overstress the precast elements at any time. Piling shall remain undisturbed until the strands are released and shall not be subjected to handling until the end of the specified curing period and until the pile has developed a strength of 4,000 psi as indicated by the test cylinders. In general, piles shall be lifted by means of a suitable bridle, slings and/or inserts attached to the pile at the marked pick-up points. Piles which are crushed or otherwise injured during curing, handling or driving shall be removed from the site of the work by the CONTRACTOR at no cost to the Owner. Piling shall not be shipped from the storage yard to the construction site until the concrete has developed a strength of 5,000psi.

I. Tolerance and Rejection -

a) Thickness: (±) 1/8 in.
b) Precast Holes: (±) 1/8 in. for locations; (±) 1/8 in. for size

SPECIFICATIONS FOR PRESTRESSED CONCRETE PILING (cont'd)

c) Out of Square: Across ends ± 1/8 in.
d) Out of Plane: (±) 1/8 in.
e) Tongue and Groove Shear Key: All dimensions must conform to ± 1/16" of those shown on the approved shop details
f) Changes in shape due to curing, storage, deflection, and erection shall conform to these tolerances so that precast work fits properly to related or abutting materials and final appearance is reasonably free of visual imperfections.

Upon delivery to the jobsite, all units shall be straight and true to the required dimensions within the tolerances specified in the AASHO-PCI Joint Committee "Manual for Inspection of Prestressed Concrete". Any unit not meeting these requirements or which has been cracked or broken in transportation or erection shall be rejected and replaced with a suitable unit.

J. Piling Finishes - Surfaces which will be exposed after construction shall either be steel formed or steel troweled.

FILLING:

A. Grout - With Portland Type I Cement and Sand, mixed with potable water in amounts necessary to fill air holes, casting bells and similar blemishes to permanently bond to the precast substrata, and to match the precast unit in color and texture.

B. Apply grout to all exposed faces or the prestressed units necessary to fill all holes and blemishes and form a smooth finish.

PATCHING:

A. Permitted only to an amount less than one square foot per 1,000 square feet of finished surface.

B. Patches shall be practically invisible to be acceptable.

C. All jobsite patches shall be performed as directed by the precast concrete manufacturer.

D. All patches and repairs shall equal or exceed the quality and appearance of approved samples.

E. All chipped, cracked, blemished, damaged, or otherwise defective precast elements, not feasible to repair, shall be rejected and replaced without cost to the Owner.

SPECIFICATIONS FOR PILE DRIVING

SCOPE

This section includes the complete work of Prestressed Concrete Pile Driving.

RELATED WORK

The following are specified under other sections. Excavation if any.

WORK GOVERNED BY OTHER SECTIONS

Refer to other sections for additional requirements that apply to portions of this work. The actual performance of this work remains within this section, but subject to the applicable requirements of the section covering Prestressed Concrete.

GENERAL

A. Furnish and place the required number of piles indicated on the Drawings. Before beginning work, submit details of the piles proposed and a description of the proposed type and size of pile driving equipment and proposed method of installation for approval of the engineers.

B. All piles shall be driven with a standard drop hammer, single action hammer, or double action hammer with a rated energy capacity of not less than 16,000 foot-lb. and using an oak cap block and plywood cushions. The Contractor will be allowed to install the sheet piles with the aid of jets, provided jetting is carried out in such away as to not disturb the soil around previous ly driven piling. To avoid damage due to over-driving, pile penetration measurements will be made by the Owner, Engineer, or their representatives and shall not exceed 60 blows per foot. Piling must be driven without the aid of jetting for the final four (4) feet, unless the maximum blow count is exceeded; at which time intermittent jetting will be allowed to reduce the blow count.

   If during the final four (4) feet of driving, the blow count reduces drastically over a period of 5 blows, this will indicate pile failure and the pile will be extracted and a new pile redriven at the Contractor's expense.

C. Piles damaged or broken in handling or driving shall be properly withdrawn and replaced, AT THE EXPENSE OF THE CONTRACTOR.

D. Piles shall be prestressed, single units. Units shall be constructed of 5,000 psi concrete. Pile splicing will not be permitted.

PILE HEAVING

All piles that heave in excess of 1/2" shall be reseated at no additional cost to the Owner.

SPECIFICATIONS FOR PILE DRIVING (cont'd.)

TESTING INSPECTION

The contractor must notify engineer of pile casting schedule at least seven (7) days before casting begins.

The Engineer, Owner, or representative shall at their discretion inspect all aspects of the casting procedures and materials for compliance with the Specifications.

SUB-SURFACE DATA

Sub-Surface log data taken at the site is in the office of the Engineer and is available to the Contractor. It shall not be assumed that conditions over the entire site are shown by log data. Owner and Engineer will not assume responsibility for variations of subsoil quality or condition at locations other than places shown and at time of investigation.

PILE TOLERANCES

All piling shall be driven to the grades as shown in the plans ± one-half (1/2) inch.

The overall horizontal alignment of the bulkhead shall not exceed ± one (1) inch in every hundred feet for each straight run of piles. This tolerance must hold true for the upper four (4) feet of the bulkhead. The maximum distance from the face of the bulkhead to an eight (8) foot straight edge laid flush against the face of the bulkhead is one-fourth (1/4) inch. This tolerance must hold true for the upper four (4) feet of the bulkhead.

SPECIFICATIONS FOR EARTHWORK

DESCRIPTION

This item shall include all earthwork of in-situ material necessary to construct the bulkhead, and shall include excavation, embankment, backfill and compaction of backfill. This item shall not include any trucked-in fill.

CONSTRUCTION METHODS

Before excavation, all vegetation must be removed from the area to be excavated. Excavation shall be to the line and grade as shown on the plans, or as most advantageous to the construction of the bulkhead. The recommended slope of excavation and/or embankment shall be 2:1 with a maximum allowable slope of 1:1.

After construction of the bulkhead, in-situ excavated material shall be backfilled behind bulkhead. This material shall have all vegetation and large rocks removed. It shall be compacted to 95% of its Standard Proctor Density in lifts not to exceed eight (8) inches in compacted depth.

The top layer of backfill shall be mixed with the hauled-in fill and then compacted as previously specified. After this, compaction of the hauled-in fill may proceed.

Random tests shall be made of the compaction of backfill by an independent testing laboratory and paid for by the Owner. If deficiencies are found, the contractor shall, at his own expense, recompact the backfill and have a retest made of the area.

MEASUREMENT AND PAYMENT

This item shall not be measured or paid for separately. It shall be considered as incidental to the construction of the bulkhead and shall be included in the base bid for the bulkhead.

SPECIFICATIONS FOR FILL

DESCRIPTION

Fill material shall consist of suitable hauled-in earth material such as clay, or other such materials with a reasonably high P.I. that will form a stable embankment and suitable roadbed. The fill shall be free from vegetation, large rocks and other such unsuitable materials.

CONSTRUCTION METHODS

Fill shall be added and compacted to the lines and grades shown on the plans. It shall be brought to approximately optimum moisture content and compacted to 95% of the Standard Proctor Density, in lifts not to exceed eight (8) inches in compacted thickness. Random compaction tests shall be made by an independent testing lab and paid for by the Owner. If deficiencies are found, it shall be the Contractor's responsibility to correct the deficiencies and pay for a retest of the area.

MEASUREMENT AND PAYMENT

The Engineer has furnished fill estimates for the purpose of calculating bid quantities, however, measurement and payment for this item shall be made by the grand total lump sum bid for "Fill" and shall be full compensation for furnishing all labor, materials and equipment, for all hauling and delivering, and for all tools and incidentals necessary to complete this work.

SELECT MATERIAL

DESCRIPTION

This specification shall govern for the use of select material to be used underneath the concrete steps as specified in Alternate Bid Item #1 and as shown in the plans. Select material shall be a mixture of sand and clay or other suitable granular material. The material shall be free from vegetation, debris and clay lumps. That portion of the select material passing a 40-mesh sieve shall have a liquid limit of 45 maximum, a plasticity index range from 6 to 13, and a calculated linear shrinkage of 8.5 maximum.

CONSTRUCTION METHODS

Select material shall be mixed uniformly and placed in layers not to exceed 6" loose depth. The material shall be brought to approximately optimum moisture content and compacted to 95% Standard Proctor Density. Each layer shall be complete before the succeeding layer is placed.

The finished surface of the select material shall conform to the grade and section shown on the plans.

MEASUREMENT AND PAYMENT

Measurement and payment shall be included in the unit price per linear foot bid for the "Reinforced concrete walk and steps" of Alternate Bid Item #1, Part A. This shall be full compensation for furnishing all labor, materials and equipment, for all hauling and delivering, for all watering and compaction and for all tools and incidentals necessary to complete this work.

FLEXIBLE BASE-CALICHE

DESCRIPTION

"Flexible Base-Caliche" shall consist of foundation course for surface course, for other base courses, or other purpose as shown on the plans or otherwise specificed by the Engineer. It shall be constructed as herein specified in one or more courses in conformity with the typical sections shown on the plans and to the lines and grades established by the Engineer.

MATERIAL

The material shall consist of argillaceous limestone, calcareous or calcareous clay particles, with or without stone, conglomerate, gravel or sand, and free of vegetation. The material source shall be approved by the Engineer. All acceptable material shall be screened and the oversize shall be crushed and returned to the screened material in such a manner that a uniform product will be produced.

(a) Gradation Limits

	%
Passing 2-1/2" sieve	100
Passing 2" sieve	95-100
Passing 1" sieve	65-90
Passing 3/4" sieve	60-80
Passing 40 mesh	15-50

(b) Minus 40 Materials (Raw Caliche) shall have:

Liquid Limit (L.L.)	45 max.
Plasticity Index (P.I.)	16 max.
Los Angelos Abrasion Loss	55% max.

(c) All material with P.I. greater than 9 must be stabilized with lime admix. The amount of lime required shall be that percent by weight required to lower the P.I. to 7 or less as determined by a laboratory (laboratory fee shall be paid for by the Contractor). The minimum P.I. allowed is 5.

Caliche with P.I. less than 10 and with at least 15% minus #200 mesh material present shall be stabilized with lime admix. The amount of lime required shall be the same as required above.

Caliche with P.I. less than 10 without at least 15% minus #200 mesh material present does not require lime.

Lime slurry for admix (CaO basis) shall be 3.3 pounds minimum of Ca (OH_2) per gallon hydrated lime, if permitted, shall conform to standard specification "Lime Treatment For Materials in Place".

TESTING

The Engineer may accept recent test as proof of compliance with the above material specifications. The Contractor will engage a labratory and pay for one test each gradation, L.L., P.I., before and after lime mixing if required, standard proctor, moisture-density relation, and necessary field densities. The Engineer may call for additional tests at anytime. The cost of all retests, in case of failure to meet specifications, will be deducted from the Contractors payment. The Contractor will pay for proctor and soil constant sand abrasion tests, with or without lime admix at the rate of one test for each 1500 square yards. If material changes and this ratio of tests increases, the Contractor shall pay the cost of additional tests required by the Engineer. The Engineer may waive testing and/or lime admix for small amounts of unimportant uses.

CONSTRUCTION METHODS

Get approval of finished subgrade before dumping. The surface of the subgrade shall be finished true to line and grade as established and in conformity with the typical section shown on the plans. Grade tolerance shall be generally 1/2 inch and highs and lows must approximately balance.

Caliche shall be delivered in approved vehicles and spread the same day if possible (no later than the next day).

Piles and windrows shall be broken down to the bottom and all nests of coarse or loose material shall be corrected.

Mix uniformly, prior to the addition of lime if required. Lime slurry admix shall be spread at rate required and shall be placed only on that area where mixing can be completed that day. Material shall be mixed with pulverizing, type mixer, so designed for this specific purpose, until mixed to the satisfaction of the Engineer.

Material shall be shaped and rolled after mixing and allowed to set at least 48 hours before compaction. Moisture content must be maintained in the material during the 48 hour period. Material shall be sprinkled or aerated to optimum moisture, and compacted in layers (6 inches maximum loose) by approved power-drawn roller to uniform density, minimum 98% Proctor (AASHTO T-99-57, Method D). Use mechanical tamps in areas inaccessible to rollers.

On completion of compaction the surface shall be smooth and conform to lines, grades, and sections shown on the plans. Areas with any deviation in excess of 1/4 inch in cross-section and in length of 16 feet measure longitudinally shall be corrected by loosening, adding or removing material, reshaping, and recompacting by sprinkling and rolling. The maximum moisture shall be 115% optimum and the minimum moisture 85% optimum.

Moisture and density shall be maintained until the paving is complete.

MEASUREMENT AND PAYMENT

Measurement shall be by the square yard, as specified on the plans. Payment includes all materials, royalty, hauling, labor and equipment to complete.

SURFACE TREATMENT

DESCRIPTION

One course surface treatment shall consist of a wearing surface composed of a single application of asphaltic material covered with aggregate, constructed on the prepared base course or surface in accordance with these specifications.

Two course surface treatment shall consist of a wearing surface composed of two applications of asphaltic material, each covered with aggregate,constructed on the prepared base course or surface in accordance with these specifications.

Three course surface treatment shall consist of a wearing surface composed of three applications of asphaltic material, each covered with aggregate,constructed on the prepared base course or surface in accordance with these specifications.

MATERIALS

1. Asphaltic Materials. The asphaltic materials used shall be AC-5 (AC-3 in winter) or other approved material as described in the specification "Asphalts, Oils and Emulsions".

2. Aggregate

Single Course-The aggregate used shall be Class A, Type A (Type PA for precoated aggregate) Grade 4 as described in Item 302 "Aggregate for Surface Treatments", Texas Highway Department Specifications.

CONSTRUCTION METHODS

The area to be treated shall be cleaned of dirt,dust, or other deleterious matter by sweeping or other methods. If it is found necessary by the Engineer, the surface shall be lightly sprinkled just prior to the application of the asphaltic material.

Asphaltic material shall be applied on the clean surface by an approved type of self-propelled pressure distributor so operated as to distribute the material in the quantity specified, evenly and smoothly, under a pressure necessary for proper distribution. The Contractor shall provide all necessary facilities for determining the temperature of asphaltic material in all of the heating equipment and in the distributor, for determining the rate at which it is applied, and for securing uniformity at the junction of two distributor loads. The distributor shall have been recently calibrated and the Engineer shall be furnished an accurate and satisfactory record of such calibration. After beginning the work, should the yield on the asphaltic material appear to be, the distributor shall be calibrated in a manner satisfactory to the Engineer before proceeding with the work. Asphaltic material may be applied for the full width of the surface treatment in one application, unless the width exceeds 26 feet. No traffic or hauling will be permitted over the freshly applied material. Asphaltic material shall not be applied until immediate covering is assured.

Aggregate shall be immediately and uniformly applied and spread by an approved self-propelled continuous feed aggregate spreader, unless otherwise shown on the plans or authorized by the Engineer in writing.

Surface treatment shall not be applied when the air temperature is below 60° F and is falling, but it may be applied when the air temperature is above 50° F and is rising, the air temperature being taken in the shade and away from artificial heat. Asphaltic material shall not be placed when general weather conditions, in the opinion of the Engineer, are not suitable.

The rates of application of the aggregate and asphalt shall be as follows or as otherwise specified.

	1st Course	2nd Course	3rd Course
Asphalt Cement	0.2 gal/s.y.	0.16 gal/s.y.	0.16 gal/s.y
Precoated Limestone (Rock Asphalt)	1:80 Grade 3	1:100 Grade 4	1:100 Grade 4

The entire surface shall be broomed, bladed or raked and thoroughly rolled as required by the Engineer.

Where multiple courses are specified each course shall be applied in the manner specified for one course.

The Contractor shall be responsible for the maintenance of the surface until the work is accepted by the Engineer.

All storage tanks, piping, retorts, booster tanks and distributors used in storing or handling asphaltic materials shall be kept clean and in good operating condition at all times, and they shall be operated in such manner that there will be no contamination of the asphaltic materials with foreign material. It shall be the responsibility of the Contractor to provide and maintain in good working order a recording thermometer at the storage heating unit at all times. The Engineer will select the temperature of application based on the temperature-viscosity relationship that will permit application of the asphalt within the limits recommended in Item 300,"Asphalts, Oils and Emulsions", Texas Highway Department Specifications. The Contractor shall apply the asphalt at a temperature within 15° F of the temperature selected.

MEASUREMENT

Surface treatment shall be measured in place by the square yard of surface area to the limits shown on the plans and as directed by the Engineer.

PAYMENT

Payment shall be at the price bid per square yard for the items one,two, or three course surface treatment. Which prices shall be full compensation for all labor, materials, and equipment necessary to furnish and place the type of surface treatment called for. The Contractor is responsible for all costs incurred in achieving the finished product. It is assumed that such costs are included in the bid price.

ASPHALT MULCH SEEDING

DESCRIPTION

This item shall consist of preparing ground, providing and sowing seeds and fertilizer and applying asphalt along and across such areas as are designated on the plans and in accordance with these specifications.

MATERIALS

All seeds must meet the requirements of the Texas Seed Law including the labeling requirements for showing purity, germination, name and type of seed. Seeds furnished shall be the previous season's crop and the date of analysis shown on each bag will be within nine months of the time of delivery to the project. Each type of seed shall be furnished or delivered in separate bags or containers.

Seeds planted per acre shall be the type specified with the mixture and rate as follows:

Green Sprangletop	4 lbs.
Sideoats Grama (Premier)	5 lbs.
Bermudagrass	8 lbs.
K. R. Bluestem	10 lbs.
	27 lbs./acre

Fertilizer shall be pelleted or granulated and have an analysis of 16-20-0 or 16-8-8 (percentage of nitrogen, phosphoric acide, and potash nutrients respectively). It shall be applied uniformly at the average rate of 400 pounds per acre. In the event that it is necessary to substitute a fertilizer of a different analysis, it shall be a pelleted or granulated fertilizer with a lower concentration. The total amount of nutrients furnished and applied per acre shall equal or exceed that specified for each nutrient.

Asphalt shall be anionic emulsified asphalt and shall comply to Texas State Highway Department Specification #300, "Ashalts, Oils and Emulsions".

CONSTRUCTION METHODS

After the designated areas have been completed to the lines, grades and cross-sections shown on the plans and as provided for in other items of this contract, seeding shall be performed in accordance with the requirements hereinafter described. All areas to be seeded shall be cultivated to a depth of at least 4 inches. The seed-bed shall be deemed in a state of good tilth when the soil particles on the surface are small enough and lie closely enough together to prevent the seed from being covered too deep for optimum germination.

The cross section previously established shall be maintained throughout the processes of cultivation and any necessary reshaping shall be done prior to any planting of seed.

ASPHALT MULCH SEEDING (cont'd.)

The surface shall be relatively smooth without ruts or tracks. Water shall be applied to the seed-bed until a minimum depth of 4 inches is uniformly moistened. The water shall be applied in such a manner as not to erode the smooth surface.

After the watering, when the surface of the seed bed has become sufficiently dry to permit planting, the seed mixture specified shall then be planted at the rate required and the application shall be uniform. If the sowing of seed is by hand, rather than mechanical methods, the seeds shall be sown in two directions at right angles to each other. Seed and fertilizer may be distributed at the same time provided the specified uniform rate of application for both is obtained. When seed and fertilizer are to be distributed as a water slurry, the mixture shall be applied to the area to be seeded within 30 minutes after all components are placed in the equipment. Upon the completion of the sowing of the seed, the application of the asphalt shall follow as rapidly as possible. Immediately prior to the application of the asphalt, the planted area shall be watered sufficiently to assure uniform moisture from the surface to a minimum of 4 inches in depth. Application of the asphalt shall be at the rate of approximately 0.3 gallon per square yard. It shall be applied to the area in such a manner that a complete film is obtained and the finished surface shall be comparatively smooth.

MEASUREMENT AND PAYMENT

Measurement of Asphalt Mulch Seeding will be by the square yard and payment will be by the square yard, complete, in place. Said payment shall be full compensation for all materials, seed, fertilizer, water, and asphalt required and for all labor and tools necessary to complete the work, including preparation of seed-bed, watering, spreading seed and asphalt.

The Contractor shall make every effort to produce a healthy and even growth of grass over the affected area. If germination and growth do not occur, the Contractor shall be responsible for reseeding of that area. No additional payment will be made for this reseeding unless germination and/or growth were hindered by adverse weather conditions or other hinderances not under the control of the Contractor or Owner.

METAL BEAM GUARD FENCE

DESCRIPTION

Metal beam guard fence shall consist of one line of metal beam rail element supported on timber or steel post, and shall be constructed of materials and workmanship as prescribed by these specifications, at such places as shown on the plans or as designated by the ENGINEER, and in conformity with the plans and typical details shown. Metal beam guard fence shall conform to Texas Highway Department Specifications, Item #560.

MATERIALS

1) Rail shall be 10 gage galvanized steel, galvanized after fabrication, in accordance with ASTM Specifications.

2) Posts shall be treated timber. All posts shall be round and shall not be, in any place, less than 7 inches in diameter. They shall be beveled and shall be 6 feet, of which 3 feet shall be imbedment length.

3) Fittings - shall consist of bolts, nuts and washers and shall be hot-dip galvanized according to ASTM A-153

4) Concrete for terminal anchor posts and for imbedment of all posts shall meet the requirements of the Texas Highway Department Specification Item #421 for "Class A" concrete.

CONSTRUCTION METHODS

Timber posts shall be set in concrete to a depth of 3 feet below finished ground. They shall be set plumb and firm to the line and grade shown on the plans. The rail elements shall be erected to produce a smooth, continuous rail paralleling the line and grade of the roadway surface or as shown on plans. The rail elements shall be joined end to end by bolts and lapped in the direction of traffic in the lane adjoining the guard fence. Where rails or fasteners have been chipped or cut, they shall be cleaned and touched up with a galvanizing repair compound.

MEASUREMENT AND PAYMENT

Measurement and payment shall be a lump sum for metal beam guard fence, complete in place, which price shall be full compensation for furnishing all materials, hauling, erection, setting posts in concrete, all labor, tools, equipment and incidentals necessary to complete work.

MISCELLANEOUS ITEMS

TIMBER POSTS

All timber posts shall be beveled and shall be a minimum of seven (7) inches in diameter. They shall be treated with a pentachlorophenol treatment, shall be spaced six (6) feet apart, and shall be concreted in the ground.

CONCRETE VEHICLE STOPS

Concrete vehicle stops shall be standard six (6) foot, solid, reinforced stops and shall be pinned, with 3/8" iron rods, to the parking lot in the standard manner.

B.B.Q. GRILLS

B.B.Q. grills shall be standard, heavy-duty park type mounted on pipe set in concrete. "Extra-Heavy-Duty Park Stove" by Quality Industries, Inc. (page 29 of the 1978 School and Park Catalog) or approved equal will be accepted.

PICNIC TABLES

All picnic tables shall be reinforced concrete on reinforced concrete slabs. They shall be natural cement color, as are Form Inc. picnic tables (as supplied by Paul E. Allen Co., Inc., Houston) or approved equal concrete picnic table.

PARK BENCHES

All park benches shall be reinforced concrete and shall be natural cement color. An approved bench is the "New Bench" by Form Inc. (as supplied by Paul E. Allen Co., Inc., Houston). Other benches may be used with the Engineer's approval.

RECONSTRUCTION OF FISHING PIER

SCOPE

These specifications cover the reconstruction of the existing wooden fishing pier. The contractor shall furnish and install all necessary wood, anchor bolts, nails, etc. required to rebuild the pier.

I. Area where existing decking and stringers are to be reused.
The contractor shall:

A. Remove the 1 X 6 X 6' decking and the 3 - 2 X 8 stringers

B. The 2 - 2 X 8 X 6' long and 2 X 8 single cross brace to remain.

C. Install new 6 X 6 X 5' long posts to each pile

D. Install new 2 - 2 X 8 X 6' long cross pieces and a 2 X 8 X approximately 10' long single cross brace

E. Reinstall the existing 2 X 8 X approximately 17' long and the 1 X 6 decking.

F. Every 4th section shall be cross-braced under the new section over the 16' span.

G. Diaphrams shall be of 2 X 4 spaced every 5 feet

The payment for this work shall be by the linear foot unit bid price for "Elevate Existing Pier".

II. Area where only the 6" diameter piles remain.
The contractor shall:

A. Install new 2 - 2 X 8 X 6' long cross pieces and a 2 X 8 X approximately 10' long

B. Install new 6 X 6 X 5' long posts to each pile

C. Install new 2 2 X 8 X 6' long cross pieces and a 2 X 8 approximately 10' long single cross brace

D. Install new 2 X 8 stringers (3 required) and 1 X 6 decking (with 1" space)

E. See previous (F)

F. As previous (G)

The payment for this work shall be by the linear foot unit bid price for "Elevate and Install New Pier".

6.

RECONSTRUCTION OF FISHING PIER (cont'd.)

III. Area at end of pier (only piling remains)
This area shall be elevated using the new 6 X 6 X 5' long posts, new cross bracing, stringers (all 2 X 8) and new 1 X 6" decking. Using the same basic construction as the pier.
The unit bid price per square foot of "Pier Area" shall be full compensation for all work and materials required to furnish an area at the end of the pier.

IV. Handrails - These shall be provided as shown on the drawings and installed on the concrete steps. The price for furnishing and installing the handrails shall be lump sum bid.

V. Material

A. Wood - number 1 or number 2 "KD" Southern Pine or equal minimum extreme fiber stress in bending of 1500 p.s.i.

B. Treatment - Wolmanized (CCA) at 2.5 pounds per cubic foot, Koppers or approved equal 0.60

C. All nails hot dipped galvanized

D. Anchor bolts, nuts & washers to be hot dipped galvanized

E. All other clips, angles, etc. shall be hot dipped galvanized prior to installation

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