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DESIGN REPORT

CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY

DECEMBER 1982

SUBMITTED TO:

STATE OF NEW JERSEY
DEPARTMENT OF ENERGY
COASTAL ENERGY IMPACT PROGRAM
101 COMMERCE STREET
NEWARK, NEW JERSEY 07102

SUBMITTED BY:

FLAHERTY GIAVARA ASSOCIATES, INC.
ONE COLUMBUS PLAZA
NEW HAVEN, CONNECTICUT 06510

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Section 1

ENVIRONMENTAL ASSESSMENT, CITY DOCK

BAYONNE, NEW JERSEY

City Dock, also known as Brady's Dock, is an abandoned municipally-owned dock located at the foot of Lexington Street on Kill Van Kull. The dock, contiguous to Kill Van Kull Park, was once used for day fishing boats and commercial transhipment of goods but is in such a state of disrepair as to render it a severe safety hazard. The City of Bayonne is applying to the New Jersey Department of Environmental Protection, Green Acres Program, for funds to reconstruct the dock for recreation purposes as part of the City-wide Waterfront Revitilization Program.

I. DESCRIPTION OF PROPOSED ACTION

The improvements of City Dock generally consist of the replacement of the entire dock facility to be compatible with the recently improved Kill Van Kull Park and to enhance the opportunities for general recreation and water-related activities. The proposed improvements are more fully described below:

a. Remove broken surface of dock and remains of dock support structure.

b. Remove fencing and other physical barriers limiting access to facility.

c. Install sheet piling in line with adjacent seawall and backfill to provide street level access to dock.

d. Install lower level dock constructed on wood piles to provide place for pleasure and fishing craft.

e. Provide pavilion/concession structure including sanitary facilities connecting to existing municipal sewer system.

f. Provide pedestrian link to adjacent Kill Van Kull Park.

g. Install landscaping, lighting and street furniture.

During the conceptual development of this project, the following agencies were consulted: New Jersey Department of Community Affairs; New Jersey Department of Energy; Coastal Energy Impact Program; New Jersey Department of Environmental Protection, Green Acres Program, Coastal Zone Management Program.

II. DESCRIPTION OF THE ENVIRONMENT

a. Site Description

City Dock is located on waterfront property bounded by Kill Van Kull Park to the west and East 1st Street to the north. The concrete wharf structure supported by timber piles is badly deteriorated and in hazardous condition. Deterioration of this structure will continue should no remedial action or removal be undertaken.

b. Flora and Fauna

There is a very limited diversity of terrestrial flora and fauna which are supported by this site. Several weed species occupy the land adjacent to the dock. Fauna is limited to rats and an occasional seagull or common bird. Waterfowl, shore birds, upland and song birds which may be seen in the Kill Van Kull - Newark Bay areas are listed in Appendix A.

c. Aquatic Life

The Kill Van Kull tidal gut is highly polluted. The U.S. Fish and Wildlife Service has reported that the fish and wildlife resources are of negligible value in Kill Van Kull/Newark Bay estuary. Historically, the area supported important crab, oyster, shad, and smelt fisheries.

Few species of zooplankton are common in Kill Van Kull including shrimp, blue crab and jellyfish. Near the shore, green algae grows on rocks and pilings. Mummichog is the dominant fish, with some striped bass, bluefish, porgy and striped anchovy found in the Kill Van Kull. A listing of benthic invertebrates and fish are included in Appendix B.

d. Rare or Endangered Species

The project area is within the historic range of the American peregrine falcon and southern bald eagle listed as endangered by the U.S. Department of the Interior. The yellowcrowned night heron occurs within the project area and is listed as threatened by the State of New Jersey. Falcons and osprey occasionally pass through the area during migrations. The bald eagle is considered a rare visitor.

e. Air Quality

The project is located in the New Jersey - New York - Connecticut Interstate Air Quality Control Region (AQCR). This AQCR has been classified by the U.S. En-

vironmental Protection Agency as Class II for the following pollutants: particulates, sulfur oxides, nitrogen dioxide, carbon monoxide and photochemical oxidants. Class I - Those areas in and adjacent to International Parks, National Wilderness Areas which exceeds 5000 acres, National Memorial Parks which exceed 5000 acres, and National Parks in existence at date of enactment of the 1977 Clean Air Act which exceeded 6000 acres.

Class II - All other areas not included in Class I as defined by the EPA.

Classification is assigned on the basis of a comparison between ambient air quality data throughout the entire region. The fact that an area is located within a particular AQCR does not necessarily imply that the concentration of every pollutant in that area falls within the designated classification range. High levels of certain pollutants in nearby locations within the same ACQR may qualify the entire AQCR for a given classification. The New Jersey Department of Environmental Protection has established air monitoring stations at selected sites throughout the state. In Bayonne the station is located in Bayonne Park (Hudson County Park) fronting Newark Bay. Air qaulity data for the year 1979 is presented in Appendix C.

f. Water Quality

Fresh water enters Newark Bay via the Hackensack and Passaic Rivers; salt water enters via the Arthur Kill and Kill Van Kull. The Hackensack and Passaic Rivers carry large amounts of nutrients from natural run-off as well as treated and untreated sewage.

Water quality of the Kill Van Kull and Newark Bay is summarized in Appendix D. As can be seen from this information, water quality is generally poor, with dissolved oxygen levels (summer) at a minimum level of 2.6 mg/l, total coliform levels at 6100 colonies/100 ml, and conductivity at 18,000 umhos/cm.

Due to the project's waterfront location, it is subject to tidal flooding.

g. Historical and Archaeological

Historical and archaeological review of the project site and adjacent areas are currently not warranted as determined by the New Jersey Department of Environmental Protection, Green Acres Program.

h. Land Use

The land use contiguous to this site is dense residential and industrial. Opposite the dock is high density public housing. Northerly of the site is a vacant, deteriorating warehouse. Other nearby uses include manufacturing and warehousing.

Section 2

I. DESCRIPTION OF PROPOSED ACTION

A. SITE LOCATION

Brady's Dock, a .66 acre study site, is located on the north side of Kill Van Kull at the foot of Lexington Avenue in the City of Bayonne, New Jersey. (See Fig. 1). The dock facility forms the most easterly terminus of the City of Bayonne's Kill Van Kull Park and is owned in total by the City.

1. Tides

The Kill Van Kull forms a narrow channel which provides for tidal communication between the waters of Newark Bay on the west and New York Bay and the Atlantic Ocean on the east. The mean tidal range in the area is 4.5 feet. A spring tidal range of 5.4 feet is expected.

2. Tidal Currents

Maximum flood tidal currents under mean tidal conditions range between 2.3 amd 2.6 knots in the vicinity. Maximum ebb currents under similar conditions range from 2.0 to 2.2 knots. The average spring tidal current veclocity during both ebb and flood is approximately 2.4 knots.

3. Waves

No statistical information regarding wave conditions in the Kill Van Kull is available. Due to fetch limitations presented by Staten Island and Long Island, it is estimated that significant wave heights would not exceed 3.0 feet.

The most significant source of water surface turbulence in the area is expected to be wakes generated by vessel traffic accessing Port Newark. Visual observation of typical wake characteristics indicate wave heights of 1 to 2 feet.

4. Littoral Zone

The intertidal substrate in the vicinity of the Dock is comprised of various exogenous material comprised of

broken cement, discarded chert nodules and other debris. No attached macro benthic organisms were observed in the area beneath the pier.

5. Environmental Conditions

The environment of the Kill Van Kull and Newark Bay were throughly discussed in the previously submitted Environmental Assessment. That document also includes a complete listing of fin and shellfish, waterfowl and shorebirds which may inhabit the area. Its contents are incorporated herein by reference.

B. EXISTING DOCKING FACILITY

The existing docking facility has been demolished and removed. It formerly consisted of a concrete decked, wooken pier of approximately 14,500 square feet (S.F.) and 250 linear feet (L.F.) of timber bulkhead. Both portions of the structure had fallen into desrepair and were essentially unuseable and in hazardous condition prior to demolition.

The dock was formerly used for commercial transhipment of goods.

C. PROPOSED IMPROVEMENTS

The currently proposed plan of improvements for Brady's Dock has developed through a series of conceptual plans and meetings with officials of the New Jersey Department of Environmental Protection and State Green Acres Program. It is believed to represent a conscientious effort to:

1. Improve the structurally deteriorated conditions at Brady's Dock.

2. Incorporate the former commercial facility into the recreational scheme of the adjoining Kill Van Kull Park.

3. Provide recreational docking facilities for fishing vessels available for public charter.

4. Alleviate the aesthetically displeasing appearance of the area.

5. Provide for passive recreational use of the waterfront including fishing and view points.

6. Improve existing environmental conditions by reducing the water area covered by the dock.

The current configuration of the dock structure (as presented in the Preliminary Design) has been slightly enlarged and extended waterward as a consequence of final design modifications which were found to be necessary to obtain sufficient water depths to accomodate the envisioned recreational vessel use without dredging. This fact not withstanding the current design still represents a 6,000 S.F. reduction in surface area over the previous configuration.

The proposed improvements consist of:

- Removal of 14,500 S.F. of concrete decking and existing timber support pilings, whalers, etc.

- Removal of 250 L.F. of timber bulkhead.

- Removal of existing fill (311 C.Y.) from approximately 0.014 acres (600 S.F.) of the Kill Van Kull.

- Construction of 8,256 S.F. of pile and timber dock.

- Construction of 245 L.F. of new steel sheet bulkhead.

- Placement of 400 cubic years of rip-rap as toe protection for the bulkhead.

- Placement of fill (500 C.Y.) in 0.022 acres (960 S.F.) of the Kill Van Kull as backfill behind the bulkhead.

- Construction of an octagonal pavillion containing 2,000 S.F. of floor space including public restrooms (accessible by handicapped) and space for public use.

- Paving of 7,150 S.F. of existing upland with unit pavers.

- Planting of 14 shade trees, 8 ornamental and 17 evergreens and 20 shrubs.

- Landscaping including wooden benches, bollards, bark mulch.

- Erection of five site lighting standards and one nautical flagpole.

All of the noted aspects of the proposed improvements are shown on the plans submitted with this document (Scale 1"=10'). Reduced plans will be submitted with the formal application.

The environmental impacts of these actions were identified and summarized in the previously submitted Impact Assessment. In essence, they are considered to be negligible. It should be

noted however that since the original submission of the impact statement several design changes have been implemented which will serve to offer positive impacts. They are as follows:

1. Inclusion of rip-rap toe protection at the base of the bulkhead. This new design element will provide an estimated 140 square yards of hard substrate for attachment of intertidal organisms thereby improving the diversity of the site.

2. Extension of the proposed dock limits waterward in order to access deeper water. This option eliminates any need for dredging and thereby also eliminates any potential deleterious impacts associated with it.

3. The pavilion has been relocated to a more landward position thereby reducing the amount of fill necessary for its construction by 2,600 cubic yards. This measure conserves an estimated 5,000 S.F. of tidal area which would have been filled.

4. The chain link fence which exists along the waterfront will be removed thereby eliminating any obstruction to access.

D. CONSISTENCY WITH COASTAL MANAGEMENT POLICIES

The site is located in the Northwestern Waterfront Area as designed by the New Jersey Coastal Management Program. The Coastal Management Consistency Analysis which follows addresses those coastal resource policies which are believed to be applicable. The analysis follows the Coastal Location Acceptability Method (CLAM). Policy numbers refer to those numbers shown in a document titled "Coastal Resource and Development Policies" by the New Jersey Department of Environmental Protection dated June 1981.

The site and surrounding areas are shown on the covering page of the plans submitted with this document. The site was described on page 2 of this report. It is situated on the north side of the Kill Van Kull and is located at the foot of Lexington Avenue in Bayonne. It is adjoined on the west by the City's Kill Van Kull Park, on the north by residential areas and on the east by a commercial facility (warehouse).

1. Applicable Policies

a. Special Areas

The following special areas are known to exist on or immediately adjacent to the site.

Special Area	Policy No.	Location
Prime Fishing Area	7:7E-e.4	The site after improvements will become a prime fishing area.
Finfish Migratory Pathway	7:7E-3.5	Waters of the Kill Van Kull.
Navigation Channel	7:7E-3.7	Kill Van Kull approximately 300 feet west of site.
Marina Mooring	7:7E-3.10	The site after improvements will be used for mooring of recreational vessels.
Ports	7:7E-3.11	The nearest ports are Port Newark and Port Richmond which are located on the Kill Van Kull and Newark Bay in Elizabeth and on Staten Island respectively.

Filled Waters Edge	7:7E-3.17	Bulkheaded portion of site.
Public Open Space	7:7E-3.39	Kill Van Kull Park and the site.
Special Urban Area	7:7E-3.42	All of Bayonne.

b. General Areas

The following general areas are located on or immediately adjacent to the site.

General Areas	Policy No.	Location
(Water)		
Tidal Gut	7:7E-4.6	Kill Van Kull
(Land)		
None		No general land area is on site - the site is all filled waters edge.

c. General Location Policies

There are no general location policies applicable to a site improvement activity such as that proposed.

d. Use Policies

The following use policies are applicable to the proposed activity.

Use Policy	Policy No.
Coastal Engineering	7:7E-7.11

e. Resource Policies

The following resource policies are applicable to the proposed activity.

Resource Policy	Policy No.
Marine Fish and Fisheries	7:7E-8.2
Water Quality	7:7E-8.4
Runoff	7:7E-8.7
Vegetation	7:7E-8.9
Air Quality	7:7E-8.11
Public Access to the Shorefront	7:7E-8.13
Scenic Resources	7:7E-8.14
Buffers and Compatibility of Uses	7:7E-8.15
Flood Hazard Areas	7:7E-8.23
Noise Abatement	7:7E-8.25
Barrier Free Design	7:7E-8.26

2. Consistency/Acceptability of Proposed Activity

The following narrative is designed to demonstrate the consistency of acceptability of the proposed improvements with New Jersey Coastal Management Policies. In lieu of quoting each specific policy verbatim from the Coastal Management Program Document reference is made to the policy number and the reader is directed to the Coastal Resource and Development Policies Document dated June 1981 by the State of New Jersey D.E.P.

a. Special Areas (7:7E-3.4)

- Prime Fishing Areas

The site is at present not useable as a recreational area of any sort. The proposed improvements will transform it into a recreational fishing area open to the public. The proposed action is therefore considered to be consistent with this policy.

- Finfish Migratory Pathway (7:7E-3.5)

The Kill Van Kull is considered to be a migratory pathway for a number of fish species utilizing Newark Bay. The proposed action will in no way reduce or restrict the passage of migratory finfish through the area. Removal of the existing dock and the reduced size of that proposed will in fact improve existing restricted conditions.

- Navigation Channels (7:7E-3.7)

The proposed project will have no impact on the adjacent navigation channel. Phasing of construction and appropriate erosion and sedimentation controls will

preclude loss of terrestrial materials to the navigation channel. The action is therefore consistent with this policy.

- Marina Moorings (7:7E-3.10)

As proposed the activity would provide new recreational mooring for public charter fishing boats. As designed, deep water access is achieved by wharfing out, hence no dredging will be required. Since the action will improve existing recreational boating conditions it is consistent with this policy.

- Ports (7:7E-3.11)

Although the site is proximal to designated ports the proposed use will not interfere with port uses and is therefore consistent with this policy.

- Filled Waters Edge (7:7E-3.17)

The proposed use of the site is water dependent and recreational in nature and is therefore acceptable.

- Public Open Space (7:7E-3.39)

The proposed action will result in a major improvement

to public property which will transform an unuseable commercial site into attrative and useful public recreational space. It is therefore considered consistent with this policy.

- Special Urban Area (7:7E-3.42)

The proposed reconstruction action will provide a significant recreational and social benefit to residents of the community. Available recreational open space will be increased and the opportunity for individuals to experience deep sea fishing will be provided by public charter vessels which will use the mooring facility. The accrued social and recreational benefits make the action consistent with this policy.

b. General Water Areas

- Tidal Gut

The use of tidal guts for construction of docks and mooring facilities is designated as being conditionally acceptable. Since the improvements proposed essentially continue these uses, as opposed to establishing them as new facilities, it is believed that these elements of the project are acceptable. It should be noted that the proposed design will enhance the

previously existing environmental condition by providing greater public access and reducing the water area covered by the dock structure.

Minor filling (960 S.F.) in the Kill Van Kull will be necessary for construction of the new bulkhead and pavilion structure. Although this activity is discouraged it is believed that in this instance the activity is acceptable for the following reasons:

1. Although 960 S.F. of Kill bottom are being filled approximately 600 S.F. will be returned by excavation of existing fill. The net loss of submarine area is therefore only 360 S.F.

2. The substrate on which fill is proposed to be placed currently consists of debris, broken concrete, exogenous stones and other materials resulting from commercial transhipment activities at the former dock. The area is essentially void of macroscopic benthic organisms and hence little productive substrate will be lost be filling.

3. The need for fill results from realignment of the bulkhead to a more rectilinear design which will form a homogenous shoreline and meet flush with the

existing westerly bulkhead adjoining Kill Van Kull Park.

4. The fill will in no way adversely affect the ability of the Kill Van Kull to transport nutrients, control fresh and saltwater transport between New York Bay and Newark Bay or serve as a movement corridor for aquatic organisms.

c. Use Policies

- Coastal Engineering (7:7E-7.11)

Although construction of the bulkhead is apparently subject to this policy, there are no specific subpolicies which pertain to the action. Since the proposed project is essentially a reconstruction of an existing shore protection work and since there are no bluffs, beaches, or dunes on or near the site which would be affected, it is apparent that the activity is acceptable.

d. Resource Policies

- Marine Fish and Fisheries (7:7E-8.2)

The activity will not interfere with or adversely impact marine fish or fisheries or their spawning and

migration. Its magnitude and location preclude these impacts.

- Water Quality (7:7E-8.4)

Although it is possible that some minor water quality impacts will occur during construction, it is anticipated that these will generally be in the area of suspeneded particulates and turbidity. In order to mitigate these impacts, construction will be phased and appropriate sedimentation and erosion controls will be implemented. The low magnitude and short term duration of impacts will in no way prevent attainment of defined surface water standards.

- Runoff (7:7E-8.7)

All runoff from the site is currently received by storm drains in First St. or is transmitted directly to the Kill Van Kull. No increase in runoff will occur nor will additional pollutants be introduced into existing runoff. Virtually no infiltration is expected and stormwater discharge volumes are too small to affect the quality of receiving waters in the Kill Van Kull.

- Soil Erosion and Sedimentation (7:7E-8.8)

  Soil loss and erosion during construction will be controlled by phasing of the work and implementation of appropriate erosion controls as necessary. Following construction the minor unstablized surface areas which will exist are to be seeded, planted and otherwise mulched. These actions will virtually completely eliminate any erosion or soil loss.

- Vegetation (7:7E-8.9)

  At present there is essentially no vegetation on site. The proposed action includes significant plantings and landscaping which will improve vegetative conditions.

- Air Quality (7:7E-8.11)

  Construction activities which may produce air quality impacts will conform to all applicable state and federal emissions regulations, and air quality standards and criteria.

- Public Access to the Shorefront (7:7E-8.13)

  Public Access to the Shorefront will be significantly

improved by the project. The formerly commercial waterfront facility will be converted to total public use for fishing and passive recreation. In addition it is anticipated that charter fishing vessels available for public use will moor at the Dock thereby offering deep sea fishing opportunities to urban residents.

- Scenic Resources and Design (7:7E-8.14)

The proposed reconstruction presents an aesthetically pleasing design which by virtue of its landscaping, plantings and construction materials, offers an infinite improvement in the currently deteriorated conditions. This development is entirely consistent with the character of the adjoining Kill Van Kull Park and serves to enhance the surrounding residential atmosphere.

- Buffers and Compatibility of Uses (7:7E-8.15)

Extension of the existing Kill Van Kull Park via the proposed improvements to Brady's Dock will serve to increase the buffer between residential uses on the north and the commercial facilities on the east. This expanded buffering effect is consistent with State policy.

- Flood Hazard Areas (7:7E-8.23)

  The site is located within a coastal flood hazard area; however, the proposed use is water-dependent and requires such a location. In addition no inhabitable structures are proposed and the site will be dedicated to open space. This action is not only consistent with coastal policy but is encouraged.

- Noise Abatement (7:7E-8.25)

  Short term noise impacts will occur during construction as a result of the equipment necesary for erection of structures. However, all local, state and federal noise regulations will be compiled with.

- Barrier Free Design

  As shown on the plans, the pavilion, dock, restrooms and associated facilities have been designed for easy access by the handicapped. Ramps are provided for access to the dock and pavilion facilities and all applicable "Barrier Free Design Regulations" have been complied with.

3. Summary/Conclusions

Based on analysis of all applicable Coastal Resource and Development Policies it is apparent that the project is fully consistent. The minor environmental impacts which may be expected have been recognized and their mitigation provided for. Only one potential inconsistency is apparent. That is the placement of a small amount of fill in the Kill Van Kull. Although this action is discouraged as a general policy, it is felt that in this instance fill is acceptable in light of its minor magnitude and the poor environmental condition of the area to be filled. It is further believed that the tremendous public benefit in terms of water access and recreation which would result from the project far outweighs the impacts of minor filling. It is therefore respectfully submitted that the project is consistent to the maximum extent practicable with applicable Coastal Management Policies and should be approved without modification.

Section 3

HYDROLOGIC STUDIES

CITY (BRADY'S) DOCK
BAYONNE, NEW JERSEY

FGA NO. 80 47 20

Our hydrologic analysis generated information necessary to determine the oceanographic parameters influencing design of Brady's Dock. Port Richmond, New York at latitude N 40° 38', longitude W 74° 08' is the closest data reference point to Brady's Dock and therefore was used as an information source.

Tides

The Kill Van Kull is directly under the influence of tidal action of the ocean via upper New York Bay and the Arthur Kill. The normal mean tide range is 4.5 feet, spring range is 5.4 feet. The extreme 100 year flood range at 10.9 feet above mean low water was recorded in 1960. Extreme low range was recorded in 1935 as 3.3 feet below mean low water.

Tidal Currents

The Flood current (west movement-incoming tide) has an average velocity (in knots) of 0.5 one hour after high water. Four hours after high water the current is 2.3 - 2.6 knots.

The Ebb current (east movement-out going tide) has an average velocity (in knots) of 0.9 - 1.0 one hour after high water. Four hours after high water the current is 2.0 - 2.2 knots. The average strength spring current is 2.4 knots.

Data for currents information is based on time of high water at Battery Park, New York City.

Wave Characteristics

Data regarding the characteristics of wave action in the Kill Van Kull have not been collected by any governmental agencies concerned with oceanographic survey, study or information compilation or by the U.S. Coast Guard as far as our research has been able to establish.

We do know because of the relatively protected nature of the Kill Van Kull and the fact that it is a fairly narrow body of water, winds will have little effect on increasing wave heights. Ship wake action as observed also seemed to have minimal effect on wave height characteristics. These waves generated by ships

passing through the Kill Van Kull create minor run up on vertical surfaces; one to two foot wave run-ups have been observed.

It is possible that at times of a surge, the difference in tide levels between the observed and predicted tide, which is usually due to meterological conditions, the wave action may cause over-topping of the dock structure. In this case, water splashed up onto the dock will run horizontally for a distance which is dependent on the strength of the wave action. Under normal conditions, wave over-topping and run-up is not likely to reach further than the vertical bulkhead. Under extreme weather conditions, waves may reach the upper pavement area.

Docking Loads and Impacts

At present the dock structure has been preliminarily designed based on normal minimal dock loads. As soon as it is determined as to the type of vessels that will be utilizing these facilities, a more specific calculation can be made to insure structural stability to handle required docking loads and impacts.

TIDAL HYDROLOGY

1. GENERAL

Tide may be defined as the periodic rising and falling of the ocean due mainly to the attraction of the moon and sun as the earth rotates upon its axis. The most common terms used to describe the various ocean levels are briefly summarized:

Mean Low Water (mlw) - Average height of all low waters observed over a considerable length of time.

Mean Sea Level (msl) - Average height of the sea for all stages of the tide. It may be obtained by averaging hourly heights and its precision depends upon the number of years of observation.

Sea Level Datum of 1929 - The standard datum of the precise geodetic level net of the country and is based on mean sea level at selected tide stations along the coasts of the United States and Canada.

Mean High Water (mhw) - Average height of all high waters observed over a considerable period of time.

Range of Tide - Difference between mean high and mean low water.

Spring Tide - The tide that occurs at or near the time of new and full moon which rises highest and falls lowest from the mean level. It occurs semi-monthly.

Neap Tide - The tide that occrs at or near the time when the moon is at its first and third quarters. This tide also occurs semi-monthly and does not rise as high or fall as low as the average.

Predicted Tide - Predicted tides are given in tide tables published by the National Ocean Survey (formerly U.S. Coast and Geodetic Survey). These tables give the times and heights of the high and low waters for the entire maritime world and are issued annually in four volumes. Predictions for the East Coast are included in volume, entitled: "East Coast of North and South America (including Greenland)." Predicted tides are based only on astronomical factors and do not include noncyclic influences such as wind and barometric pressure.

Surge - The difference in tide levels between the observed and predicted tide.

2. FACTORS INFLUENCING TIDES

In addition to the normal gravitational effects of the moon and sun, tides are subject to meterological influences such as changing atmospheric pressure and strong winds. Along the North Atlantic coast a drop in barometric pressure of 1 inch of mercury will cause about a 1 foot rise in ocean levels. In addition, during intense coastal storms, attended by strong east or northeast winds, tide levels in enclosed water bodies often build up several feet above the predicted elevations. In like manner the passage of a high pressure frontal system associated with strong westerly winds results in the tides running below predicted elevations.

3. FREQUENCY OF TIDAL FLOODING

Although hurricanes have been recorded on the East Coast since the early part of the 17th century, records of elevations are meager until recent years. A flood frequency relationship has been approximated by combining elevations of the hurricanes of 1938 and 1954 and records of great historical storms, of which 23 September 1815 is the earliest for which tidal elevations may be estimated, with the records of the USC&GS, municipal and public utility company tide gages. The period of record of these tide gages varies from 26 years at Montauk, New York to 42 years at Willets Point, New York.

4. CHARACTERISTICS OF SEVERE STORMS

a. Hurricanes - The type of storm which affects the area most severely is the hurricane, which is tropical in nature and characterized by low barometric pressures, high winds (75 miles per hour or greater), torrential rain, tremendous waves and tidal flooding. Most of the hurricanes that have affected the eastern coast of North America have formed either near the Cape Verde Islands off the African coast, or in the Western Caribbean Sea. Cape Verde hurricanes move westerly for a number of days with a forward speed of about 10 mph and generally, after reaching the Middle Atlantic Ocean, recurve northerly and then easterly Frequently they cross the West Indies, sometimes striking the eastern coast of the United States between Key West, Florida, and Cape Cod, Massachusetts. After recurving, the storms usually increase their forward speed to a rate of 25 to 30 miles per hour and occasionally to speeds of 40 to 60 mph. The hurricanes which form in the Caribbean Sea generally move in a northerly direction and strike either the Gulf or the southeastern shores of the United States. The hurricanes that most severely affect the study area usually approach from the south after recurving east of Florida and skirting the Middle Atlantic States.

The highest winds of a hurricane are those within a circular region extending from the edge of the "eye", or calm center, outward for 10 to 15 miles. The diameter of the eye is usually about 15 miles, although the eye of a mature hurricane may extend 20 to 30 miles in diameter. Winds spiral inward in a counterclockwise direction toward the center of low pressure. Consequently, the highest wind velocities occur at points to the right of the hurricane's center where the sprial wind movement and the forward motion of the storm are in the same direction. Atmospheric pressure falls rapidly as the center of the hurricane approaches and as the velocity of the wind increases. Usually, the barometric low is about 2 inches below the normal sea level pressure of 30 inches.

Hurricane winds generate gigantic waves. The ultimate size of the waves depends upon the force and duration of the wind and the distance the wave travels. The Kill Van Kull is somewhat protected from severe winds and its narrowness reduces the distance the waves can travel, therefore, the overall effect upon wave heights is reduced. Driven by hurricane winds, the breaking waves will run up on a horizontal surface or overtop vertical structures well above the actual stillwater height, so that reports of wave and flood damage from 5 to 25 feet above water level are not uncommon. The rise of the tide amounts to only 1 or 2 feet in the open ocean while its range can reach 6 to 10 feet or more at coastal points.

The location of the storm track relative to a coastal community influences the magnitude of the surge. As hurricanes and other low pressure systems in the northern hemisphere rotate in a counter-clockwise direction, the winds will be highest and southerly if the storm center passes west of a community. On the east side of the storm track, the components affecting surge, consisting of the forward speed of the storm, the high circulating hurricane winds and low barometric pressure, are additive. Such conditions may cause abnormally high tides and waves that are often intensified at the heads of coves and bays. On the west side of the storm center, however, the counterclockwise rotation of the storm produces northerly winds which are generally in opposition to the storm movement. The resultant wind velocities are subtractive and usually smaller than those experienced on the east side where the components are additive.

Another characteristic of a hurricane is the heavy rainfall that usually accompanies the storm. At the edge of the disturbance rainfall is light, normally in the form of showers. As the center approaches, the showers increase in frequency and intensity, becoming heavy to ex-

cessive near the eye. The heaviest rain usually falls ahead of the eye, driving torrentially from spiral bands of clouds that sometimes produce nearly 2 inches of rain per hour.

It is not yet possible to predict with a high degree of reliability whether the track of a hurricane, still several hundred miles away, may either hit or miss the New Jersey coast, or pass to the west or east of a community. The National Weather Service tracking season is from about 15 June to 15 November. Although it is possible for hurricanes to occur in most months, the major hurricanes of this century that have caused tidal flooding in the Mid-Atlantic States have occurred in August or September. Because of the enormous energy associated with hurricanes, the highest abnormal tide can occur during any part of the predicted tide cycle, either high, low or mean tides.

Section 4

GEOTECHNICAL ENGINEERING REPORT

BRADY'S DOCK BAYONNE, NEW JERSEY

I. INTRODUCTION

This report presents the results of the foundation investigation performed at the site of the proposed Brady's Dock Reconstruction for the City of Bayonne, New Jersey.

The purpose of the investigation was to obtain data regarding the index properties and subsurface conditions relative to the design of proposed dock improvements.

II. SUBSURFACE CONDITIONS

In July of 1981, five test holes were performed at the site taken to depths of 35 feet below existing ground elevation. Generally the uppermost soil layer is comprised of cinders, miscellaneous sandy fill (with wood content) and black organic silt. Based on the blow counts of the standard sampler the relative density of these materials is "loose". The thickness of this fill layer is estimated to be 8 to 10 feet.

Underlaying the above described layer exists a strata of red-brown coarse to fine sand with varying amounts of gravel and silt content. The relative density of this soil was found to

be very dense to very firm. This strata extended to the depth of the investigations.

III. FOUNDATION RECOMMENDATIONS

A. Dock Support

Due to the loose nature of the miscellaneous fill encountered in the investigations, a pile supported foundation that would penetrate this layer is recommended. Because of the very dense nature of soils underlying the fill layer, friction piles utilizing stress values for point bearing as well as skin friction should be allowed for in the design. Assuming a 25 ton pile capacity, it is estimated from static formula analsis, that a 15 to 20 foot embedment in the dense sand layer would be required to provide a safety factor of 1.85. The actual safe bearing capacity of each pile shall be determined in the field, based on driving resistance and an empirical formula known as the Engineering News Record Formula.

B. Steel Sheet Pile Retaining Structures

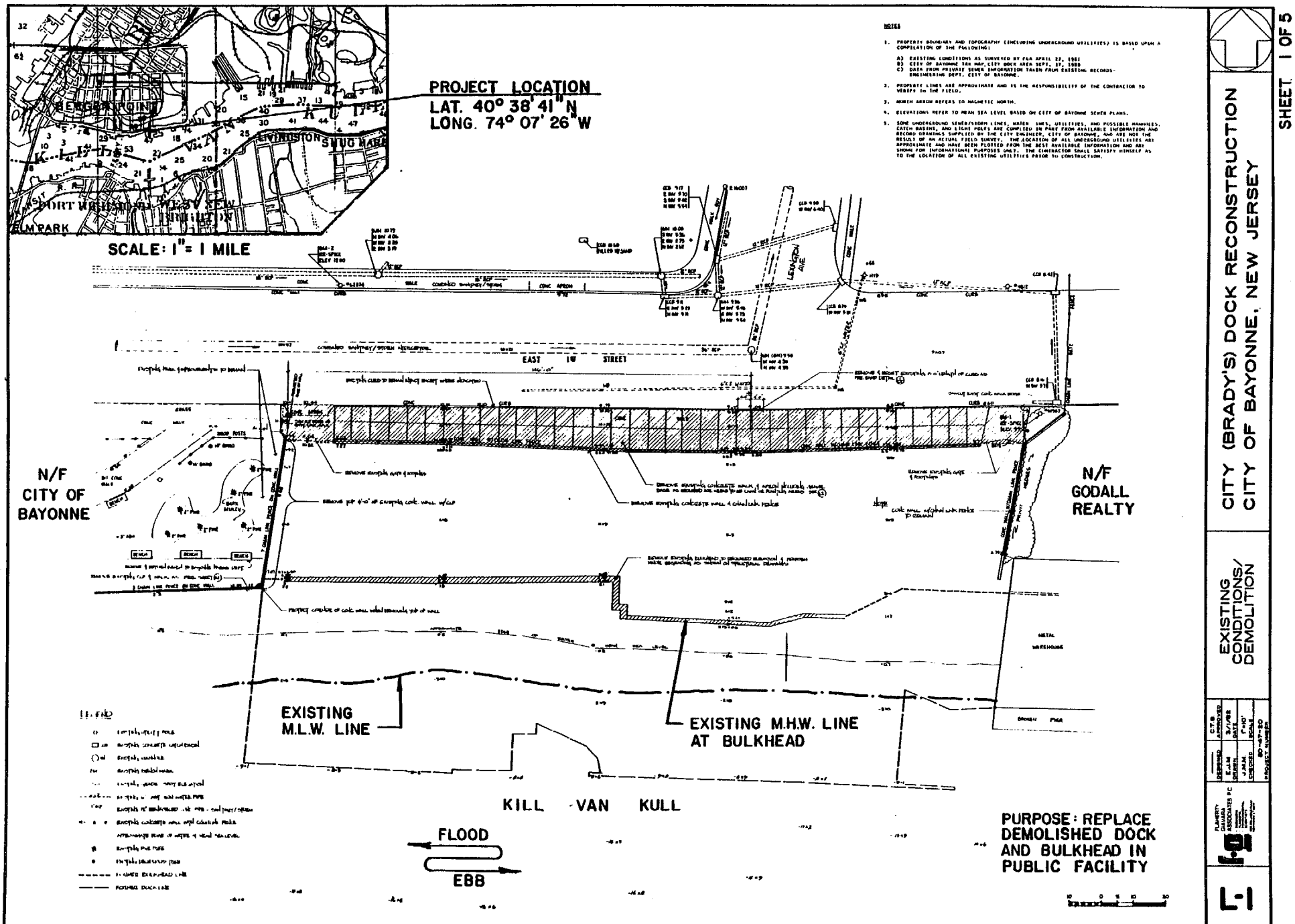
For the design of steel sheet pile retaining structures, the following soil parameters are recommended:

Soil Type	Angle of Internal Friction 0	Density (lbs/ft^3)	Equivalent Fluid Pressure (Active State) (lbs/ft^2)	Equivalent Fluid Pressure (Passive State) (lbs/ft^2)
Miscellaneous Fill	20°	50*	25	130
Gravel Fill (compacted)	35°	120	32	800
Gravel Fill (loose)	30°	115	35	560
Dense Sand Strata	35°	60*	20	450

* Submerged unit weight

C. At grade structures

Due to the light loads of the proposed structures at grade, spread footings are recommended. The depth of the footings should be a minimum of 3.5 feet and the ultimate bearing capacity should not exceed one ton per square foot.


PROJECT LOCATION
LAT. 40° 38' 41" N
LONG. 74° 07' 26" W
SCALE: 1" = 1 MILE
BERGEN POINT
ELM PARK
NOTES
1. PROPERTY BOUNDARY AND TOPOGRAPHY (INCLUDING UNDERGROUND UTILITIES) IS BASED UPON A COMPILATION OF THE FOLLOWING:
A) EXISTING CONDITIONS AS SURVEYED BY FGA APRIL 27, 1961
B) CITY OF BAYONNE TAX MAP, CITY DOCK AREA SEPT. 27, 1988
C) DATA FROM PRIVATE SEWER INFORMATION TAKEN FROM EXISTING RECORDS - ENGINEERING DEPT. CITY OF BAYONNE.
2. PROPERTY LINES ARE APPROXIMATE AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY IN THE FIELD.
3. NORTH ARROW REFERS TO MAGNETIC NORTH.
4. ELEVATIONS REFER TO MEAN SEA LEVEL BASED ON CITY OF BAYONNE SEWER PLANS.
5. SOME UNDERGROUND SEWER/STORM LINES, WATER LINES, UTILITIES, AND POSSIBLE MANHOLES, CATCH BASINS, AND LIGHT POLES ARE COMPILED IN PART FROM AVAILABLE INFORMATION AND RECORD DRAWINGS SUPPLIED BY THE CITY ENGINEER, CITY OF BAYONNE, AND ARE NOT THE RESULT OF AN ACTUAL FIELD SURVEY. THE LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION AND ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
EAST 18 STREET
LEXINGTON AVE
N/F CITY OF BAYONNE
N/F GODALL REALTY
EXISTING M.L.W. LINE
EXISTING M.H.W. LINE AT BULKHEAD
KILL VAN KULL
FLOOD
EBB
PURPOSE: REPLACE DEMOLISHED DOCK AND BULKHEAD IN PUBLIC FACILITY
CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY
SHEET 1 OF 5
EXISTING CONDITIONS/ DEMOLITION
L-1

Appendix A

JERSEY BORING AND DRILLING CO., INC.
150-152 WRIGHT STREET, NEWARK, N J 07114 (201) 248-6000

7-21-81

J-2884
BB-2785

1st Report of Soil Borings

CLIENT: Flaherty Giavara Associates, P.C.
PROJECT: Subsurface Explorations - Brady's Dock, Bayonne, NJ
SUBJECT: Soil Borings
REPORTED TO: Flaherty Giavara Associates, P.C.
Attn: Mr. R. Smith

We submit herewith a report of soil borings conducted at locations and to depths as directed by client's representative:

Ident.	Drive Borings in Earth Linear Feet	Concrete Slab Core Drilling 4" Diameter Bit	Date
B-1	31.50	0.50'	7-20-81
B-2	36.00	0.50'	7-15, 7-16-81
B-3	30.00	0.50'	7-21-81
B-4	35.25	0.50'	7-18-81
B-5	35.00	0.58'	7-17-81

Mobilization/demobilization of equipment this report, four rigs, lump sum..... 100%
(light skid rig, heavy skid rig, tripod rig and portable concrete electric core drilling rig with 4" diameter thin wall bit.)
Number of days of soil borings in earth this report, July 15, 16, 17, 18, 20, and 21)..... 6
Lineal feet of four (4") inch diameter concrete cores drilled this report..... 2.58

All boring locations were marked out in the field by client's representative.
All boring operations were inspected by client's representative.
All samples were received in the field and retained by client's representative, Mr. Ted Hart.
Formal boring logs and report will be prepared by the client.
Informal boring logs as prepared in the field by the driller make no representations or warranties either as to the presence or absence of obstructions other than those actually penetrated by the borings or as to their nature and extent. Subsurface conditions other than that actually penetrated by the borings, soil or rock, may vary with regard to elevation, composition, texture, structure, soundness, and other characteristics, from the descriptions given in the boring logs and/or report.

Driller: LS,JK
FWW/swl

Respectfully submitted,
JERSEY BORING & DRILLING CO., INC.

F.W. Wingerter, President

THE FED. BORING ASSOCIATION MEMBER

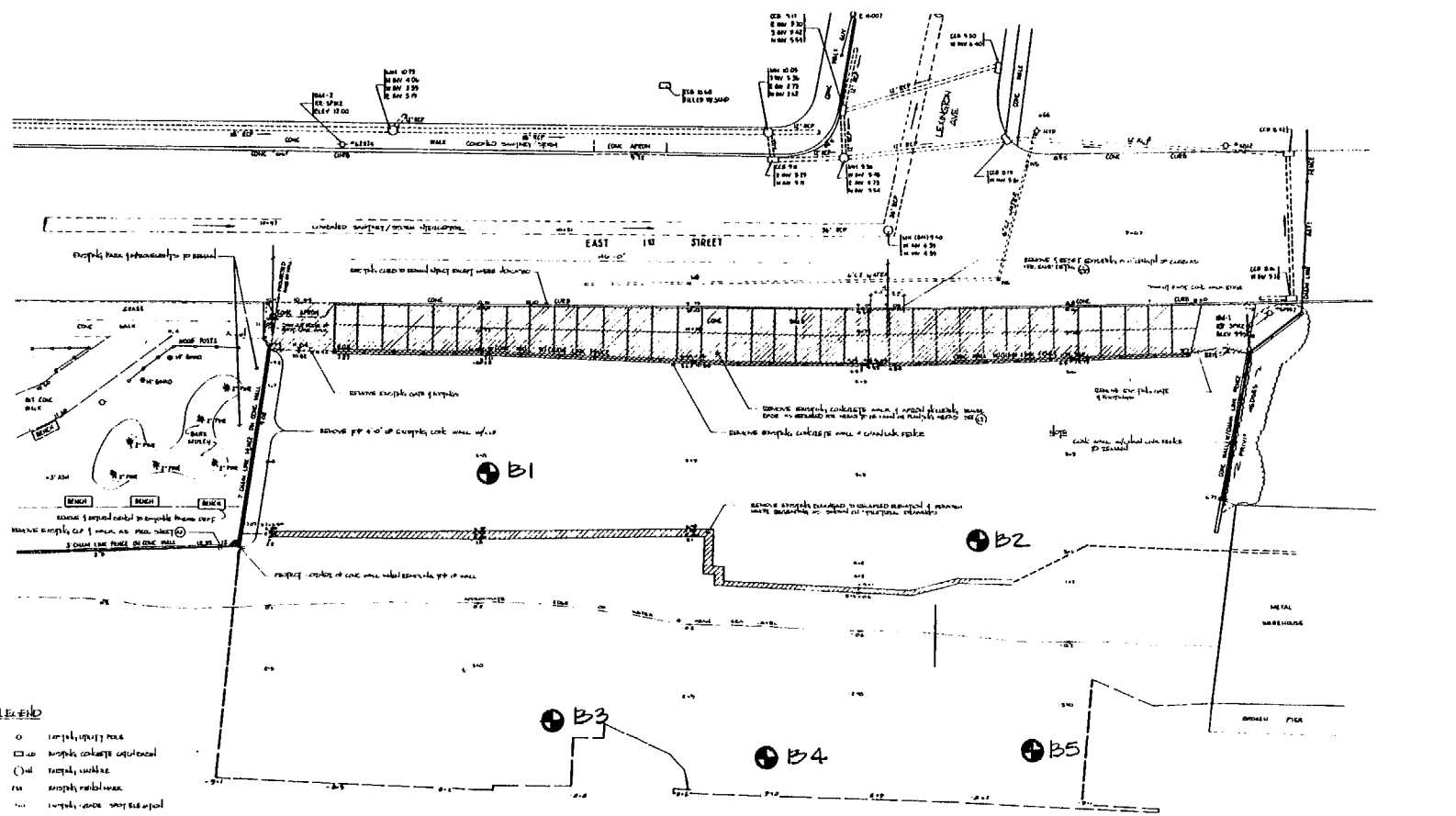
TEST BORING LOCATIONS

NOTES

1. PROPERTY BOUNDARY AND TOPOGRAPHY (INCLUDING UNDERGROUND UTILITIES) IS BASED UPON A COMPILATION OF THE FOLLOWING:

   A) EXISTING CONDITIONS AS SURVEYED BY FLA APRIL 27, 1981
   B) CITY OF BAYONNE TAX MAP, CITY GOLF AREA SEPT. 17, 1980
   C) DATA FROM PRIVATE SEWER INFORMATION TAKEN FROM EXISTING RECORDS ENGINEERING DEPT. CITY OF BAYONNE.

2. PROPERTY LINES ARE APPROXIMATE AND IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY IN THE FIELD.
3. NORTH ARROW REFERS TO MAGNETIC NORTH.
4. ELEVATIONS REFER TO MEAN SEA LEVEL BASED ON CITY OF BAYONNE SEWER PLANS.
5. SOME UNDERGROUND SEWER/SIGNAL LINES, WATER LINES, UTILITIES, AND POSSIBLE MANHOLES, CATCH BASINS, AND LIGHT POLES ARE COMPILED IN PART FROM AVAILABLE INFORMATION AND RECORD DRAWINGS SUPPLIED BY THE CITY ENGINEER, CITY OF BAYONNE, AND ARE NOT THE RESULT OF AN ACTUAL FIELD SURVEY. THE LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION AND ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.



LEGEND

- EXISTING UTILITY POLE
- EXISTING CONCRETE CATCH BASIN
- EXISTING MANHOLE
- EXISTING METAL WALK
- EXISTING WOODEN SPOT ELEVATION
- EXISTING 6" CAST IRON WATER PIPE
- EXISTING 12" REINFORCED CONC. PIPE - SANITARY/SEWER
- EXISTING CONCRETE WALL WITH CHAINLINK FENCE
- APPROXIMATE ZONE OF WATER AT MEAN SEA LEVEL
- EXISTING FIRE PIPE
- EXISTING BULKHEAD PIPE
- FORMER BULKHEAD LINE
- PROPOSED DOCK LINE

BORING LOCATION

CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY

EXISTING CONDITIONS/ DEMOLITION

DESIGNED	C.T.B.
APPROVED	
DRAWN	E.J.M.
DATE	3/1/82
SCALE	1"=10'
CHECKED	J.M.A.M.
DATE	1-6-82
PROJECT NUMBER	80-47-20

FLAHERTY, MUSTARI & ASSOCIATES P.C.
CONSULTING ENGINEERS
PLANNERS
SURVEYORS
ARCHITECTS

L-1

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOG	BORING NO.: B-1

PROJECT City (Brady's) Dock Bayonne, N.J. — SHEET NO. 1 OF 2

CLIENT Flaherty Giavara Associates — JOB NO.: FGA 80-47-20

Location As staked in field by client — ELEVATION:

DATUM:

DATE START: 7-19-81

DATE FINISHED 7-19-81

DRILLER: L. Smart

INSPECTOR:

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	BX	S.S.		
7-19-81	2:25	5"		DIA.	2 1/2"	1 3/8"		
				WT.	300#	140#		
				FALL	24"	30"		

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1	2	S-1	3		Cinders & red brown fine-medium sand with trace silt.	cut out 6" concrete
			5			
2	5		9			
			6			
3	5					
4	4					
5	3					
6	7	S-2	2		Red brown silt sand	
			1			
7	19		2			
			9			
8	29					
9	35					
10	29					
11	9	S-3	11		Red brown find sand, little silt, little gravel	
			11			
12	9		21			
			25			
13	29					
14	38					
15	38					
16	25	S-4	10		Red brown find-medium sand boulder fragments.	
			16			
17	29		19			
			24			
18	42					
19	49					
20	56					
21	31	S-5	35		Red brown fine-medium sand boulder fragments.	
			63			
22	35		41			
			59			
23	110					

JERSEY BORING AND DRILLING CO., INC.	TEST BORING LOG	BORING NO. B-1
PROJECT City (Brady's) Dock Bayonne, N. J.		SHEET NO. 2 OF
CLIENT Flaherty Giavara Associates		JOB NO. FGA 80-47-20

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
24	98					
25	175					
26	35	S-6	29			
			31			
27	93		56			
			64			
28	123					
29	109					
30	100					
31		S-7	25			
			47			
32			66			
			91			
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOG	BORING NO.: B-2
PROJECT City (Brady's) Dock Bayonne, N. J.		SHEET NO. 1 OF 2
CLIENT Flaherty Giavara Associates		JOB NO.: FGA 80-47-20
Location As staked in field by client		ELEVATION:
		DATUM:
		DATE START: 7-15-81
		DATE FINISHED: 7-16-81
		DRILLER: L. Smart
		INSPECTOR:

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	BX	S.S.		
7-16-81	9:30	3'-0"	10"	DIA.	2 1/2"	1 3/8"		
				WT.	300#	140#		
				FALL	24"	30"		

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1	3	S-1	2		Brown fine-medium sand cinders & wood "fill"	Cut out 6" conc.
			3			
2	12		8			
			17			
3	12					
4	14					
5	10					
6	3	S-2	4		Red brown fine to medium sand, trace silt & cinder fill.	
			2			
7	3		1			
			2			
8	6					
9	9					
10	10					
11	11	S-3	4		Red brown silty sand Trace fine gravel	
			4			
12	9		3			
			4			
13	24					
14	54					
15	63					
16	31	S-4	42		Red brown gravely silty sand	
			24			
17	43		24			
			20			
18	59					
19	45					
20	81					
21	32	S-5	86		Red brown gravely silty sand	
			52			
22	49		35			
			32			
23	49					

JERSEY BORING AND DRILLING CO., INC.	TEST BORING LOG	BORING NO. B-2
PROJECT City (Brady's) Dock Bayonne, N.J.		SHEET NO. 2 OF 2
CLIENT Flaherty Giavara Associates		JOB NO. FGA 80-47-20

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
24	52					
25	48					
26	25	S-6	20		Red brown fine-coarse sand some silt & trace fine gravel	
			32			
27	46		46			
			53			
28	53					
29	69					
30	109					
31	35	S-7	52		Red brown fine-medium sand little silt	
			75			
32	44		[illegible]			
33	49					
34	69					
35	81					
36		S-8	32		Red brown fine-medium sand little silt	
			85			
			139			
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOG	BORING NO.: B-3

PROJECT City (Brady's) Dock Bayonne, N.J.	SHEET NO. 1 OF 2
CLIENT Flaherty Giavara Associates	JOB NO. FGA 8 -47-20
Location As staked in field by client	ELEVATION:
	DATUM:
	DATE START: 7-20-81
	DATE FINISHED: 7-20-81
	DRILLER: L. Smart
	INSPECTOR:

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	BX	S.S.		
				DIA.	2 1/2"	1 3/8"		
				WT.	300#	140#		
				FALL	24"	30"		

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1					From the top of dock to bottom of water 11'-0" First sample from 15'	Cut out 6" concrete
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16	3	S-1	1		Try for sample three (3) times No recovery	
			1			
17	3		2			
			1			
18	5					
19	9					
20	10					
21	12	S-2	15		Red brown find-medium sand Little silt & trace gravel	
			17			
22	13		20			
			24			
23	21					

JERSEY BORING AND DRILLING CO., INC.	TEST BORING LOG	BORING NO. B-3
PROJECT City (Brady's) Dock Bayonne, N.J.		SHEET NO. 2 OF 2
CLIENT Flaherty Giavara Associates		JOB NO. FGA 80-47-20

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
24	32					
25	44					
26	27	S-3	26		Red brown fine-coarse sand Little silt & trace gravel	
			31			
27	35		37			
			50			
28	48					
29	59					
30	62					
31	23	S-4	31		Red brown fine-coarse sand Little silt & little fine gravel	
			29			
32	27		32			
			35			
33	35					
34	39					
35	49					
			16		Red brown fine-coarse sand Little silt & little fine gravel	
36	25	S-5	39			
			42			
37	29		56			
38	49					
39	66					
40	80					
		S-6	39		Red fine-medium sand Little silt	
41	52		65			
			120			
42	75					
43	61					
44	345					
45		S-7	85			
			150			
46						
47						
48						
49						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOG	BORING NO.: B-4
PROJECT City Brady's) Dock		SHEET NO. 1 OF 2
CLIENT Flaherty Giavara Associates		JOB NO.: [illegible]
Location As staked in field by client		ELEVATION:
		DATUM:
		DATE START: 7-17-81
		DATE FINISHED 7-17-81
		DRILLER: L. Smart
		INSPECTOR:

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	BX	S.S.		
				DIA.	2 1/2"	1 3/8"		
				WT.	300#	140#		
				FALL	24"	30"		

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1					From top of dock to the bottom of water- 12'-0". First sample at 15'	Cut out 6 1/2" Concrete
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13	2					
14	5					
15	5					
16	3	S-1	2		Black organic silt & cinders	
			1			
17	9		1			
			1			
18	10					
19	17					
20	21					
			32			
21	19	S-2	12		Red fine-medium sand Little silt & trace gravel	
			14			
22	10		12			
23	12					

JERSEY BORING AND DRILLING CO., INC.	TEST BORING LOG	BORING NO. B-4
PROJECT City (Brady's) Dock Bayonne, N.J.		SHEET NO 2 OF 2
CLIENT Flaherty Giavara Associates		JOB NO. 80-47-20

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
24	17					
25	21					
26	27	S-3	19		Red borwn fine-coarse sand little silt	
			23			
27	31		26			
			31			
28	42					
29	35					
30	39					
31	65	S-4	15		Red brown fine-coarse sand little silt	
			19			
32	79		25			
			30			
33	105					
34	93					
35	122					
			19		Red brown fine-coarse sand trace silt, little fine gravel	
36	45	S-5	29			
			35			
37	92		53			
38	131					
39	143					
40	92					
			29		Hit boulder drill from 43'-45' Recovery 14" boulder	
41	45	S-6	35			
			140			
42	79					
	400/6"					
43						
44						
45						
46		S-7	27		Brown coarse sand, trace silt	
			39			
47			75			
			100/3"			
48						
49						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOG	BORING NO.: B-5
PROJECT City (Brady's) Dock Bayonne, N.J.		SHEET NO. 1 OF 2
CLIENT Flaherty Giavara Associates		JOB NO.: FGA [illegible]
Location As staked in field by client		ELEVATION:
		DATUM:
		DATE START: 7-17-81
		DATE FINISHED: 7-17-81
		DRILLER: T. Smart
		INSPECTOR:

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	BX	S.S.		
				DIA.	2 1/2"	1 3/8"		
				WT.	300#	140#		
				FALL	24"	30"		

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1					From the top of the dock to the bottom of water - 12'-0" First sample from 15'-17'.	Cut out 7" concrete
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13	5					
14	9					
15	10					
16	2	S-1	2		Black organic silt	
			2			
17	~~1~~		1			
			1			
18	2					
19	2					
20	9					
21	10	S-2	5		Red brown silty sand	
			9			
22	~~18~~		10			
			8			
23	20					

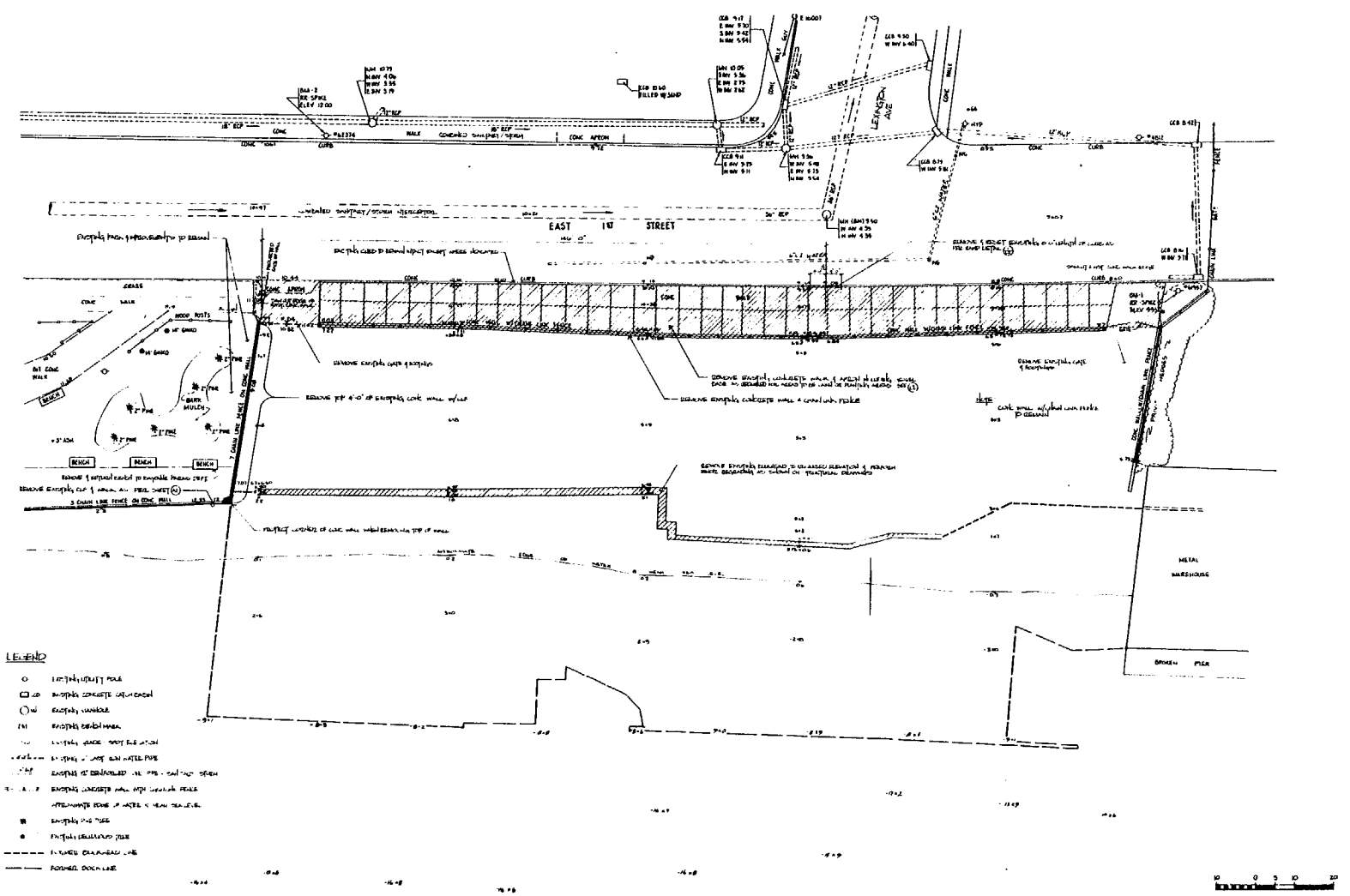
JERSEY BORING AND DRILLING CO., INC.	TEST BORING LOG	BORING NO. B-5
PROJECT City (Brady's) Dock, Bayonne, N.J.		SHEET NO. 2 OF 2
CLIENT Flaherty Giavara Associates		JOB NO. FGA 80-47-20

DEPTH FT.	CASING BLOWS	SAMPLE NO	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
24	23					
25	30					
26	22	S-3	19		Red brown fine-medium sand little silt, trace fine gravel	
			13			
27	31		17			
			19			
28	35					
29	47					
30	59					
31	19	S-4	20		Red Brown fine-coarse sand little silt, trace fine gravel	
			27			
			35			
32	25		63			
33	22					
34	31					
35	49					
36	76	S-5	16		Red brown fine-coarse sand little silt & trace fine gravel	
			23			
			35			
37	85		40			
38	117					
39	126					
40	105					
41	29	S-6	23		Brown gravely fine-coarse sand Little silt	
			31			
42	27		35			
			25			
43	56					
44	76					
45	82					
46		S-7	42		Brown gravely silty sand, little clay, boulder fragments.	
			45			
47			63			
			50			
48						
49						

Appendix B

NOTES

1. PROPERTY BOUNDARY AND TOPOGRAPHY (INCLUDING UNDERGROUND UTILITIES) IS BASED UPON A COMPILATION OF THE FOLLOWING:
   A) EXISTING CONDITIONS AS SURVEYED BY FSA APRIL 27, 1981
   B) CITY OF BAYONNE TAX MAP, CITY DOCK AREA SEPT. 12, 1986
   C) DATA FROM PRIVATE SEWER INFORMATION TAKEN FROM EXISTING RECORDS ENGINEERING DEPT. CITY OF BAYONNE.
2. PROPERTY LINES ARE APPROXIMATE AND IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY IN THE FIELD.
3. NORTH ARROW REFERS TO MAGNETIC NORTH.
4. ELEVATIONS REFER TO MEAN SEA LEVEL BASED ON CITY OF BAYONNE SEWER PLANS.
5. SOME UNDERGROUND SEWER/STORM LINES, WATER LINES, UTILITIES, AND POSSIBLE MANHOLES, CATCH BASINS, AND LIGHT POLES ARE COMPLETED IN PART FROM AVAILABLE INFORMATION AND RECORD DRAWINGS SUPPLIED BY THE CITY ENGINEER, CITY OF BAYONNE, AND ARE NOT THE RESULT OF AN ACTUAL FIELD SURVEY. THE LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION AND ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.



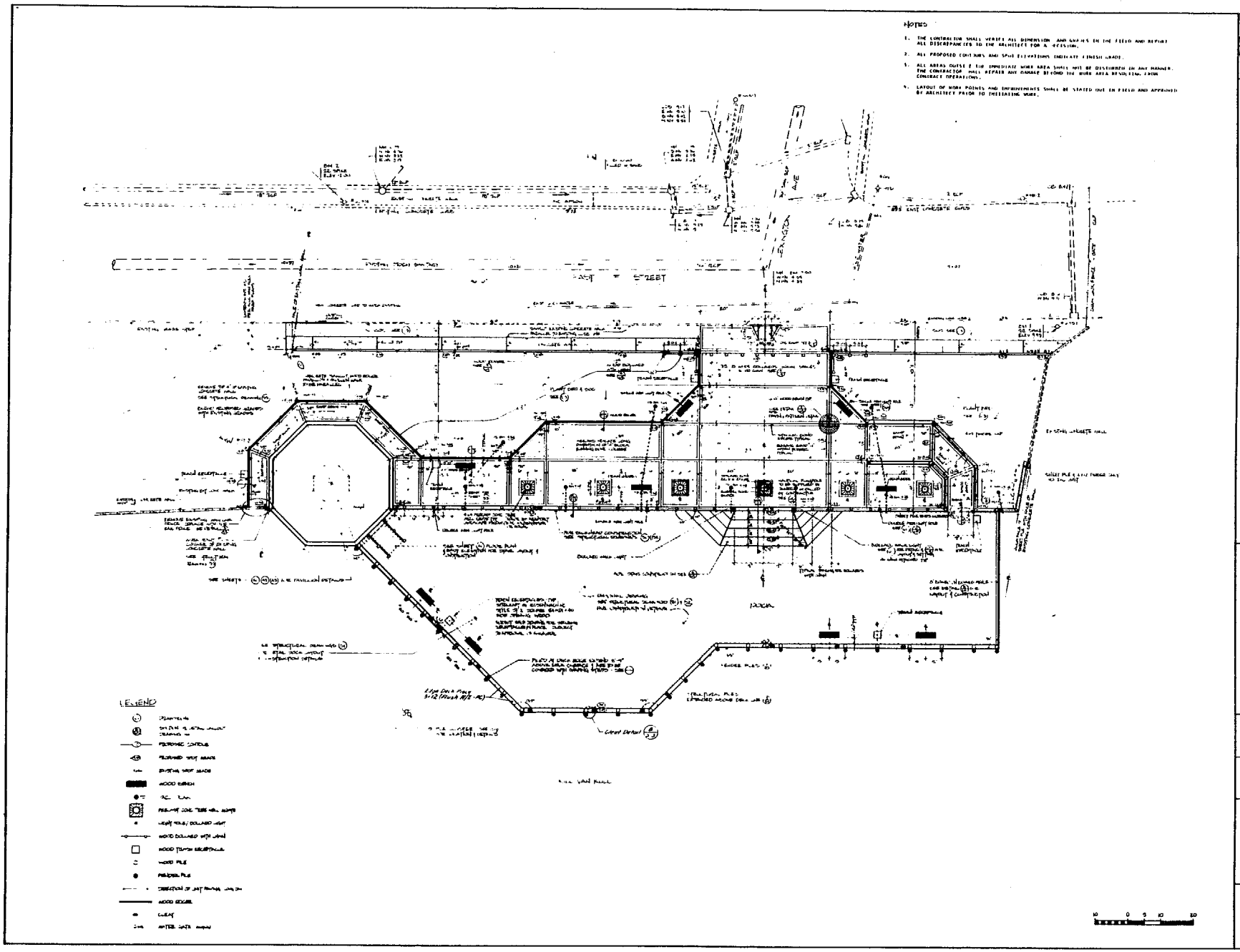
CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY

EXISTING CONDITIONS/ DEMOLITION

DESIGNED	C.T.B.
APPROVED	
DRAWN	E.J.M.
DATE	3/1/82
CHECKED	J.M.M.
SCALE	1"=10'
PROJECT NUMBER	80-47-20

FLAMERTY GANARA ASSOCIATES P.C.

L-1



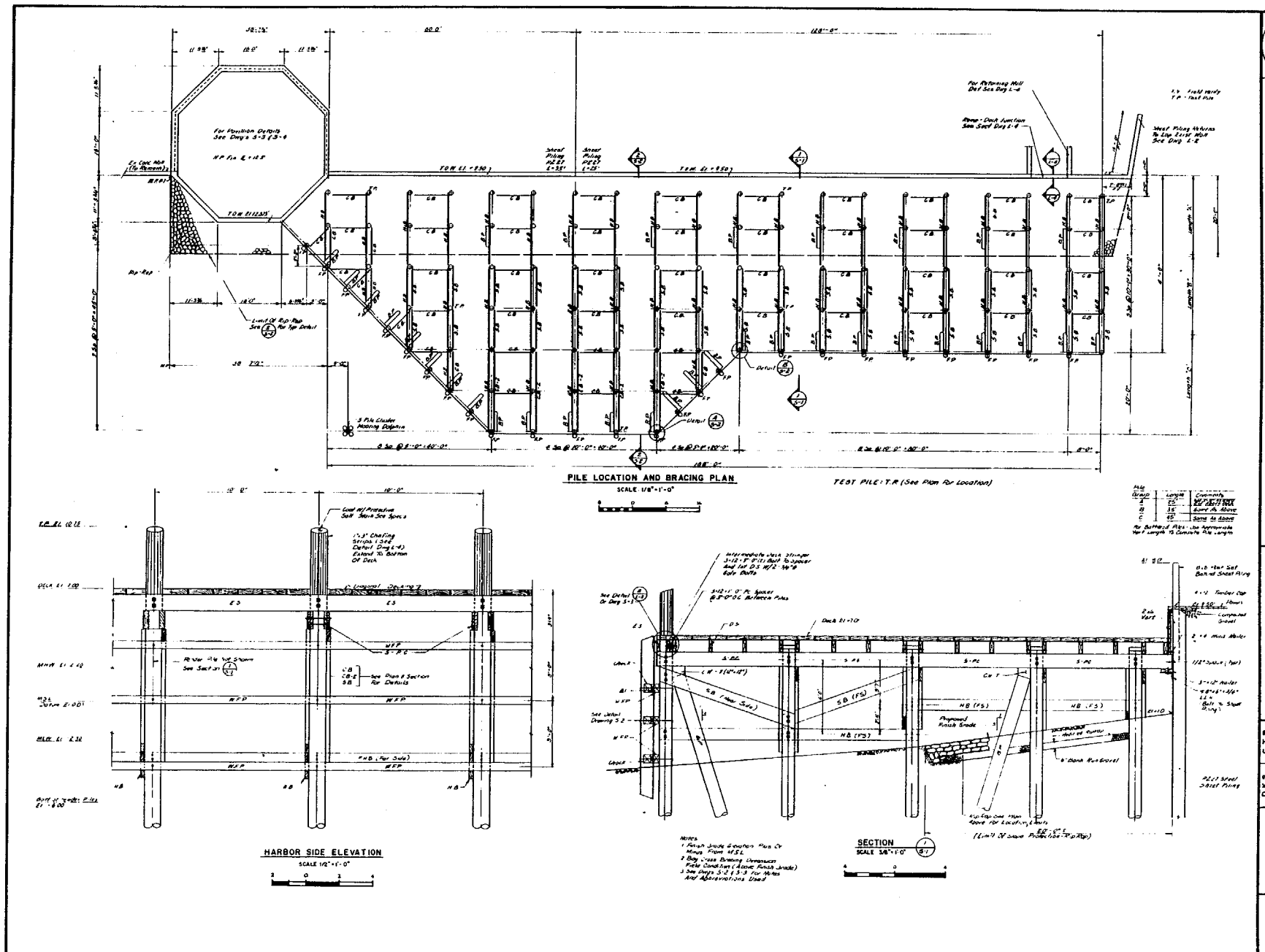
CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY

LAYOUT/GRADING /DRAINAGE & DETAILS

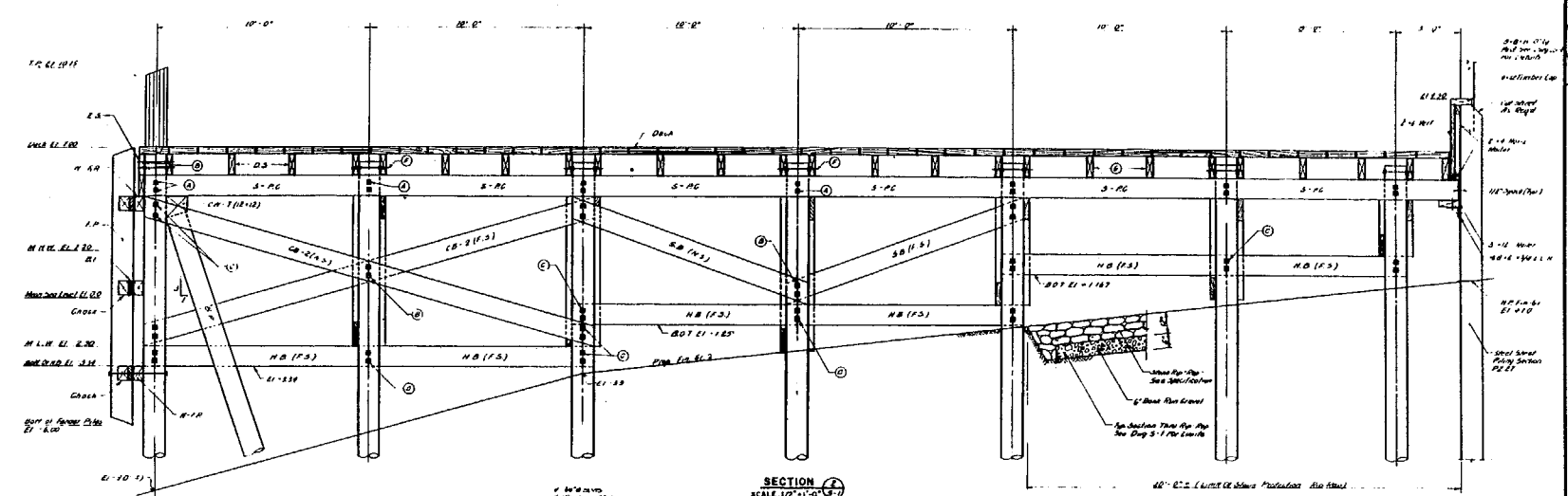
DESIGNED	C.T.B.
APPROVED	
DRAWN	R.I.S.
DATE	3/1/92
CHECKED	J.M.M.
SCALE	1"=10'
PROJECT NUMBER	80-147-20

FLAHERTY GRAVARA ASSOCIATES PC

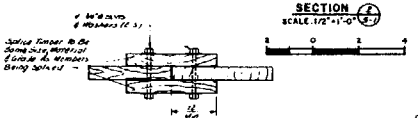
L-2


PILE LOCATION AND BRACING PLAN
SCALE 1/8"=1'-0"
TEST PILE: T.R. (See Plan For Location)
HARBOR SIDE ELEVATION
SCALE 1/2"=1'-0"
SECTION
SCALE 3/8"=1'-0"
Notes
1 Finish Grade Elevation Plus Or Minus From M.S.L.
2 Bay Cross Bracing Dimension Field Condition (Above Finish Grade)
3 See Dwgs S-2 & S-3 For Notes And Abbreviations Used
CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY
DOCK PLAN/ SECTIONS
C.T.B.
J.M.W.
R.K.W.
3/1/82
AS NOTED
S-1

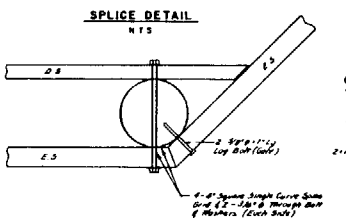
SHEET 3 OF 5



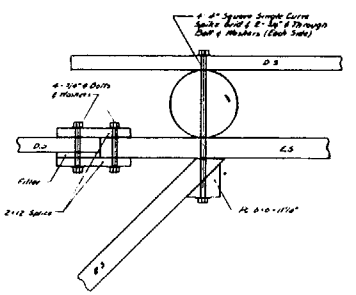
SECTION 1/S-1
SCALE: 1/2" = 1'-0"



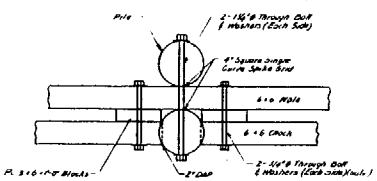
SPLICE DETAIL
N.T.S.



SECTION AT STRINGER CONNECTION - EL. 8.0±



SECTION AT STRINGER CONNECTION - EL 8.0±



DETAIL OF FENDER PILE
PLAN
SCALE: 1" = 1'-0"

MEMBER	ABBREV.	SIZE NS	FASTENER	PRESERVATIVE
SPLIT-PILE CAP	S.P.C.	4" x 14" (S4S)	(EXCEPT A WHERE NOTED)	C-CTS AWPA SPEC. P2-58
DECK STRINGER	D.S.	3" x 12" (S4S)	L & F	C-CTS AWPA SPEC. P2-58
END STRINGER	E.S.	4" x 12" (S4S)	B	W (CA-P5 " AWPA SPEC. P5-68
DECKING	DECK	3" x 10" (S4S)	E	DO
MALE-FENDER PILE	W-F.P.	8" x 8" (S4S)	SEE DETAIL	W (CA-P5 AWPA SPEC. P5-68
CONTINUOUS WHALE TIMBER	CW-T	12" x 12" (S4S)	D	C-CTS AWPA SPEC. P2-58
SINGLE BRACING	S.B.	3" x 12" (S4S)	C & B	DO
CROSS BRACING	C.B.	3" x 12" (S4S)	C & B	DO
2 BAYCROSS BRACING	C.B. 2	3" x 12" (S4S)	C & B	DO
HORIZONTAL BRACING	H.B.	3" x 12" (S4S)	C	DO
BLOCKING	BLK.	SEE DETAILS	A THRU G	C-CTS AWPA SPEC. P2-58
TIMBER SPLICE	TS	SEE DETAILS		WCCA-P5 " AWPA SPEC. P5-68
PILE	P	ASTM D673L-D35-70 CLASS "B" 25 TONS PER PILE	SEE DETAIL	A-CTS AWPA SPEC. P2-58
BATTER PILE	BP	DO	DO	DO
FENDER PILE	FP	SEE DETAILS	SEE DETAIL	WLCA-P5 " AWPA SPEC P5-68*

(-CTS - CREOSOTE COAL TAR SOLUTION AWPA SPEC. P2-58-RETENTION. SOUTHERN PINE...7LBS./FT.³ DOUGLAS FIR...14 LBS./FT.³

WLCA P5* - WOLMAN LCA PRESERVATIVE SALTS AWPA SPEC. P5-68

(A) - 2" UHP x4-1/4" SQUARE FLAT SPIKE GRID (2-3/4"ø THROUGH BOLT & WASHERS (EACH SIDE)

(B) - 4" UHP x4-1/4" SQUARE SINGLE CURVE SPIKE GRID 2-3/4"ø THROUGH BOLT & WASHERS (EACH SIDE)

(C) SAME AS B. ONE (1) SIDE ONLY

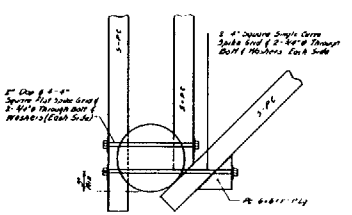
(D) SAME AS B x 2 1"ø x 24" LONG DRIFT PINS

(E) 2-40D x 6" LONG WIRE SPIKES PER CONNECTION TO DECK STRINGER

(F) 1/2 THE QUANTITIES AS B

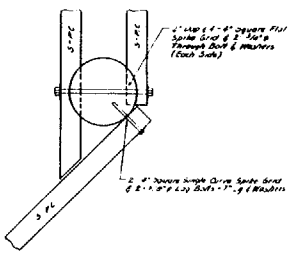
(G) SLAB 1" x 12" (2) DETAIL AS 40D x 6" LONG WIRE SPIKES

* - MARINE SALT WATER USE-RETENTION 8.0 LBS. OF OXIDE/FT.³



SECTION AT SPLIT PILE CAP CONNECTION - EL 5.0±

DETAIL A
SCALE: 1 1/2" = 1'-0"



SECTION AT SPLIT PILE CAP CONNECTION - EL 5.0±

DETAIL B
SCALE: 1 1/2" = 1'-0"

ABBREVIATIONS

T.O.W.	TOP OF WALL
B.O.T.	BOTTOM OF TIMBER
ELEV. - EL. - E.	ELEVATION
M.H.W.	MEAN HIGH WATER
M.L.W.	MEAN LOW WATER
B.P.	BATTER PILE
W.P.	WORK POINT
T.P.	TOP OF PILE
B.F.	BOTTOM OF FOOTING
N.S.	NEAR SIDE
F.S.	FAR SIDE
℄	CENTER LINE
WWF	WELDED WIRE FABRIC
T.S.	TOP OF STEEL
H	HORIZONTAL
V	VERTICAL
EF	EACH FACE
EW	EACH WAY
O.C.	ON CENTER
TYP.	TYPICAL

CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY

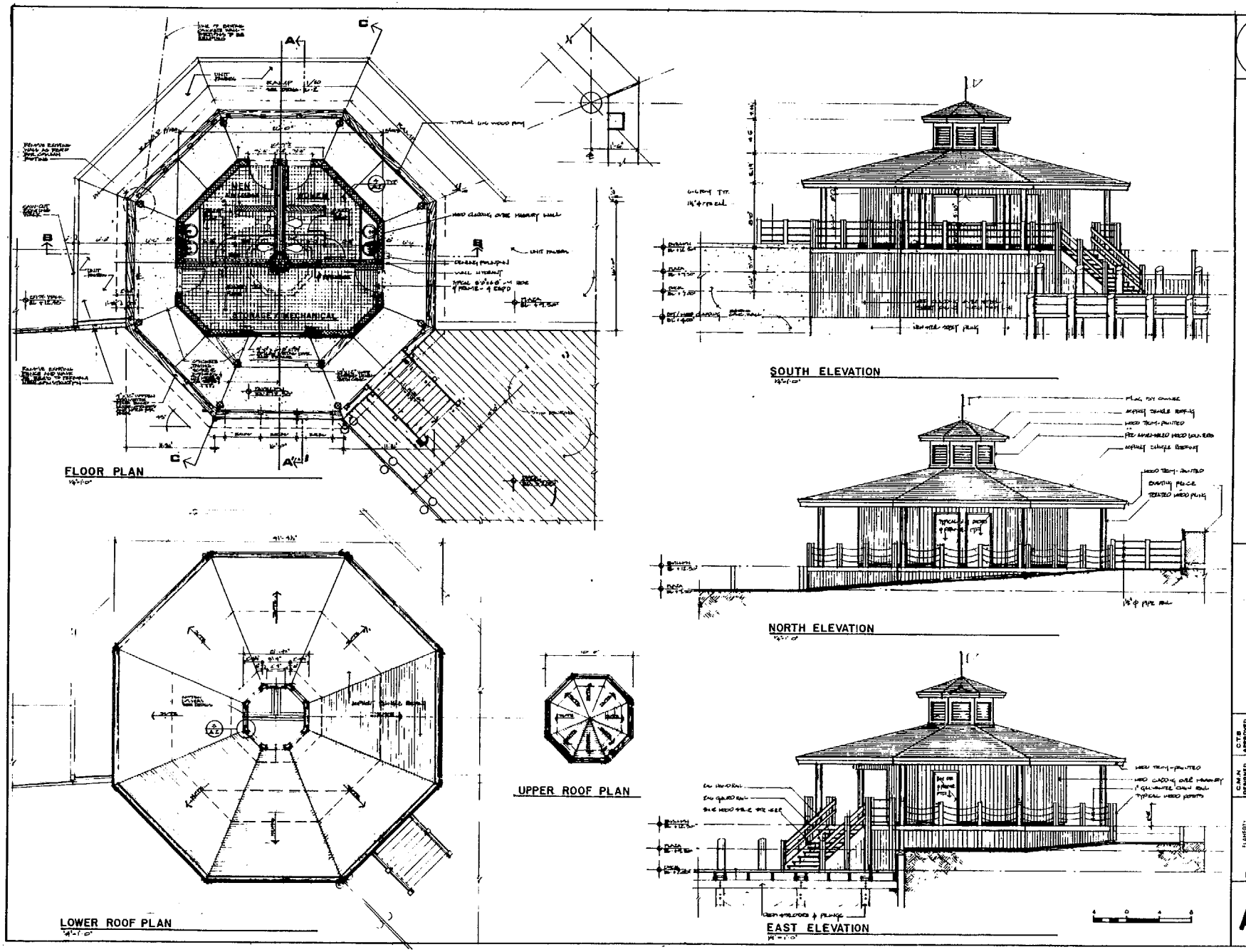
SHEET 4 OF 5

DOCK SECTIONS/ DETAILS

DESIGNED	D.K.S.
DRAWN	J.M.W.
CHECKED	R.K.W.
	C.T.B.
	3/1/82
	AS NOTED
	BO-47-20

PROJECT NUMBER

S-2



CITY (BRADY'S) DOCK RECONSTRUCTION
CITY OF BAYONNE, NEW JERSEY

SHEET 5 OF 5

FLOOR PLAN/
ELEVATIONS

C.M.N. DESIGNED	C.T.B. APPROVED
M.W. DRAWN	3/1/82 DATE
J.M.M. CHECKED	1/4"=1'-0" SCALE
PROJECT NUMBER	80-47-20

FLEMERTY GRAVARI ASSOCIATES PC

A-1