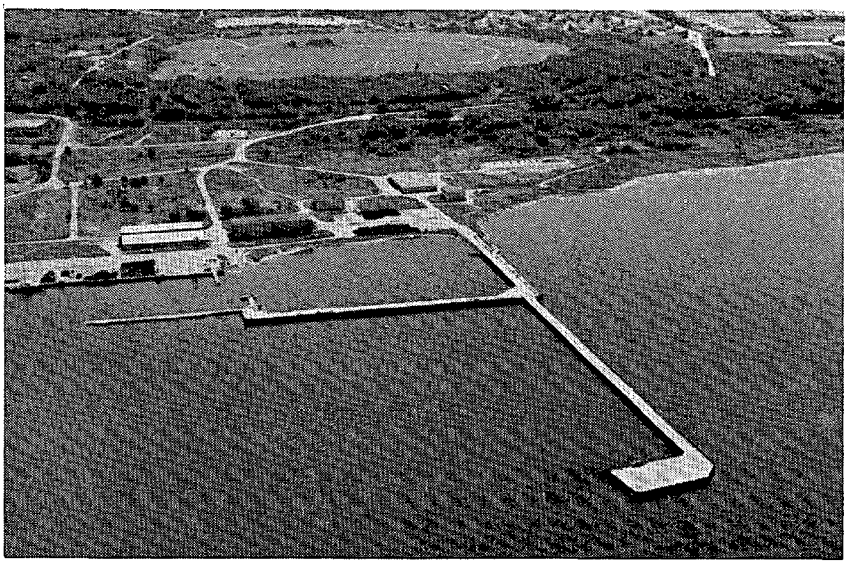
MELVILLE CONDITION SURVEY

prepared for

Rhode Island Port Authority and Economic Development Corporation



MAY, 1982

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July 1, 1982

Mr. Edward J. Spinard
Rhode Island Port Authority and
Economic Development Corporation
Seven Jackson Walkway
Providence, Rhode Island 02903

RE: Melville Condition Survey
CEM No. 4001

Dear Ted:

We are pleased to submit this report of our findings relative to the existing conditions of the waterfront facilities and utilities at Melville, Rhode Island. The report is submitted in accordance with our contract dated 1 December 1981 for the work. As you are aware, the weather did not cooperate, and we had a difficult time scheduling the diving and ultrasonic work. Credit, therefore, must go to Maguire's PE ("cold weather")/dive team for delivery of this report within the time limit set forth in the contract. The following summarizes our findings:

In general, we found the major waterfront structures to be in very good structural condition in view of their age. The piers, of course, showed the effects of "wear and tear" from use and weathering, however, we consider this damage to be minor. With the exception of a few damaged piles on the FBM pier, major rehabilitation does not appear necessary prior to reutilization.

The bulkhead at the former Fuel and Net Depot did not fare as well. We found large holes in the steel sheetpiles in the splash zone and our ultrasonic testing exhibited the common characteristics of steel piles in advanced stages of corrosion. It is only a matter of time (perhaps a few years or so) before the sheetpile sufficiently weakens in the splash zone so that major distortion occurs. The will be accelerated by the increased activity on the waterfront resulting from reuse.

Utilities at the site were found to be in generally poor condition. The water system is reported to be very old and increased usage will most probably result in frequent breaks and leaks. The system of storm sewers is inadequate for all but small storms. This is of minimum consequence, however, since future development can utilize surface channels for runoff. Site sanitary sewage is dependent on the existing Navy force main extending along the Defense Access Highway (Burma Road). We understand that you have reached a tentative agreement with the Navy regarding capacities.

We trust that you will find this report of great benefit for your work. As usual, we enjoyed an excellent working relationship with you and your staff. We repeat our commitment to meet at your request with any potential developers to discuss the salient points of our work.

Thank you for being a most professional client.

Very truly yours,

CE MAGUIRE, INC.

Victor V. Calabretta, P.E.
Assistant Vice President
Manager, Civil & Marine Division

VVC:tmt

MELVILLE CONDITION SURVEY

INTRODUCTION

Authority

This study has been accomplished by CE Maguire, Inc. under contract with the Rhode Island Port Authority and Economic Development Corporation. The preparation of this report was financed in part by funds from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Deparment of Commerce, administered by the Energy Office, EXECUTIVE DEPARTMENT, GOVERNOR'S OFFICE, STATE OF RHODE ISLAND.

Scope

The purpose of this study is to provide the Rhode Island Port Authority and Economic Development Corp with documentation which summarizes the present condition of the Melville Waterfront Facilities. The findings of this survey will be used in conjunction with the purchase and sale of the Melville facilities from the U.S. Government to the State of Rhode Island and to provide current data to potential development groups. The Melville site was classified by the U.S. Government surplus in 1974 and has had minimum occupancy by the military since that time. As part of this study the followind was undertaken:

- Visual inspection survey of all the waterfront facilities both above and below the water by CE Maguire engineering/diver staff.

- Ultra Sonic measurement of the steel sheetpile bulkhead

- Structural Analysis of the piers and bulkhead.

- Analysis of existing sewage system.

- Field Investigation and Analysis of the existing storm water drainage sewer.

- Analysis of the existing water distribution system.

- Remedial Repair Analysis of all waterfront structures to include required improvements to the facilities to accommodate development scenarios.

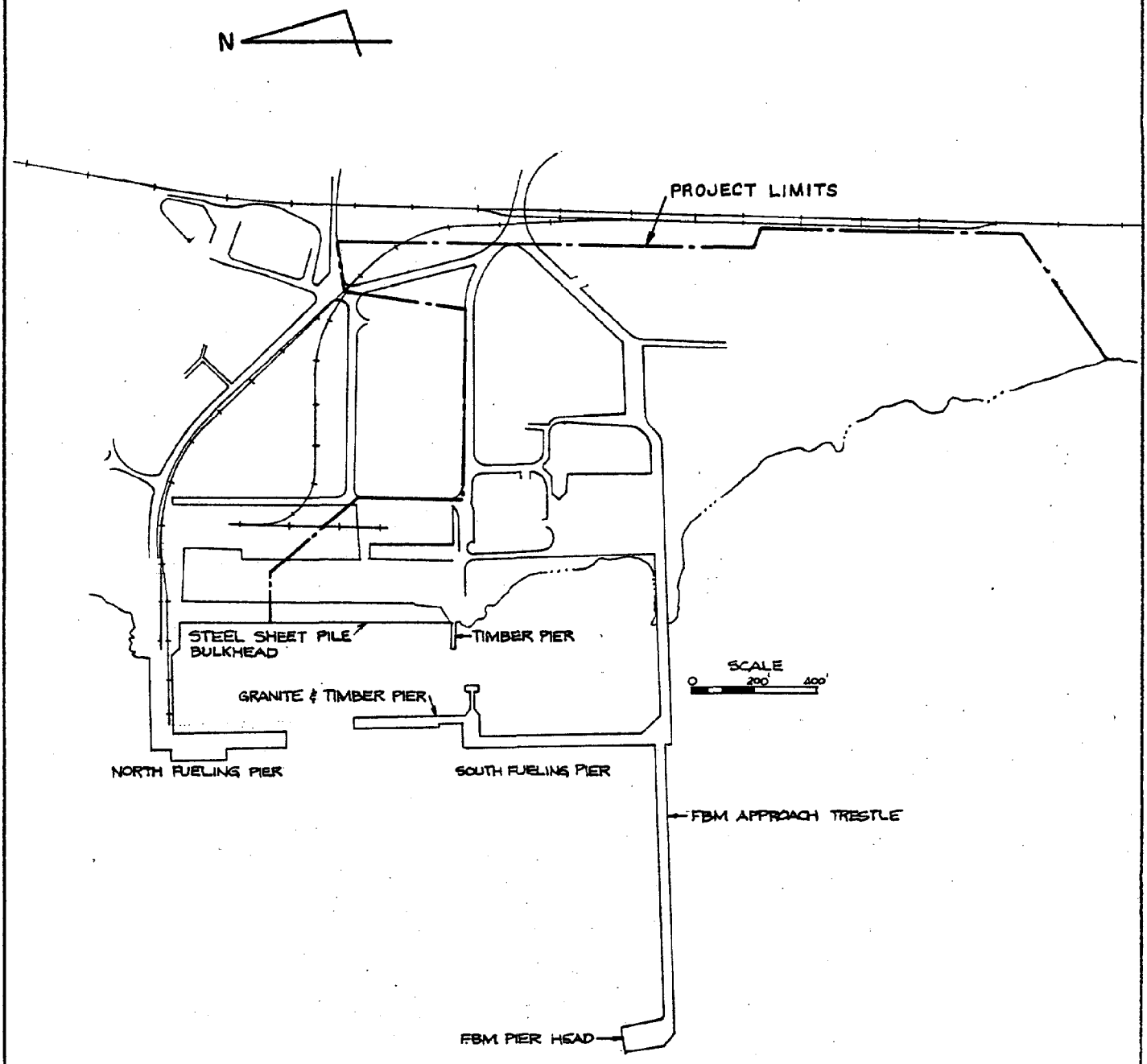
- Hydrographic Survey which includes compilation of existing hydrographic information and new data submitted by CE Maguire hydrographic group.

Site Description

The project site is shown on Figure No. 1 and consists of approximately 40 acres of waterfront properties located in Portsmouth, Rhode Island. The site is bordered by the east passage of Narragensett Bay on the North and West, Penn Central Railroad right-of-way to the east, the Navy's remaining Defense Fuel Supply Agency, to the North and the Navy to the south.

The land area is relatively flat with an average elevation of 11.5 ft. above mean low water. There are several abandoned buildings and a network of paved and unpaved roadways.

The waterfront facilities consist of an L shape concrete deck timber pile pier (South Fueling Pier), 550 linear feet of steel sheetpile with an attached 80 feet of timber pier, and a dog-leg shaped pier and access trestle (FBM Replenishment Pier) which was designed for servicing of submarine tenders.



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MELVILLE CONDITION SURVEY

GENERAL PLAN

DATE	FIGURE NO.
MAY, 1982	1

WATERFRONT FACILITIES

WATERFRONT CONDITION SURVEY

General: The condition survey generally consisted of a visual inspection above and below the water surface of the following structures:

- The FBM Pier and Access Trestle
- The South Fueling Pier to include the attached Granite & Timber Pier
- The Steel Sheetpile Bulkhead

To augment the field investigation, a data search was conducted of available waterfront construction and repair documents. Measurement of the degree of metal corrosion was made by ultrasonic equipment. Field diver personnel were mobilized and subaqueous work commenced on March 22 and 23 1982. Above water investigations were conducted on January 7 and March 6, 7 & 13 1982.

Data Search: A search was conducted at the Newport Naval Base Public Works Office files for design and construction drawings of the waterfront facilities at the Melville Fuel Depot and FBM Replenishment Facility. Melville records are maintained at the Newport Navy Base. In addition, Maguire archives were searched. Maguire was the Engineer or record for many of the Navy construction projects at Melville.

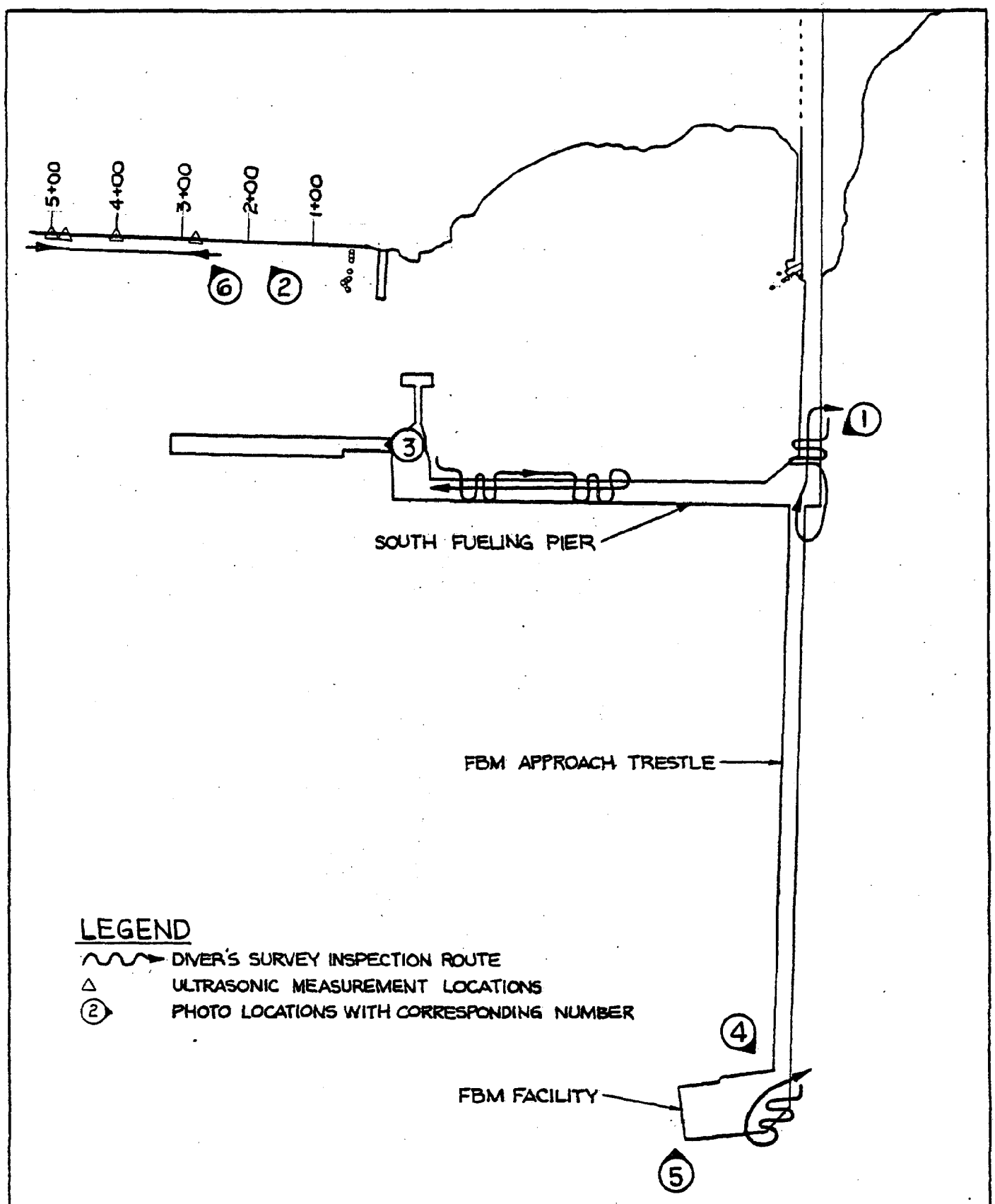
Methodology: To systematically evaluate the various waterfront components, the facility was broken into three major components with a system of baselines in order to coordinate field observations with the text. Figure No. 1 delineates those components and baselines.

1. Visual Inspection: Inspection of all pier superstructures and bulkheads was completed on January 7 by members of the inspection team from CE Maguire, Inc. Inspection of wharf fixtures, deck surfaces, bollards and cleats were accomplished from topside. The condition survey below decks was completed as March 6, 7 and 13 using an eight ft pram for access. Supporting piles, pile caps, stringers cross bracing and the above water sections of the bulkhead were surveyed on a bent by bent bases utilizing preprinted forms, with one form assigned to each pile bent. The field notes of this portion of the survey are included in Appendix B to this report. With the exception of one-half of the north/south leg of the fueling pier all surveys were conducted at or near low tides. The survey of the above water portions of the steel bulkheads and pier superstructure consisted of visual inspection and, where appropriate, ultrasonic testing. Areas which were coated with marine growth were scraped to the base material and examined. Timber members were examined for breakage, rot and biological attack. Particular attention was paid to the integrity of connections and fasteners. Concrete components were inspected for stress cracks, exposed reinforcing, spalling and staining.

2. Diver Inspection: The underwater inspection of the Melville facilities was completed on March 24, by one of CE Maguire's dive teams. Figure No. 2 indicates the routes which divers followed during the survey. The team consisted of an above water diving supervisor and a two man below water team. The survey consisted of visual inspection of the type of construction materials used and the physical condition of the structures. Ultrasonic testing was accomplished at selected areas. Divers coordinated their inspection with previously established baselines via communication with the topside dive supervisor. Selected concrete piles were scraped of marine growth and checked for stress cracks, spalling, staining or exposed reinforcing.

3. Ultrasonic Testing: Locations for ultrasonic testing of the steel sheetpile bulkhead were chosen by engineers from CE Maguire, Inc., after analysis of the collected field data. Figure No. 2 shows locations which were selected and tested utilizing a Knautkramer-Branson Model USL 38 ultrasonic portable flaw detector/thickness instrument. Tests were accomplished on March 24 in conjunction with the under-water divers survey.

Divers prepared the below water test locations using hammers, scrapers and wire brushes. Above water personnel monitored the dives using tag lines and a pre-established set of signals and the above water thickness gauge monitor



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MELVILLE CONDITION SURVEY

LOCATION PLAN

DATE MAY, 1982

FIGURE NO. 2

and readout. All readings were recorded and have been included in this report.

4. Hydrographic Surveys: As part of this project, CE Maguire conducted hydrographic surveys of the inner basin at the south fueling pier and the west berth of that pier. These surveys were combined with previous hydrographic surveys conducted by Maguire in 1980 and existing Navy sounding records to develop an overall map of existing water depths. The results of the hydrographic survey analysis are presented on the drawing entitled "Melville Condition Survey, Waterfront Existing Conditions" and included as Drawing No. 1 of this report.

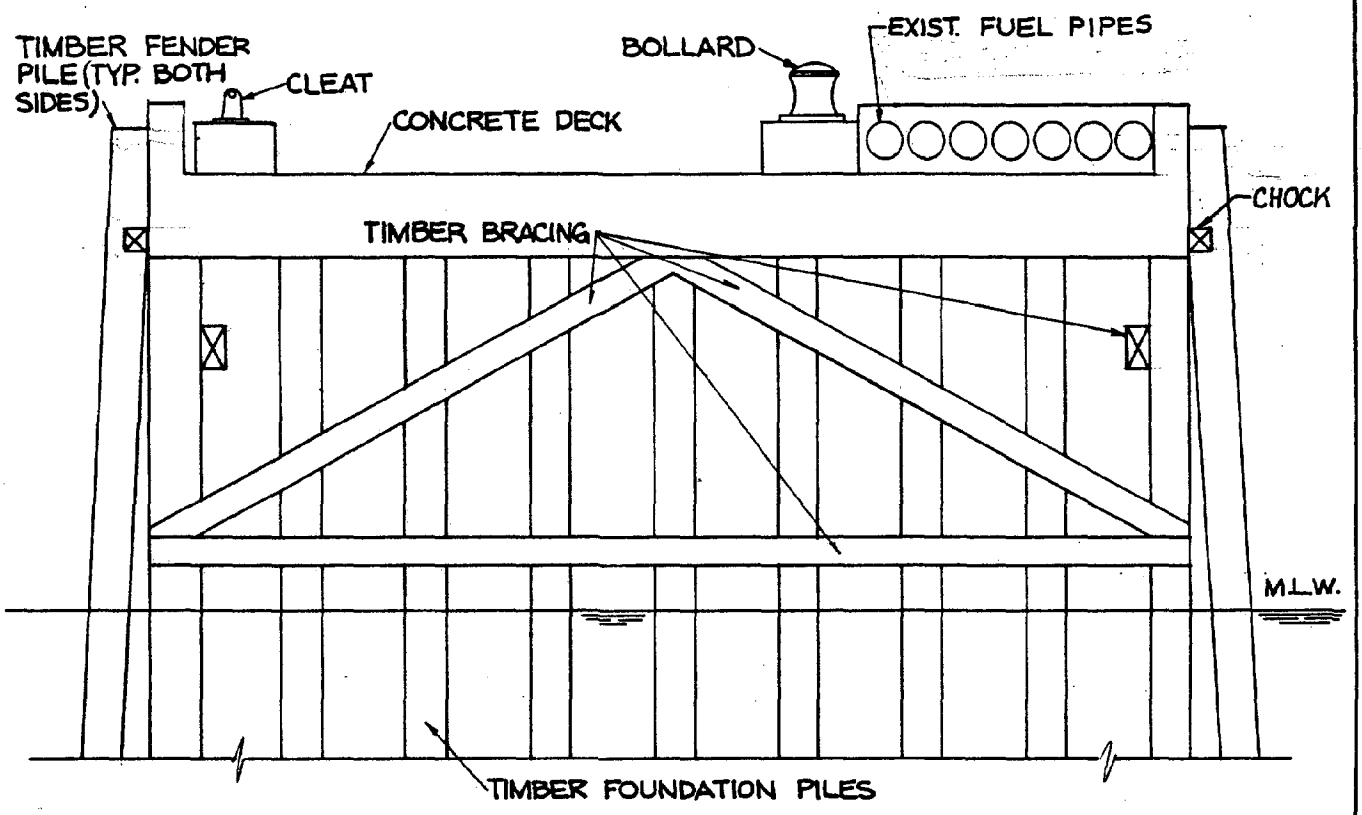
   The soundings were performed on March 3, 1982 using a Raytheon DE 19B continuous recording fathometer mounted on Maguire's 16 foot survey boat. The soundings were conducted on lines parallel to the piers utilizing premarked ranges and stations on the piers. The fathometer was calibrated at the beginning and end of the survey. Tide adjustments were made based on reading of a tide board mounted to the south fueling pier and tied into the project benchmark by a closed level run.

FINDINGS

South Fueling Piers: In general the South Fueling Pier appeared be be in good condition. Figure No. 3 indicates the typical construction of the south fueling pier. The south fueling pier's superstructure is constructed of a cast-in-place concrete deck supported on timber piles. The timber piles are in rows (bents), each row spaced approximately ten feet apart. The piles are braced laterally by diagonal timbers and have a horizontal timber brace at low water. In addition, a batter pile is incorporated in each bent. The batter piles alternate from one side of the pier to the other at each bent. As can be seen from Figure No. 3 the majority of the deck structure includes deck fittings and the fuel distribution system.

Fittings (bollards and cleats) on the South Fueling Pier will require some rehabilitation. The majority of the fittings (14 out of 25) require concrete repairs and sealing to maintain their long term structural integrity. Presently, the reinforced concrete pedestals which support the fittings show signs of cracking and spalling. In any event, it may be desirable to relocate the bollards at the edge of the pier once the pipelines are removed.

According to Navy records, the most recent rehabilitation of the south fueling pier was performed in 1955 when a timber deck was removed and the existing concrete deck placed on the original piles (Maguire design). Based on the condition survey, it is speculated that since that time some fender system repairs have been performed, however there are no Navy records indicating this.



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MELVILLE CONDITION SURVEY

SOUTH FUELING PIER
TYPICAL SECTION

DATE	FIGURE NO.
MAY 1982	3

The support piles showed some checking and splintering at the high waterline, however, the splintering appears to be surficial. The piles were probed with a knife and were found to be sound beneath the splintering. With the exception of a very few random piles noted in the field notes of the survey, all structural piles appeared to be in good condition. Above the waterline the coal tar preservative treatment was very substantial and is most probably still in service. Approximately 25 percent of the timber bracing is damaged or missing. In most cases the timber has deteriorated over time especially in the tide zone and is either split or rotted. (See photo 1) Remaining bracing was probed with a knife and was found to be in sound condition. This indicates that a majority of the damage occurred at the bolts either by rotting of the timber or corrosion of the bolts. In the tide zone, piles and timber are covered by marine growth. All visible damage was noted, however, marine growth may have covered additional damage. The underside of the concrete deck appeared in excellent condition. There was very little cracking or spalling. The timber pile fender system remains over a majority of the pier. Approximately 30% of the timber fender piles show some damage, primarily rot at the top of the pile above the wale. In some areas there were timber piles missing and it was noted that a small percentage of the fender piles were untreated. On the west face of the north/south leg of the fueling pier, there were two areas where the number of fender piles were doubled (i.e., an additional fender pile between bents.) These fender piles appeared to be newer and

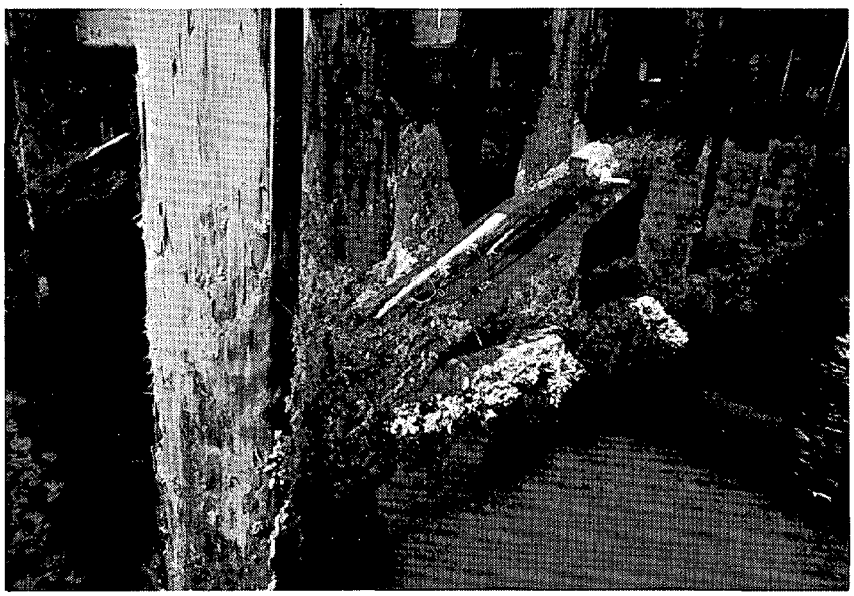


PHOTO 1 - SPLINTERED TIMBER BRACING AT THE SOUTH FUELING PIER

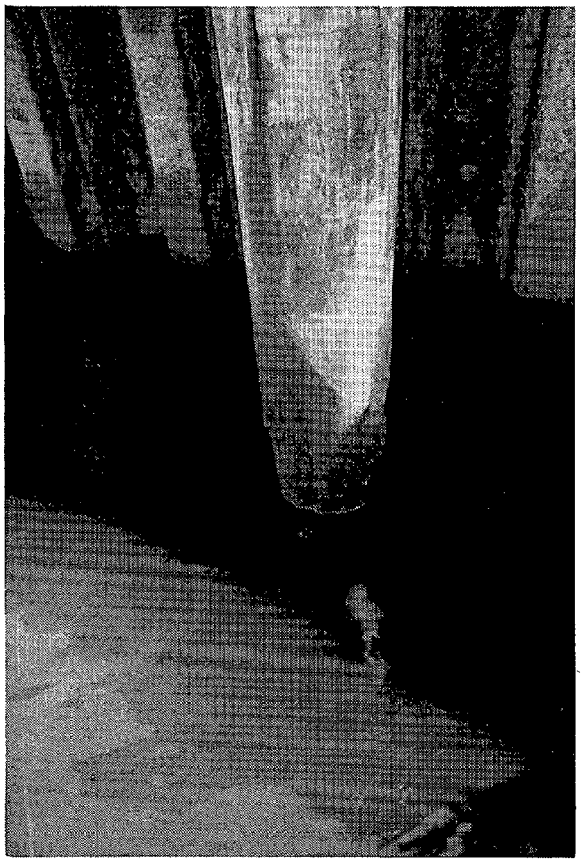


PHOTO 2 - MARINE BORER ATTACK OF TIMBER FENDER PILE

indicative of a recent repair. Untreated fender piles showed marine borer activity at low water; the treated piles did not. (See photo 2)

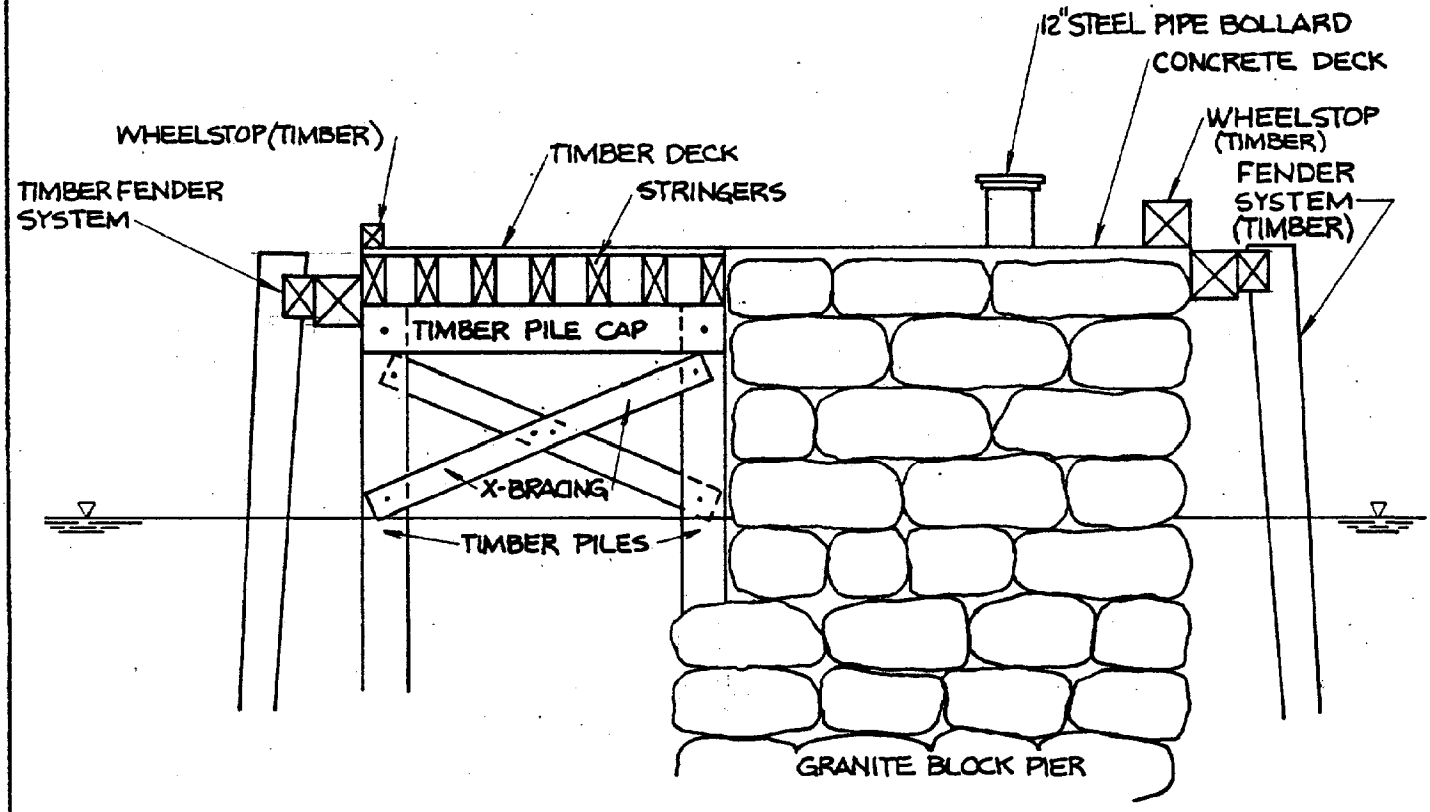
The timber support piles below water were also found to be in excellent condition, with moderate to heavy marine growth on all piles. Particular attention was paid to those areas which are normally subject to marine borer attack (i.e., the mudline and splash area). Piles were coated with moderate to heavy coatings of marine growth and had to be scraped for inspection. Piles were checked for damage and borer attack. No signs of deterioration or attack were found. In addition piles were found to still have a heavy coating of the original creosote tar treatment. Bottom conditions were relatively flat with no debris and heavy deposits of marine mussels and starfish.

Several fender piles revealed signs of marine borer attack at the waterline and mudline. Piles showed as much as a 2 inch reduction in cross sectional diameter. Note that borer attack was noted in fender piles only and not in foundation piles. A probable explanation is that the foundation piles were treated with either a different type of preservative or higher concentration of the preservative.

Granite and Timber Pier: The granite block/timber pier located at the end of the South Fueling Pier requires moderate rehabilitation. (See photo 3) Figure No. 4 indicates the typical construction of the Pier. The concrete cap which provides a portion of the deck area is cracked and shows signs of movement. The timber pile supported, timber deck portion of the pier is severely deteriorated and requires

PHOTO 3 - GRANITE PIER LOCATED AT THE NORTH END OF THE SOUTH FUELING PIER. NOTE THE DETERIORATED TIMBER SECTION AND THE STEEL PIPE BOLLARDS

PHOTO 4 - SPALLED CONCRETE DECK AT THE FBM PIER NOTE SPLIT PIPE AT LOWER EDGE OF SPALL



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MELVILLE CONDITION SURVEY	
GRANITE & TIMBER PIER-TYP. SECTION	
DATE MAY, 1982	FIGURE NO. 4

almost total rehabilitation. The majority of the support piles can be reused. Fittings for this pier consist of 6 - 12 inch diameter steel pipes which were fit vertically between the granite blocks. The pipes (bollards) are located along the centerline of the granite section of the pier. The pipes appear to be adequate for berthing small vessels, but their capacities (allowable line pulls) cannot be accurately calculated because of the unknown pipe embedment lengths and extent or existence of any additional construction techniques used during their placement. No design drawings were located for this area.

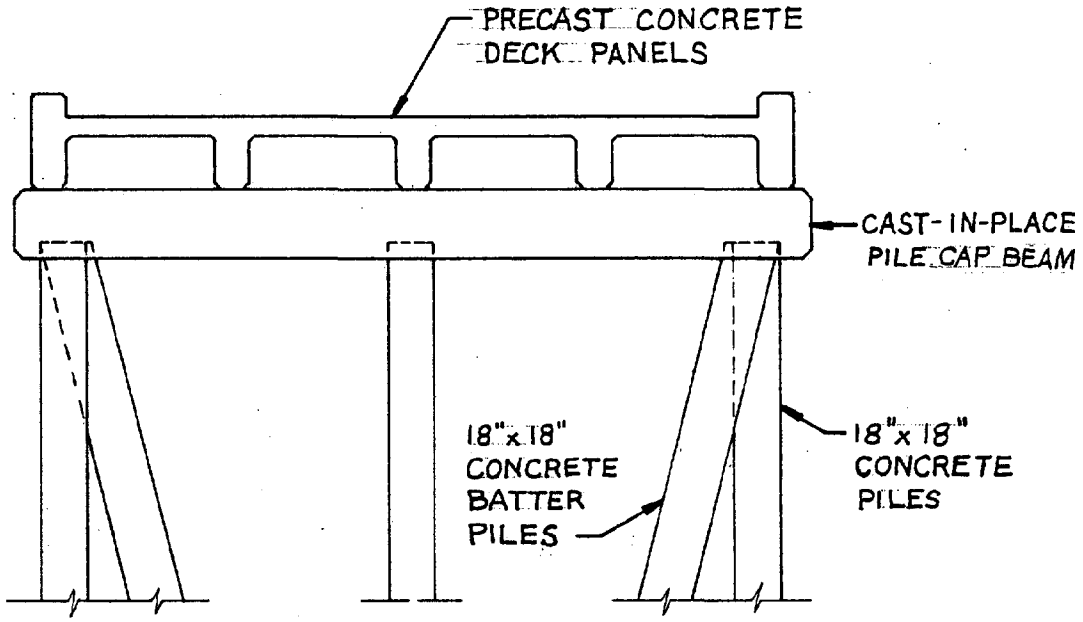
FBM Pier & Access Trestle: The FBM pier appeared in excellent condition except for isolated damage as noted in the field notes. There are three small areas on the deck which require minor concrete repairs one of which was most probably caused by the freezing and expansion of an encased steel conduit. See photo 4.

Two similar types of construction are utilized in the design of the FBM Replenishment pier. The access trestle which connects the FBM Pier to the South Fueling Pier is constructed of precast concrete deck panels which are set on cast-in-place pile cap beams. The beams provide the structural component which ties together the 5 (3 vertical, 2 battered) prestressed precast 18 inch square piles. There are no longitunal beams other than the precast deck panels. The FBM Pier Head is constructed of a cast in place reinforced concrete deck and pile cap beam. Piles are the same size and type as those used on the access trestle. Piles are spaced and battered in both

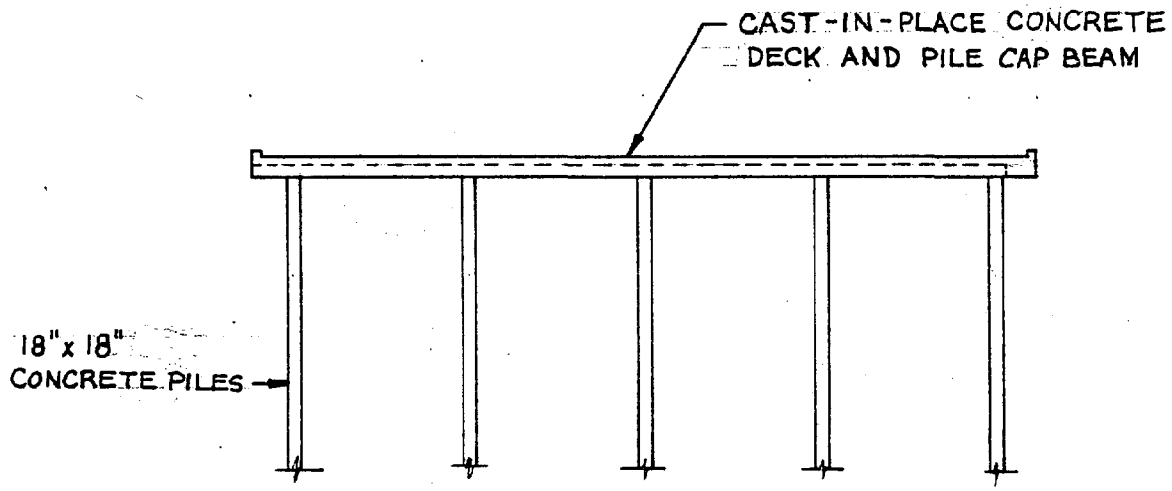
directions at various locations to provide strength both laterally and longitudinally. All bollards and cleats were found to be in excellent condition. Figure No. 5 indicates the typical construction of the FBM pier. Approximately six structural piles were found to have sustained significant damage apparently from external impact. (See Photo 5) In these cases, the piles are broken at their connection to the pile cap, the concrete cover gone and the reinforcing exposed and corroded. On approximately eight other piles, cracking or spalling was noted and the reinforcing was exposed and corroded. With the exception of these piles, the remainder of the pier looked in excellent condition.

Numerous concrete support piles were also inspected during the diver survey from the waterline to the mudline and found to be in excellent condition with moderate to heavy marine growth on all piles. Selected piles were scraped and inspected for signs of deterioration (i.e., cracks, spalls or staining). No signs of deterioration were observed below water on those piles inspected. Bottom conditions were relatively flat and clear of debris with heavy deposits of marine mussels and starfish.

Sheetpile Bulkhead: The condition of the steel sheetpile bulkhead is typically poor. Figure No. 6 presents a typical section of the steel sheetpile bulkhead and concrete cap. The concrete curb topside has suffered moderate damage (cracking and spalling). In addition, the underside of the cantilevered deck slab shows signs of deterioration and stress (cracking and spalling). The fender system along the



ACCESS TRESTLE



BATTER PILES ARE PRESENT AT NORTH END OF PIER

PIER HEAD

NOT TO SCALE

MELVILLE CONDITION SURVEY	
F.B.M. REPLENISHMENT PIER TYPICAL SECTION	
DATE MAY 1982	FIGURE NO. 5

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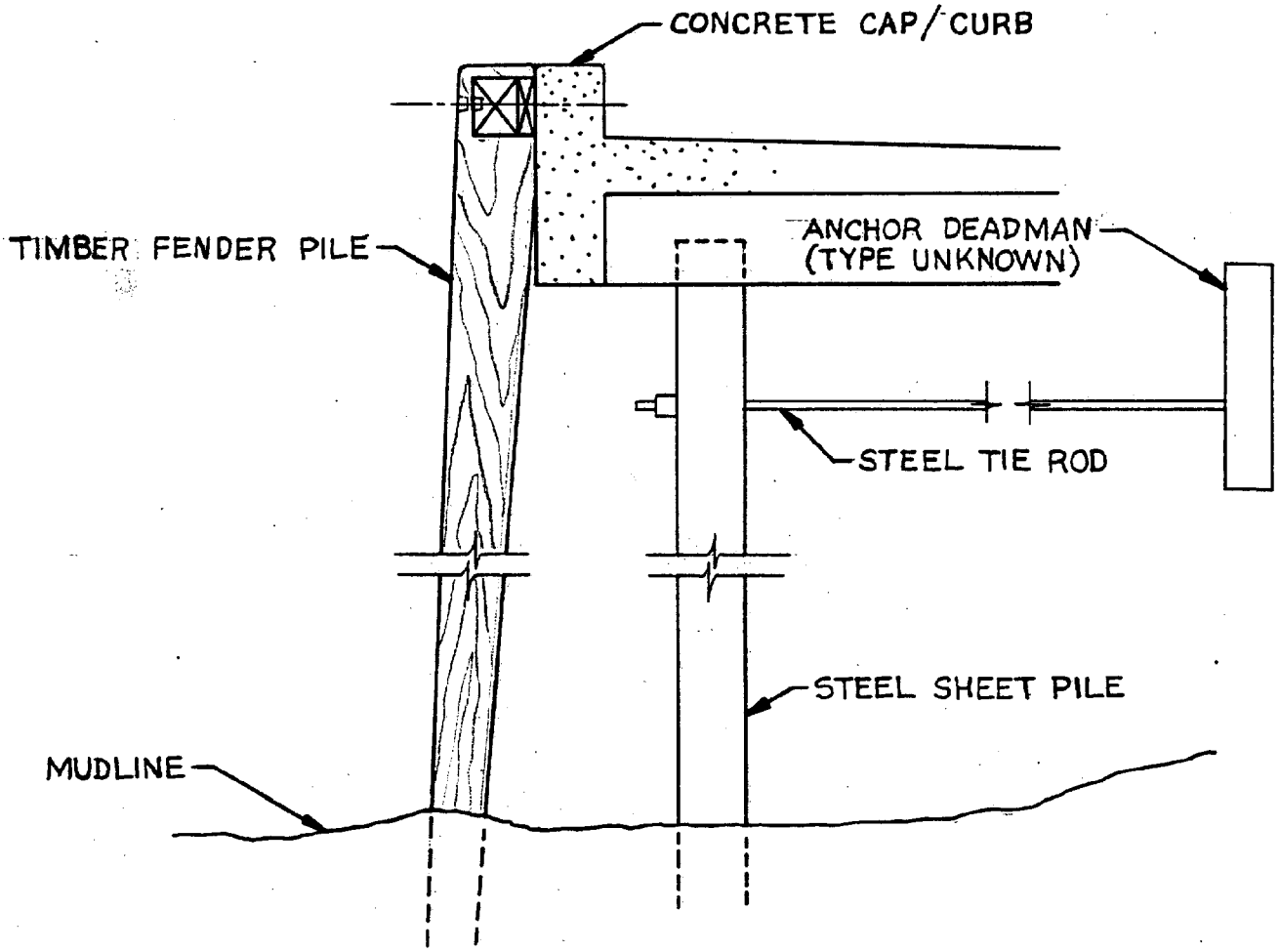

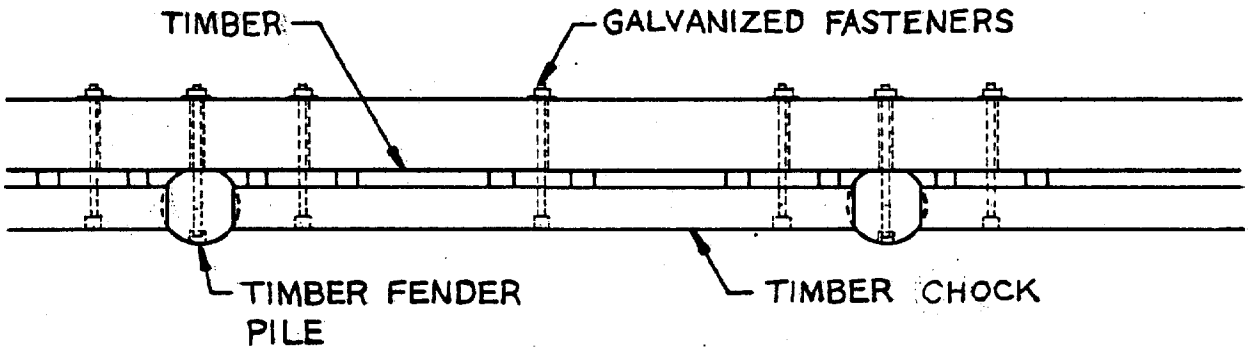

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MELVILLE CONDITION SURVEY	
TYPICAL FENDER SYSTEM & SHEETPILE BULKHEAD	
DATE MAY 1982	FIGURE NO. 6

bulkhead is almost non-existent and requires total replacement. Station 0+00 through 0+50 and station 3+50 through 5+75 were visually inspected during the diver inspection survey. Other bulkhead areas were blocked by berth vessels. The condition of the sheetpile bulkhead below water appeared to be fair with a light marine growth. Bottom conditions were somewhat steep at the base of the bulkhead with some light steel scrap scattered along the base of the bulkhead.

Inspection at the waterline (low tide) revealed a different set of conditions. The majority of the bulkhead exhibited advanced steel sheetpile deterioration with large holes in the outboard flange. See Photo 6. This common occurrence in older steel sheetpile bulkheads is caused by the continuous cyclic exposure to salt water and air (due to the continuous tidal fluctuations, wind and wave splash) which amplifies the oxidation (rusting) of the steel bulkhead. Deterioration of this type severely reduces the section modulus of the steel sheeting and therefore substantially reduces structural capability of the bulkhead. The few remaining fender piles revealed marine borer attack at the waterline. See photo 3.

Ultrasonic testing was performed at several locations along the bulkhead. The test results and profile locations are shown in Figure No. 7. During preparation for the ultrasonic testing, the steel bulkhead was scraped of existing marine growth and rust. In addition, a thick layer of black tar-like material which was thought to be the original protective coating material was still intact at the lower elevations of

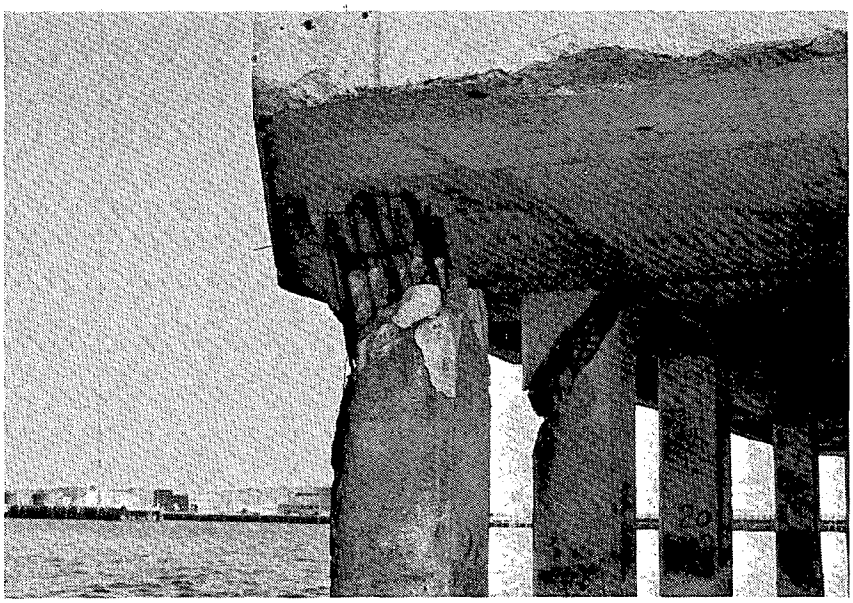


PHOTO 5 - DAMAGED CONCRETE PILES
OF THE FBM PIER HEAD

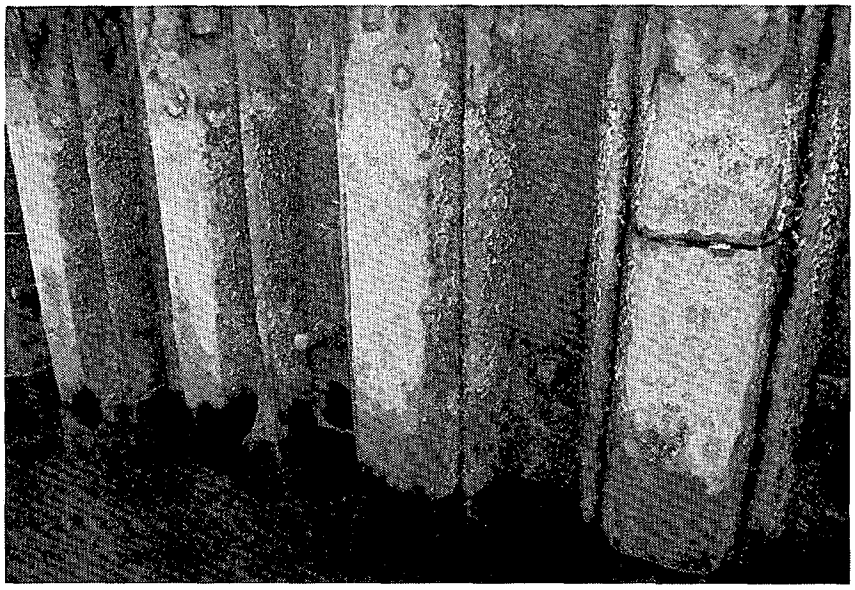
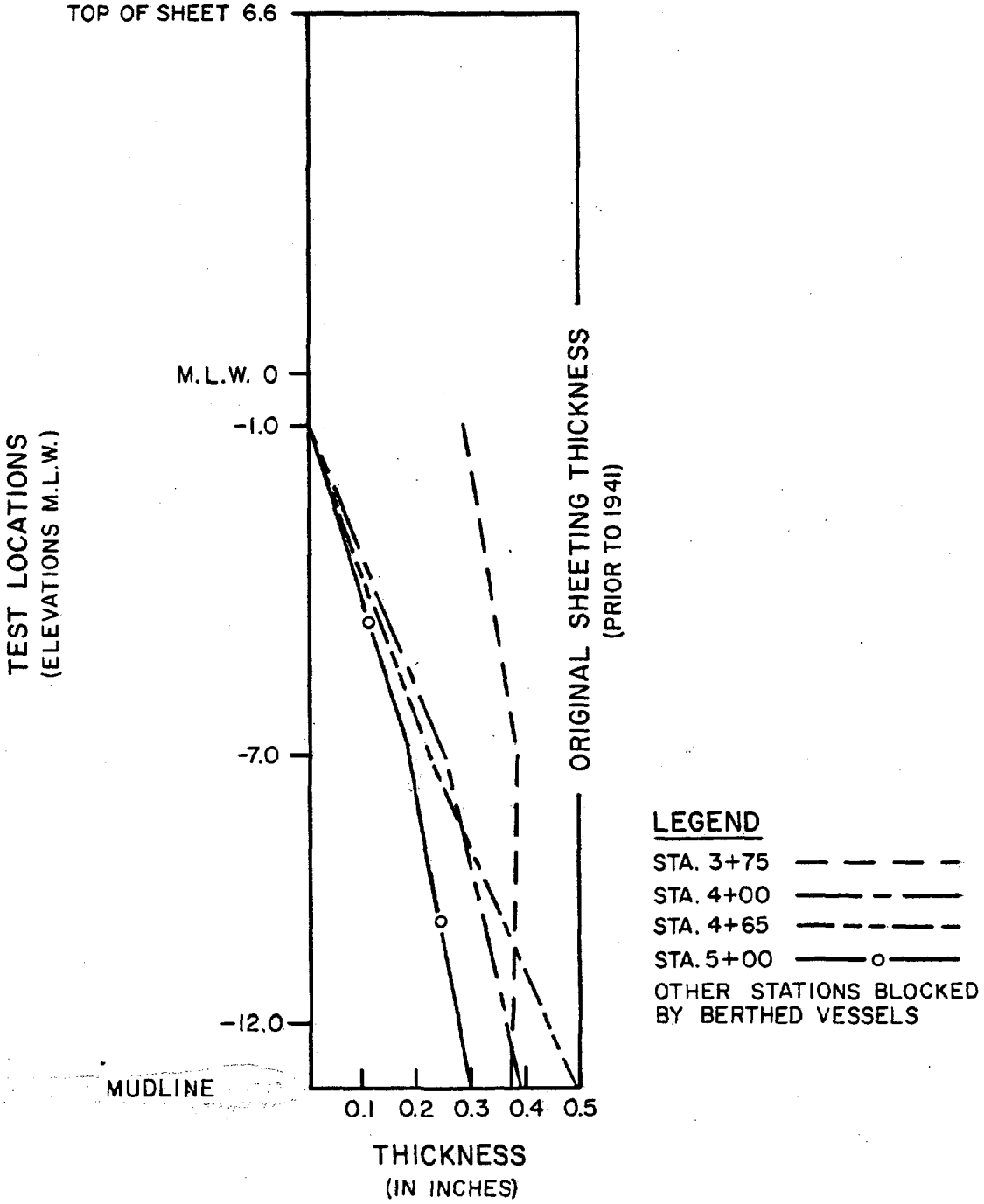


PHOTO 6 - DETERIORATED STEEL SHEETPILE BULKHEAD
NOTE HOLES AT THE WATERLINE
(PHOTO TAKEN AT LOW TIDE)



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MELVILLE CONDITION SURVEY	
ULTRASONIC THICKNESS TEST RESULTS	
DATE MAY, 1982	FIGURE NO. 7

the bulkhead. The results of the testing revealed typical deterioration curves for coated steel in salt water. As shown in Figure No. 7 the most severe reduction of material (steel) was from elevation +6 too MLW, or what is called the splash zone. Thickness measurements taken at or near the mudline showed significantly less reduction of material thickness.

Timber Pier: The timber pier located at the south end of the sheet-pile bulkhead is in poor condition. The timber decking, stringers and pile caps show moderate damage, primarily rot with the majority of the deck and superstructure requiring replacement. Several of the foundation piles are rotted and or split at the top, but may be reused with some design modification to the stringers and pile caps.

Pier Utilities: Pier utilities were inspected on all structures and were found to be either none existent or in poor condition. No costs were developed for replacement of pier utilities with the exception of fire protection which is addressed in the Utilities section of this report. It was assumed that developer would provide pier utilities based on his individual needs and user requirements.

Hydrographic Surveys: The soundings indicate a controlling depth at the entrance to the inner basin of 23 feet at Mean Low Water. Within the basin the controlling depth at the south fueling pier is 18 feet at Mean Low Water, and at the bulkhead, 17 feet at Mean Low Water. The outer berth of the south fueling pier has a controlling depth of 28 feet at Mean Low Water. Maguire's 1980 soundings showed a

controlling depth of 30 feet on the south side of the FBM pier and 40 feet on the north side. A deep hole exists on the north side of the FBM pier at approximately its mid-point; the hole has a depth of 50 feet at Mean Low Water. At the platform at the end of the FBM pier, the water depth is 40 feet at Mean Low Water. Based on available Navy information, supplemented by NOAA charts, the controlling depth of the access channel to the Melville fuel piers is 45 feet at Mean Low Water. Based on this information, it appears that the Melville piers afford one of the deepest natural terminals in Narragansett Bay.

As part of the hydrographic survey analysis, available sounding information was correlated in order to determine the amount of siltation which has occurred in the recent past. For this analysis, available Navy soundings taken in 1964 and in 1972 were utilized along with the Maguire 1980 soundings and the soundings taken for this project. In all instances where the sounding data overlapped, it was observed that water depths were the same. There is no record of any dredging projects during this period. It therefore appears that little or no siltation has occurred since 1964. Based on this observation, it is concluded that siltation at the site is negligible.

ANALYSIS OF WATERFRONT STRUCTURES

Based on the results of the waterfront condition surveys, an analysis was conducted to determine the structural integrity of the piers and the bulkhead. The purpose of the analysis was to estimate vertical and horizontal load capabilities of the piers and to estimate the remaining useful life of the structures. The remainder of this section presents the results of the analyses.

South Fueling Pier: The condition of the vertical load-carrying members (i.e., piles and the concrete deck) was found to be in very good condition. The piles showed some minor checking at the high water mark, however, this appeared to be surficial, with a majority of the sound pile remaining. No marine borer activity was observed on any structural piles. The concrete deck showed negligible signs of deterioration. Based on these observations, it appears that the south fueling pier is still capable of accommodating the standard truckloads for which it was originally designed. This corresponds to an AASHTO loading of HS 20. The pier can also most probably support light crane loads, however, the concentrated loads of outrigger pads should be distributed by means of spreaders.

The horizontal load capabilities of the south fueling pier are somewhat diminished due to the deterioration of the bracing system. In general, however, the batter piles serve to carry a majority of the horizontal load. The bracing serves to stiffen the bent and distribute the load so that the bent performs as one unit. A nominal

reduction of 20% would be a reasonable adjustment of the original design loads. Typical lateral loads for this type pier design are in the range of 2200 lbs. per linear foot per each side (NAVFAC p-272 Definitive Design Drawings) they should therefore be reduced to on the order of 1800 lbs. per linear foot. The original design loads for the mooring fittings were recovered during the data search of the Navy's Public Works files in Newport. Mooring fitting loads were taken from the Navy's drawing No. 662506 "Rehabilitation of Fuel Piers". Based on examination and analysis of the fitting foundations, the allowable loads should be reduced, due to the poor condition of the concrete support pedestals on which the fittings are mounted. In their present condition, a conservative reduction of 50% would provide ample mooring facilities for commercial fishing vessels but would require rehabilitation for larger ships.

FITTING LOADS

	As Designed	50% Reduction
Bollards @30° with horizontal	70,000 lbs.	35,000 lbs.
Low Double Bits	60,000 lbs.	30,000 lbs.
30" Cleats	20,000 lbs.	10,000 lbs.

FBM PIER: No design load data was recovered during the document search for the FBM Replenishment Pier, some soil profiles and design drawings were obtained from the Navy's Public Works files. Typical pier design data from the Navy's P-272 Definitive Design Drawings indicate allowable vertical loadings are in the rage of HS-20 wheel loads. The original design function of the access trestle was to

provide accessability to the FBM Pier Head for both vehicle traffic carrying supplies and a raceway for utilities. Therefore, the access threstle was not designed to provide any lateral resistance other than those forces from wind and waves. Lateral loads for the FBM access threstle are limited due to the available number of piles per bent to resist uplit and the lack of longitunial beams to transfer loads between pile bents. Pile uplift is one of the structural components which is used to provide resistance to horizontal (lateral) loads such as berthing or mooring of a vessel. The precast concrete concrete deck slabs which span the 15' pile bents do not provide the structural component required to transfer normal berthing impact loads to the foundation piles. Substantial structural modifications would be required in order to provide berthing capabilities along either side of the access trestle.

Steel Sheetpile Bulkhead: Detailed examination and analysis of the field data requires load restrictions be applied to the sheetpile bulkhead area. The advance deterioration of the steel sheetpile sections, requires that deck loads be limited to pedestrian and light moving traffic loads in the immediate area of the bulkhead face. All new construction should be restricted from the bulkhead's area of influence (approximately 45 feet measured from the bulkhead face) until permanent repairs are made. Factors which have prevented earlier failure of the bulkhead system are; the remaining steel interlocks, webs, and inside flange faces of the sheetpile; the 6" reinforced concrete deck slab; the limited present use; and the oversized steel sheeting which originally provided heavy surcharge load capacities for the Navys submarine net storage and repair facilities.

REMEDIAL MEASURES

Waterfront: In order to develop the scope, extent and budget costs for rehabilitation of the waterfront facilities, particularly in the case of the Melville facilities where remedial structural repairs are not urgent, it is necessary to know the intended reuse of the facilities. Clearly, the physical needs to berth small fishing craft, for example, would not be as extensive as the needs of a large cargo port with associated cranes, heavy trucks and relatively large fendering loads. For this reason, the scope of work for this evaluation included the establishment of potential development scenarios. Remedial measures were then analyzed in relation to the rehabilitation and upgrading necessary to prepare the site for the typical development.

The original project scope proposed three potential scenarios:

1. Fishing Port,
2. Commercial Cargo Port, and
3. Bulk Terminal

During the early course of the study, the Rhode Island Port Authority had narrowed the list of potential developers and was in negotiations with the most probable candidate. For this reason, the commercial cargo port scenario was deleted and a scenario similar to the probable development inserted. The commercial cargo port was deleted because it presented the least probability of implementation for the following reasons:

1. The narrow piers are not conducive to efficient cargo handling operations;

2. Numerous facilities are in existence throughout the Bay to accommodate existing demands; and

3. Market projections do not indicate a major future demand for additional facilities beyond existing regional capabilities.

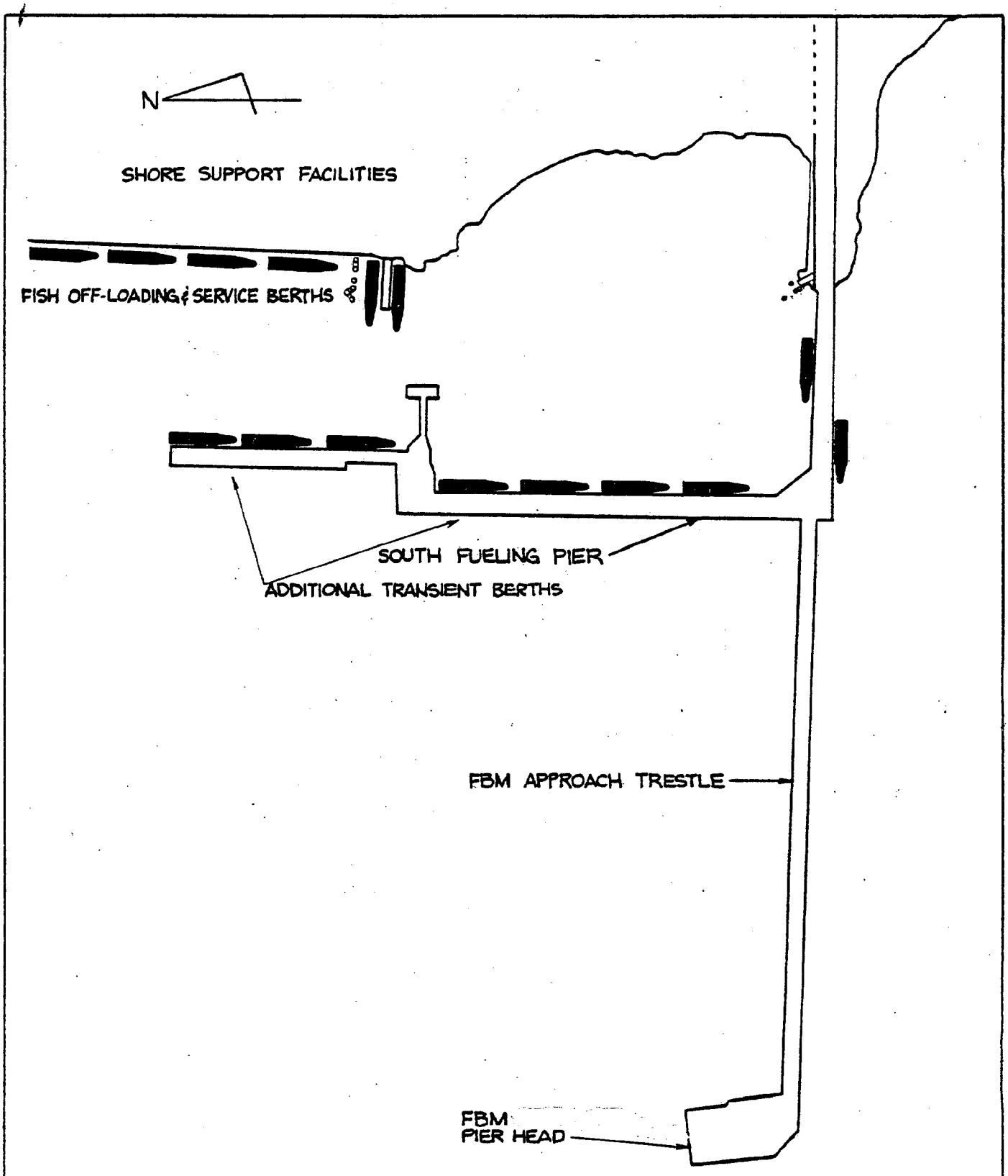
The remainder of this section addresses the remedial measures necessary to prepare the site for the various types of port operations. Appendix A presents detailed discussions of the needs of the various development scenarios. This section then quantifies those needs and addresses rehabilitative work necessary to meet those needs. Finally, budget cost estimates are presented for the various items of work. A large amount of the data presented herein was drawn from previous studies performed by Maguire for similar development across the Bay in Quonset-Davisville as well as from our involvement with several of the development proposals at Melville.

Fishing Port: Referring to the idealized cooperative fishing port Figure No. A1 of Appendix A, two primary waterfront functions are required: (1) an area for fish unloading and taking on supplies, preferably a wharf with contiguous land area for ease in unloading and handling of the catch, and (2) an area for berthing of the fishing boats, ideally with access for light vehicles. The idealized configuration has been conceptually adapted to Melville in Figure No. 8.

The existing bulkhead which is approximately 550 feet long is ideally suited for the fish unloading/service area. It can typically accommodate 4 to 5 boats simultaneously, depending on size. The draft at the bulkhead, as stated previously, is approximately 15 feet at MLW. This depth is adequate and no dredging is required. The land area adjacent to the bulkhead is more than adequate for shore facilities and the apron adjacent to the bulkhead has a heavy concrete slab, originally constructed for the anti-submarine nets.

Rehabilitative work necessary for this area and use consists primarily of repairs to the steel sheetpiles and installation of a new fender system. As discussed previously in the analysis section, the bulkhead is extremely corroded in the splash zone, particularly at the low waterline and repairs should be made as soon as practical. Similarly, the fender system, with the exception of a few piles, is non-existent and therefore, a new system is required. Other items of work to be considered include repairs and installation of new cleats, installation of boarding ladders and possibly clearing of debris from the berth.

Repairs to the steel sheetpile are the most difficult problem to evaluate. The ultrasonic tests indicate that, at the mudline, the steel sheetpile has undergone a slow rate of corrosion. The corrosion rate increases to the surface, where just below the low waterline, only the steel at the interlocks and webs remain with the flange steel corroded through in many places. Unfortunately, the sheetpile in the splash zone is generally subject to large shear stresses and therefore presents a weak link in the structural system. Short of driving new



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MELVILLE CONDITION SURVEY

FISHING

DATE MAY, 1982 | FIGURE NO. 8

sheetpile adjacent to the corroded sections, there is no proven system which is less costly and maintains the necessary structural continuity.

In this case, the bulkhead is still standing, held in place by the tie rods, the heavy concrete slab and the remaining steel of the interlocks and the inboard flanges. Gradually, as the remaining steel corrodes, the bulkhead will distort and the soil backfill will leach from behind the bulkhead. Evidence that this may already be taking place is indicated by the cracking and breakage where the sheetpile is embedded into the concrete slab as discussed previously. Further, the deterioration will be accelerated by heavy loads and vibrations on the apron.

In the case of commercial fishing, where apron loads can be restricted to light trucks which would be distributed by the heavy concrete slab and fish offloading equipment could be set in one spot on prepared foundations, perhaps an interim solution can be developed which could stretch the utility of the existing bulkhead for say 5 years. This will require detailed design analysis and most probably a compromise in operating loads placed on the bulkhead.

Patchwork will only delay permanent repairs and will not provide original design capacities. They should be done only with full cognizance and understanding of risk by the developer.

Buildings should be kept at least 60 feet behind the face of the bulkhead to minimize foundation loads on the sheetpile, or should be

placed on pile foundations. Similarly, heavy truckloads and heavy machinery should be set back from the bulkhead to minimize vibration and heavy loads.

Since the bulkhead area will be very active with boats docking to off-load and take on supplies then proceeding to their berthing area or out to sea again, it is anticipated that the fender system will undergo considerable impact damage. This observation is made based on the damage observed at Davisville by similar vessels. Pending a detailed evaluation which should take place during design of the fender system, it appears that a timber pile fender system may be the most austere for this project. It is acknowledged that some pile breakage will most probably occur and the port authority or the developer (depending on the terms of the lease/sale) should program for annual maintenance. Damage can be reduced considerably by either up-grading the fender system to include some type of rubber energy absorption device or the installation of a low wale at or near the waterline which is attached to the bulkhead. This wale will stiffen the system and provide a positive backing nearer the point of impact. If the vessel standoff is not critical, a floating camel may also help to distribute impact loads. Figure No. 6 presents a typical section of the fender system. An estimate of costs for the rehabilitation described above are included in the cost estimate at the end of this section.

The second waterfront activity at the fishing port is the permanent berthing of the fishing boats. The inner basin of the south fueling

pier (including the granite extension) provides approximately 1100 lineal feet of space. The south side of the fuel pier provides an additional 350 feet. This space appears adequate for approximately 12 boats and could accommodate double that many if rafting is acceptable. The water depth of 18-20 feet is also adequate for fishing boats.

An additional 160 lineal feet of berthing can be added with the rehabilitation of the timber pier located at the south end of the steel bulkhead. Repairs would include: removal of the existing deck, stringers and pile caps: cutting of the rotted top portions of the piles: and design and construction of new pile caps, stringers and deck which will accommodate the reduced pile length.

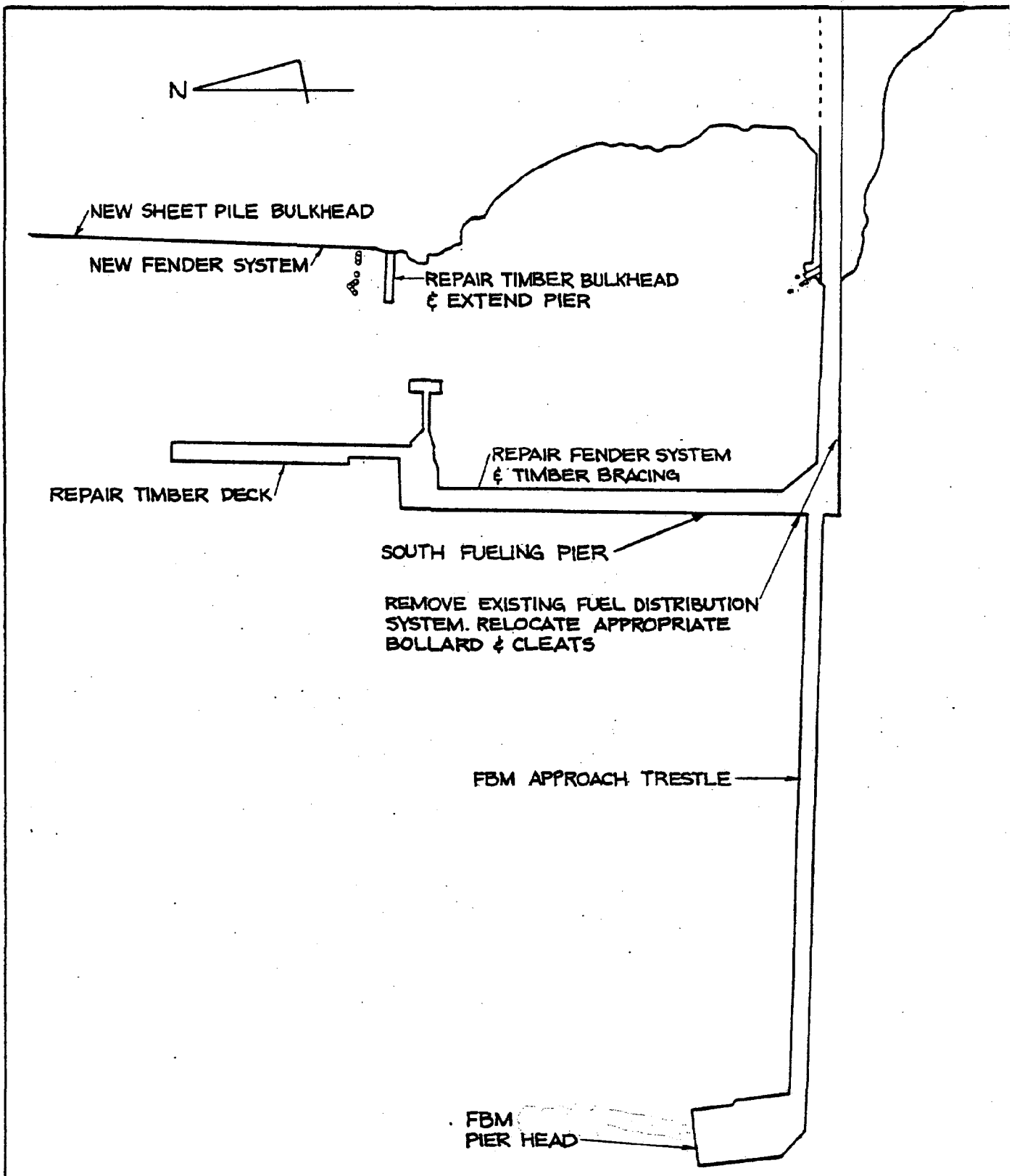
The FBM pier and the west face of the fuel pier provide an additional 2900 lineal feet of space, however, wave and current conditions may be too extreme for berthing. We are told that the Navy ceased fuel operations when northwest winds exceeded 20 knots. Further, during the course of our surveys, we observed rather severe north-south currents under the FBM pier as well as a very uncomfortable chop at the fueling pier. It is therefore not recommended that these areas be utilized for permanent berthing of fishing boats. Such berthing would most probably result in damage to the boats, the pier fender system, and possibly to the pier itself. A developer may elect to use the piers, particularly the west side of the fuel pier on a transient basis; however, it is stressed that such use should be at the developer's risk and he should be aware that the boats may fre-

quently have to leave the berths due to wave activity. It is noted that the granite extension had a timber deck on the west face with remnants of a timber fender system evident. From this it can be inferred that some docking of boats took place on the west face in addition to the protected east face.

The fender system in the inner basin of the south fuel pier, as previously pointed out, is in fairly good condition. Following repairs to the system, a floating camel should be added to help distribute impact loads. Other rehabilitative work at the south fuel pier includes removal of the abandoned fuel lines and installation of appropriately spaced cleats and ladders. Figure No. 9 presents rehabilitation concepts discussed herein.

A cost has been presented to replace damaged bracing under the piers. It is judged, however, that the damage at this time has not progressed sufficiently to significantly reduce the capabilities of the pier for the berthing of fishing boats. It is recommended that periodic inspections of the pier be conducted and when the bracing damage progresses further that repairs be undertaken.

Regarding repairs to the fender system, it is noted that approximately 35 fender piles were reported as broken or rotted above the wale. Since the tops of the piles were uncapped, the rot most probably occurred from water entering the end grain. Since these piles appear to be in good condition below the wale, an attempt could



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MELVILLE CONDITION SURVEY

REQUIRED REHABILITATION
FISHING SCENERIO

DATE	FIGURE NO.
MAY, 1982	9

be made to cut off the damaged portion of the pile, pull it up slightly and refasten it. This procedure was used at the Port of Providence municipal wharf recently. It is noted that the upper portion of the pile above the wale is not needed for fishing boats which would ride lower on the pile and camel, and therefore, the pile would only have to be pulled a few feet. It may be desirable to cut all of the fender piles at the wale and cap them with fiberglass to retard further rot. In addition, there were approximately fourteen missing piles which will require replacement. Preliminary budget costs have been developed for all the rehabilitation discussed above and are included in Table No. 1. Cost for repair concepts are not listed in order of priority, actual order and implementation will depend on owner/ developer preference.

Bulk Terminal: The natural deep water at the location of the FBM pier presents one of the best attributes of the site. The Appendix discusses the application of this natural attribute to the US East Coast to Europe trade for bulk carriers on the order of 80,000 dead weight tons (DWT). Maguire has been involved as consultants on two such proposals, one dealing with grain and the second with coal. Figures A-2 and A-3 in Appendix A present the site concepts considered at the time.

In both concepts, delivery of the cargo to the ships was by overhead conveyor. It was determined at the time that the foundations of the FBM access trestle were adequate to support the conveyor loads. By placing the conveyors overhead, the deck was left free for pedestrian and light truck access.

REHABILITATION BUDGET COSTS[1]

FISHING SCENARIO

TABLE NO. 1

ITEM NO.	ITEM DESCRIPTION	UNIT COST	PROJECT COST
1	Replace sheetpile bulkhead	$2,600/L.F.	$1,430,000
2	New timber fender system @ bulkhead	$ 130/L.F.	$ 71,500
3	Pull & refasten existing timber piles @ south fueling system.	$ 250/ea.	$ 10,000
4	Replace broken or missing fender piles	$ 450/ea.	$ 6,750
5	Remove existing fuel distribution system south pier	Lump Sum	$ 60,000
6	Relocate existing bits & bollards to edge of pier	$2,500/ea.	$ 42,500
7	Rehabilitate concrete bit & bollard foundation pedestals	$ 250/ea.	$ 1,250
8	Repair fuel pier bracing	$ 4.50/bf.	$ 40,000
9	Timber deck replacement	$ 5.50/S.F.	$ 11,000
10	Timber pier extention	$ 55.00/S.F.	$ 30,800

1. Costs do not include allowances for engineering, contingencies or esculation to a future time of construction.

As discussed previously in the analysis section, the FBM access trestle does not appear to have been designed for lateral berthing loads. While there is a horizontal capability inherent in the design, it is relatively small and far short of that necessary to restrain a large 80,000 DWT ship. For this reason, independent breasting and mooring dolphins were proposed for the ship berths.

For the grain terminal, which was the first proposal considered, it was proposed to berth the ships parallel to the FBM Pier. It was reasoned that all new marine construction could be reached from the pier thereby reducing new construction costs. For the coal proposal, a new pier was considered extending in a north-south direction from the center of the FBM pier. In this case, while marine construction costs were higher, the alignment took advantage of the natural channel thereby minimizing dredge quantities.

In both proposals, development costs were relatively large on the order of $50 million and the marine portions were relatively small percentages of the total project. In any event, site preparation costs in both cases were negligible since the structures were considered adequate and all construction was specific to the bulk terminal. For the purposes of comparison, we have included in the cost estimates the costs for the new marine terminal construction and for the dredging. (See Table No. 2).

Developer's Proposal: The third development concept evaluated was based on discussions with representatives of the selected developer

REHABILITATION BUDGET COSTS[4]

BULK TERMINAL SCENARIO

TABLE NO. 2

ITEM NO.	ITEM DESCRIPTION	UNIT COST	PROJECT COST
1	Repair of broken foundation piles, FBM Pier	$ 700.00/ea.[3]	$ 4,200.00
2	Repair and seal cracked piles FBM Pier	$ 250.00/ea.[3]	$ 2,000.00
3	Coal handling facility improvements as shown in Appendix A[1]	---	$ 5,900,000
4	Mooring dolphins and dredging for grain of loading facility as shown in Appendix A[2]	---	$ 500,000

1. Information extracted from CE Maguire's "Development of a Coal Port" technical proposal.
2. Information extracted from CE Maguire's "Proposed Grain Facility"
3. Mob. and Demob. could be significant for these items, construction should be scheduled with other marine work.
4. Costs do not include engineering an allowance, contingencies or esculation to a future construction date.

and the RIPAEDC. This concept consisted of several uses including a commercial fishing port at the bulkhead, with berthing of fishing boats along the fueling pier. A new bulkhead was proposed extending from the general area of the existing bulkhead south to the general area of the foot of the fuel pier. The new bulkhead would accommodate a travel lift and floating docks for large pleasure boats. Use of the outer piers had not been definitely established, however, under consideration was the berthing of large ships, either on a transient basis or a maintenance storage type agreement similar to that at Coddington Cove. Figure 10 presents the layout concept considered under this alternative.

The needs of the fisheries industry have been addressed in the first development alternative. In this alternative, the new bulkhead area and berthing of large ships will, therefore, be addressed.

The developers concept called for a sheetpile bulkhead to span from the southern tip of the existing sheetpile bulkhead to the eastern abutment of the south fueling pier. The vertical face would then be adapted with a series of floating docks and access ramps to provide berthing for large yachts. Steel bulkheads are costly (Table 3) and require periodic maintenance to ensure an extended life (as can be seen by the condition of the existing bulkhead). Two other less costly solutions which would adapt nicely to the site are a riprap revetment or a granite block/concrete retaining wall.

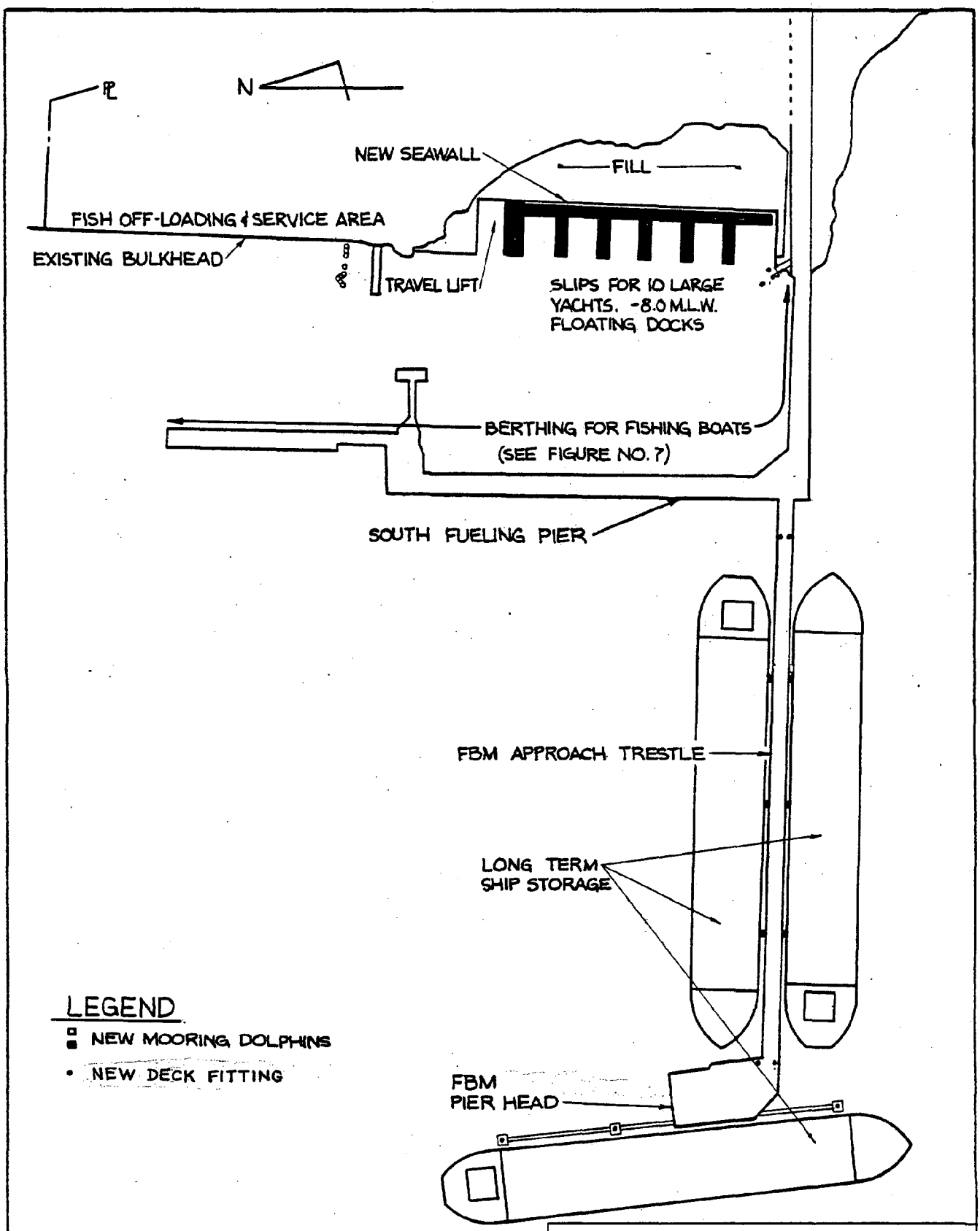
REHABILITATION BUDGET COSTS[1]

PREFERRED DEVELOPMENT SCENARIO

TABLE NO. 3

ITEM NO.	DESCRIPTION	UNIT COST	PROJECT COST
1-8 fishing	See fishing scenario	Same as fishing scenario	Same as fishing scenario
9	Mooring dolphins	$ 150,000/ea.	Variable dependent on number of ships to be berthed
10	Slips for large yatchs	$ 30 - 45/S.F. dock	$ 60,000 - $ 90,000
11	Travel lift runway & foundations	$ 65/S.F. dock	$ 50,000
12	New seawall (Rip Rap)	$ 400/S.F.	$ 500,000
13	New Seawall (Bulkhead)	$2200/L.F.	$2,750,000
14	New Seawall (Granite/Conc.)	$ 825/L.F.	$1,031,250

1. Costs do not include an allowance for engineering contingencies, or esculation to a future construction date.



MELVILLE CONDITION SURVEY

DEVELOPMENT SCENERIO

DATE MAY, 1982 | FIGURE NO. 10

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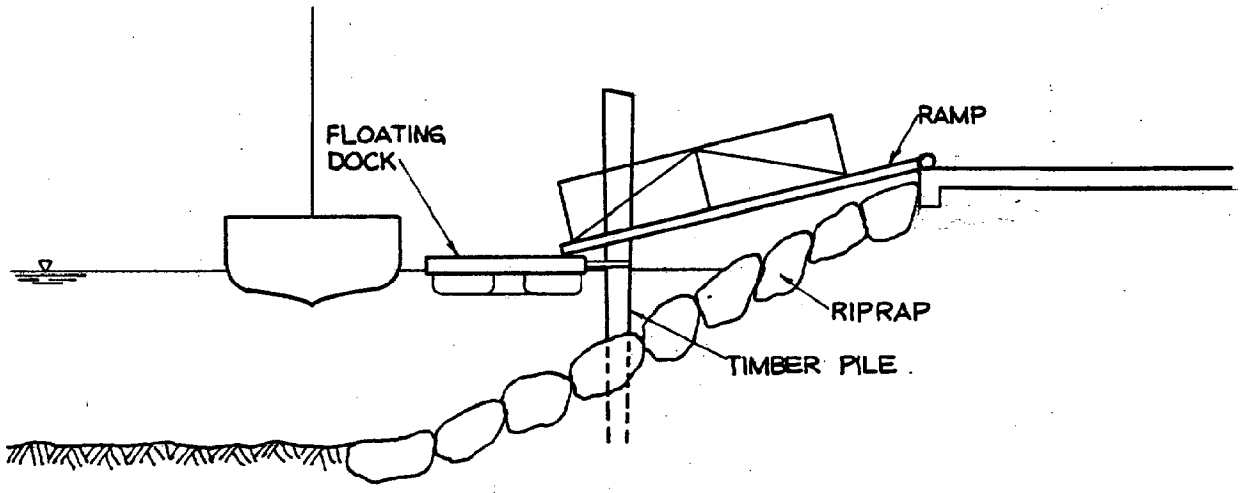
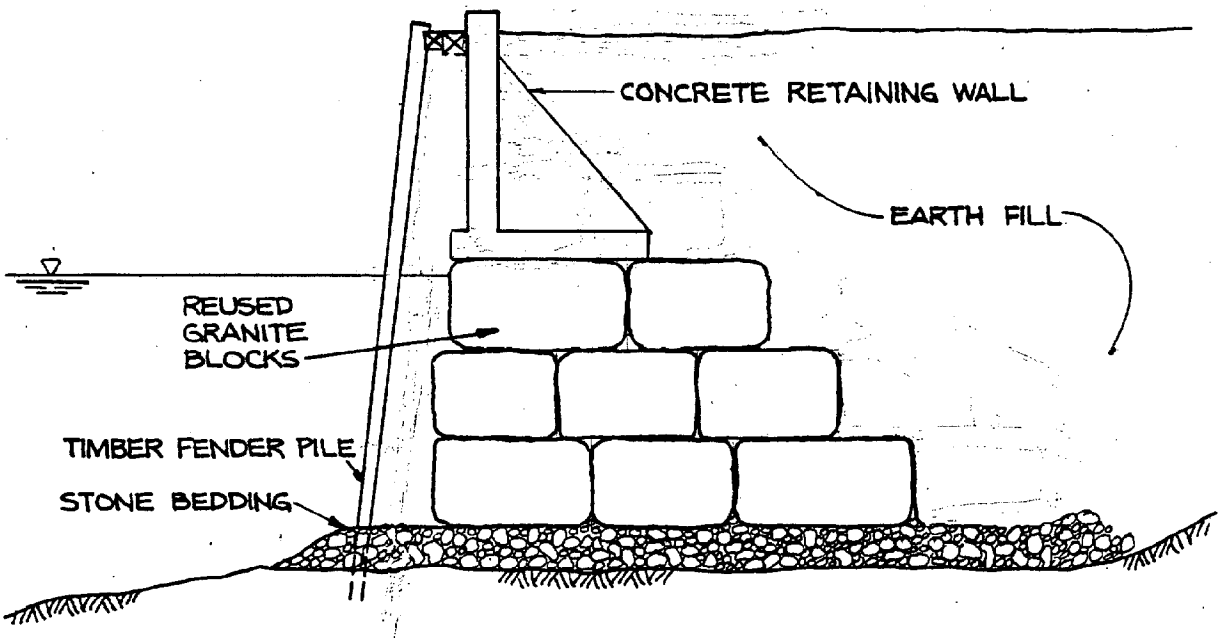
Figure No. 11 delineates the rip-rap and floating dock combination which if properly designed could provide the desired yacht berthing layout at a substantial reduction in construction cost. This concept was recently used in two of Maguires Marina design projects in Bourne Massachusetts and Norwich, CT. In addition to the initial construction cost savings the rip rap embankment requires little to no maintenance for a very long life expectancy.

The second concept shown in Figure No. 11 would utilize existing granite blocks located at the North eastern end of the south fueling pier and a relatively low concrete retaining wall in order to provide the developers preferred vertical bulkhead face. Cost savings could be incurred by both the savings in materials already on hand (existing granite blocks) and the lack of long term maintenance when compared to steel sheeting.

Cost developed for this scenario are shown in Table No. 3 and are not listed in the order or priority. The developer/owner could execute the rehabilitation concepts in a as needed sequence.



RIPRAP REVETMENT



GRANITE BLOCK AND CONCRETE RETAINING WALL

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MELVILLE CONDITION SURVEY	
ALTERNATE SEAWALL CONSTRUCTION CONCEPTS	
DATE MAY 1982	FIGURE NO. 11

UTILITIES

WATER DISTRIBUTION SYSTEM

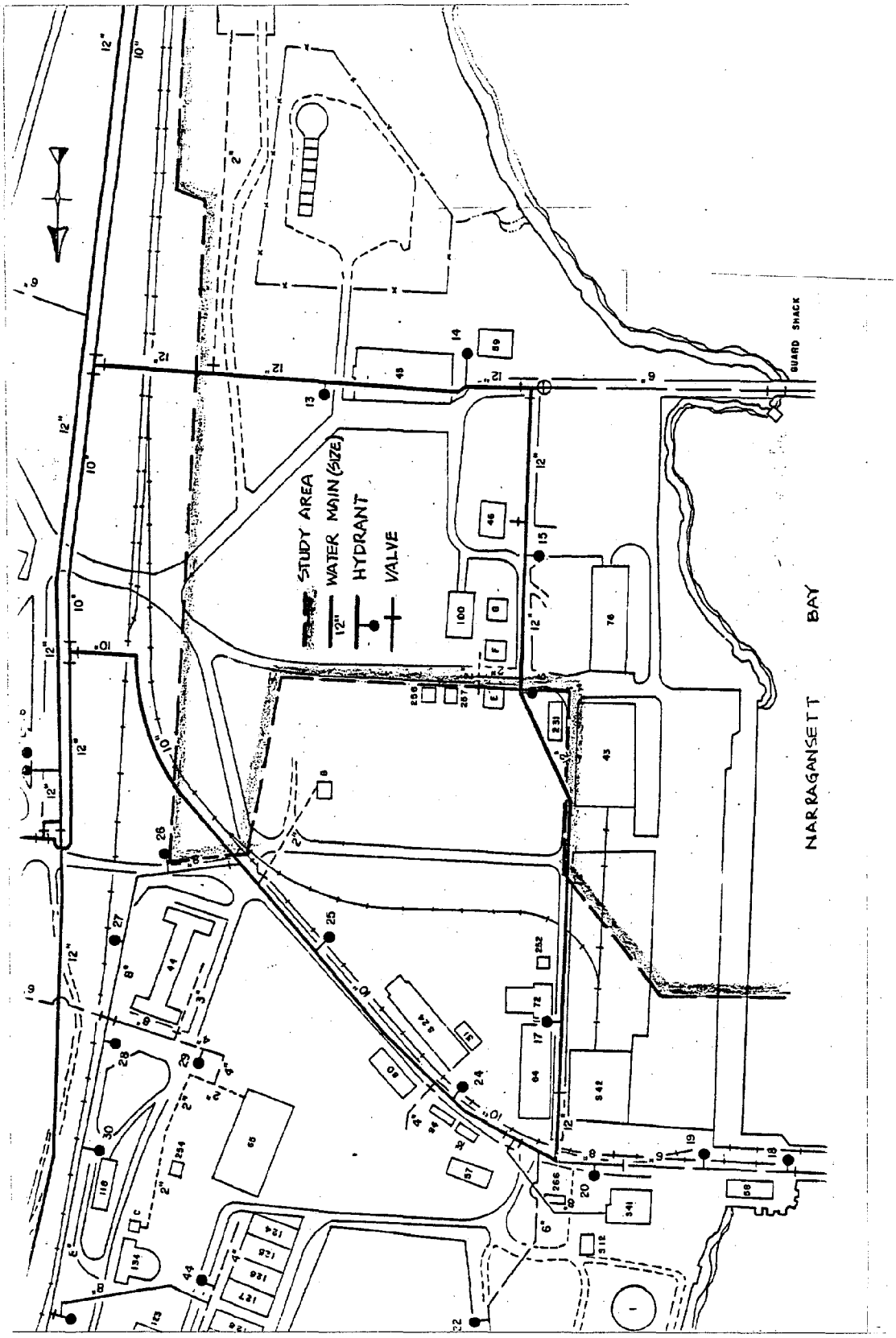
Data: Input data obtained for use in this analysis was the "best available" information based upon U.S. Navy files. Data included "As-Built" and design drawings of the water system within the study area and surrounding areas.

Through verbal contact with several users of the system within the study area and discussion with key personnel employed by the Navy Utilities Division, and Department of Engineering, information was gathered which aided in the evaluation of the system's existing conditions and potential capacities.

Description: The existing water distribution system servicing the study area was built by the Navy during World War II and consists of a loop fed from two directions and tied into a 10-inch diameter cast-iron feeder supplemented by a 12-inch diameter cast-iron transmission line. Water is provided to the Navy by the City of Newport Water Department and is metered at various locations by the Navy as portions of the system serve private industries located adjacent to the study area. The system provides potable water for domestic, commercial, and industrial use as well as fire protection for Naval and non-military installations along the shoreline.

The above mentioned loop as shown on Figure No. 12 consists of approximately 2500 linear feet of 12" diameter and 1550 linear feet of

10" diameter cast-iron piping. In addition, the system consists of two branches serving the north and south fueling piers which is made up of 8", 6", 4", 2-1/2" and 2" diameter cast-iron piping, currently shut off from the loop. Various other mains served from the loop are an 8" diameter main providing water to the Navy Steam Plant, an 8" diameter main serving private industries to the north, a 6" diameter main providing fire protection to fuel storage tanks along the south entrance to the Bend Boat Basin, and smaller 4" and 2" diameter mains serving various buildings and facilities. There are three hydrants within the study area, No. 13, 14, and 15 which are fed directly off the loop. The invert elevation of the loop piping is estimated to be at elevation 5± to 6± M.L.W. Much of the system is believed to be under tidal influence.



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MELVILLE CONDITION SURVEY

EXISTING WATER SYSTEM

DATE	FIGURE NO.
MAY, 1982	12

FINDINGS

The present demand on the existing water system consists of the Naval Steam Plant at Melville which provides heat for various buildings along with servicing the Navy's tank farms, which are in continual use (the water demand here would vary with the ambient air temperature). In addition, several private (non-military) industries located at Bend Boat Basin and beyond draw down the system at rates which vary seasonably. Also the system provides fire protection for all coastal facilities in the area.

Personnel from the Navy Department of Public Works, Utility Division, have expressed deep concern and reservations regarding any testing operations conducted by their Department on behalf of this office of the water distribution mains in the study area. In communicating with Utility Division Personnel, it was learned that the mains in question have had a history of problems including water main breakages, leaking valves, frozen valves, pipe jointing, and brittleness. These maladies which plague the system have occurred on various occasions in the past when earth excavations were dug and/or exercising of the system's valves and fittings was performed.

The Navy stated that because of the questionable condition of its water mains in this area, written guarantees would be required by the Rhode Island Port Authority and Economic Development Corporation to repair and/or replace any and all damages to the water system in the study area and in related areas which may result from any

testing or exercising of the system and its appurtenances. The Navy currently conducts fire flow testing in this area twice a year, in the months of April and October during a time when the system is apparently at low demand. Based on observations during past repair work on mains in the study area, the Navy has suggested that the 10" and 12" diameter mains, which consist of unlined cast-iron pipe, have shown signs of tuberculation.

In light of these circumstances where the integrity of the entire water system is in question (which the Navy admittedly claims is in weak condition and which the Navy avoids all unnecessary contact with), it would be the judgment of this office to abandon plans for any flow testing or other related direct contact with the water system in order to defer any responsibility of such systems being borne by this office and the offices of the Rhode Island Port Authority and Economic Development Corporation.

As a result, testing for actual flow pressures to determine losses, capacities, and demand was not conducted. However, the Navy has indicated that they would be able to provide 30 thousand G.P.D. to the potential developer, as required, with minimal effort.

CONCLUSIONS

Based on findings, rehabilitation of the present water system in the area would not be cost effective due to the unknown condition of the main's valves, joints, and fittings of the entire system. No lasting value will result from cleaning tuberculated pipelines unless followed by appropriate maintenance or installation of a lining.

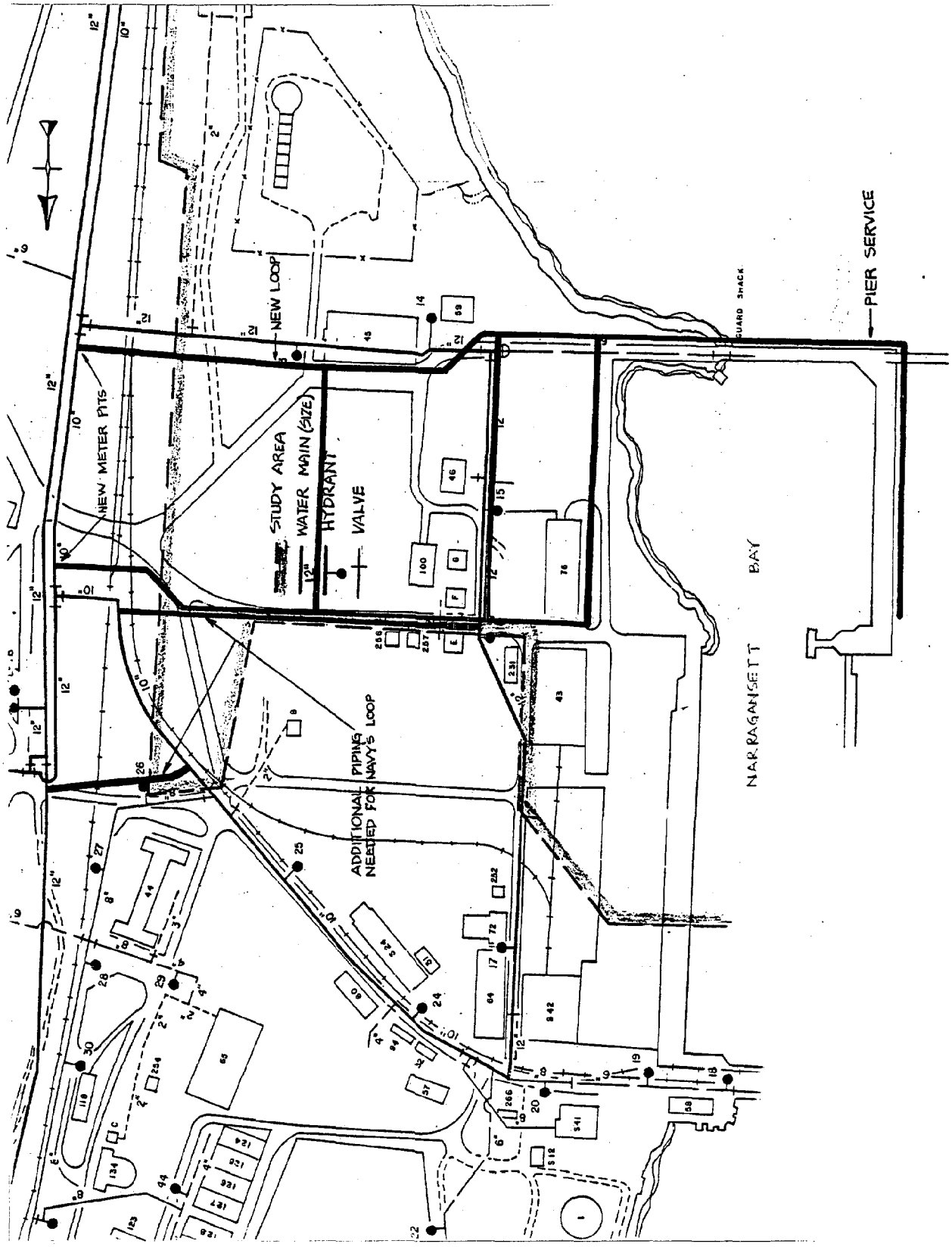
Conditions which can alter or damage pipeline interiors are sedimentation, organic growths, mineral deposits, tuberculation caused by an aggressive water supply, corrosion, and poor maintenance. Pipeline exteriors can be effected by salt-water tidal influence and soil chemistry. Considering the fact that water mains in this area are unlined and are within a tidal influence and that some tuberculation already exists, it can be assumed that deterioration of pipeline interiors and exteriors will continue. Significant tuberculation will cause pipelines to suffer a loss in "C" factor which results in loss of pipeline capacity. Pipelines whose integrities are weakened by tuberculation and external corrosion are also more susceptible to structural damage from water hammer (surge).

Therefore, if long-term demands should equal or exceed the aforementioned allowance of 30K G.P.D. provided by the Navy, consideration should be given to the installation of a separate, independently looped distribution system which would not be affected by future Naval and commercial expansion outside of the study area.

REMEDIAL MEASURES

Information receival during the various meetings with the Navy Public Works Department suggest that the present water distribution system in the area under consideration for development is questionable with regard to its structural integrity. In addition the system is reportedly tuberculated and would require considerable maintenance.

As indicated previously, if long term demands equal or exceed the allowable 30,000 GPD than perhaps a new distribution network in the area of the development should be constructed. For purposes of providing budget construction cost estimates (See Table No. 4) we have based cost on a network consisting of pipe sizes identical to those presently existing and as shown on Figure No. 12A. Items 1-5 are the cost for providing the new water system replacement network which as shown on Figure No. 12A is an independent loop with metering devices. Items 5-8 are the cost for the installation of additional piping system components needed to provide the Navy with a compatible looped water system network.



MELVILLE CONDITION SURVEY

WATER SYSTEM REPLACEMENT NETWORK

DATE	FIGURE NO.
MAY, 1982	12A

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WATER SYSTEM REPLACEMENT

BUDGET COST [1]

TABLE NO. 4

ITEM NO.	ITEM DESCRIPTION	UNIT COST	TOTAL
1	Taps w/valves	$ 2,500/ea.	$ 5,000
2	Gate Valves	$ 1,500/ea.	$ 18,000
3	Hydrants	$ 2,000/ea.	$ 8,000
4	D.I. Pipe	$ 60/L.F.	$323,000
5	*Meter Pits*	$ *30,000/e.a.*	$ 60,000
6	Taps w/valves	$ 2,500/e.a.	$ 7,500
7	Gate valves	$ 1,500/e.a.	$ 6,000
8	D.I. Pipe	$ 60/L.F.	$ 67,200

[1] Costs do include engineering, contingencies, or esculation to a future construction date.

1. Use existing water system install meter pits & valves.
2. Install new water loop to serve the site.
3. Water to piers.

STORM DRAINAGE

Data: Input data obtained for use in this analysis was the "best available" information based upon U.S. Navy files. Data included "As-Built" and Design Drawings of drainage system and topography maps of contributing drainage area.

Methodology: A field survey was conducted to visually investigate structural conditions and composition of manholes, catch basins, gutter inlets and pipelines. (Several structures could not be located in the field while several others could not be opened.) Depth of flows were measured and depositions were measured and noted as to depth and sediment composition.

Topography maps of the Study Area and surrounding contributing areas were obtained from the Navy and utilized along with drainage characteristics observed in the field and design nomographs to determine overland rainfall runoff and flow times into existing inlet structures.

The "Rational Method" for determining rainfall runoff as well as "Manning Pipe Flow Charts" and rainfall intensity and runoff coefficients were utilized as described in "ASCE-Manuals and Reports on Engineering Practice - No. 37" (WPCF Manual of Practice No. 9) for "Design and Construction of Sanitary and Storm Sewers," and "Water and Wastewater Engineering," as referenced for use by Navy Design Manuals: NAVFAC DM-5.2 (June 1979), and NAVFAC DM-5.3 (June 1979).

Results of pipe flow, overland runoff and intensity duration times as determined by field observations and design calculations were applied to establish the existing system capacity and the original system design capacity.

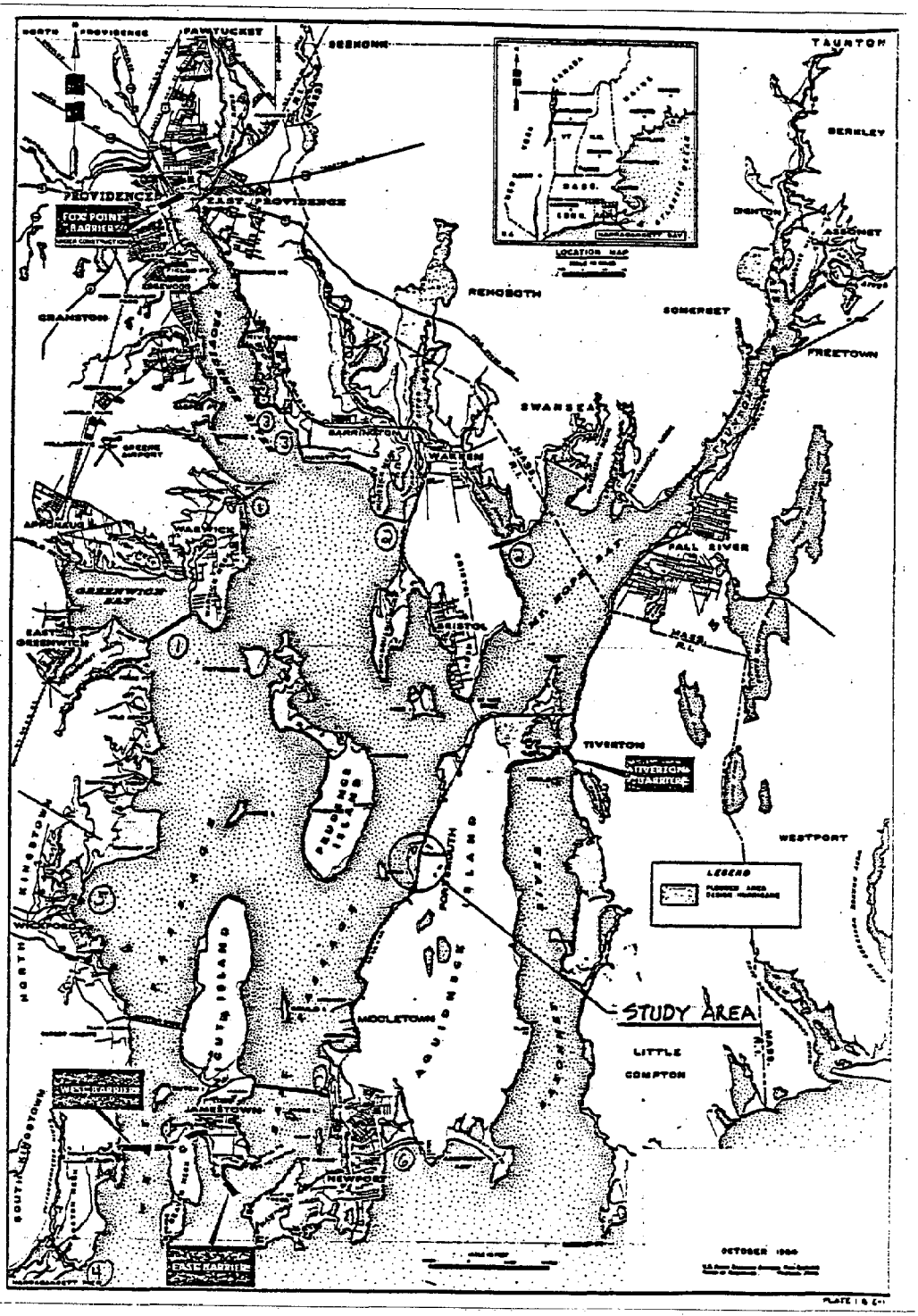
System Description: The existing drainage system is comprised of vitrified clay and reinforced concrete piping, brick masonry manholes (with cast-iron covers), catch basins, and gutter inlets, and was designed in 1943 by the United States Navy. Periodic flooding occurred during severe rain storms and hurricanes.

The outfall storm drains, which flow into the bay from this area, are influenced by tide levels which submerge manhole inverts beyond each outfall manhole. Normal tide in this area is 3.5 ft. with mean high water being 1.84 ft. above mean sea level. Land areas east of the Railroad tracks drain to an open channel which runs through a portion of the Study Area near its south end and into marsh land before entering the bay.

The following location maps indicate:

A. Flood Area for Design Hurricane (Figure No. 13)

B. Existing Drainage System within Study Area (Figure No. 14).



MELVILLE CONDITION SURVEY	
FLOOD AREA FOR DESIGN HURRICANE	
DATE MAY, 1982	FIGURE NO. 13

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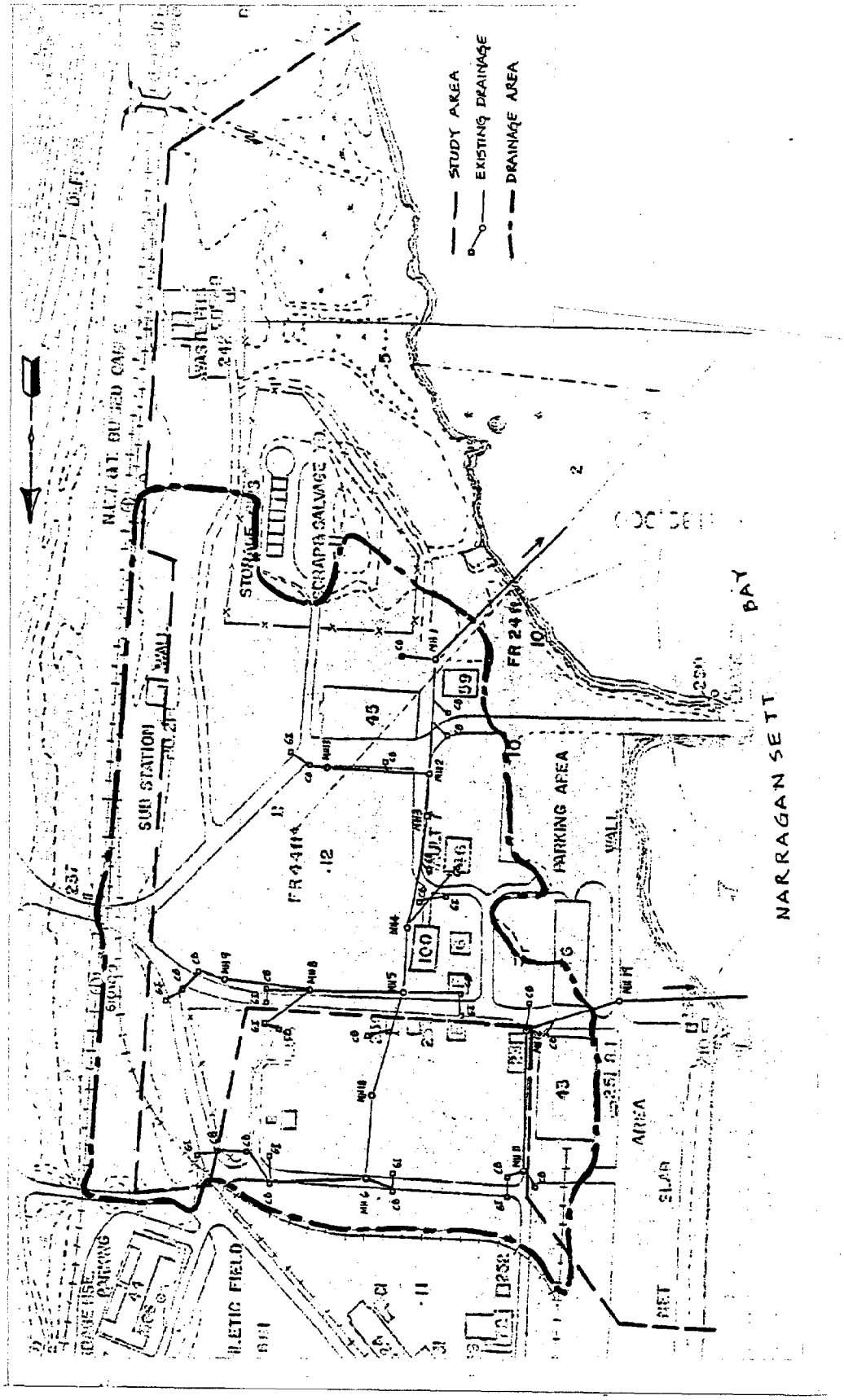

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MELVILLE CONDITION SURVEY

EXISTING DRAINAGE SYSTEM

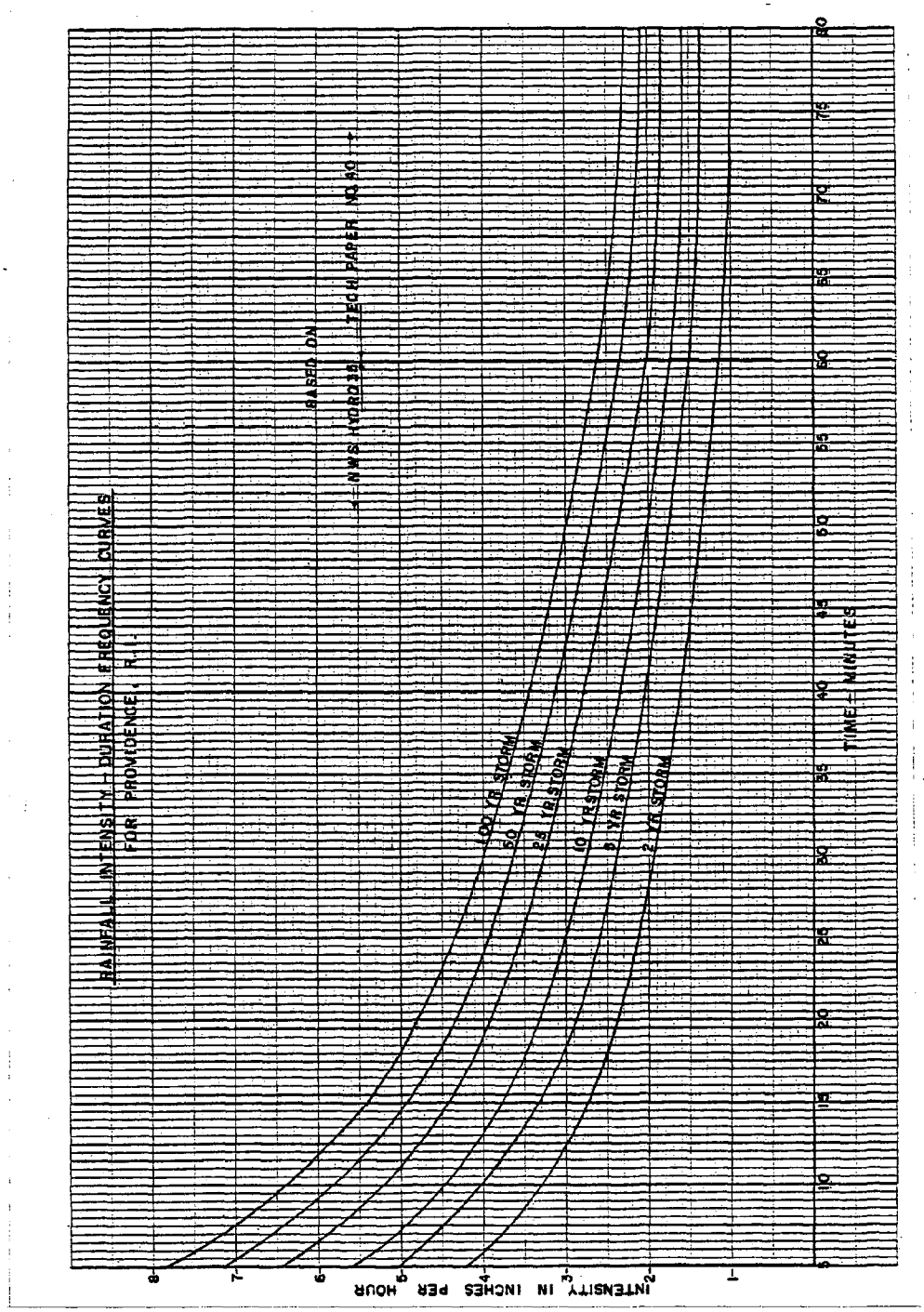
DATE MAY, 1982

FIGURE NO. 14

Design Assumptions: The existing pipelines are composed of vitrified clay or reinforced concrete pipe and appeared to be relatively smooth. A Design Roughness Coefficient (n) of 0.015 taken from Manning's Friction Tables was used in determining pipe velocities. By observation, pipelines and inverts which indicated significant amount of deposition were calculated to approximate a higher degree of frictional coefficient when determining actual pipeline capacities and flows. Where slopes of existing drainage pipelines were unknown an assumption of 2.0 ft./sec. (as recommended in WPCF Manual No. 9 for "Design and Construction of Sanitary and Storm Sewers) was used to determine flow time through system and pipeline capacity.

Rainfall runoff calculations were performed for a 2-year and 5-year storm in compliance with Navy Design Manuals: NAVFAC DM-5.2 and DM-5.3 (June 1979). Rainfall intensities were calculated using duration frequency curves for Providence, Rhode Island as shown on Figure No. 15. Previous soil investigations taken by means of soil borings in the Study Area indicate basically a fill area composed of gray fine sand, miscellaneous fill, and weathered shale. This information was taken into account when determining the rate of natural soil drainage through percolation.

Overland flow calculations were developed using the "Yarnells Overland Flow Time Monogram" shown on Figure No. 16. Field observation indicated cover density conditions ranging from paved areas to dense grass.



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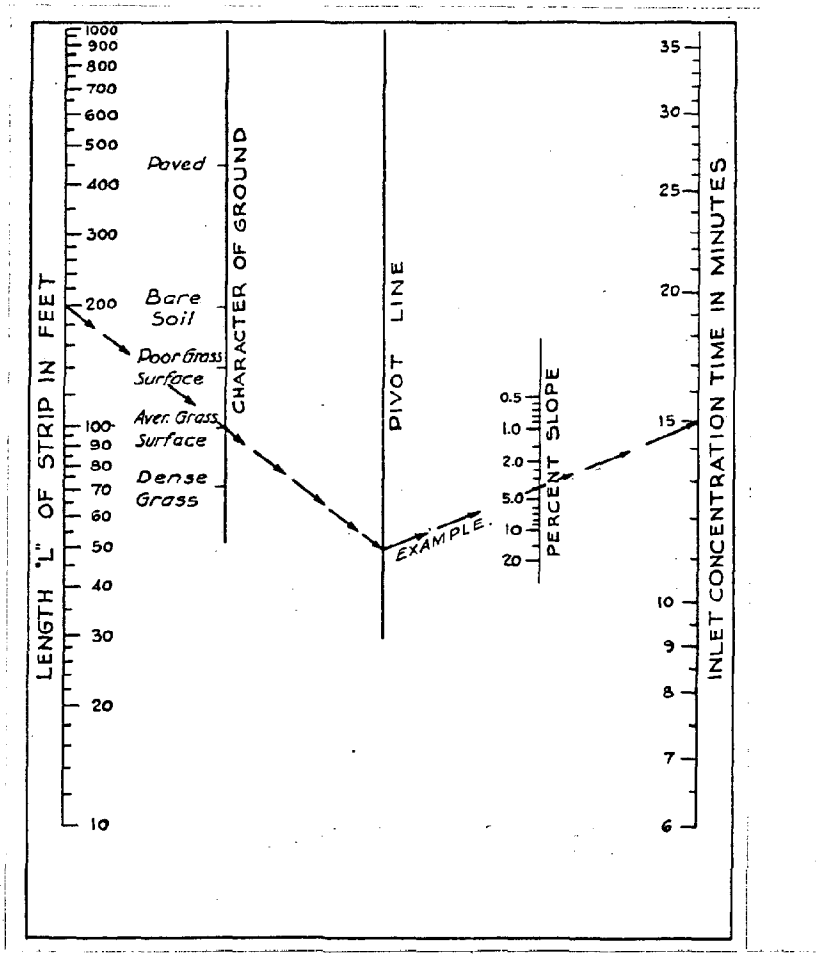
MELVILLE CONDITION SURVEY

FREQUENCY DURATION CURVES
PROVIDENCE, R. I.

DATE	FIGURE NO.
MAY, 1982	15



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MELVILLE CONDITION SURVEY	
YARNELL'S OVERLAND FLOW TIME MONOGRAPH	
DATE MAY, 1982	FIGURE NO. 16

FINDINGS

Structural Condition: All manholes, catch basins and gutter inlets investigated were in good general structural condition with the exception of several catch basin covers which are of the metal hatch type and, by nature, are loose fitting. Several other catch basins have wood plank covers with 1/4"+ spacing. The condition of these wood plank covers varied from totally demolished to properly intact.

Structural masonry walls, inverts, tables and riser rings were found to be in good condition, metal steps where used were sound.

Pipelines could not be viewed to any significant length beyond each manhole opening to detect structural condition. Pipelines located at manhole junctures appeared to be in good condition with smooth surfaces, although the amount of depositions found in some manhole inverts and catch basin sumps would indicate that some deterioration (jointing, cracking) within the pipeline may have developed.

Deposition: All catch basins and gutter inlets have sumps and were found to have significant amounts of deposition of a sandy-silt nature and muddy consistency.

Manholes No. 1, 3, 7, 8, 9 had depositions of muck in inverts and on manhole tables ranging from 1" to 6".

Sandy-muck depositions were found in pipelines leading to and from above mentioned manholes with depths of 1/4" to 4".

It should be noted that Manhole No. 18 was found to have a makeshift circular cover over a square opening. An integral independent 8" VC pipeline passes through this manhole (Possibly a sanitary line). Depositions in Manhole No. 18 are of gravel, boulders, bottles and cans which are somewhat restricting flow through manhole.

Surcharging and Blockage: It appears that tidal influence affects flow in Manholes No. 1, 2, 3 as water levels in these manholes were observed to be above the inverts ranging from 1 ft. at MH 3 to 2.3 ft. at MH 1. This observation was made during an incoming tidal sequence. A second observation made at Manhole No. 1 during an outgoing tide sequence indicated a steady drainage flow in the manhole with a depth of flow of 5" in the outfall pipe.

Manhole No. 12 was found to be nearly full of water (7.7 ft.) with no apparent flow movement. Tide was out when observation was made. There appears to be a blockage down stream (could not locate downstream Manhole No. 19 to verify). Manhole No. 11 upstream had 1 ft. of standing water over invert with no visible flow.

CONCLUSION

Pipe Capacity: Calculations made to determine rainfall runoff and contributing drainage area flowing into the existing storm system indicate insufficient capacity to withstand a 2-year storm. This is based on optimum conditions at low tide, all pipelines free flowing and no blockage occurs.

In actuality taking into account, tidal influence, pipeline desposition and system blockage at Manhole No. 12 to the stilling basin, it is unlikely that the present system can withstand a 1-year storm. It should also be noted that many Navy Regulations call for a system design to withstand a 10-year storm with an outfall capacity for a 50-year storm.

Assuming future industrial development taking place, it is likely that additional paved areas and buildings would be constructed along with residual grassing replacing the presently dense vegetation resulting in a larger runoff "C" factor than what now exists.

Additional items to be considered is the relative flatness of the study area which is comprized of marsh land, depressions and a seaward stream located at the south end. Also, the entire area up to the railroad tracks lies in a flood plain and has been inundated during the 1938, and 1954 hurricanes. It is suggested that the gutter inlets

of the type found are generally believed to allow no more than 1 CFS inflow due to location at curb gutters where gravel buildup occurs. The inlet system is also subject to complete temporary blockage due to snow buildup when not properly maintained.

Remedial Measures

In light of the fact that the drainage system is subject to tidal influence during some storm events it is recommended that new drainage design and construction be directed towards surface collection methods rather than subsurface piping networks. Surface collections methods include drainage swales, surface grading and roadway gutters.

SEWAGE SYSTEM EVALUATION

The information for this Section is taken from the 1980 Report, "The Newport Naval Base Wastewater Collection System Infiltration/Inflow Study," by CE Maguire, Inc., prepared for the RI Port Authority and Economic Development Corporation.

FINDINGS

It can be seen from the results presented in the above referenced "Newport Naval Base I/I Report" both infiltration and inflow are present throughout this sewer system. The quantity of I/I reported for this study must be viewed with the understanding that the gaging period was relatively short and the precipitation during the gaging was abnormally low.

Even with these limitations, it was clearly seen that substantial quantities of I/I were present and that there was a marked increase in these quantities when precipitation occurred. This increase, was not indicative to only the gaging period but can be considered a normal occurrence within the sewer system. This is evidenced by the wastewater flow records of the City of Newport. These records consist of recorded wastewater flows measured at the Newport Wastewater Treatment Plant, Parshall Flume, which receives only flow from the Coddington Cove Pumping Station.

Due to dry weather conditions during the study, the peak wastewater flows for the Naval Base were not recorded, since peak wastewater flows include peak I/I flows. Since the minimum remaining capacity present in the sewer system will occur at these peak flows, no real estimation of the remaining capacity can be made at this time. However, since the system was found to be rain responsive, we suspect that during periods of peak wet flows the collection system would be subjected to considerable I/I and thus restrict available carrying capacity.

Throughout the study, there was no indication that the sewers were subject to surcharging, except when there were failures in nearby pumping stations. Therefore, it can be assumed that the most critical point in the sewer system is the capacity of any pumping station. Some conclusions can be made as to what capacity would be available if I/I was not a major problem within the sewer. Since the weather during this study was relatively dry, the peak dry weather flows can be equated with peak design flows.

ANALYSIS

An analysis of the wastewater pumping stations using these peak design flows is presented hereafter. The pumping station near Buildings 24 and 81 was installed in mid-1980 and, therefore, relatively new and considered to be in good operating condition. This station has two pumps each rated at 150 gpm @ 22 feet of Total Dynamic Head (TDH), which equates to a pumping capacity of

216,000 gpd. The measured average peak dry weather flow tributary to the station is 23,000 gpd. This would presently leave an excess capacity of approximately 193,000 gpd at the station. It should be noted that, due to the small sanitary flow present, all of this flow is considered to be I/I. Therefore, the actual maximum remaining capacity in this area is the capacity of the station, which is 216,000 gpd.

The pumping station at Building 59 was also installed at the same time as the one near Buildings 24 and 81. This station is equipped with two pumps, each rated to pump 180 gpm at 50 feet of TDH which is equivalent to a capacity of 259,200 gpd. Once again, all the flow to this station is considered to be I/I since the flow gaged flows indicated little or no variation from day to night. Therefore, the present remaining capacity at this point is 202,400 gpd. But, as before the actual remaining capacity could be equated with the capacity of the pumping station because all of the flow present is I/I.

The pumping station at Building 988, an older station (early 1970's), equipped with two pumps each rated to pump 450 gpm at a TDH of 102 feet. This converts to a capacity of 648,000 gpd. Influent wastewater to this station was measured having an average peak dry weather flow of 218,600 gpd resulting in a remaining capacity of approximately 429,400 gpd on a peak flow basis.

CONCLUSIONS

The above results show that based on present domestic wastewater flows in this system, there seems to be capacity for additional wastewater flows. The Navy Department of Public Works has agreed to allowing 40,000 gpd of wastewater to the existing system with the remaining capacity being reserved for the Navy's future use. Should more capacity be needed, storage and off-peak pumping can be utilized; i.e., pumping between the hours of 8:00 p.m. and 6:00 a.m. This arrangement has been agreed to by the Navy Department of Public Works for a maximum of 60,000 gal of added flow. This will result in a total available capacity of 100,000 gpd of wastewater.

The cost of this tank and pumping system is estimated to be $590,000.

APPENDIX A

DEVELOPMENT SCENARIOS

Commercial Fishing Port

The establishment of the 200-mile limit has resulted in the largest expansion of the New England fishing industry in over a century. Foreign fishing efforts on Georges Bank are being controlled and significantly reduced, and once-depleted stocks are recovering. Under-utilized species such as mackerel, squid, silver lake, and herring offer potential for supporting commercial fishery operations. Markets, both domestic and foreign, previously dominated by foreign vessels operating on the U.S. continental shelf have been left without a source of supply as a result of the 200-mile fishing limit. As a result of the potential for capturing these markets, new vessels are entering the New England fishing fleet and numerous coastal communities are exploring the possibility of establishing or expanding fishing industries.

A. Fishing Industry Characteristics

Fishing ports can be divided into four broad categories, based on vessel and shore support facility characteristics.

* Source: "Davisville Port Expansion", CE Maguire Inc., 1981 for Rhode Island Port Authority and Economic Development Corp.

1. A simple landing place with minimal facilities is customarily used by fishermen operating on a daily basis a short distance from shore. These may be recreational or subsistence fishing operations. Support requirements include a berthing area, fuel, and vessel maintenance and repair facilities. Establishments of this type dot the perimeter of Narragansett Bay. No support facilities for the catch, with the possible exception of an ice machine, are located at the landing place since little, if any, of the catch is marketed commercially.

2. Vessels making one or two day trips in coastal water have more sophisticated equipment, are larger than vessels using a simple landing place, and require a greater degree of protection and more extensive support facilities. These vessels generally range from 50 to 75 feet in length. Many of the harbors in and around Narragansett Bay are typical of this type of port. Support facilities at dockside may be limited to ice making, a truck access ramp for offloading and the same type of vessel-support discussed above, or may be more sophisticated, including equipment and service suppliers and a cooler for storage of the catch.

3. Traditional New England fishing ports such as Galilee and New Bedford are typical of the third type of establishment. These ports support vessels of 75 to 125 feet that can make trips of up to two weeks and cover several hundred miles.

These vessels require a well developed shore support infrastructure to service their sophisticated electronic, hydraulic, pneumatic and mechanical equipment. As with the type of establishment discussed above, dockside catch-support facilities may be limited to a cooler and off loading area, or may include processing, packing and an area for auction sales of the catch. Fishing cooperatives are becoming increasingly popular with this type of establishment and often provide a complete range of services for the vessel and the catch.

4. "Factory" fishing vessels often stay at sea for months at a time, operating thousands of miles from home port and returning only for major overhauls or resupply. These ships, generally Russian, Japanese, West German, can make calls only at ports with specialized facilities. Processing facilities for this type of fishing establishment are generally sophisticated and include complete, often mechanized, handling equipment. Some processing operations may occur at sea. Often a factory ship will be accompanied by several smaller fishing boats.

B. Industry Trends

Most of the traditional New England fishing ports are in the third category and are evolutionary, in that they developed from the first or second category. The market potential created by the establishment of the 200-mile limit, however, has created new

opportunities and has highlighted a potential obstacle in the form of inadequate and inefficient onshore fish handling and processing facilities. Expansion of existing facilities is often difficult due to physical restrictions. In order to take advantage of the opportunities created by the 200-mile limit, there have been several developments in the fishing industry. In some cases, establishment of an integrated fishing operation with a complete range of support and automated handling and processing facilities adjacent to the berthing area has been achieved in a previously undeveloped area. In other cases, cooperatives have been established in traditional fishing ports, offering improvements in catch handling, processing and selling procedures, due to sophisticated technologies and economies of scale. The establishment of a cooperative, however, is contingent on the cooperation of local fishermen, who are often strongly opposed to any real or imposed restrictions on their traditional and highly valued independence.

Until recently, the trend in the fishing industry has been to larger vessels, due mainly to "trading up" within the fishing fleet, with most of the sold vessels remaining in operation. Large vessels allow increased range and longer fishing time per trip, but the rapid increases in fuel prices since 1973 have begun to limit the cost-effectiveness of larger boats. It now appears that the optimal vessel size is 75 to 95 feet, due to economics and the availability of adequate shore support facilities. As discussed previously, this size vessel is more likely to be involved in a fishing cooperative or an integrated fishing port than a smaller vessel.

C. Facility Needs

A study prepared by the University of Rhode Island Coastal Research Center on Commercial Fishing Facility Needs in Rhode Island for the Rhode Island Coastal Management Program conservatively estimates that 45 to 200 additional fishing vessels will be in demand in New England within the next 10 years, with 11 to 60 of these based in Rhode Island if adequate facilities are available. This represents an increase of about 25 percent over the present fishing fleet of 125 vessels. In addition, significant numbers of vessels from other areas of the East Coast could relocate to Rhode Island should berth space become available. However, traditional Rhode Island fishing ports such as Newport and Galilee have been expanded to their practical limits or are occupied at near capacity levels, and significant expansion in either area would encounter significant political, economic and social resistance. It has been estimated by the University of Rhode Island Coastal Resources Center that the surplus US Navy land in Melville can accommodate up to 30 vessels. These vessels would range from 45 to 95 feet in length, with a few possibly as big as 125 feet, and would have drafts of 6 to 18 feet. Based on the distance from Narragansett Bay to Georges Bank (approximately 200 miles), most of the vessels operating out of Rhode Island ports would probably be in the 75 to 95 foot range. This would result in a need for approximately 1500 to 2000 feet of additional berthing space in Narragansett Bay and approximately 8 to 20 acres of back-up space if sorting, pro-

cessing, packing, and sales operations are located adjacent to the berths. If the catch is off-loaded onto trucks for processing elsewhere, approximately 5 acres of land adjacent to the berthing area would be required for gear storage parking, fuel, pump-out facilities, ice-making, and supply services. Given the limited number of potential sites in Rhode Island, it appears that unless existing facilities can be expanded or new sites developed, additions to the New England fishing fleet will locate elsewhere. Figure B-1 shows an idealized configuration for the type of facility that could be provided at Melville. The actual configuration will be dependent upon the size of the fleet, species being caught and configuration of the available land area. Depth alongside the wharf should be deep enough to accommodate vessels at all tide levels. The maximum draft that can be expected is 15 feet thereby requiring a 18 to 20 foot berths.

Melville has a number of advantages in considering the potential location of a fishing industry there. The existence of berthing space and shore support infrastructure minimizes development requirements. There is also adequate water depth available alongside the piers and bulkhead, another considerable advantage since dredging and disposal of dredge spoils is in itself costly and can involve a lengthy and expensive permit process. Melville is also well served by road and rail, and has back-up land available adjacent to the berthing area. Since the port area of Melville is isolated from nearby commercial/residential areas

and is and has been primarily industrial, environmental concern over establishment of a fishing industry would not be as great as in other Narragansett Bay sites. These factors appear to indicate that there will be a future demand for fishing industry berthing and support facilities in Rhode Island. This offers a potential developmental opportunity for Melville. The impact of the fishing industry on Melville would be minor if limited to offloading and support facilities or it could be extensive if establishment of an integrated fish plant or a fishing cooperative, was to take place. This is dependent upon the level and type of development desired by the Rhode Island Port Authority and potential developers.

Bulk Terminal

In considering potential development scenarios for Melville, it would be negligent if the most favorable asset of the site, namely its deep water, were not considered. East Passage up to Melville, with a controlling depth of 74 feet at Mean Low Water is one of the deepest protected harbors on the east coast. Further, immediately adjacent and north of the FBM pier is a small 50 foot basin. Existing depths at the approach to Melville are in excess of 40 feet at MLW and with minor dredging could match the basin north of the FBM pier. It should also be noted that the hydrographic analysis of this study concluded that little or no siltation occurs at the Melville site.

The site, therefore, is ideally suited to accommodate large deep draft ships and this scenario therefore takes maximum advantage of Melville's major natural attribute. In general, there are three primary commodities which are dependent on large bulk carriers and utilize east coast ports; they are: petroleum products, coal and grain.

The deep-draft category, includes many of the newer dry and, liquid bulk carriers. Tankers of 500,000 DWT and dry-bulk carriers of 250,000 DWT are already in operation. The vessels draw so much water, that their concept begins with the proposition that only special terminals at limited locations in the world will be usable. The depth of water required by these carriers usually require reaching out to deeper open water to construct an offshore type of berthing and

unloading arrangement. Petroleum tankers lend themselves to these technological applications somewhat more easily than do dry bulk carriers, the chief difference being that the tanker needs only hose connections and pipes to load or unload at the berth, whereas a bulk carrier generally requires unloading or loading equipment plus conveyor transporting or storage equipment. The offshore dry-bulk terminal thus typically represents a more complex undertaking. Melville, with its deep water relatively near shore, offers an inherent advantage for dry bulk terminals. While it would not be able to handle the superships, it could be the only port to connect the lucrative US East Coast to Rotterdam route by accommodating the 80 to 100,000 deadweight ton (DWT) ships which are now handled in Rotterdam. These ships need typically 50-60 feet of water.

Regarding the so-called tanker-glut which exists in the world, this surplus is a result of supply and demand for petroleum tankers brought on by substantial orders for new vessels stimulated by high shipping prices. The increased capacity was coupled with reductions in petroleum consumption resulting from embargos and high petroleum prices. The net result was in a significant reduction in tanker capacity demand. This surplus, however, does not negate the need for a deepwater terminal, since the larger class vessels are more efficient.

A similar situation may be impending for coal transport terminals. Because of the existing demand for coal overseas, and the congestion at major east coast coal ports, numerous projects to develop new coal

terminals have been proposed. It has been said that if a majority of these proposals come to fruition, there will be an excess in terminal capacity. Herein lies another advantage at Melville. A majority of the new coal port proposals require the construction of extensive new pier facilities including extensive dredging of channels and berths. Recognizing the long lead time necessary for the permit approval process and for design and construction, many of the proposed terminals will not come on line for several years in the future. Melville already has a waterfront infrastructure in place which reaches to the deep water. The opportunity therefore exists to bring a Melville coal terminal on line years ahead of the competition which would present a lucrative competitive advantage.

In addressing Melville's potential as a bulk terminal, a major disadvantage must also be considered. Most bulk deliveries would come overland by rail (unit trains). The existing railroad structure to the site is in poor condition both physically and organizationally. There may also be concern that the advent of unit trains through New England could have a significant impact on the region. In the several bulk terminal ventures where Maguire has provided consulting services, the railroad service has been the major factor in the lack of successful implementation. Should the railroad issue be resolved, Melville could become one of the most successful bulk terminals on the east coast.

Dry bulk terminals generally consist of piers or sea islands. They are generally located near shore. Because of the need for conveyors

to deliver the cargo from storage to the pier, conveyors are generally supported over water on trestles which also provide pedestrian and possibly light vehicle access. A crane is needed to load the ship and therefore, a substantial pier structure is needed to support the crane and conveyors. Cranes are generally gantry type traveling on rails in order to reach all of the ship's holds. Since the location of crane rails are fixed, the pier is generally a skeleton structure with heavy foundations under the crane rails and lighter structures for pedestrian and light vehicle access as well as for conveyor support. Typical layouts for a coal terminal and grain terminal are shown on Figures B2 and B3, respectively. These layouts were obtained from conceptual designs for previous proposals at the Melville site.

Ships which could take advantage of the water depth at Melville (50 feet at MLW with minor dredging) would be in the 80 to 100,000 dead weight ton (DWT) class, and would typically have a length on the order of 800 to 900 feet and a beam of 120 feet.

APPENDIX A

APPENDIX

DEVELOPMENT SCENARIOS

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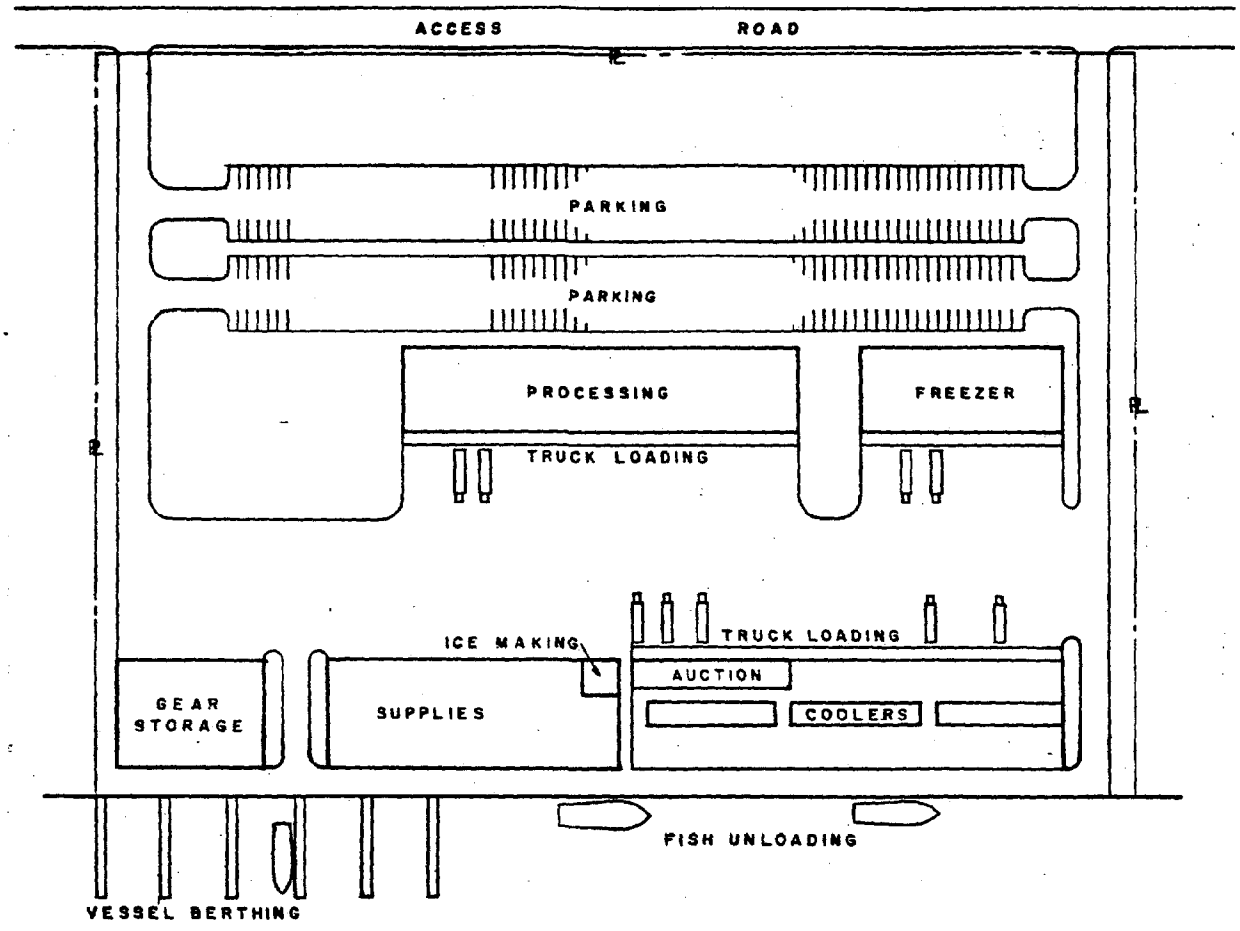

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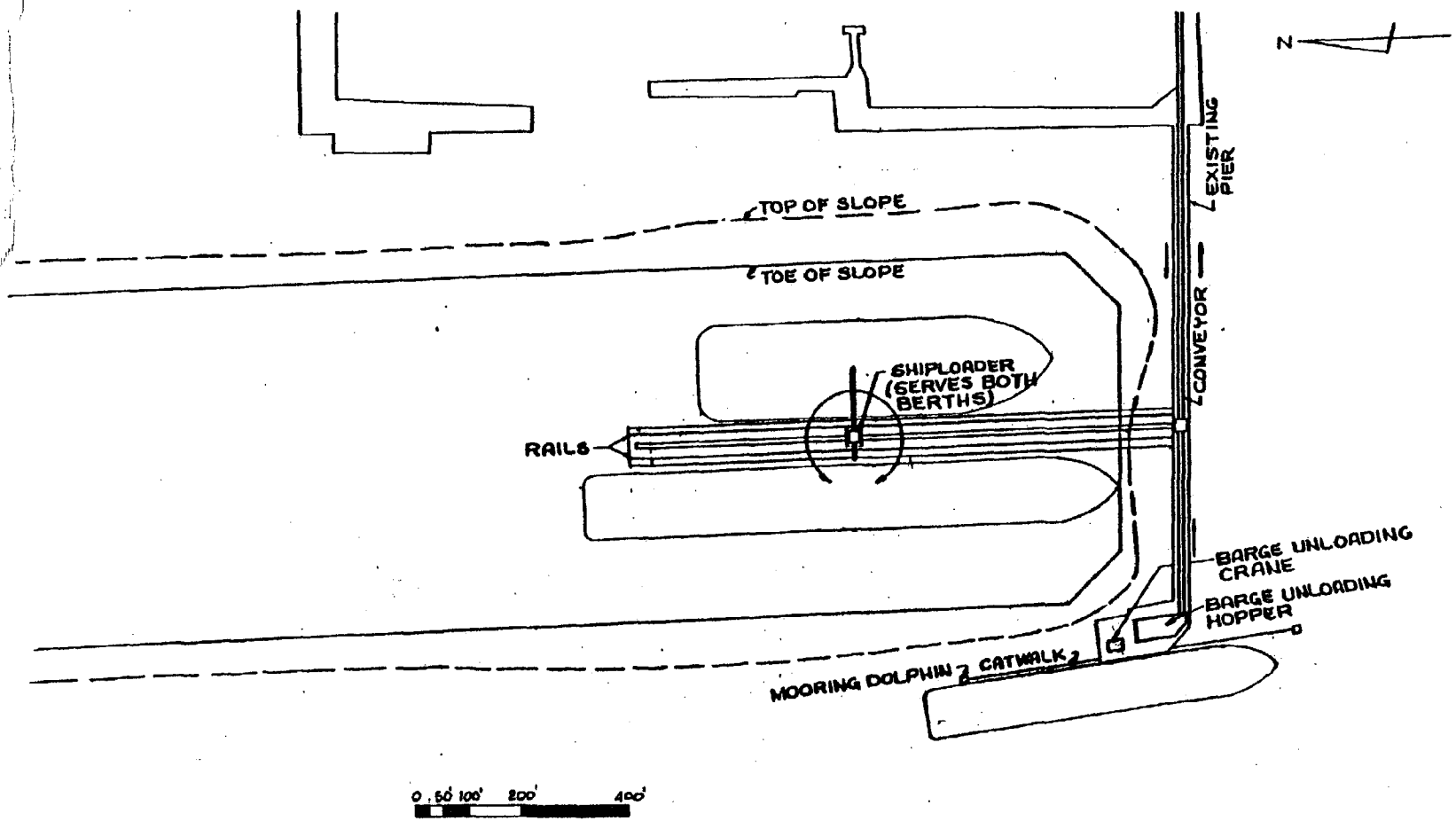
MELVILLE CONDITION SURVEY

IDEALIZED FISHING FACILITY



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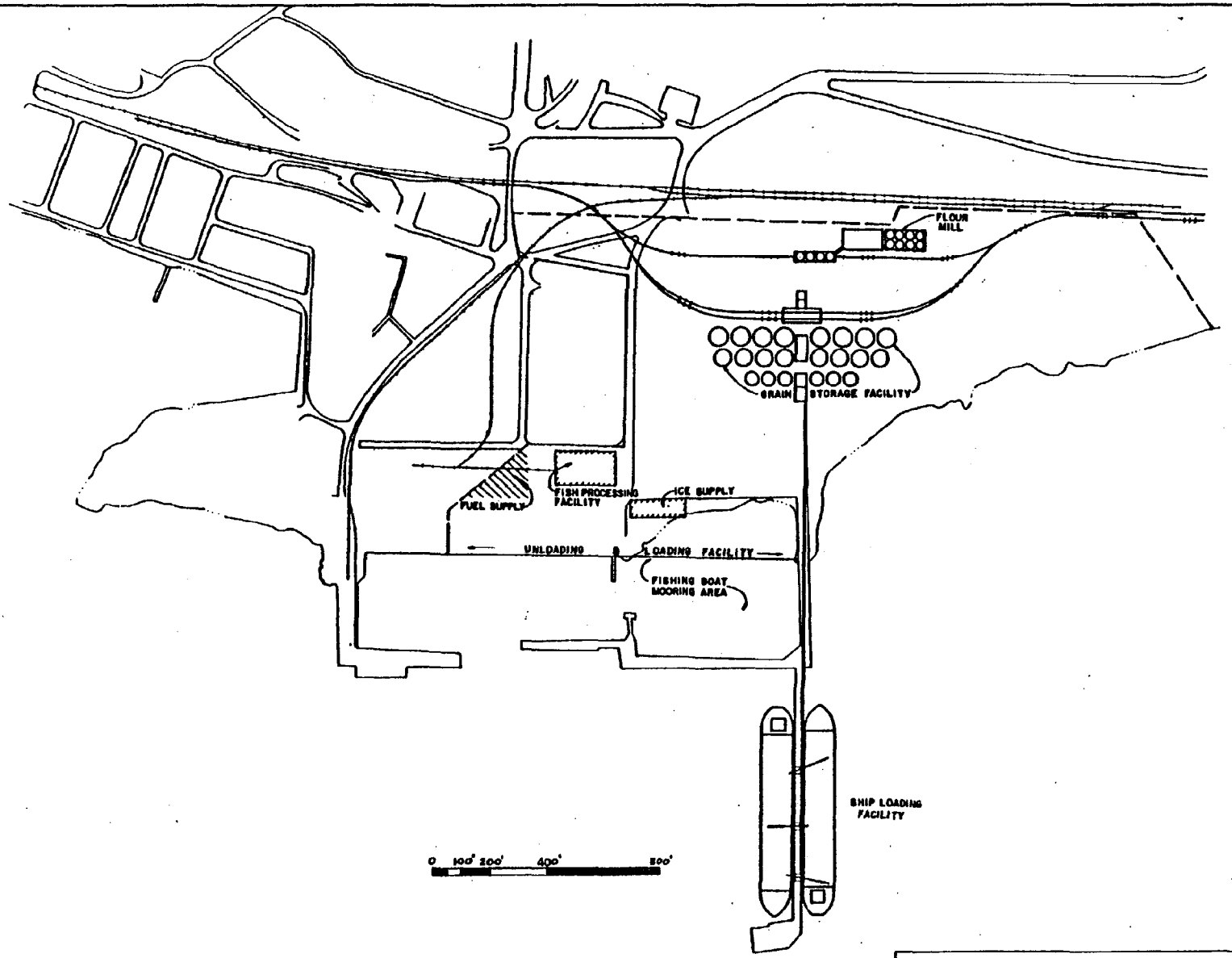
MELVILLE CONDITION SURVEY

BULK TERMINAL LAYOUT
COAL

DATE: MAY 1982

FIGURE NO. B-2



MELVILLE CONDITION SURVEY

BULK TERMINAL LAYOUT GRAIN

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DATE MAY 1982

FIGURE NO. B-3

and is and has been primarily industrial, environmental concern over establishment of a fishing industry would not be as great as in other Narragansett Bay sites. These factors appear to indicate that there will be a future demand for fishing industry berthing and support facilities in Rhode Island. This offers a potential developmental opportunity for Melville. The impact of the fishing industry on Melville would be minor if limited to offloading and support facilities or it could be extensive if establishment of an integrated fish plant or a fishing cooperative, was to take place. This is dependent upon the level and type of development desired by the Rhode Island Port Authority and potential developers.

Bulk Terminal

In considering potential development scenarios for Melville, it would be negligent if the most favorable asset of the site, namely its deep water, were not considered. East Passage up to Melville, with a controlling depth of 74 feet at Mean Low Water is one of the deepest protected harbors on the east coast. Further, immediately adjacent and north of the FBM pier is a small 50 foot basin. Existing depths at the approach to Melville are in excess of 40 feet at MLW and with minor dredging could match the basin north of the FBM pier. It should also be noted that the hydrographic analysis of this study concluded that little or no siltation occurs at the Melville site.

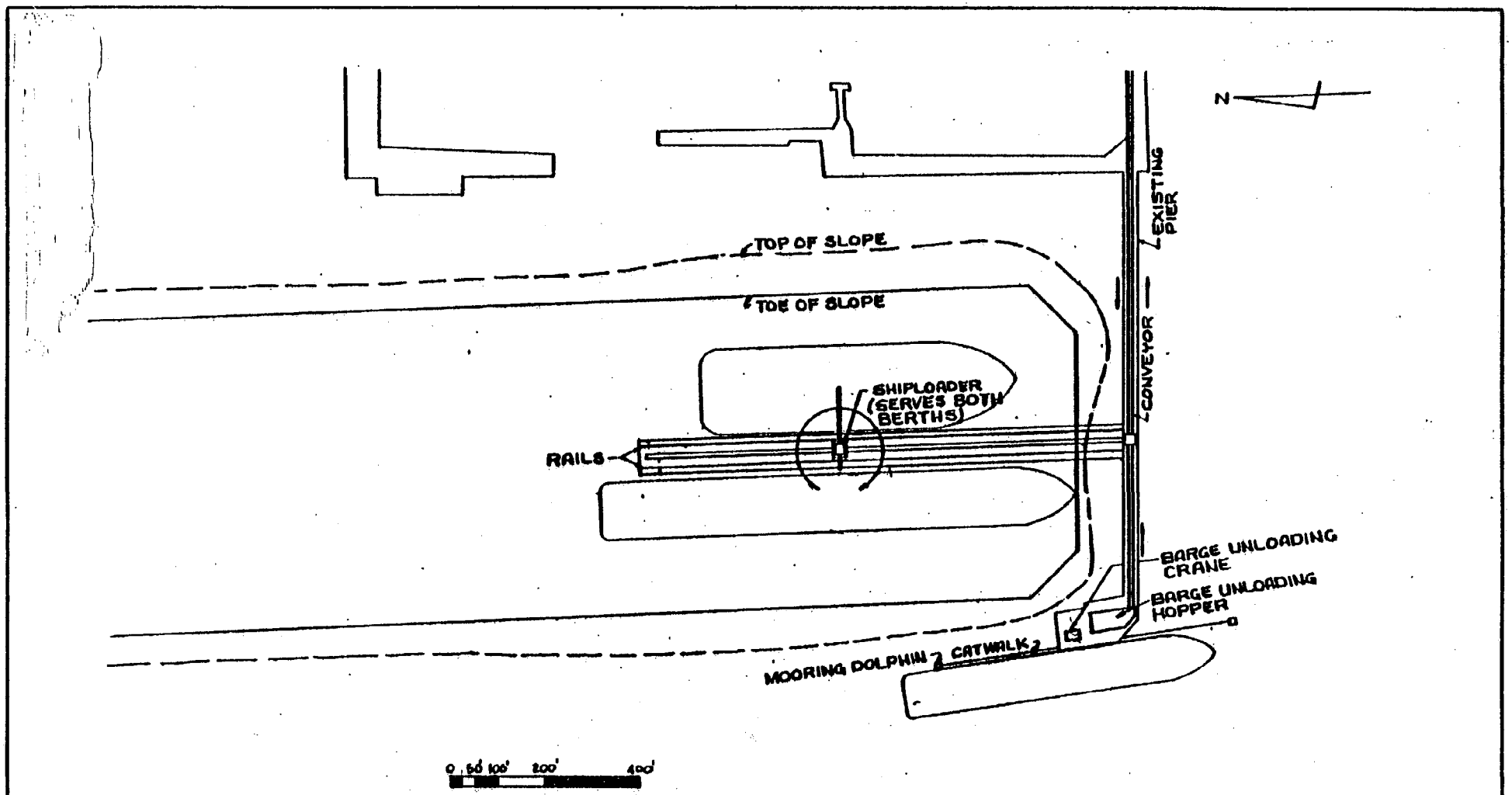
The site, therefore, is ideally suited to accommodate large deep draft ships and this scenario therefore takes maximum advantage of Melville's major natural attribute. In general, there are three primary commodities which are dependent on large bulk carriers and utilize east coast ports; they are: petroleum products, coal and grain.

The deep-draft category, includes many of the newer dry and, liquid bulk carriers. Tankers of 500,000 DWT and dry-bulk carriers of 250,000 DWT are already in operation. The vessels draw so much water, that their concept begins with the proposition that only special terminals at limited locations in the world will be usable. The depth of water required by these carriers usually require reaching out to deeper open water to construct an offshore type of berthing and

unloading arrangement. Petroleum tankers lend themselves to these technological applications somewhat more easily than do dry bulk carriers, the chief difference being that the tanker needs only hose connections and pipes to load or unload at the berth, whereas a bulk carrier generally requires unloading or loading equipment plus conveyor transporting or storage equipment. The offshore dry-bulk terminal thus typically represents a more complex undertaking. Melville, with its deep water relatively near shore, offers an inherent advantage for dry bulk terminals. While it would not be able to handle the superships, it could be the only port to connect the lucrative US East Coast to Rotterdam route by accommodating the 80 to 100,000 deadweight ton (DWT) ships which are now handled in Rotterdam. These ships need typically 50-60 feet of water.

Regarding the so-called tanker-glut which exists in the world, this surplus is a result of supply and demand for petroleum tankers brought on by substantial orders for new vessels stimulated by high shipping prices. The increased capacity was coupled with reductions in petroleum consumption resulting from embargos and high petroleum prices. The net result was in a significant reduction in tanker capacity demand. This surplus, however, does not negate the need for a deepwater terminal, since the larger class vessels are more efficient.

A similar situation may be impending for coal transport terminals. Because of the existing demand for coal overseas, and the congestion at major east coast coal ports, numerous projects to develop new coal



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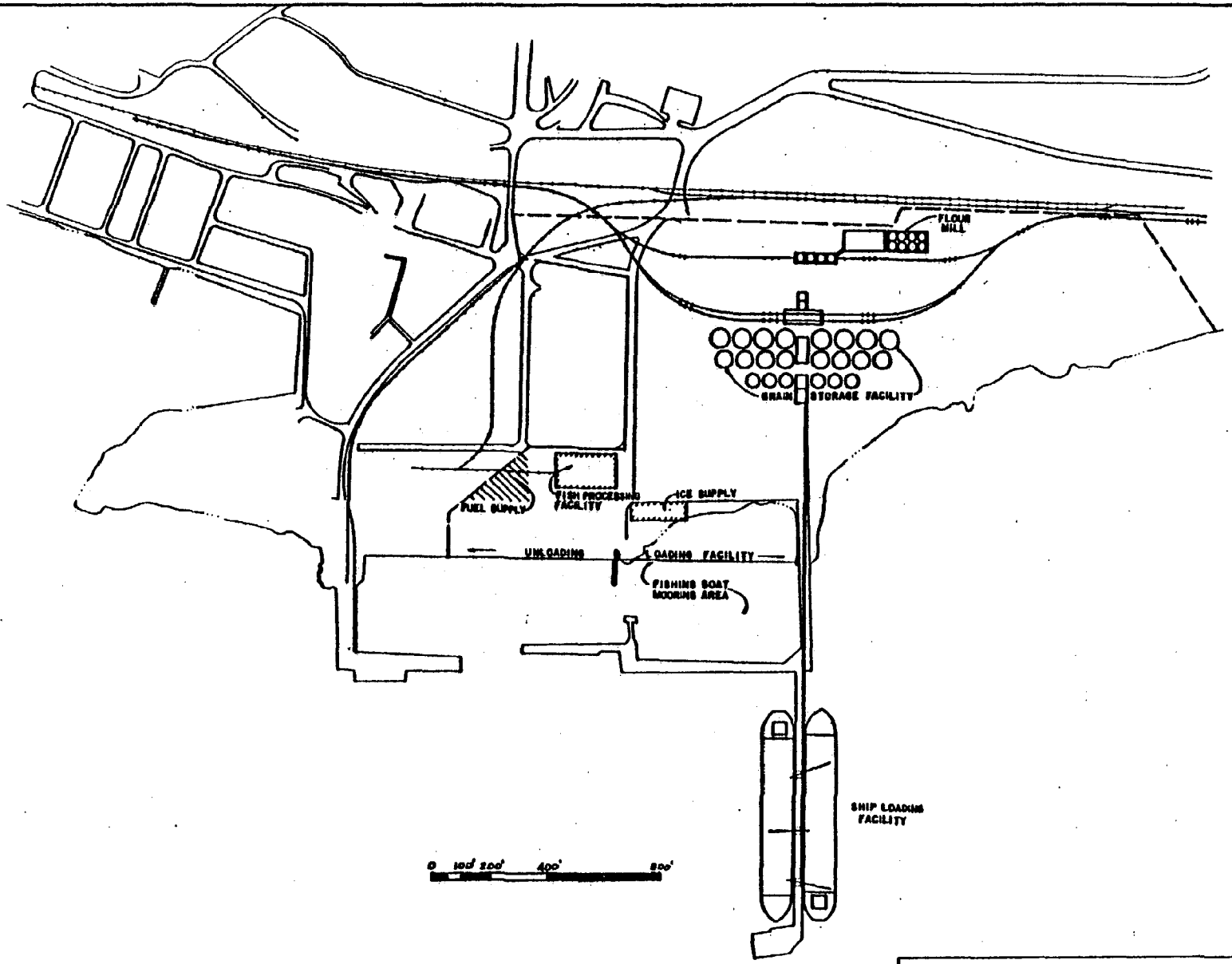
MELVILLE CONDITION SURVEY

BULK TERMINAL LAYOUT
COAL

DATE	FIGURE NO.
MAY 1982	B-2



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MELVILLE CONDITION SURVEY

BULK TERMINAL LAYOUT
GRAIN

DATE: MAY 1982

FIGURE NO. B-3

terminals have been proposed. It has been said that if a majority of these proposals come to fruition, there will be an excess in terminal capacity. Herein lies another advantage at Melville. A majority of the new coal port proposals require the construction of extensive new pier facilities including extensive dredging of channels and berths. Recognizing the long lead time necessary for the permit approval process and for design and construction, many of the proposed terminals will not come on line for several years in the future. Melville already has a waterfront infrastructure in place which reaches to the deep water. The opportunity therefore exists to bring a Melville coal terminal on line years ahead of the competition which would present a lucrative competitive advantage.

In addressing Melville's potential as a bulk terminal, a major disadvantage must also be considered. Most bulk deliveries would come overland by rail (unit trains). The existing railroad structure to the site is in poor condition both physically and organizationally. There may also be concern that the advent of unit trains through New England could have a significant impact on the region. In the several bulk terminal ventures where Maguire has provided consulting services, the railroad service has been the major factor in the lack of successful implementation. Should the railroad issue be resolved, Melville could become one of the most successful bulk terminals on the east coast.

Dry bulk terminals generally consist of piers or sea islands. They are generally located near shore. Because of the need for conveyors

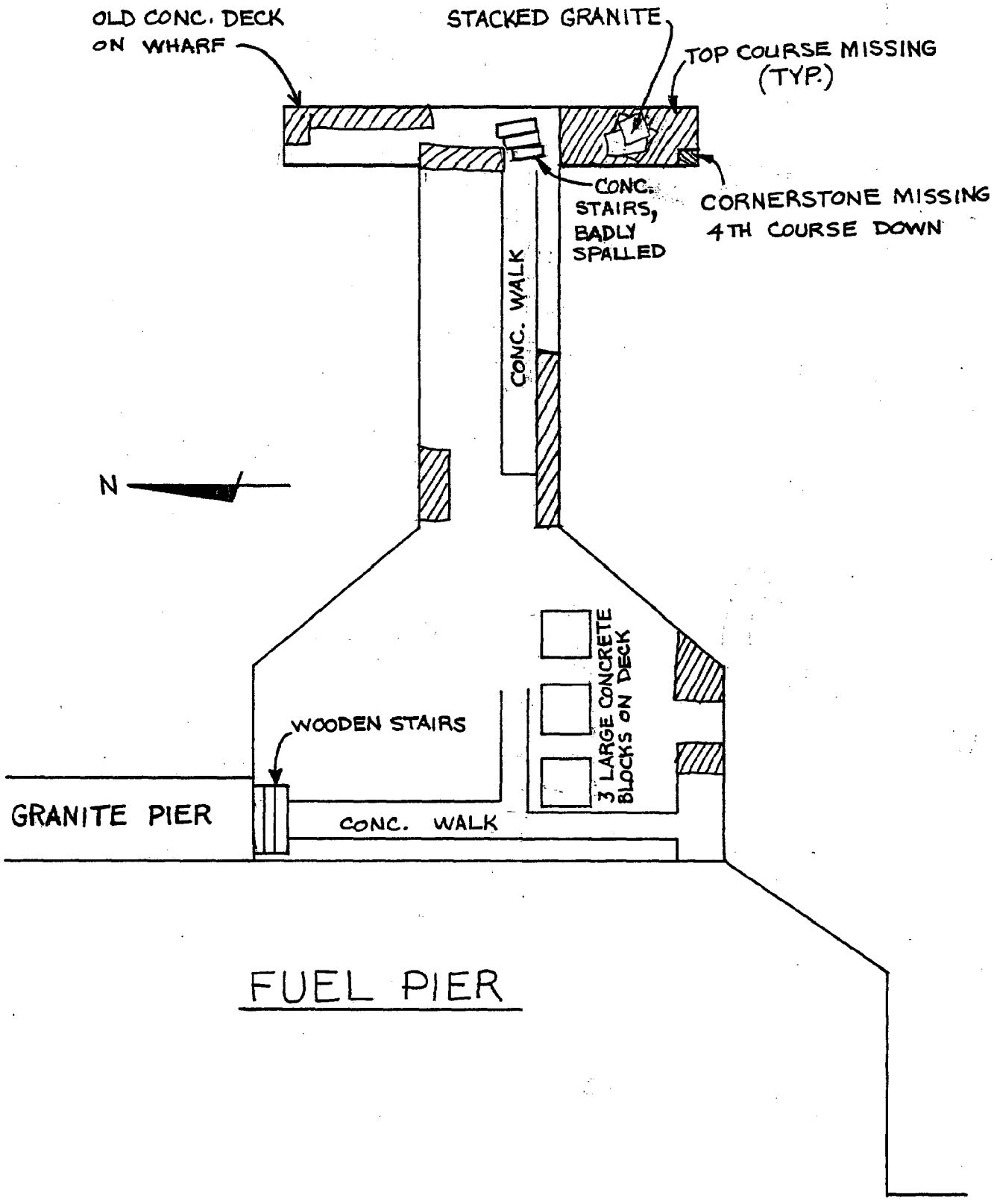
to deliver the cargo from storage to the pier, conveyors are generally supported over water on trestles which also provide pedestrian and possibly light vehicle access. A crane is needed to load the ship and therefore, a substantial pier structure is needed to support the crane and conveyors. Cranes are generally gantry type traveling on rails in order to reach all of the ship's holds. Since the location of crane rails are fixed, the pier is generally a skeleton structure with heavy foundations under the crane rails and lighter structures for pedestrian and light vehicle access as well as for conveyor support. Typical layouts for a coal terminal and grain terminal are shown on Figures B2 and B3, respectively. These layouts were obtained from conceptual designs for previous proposals at the Melville site.

Ships which could take advantage of the water depth at Melville (50 feet at MLW with minor dredging) would be in the 80 to 100,000 dead weight ton (DWT) class, and would typically have a length on the order of 800 to 900 feet and a beam of 120 feet.

APPENDIX B

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001
SUBJECT GRANITE PIER SHEET NO. ___ OF ___
DATE 3-13-1982
COMP. V.V.C. CHECK ___ CONT. NO. ___

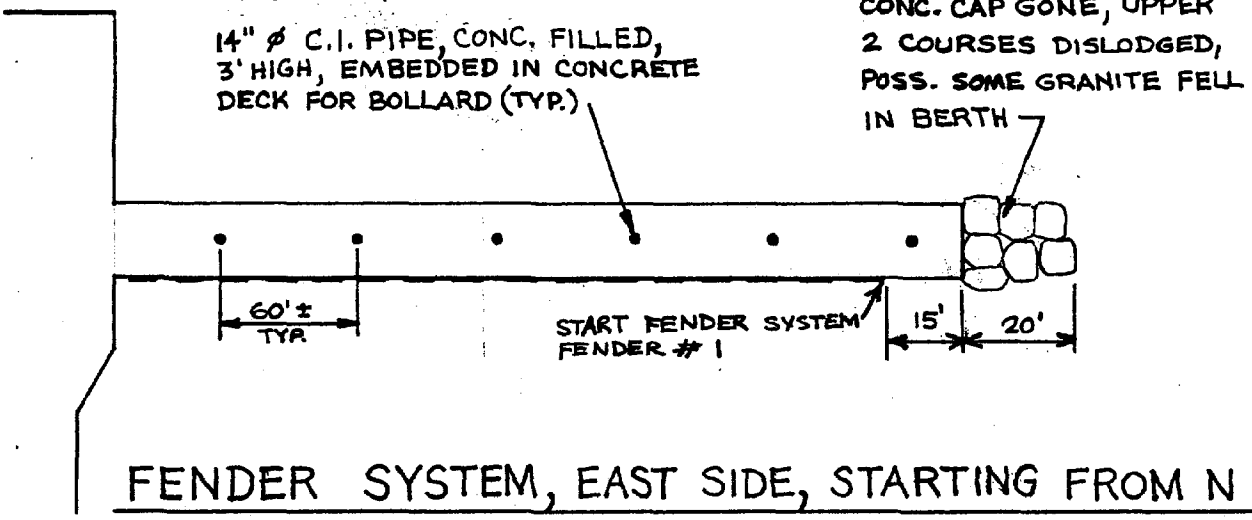


FUEL PIER

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001
SUBJECT GRANITE PIER SHEET NO. ___ OF ___
DATE 3-13-1982
COMP. V.V.C CHECK ___ CONT. NO. ___

9:30 AM, HIGH TIDE



FENDER SYSTEM, EAST SIDE, STARTING FROM N

FENDER #	PILE	CHOCK	WALE
1	ROTTED @ BOLT	✓	✓
2	MISSING	✓	✓
3	MISSING	✓	✓
4	MISSING	ROTTED	✓
5	MISSING	ROTTED	✓
6	MISSING	MISSING	SPLIT & ROTTED
7	FALLEN, LEANING ON NO. 8, ROTTED @ TOP	MISSING	SPLIT & ROTTED
8	MINOR ROT @ TOP	MISSING	SPLIT & ROTTED
9	ROTTED @ TOP	ROTTED	ROTTED
10	MISSING	ROTTED	ROTTED
11	MISSING (LEANING AGAINST 12)	ROTTED	ROTTED
12	ROTTED @ TOP	ROTTED	ROTTED
13	ROTTED, LEANING AGAINST NO. 12	ROTTED	ROTTED

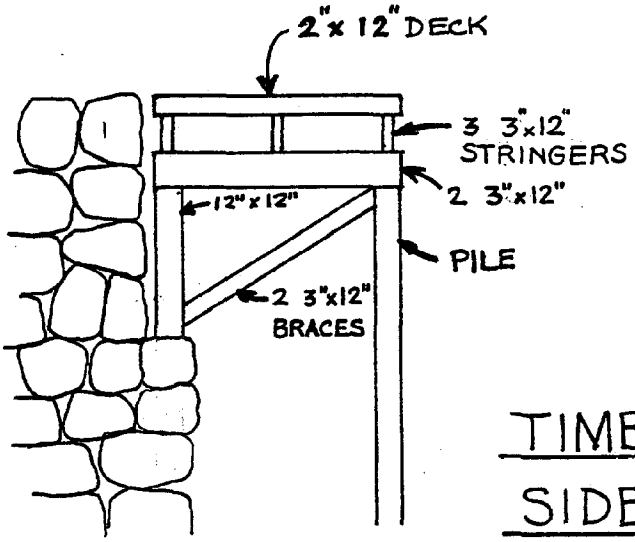
THE MAGUIRE GROUP

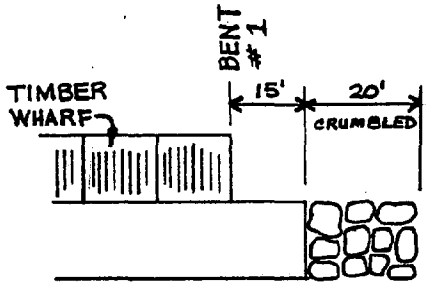
PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001
SUBJECT GRANITE PIER SHEET NO. ___ OF ___
DATE 3-13-1982
COMP. V.V.C. CHECK ___ CONT. NO. ___

FENDER #	PILE	CHOCK	WALE
14	MISSING	✓	✓
15	MISSING	✓	✓
16	MISSING	MISSING	✓
17	MISSING	MISSING	✓
18	MISSING	MISSING	✓
19	MISSING	MISSING	ROTTED
20	MISSING	MISSING	ROTTED
21	MISSING	MISSING	ROTTED
22	MISSING	MISSING	ROTTED
23	MISSING	MISSING	ROTTED & DISLODGED
24	MISSING	MISSING	ROTTED
25	MISSING	ROTTED	ROTTED
26	MISSING (LEANING AGAINST 27)	MISSING	ROTTED
27	ROTTED @ TOP	ROTTED	ROTTED
28	MISSING	MISSING	ROTTED
29	MISSING (LEANING AGAINST 30)	MISSING	ROTTED
30	ROTTED @ TOP	MISSING	ROTTED
31	ROTTED @ TOP	ROTTED	✓
32	ROTTED @ TOP	ROTTED	✓
33	ROTTED @ TOP	ROTTED	✓
34	ROTTED @ TOP	ROTTED	✓

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001
SUBJECT GRANITE PIER SHEET NO. ___ OF ___
DATE 3-13-1982
COMP. V.V.C. CHECK ___ CONT. NO. ___





TIMBER DECK ON WEST SIDE (TYP.), STARTING AT NORTH END

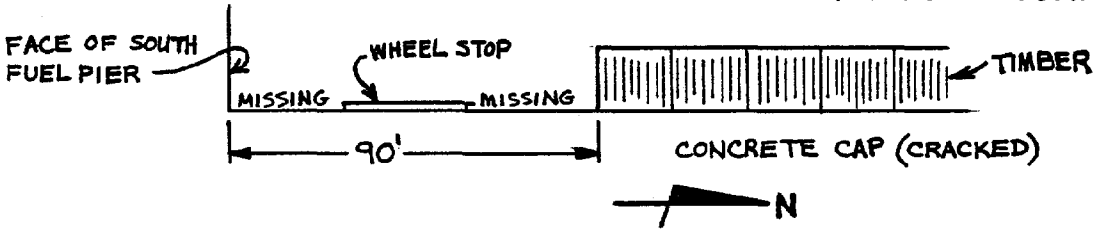
BENT#	PILE	VERT. 12x12	CAP	BRACES	STRINGERS	DECK
1	ROTTED	GONE	GONE	GONE	GONE	GONE
2	ROTTED	GONE	GONE	GONE	GONE	GONE
3	✓	✓	✓	GONE	ROTTED	GONE
4	✓	✓	✓	✓	ROTTED	GONE
5	✓	ROTTED	✓	GONE	ROTTED	GONE
6	✓	ROTTED	✓	GONE	ROTTED	GONE
7	GONE	GONE	GONE	GONE	ROTTED	GONE
8		✓	✓	GONE	ROTTED	GONE
9	ROTTED	✓	✓	GONE	GONE	GONE
10	ROTTED	✓	ROTTED	ROTTED	ROTTED	ROTTED
11	✓	✓	✓	✓	ROTTED	GONE
12	✓	✓	✓	✓	ROTTED	GONE

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001
SUBJECT GRANITE PIER SHEET NO. ___ OF ___
DATE 3-13-1982
COMP. V.V.C. CHECK ___ CONT. NO. ___

BENT#	PILE	VERT. 12x12	CAP	BRACES	STRINGERS	DECK
13	✓ & FENDER PILE (ROTTED)	✓	✓	✓	ROTTED	GONE
14	ROTTED	✓	✓	GONE	ROTTED	GONE
15	ROTTED	✓	✓	GONE	ROTTED	GONE
16	✓ & FENDER PILE	ROTTED	✓	GONE	ROTTED	GONE
17	ROTTED	✓	✓	GONE	ROTTED	GONE
18	✓	✓	✓	GONE	ROTTED	GONE
19	ROTTED	✓	✓	GONE	ROTTED	GONE
20	ROTTED	ROTTED	✓	GONE	ROTTED	GONE
21	ROTTED	✓	✓	LOOSE	ROTTED	GONE
22	✓ & FENDER PILE (ROTTED)	✓	✓	GONE	ROTTED	GONE
23	✓	✓	✓	✓	ROTTED	GONE
24	✓	✓	✓	✓	ROTTED	GONE
25	ROTTED	✓	✓	✓	ROTTED	GONE
26	✓	✓	✓	✓	ROTTED	GONE
27	✓	✓	✓	GONE	ROTTED	GONE
28	ROTTED	✓	✓	✓	ROTTED	GONE
29	ROTTED & FENDER PILE	✓	✓	GONE	ROTTED	ROTTED
30	ROTTED & DISLODGED	✓	✓	✓	ROTTED	ROTTED
31	✓	ROTTED	✓	GONE	ROTTED	GONE

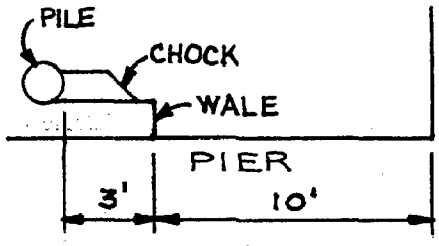
REMNANTS OLD FENDER SYSTEM



THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001
SUBJECT GRANITE PIER SHEET NO. ___ OF ___
DATE 3-13-1982
COMP. V.V.C. CHECK ___ CONT. NO. ___

FENDER#	PILE	CHOCK	WALE
35	MISSING	ROTTED	✓
36	ROTTED @ TOP	✓	✓
37	MISSING (LEANING AGAINST 38)	✓	✓
38	ROTTED @ TOP	END	



PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

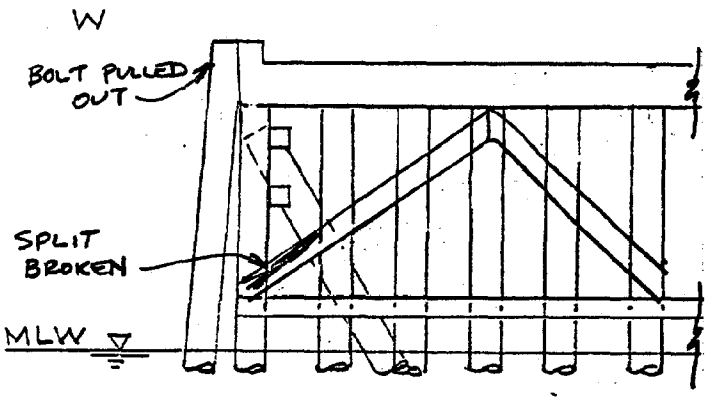
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VV C

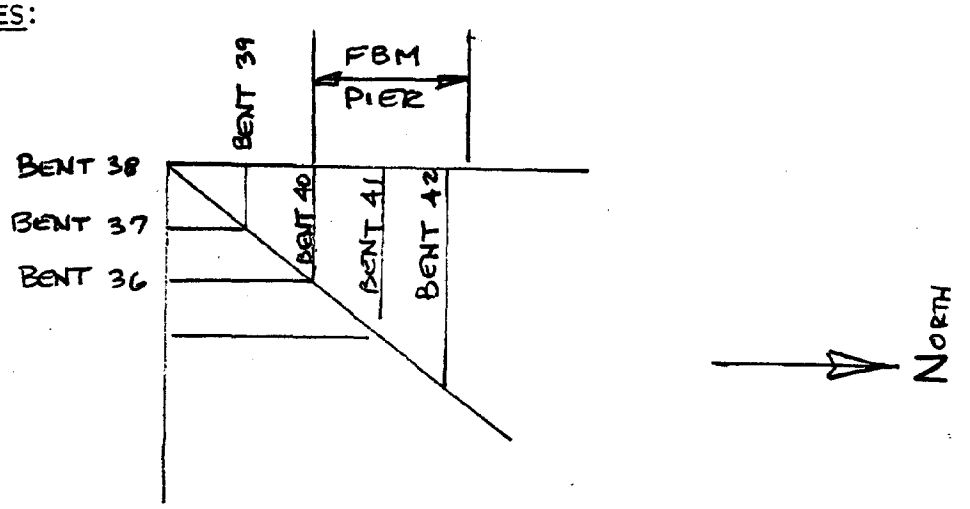
TIME: 7:07 AM CONDITIONS: FOGGY, CALM, DAMP

APPROX. TIDE: +2.0 MLW



BENT NO. 40

NOTES:



PLAN

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

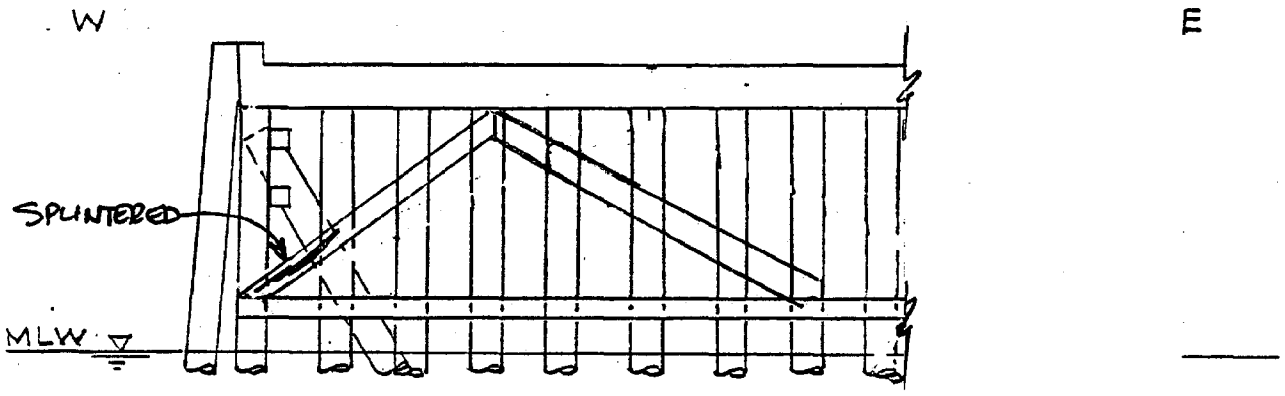
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.1 MLLW



BENT NO. 41

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

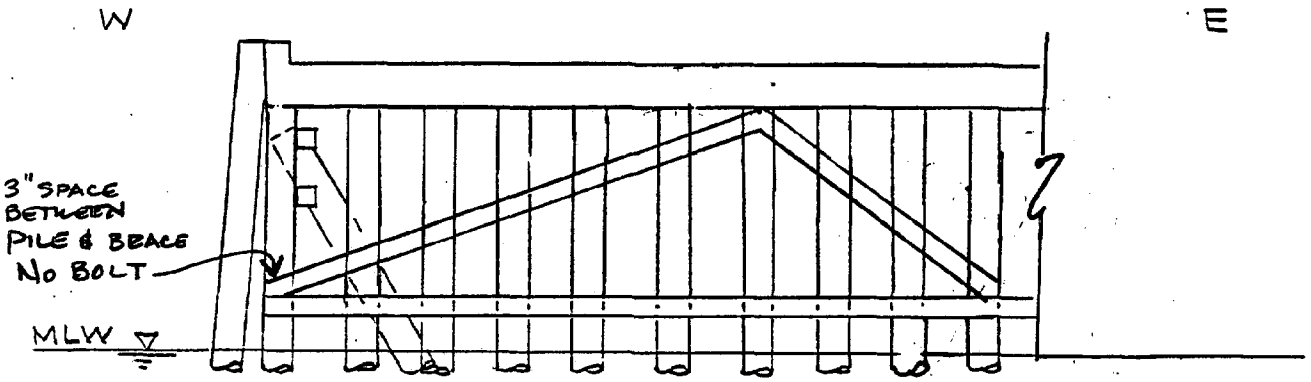
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: 7:29 AM CONDITIONS: ____

APPROX. TIDE: +2.2 M.L.W.



BENT NO. 42

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 7001

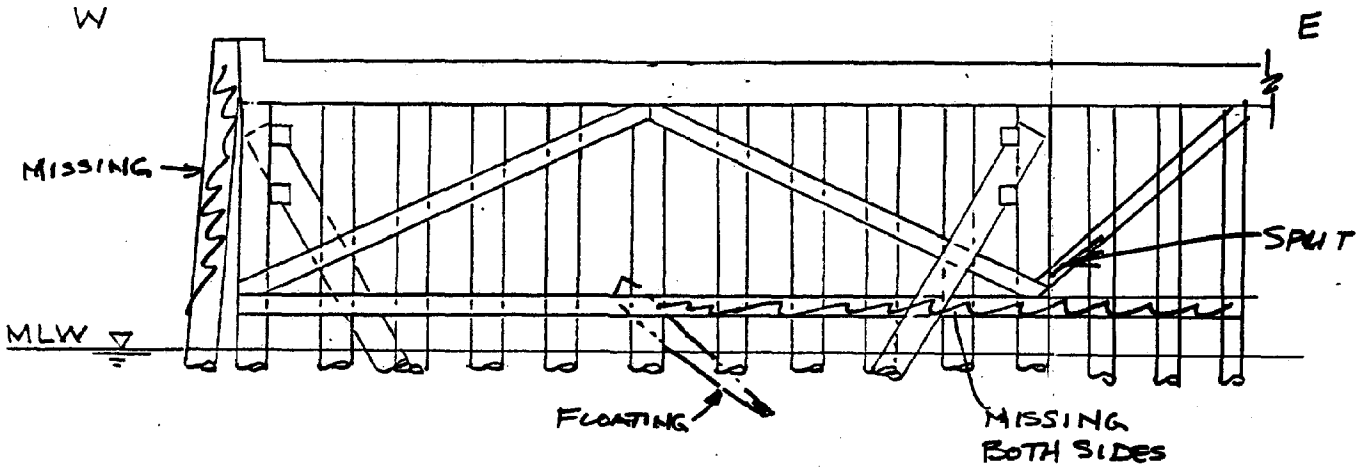
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.2 M.L.W.



BENT NO. 43

NOTES:

CHOCK BETWEEN FBM PIER & FENDER PILE MISSING

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

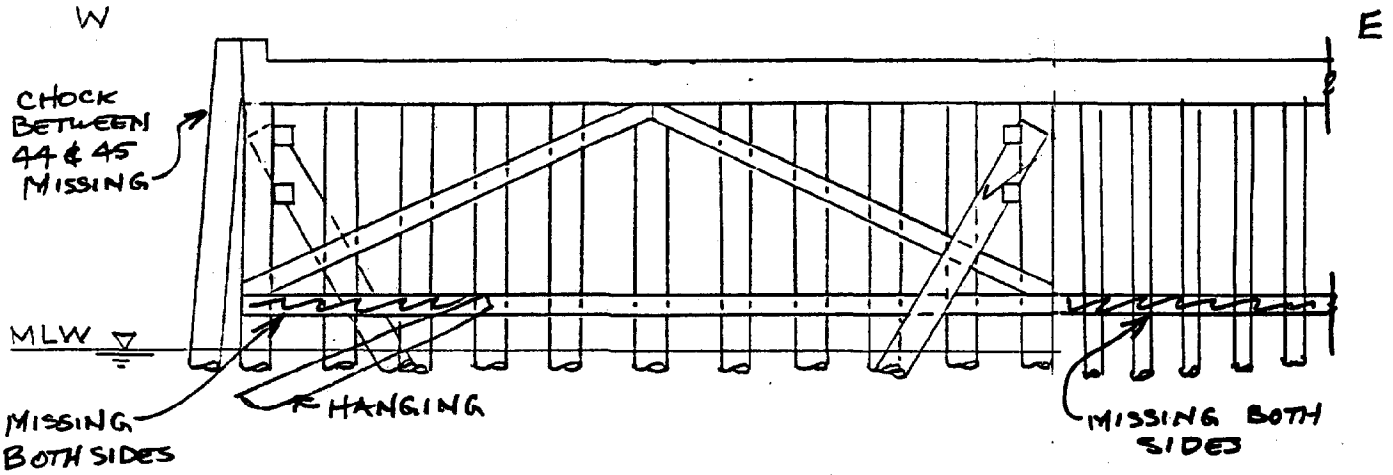
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: 2.2 M.L.W.



BENT NO. 44

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

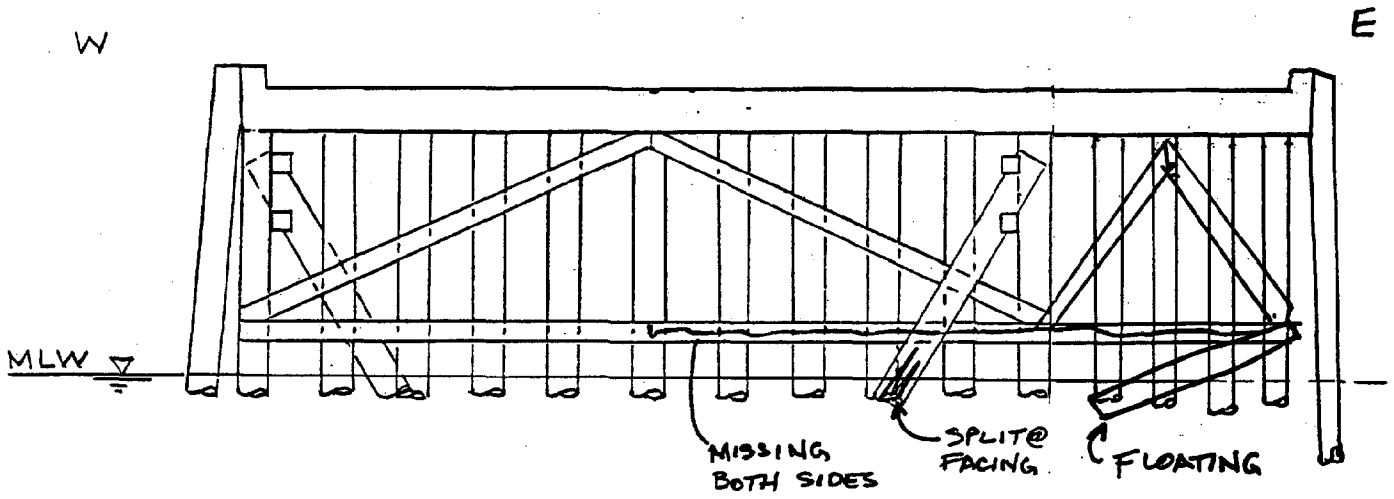
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: 7:37 AM CONDITIONS: ____

APPROX. TIDE: +2.3 M.L.W.



BENT NO. 45

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

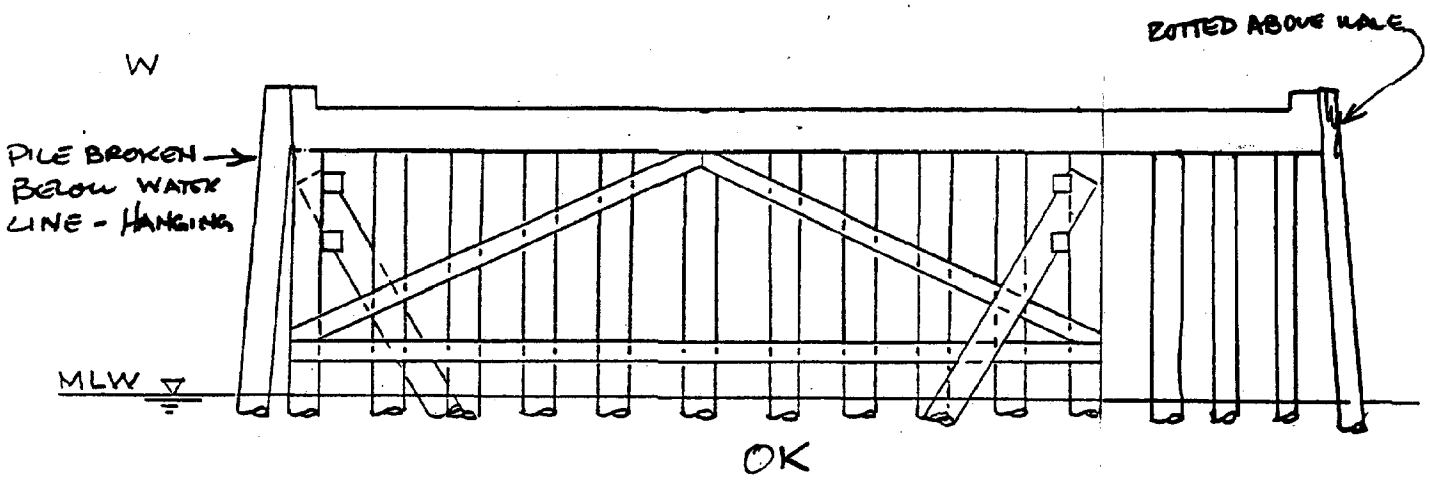
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.3M.L.W.



BENT NO. 46

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

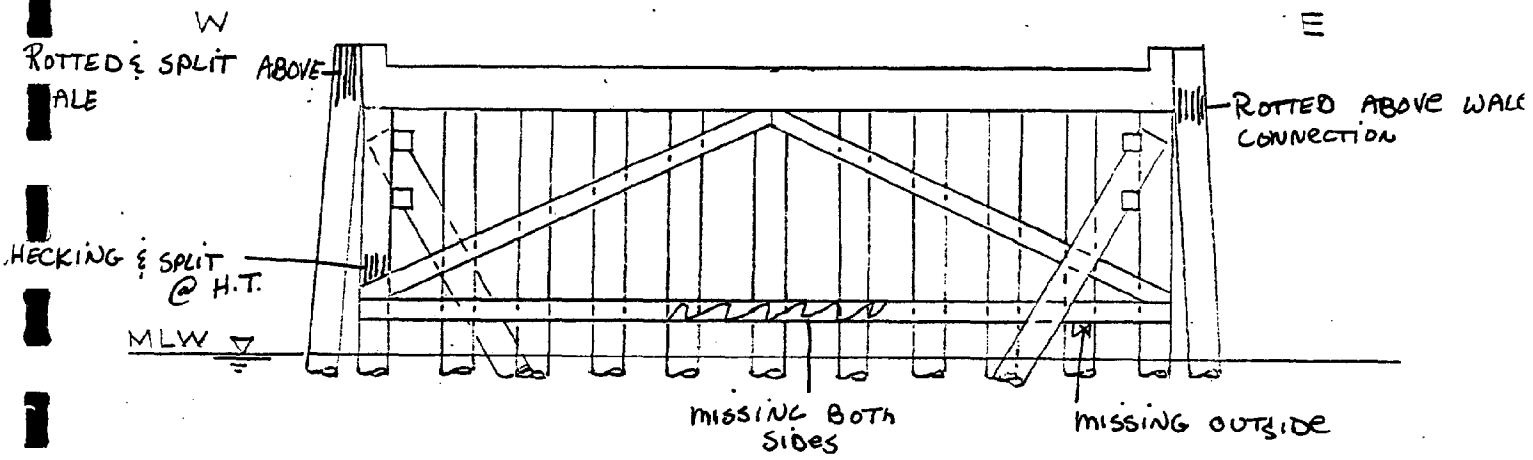
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE +2.3 M.L.W.



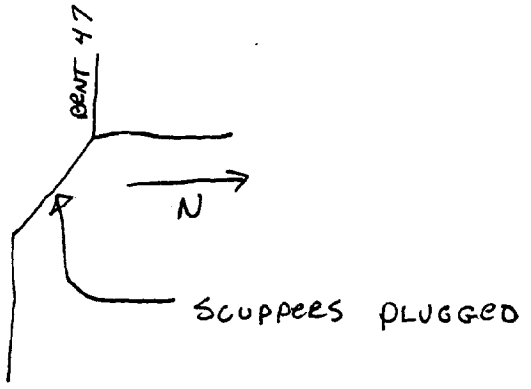
BENT NO. 47

NOTES:

NOTE SCUPPERS ON WEST FACE OF PIER ARE PLUGGED WITH CONCRETE

PILES SPLITTING ON FACE @ H.T.

END OF DIAGONAL START OF NORMAL BENTS



PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

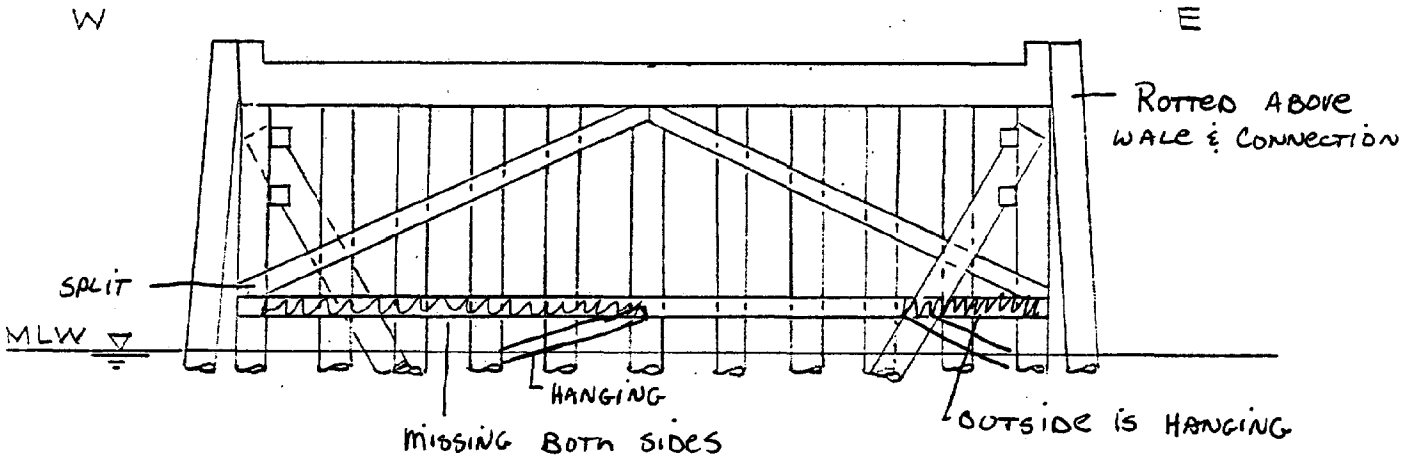
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR. 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.3 M.L.W.



BENT NO. 48

STA 1+00

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

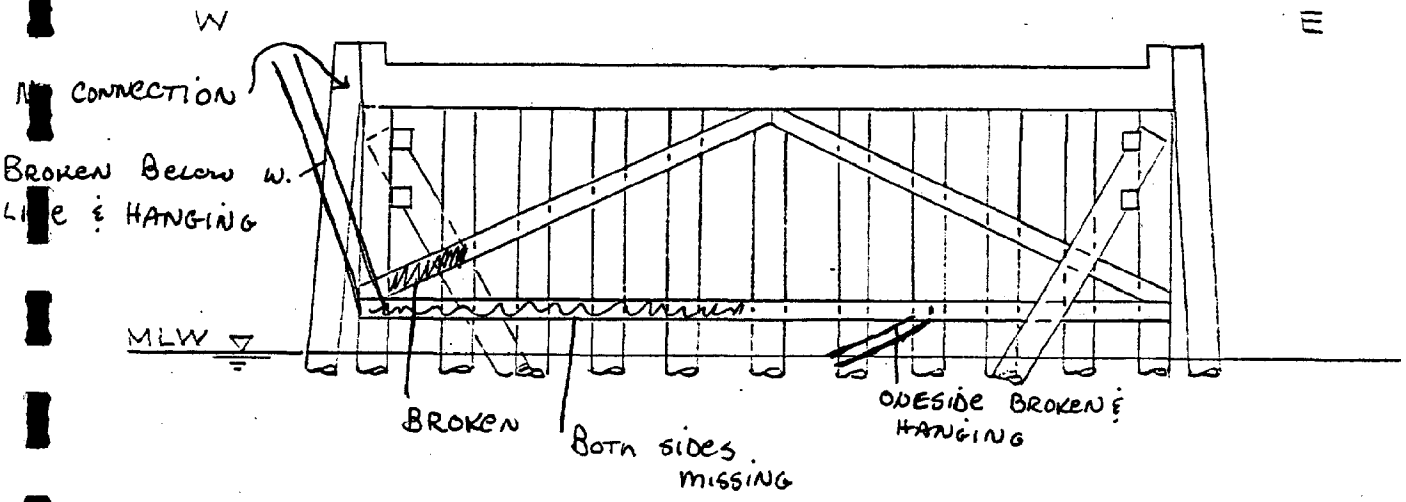
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.3 M.L.W.



BENT NO. 49

NOTES:

CABLE HANGING UNDER PIER

5 PLATES WITH 2 BOLTS EACH UNDER DECK BETWEEN 49 & 50 STEPIN CONCRETE

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

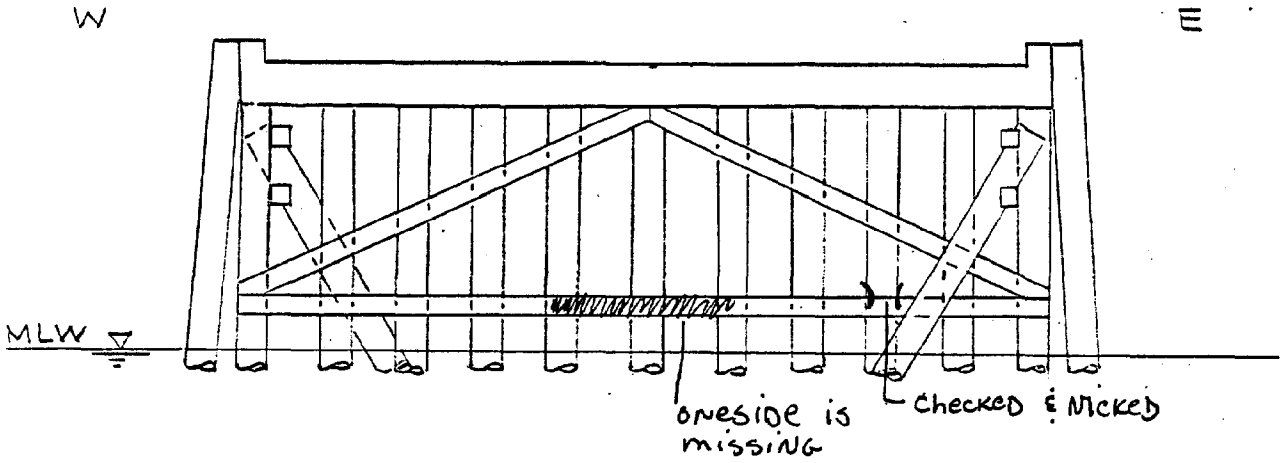
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.3 M.L.W.



BENT NO. 50

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

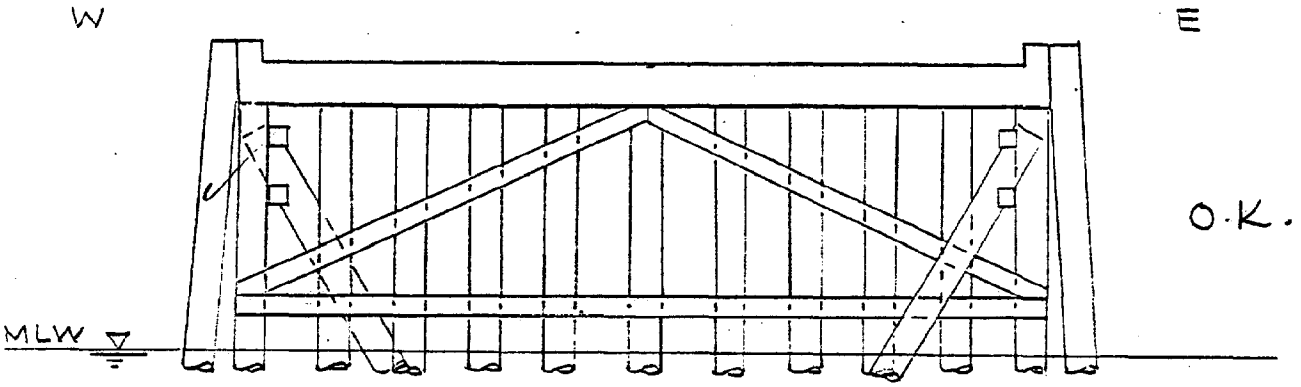
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: 8:01 Am CONDITIONS: STARTING TO DRIZZLE

APPROX. TIDE: +2.4 M.L.W.



BENT NO. 51

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

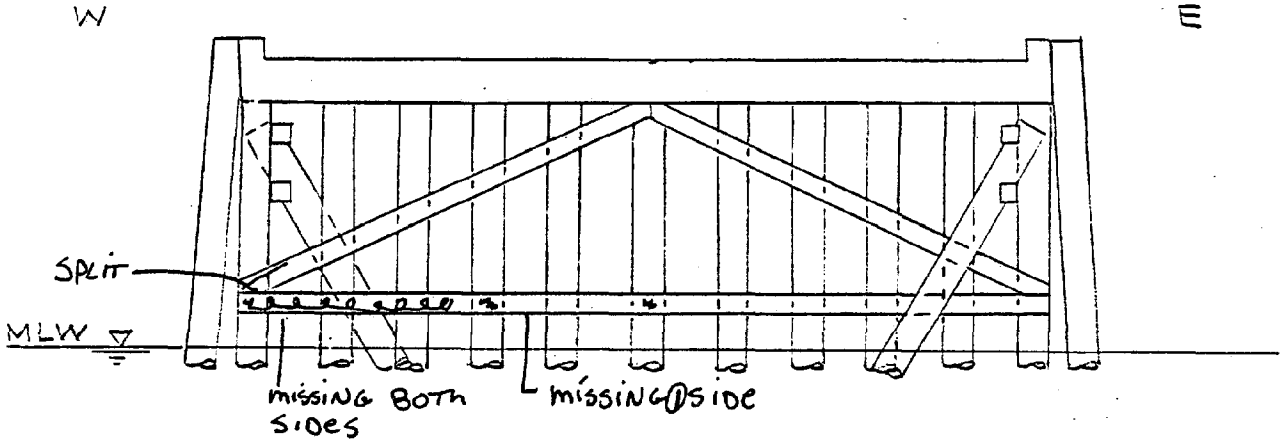
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.4 M.L.W.



BENT NO. 52

NOTES:

TIDE HIGH CAN BARELY FIT UNDER BRACES

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

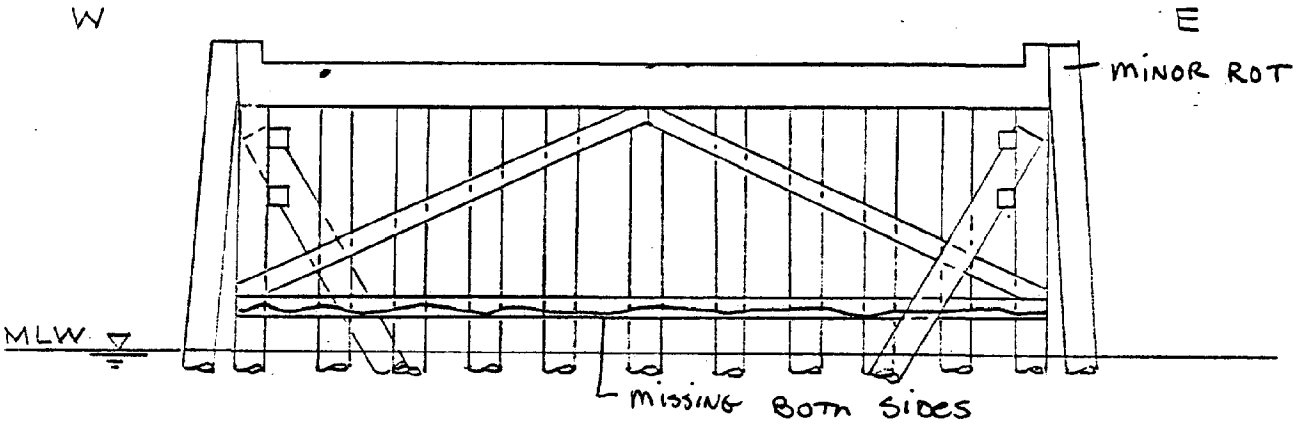
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

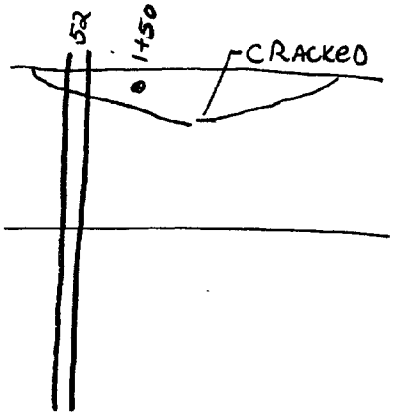
TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.4 M.L.W.



BENT NO. 53
STA 1+50

NOTES:



WEST FACE OF CONCRETE

SCUPPERS PLUGGED EAST FACE STA 1+50 TO 2+00

CABLE LOOKS LIKE NEW INSTALLATION UNDER DECK

PIPES BETWEEN 52 & 53

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

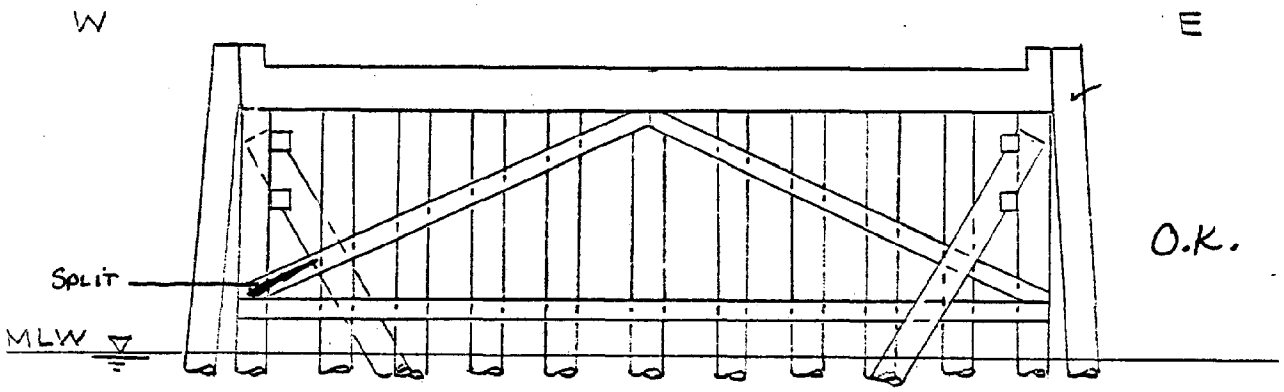
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: YYC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.4 M.L.L.W.



BENT NO. 54

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

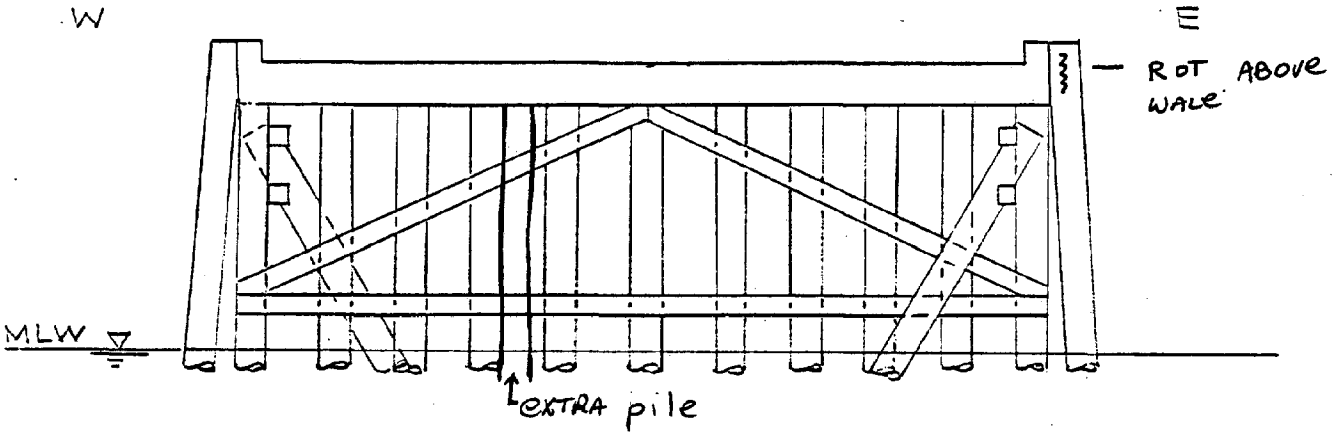
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.5 M.L.W.



BENT NO. 55

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

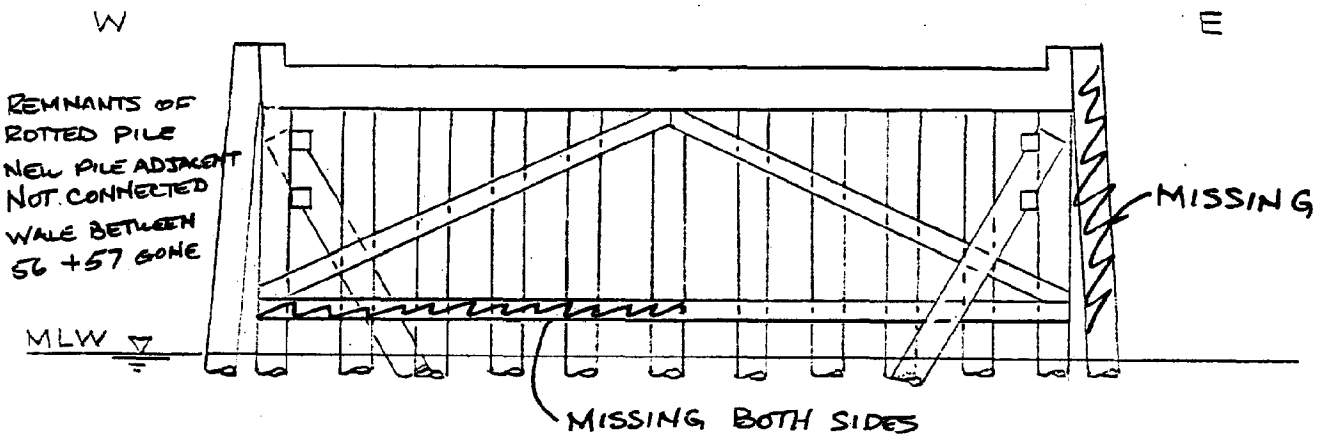
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.5 M.L.W.



BENT NO. 56

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

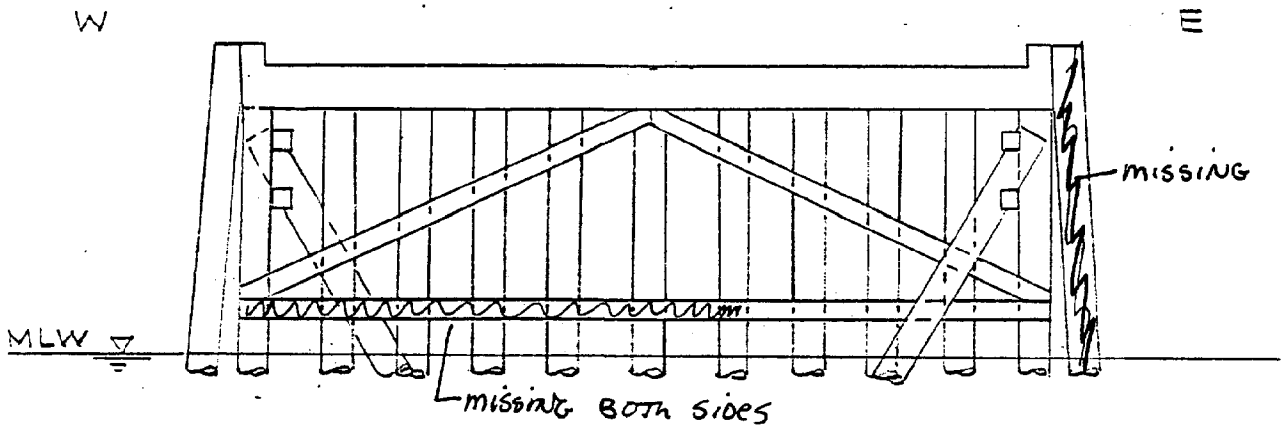
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.5 M.L.W.



BENT NO. 57

CHOCK BETWEEN 55 & 56 ROTTED

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

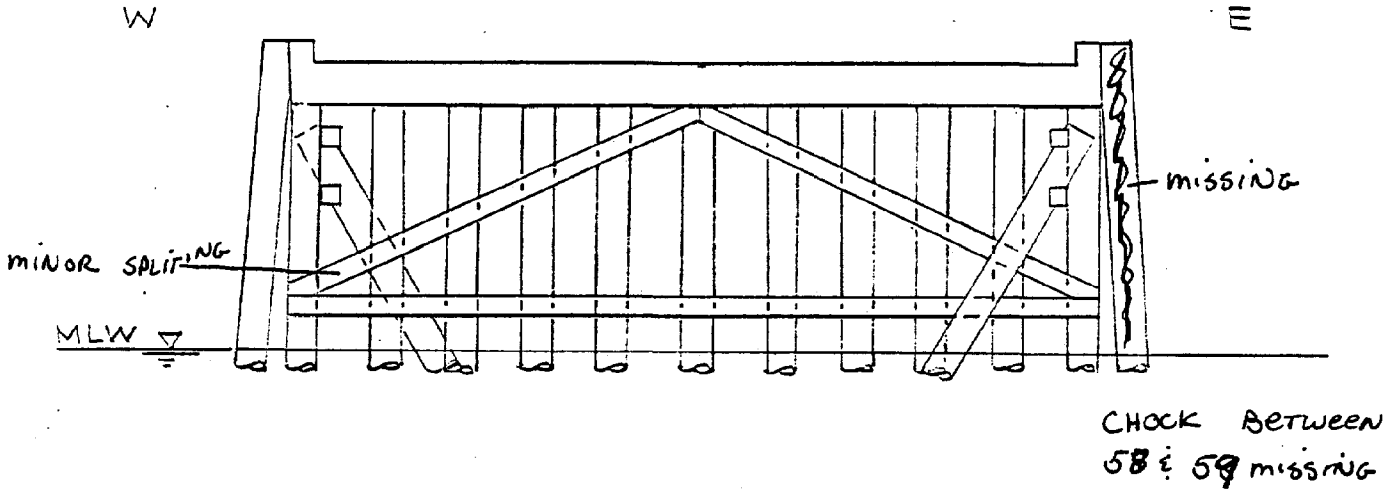
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: 8:20 CONDITIONS: ____

APPROX. TIDE: +2.6 M.L.W.



CHOCK BETWEEN 58 & 59 missing

BENT NO. 58

STA 2 + 00

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

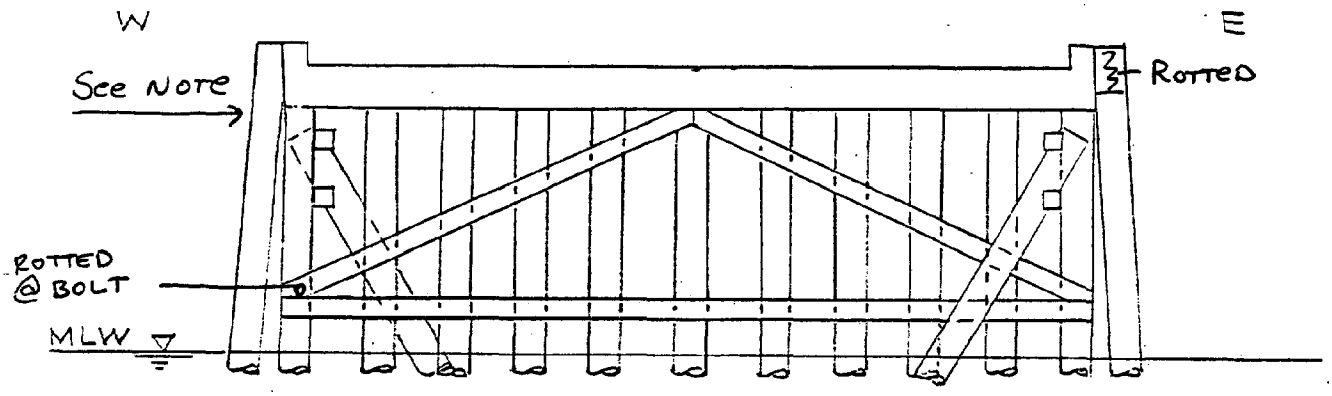
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

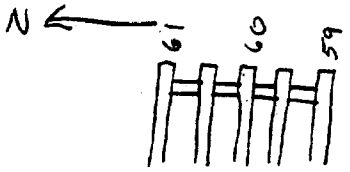
APPROX. TIDE: +2.6 M.L.W.



BENT NO. 59

NOTES:

STARTING AT BENT 59 TO STATION 3+00 THERE IS AN EXTRA FENDER PILE BETWEEN BENTS ON WEST FACE



2 PLATES UNDER DECK W/2 BOLTS EA. EAST SIDE BETWEEN 58 & 59

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

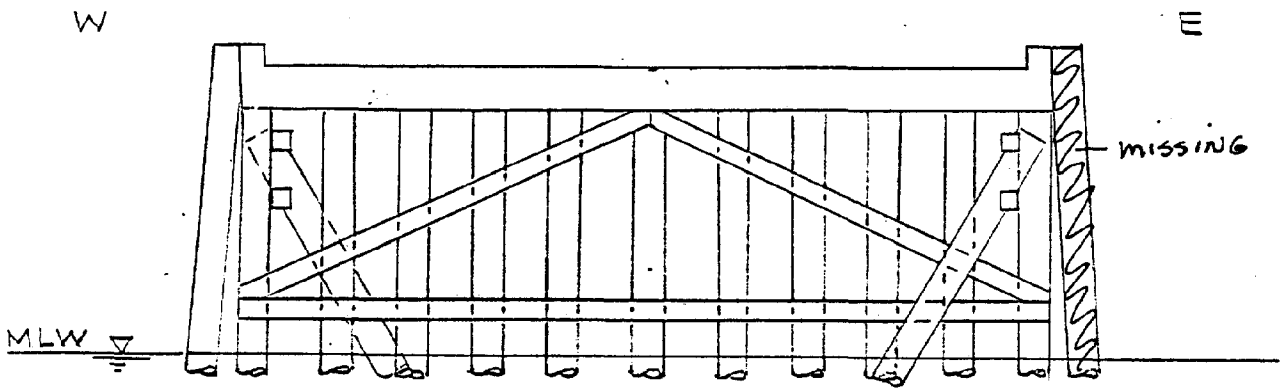
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: 8:26 CONDITIONS: ____

APPROX. TIDE: +2.6 M.L.W.



BENT NO. 60

NOTES:

5 PLATES WITH 2 BOLTS EACH BENT 59 & 60 UNDER DECK EAST SIDE.

8:26/TIMED DRIFT – 18 SECONDS TO DRIFT 1 BENT

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

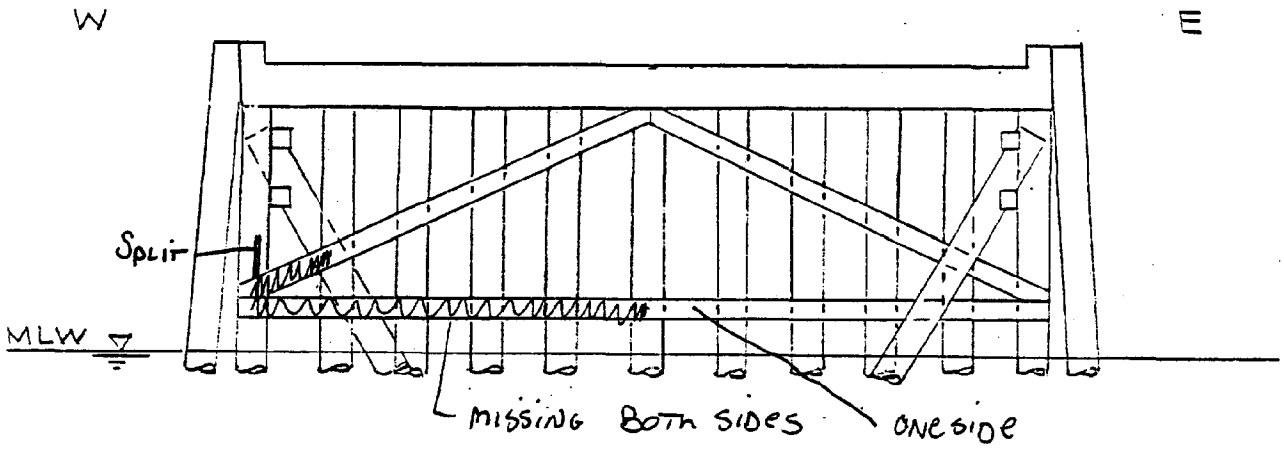
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.6 M.L.W.



BENT NO. 61

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

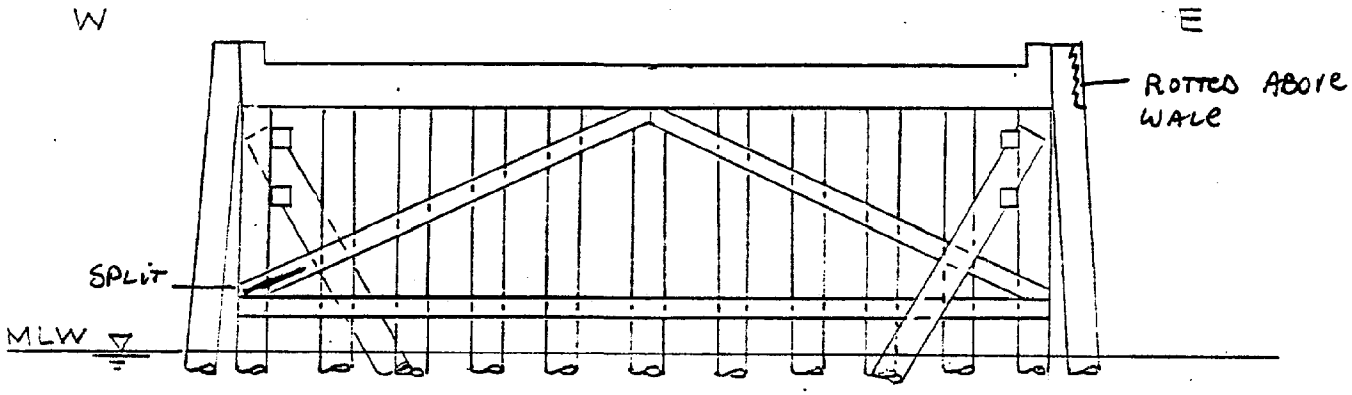
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.6 M.L.W.



BENT NO. 62

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

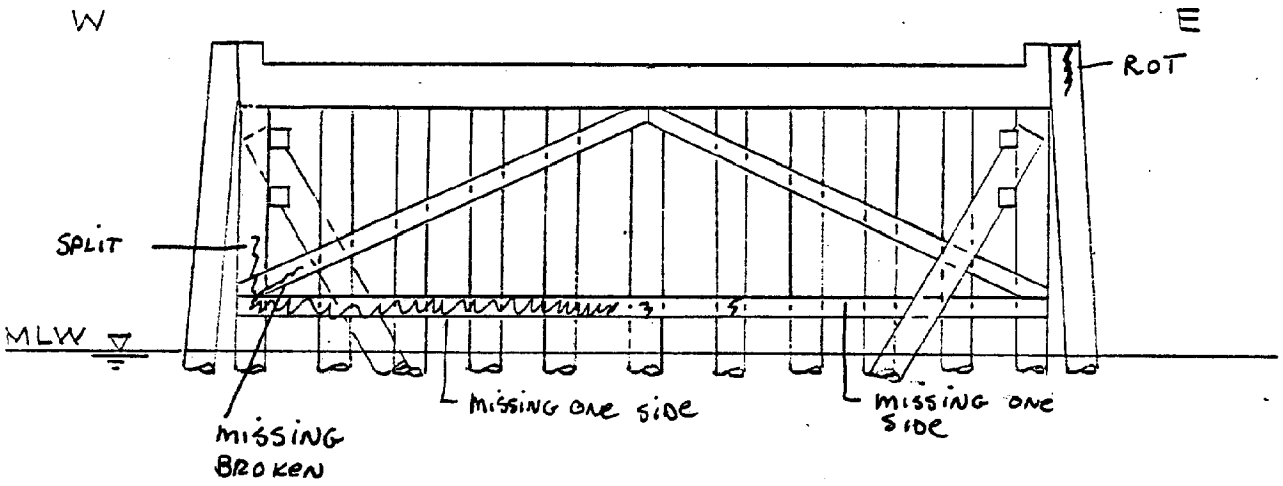
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: YVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.6 m.c.w.



BENT NO. 63

STA 2+50

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

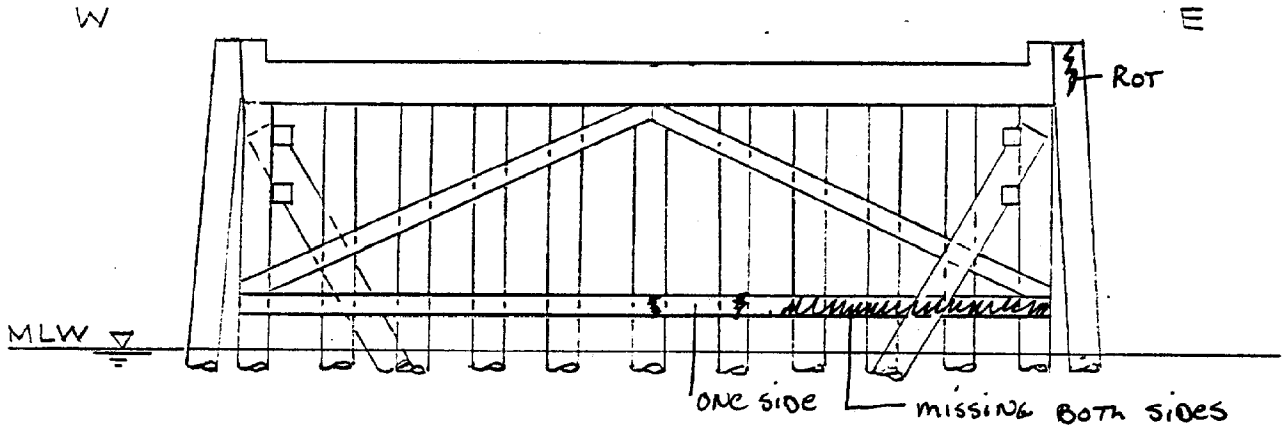
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.6 M.L.W.



BENT NO. 64

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

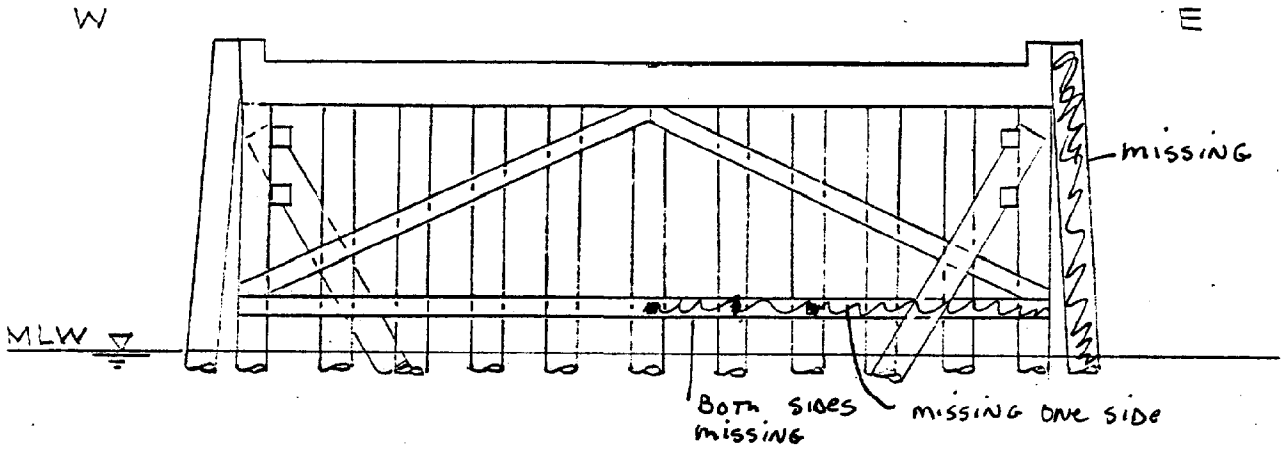
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: 8:41 CONDITIONS: ___

APPROX. TIDE: +2.7 M.L.W.



BENT NO. 65

NOTES:

5 PLATES WITH 2 BOLTS EACH BETWEEN 64 & 65 WEST END STEP IN DOWN UNDER PLATES

2 PLATES WITH 4 BOLTS EAST SIDE UNDER CONCRETE

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

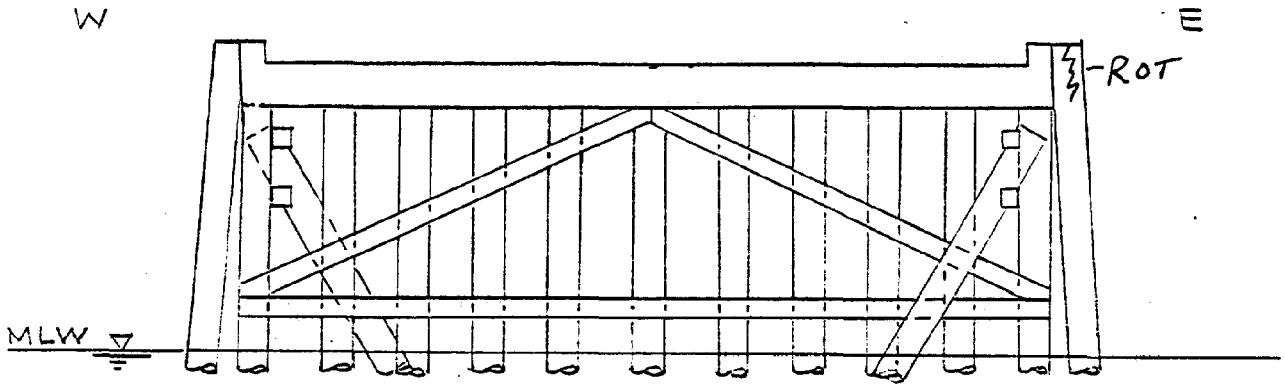
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.7 M.L.W.



BENT NO. 66

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

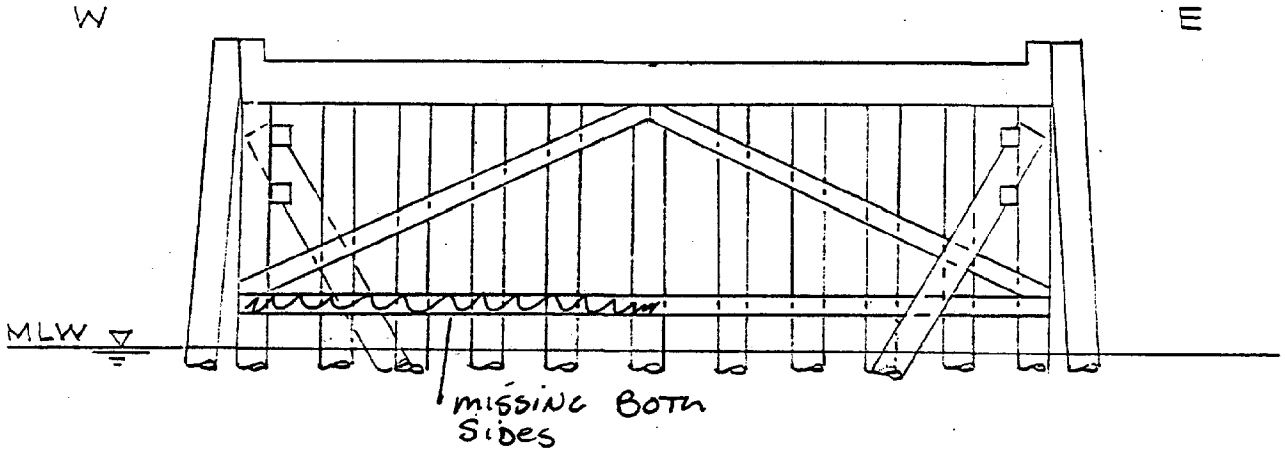
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1984 SURVEY BY: YVC

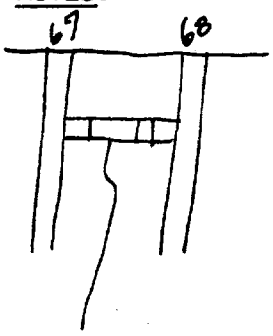
TIME: 8:50 CONDITIONS: ____

APPROX. TIDE: +2.8 M.C.W.



BENT NO. 67

NOTES:



CONNECTION GONE
EAST SIDE 12×12
SPLICE ROTTED

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

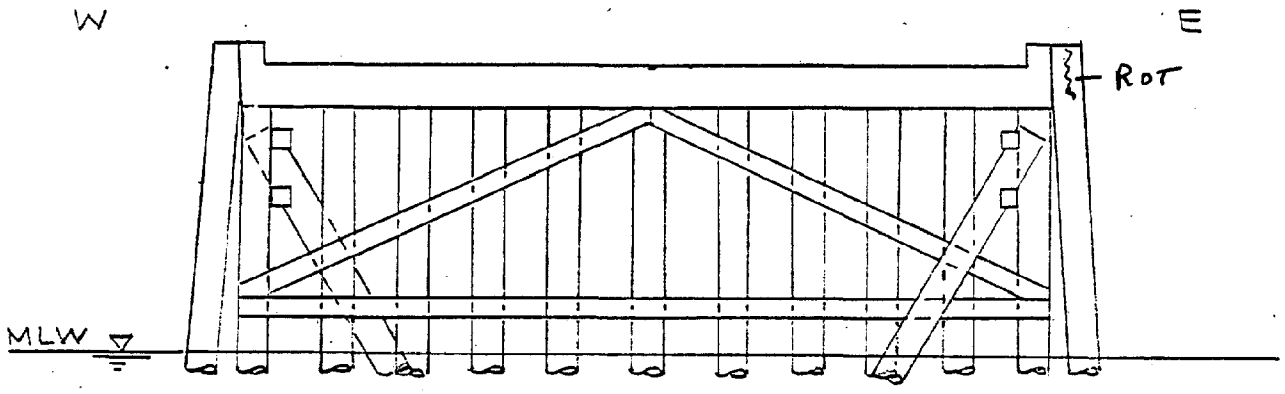
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +2.8 M.L.W.



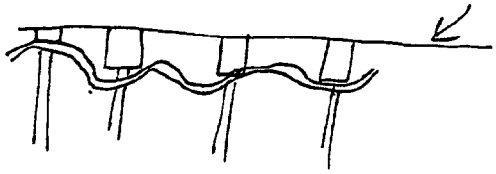
BENT NO. 68

STA 3+00

NOTES:

5 PLATES WITH 2 BOLTS UNDER DECK EAST SIDE
SO FAR ALL HAVE LOOKED GOOD

NEW CABLE STILL GOING



PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

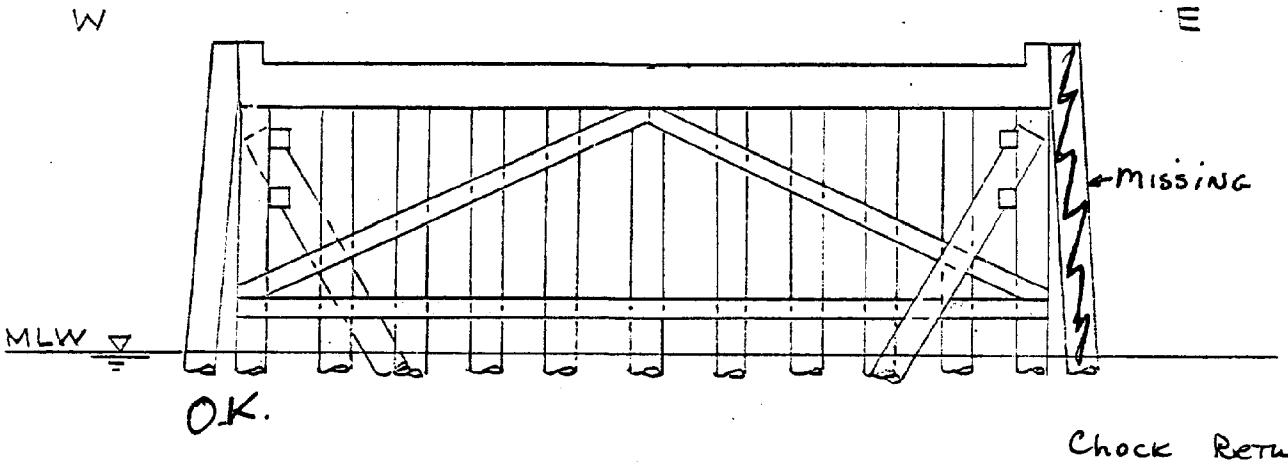
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: 8:55 CONDITIONS: WIND, CHOP & CURRENT PICKING UP

APPROX. TIDE: +2.8 M.L.W.



Chock Between 68 & 69 Split

BENT NO. 69

NOTES:

2 PLATES - 2 BOLTS EAST SIDE UNDER CONCRETE

EXTRA FENDER PILE WEST SIDE STOPS AT BENT 69

9:00 STOPPED - DINGY WONT FIT UNDER BRACE, HIGH TIDE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

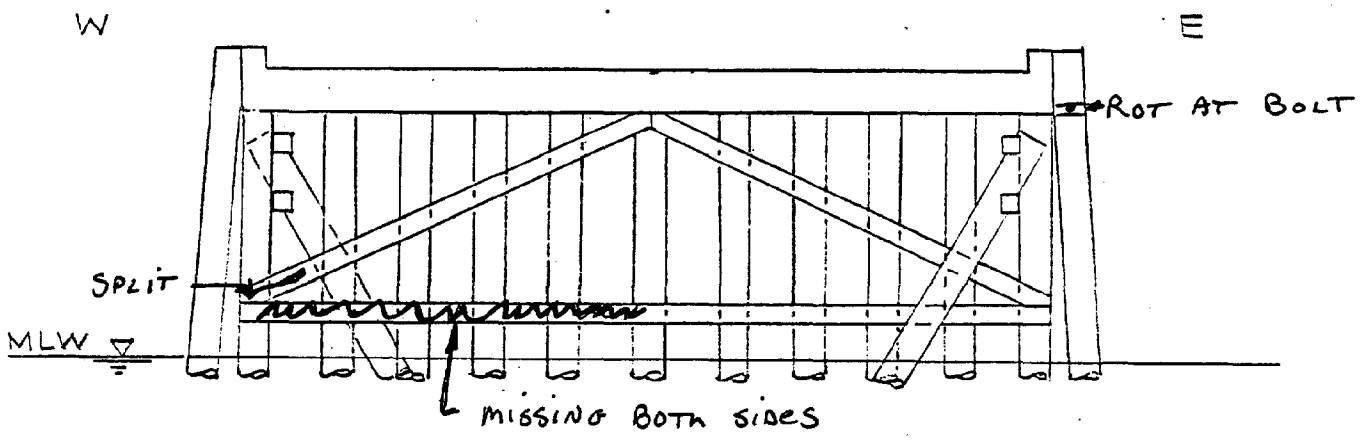
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: March 13, 1982 SURVEY BY: VVC

TIME: 2:05 STARTED AGAIN CONDITIONS: FOGGY, WINDY, DAMP

APPROX. TIDE: +1.1 M.L.W.



BENT NO. 70

NOTES:

OLD ELECTRICAL CONDUIT HANGING ON BENT

5 PLATES WITH 2 BOLTS UNDER CONCRETE WEST SIDE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

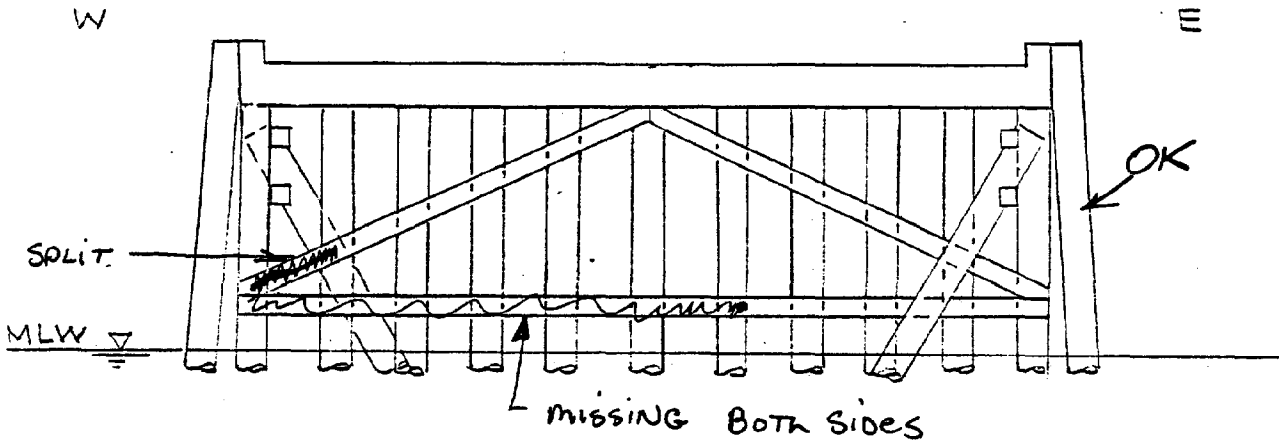
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +1.1 M.L.W.



BENT NO. 71

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

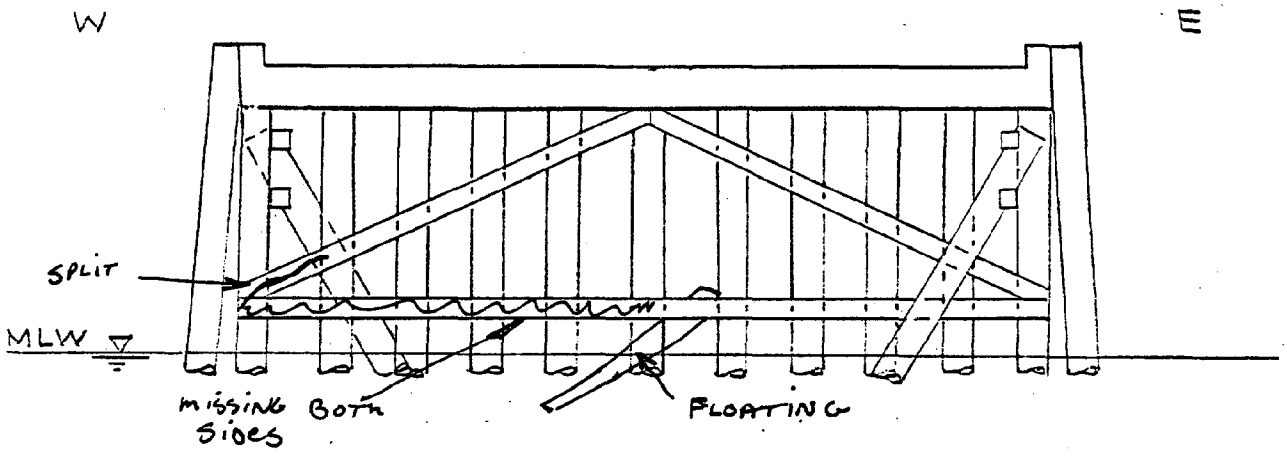
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +1.0 M.L.W.



BENT NO. 72

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

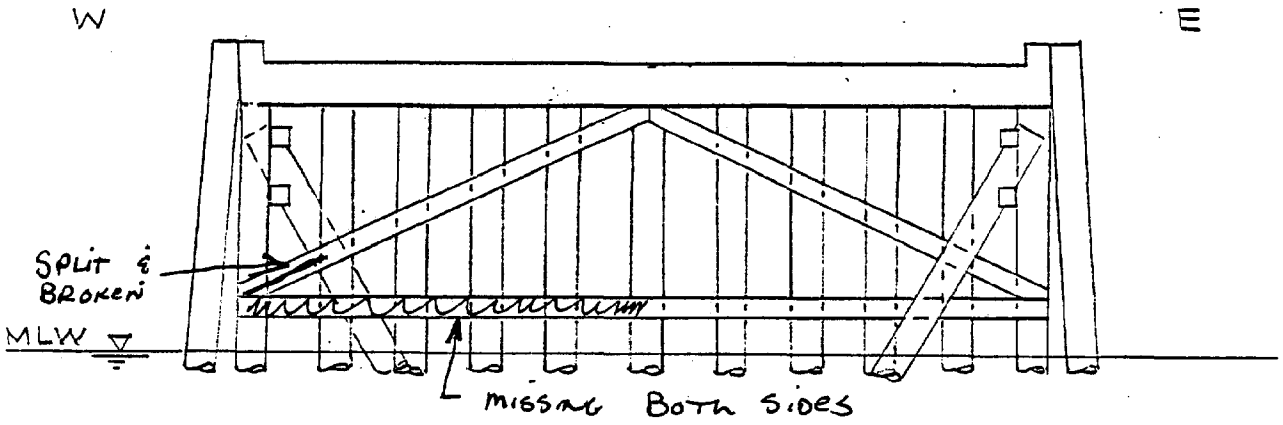
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +1.0 M.L.W.



BENT NO. 73

STA 3+50

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

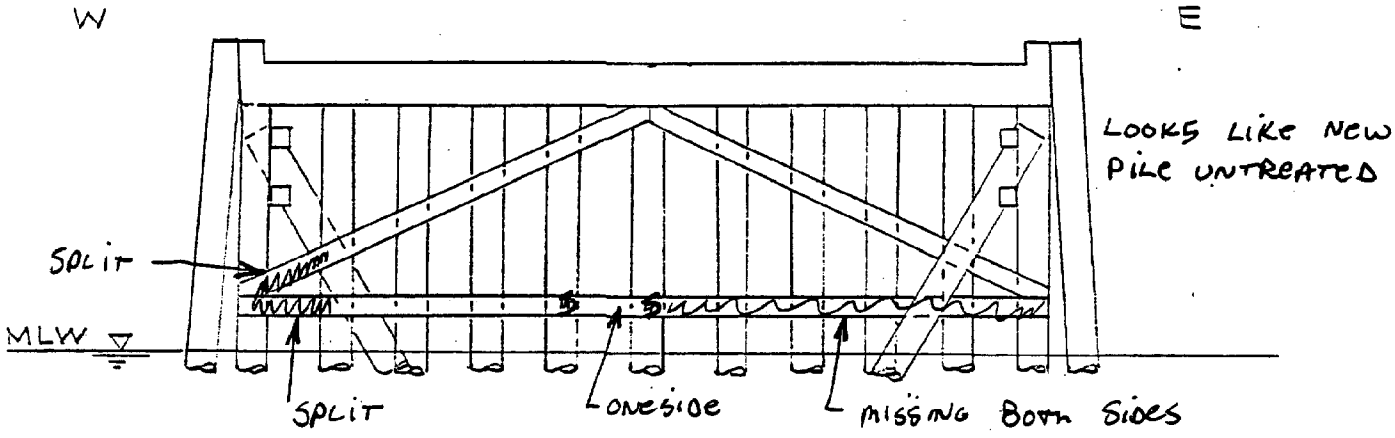
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +1.0 M.L.W.



BENT NO. 74

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 7001

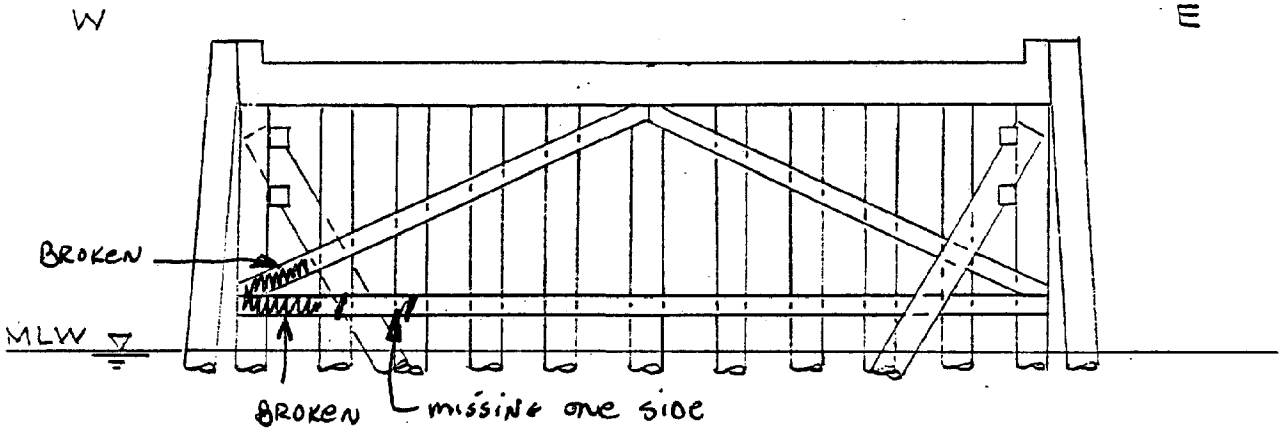
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.9 M.L.W.



BENT NO. 75

NOTES:

PLATES & BOLTS UNDER DECK WEST BETWEEN 74 & 75

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

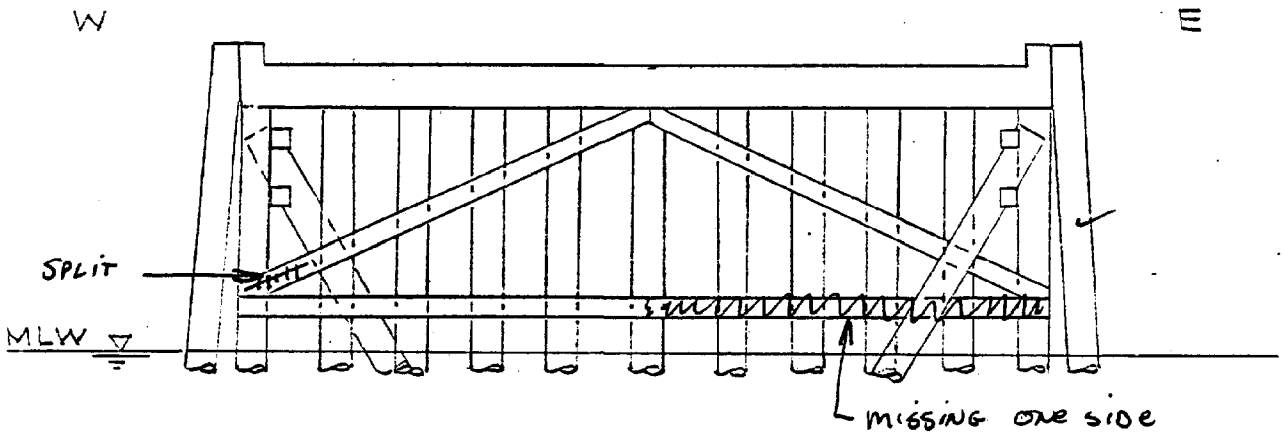
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: _____ SURVEY BY: _____

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.9 M.L.W.



BENT NO. 76

NOTES:

REAL STRONG CURRENT EAST- WEST UNDER PIER

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

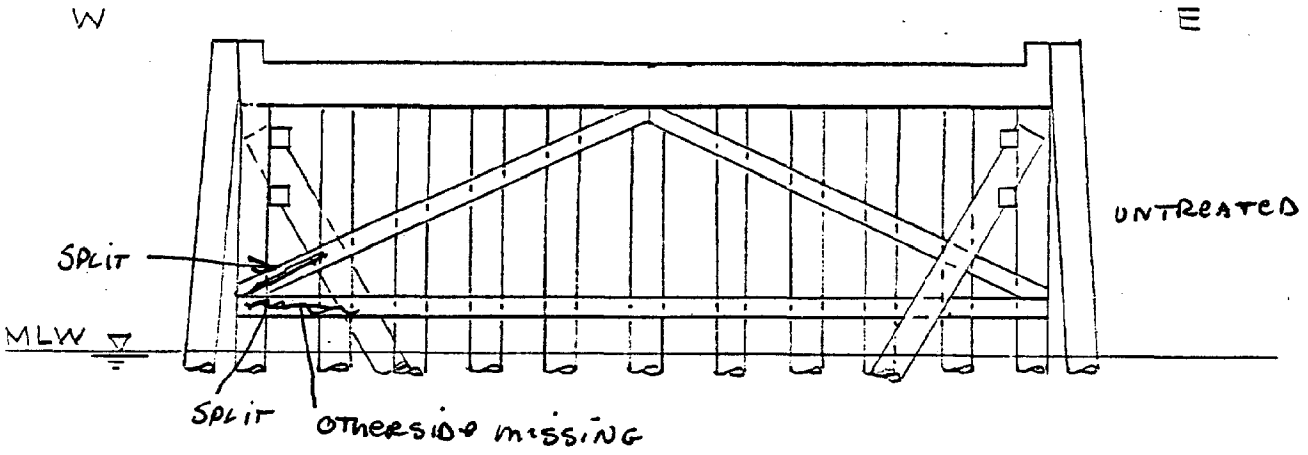
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.9 M.L.W.



BENT NO. 77

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 7001

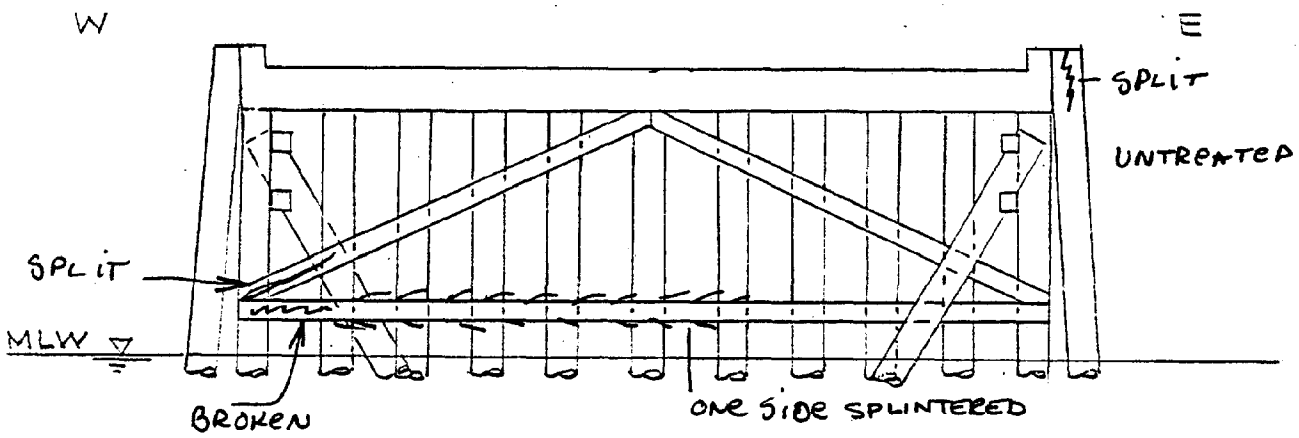
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.8 M.L.W.



BENT NO. 78

STA 4+00

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

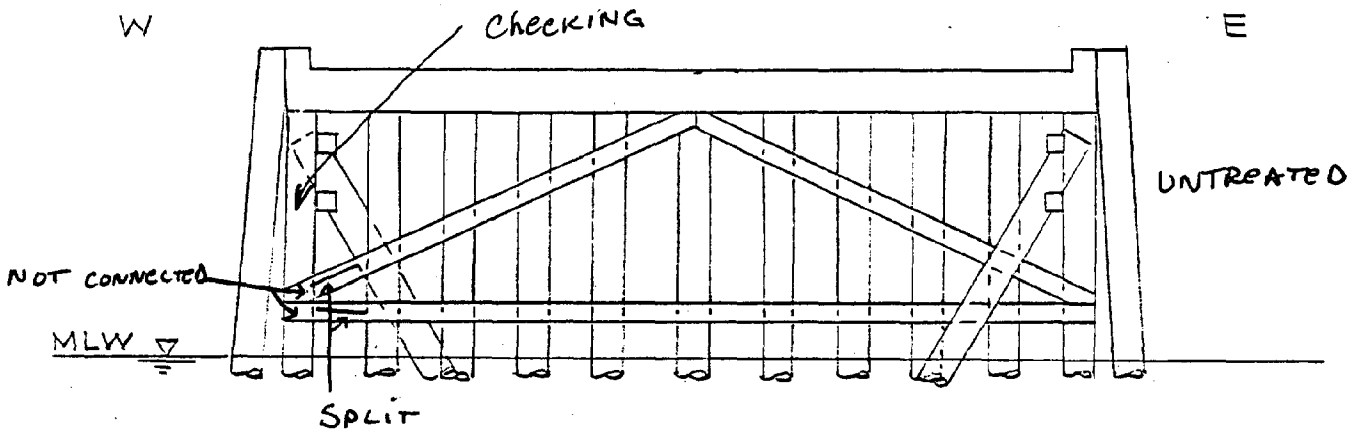
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: YVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.8 M.L.W.



BENT NO. 19

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

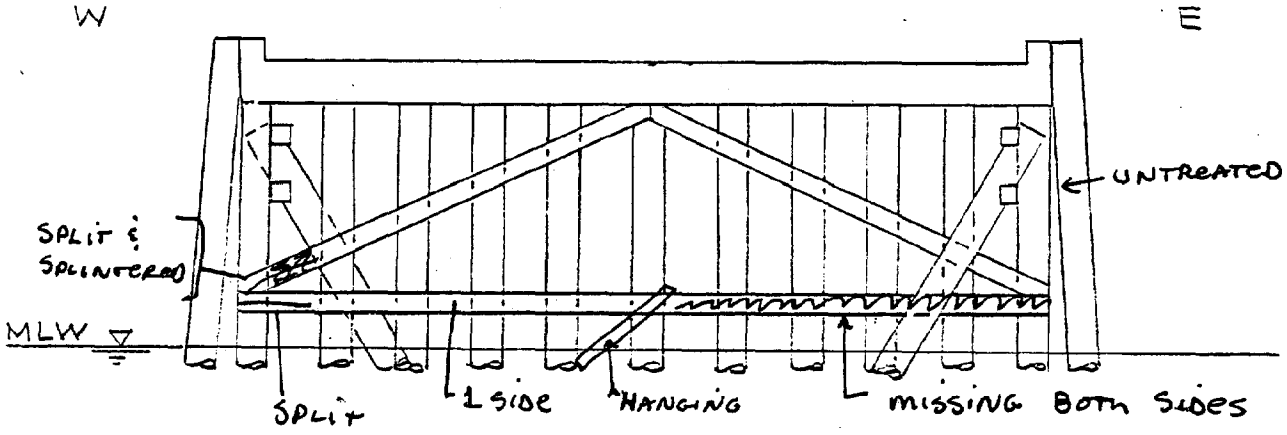
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.8 M.L.W.



BENT NO. 80

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

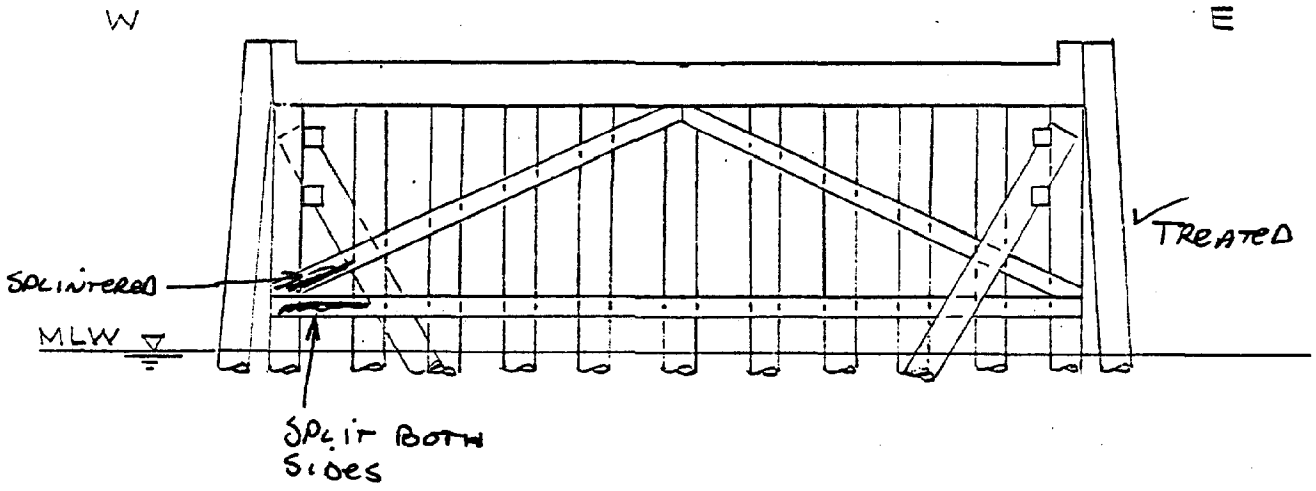
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 81

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

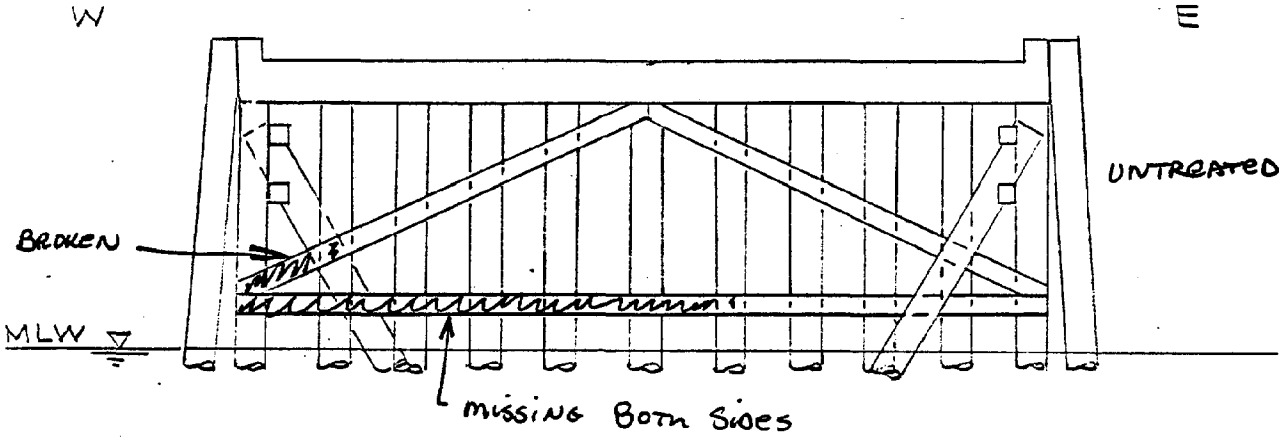
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 82

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

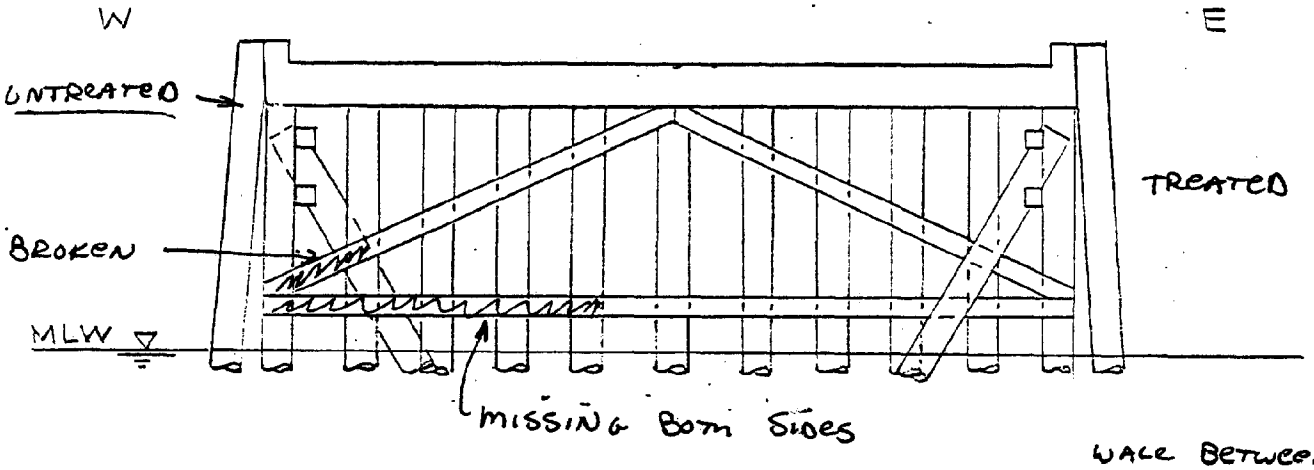
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 83

STA 4+50

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

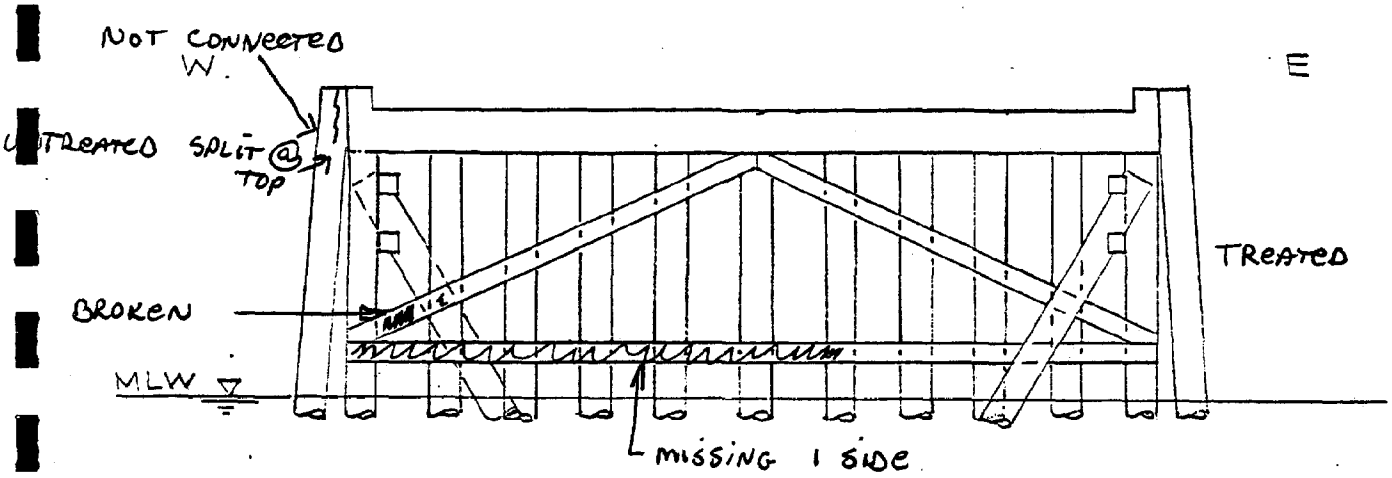
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 84

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

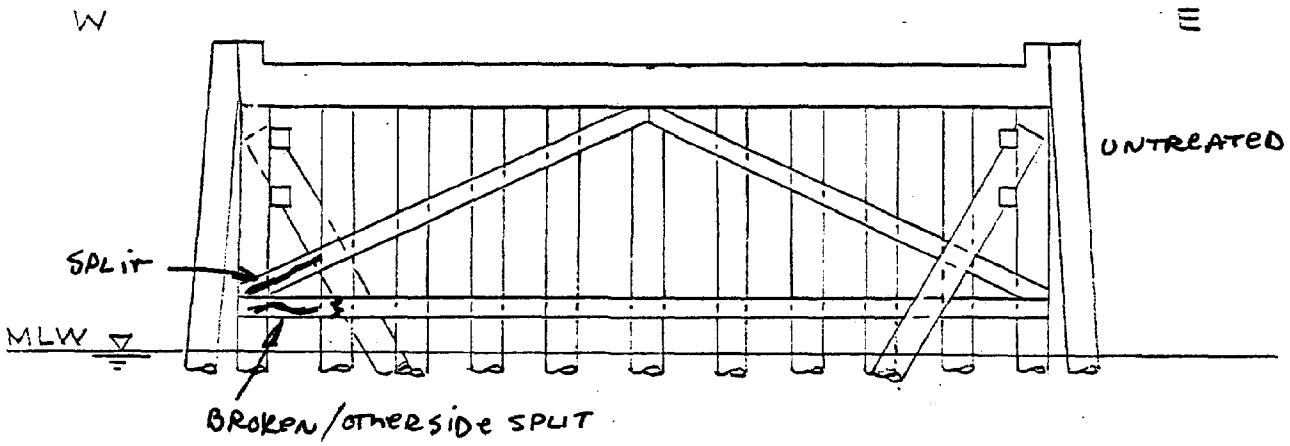
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: VERY WINDY

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 85

NOTES:

EXTRA FENDER BETWEEN BENTS ON WEST SIDE STARTS AGAIN HERE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

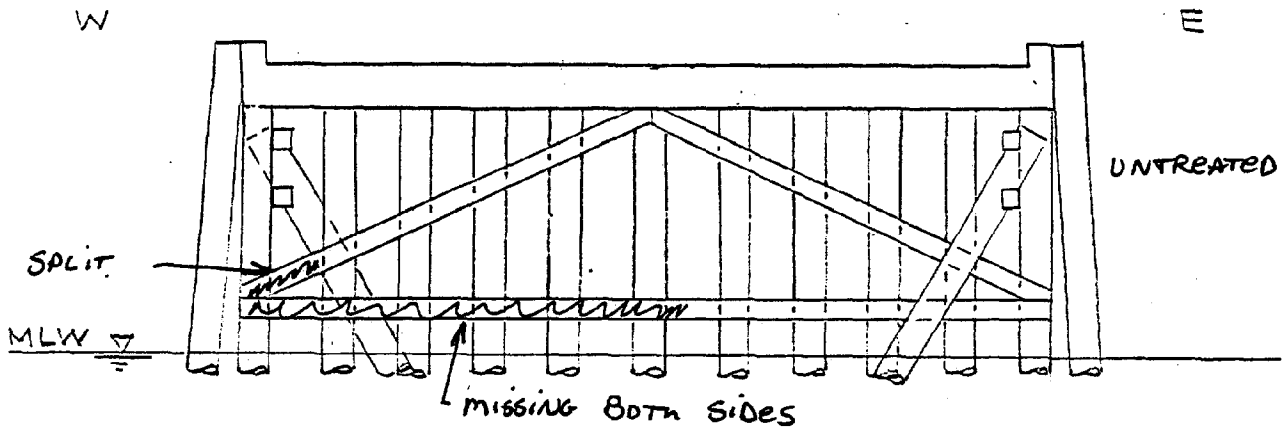
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 86

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

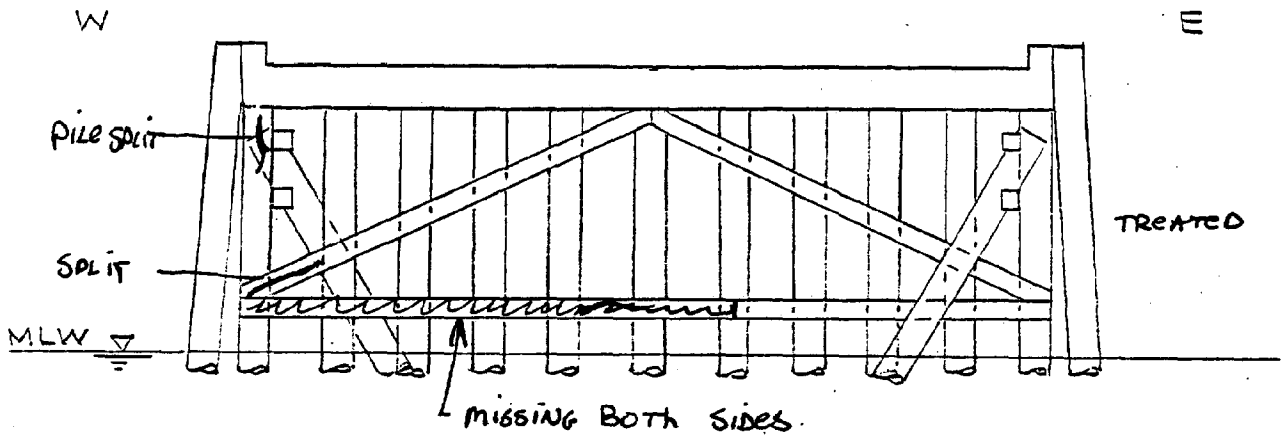
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: 10.6 M.L.W.



BENT NO. 87

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 7001

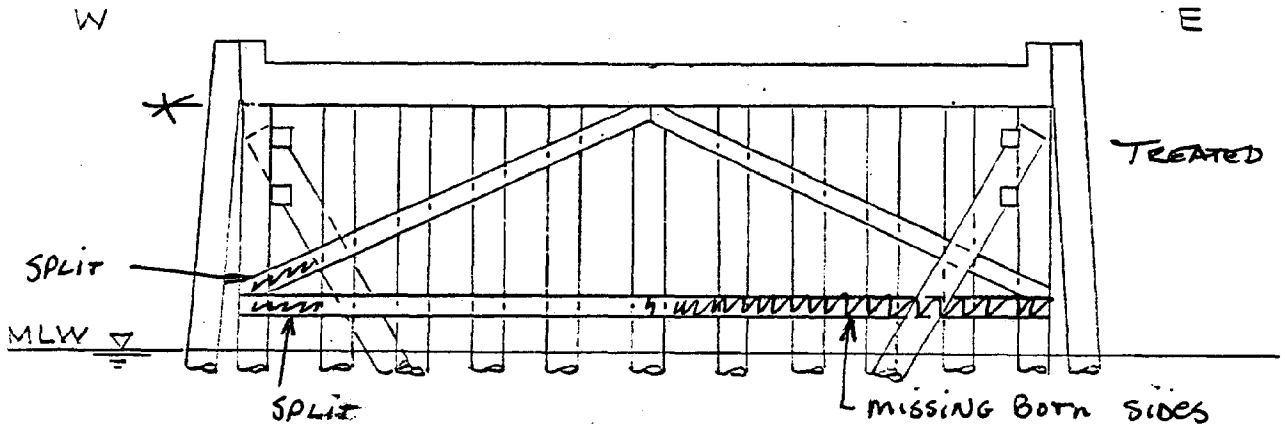
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1983 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 88

STA 5+00

NOTES:

END OF PLUGGED SCUPPERS WEST FACE

* FENDER PILE BETWEEN 88 & 89 SPLIT @ TOP

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

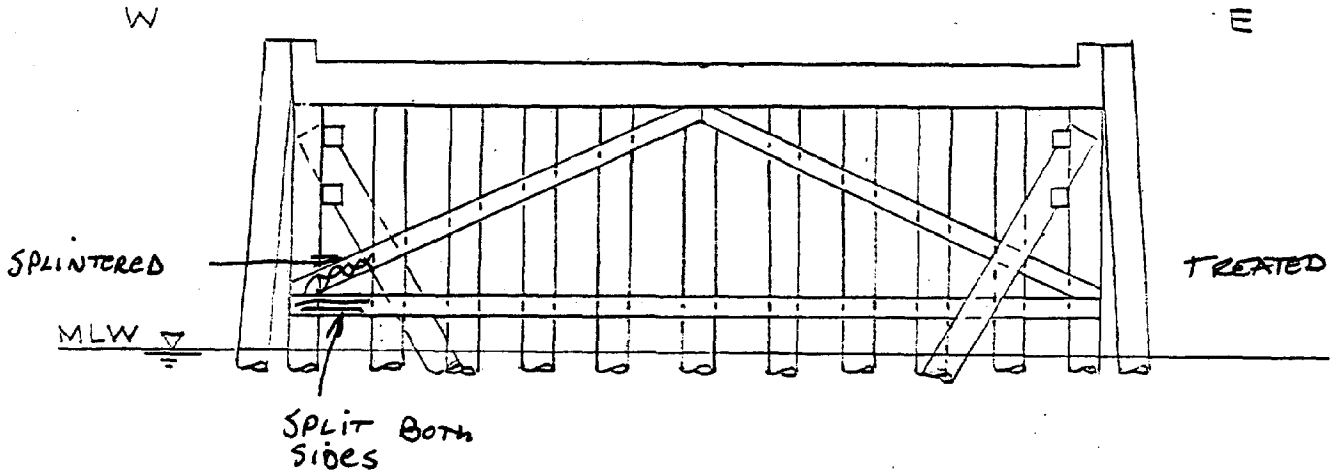
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 89

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

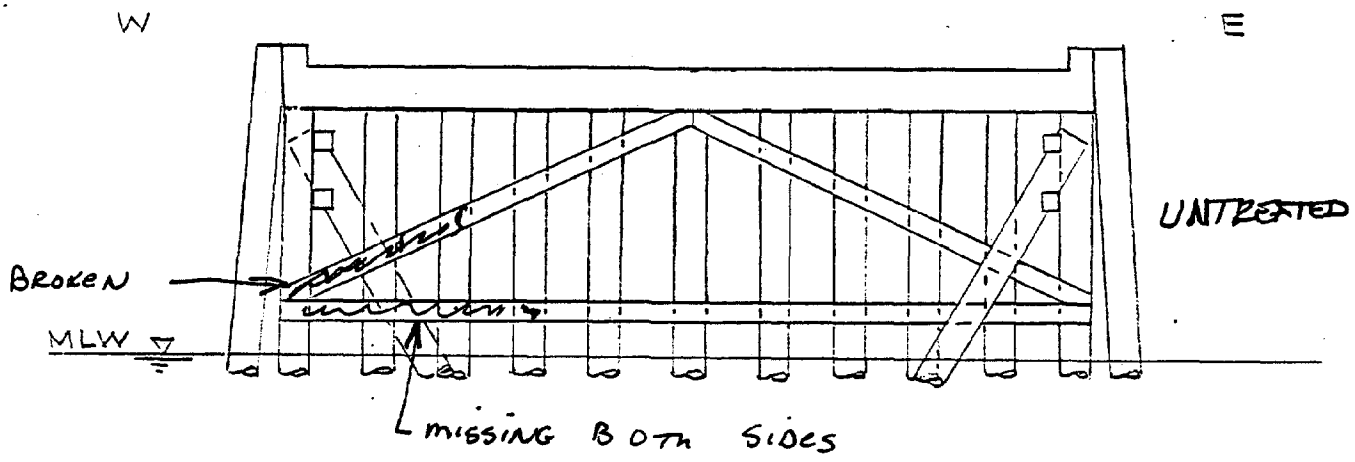
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: 2:44 CONDITIONS: ___

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 90

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

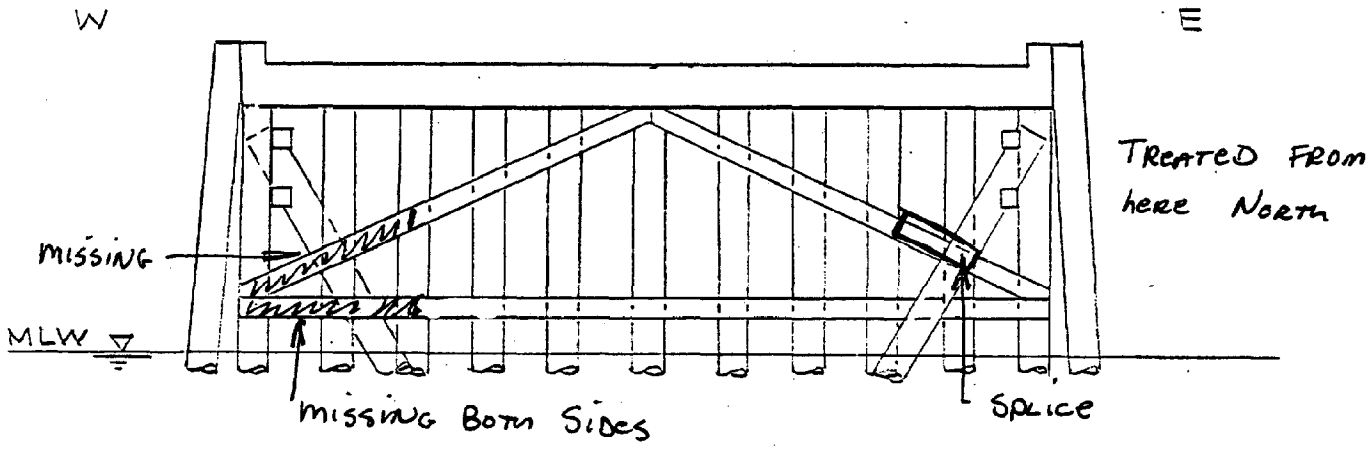
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 91

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

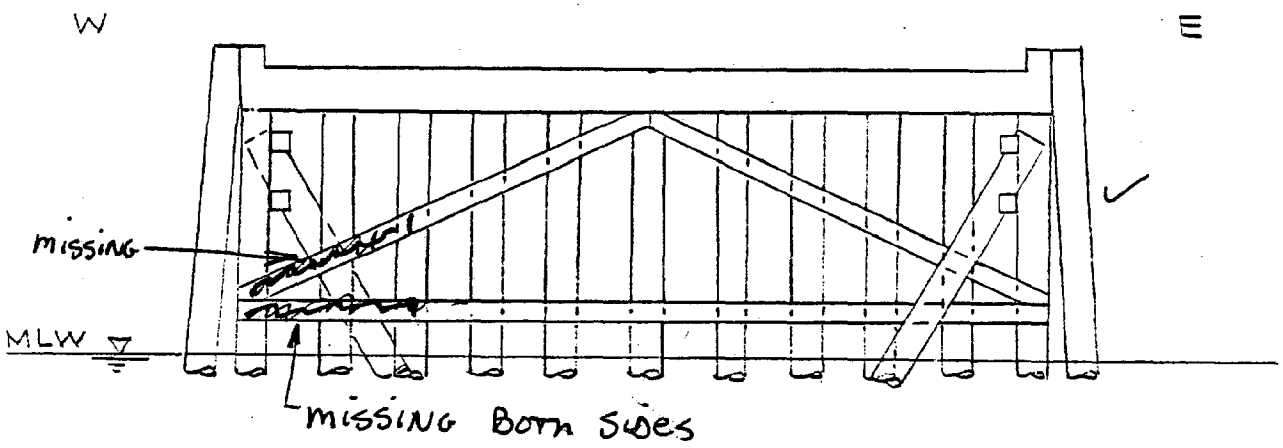
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: + CONDITIONS: ___

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 92

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 7001

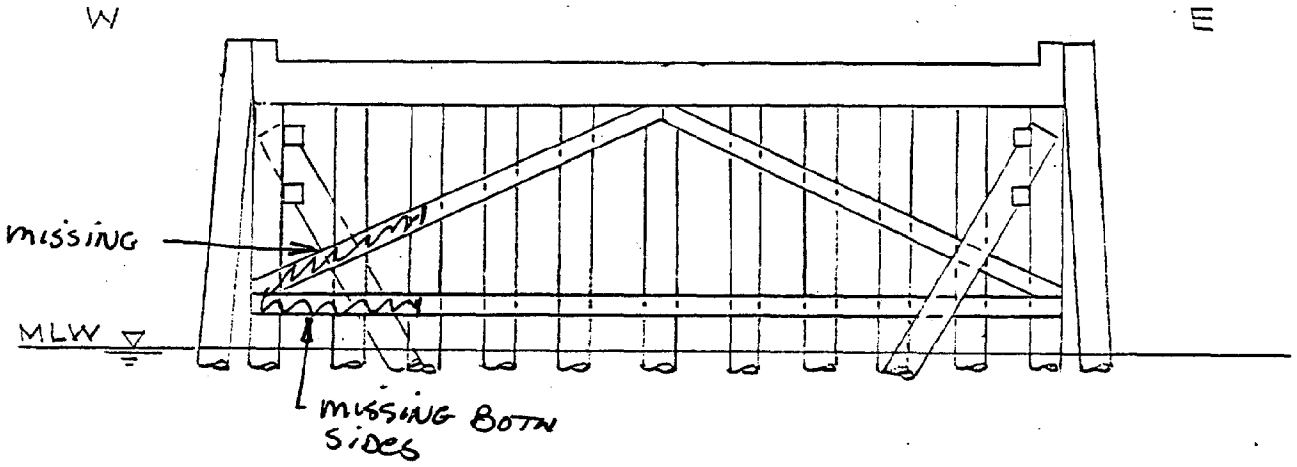
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.4 M.L.W.



BENT NO. 93

STA 5+50

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 7001

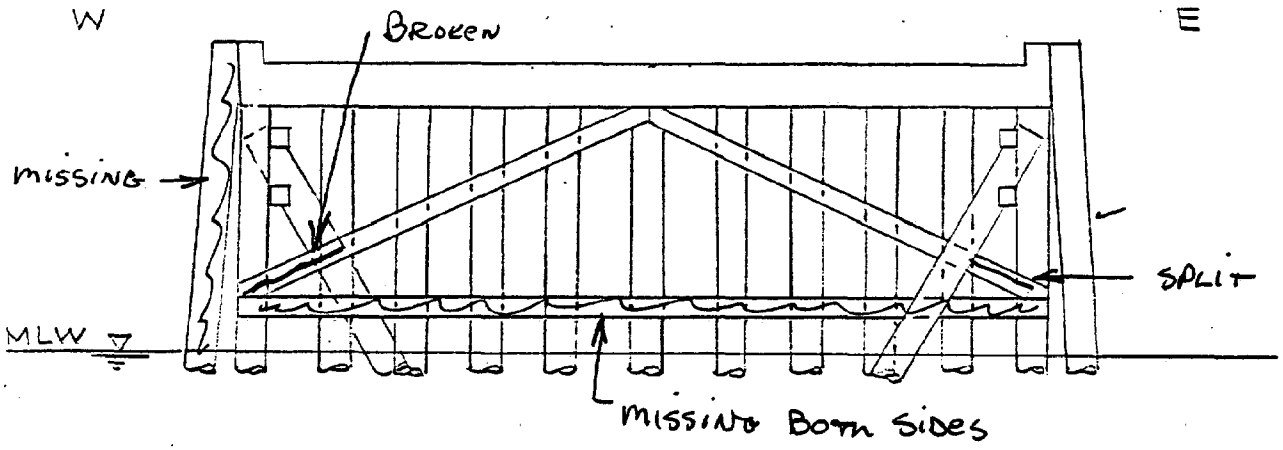
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.4 M.L.W.



BENT NO. 94

NOTES:

NOTE STILL FENDERPILES BETWEEN BENTS, WEST SIDE
CHOCK ACROSS BENT 94 LOOKS LIKE CONTRACTOR MISSE

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

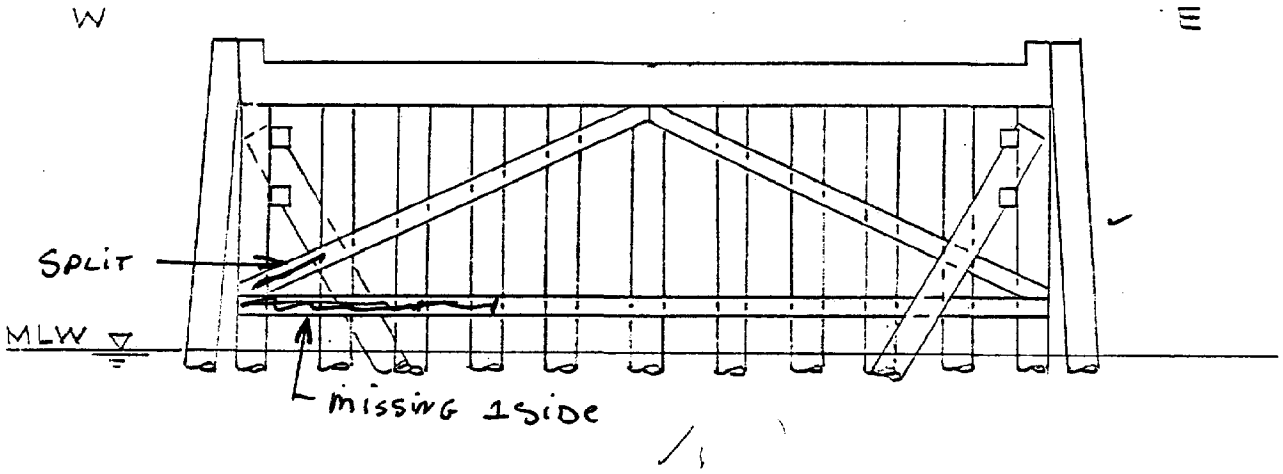
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: 2:50 CONDITIONS: STARTING TO RAIN

APPROX. TIDE: +0.4 M.L.W.



BENT NO. 95

NOTES:

END OF FENDER BETWEEN BENTS WEST SIDE

CURRENT MAKES IT HARD TO STAY UNDERNEATH

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

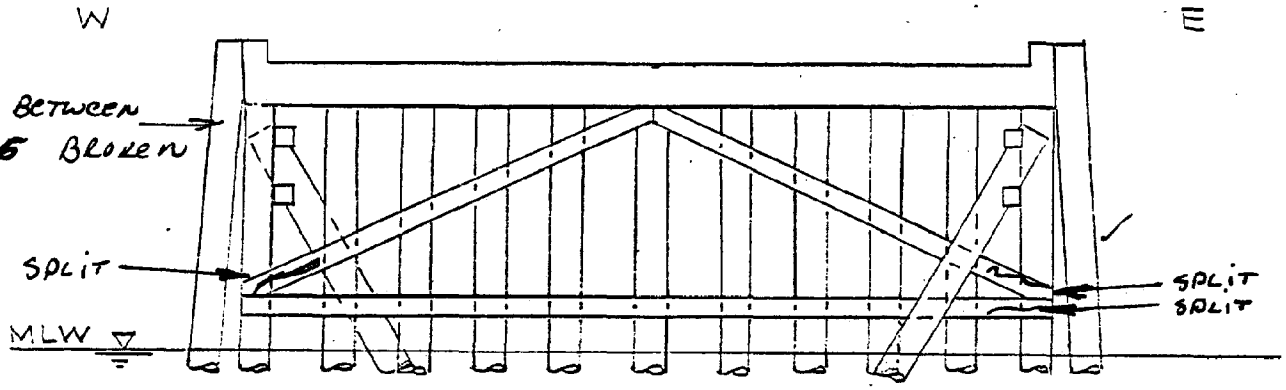
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1983 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.4 M.L.W



BENT NO. 96

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

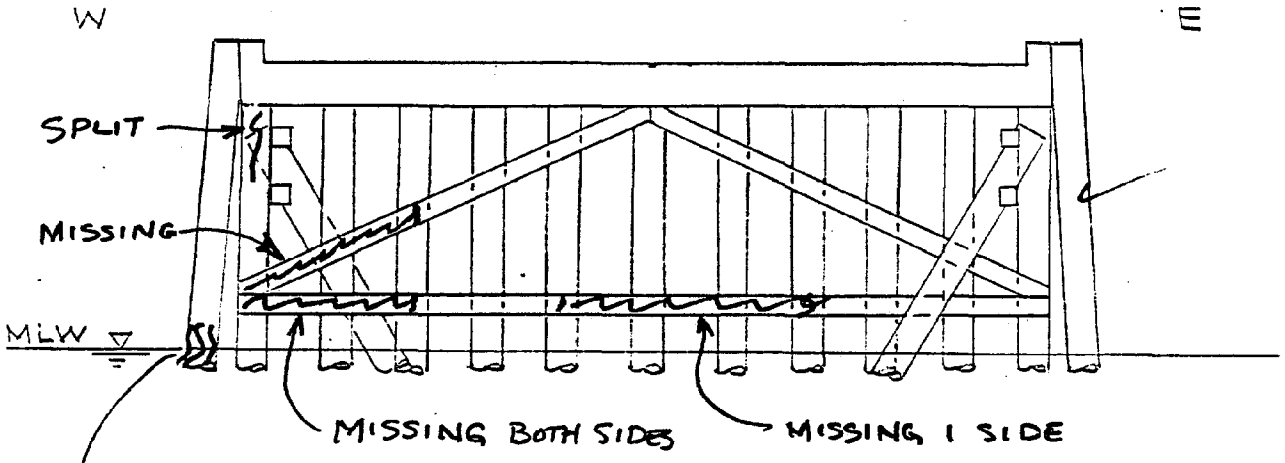
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: ___ CONDITIONS: ___

APPROX. TIDE: +0.3 M.L.W.



BENT NO. 97

NOTES:

WORMY @ LOW WATER LINE - FENDER PILE UNTREATED

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

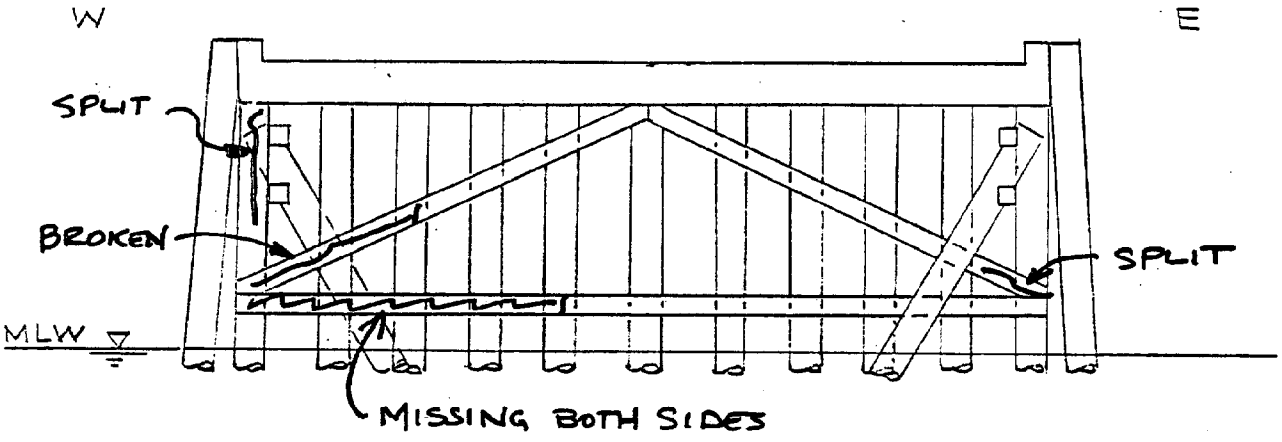
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

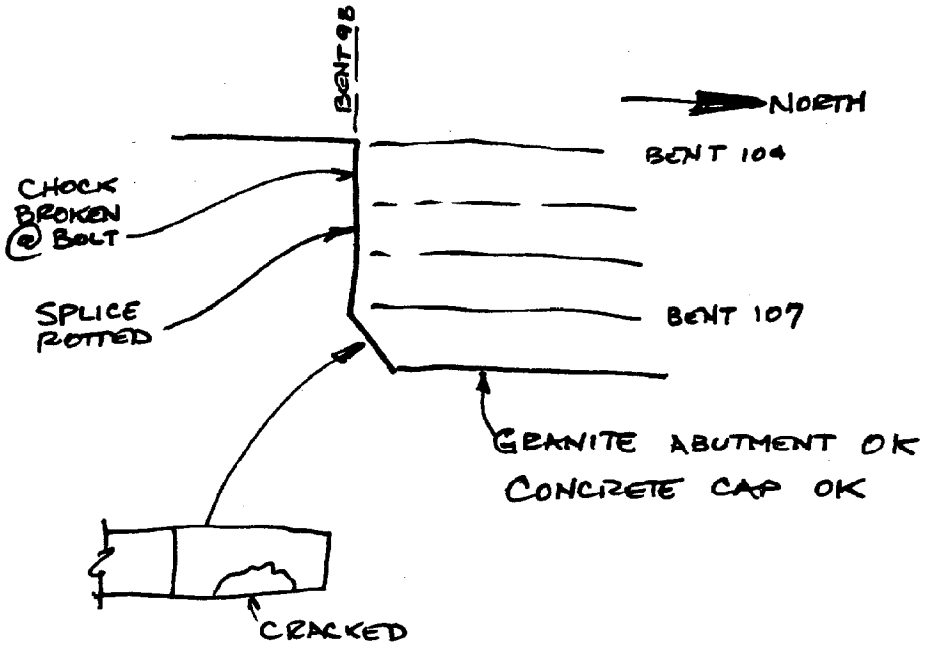
APPROX. TIDE: +0.3 M.L.W.



BENT NO. 98

STA 6+00

NOTES:



THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

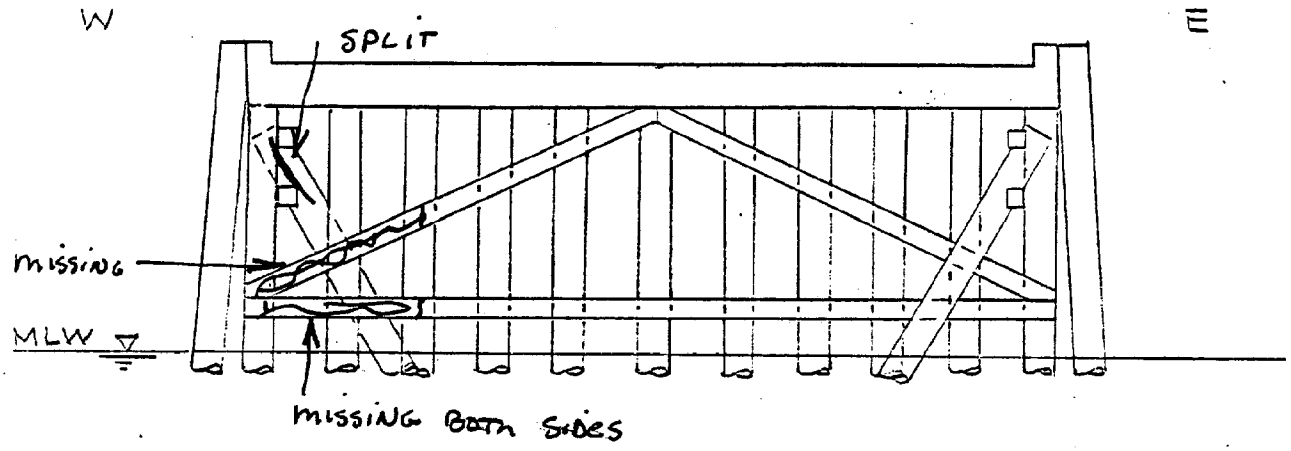
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.2 M.L.W.



BENT NO. 99

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 7001

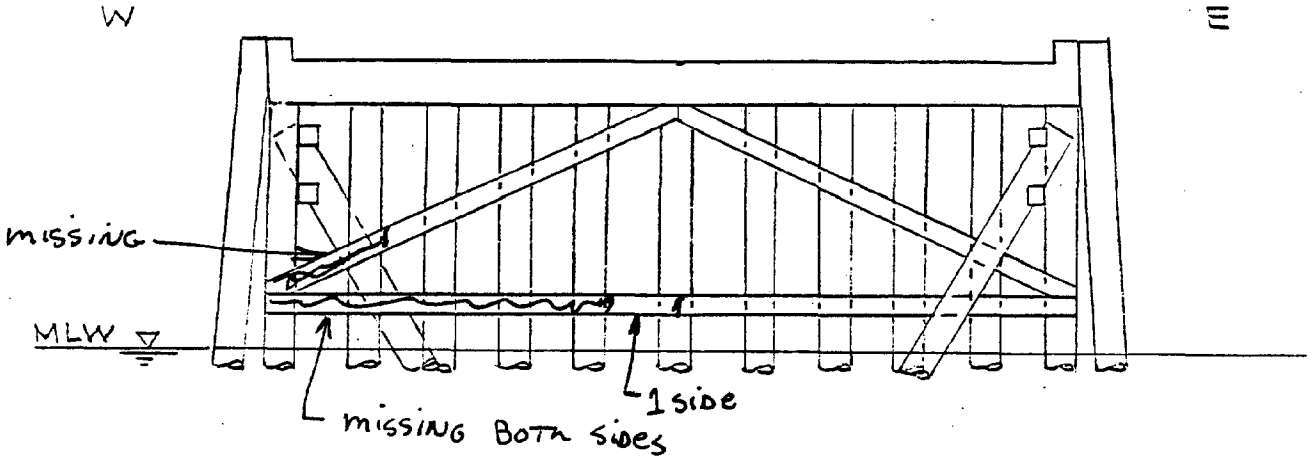
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.2 M.L.W.



BENT NO. 100

NOTES:

THE MAGUIRE GROUP

PROJECT _____ ACC. NO. _____

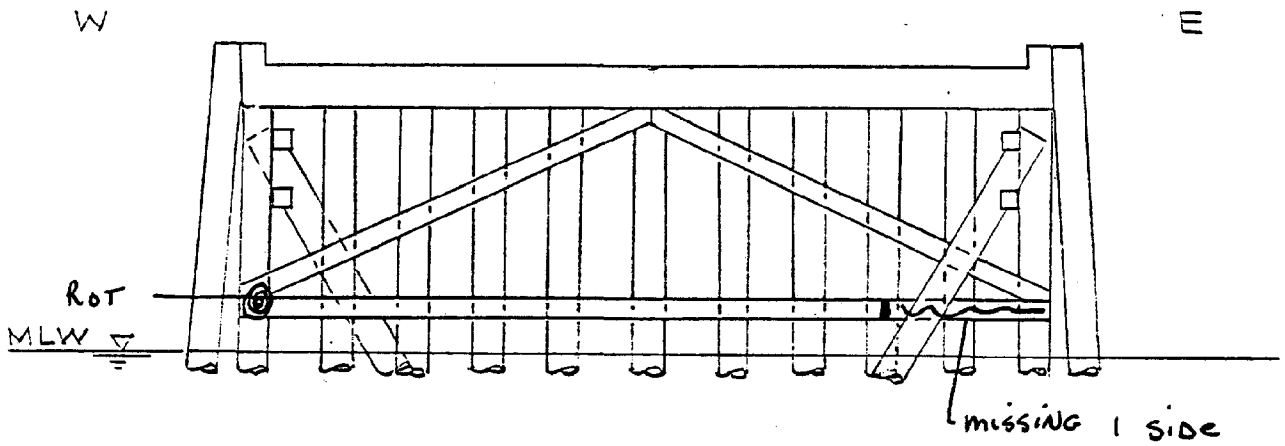
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.1 M.L.W.



BENT NO. 101

NOTES:

THE MAGUIRE GROUP

PROJECT [illegible] ACC. NO. [illegible]

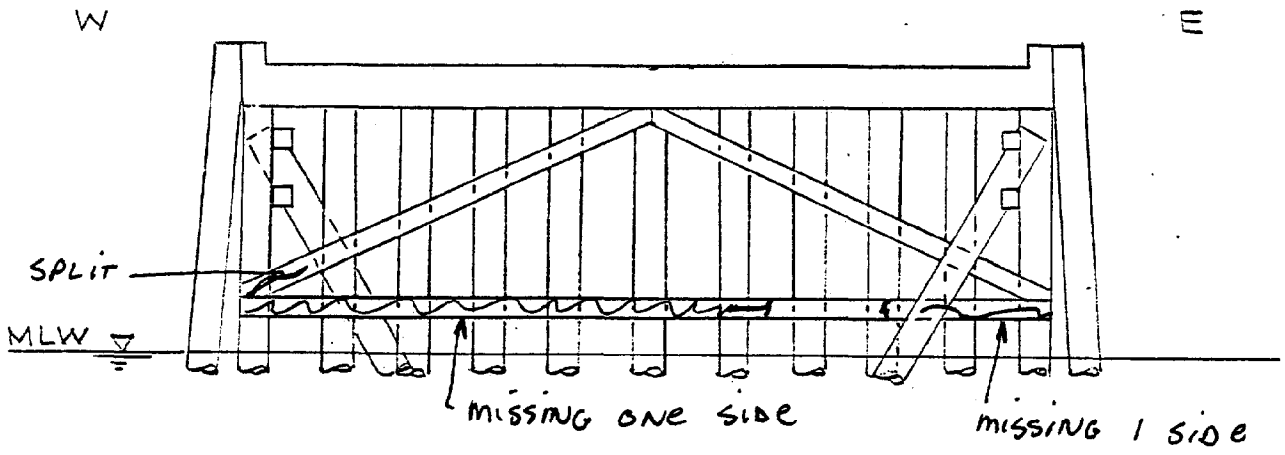
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: +0.1 M.L.W.



BENT NO. 102

NOTES:

THE MAGUIRE GROUP

PROJECT _____ ACC. NO. _____

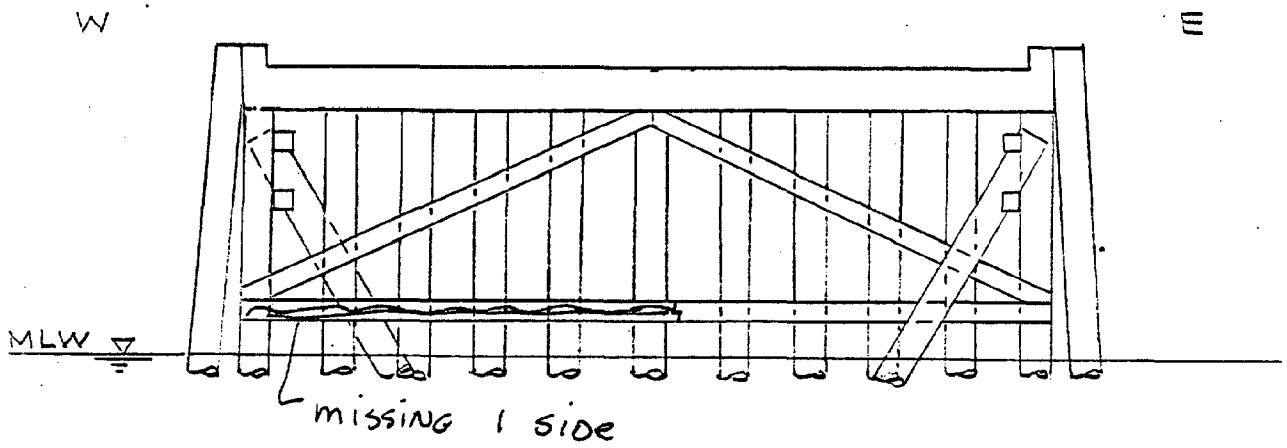
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

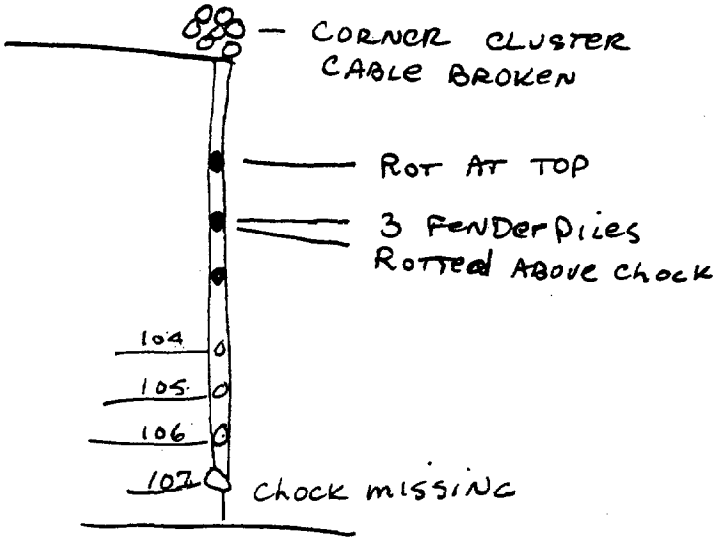
APPROX. TIDE: +0.1 M.L.W.



BENT NO. 103

NOTES:

NORTH END OF PIER



THE MAGUIRE GROUP

PROJECT FLEETVILLE CONDITION SURVEY ACC. NO. [illegible]

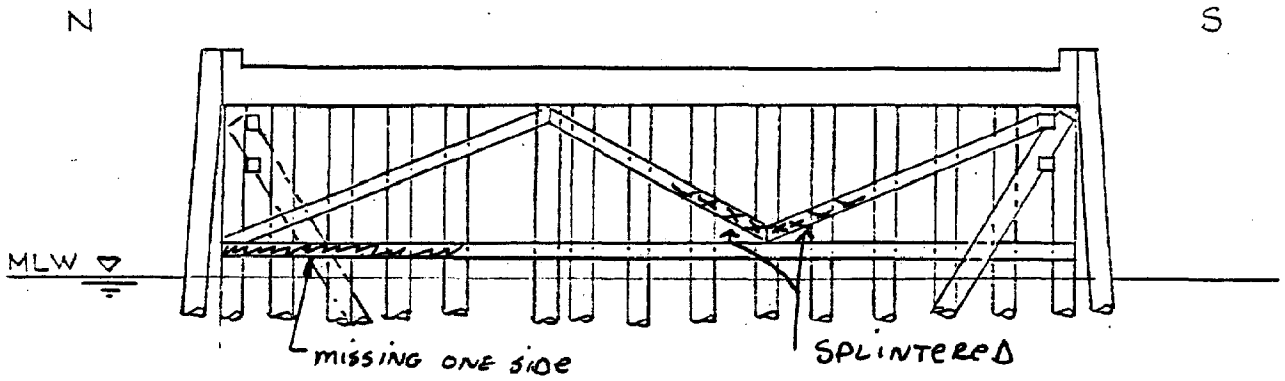
SUBJECT SOUTH FUELING PIER SHEET NO. ____ OF ____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: VVC

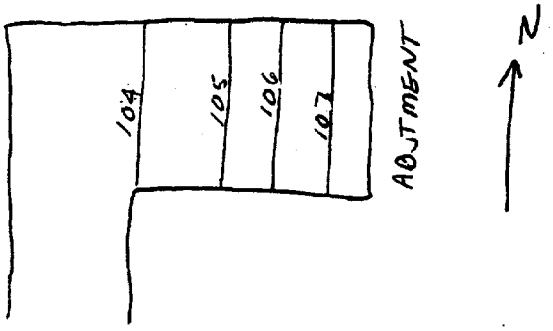
TIME: 3:14 CONDITIONS: STORM BREWING

APPROX. TIDE: 0.0



BENT NO. 104

NOTES:



THE MAGUIRE GROUP

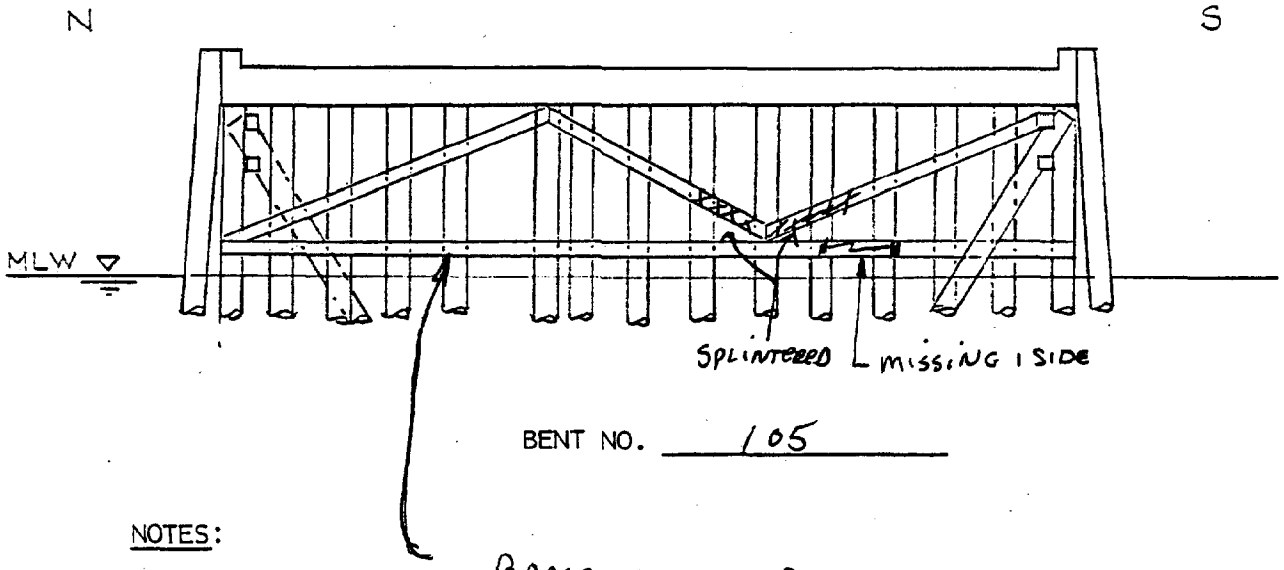
SUBJECT SOUTH FUELING PIER SHEET NO.____OF_____

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13, 1982 SURVEY BY: YVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: -0.1 M.L.W.



BENT NO. 105

NOTES:

BRACE LOOKS ROTTED

THE MAGUIRE GROUP

PROJECT TIDEVILLE CONDITION SURVEY ACC. NO. 7001

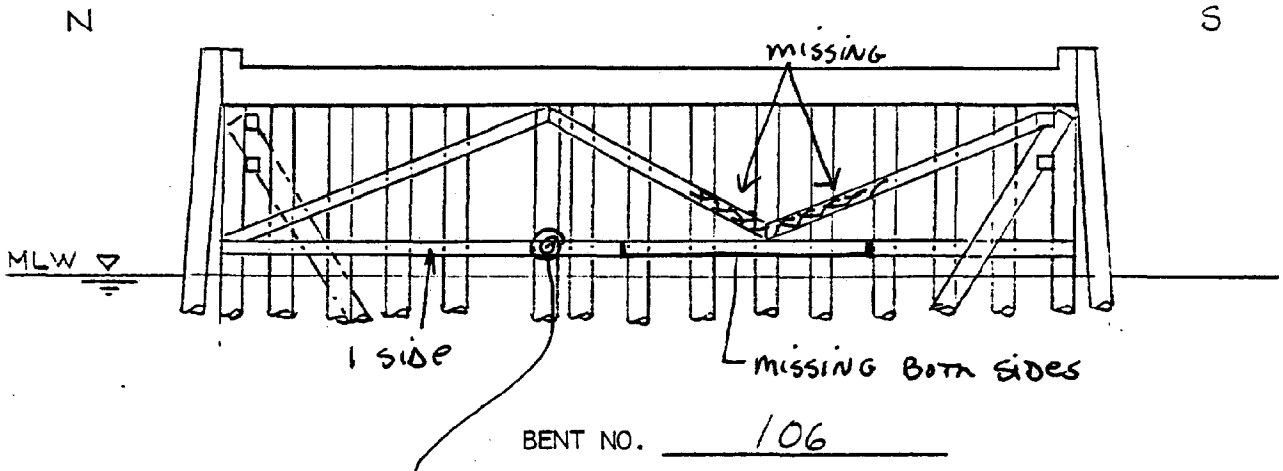
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: _____ CONDITIONS: _____

APPROX. TIDE: -0.1 m.l.w.



BENT NO. 106

NOTES: Big Hole in pile looks like rot around bolt

Lower Brace looks bad

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

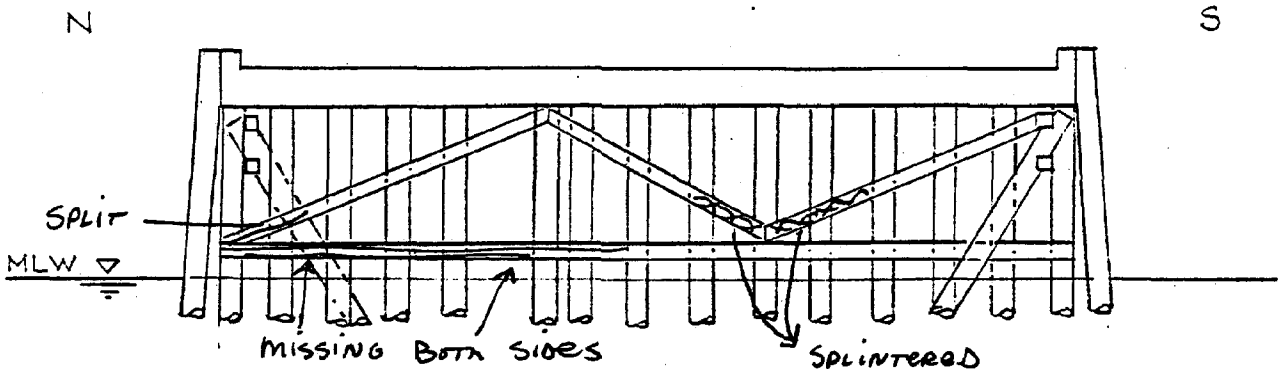
SUBJECT SOUTH FUELING PIER SHEET NO. ___ OF ___

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: MAR 13 1982 SURVEY BY: VVC

TIME: 3:27 Finish CONDITIONS: Stormy

APPROX. TIDE: -0.1 m.l.w.



BENT NO. 107

NOTES:

WIND FROM SOUTHWEST FAIRLY STRONG + CURRENT. INNER BASIN FAIRLY SLOPPY 6" TYPE CHOP. HARD TO ROW AGAINST

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

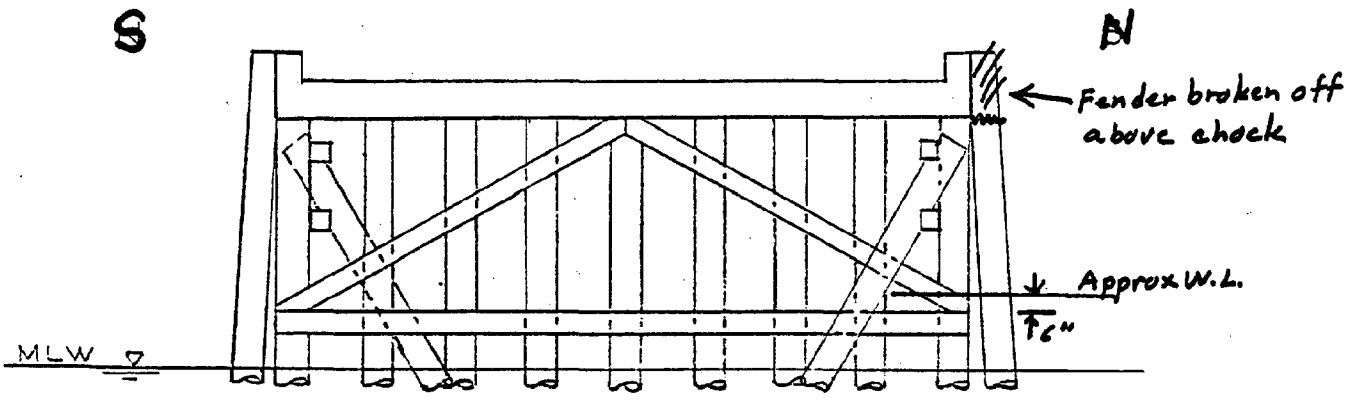
SUBJECT SOUTH FUELING PIER SHEET NO. 1 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: Sat. 3/6/82 SURVEY BY: VVC

TIME: 7:15 AM (START) CONDITIONS: Cold, windy

APPROX. TIDE: +2.2 m.l.w.



BENT NO. 1

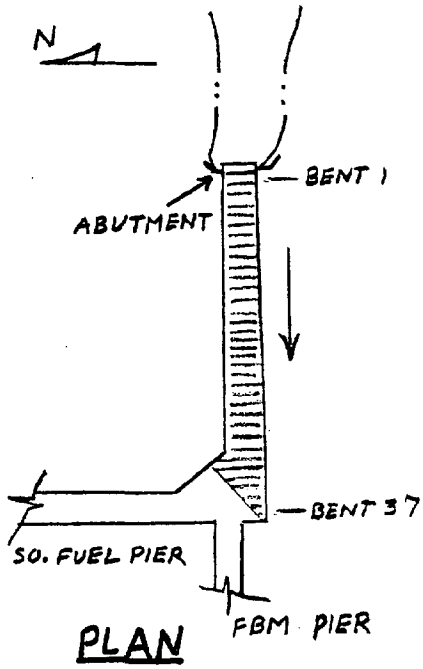
NOTES:

ABUTMENT: Granite block courses (no mortar) Blocks approx 33" high. One course above high tide then conc abutment to deck. Condition good. Vertical crack in conc

3 vertical piles between abutment and bent 1 not connected. cutoff approx 2' above H.T.

Concrete Cap with steel form. Steel completly rusted away (Typ all bents)

Timber piles bear against conc cap. Not embedded. No sign of positive connection. (Typ all bents)



PLAN

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

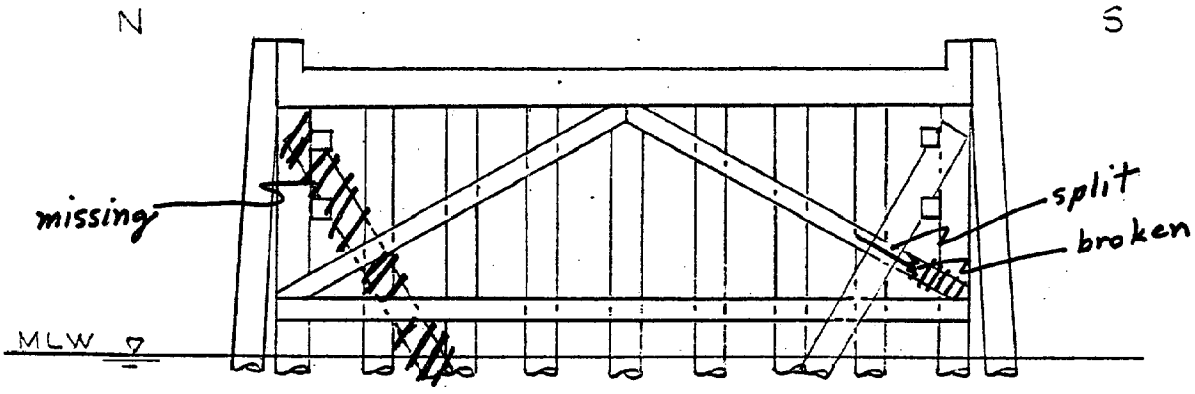
SUBJECT SOUTH FUELING PIER SHEET NO. 2 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, windy

APPROX. TIDE: 2.0 M.L.W.



BENT NO. 2

NOTES:

Piles show minor splintering in splash zone on face only. Probe with knife had little penetration (typical, except as noted, all bents)

3 piles between bents

Probed bracing with knife. Timber was solid. little penetration of knife. (Typical, except as noted)

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

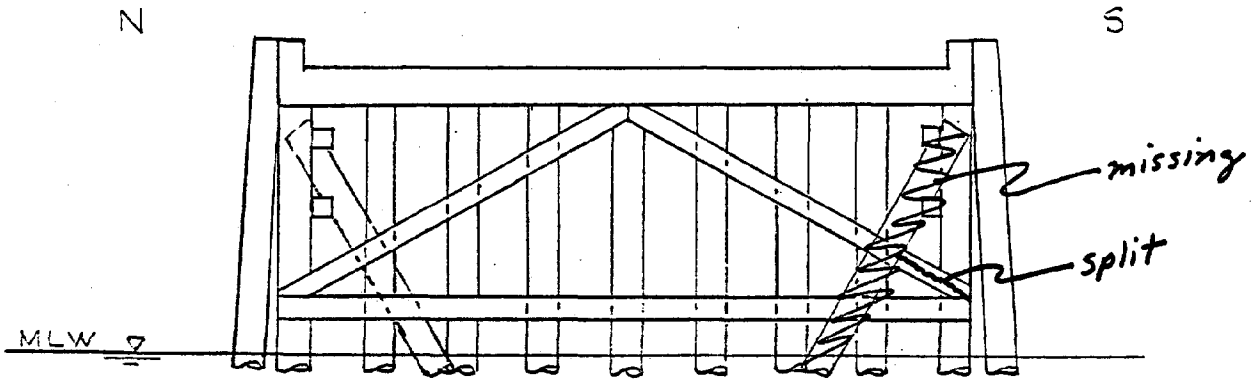
SUBJECT SOUTH FUELING PIER SHEET NO. 3 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.9 m.c.w.



BENT NO. 3

NOTES:

Batter piles alternate N & S side each bent

3 piles between bents

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

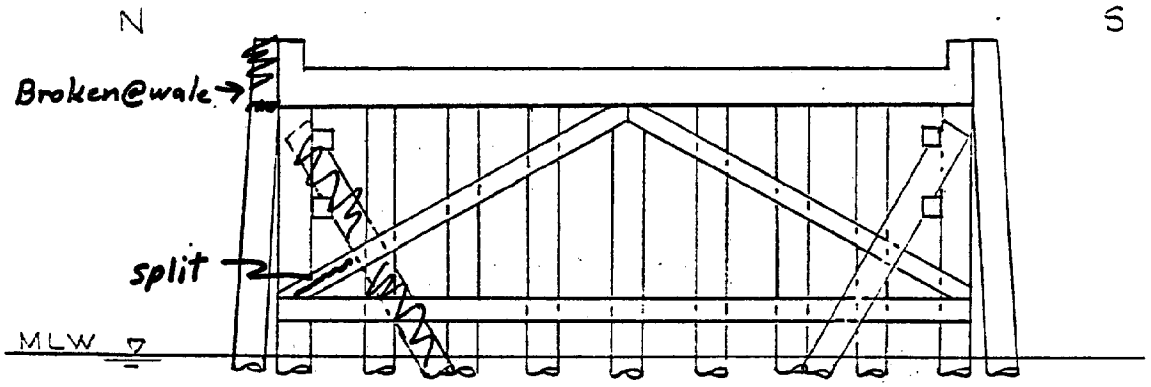
SUBJECT SOUTH FUELING PIER SHEET NO. 4 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.8 m.l.w.



BENT NO. 4

NOTES:

3 piles between bents

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

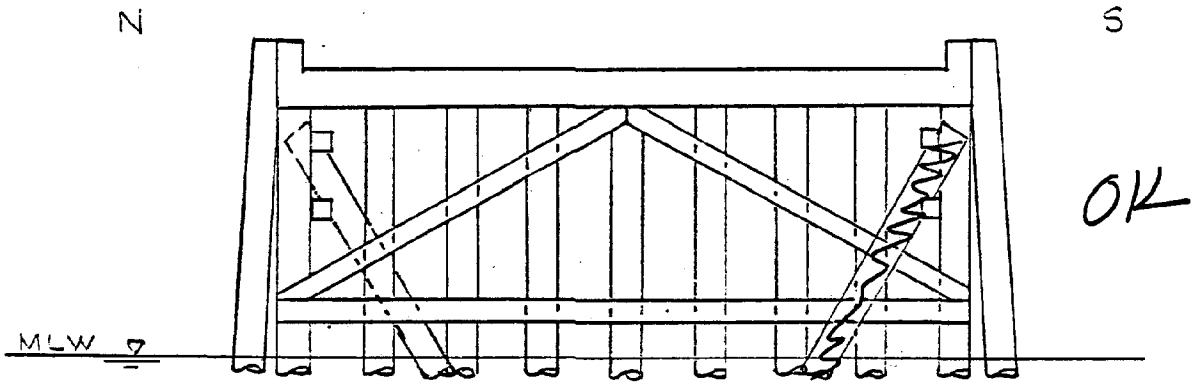
SUBJECT SOUTH FUELING PIER SHEET NO. 5 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.7 m.l.w.



BENT NO. 5

NOTES:

3 piles between bents

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

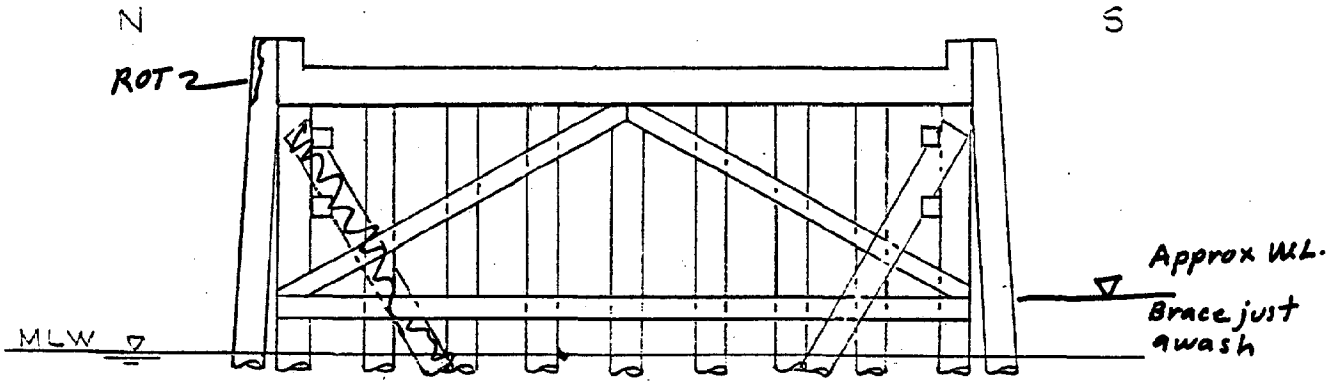
SUBJECT SOUTH FUELING PIER SHEET NO. 6 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: 8:07 AM CONDITIONS: Cold, Windy

APPROX. TIDE: +1.6 M.L.W.



BENT NO. 6

NOTES:

3 piles between bents

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

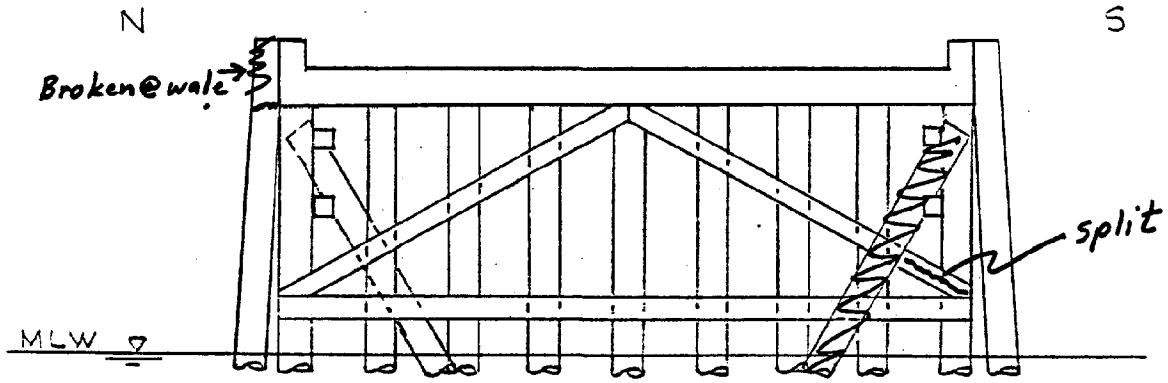
SUBJECT SOUTH FUELING PIER SHEET NO. 7 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.6 M.L.W.



BENT NO. 7

NOTES:

5 steel plates with 2 bolts ea underside deck between bents 6 & 7

Underside of conc deck looks good. Very little spalling, minor cracking (Typical except as noted)

3 piles between bents

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

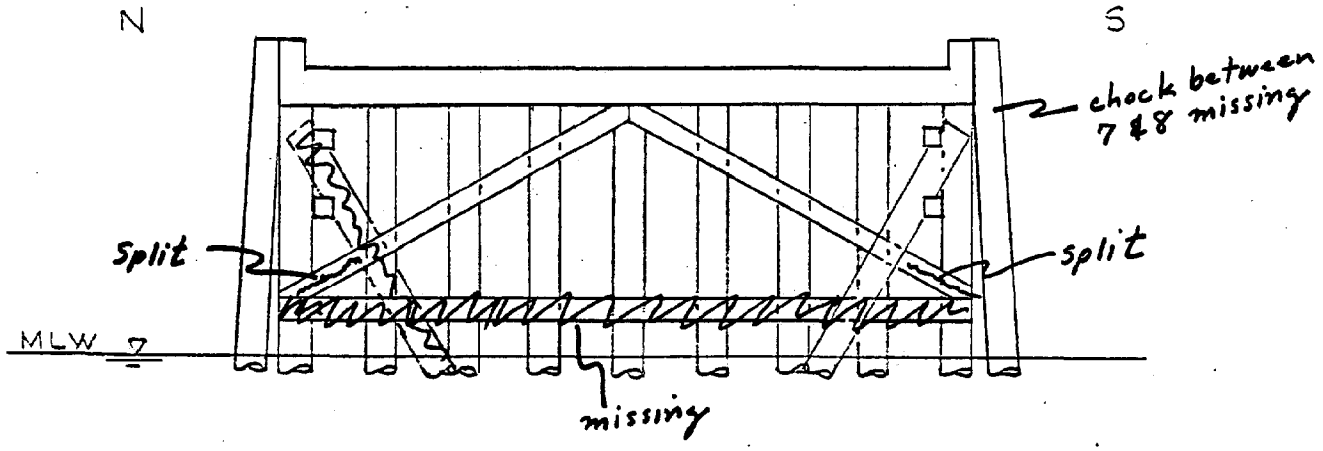
SUBJECT SOUTH FUELING PIER SHEET NO. 8 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.5 M.L.W.



BENT NO. 8
STA 3+00

NOTES:

No piles between 7 & 8

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

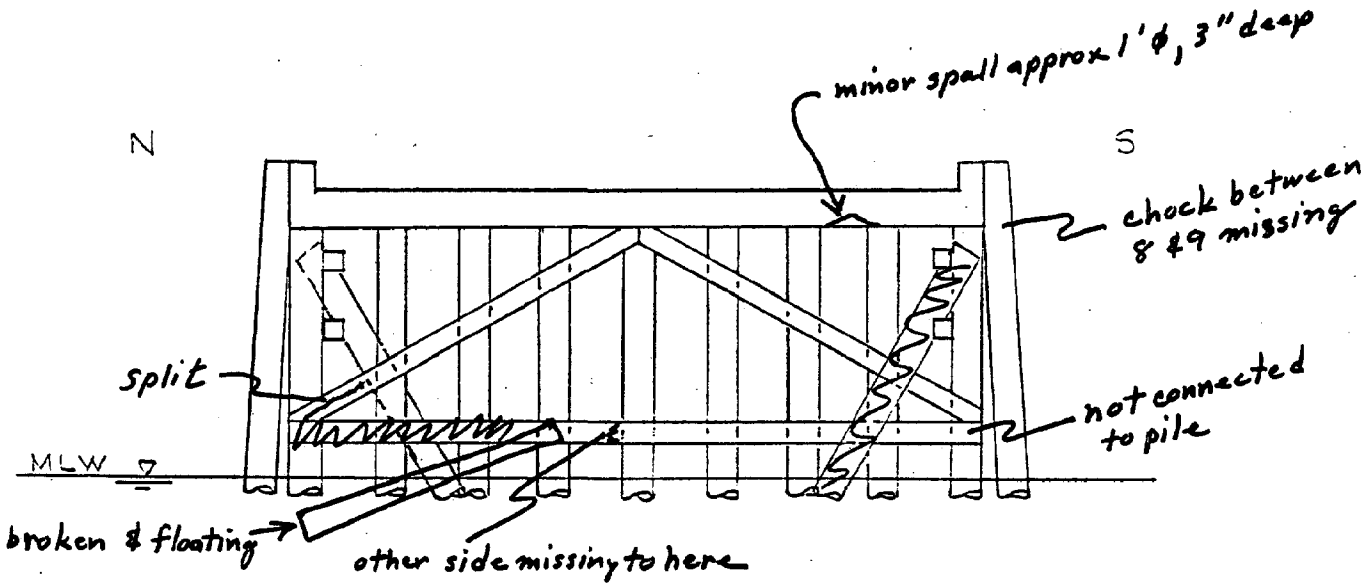
SUBJECT SOUTH FUELING PIER SHEET NO. 9 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.5 M.L.W.



BENT NO. 9

NOTES:

3 piles between 8 & 9

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

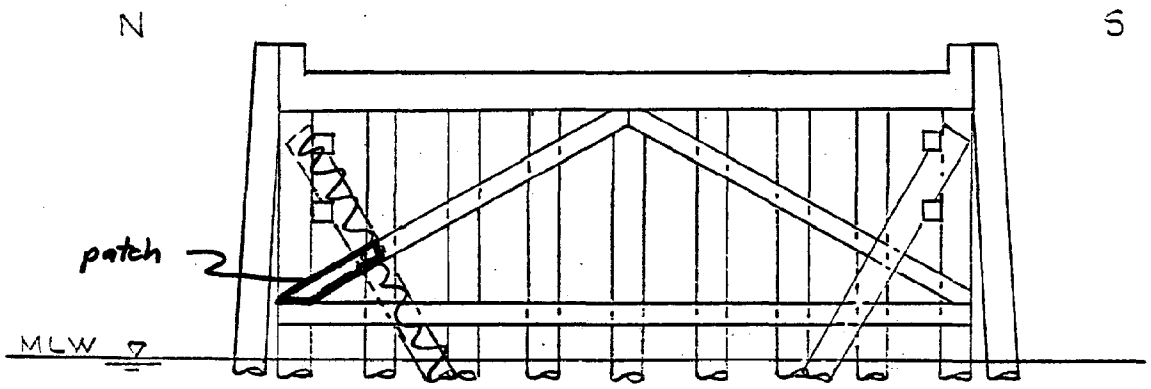
SUBJECT SOUTH FUELING PIER SHEET NO. 10 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.4 M.L.W.



BENT NO. 10

NOTES:

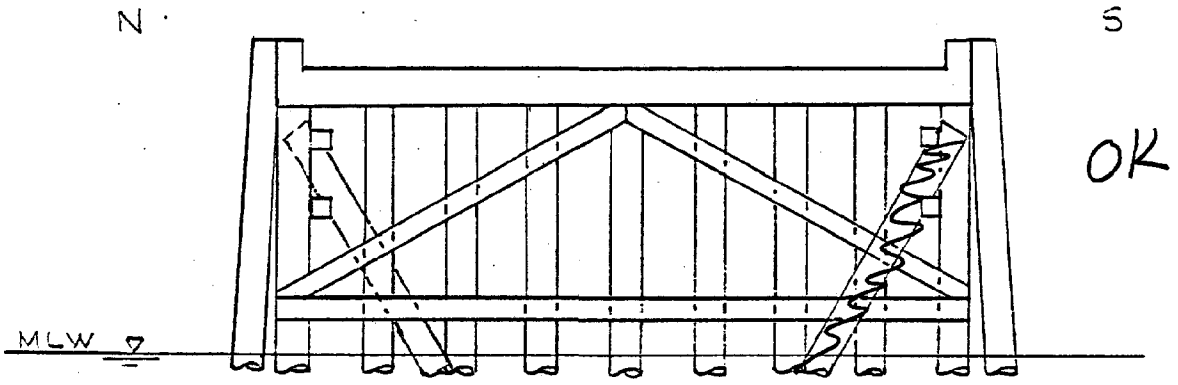
No piles between bents from here out

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.4 M.L.W.



BENT NO. 11

NOTES:

Stray pile between 10 & 11

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

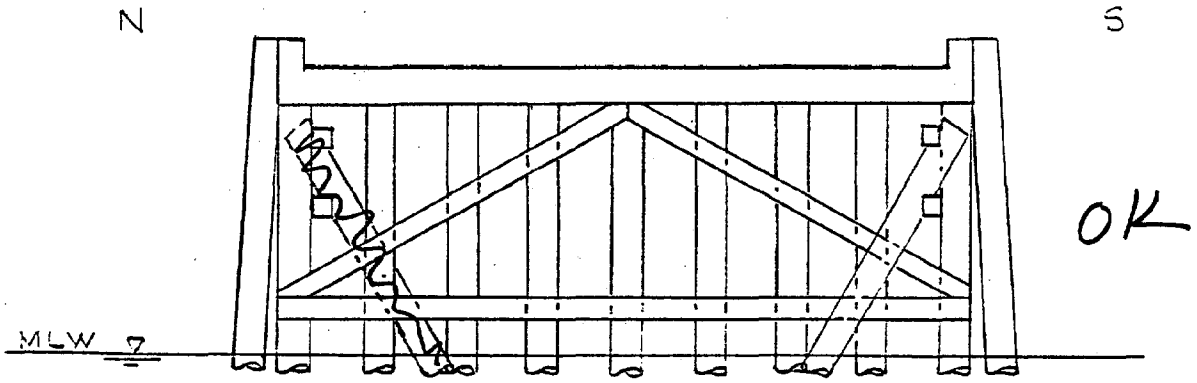
SUBJECT SOUTH FUELING PIER SHEET NO. 12 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.3 M.L.W.



BENT NO. 12

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

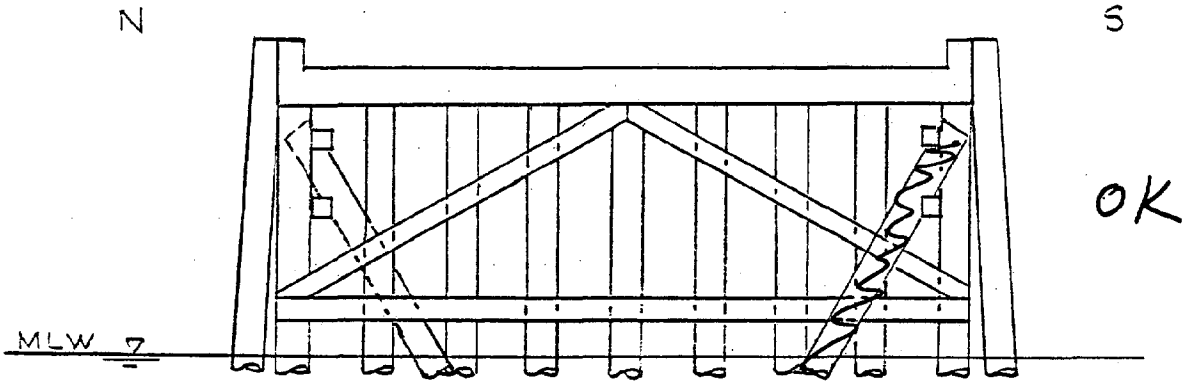
SUBJECT SOUTH FUELING PIER SHEET NO. 13 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.3 M.L.W.



BENT NO. 13
STA 3+50

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

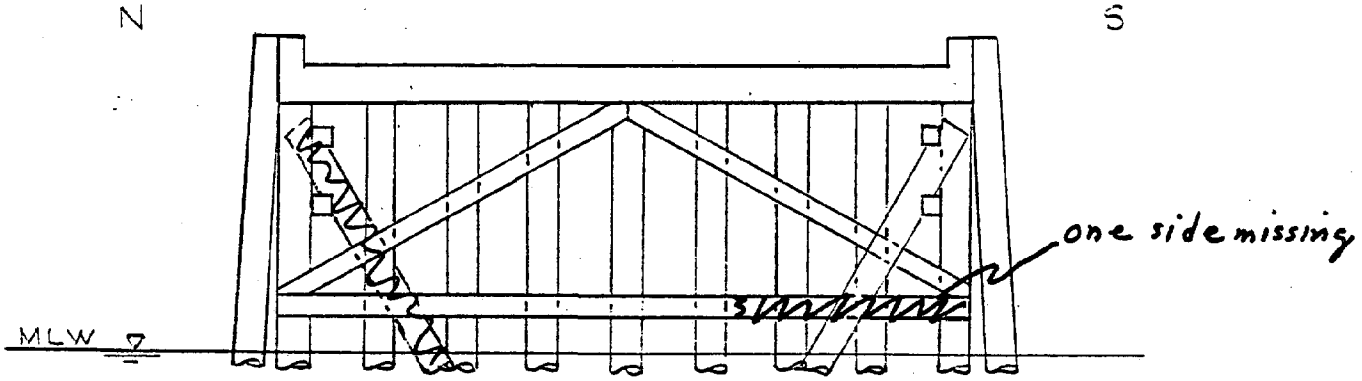
SUBJECT SOUTH FUELING PIER SHEET NO. 14 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.2 m.c.w.



BENT NO. 14

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

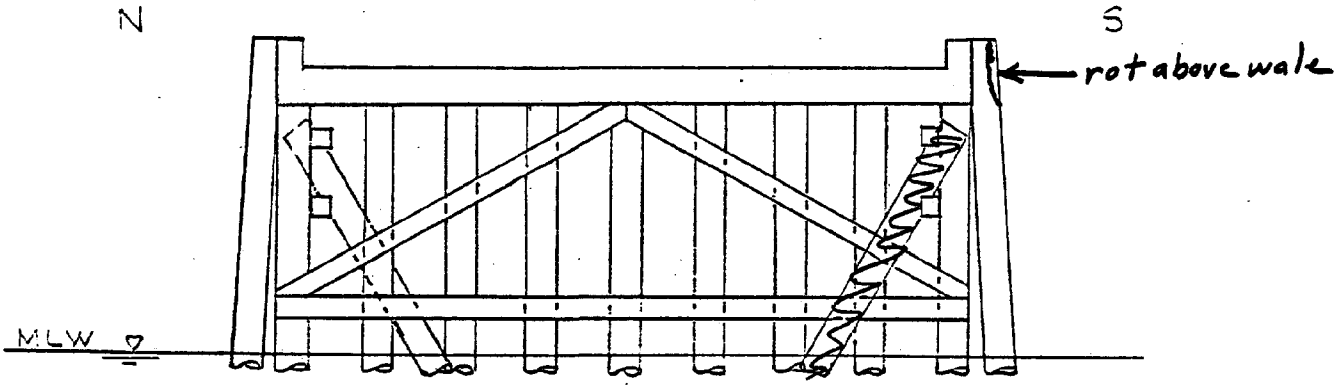
SUBJECT SOUTH FUELING PIER SHEET NO. 15 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: V V C

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.2 M.L.W.



BENT NO. 15

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

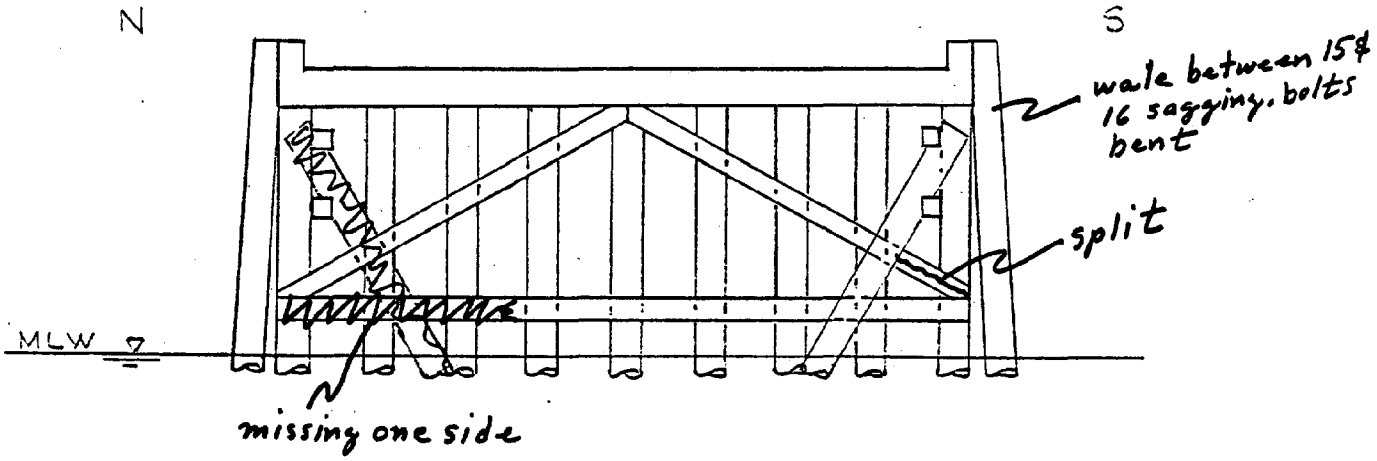
SUBJECT SOUTH FUELING PIER SHEET NO. 16 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.1 M.L.W.



BENT NO. 16

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

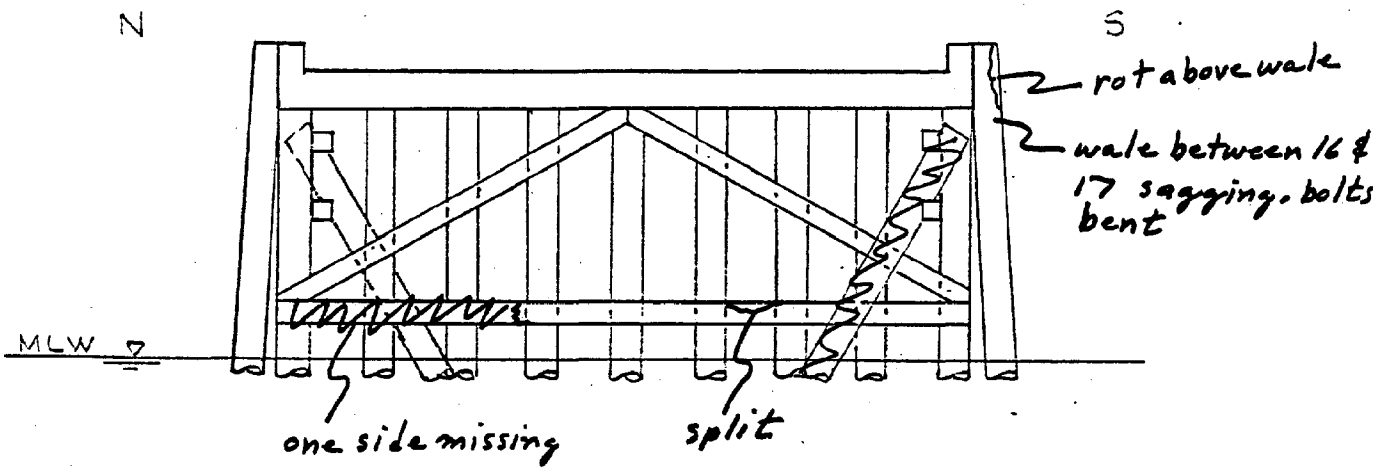
SUBJECT SOUTH FUELING PIER SHEET NO. 17 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.1 M.L.W.



BENT NO. 17

NOTES:

Stray pile between 16 & 17

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

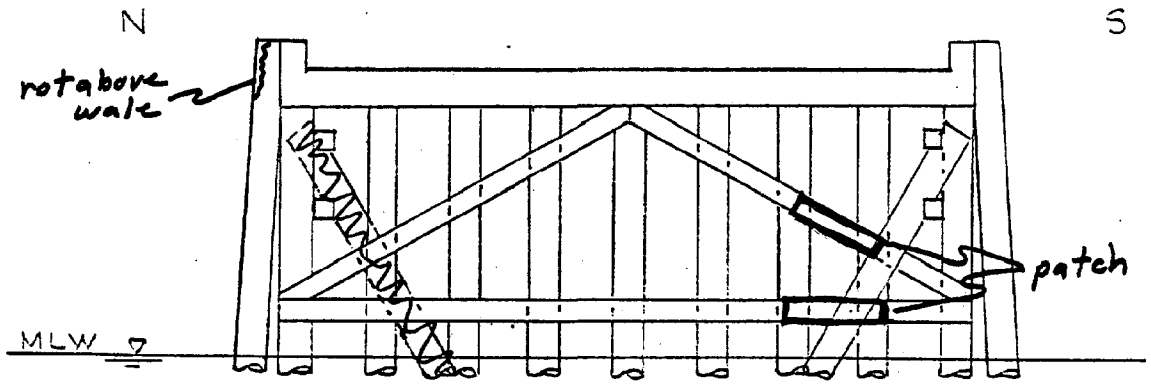
SUBJECT SOUTH FUELING PIER SHEET NO. 18 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.0 m.l.w.



BENT NO. 18
STA 2+00

NOTES:

5 plates w/ 2 bolts ea under deck between 17 & 18

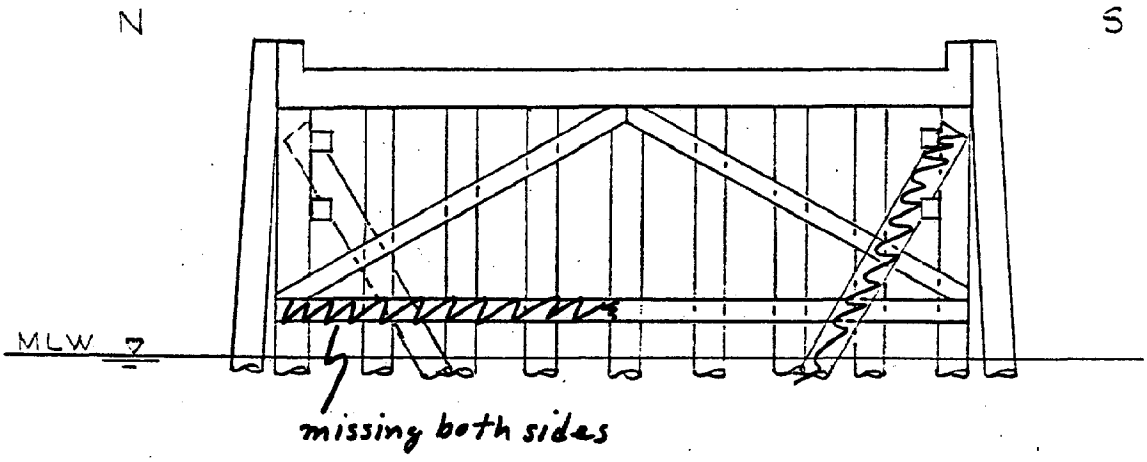
THE MAGUIRE GROUP

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +1.0 M.L.W.



BENT NO. 19

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

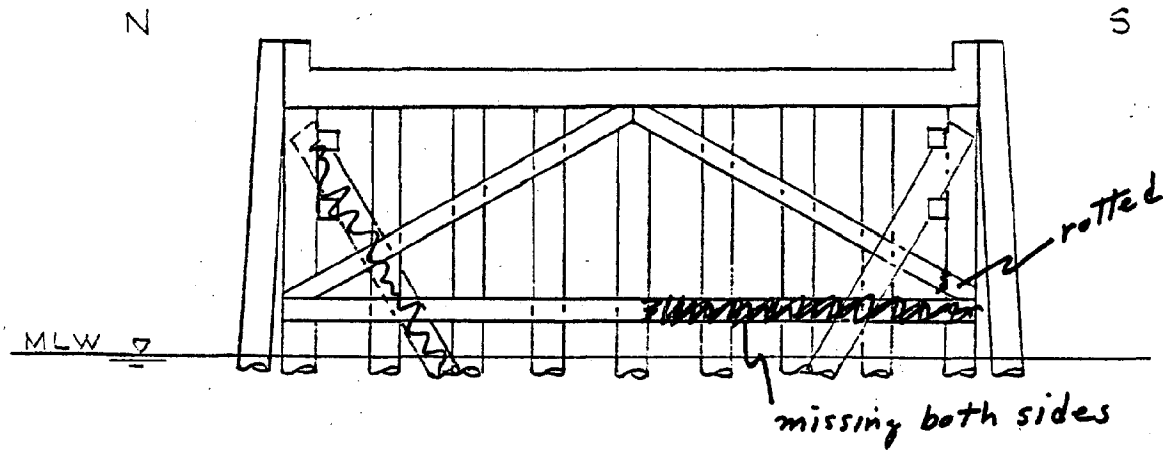
SUBJECT SOUTH FUELING PIER SHEET NO. 20 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.9 M.L.W.



BENT NO. 20

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

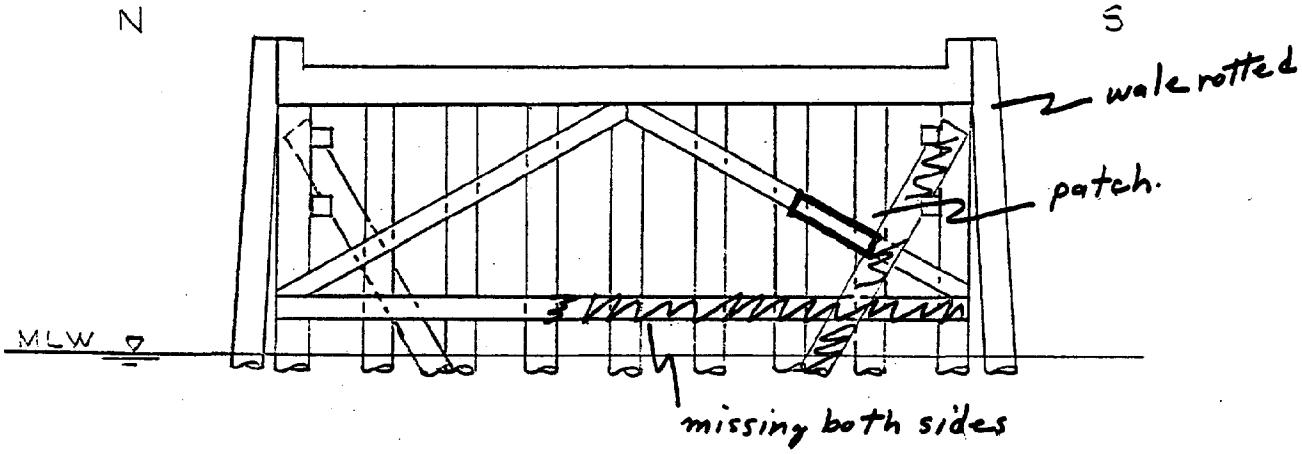
SUBJECT SOUTH FUELING PIER SHEET NO. 21 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.9 M.L.W.



BENT NO. 21

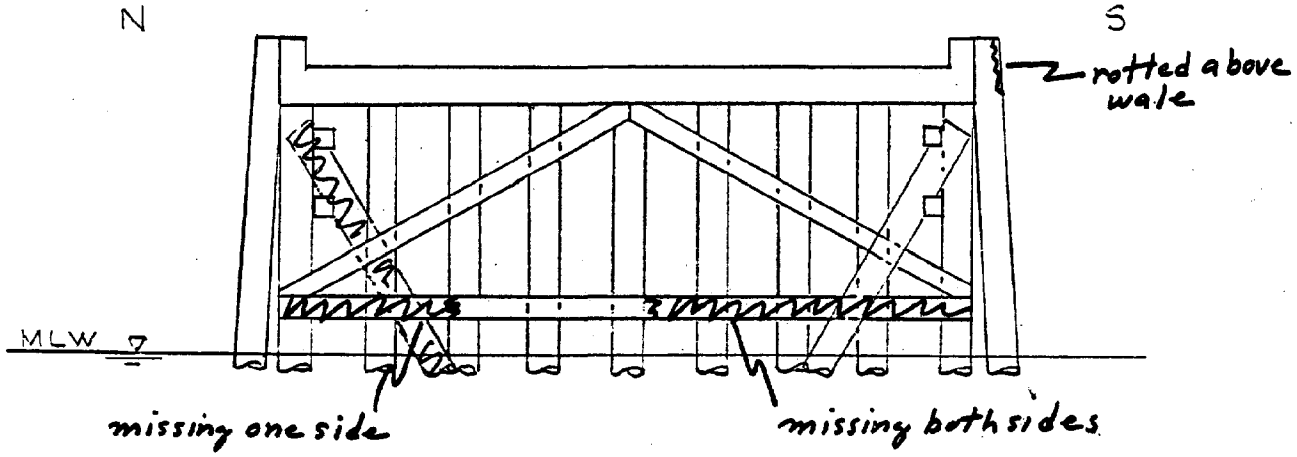
NOTES:

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.8 M.L.W.



BENT NO. 22

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

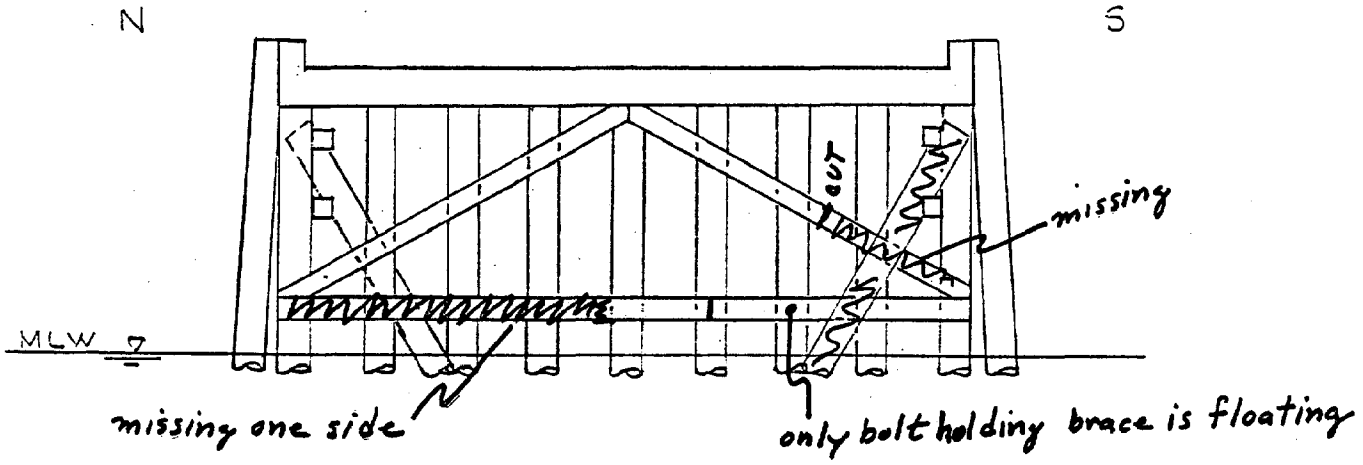
SUBJECT SOUTH FUELING PIER SHEET NO. 23 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

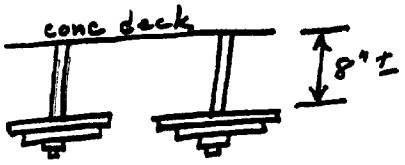
APPROX. TIDE: +0.8 M.L.W.



BENT NO. 23
STA 1+50

NOTES:

Two large bolts & plates hanging below deck



THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

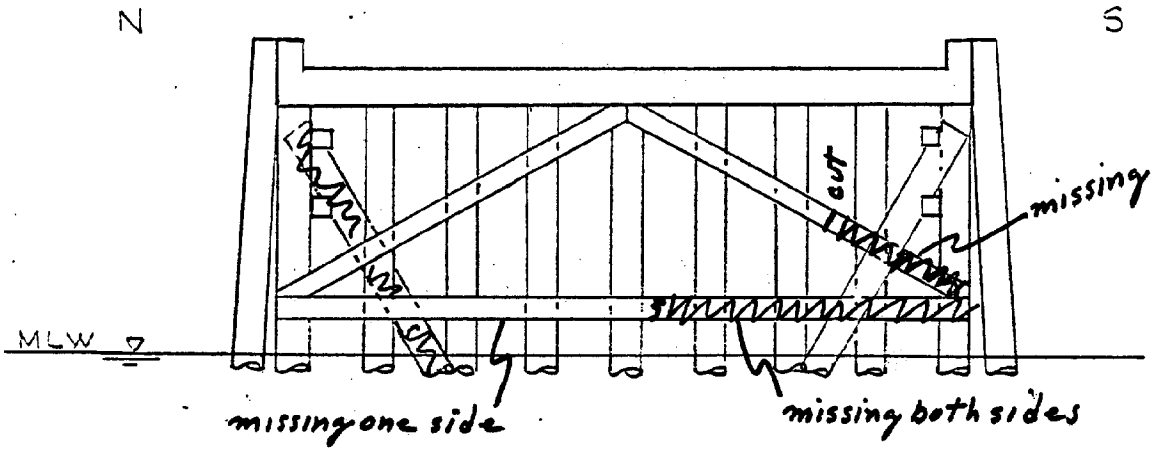
SUBJECT SOUTH FUELING PIER SHEET NO. 24 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 24

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

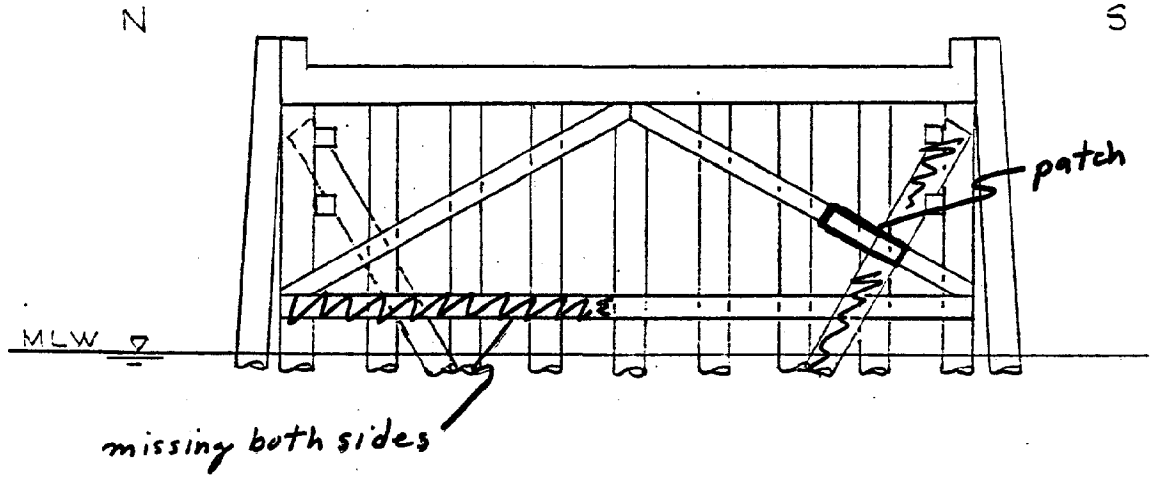
SUBJECT SOUTH FUELING PIER SHEET NO. 25 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 25

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

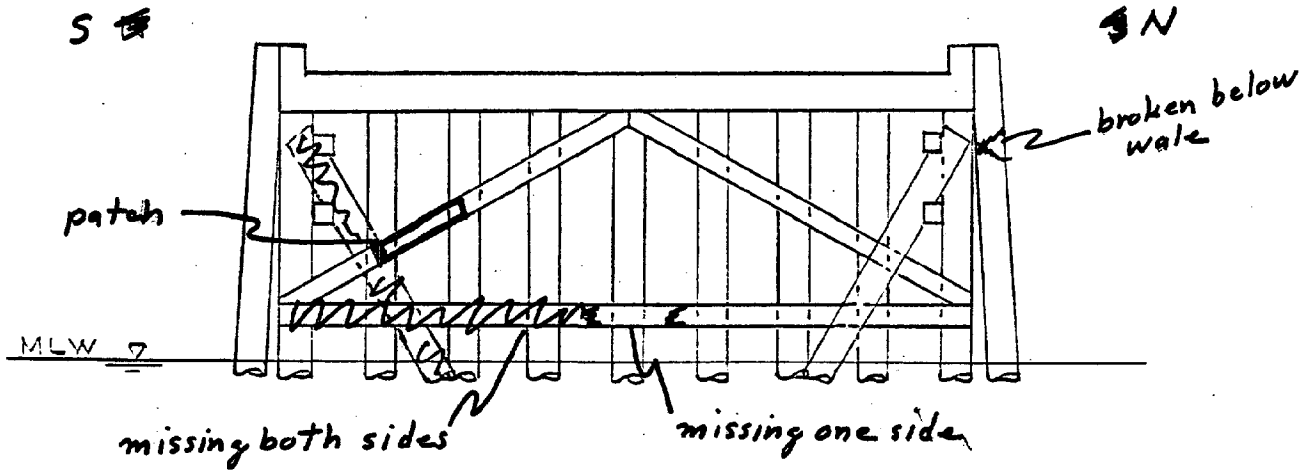
SUBJECT SOUTH FUELING PIER SHEET NO. 26 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 26

NOTES:

Batter Pile South Side. Crossed out wrong one

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

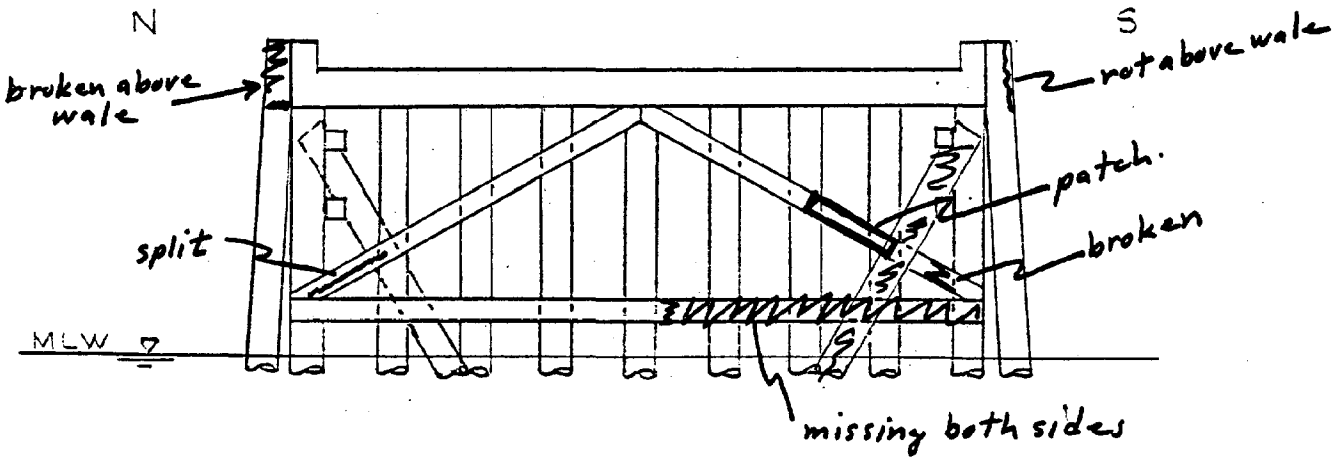
SUBJECT SOUTH FUELING PIER SHEET NO. 27 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 27

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

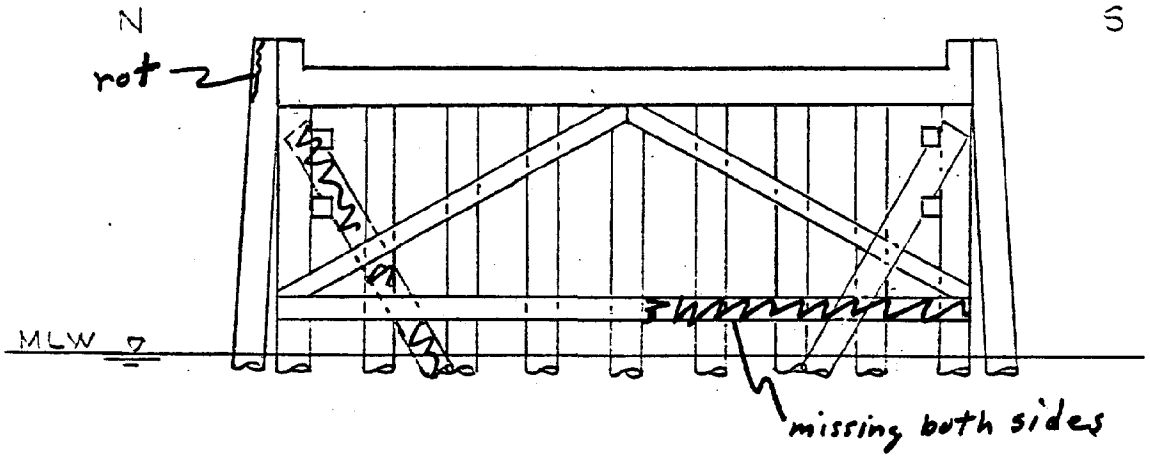
SUBJECT SOUTH FUELING PIER SHEET NO. 28 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 28
STA 1+00

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

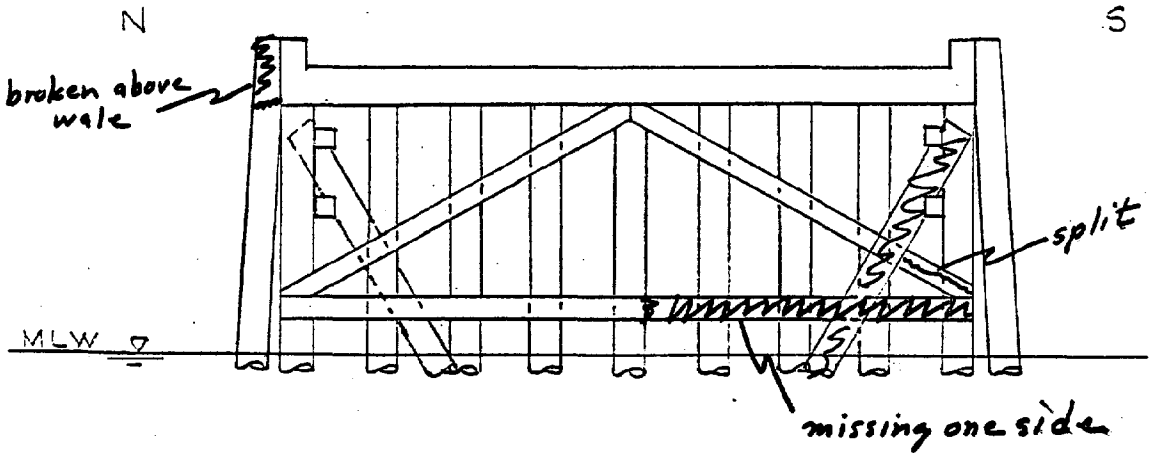
SUBJECT SOUTH FUELING PIER SHEET NO. 29 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 29

NOTES:

Diagonal corner to N-S Leg of Fuel Pier starts here

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

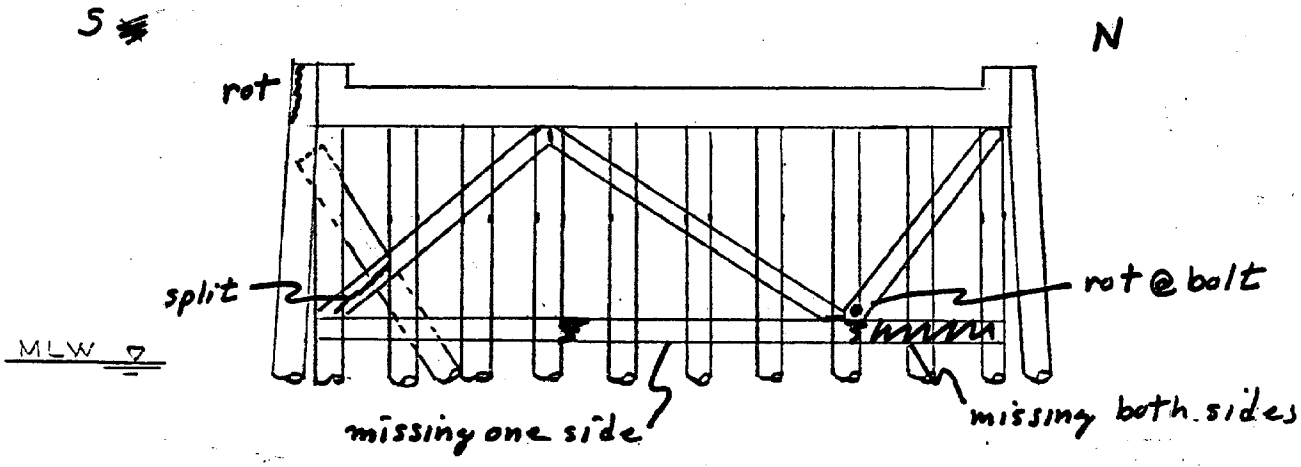
SUBJECT SOUTH FUELING PIER SHEET NO. 30 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 30

NOTES:

10 piles this bent

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

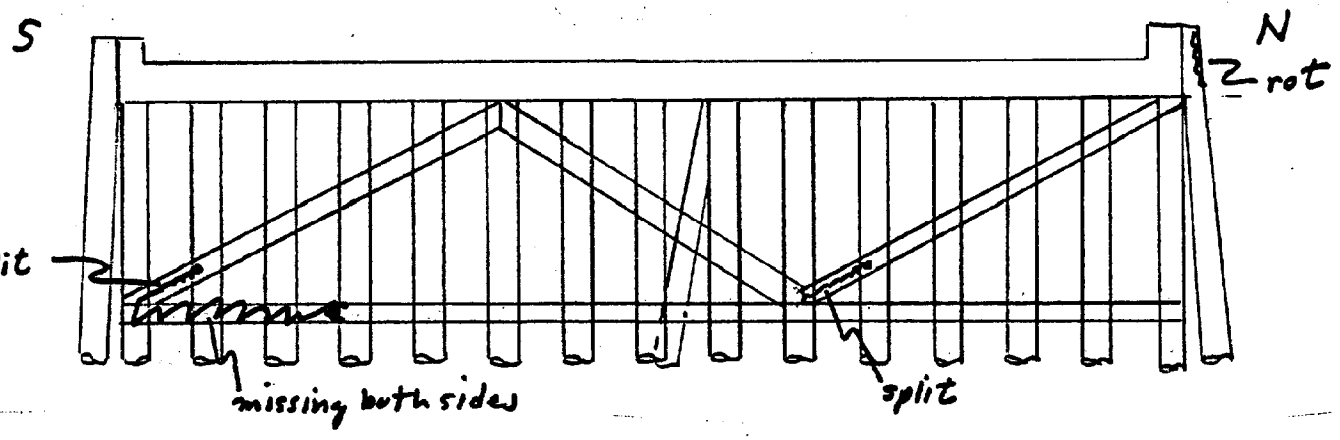
SUBJECT SOUTH FUELING PIER SHEET NO. 31 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.4 M.L.W.



BENT NO. 31

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

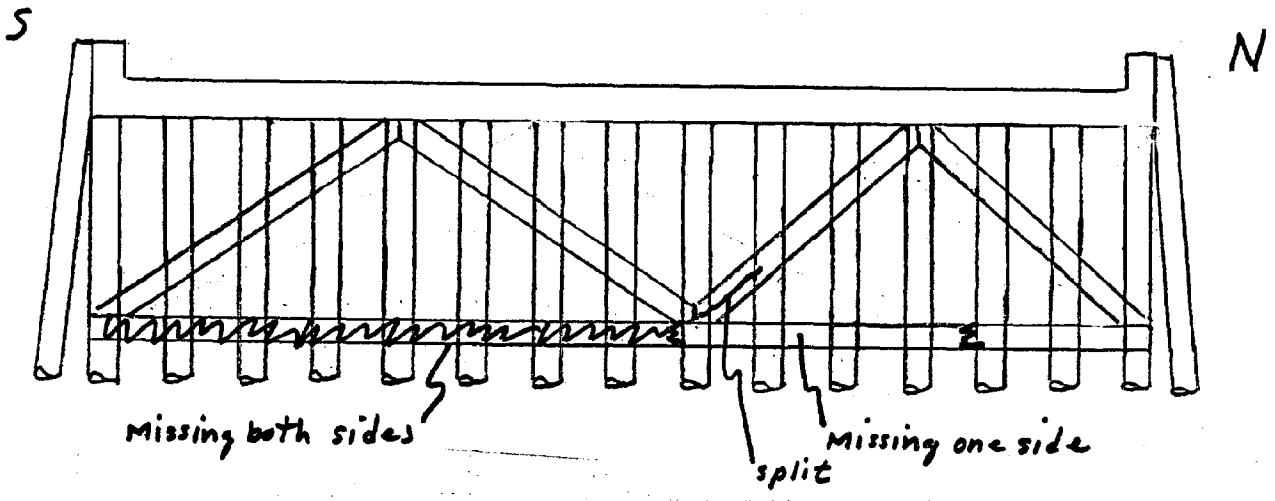
SUBJECT SOUTH FUELING PIER SHEET NO. 32 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.4 M.L.W.



BENT NO. 32

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

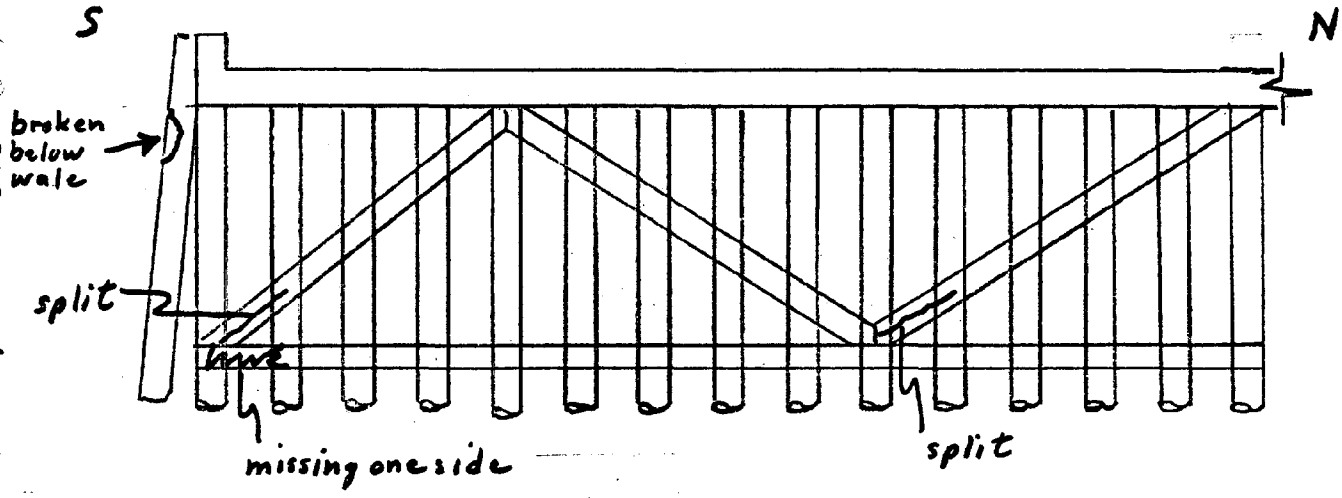
SUBJECT SOUTH FUELING PIER SHEET NO. 33 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

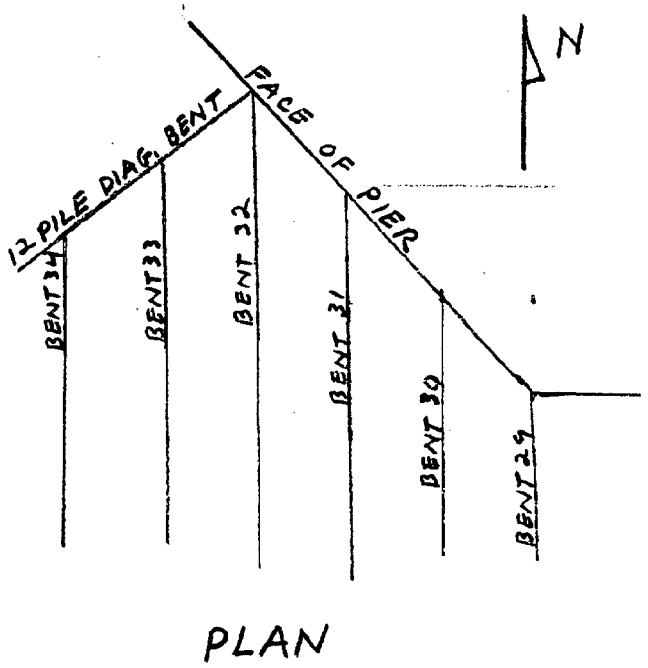
TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.3 M.L.W.



BENT NO. 33

NOTES:



PLAN

THE MAGUIRE

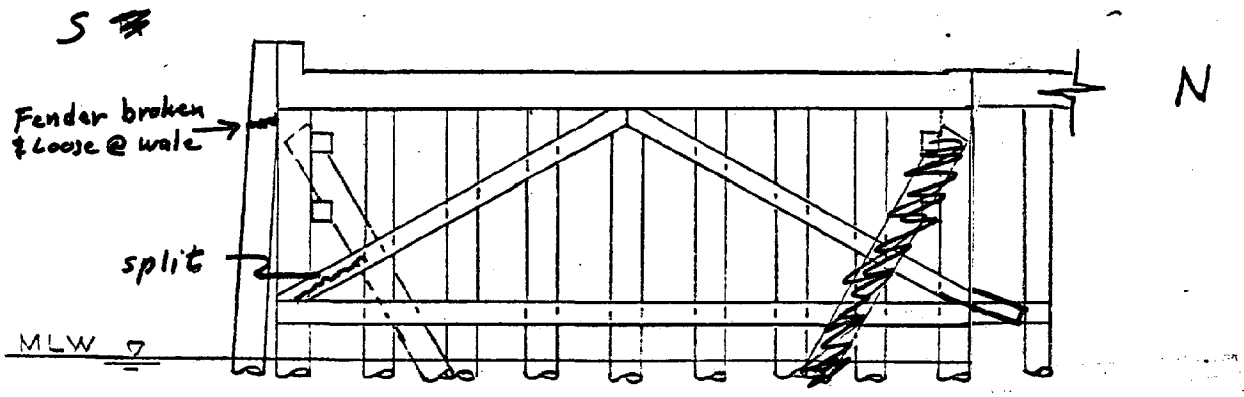
1.81

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.3 M.L.W.



BENT NO. 34

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

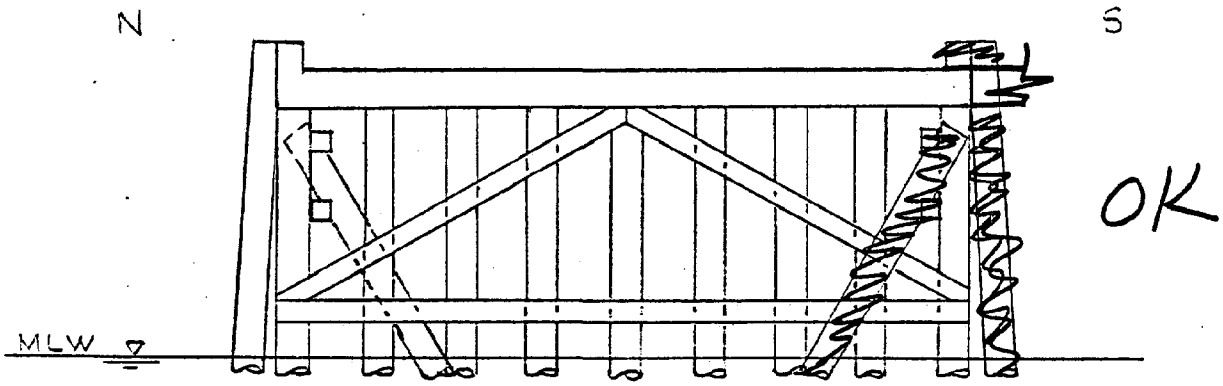
SUBJECT SOUTH FUELING PIER SHEET NO. 35 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Cold, Windy

APPROX. TIDE: +0.3 M.L.W.



BENT NO. 35

NOTES:

9 Piles in bent

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

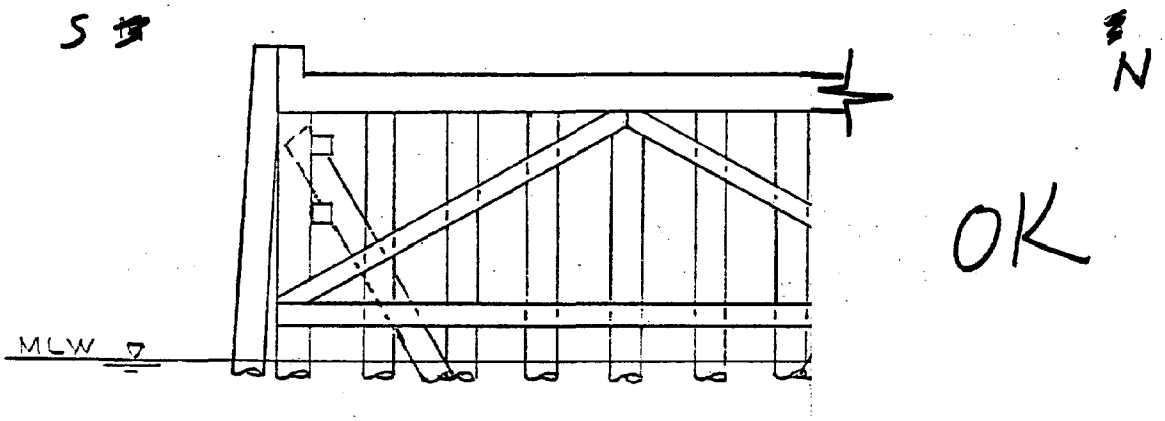
SUBJECT SOUTH FUELING PIER SHEET NO. 36 OF 36

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/6/82 SURVEY BY: VVC

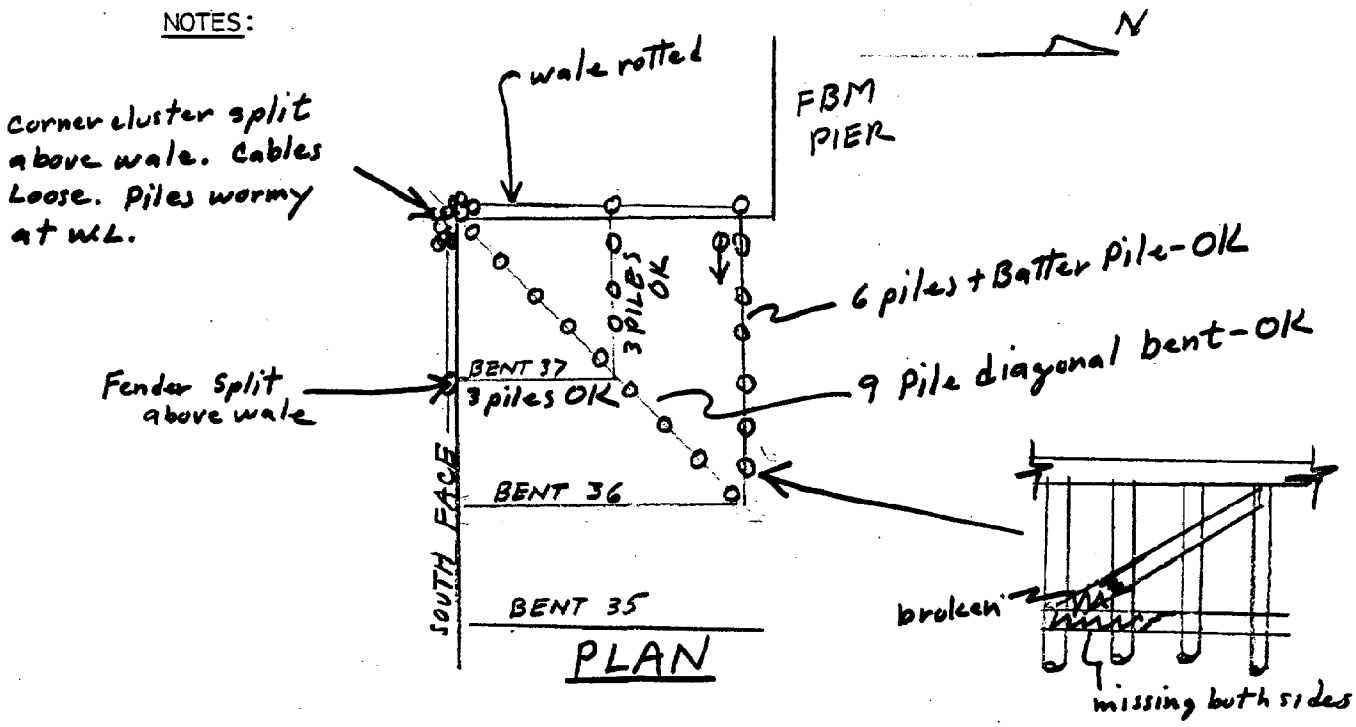
TIME: 10:00 AM (FINISH) CONDITIONS: Cold, Windy

APPROX. TIDE: +0.2 M.L.W.



BENT NO. 36

NOTES:



THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

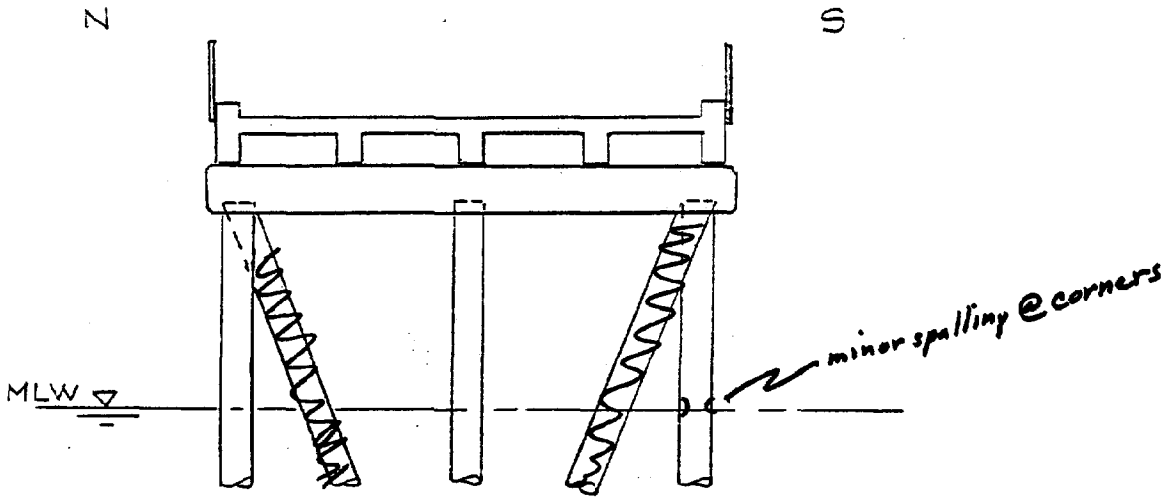
SUBJECT FBM PIER SHEET NO. 1 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: 12:45 PM CONDITIONS: Foggy, drizzle, Calm

APPROX. TIDE: 0.0 m.c.u.

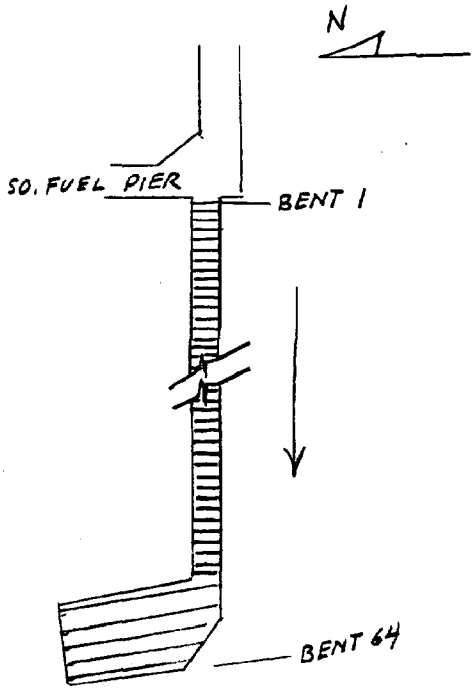


BENT NO. 1

NOTES:

No batter piles bent 1

Piles are 18" □ cone piles



PLAN

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

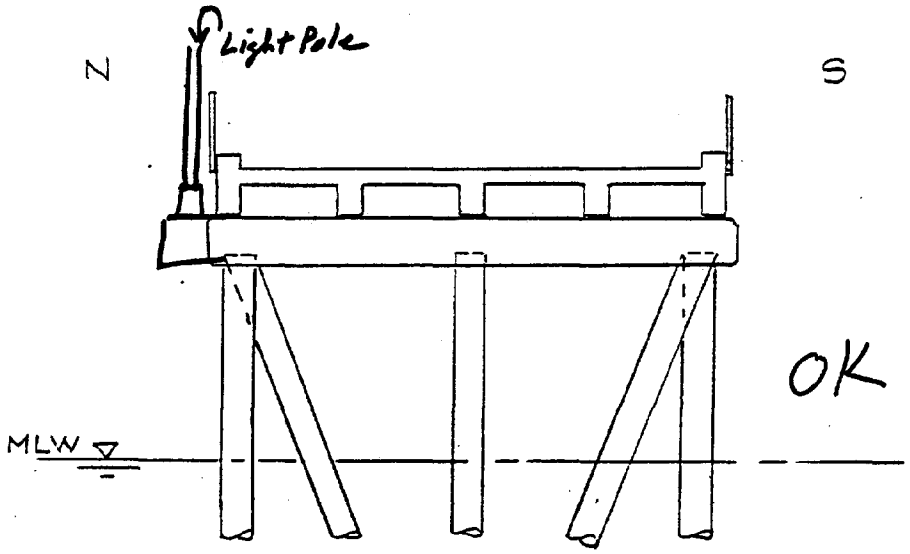
SUBJECT FBM PIER SHEET NO. 2 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

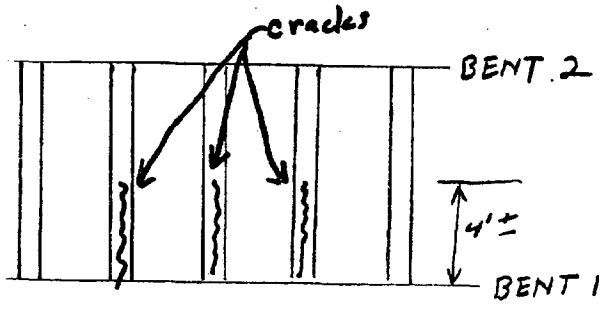
TIME: _____ CONDITIONS: Foggy, drizzle, calm

APPROX. TIDE: 0.0 M.L.L.W.



BENT NO. 2

NOTES:



LOOKING UP AT UNDERSIDE OF DECK

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

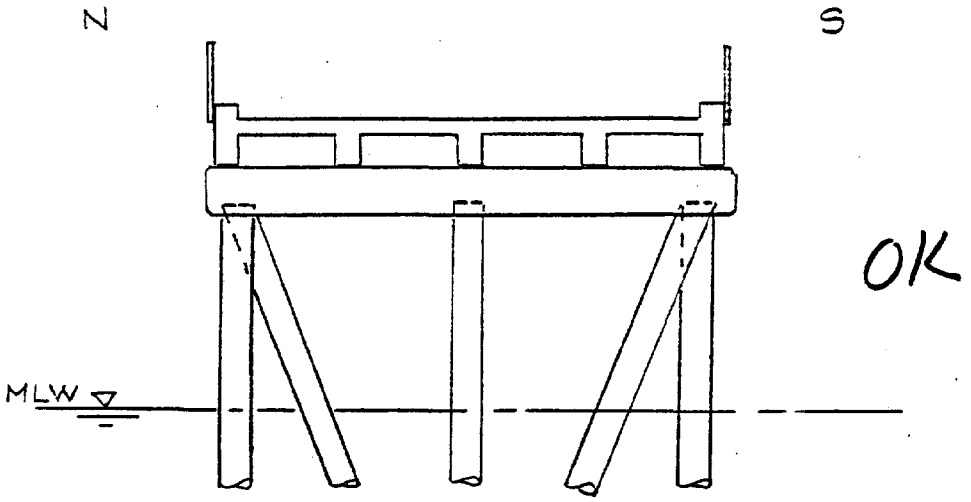
SUBJECT FBM PIER SHEET NO. 3 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Foggy, drizzle, calm

APPROX. TIDE: 0.0 M.L.W.



OK

BENT NO. 3

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

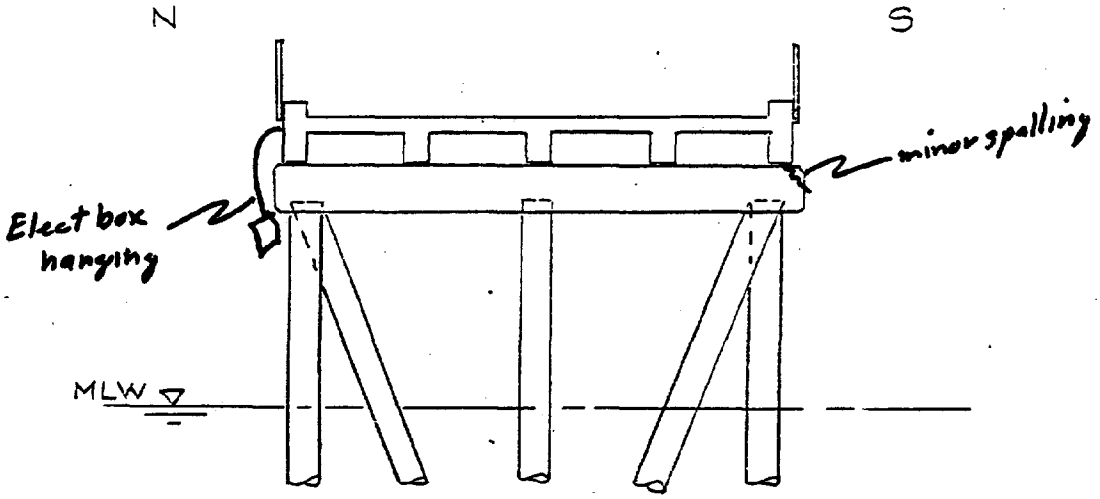
SUBJECT FBM PIER SHEET NO. 4 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Foggy, drizzle, calm

APPROX. TIDE: +0.1 M.L.L.W.



BENT NO. 4

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

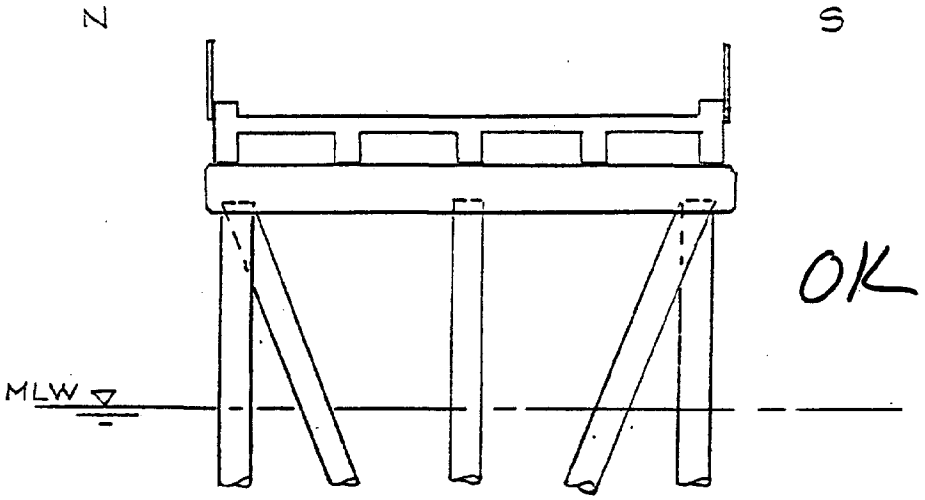
SUBJECT FBM PIER SHEET NO. 5 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/2/82 SURVEY BY: VVC

TIME: 12:55 CONDITIONS: Foggy, drizzle, calm wind picking up

APPROX. TIDE: +0.1 M.L.L.W.



BENT NO. 5

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

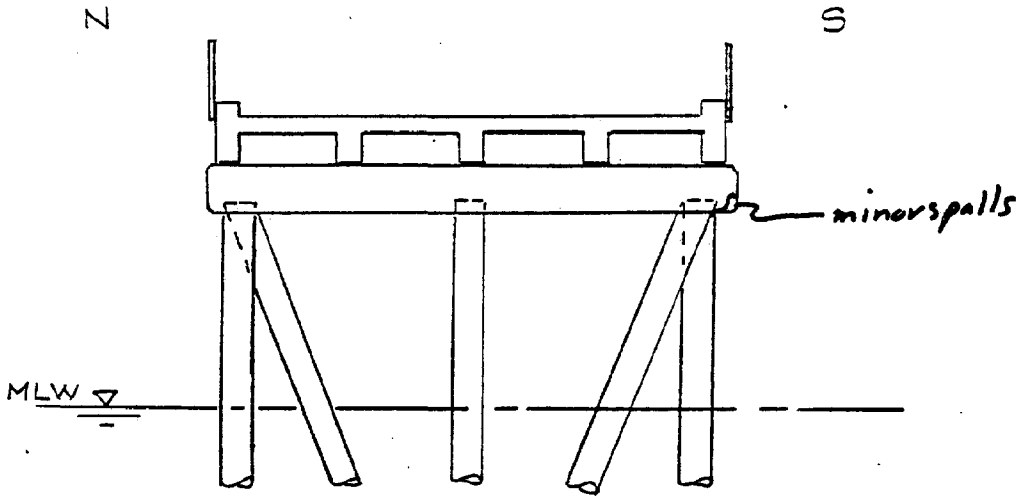
SUBJECT FBM PIER SHEET NO. 6 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Foggy, drizzle, sm. chop

APPROX. TIDE: +0.1 m.c.w.



BENT NO. 6

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

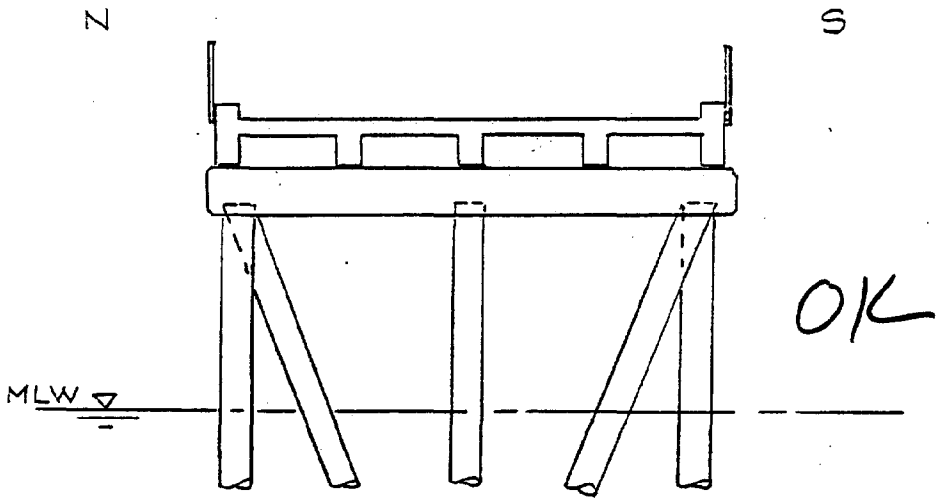
SUBJECT FBM PIER SHEET NO. 7 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Foggy, drizzle, chop

APPROX. TIDE: +0.2 M.L.W.



BENT NO.'S 7 & 8

NOTES:

THE MAGUIRE GROUP

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

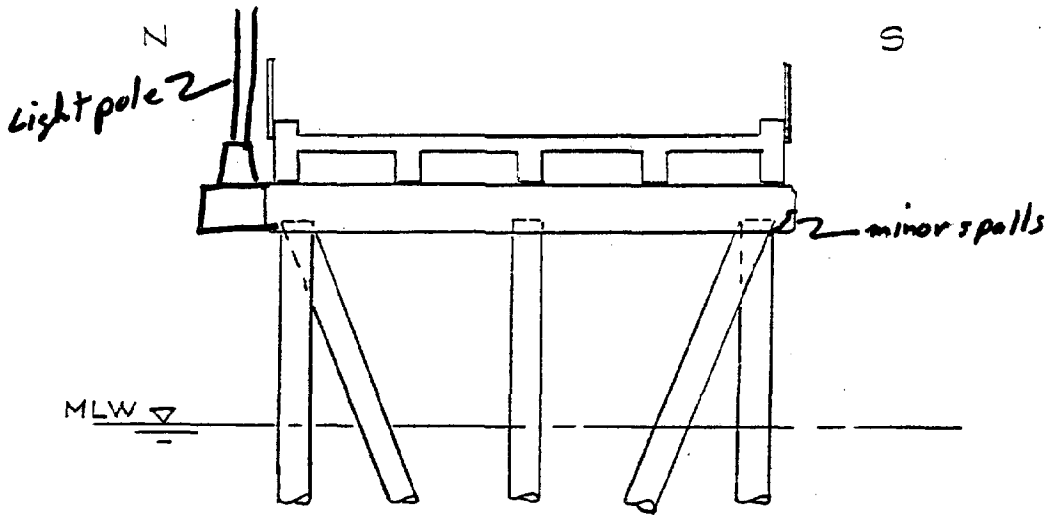
SUBJECT FBM PIER SHEET NO. 8 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: YVC

TIME: _____ CONDITIONS: Foggy, drizzle, clop
current picking up SE → NW

APPROX. TIDE: +0.2 M.L.W.



BENT NO. 9

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

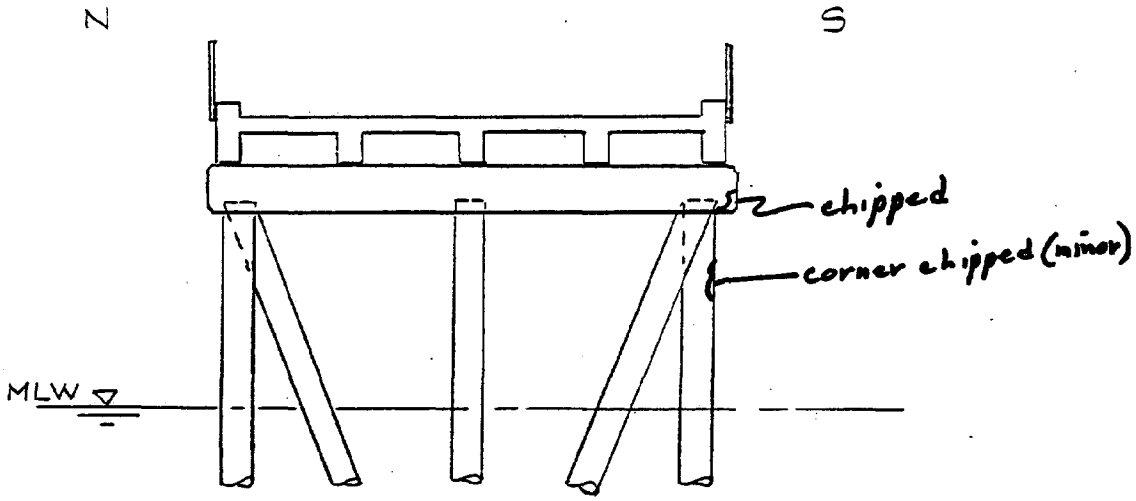
SUBJECT FBM PIER SHEET NO. 9 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Foggy, drizzle

APPROX. TIDE: +0.2 M.L.W.



BENT NO. 10

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

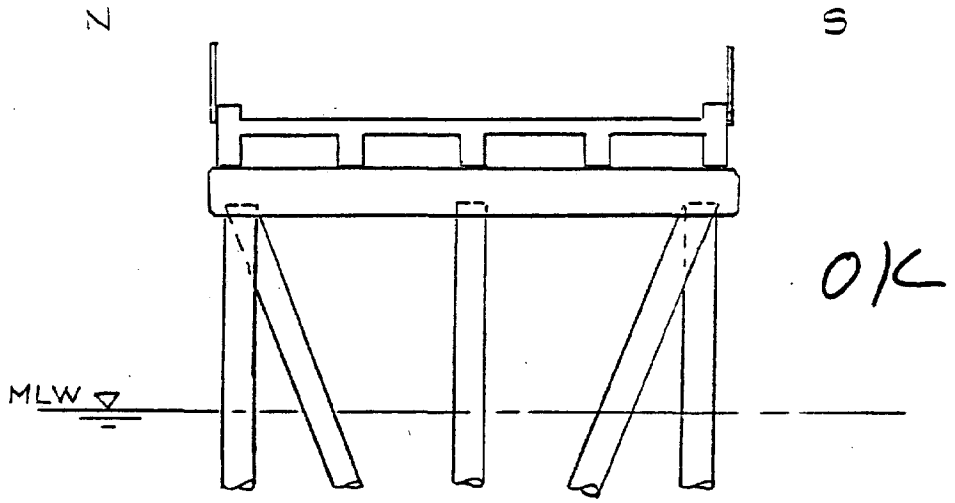
SUBJECT FBM PIER SHEET NO. 10 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/3/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: Fog, drizzle

APPROX. TIDE: +0.3M.L.W.



BENT NO. 11

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

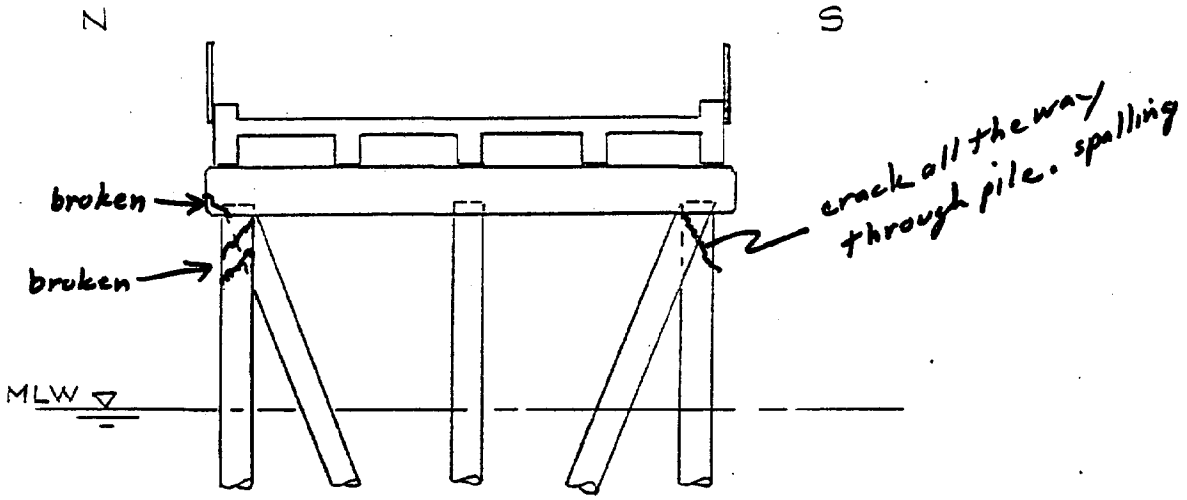
SUBJECT FBM PIER SHEET NO. 11 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/92 SURVEY BY: VVC

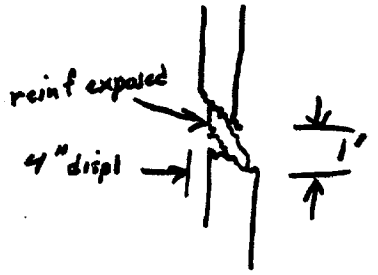
TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.3 M.L.L.W.



BENT NO. 12

NOTES:



PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

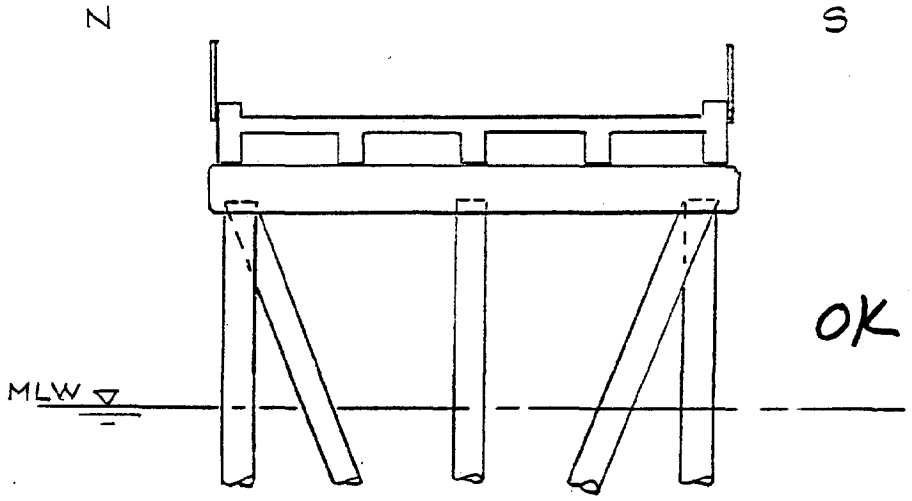
SUBJECT FBM PIER SHEET NO. 12 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/92 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.3 M.L.W.



BENT NO.'S 13 Thru 15

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

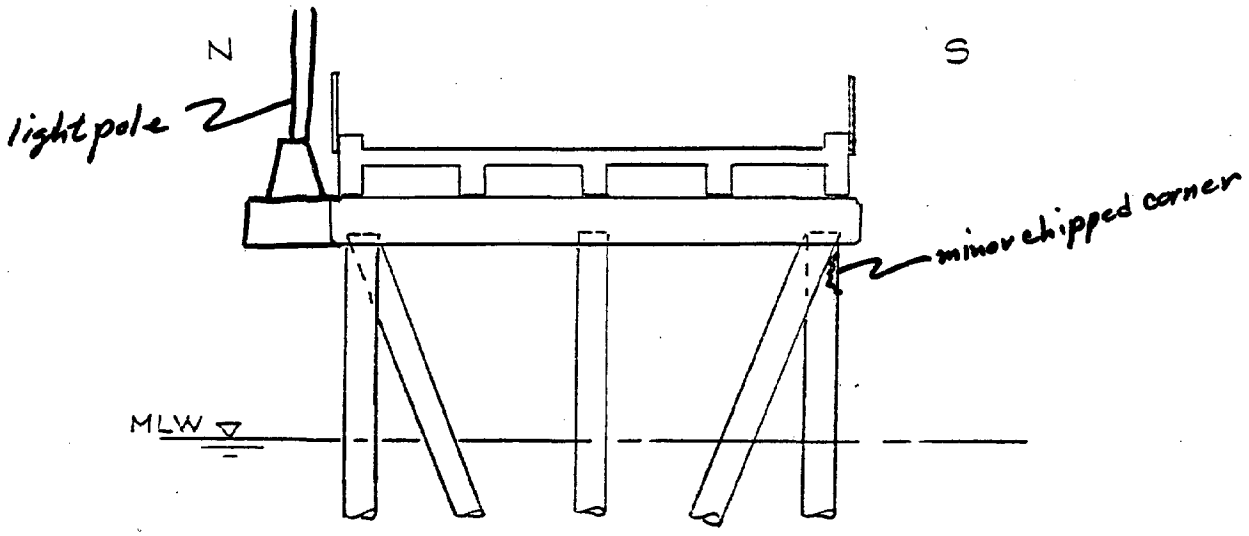
SUBJECT FBM PIER SHEET NO. 13 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.4 m.l.w.



BENT NO. 16

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

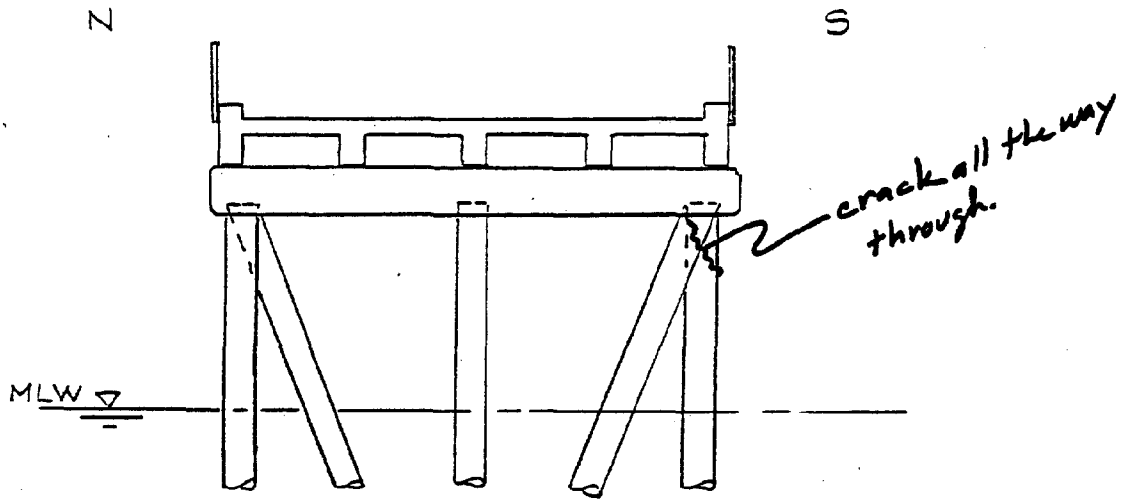
SUBJECT FBM PIER SHEET NO. 14 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.4 m.l.w.



BENT NO. 17

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

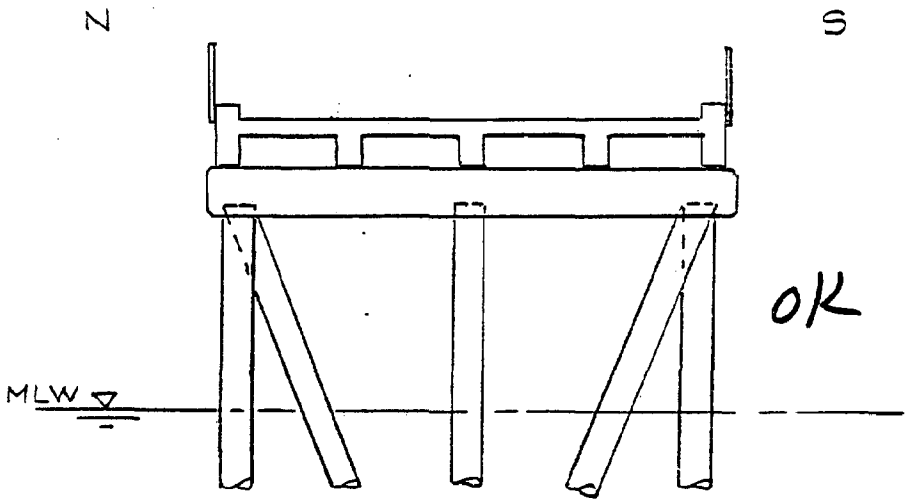
SUBJECT FBM PIER SHEET NO. 15 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.4 M.L.W.



BENT NO. 18

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

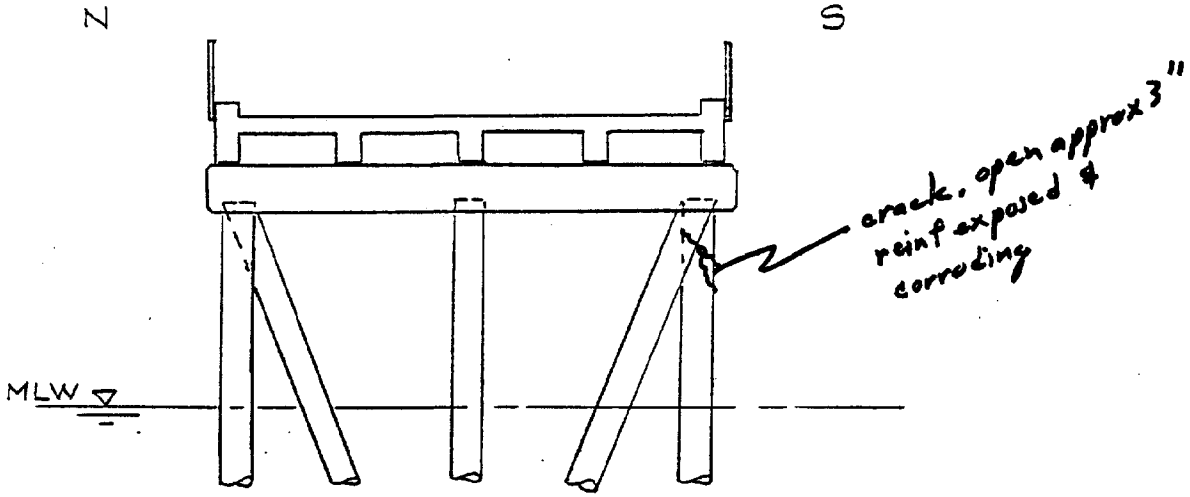
SUBJECT FBM PIER SHEET NO. 16 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 19

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

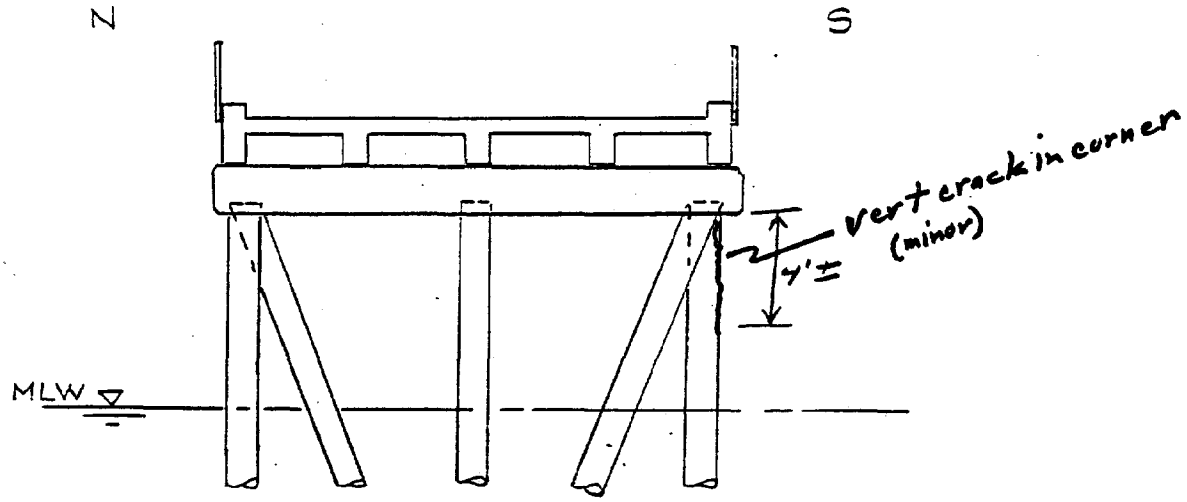
SUBJECT FBM PIER SHEET NO. 17 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: V Y C

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 20

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

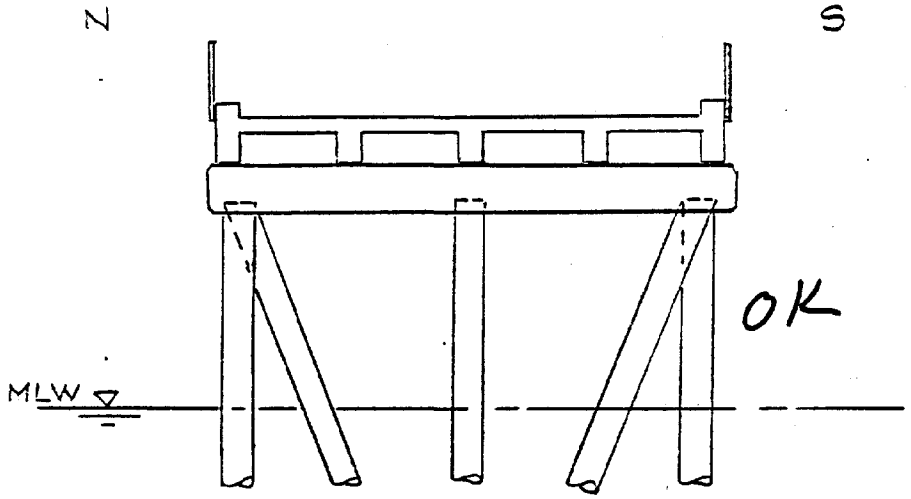
SUBJECT FBM PIER SHEET NO. 18 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.5 M.L.W.



BENT NO. 21

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

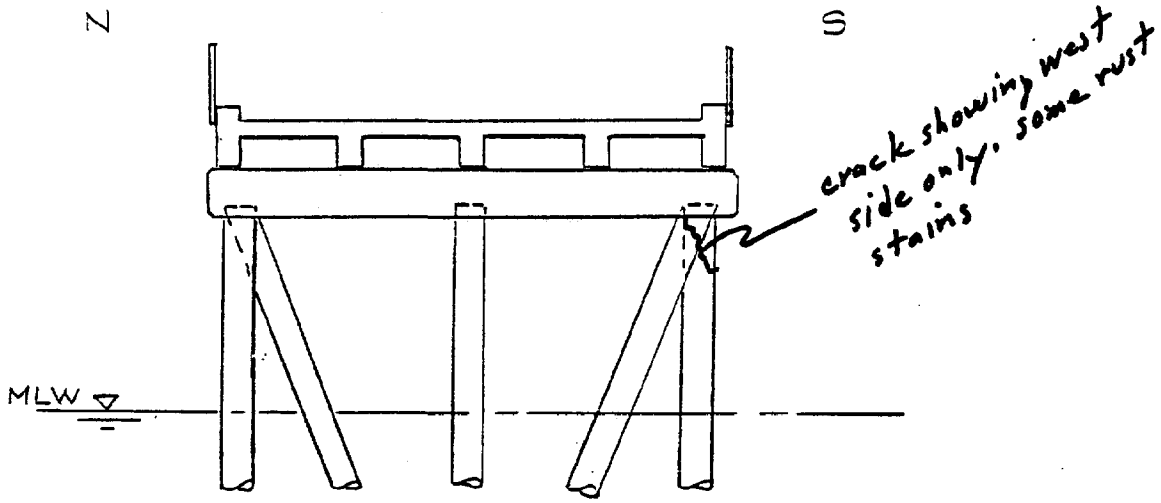
SUBJECT FBM PIER SHEET NO. 19 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.6 M.C.W.



BENT NO. 22

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

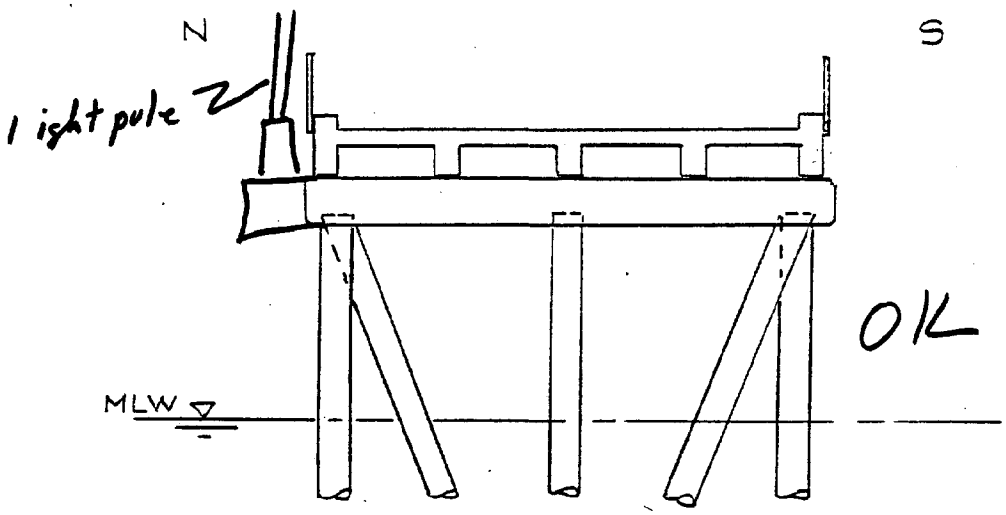
SUBJECT FBM PIER SHEET NO. 20 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 23

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

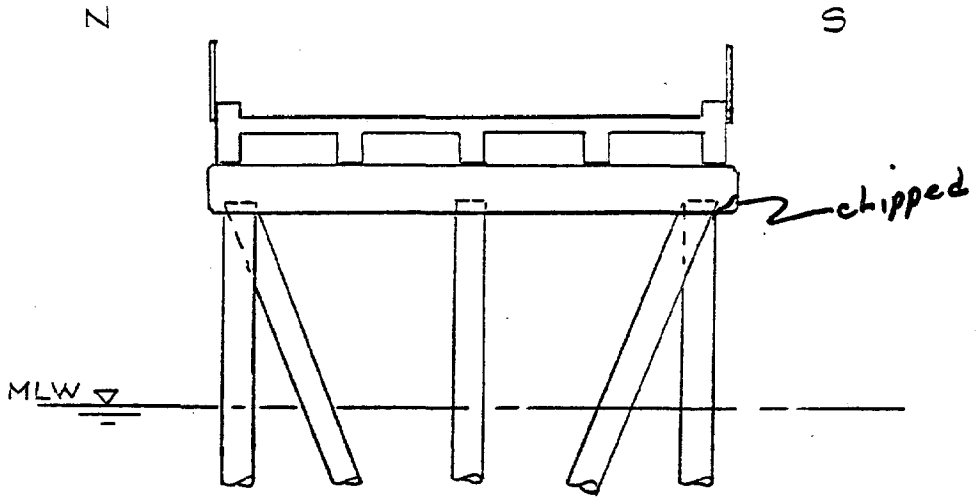
SUBJECT FBM PIER SHEET NO. 21 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.6 M.L.W.



BENT NO. 24

NOTES:

THE MAGUIRE

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

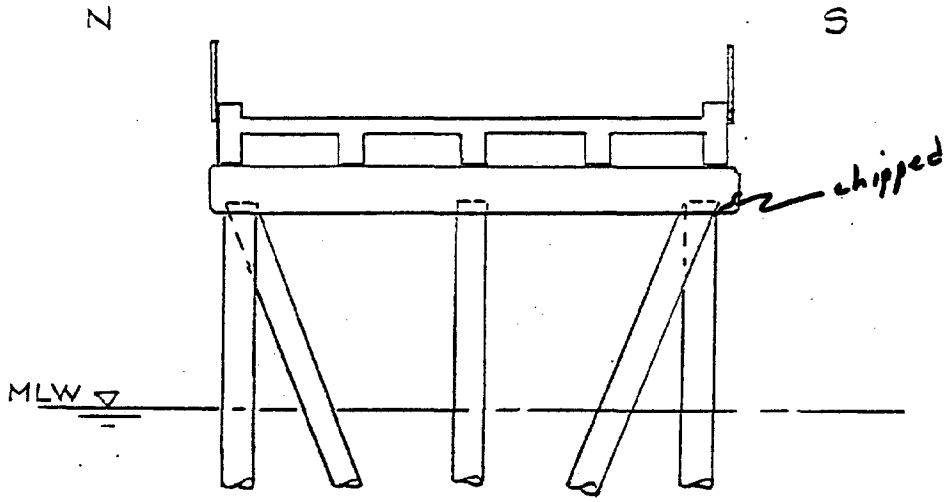
SUBJECT FBM PIER SHEET NO. 22 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/92 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 25

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

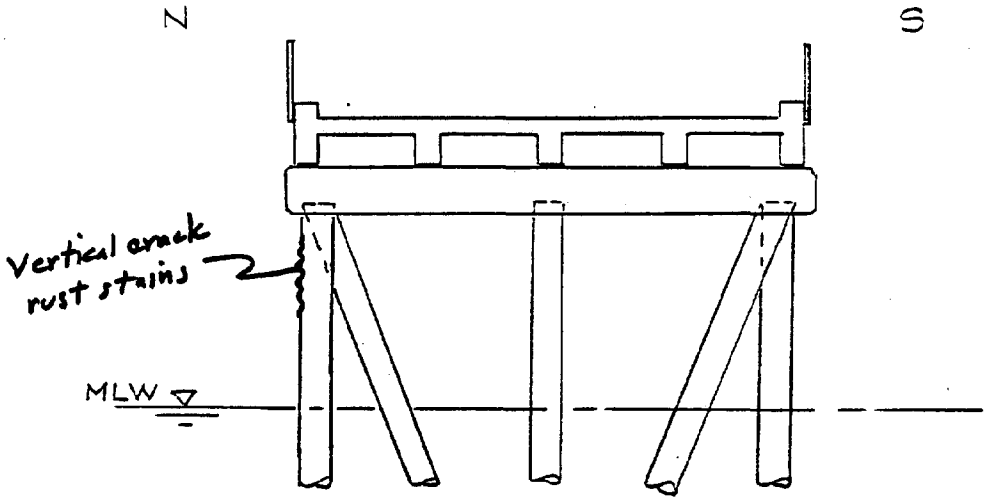
SUBJECT FBM PIER SHEET NO. 23 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/2/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 26

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

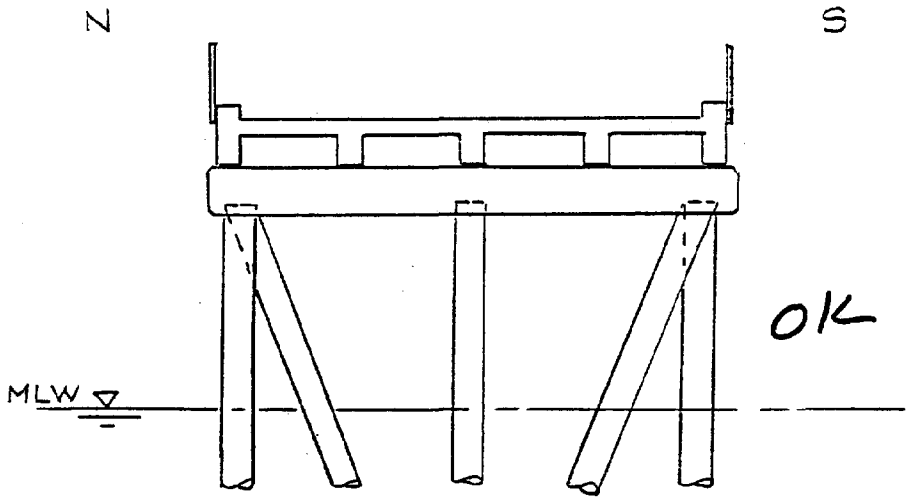
SUBJECT FBM PIER SHEET NO. 24 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: YVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.7 M.L.W.



BENT NO. 27

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

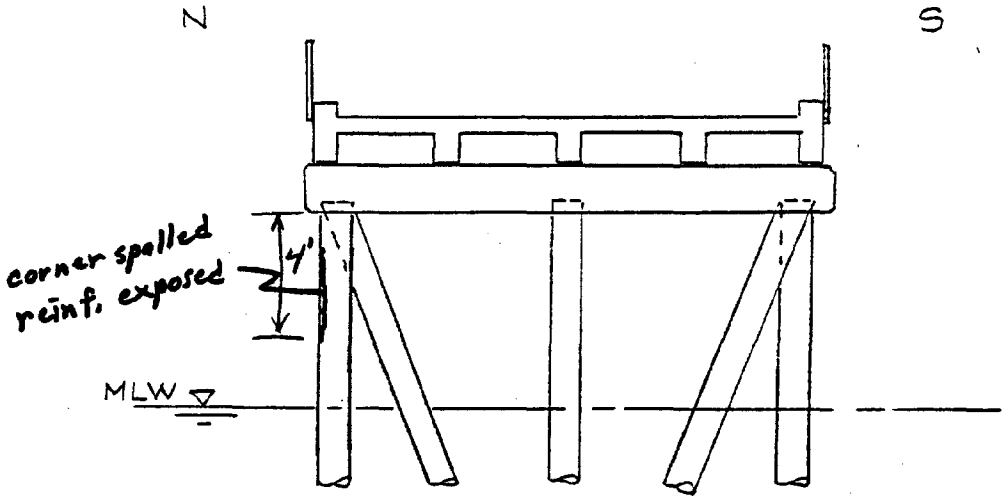
SUBJECT FBM PIER SHEET NO. 25 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.8 M.L.W.



BENT NO. 28

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

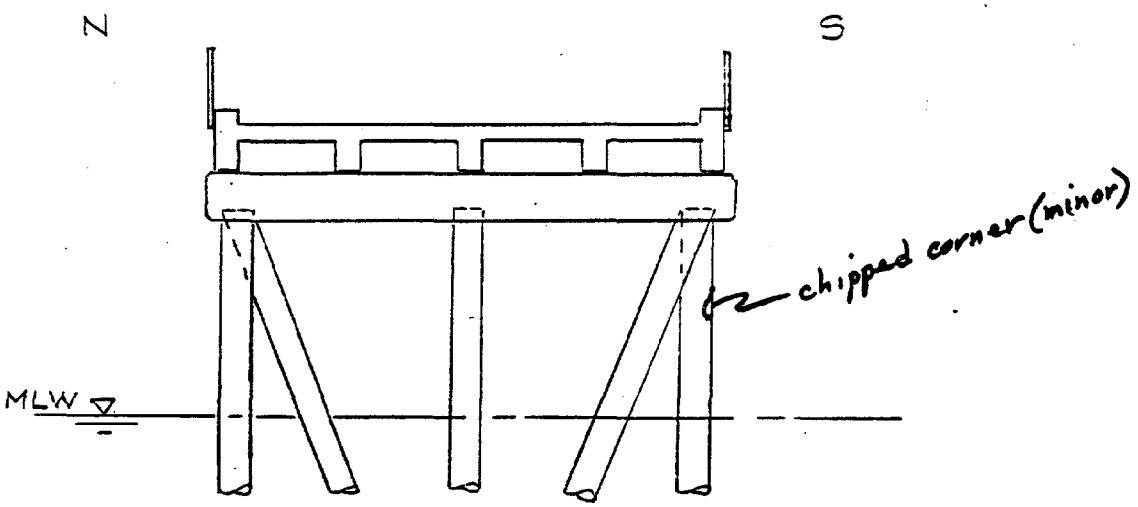
SUBJECT FBM PIER SHEET NO. 26 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.8 M.L.W.



BENT NO. 29

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

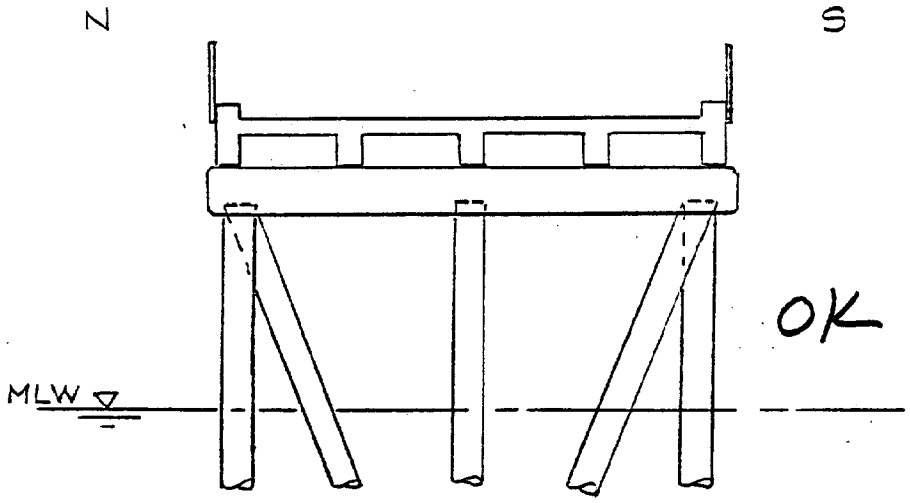
SUBJECT FBM PIER SHEET NO. 27 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.8 M.L.W.



BENT NO.'S 30 Thru 32

NOTES:

Note: Light pole base bent 30. Pole missing

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

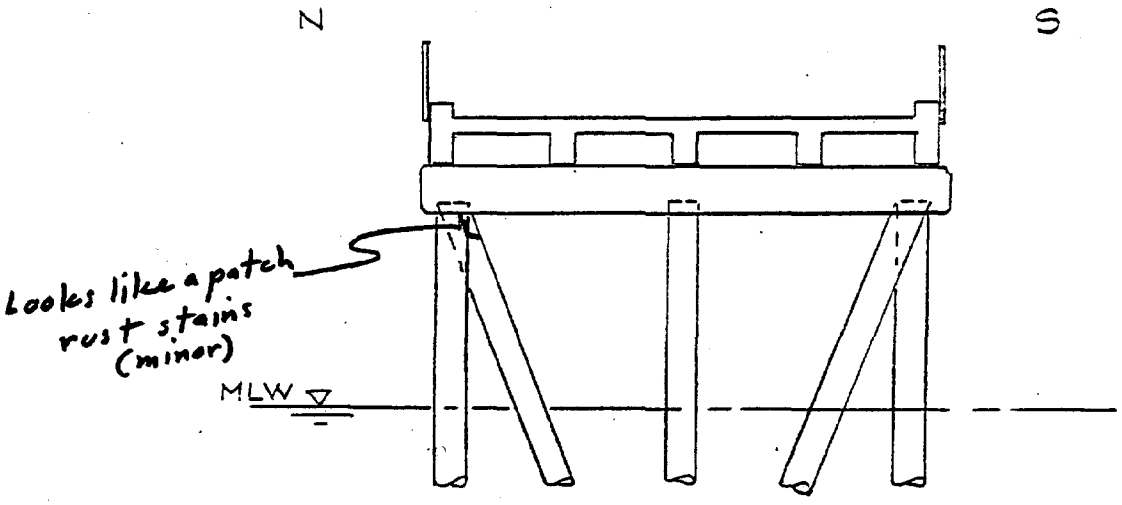
SUBJECT FBM PIER SHEET NO. 28 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/2/82 SURVEY BY: YVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.8 M.L.W.



BENT NO. 33

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

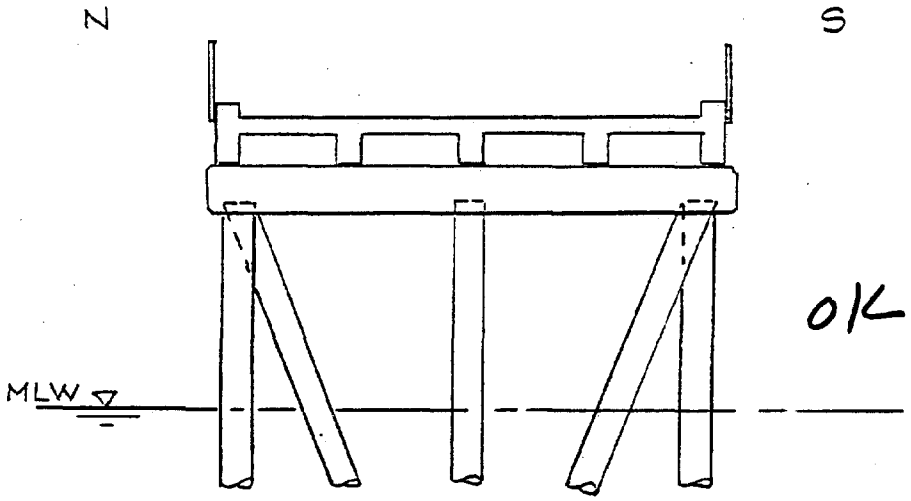
SUBJECT FBM PIER SHEET NO. 29 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: YVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.9 M.L.W.



BENT NO.'S 34 Thru 36

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

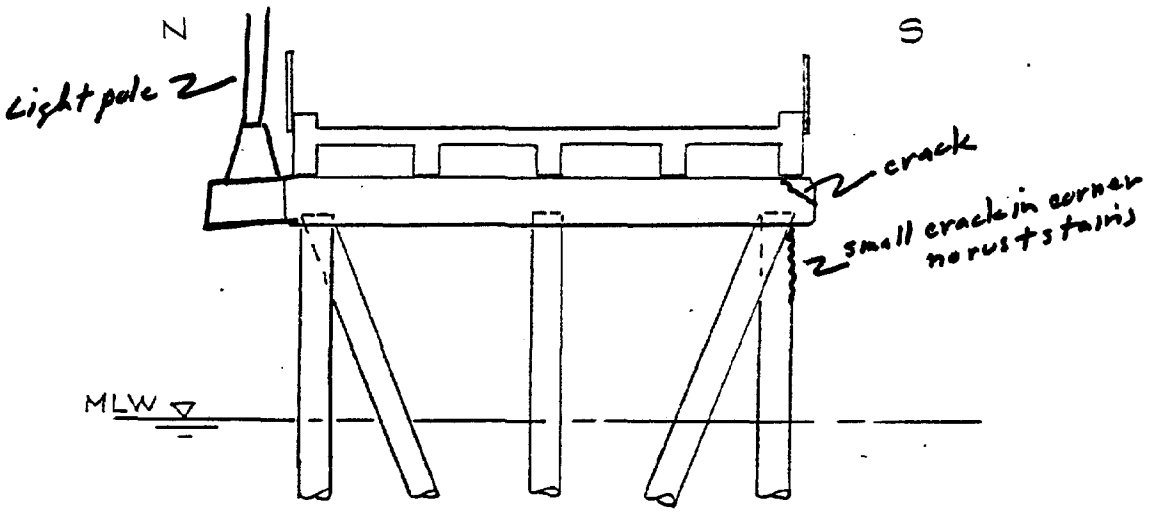
SUBJECT FBM PIER SHEET NO. 30 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.9 M.L.W.



BENT NO. 37

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

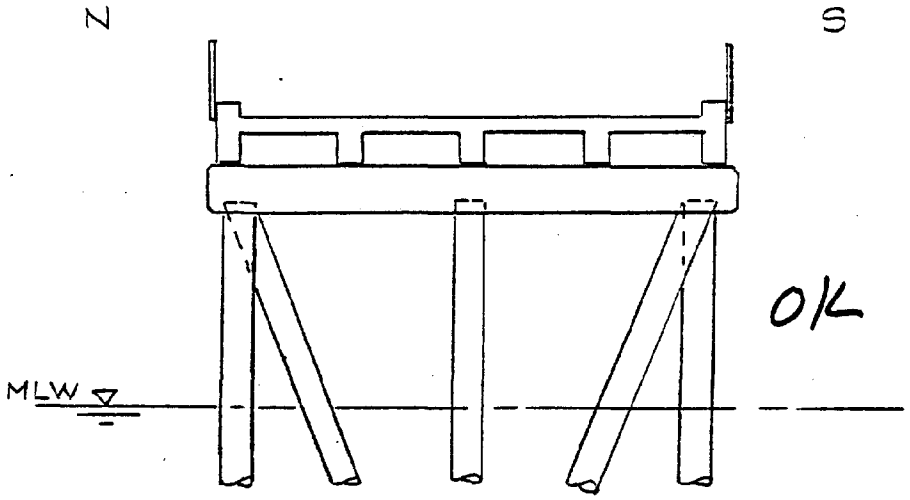
SUBJECT FBM PIER SHEET NO. 31 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +0.9 M.L.W.



BENT NO.'S 38 Thru 41

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

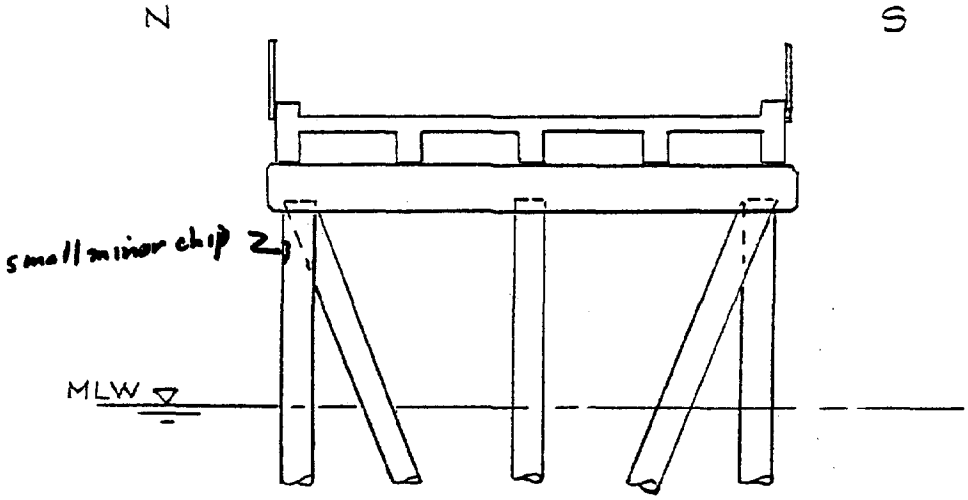
SUBJECT FBM PIER SHEET NO. 32 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +1.0 M.L.W.



BENT NO. 42

NOTES:

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

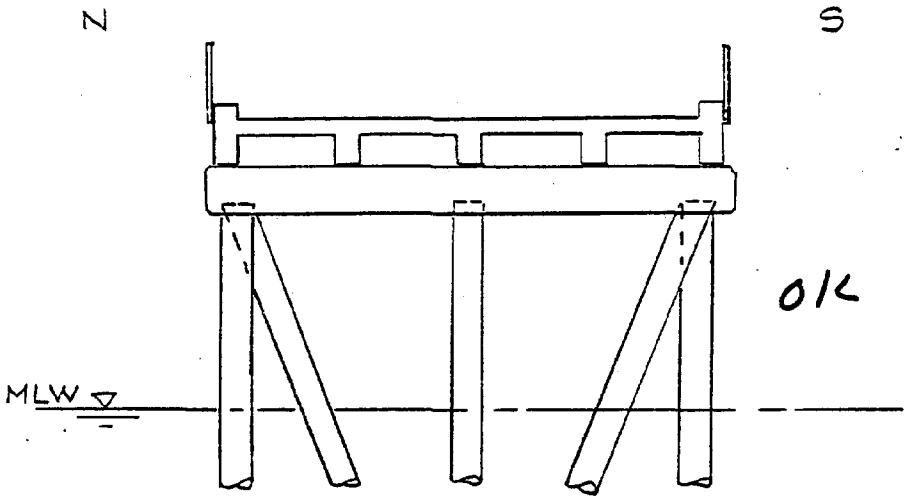
SUBJECT FBM PIER SHEET NO. 33 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/92 SURVEY BY: VVC

TIME: _____ CONDITIONS: foy, drizzle

APPROX. TIDE: +1.0 M.L.W.



BENT NO.'s 43 Thru 58

NOTES:

Light pole on bents 44, 51, 58

Bent 58 is at intersection with FBM platform

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

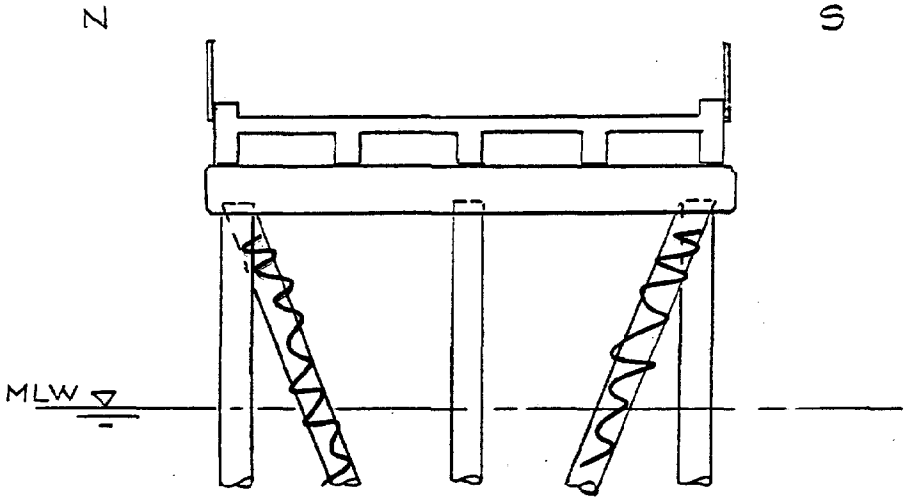
SUBJECT FBM PIER SHEET NO. 39 OF 89

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +1.1 M.L.W.



BENT NO. 59

NOTES:

No batters this bent

Bent 59 approx 4' from Bent 58

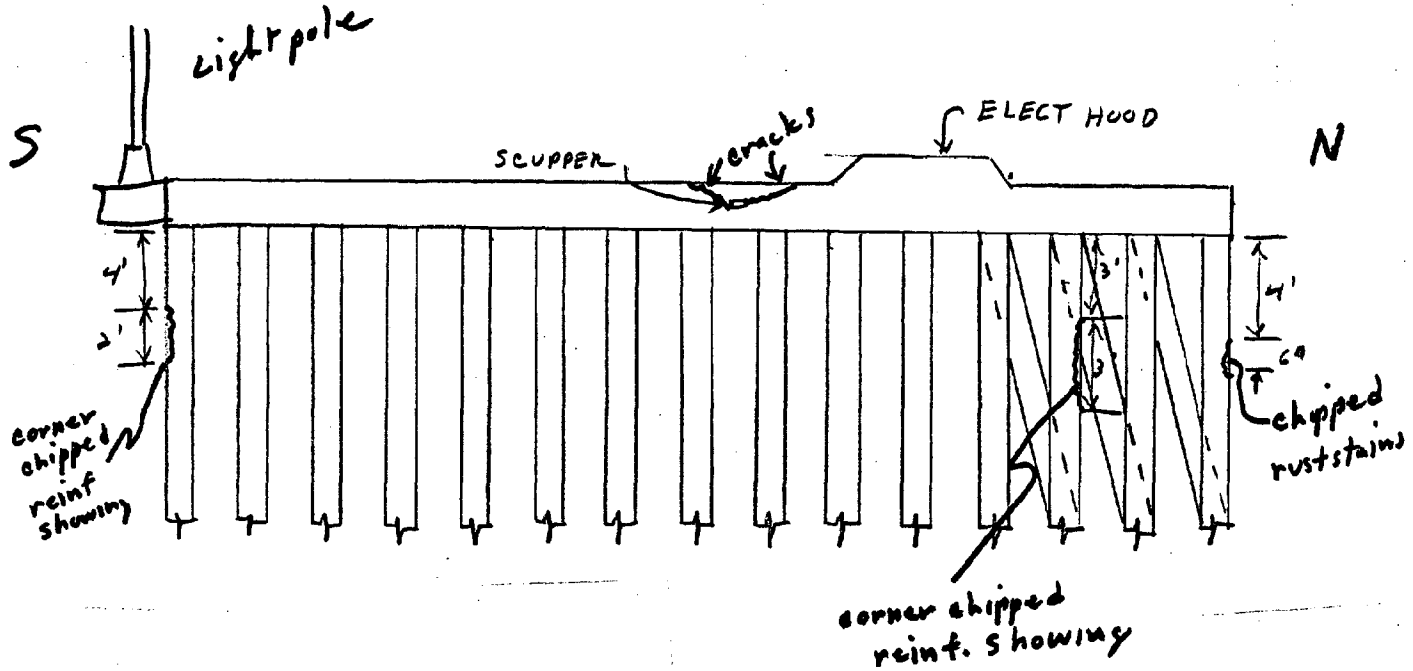
PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

SUBJECT FBM PIER SHEET NO. 35 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

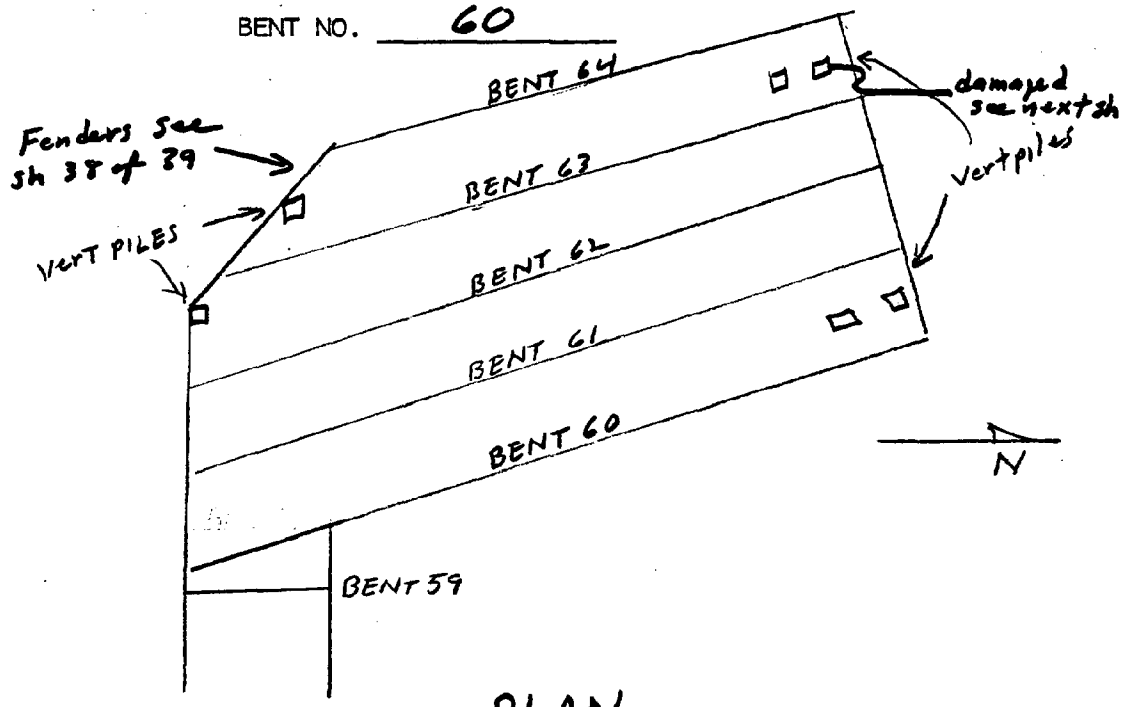
DATE: 3/7/82 SURVEY BY: VVC

TIME: TIDE +1.1 M.L.L.W. CONDITIONS: fog, drizzle



BENT NO. 60

NOTES:



PLAN

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

SUBJECT FBM PIER SHEET NO. 36 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

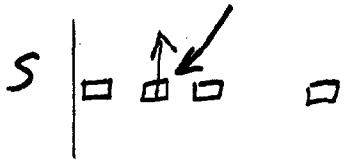
TIME: _____ CONDITIONS: fog, drizzle.

APPROX. TIDE: +1.2 M.L.W.

SAME AS 60

EXCEPT BATTER PILE TO WEST

BETWEEN 1ST & 2nd South piles

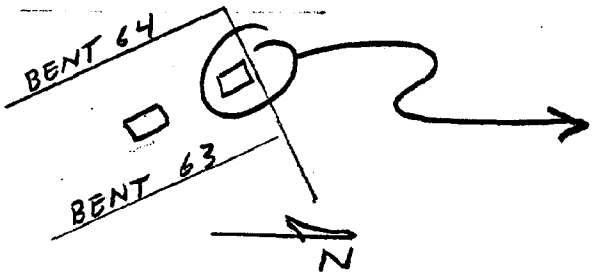


ML

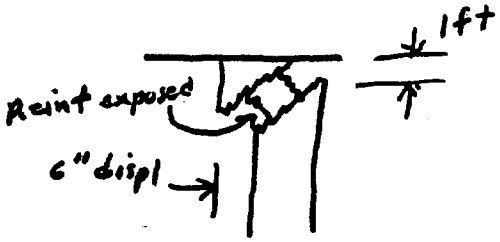
GOOD COND

BENT NO. 61

NOTES:



PLAN



Pile Between Bents 63 & 64
North Side
(See previous sheet)

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

SUBJECT FRM PIER SHEET NO. 27 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

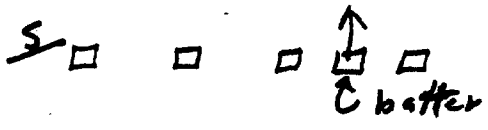
TIME: _____ CONDITIONS: fog, drizzle

APPROX. TIDE: +1.2 M.L.W.

SAME AS BENT 60

EXCEPT BATTER TO WEST 3rd
And 4th Piles South END.

NO BATTERS NORTH END



MLV

Good Condition

BENT NO. 62

NOTES:

UNDERSIDE OF CONC DECK LOOKS LIKE NEW

PROJECT MELVILLE CONDITION SURVEY ACC. NO. 4001

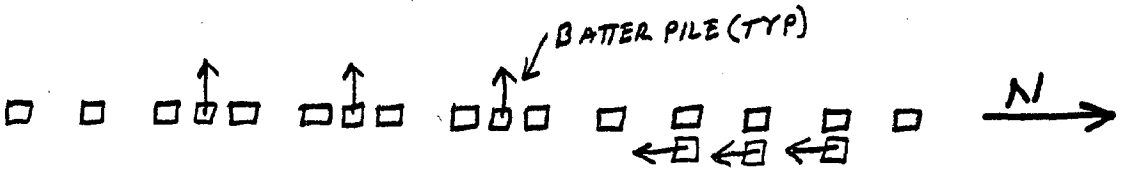
SUBJECT FBM PIER SHEET NO. 38 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

TIME: 1:55 PM CONDITIONS: fog, starting to rain

APPROX. TIDE: +1.2 m.l.w.

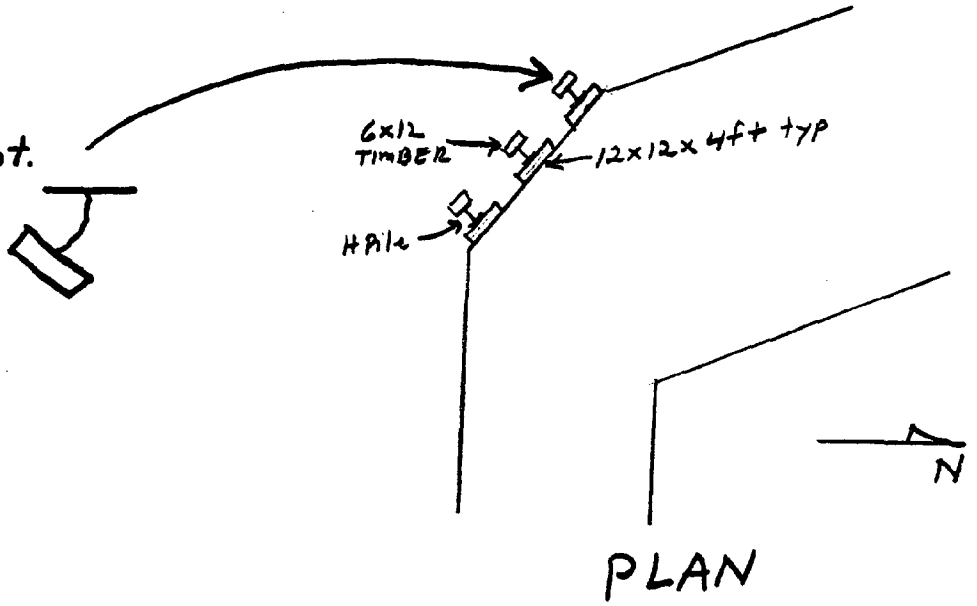


PLAN

Good Condition

BENT NO. 63

NOTES:



PLAN

PROJECT MELVILLE CONDITION SURVEY . ACC. NO. 4001

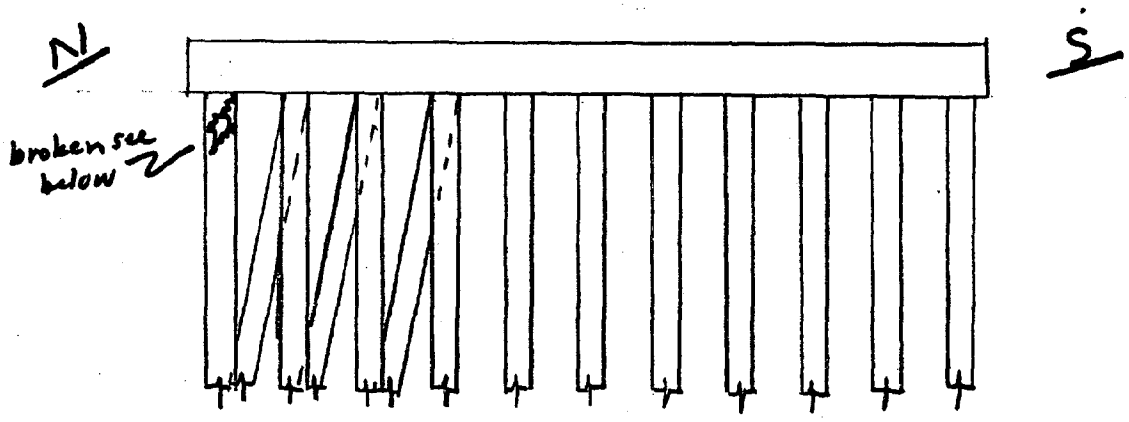
SUBJECT FRM PIER SHEET NO. 39 OF 39

CONDITION SURVEY BELOW DECK TO WATERLINE

DATE: 3/7/82 SURVEY BY: VVC

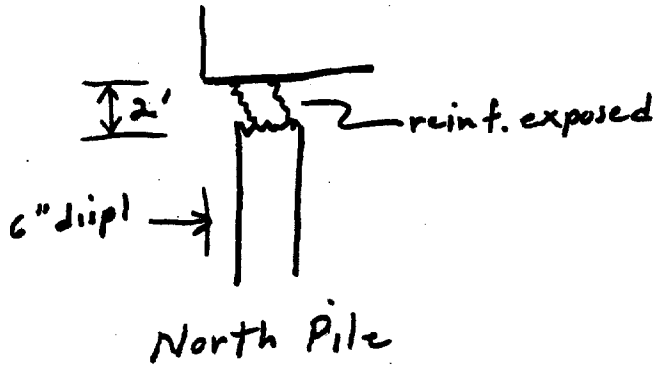
TIME: 2:20 (FINISH) CONDITIONS: fog, rain

APPROX. TIDE: +1.3 M.L.W.



BENT NO. 64

NOTES:

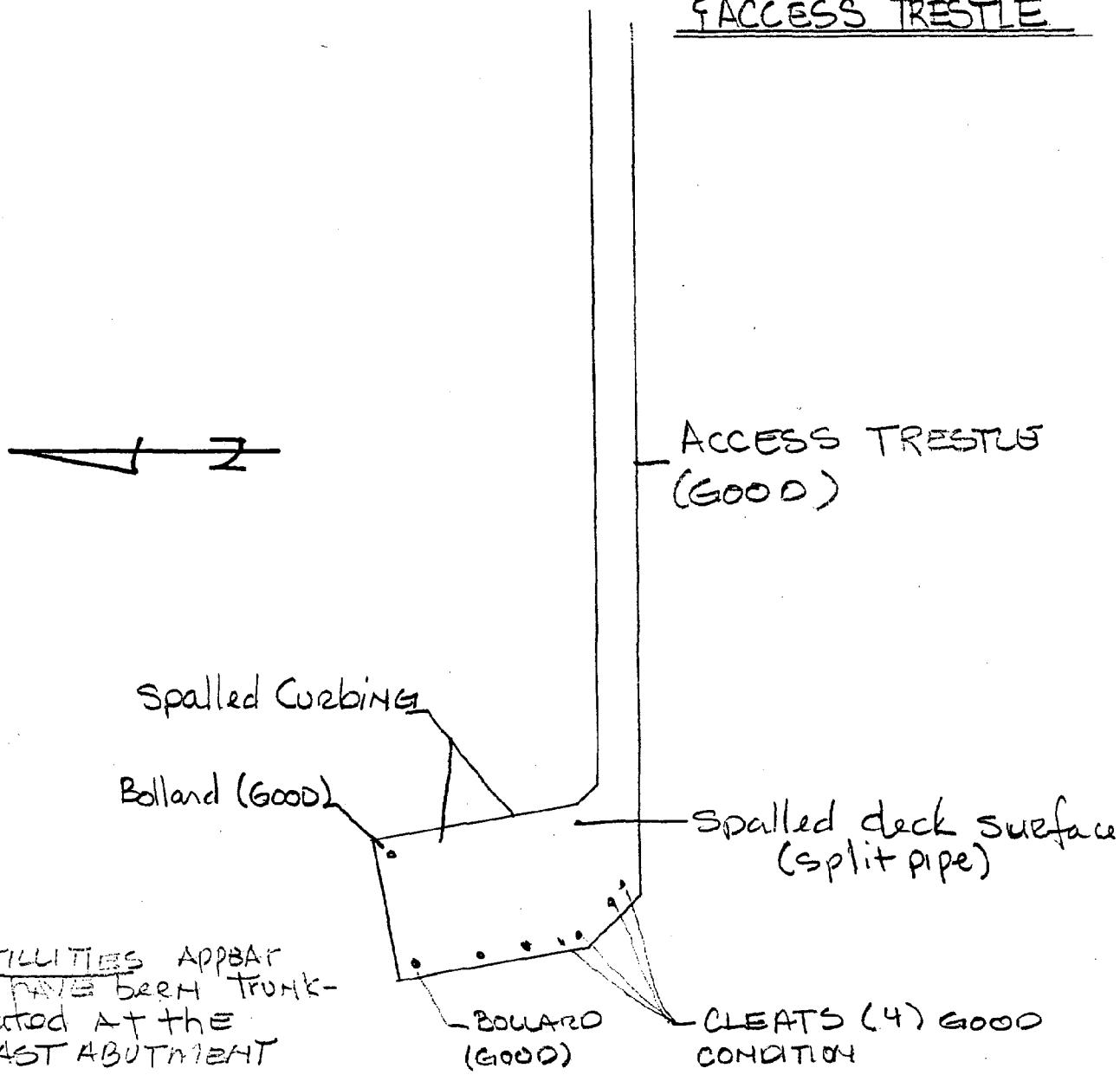


THE MAGUIRE GROUP

PROJECT
SUBJECT MELVILLE CONDITION SURVEY
DECK SURVEY
COMP. LBT & EHD CHECK

ACC. NO. 4001
SHEET NO. ___ OF ___
DATE 9/17 19 87
CONT. NO. ___

FBM PIER HEAD & ACCESS TRESTLE



Pier & Trestle appear IN EXCELLENT CONDITION WITH ONLY FEW EXCEPTIONS

THE MAGUIRE GROUP

PROJECT
SUBJECT MELVILLE CONDITION SURVEY
DECK SURVEY
COMP. LBT & EHD CHECK

ACC. NO. 4001.
SHEET NO. OF
DATE Jan 7 19 82
CONT. NO.

STEEL SHEETPILE BULKHEAD

Numerous pile tops are rotted

deck - Rotted
STRINGERS - Rotted

timber pier

CONCRETE CURB is Generally fair but has numerous spalls & cracks

ALL cleats Appear good

Sheetpile bulkhead
Appears fair above water line

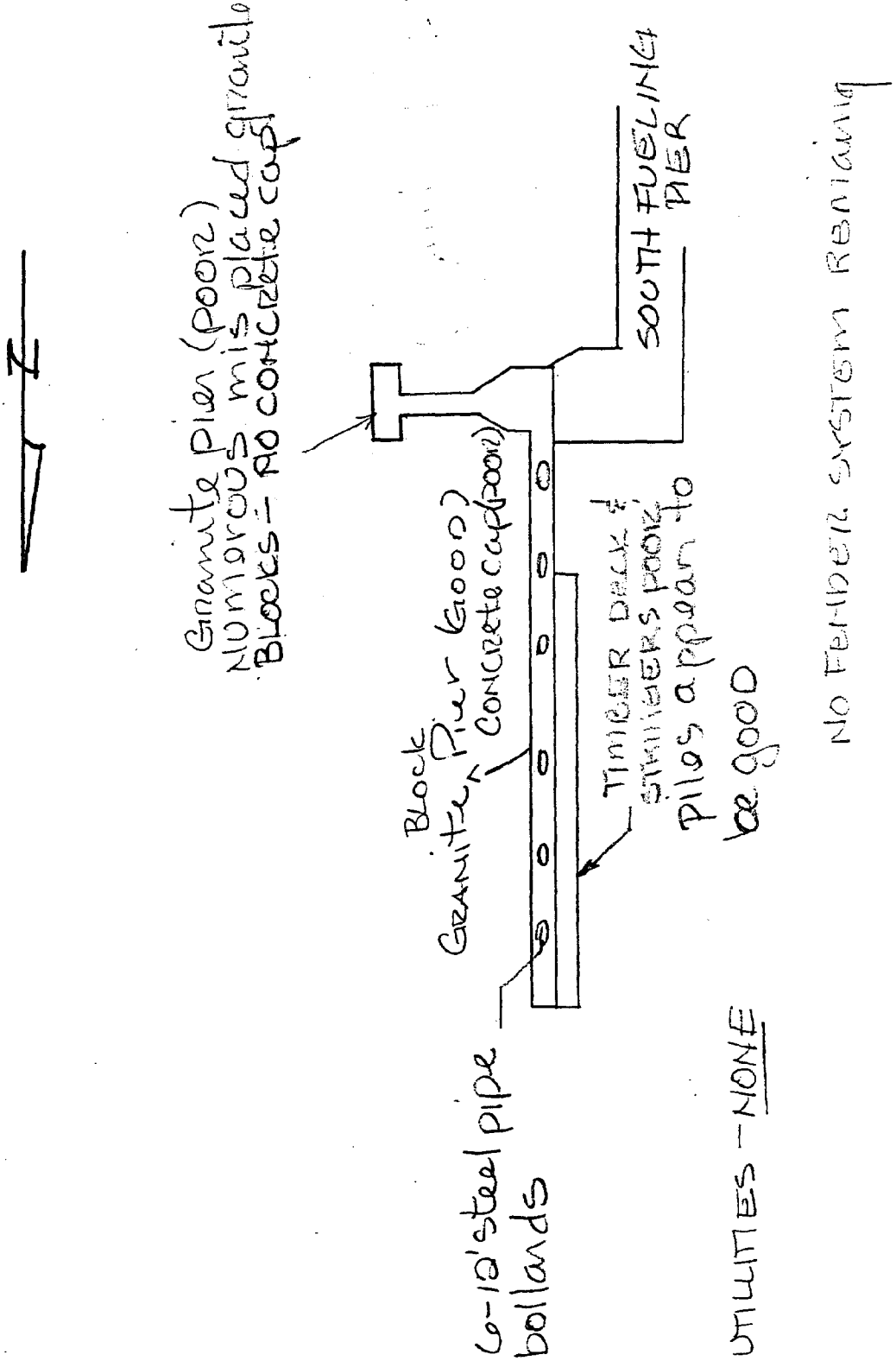
FENDER SYSTEM.
(Cracks, WALES, Piles & Fasteners)
Needs total rehabilitation

THE MAGUIRE GROUP

PROJECT
SUBJECT MELVILLE CONDITION SURVEY
DECK SURVEY
COMP. LBT & SHD CHECK

ACC. NO. 4001.
SHEET NO. ___ OF ___
DATE Jan 7 1982
CONT. NO. ___

GRANITE & TIMBER PIER



THE MAGUIRE GROUP

PROJECT
SUBJECT MELVILLE CONDITION SURVEY
DECK SURVEY
COMP. LBT & EHD CHECK

ACC. NO. 4001.
SHEET NO. ___ OF ___
DATE Jan 7 19 82
CONT. NO. ___

SOUTH FUELING PIER