Staff Report

ROMEO PIER UPDATE: REPORT ON PERMITS, BIDS, FUNDING OPTIONS, AND PROPOSED TIMELINE

Recommendation
This item was placed on the Agenda by Commissioner David. The Commission will review Status of Actions Regarding Romeo Pier and may provide direction to staff.

Background
The pier was built around 1950. The Harbor District identified a replacement pier for Romeo Pier as a priority; it remains, but now as a long term priority. In 1996, the Army Corps of Engineers produced a Phase I Reconnaissance Study for a deep water navigation channel from the federal breakwater entrance to the pier; it had a positive 2.5:1 benefit/cost ratio. Project was discontinued because the Harbor District had not established a location for a replacement pier. In 1998 The Romeo Pier had an engineer's investigation report performed (see attached).In 2000 there was an update performed to the 1998 report (see attached). In 2014, Moffitt Nichol Engineering was tasked with developing a demolition plan for the pier due to the pier's failing condition. The planning was stopped at the 50% point awaiting approval to move forward bidding and related permitting processes.

At the same time in April of 2014, an Emergency Permit request was submitted to the California Coastal Commission; however the Commission action to fund the approximate $600,000 removal of the pier did not occur. Staff was informed in April of 2015 that proceeding with permitting will require a regular Coastal Development Permit (CDP) and not an emergency permit. It is anticipated that a Water Board Permit and a San Mateo County Building Permit will also be required upon the CDP being approved for the piers removal.

The total pier area is approximately 18,000 square feet. Pier buildings total approximately 2,800 square feet.

Two components of the project that should also occur are the mitigation credits for the amount of creosote pilings removed for future piling installation of new material pilings in the harbor, and the historic photographic documentation of the pier and its buildings as part of a preservation action. Additionally, the old growth (redwood and fir) salvageable lumber should be collected and dispersed for public preservation projects around San Mateo County.

Moffitt Nichol Engineering upon board direction is prepared to move towards acquiring all permits, finalizing bid documents and project management of the pier removal.

Analysis
Under the present lineal timeline below noted the start to end of this project could last up to 10 months, this really depends on permits, construction bidding and direction to move forward.

The staff recommendation is to perform two tasks in parallel, task one would be to obtain all permits for the project, and task two would be to put to bid the project with an allowance incase permit agencies require any additional tasks beyond the original bid. The desire to fast track this project where possible before winter storms cause additional impact prior the project start.

An overall estimated timeline for completion of this project is as follows:

- Coastal Development Permit, and other required permits 3-4 months
- Bidding 30-60 days from permit approval
- Demolition (start to finish) 60-90 days *{assuming no fish window impacts}
- Project closeout (documents, billing, permit closeouts etc.) 30 days

Fiscal Impact

Construction demolition costs **MACC** (Maximum Allowable Construction Cost) was estimated in 2014 to be approximately $600,000.

Presently in the budget Moffat & Nichol have a carryover balance of $55,796 from when the effort stopped in 2014. Moffat & Nichol have provided report an update to their project cost reflecting that an Emergency permit has changed to a Coastal Development Permit. In addition the FY 2015-16 has an additional $50,000 for study/engineering for this project.

Staff recommends further in the bid process that an "alternate" be provided in the bid to reduce costs by leaving pilings that are still secure. Depending on outcome of bid results this alternate could be added to the overall bid costs. Construction work is not budgeted in the FY 2015-16 budget, however, augmentations to the budget can be made and would be taken out of the District's unrestricted reserves.

Conclusion

It is anticipated this winter will have a greater amount of El Nino storm impacts, and it would be staff's expectation that the pier will have a greater potential for failing. Most of the pilings do not touch the surface of the harbor bottom. Pier structure is too weak for top side removal of buildings and deck surfaces without increased safety concerns.

No action could result in debris above and below water surfaces interfering with vessel traffic, and adding to harbor pollution concerns.

Alternatives

None proposed at this time.

ROMEO PIER
PILLAR POINT HARBOR

INVESTIGATION REPORT

PREPARED FOR

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JANUARY 1998
M&N FILE NO. 4062

ROMEO PIER INVESTIGATION REPORT

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1. EXECUTIVE SUMMARY

San Mateo Harbor District, as a participant in a dredging project at Pillar Point Harbor with the Corps of Engineers, needed an assessment of the condition of the pier structure and the implication of dredging to a deeper depth adjacent to the eastern side of the pier. This report presents the results of a field inspection of the pier and engineering analysis to determine probable costs to retrofit the pier, and an assessment of the implications of the proposed dredging. The results were developed to provide planning guidance.

As shown by the costs developed to retrofit the pier, it does not appear to be economically viable to proceed with a retrofit program. Also, because dredging to a deeper depth adjacent to the pier would be detrimental to the structure, we do not recommend that this pier be retrofitted. Although this study does not include an evaluation of the feasibility of constructing a new pier, we recommend that this approach be investigated. To that end, we recommend repairing the present pier and modifying usage so that it can be used safely for the length of time necessary (two to three years) to investigate and possibly construct a new pier.

Romeo Pier is a timber structure constructed approximately 50 years ago. It extends approximately 640 feet out from shore. A building at the pier head, used for fish handling operations, covers 2,800 square feet of the pier. The total pier area is approximately 18,000 square feet.

The inspection consisted of an abovewater and an underwater inspection. Results of that inspection indicate that the structural members are generally in good condition, and that about 10 percent of the members need replacement. However, the engineering analysis shows that the pier has a capacity for vertical load that is significantly less than the 15,000 pound truck weight limit posted at the approach. This is primarily due to the deck planks, and to a lesser extent the stringers. Also, the pier is not adequate for lateral loads. It is severely overstressed from earthquake loading, and to a lesser extent from wind loading. The deficient lateral capacity is primarily due to the lack of a horizontal diaphragm at the deck level, and the inadequate bending capacity in the piles.

Retrofitting the structure was investigated. Both retrofit for vertical load and retrofit for lateral were studied. Three alternatives to retrofit for lateral load were identified. Alternative 1 requires installing cross-bracing on the piles. Alternative 2 provides batter piles to resist the lateral loads, and Alternative 3 utilizes new vertical steel piles to resist lateral loads. Costs were developed for all retrofit methods investigated. For comparison, costs to replace the pier structure were estimated. A summary of the cost figures are shown on the following page. It should be noted that these costs were developed based on limited information and are therefore meant to provide a comparison between the various approaches.

ROMEO PIER REPAIR/RETROFIT

COST SUMMARY COMPARISION

APPROACH	AMOUNT $ (1000s)
ALTERNATIVE 1	
Repair for Vertical Load	924
Retrofit for Seismic Load	1,190
	$2,114
ALTERNATIVE 2	
Repair for Vertical Load	924
Retrofit for Seismic Load	684
	$1,608
ALTERNATIVE 3	
Repair for Vertical Load	924
Retrofit for Seismic Load	684
	$1,608
NEW PIER STRUCTURE	
New Pier Construction	1,800
Existing Pier Demolition	360
	$2,160

2. PURPOSE AND SCOPE OF INVESTIGATION

2.1 PURPOSE OF STUDY

San Mateo County Harbor District is participating in a dredging project with the U.S. Army Corps of Engineers in Pillar Point Harbor alongside Romeo Pier. The District requested that a structural assessment be made to determine the adequacy of the pier to support vertical and lateral loads, and the estimated costs to retrofit the pier if required. The effects on the pier, if any, of dredging to a deeper depth adjacent to the pier was also requested in order to assess the District's interest in continuing with the dredging project.

2.2 SCOPE OF WORK

The scope of work included a field inspection of the pier structure, preparation of engineering calculations to assess the condition and capacity of the structure, and identification of possible retrofit methods and the estimated costs of the retrofits. The field inspection included both abovewater members and selected underwater inspection of piles. The building was not inspected as a part of this study. The field inspection and engineering assessment was made of selected elements of the structure to determine the general condition of the pier to provide planning assistance to the District.

3. DESCRIPTION OF ROMEO PIER

Romeo Pier is a timber framed and timber pile supported structure which is approximately 50 years old. The pier in plan consists of a 16 foot wide by 390 foot long approach section and a 35 foot wide by 250 foot long head section, for a total length of 640 feet. It is oriented in a north/south direction with the landfall at the northern end. A plan view, elevation and sections of the structure are shown in Figure 1 and Figure 2. Grid lines are shown on the plan view of the pier. These grid lines are used as a reference system in this report to help identify specific locations being discussed in the text. It should be emphasized that the gird is an idealized representation of the pier, and the actual pier is skewed in many locations. The pier deck is at Elevation +13.8 Ft relative to Mean Lower Low Water (MLLW). This relatively high deck elevation is because the pier was constructed before the breakwater was built and therefore at one time required clearance for storm waves. Total plan area of the pier is 18,000 square feet. Photographs 1 through 3 provide a general view of the pier structure.

Framing consists of 3 x 12 deck planks supported on 6 x 12 stringers with 4 x 12s along the deck edges. The stringers are supported on 12 x 12 pile caps. Timber piles range in diameter from 8-inch to 12-inch. Cores taken indicate all framing is Douglas Fir timber.

The ocean bottom slopes down rather quickly to an elevation of −7.00 Ft (MLLW) approximately 285 feet from the pier abutment on shore, and then continues relatively flat from that location to the end of the pier. Maximum height from mudline to deck is therefore approximately 21 feet.

The pier supports a two-story building used for fish handling operations (Photographs 2 and 4). The building occupies approximately 2,800 square feet of pier area. Abalone tanks are located at the head of the pier under the shelter of the building. The pier also supports a number of storage containers along the western side (Photograph 5). Utilities on the pier include water, gravity sewer, power, and a dry seawater line.

Fishing boats berth along the eastern face at the outer end for general fish offloading operations, and at the southwest corner for access to the abalone tanks. Timber fender piles, a boat access stair, and two cranes for offloading are located along the eastern face.

4. INSPECTION METHODS AND RESULTS

4.1 INSPECTION METHODS

4.1.1 Above-water Inspection

Pier structural members above the water were inspected by visual examination and by probing and recorded as good, fair, or poor condition. Field notes, still and video photography were used to record the condition of the structure. Members inspected included the deck planks, stringers, pile caps, and above water portion of the piles. Pile inspection is discussed in Section 4.1.2. Deck planks were observed for their general condition, and were probed where the condition appeared fair to poor. Deck stringers can generally be seen from under the deck. However, stringers were probed from above the deck from between the deck planks along the approach, and over selected areas of the remainder of the pier. Pile caps were probed from over the deck and visually observed from under the deck. Deck planks were removed in specific locations, to observe or confirm the condition of the stringers and pile caps (Photograph 6). Utility pipes are supported along the western side of the pier on the deck on a timber framed pipe support. The condition of this pipe support was also observed.

4.1.2 Underwater Inspection

The underwater inspection work was conducted by a two-person dive team consisting of two registered professional engineers-divers and a boat attendant. The boat and attendant were provided by the District. Pile condition was listed as a percentage of section remaining: 0 to 25%, 26% to 50%, 51% to 75%, and above 75%. This inspection consisted of visually inspecting, probing with an awl, and sounding with a hammer to assess timber integrity and the presence of and/or extent of marine borer damage. A total of 70 piles were inspected under water. In addition, cores taken from seven piles were sent to a materials laboratory for analysis. All core holes were plugged with treated timber dowels. Piles were also inspected visually above water, and selected piles were drilled through to determine if pile cores were rotted out while appearing visually sound. Field notes, still and video photography were used to record the pile condition. No fender piles were inspected.

Depth to mudline measurements were taken at selected locations along the length of the pier. This information was used to estimate the pile lengths used in the engineering analysis.

4.2 INSPECTION RESULTS

4.2.1 Deck Planks

Deck planks are generally in good condition. There are a number of planks, which have been replaced during the past couple of years. Approximately ten percent of the deck planks are recommended for replacement. Those recommended for replacement show excessive wear, end cracking, and in some instances general

decay. The ice maker in the building leaks water which then keeps some deck planks in the ice maker area wet. This has allowed moss to grow on the planks. The planks in this area do not appear to have been adversely affected by this wetness.

4.2.2 Deck Stringers

Stringers are generally in good condition. Approximately 9 percent (35 stringers out of 400 total) are recommended for replacement. These stringers are spongy with significant deterioration, and as such, pose either a current safety hazard or will pose this level of hazard in the near future. Wet stringers also occur under the icemaker as discussed in Section 4.2.1. Stringers identified for replacement are shown in Figure 3.

4.2.3 Pile Caps

Pile caps are also in good condition. A total of 80 lineal feet of cap material, out of approximately 1,230 feet, is recommended for replacement. Those caps recommended for replacement show significant deterioration. One specific area of deterioration is located under steel plates placed on the deck at Grid Line 29. These plates have been placed at this location because the cap is no longer capable of safely carrying load. Pile caps identified for replacement are shown in Figure 3.

4.2.4 Piles

Piles are generally between fair and good condition. All pile cores indicated piles are treated with creosote. Many of the older piles have been replaced with 'sister' piles located directly beside the old pile. These piles were driven next to the existing pile and then pulled into place under the existing pile cap. The piles replaced with sister piles were typically not removed. A total of 50 piles are identified for replacement as shown in Figure 4.

Fender piles were not specifically inspected. However, it is apparent based on a general observation of these piles that the fender system is very old, deteriorated and in need of replacement. Photograph 7 shows a fender pile connection at the deck level that is no longer attached due to a deteriorated timber. Photograph 8 shows a fender pile attached at the deck level, but broken at the waterline. It is therefore being held in place by the connection at the deck.

5. ENGINEERING EVALUATION

5.1 VERTICAL LOAD CAPACITY

The vertical load carrying capacity of the pier was calculated using the 1994 Uniform Building Code (UBC) as the basis for allowable member stresses. The strength of the existing structural members was assessed by assuming a grade of timber and then calculating the allowable load carrying capacity. Allowable timber stresses are typically determined by visual grading. The UBC specifies allowable stresses for various grades and species of timber. The laboratory analysis indicated that the timber is Douglas Fir. A grade of timber one level below the best possible grade was used for allowable stress levels in the deck planks and stringers. This means that the allowable bending stress assumed for the planks and stringers is 20 to 25 percent lower than the maximum obtained by assuming the best grade. The allowable stress assumed for the pile caps is about 45 percent lower than the maximum, but the caps do not have stresses which are of concern. Douglas Fir piles have one grade and therefore one level of allowable stresses.

Vertical load carrying capacity was investigated for self-weight plus live loading. A 15,000 pound truck, assuming an AASHTO 'H' load distribution, was used for the live load condition. The 'H' loading specifies that 80 percent of the truck weight be placed on the rear axle. This rear axle weight is divided equally between the wheels so that 40 percent is applied under one set of wheels. A 50 pounds per square foot uniform live load was also used in areas not accessible to truck traffic.

Results of the vertical load carrying capacity check are described below.

- Decking: Two thicknesses of 3x12 deck planks occur on the pier; full section planks and net section planks. The full section planks measure 3 inches by 12 inches. The net section planks measure 2 ½ inches by 11 ½ inches. The net section planks will support less load and were used in this analysis. The truck weight, which can be supported by the deck planking, varies based on the span of the deck planks. The maximum allowable weight varies from 11,154 pounds for a 16-inch span to 5,310 pounds for a 48-inch span. Figure 5 shows the change in allowable truck weight versus span.

- Stringers: The allowable truck weight on the stringers varies from 12,425 lbs. for a 14-foot span to 8,300 lbs. for a 21-foot span, as shown in Figure 5.

- Pile Caps: Caps are capable of supporting a 15,000 lb. truck up to the maximum span of 16 feet found on the pier.

- Piles: Piles (assuming 12-inch diameter) are capable of supporting the vertical load from dead load (self weight) and live loads (truck or uniform load). Piles under the building structure with the live load are approximately 1 percent overstressed under the vertical load condition with no lateral loading.

5.2 LATERAL LOAD CAPACITY

5.2.1 Earthquake Load

The structure was evaluated for seismic loading based on the 1994 UBC. The pier relies on bending in the piles to resist the lateral loads. The lateral forces are transferred to the piles, which in turn resist the load in bending. They act as a cantilever fixed at some point below the mudline. There are two primary deficiencies in the pier to resist lateral loads. First, there is not a horizontal diaphragm to transfer the loads to the piles. Second, the piles do not have adequate bending capacity.

This check assumed a typical framing condition with 12-inch diameter piles; all members in good condition. Framing, both member sizes and spans vary considerably throughout the pier structure. The intent of this analysis was to determine the general condition of the structure without the expense of measuring and analyzing each member size and span. The framing pattern from Guidelines 1 to 26 was used as the typical framing pattern for this study. Based on this framing layout, the structure is adequate for seismic loads from the beginning of the approach out approximately 270 feet to Gridline 19. From that location and farther out the piles are overstressed. The ratio of actual stress to allowable stress varies from 1.0 at Bent 19 to 3.7 at the end of the pier under the building. The ratio would be higher for both those piles in less than good condition and for those smaller than the assumed 12-inch diameter.

5.2.2 Wind Load

Wind loading on the building also overstresses the piles in this area but to a smaller degree than the earthquake loading condition.

5.2.3 Boat Impact Load

This condition was not calculated; however, it is apparent that the structure is deficient with regard to lateral capacity. Lateral movement of the pier from general vehicular use on the pier, as well as impact of the boats moored to the structure is easily felt on the pier.

5.2.4 Wave Load

Romeo Pier is located within a protected harbor and will be exposed to relatively low period and therefore low energy waves for any wave height greater than about 2 feet. Wave heights of approximately four feet have been observed at the pier during storm conditions and would have had relatively low energy due to the low period. Based on this information, earthquake and wind conditions are more severe and were therefore used for this assessment.

6. EFFECTS OF DREDGING ALONG PIER

The structure is just adequate for vertical load, and does not meet code recommendations for lateral load. Dredging alongside the pier will increase the water depth another six feet. There are three significant problems associated with the additional water depth. First, the capacity of the piles to carry vertical load is reduced due to the additional pile height. This is because the piles will have a lower stress threshold before buckling can occur. Second, the bending stresses due to lateral loads increase in direct proportion to the pile length. Bending stress is already the primary problem, increasing the pile length by dredging will make the situation worse. Third, the embedment of the piles is not known. Dredging another six feet could undermine the piles.

7. REPAIR/RETROFIT ALTERNATIVES

7.1 RETROFIT FOR VERTICAL LOAD

Retrofit of the pier structure would require work at various locations on all of the structural member types; deck planks, stringers, pile caps, piles, and pipe supports. The estimate of amount of work required is based on the general review of typical conditions as described elsewhere in this report, and is not meant to serve as a detailed breakdown of items to be completed. Retrofit work is described below for each primary structural member type on the pier.

- Deck Planks: Approximately 1,600 square feet of deck plank needs replacement. This work would require removing the existing planks and installing new 3x12 planks.

- Stringers: Approximately 35 stringers require replacement. This work would require removing the existing planks and stringers and installing new 6x12 stringers. A small number of new stringers could be installed to reduce the maximum deck plank spans.

- Pile Caps: Approximately 80 lineal feet of pile caps are in need of replacement. This work would require removing the existing deck planks, stringers and caps. The new 12x12 caps must be attached to the piles with drift pins or bolted plate connections.

- Piles: Approximately 50 piles require replacement. Replacement of these piles would require removal of members supported by the piles or providing temporary support. The piles can be driven adjacent to the existing piles and then pulled in to align with the cap.

- Pile Wraps: We recommend wrapping piles, which are in good condition. This will help to maintain these piles in their good condition.

- Boat Landing Stair: The boat landing stair area on the eastern side of the pier has deteriorated to an unsafe condition. We recommend that the stair be replaced and new support members be installed, or that the stair be removed if not needed, and the area be re-framed.

- Reset/Add Spikes and Bolts: Deck planks are not adequately attached to the stringers. The spikes, which are holding the planks, are loose, and many of the planks do not have adequate spikes attaching them to the stringers. All bolts on the structure should be checked for tightness and replaced where severely corroded.

- Fender Piles: The existing fender piles are either in poor condition or are missing. The fender piles are important for absorbing energy from boat berthing and for resisting loads from boat mooring loads. Installation of fender piles is essential to resist the boatloads so that the main structure has limited exposure to either the abrasion or loading.

- Guard Rail: The pipe support along the western edge of the pier is in disrepair. We recommend that a new pipe support/guard rail be installed along the western side and a new guardrail be provided along the eastern edge to provide added safety.

- Wheel Planks: The low allowable truck weight is primarily due to the capacity of the deck planks. This situation can be improved to a large extent by the addition of wheel planks as shown in Figure 6. Loaded trucks should be restricted to the areas with wheel planks. These planks should be installed in areas where loaded trucks are expected to require access for normal fish handling operations on the pier.

- Ladders: Access ladders along the eastern side of the pier should be inspected and re-supported were necessary.

7.2 RETROFIT FOR LATERAL LOAD

Three alternatives were investigated to provide additional lateral load capacity to the pier. Although these alternatives would not bring the pier up to current code recommendations, they would provide a significant improvement to the structure. It should be noted that it is difficult, and in most respects impractical, to retrofit a pier of this age and type to resist current code defined loads. The existing structure has no inherent lateral system, and installing one is difficult because the piles do not align, and framing bents are all different dimensions. Development of the following alternatives affords an opportunity to develop estimates of construction cost for comparison with other approaches such as a replacement structure.

7.2.1 Alternative 1: Cross-Bracing

A significant deficiency of the existing structure is bending of the piles due to lateral load. This bending can be reduced by bracing the structure. Lateral loading from an earthquake can occur from any direction. Therefore, cross bracing would be required in both directions; transverse to the pier and longitudinal to the pier. Although not a practical solution for this pier because the piles do not align, this has been a relatively common method of bracing timber piers, and is included for cost comparison purposes. It would be difficult to implement on Romeo Pier because of the irregular pattern of the piling and resulting difficulty of installation. Due to the high bending stress in the piles, the bracing would be required to extend below the waterline, necessitating underwater work. Figure 7 illustrates this retrofit alternative.

7.2.2 Alternative 2: Batter Piles

Introducing batter piles to the structure has an effect similar to cross-bracing the structure by taking the lateral load in the batter piles rather than by bending of the older timber piles. Batter piles would be required in both the transverse and longitudinal directions because earthquakes can occur from any direction. The batter piles could be spaced so that the batter piles are not required at each frame. Spacing the batter piles requires that a new horizontal bracing system be installed

to transfer the lateral load to the bents with batter piles. Horizontal bracing would be less expensive than installing batter piles at each bent. This alternative is illustrated in Figure 8.

7.2.3 Alternative 3: Vertical Steel Piles

This alternative is similar to using batter piles except that vertical steel piles are used in place of the batter piles. The advantage of this method is less interference with the existing structure, and the possibility of using these same piles as fender piles along the eastern side of the dock. A horizontal bracing system is also required. This alternative is illustrated in Figure 9.

7.3 MINIMUM REPAIR

If the present structure is to be replaced within the next three to five years, the following repairs are recommended as minimum work to maintain a safer work environment.

- Replace deck planks, stringers, and pile caps where required.
- Rebuild or remove stair to boat landing.
- Add fender piles as required (this could be done for those specific areas where boats currently tie up and restricting vessels to those areas).
- Replace piles as required (this can be investigated to identify those piles which must be replaced to help ensure a safe working environment).
- Add wheel planks (Adding the wheel planks adds a significant upgrade to the structure, as well as additional safety feature. The wheel planks could be limited to certain areas and then restrict loaded trucks to those areas).
- Inspect and repair access ladders.

8. ESTIMATED COSTS OF REPAIRS/RETROFIT

Construction costs were developed for both vertical load and lateral load repairs and retrofit. These costs are conceptual estimates, based on square foot prices due to the level of engineering analysis done and on the detail of inspection work carried out at the pier to determine the extent of work required. A cost summary comparison of the repair/retrofit alternatives are shown below. A new pier structure is included for comparison purposes. It assumes that a pier of approximately the same area be constructed. The cost of providing a new building on the pier for fish handling is not included. A detail of the repair cost for vertical load follows the cost summary comparison.

REPAIR/REPLACE COST SUMMARY COMPARISON

APPROACH	AMOUNT $ (1000s)
ALTERNATIVE 1	
Repair for Vertical Load	924
Retrofit for Seismic Load	1,190
	$2,114
ALTERNATIVE 2	
Repair for Vertical Load	924
Retrofit for Seismic Load	684
	$1,608
ALTERNATIVE 3	
Repair for Vertical Load	924
Retrofit for Seismic Load	684
	$1,608
NEW PIER STRUCTURE	
Pier	1,800
Pier Demolition	360
	$2,160

REPAIR FOR VERTICAL LOAD

ITEM	UNITS	AMOUNT $(1000s)
Replace Decking where Required	(1600 SF)	5
Replace Stringers where Required	(500 LF)	40
Replace Caps where Required	(80 LF)	10
Replace Piles where Required	(50 EA)	200
Add Wheel Planks	(500 LF)	40
Add Pile Wraps	(280 EA)	280
Add Guard Rail	(1200 LF)	35
Rebuild Stair to Boat Landing	(LS)	5
Reset/Add Spikes and Tighten Bolts	(LS)	5
Add Fender Piles	(50 EA)	150
Total		770
Contingency (20%)		154
Estimated Total		$924

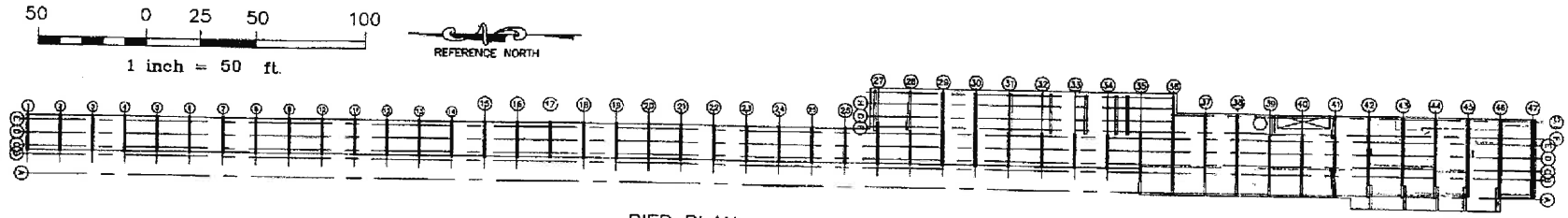
9. RECOMMENDATIONS

The cost to retrofit the pier is almost as much as the cost of constructing a new pier structure. Furthermore, retrofitting the pier will not resolve the issues related to dredging to a deeper depth adjacent to the pier. We, therefore, do not recommend retrofitting the pier for use in conjunction with the Corps of Engineers proposed dredging project. Although this study does not include an evaluation of the feasibility of constructing a new pier, we suggest that this approach be investigated. To that end, we recommend repairing the present pier and modifying usage so that it can be used safely for the length of time necessary to investigate and possibly construct a new pier. The items identified in Section 7.3 – Minimum Repair, should be included in a repair program for continued use of the pier for the next two to three years.

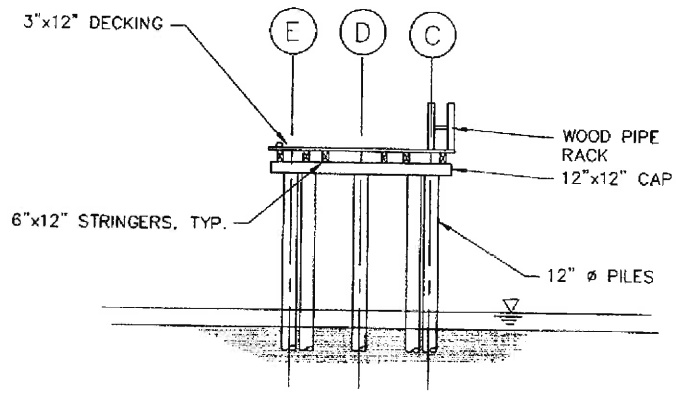
We also recommend that the pier be re-posted to show a lower allowable truck weight until the deck plank, stringer, and pile cap repairs noted in Section 7.3 are completed. Installation of the wheel planks should also be considered to increase the allowable truck weight.

Even though we are not able to predict when an earthquake might occur, the District can take measures that would help minimize the risk to personnel, such as limiting activities on the pier to items essential to the fish handling operations only as opposed to more permanent uses. A final recommendation would be to vacate the pier structure during storm conditions. It is recommended that a threshold wind speed be determined and that the pier be closed during wind conditions, which exceed that level.

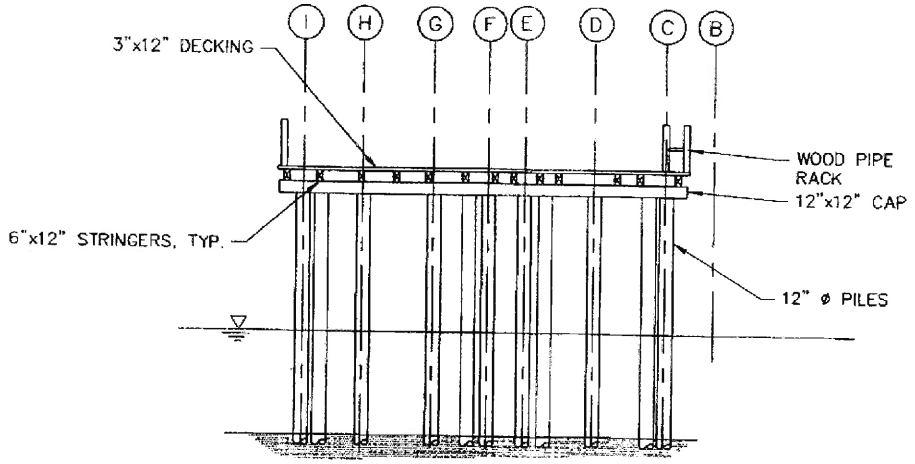
10. FIGURES



PIER PLAN



BENTS 1 TO 26--ELEVATION



BENTS 27 TO 36--ELEVATION

FIGURE 1

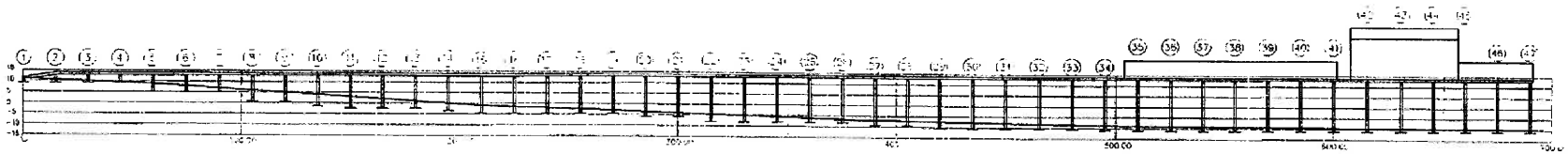
MOFFATT & NICHOL ENGINEERS WALNUT CREEK, CALIFORNIA	EXISTING PIER--PLAN AND SECTIONS ROMEO PIER JOB NO. 4062

50 0 25 50 100

1 inch = 50 ft.

REFERENCE NORTH

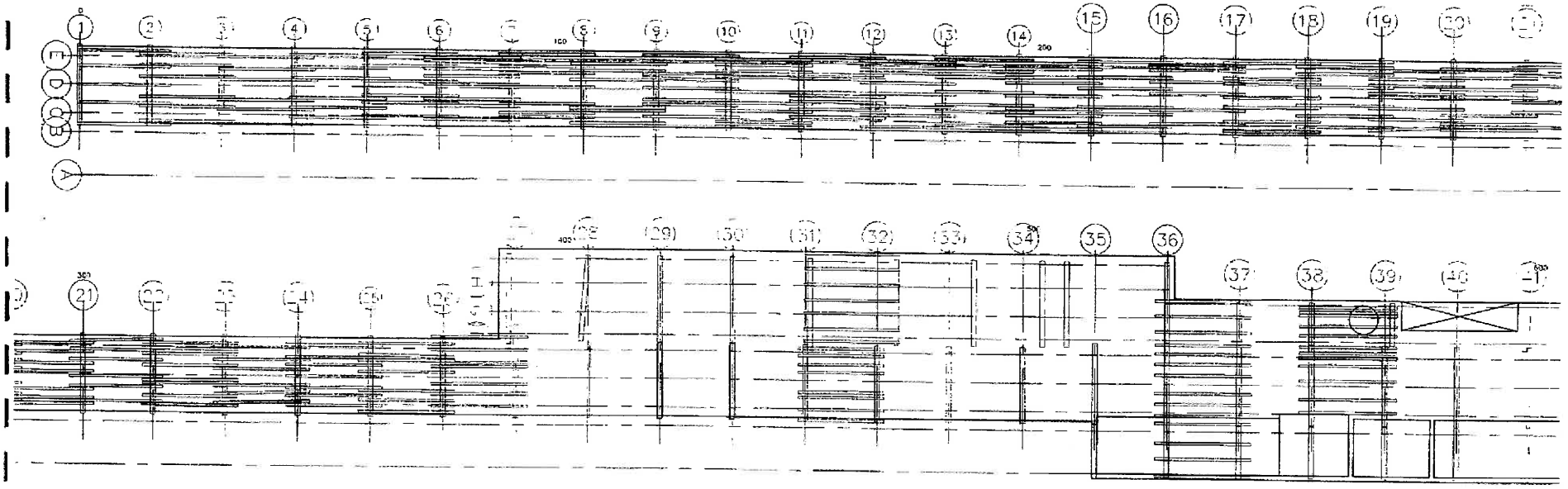
PLAN

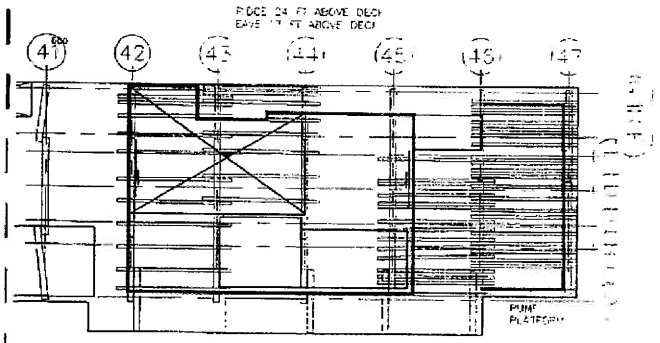


ELEVATION

FIGURE 2

MOFFATT & NICHOL ENGINEERS WALNUT CREEK, CALIFORNIA	EXISTING PIER–PLAN AND ELEVATION ROMEO PIER JOB NO. 4062





KEY

CAP BEAM OR STRINGER, NO DAMAGE NOTED

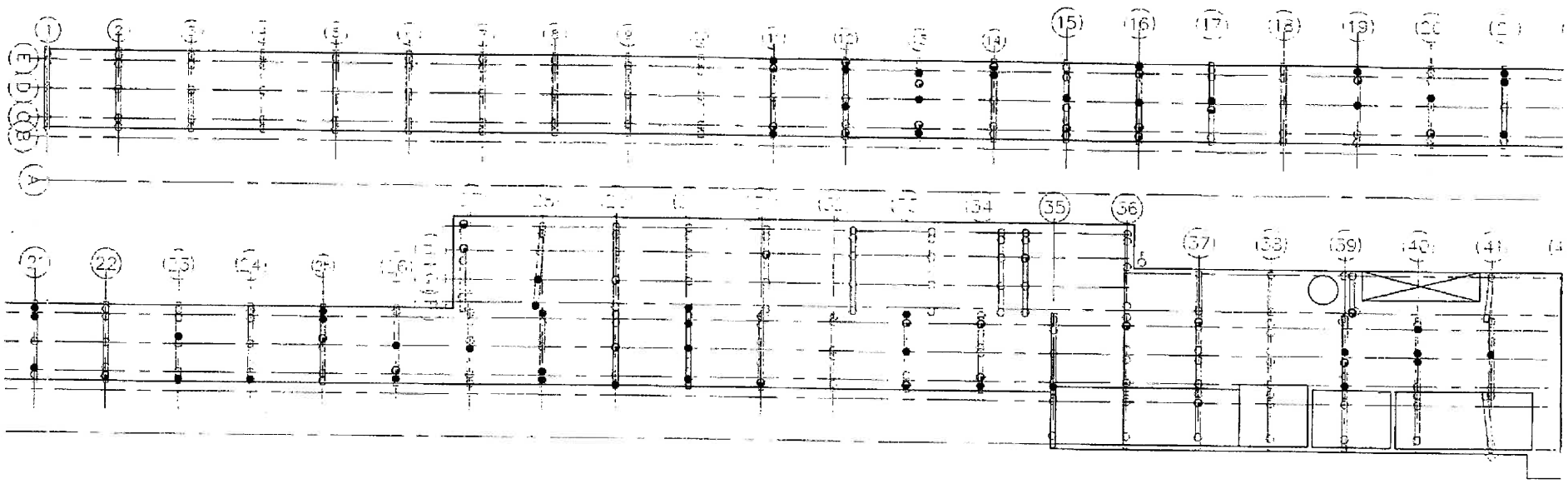
CAP BEAM OR STRINGER, POOR CONDITION

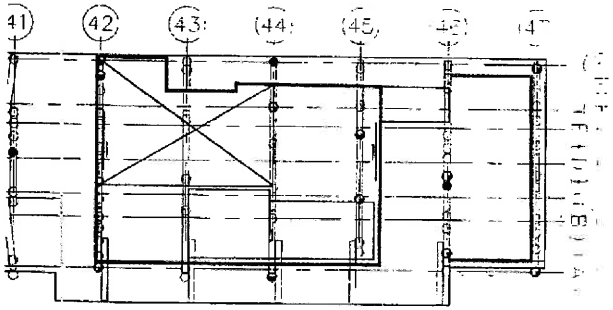
NOTES:

1. THIS DRAWING IS A SCHEMATIC OF THE STRUCTURAL FRAMING SYSTEM BASED UPON LIMITED FIELD MEASUREMENTS OF REPRESENTATIVE CONDITIONS NO DRAWINGS ARE AVAILABLE OF THE PIER STRUCTURE.
2. ONLY STRINGERS OBSERVED DURING THE FIELD INSPECTION ARE SHOWN.

FIGURE 3

MOFFATT & NICHOL ENGINEERS WALNUT CREEK, CALIFORNIA	CONDITION ASSESSMENT–STRINGERS & PILE CAPS ROMEO PIER JOB NO. 4062





KEY

- ○ VERTICAL PILE
- ○ PILE INSPECTED, GOOD CONDITION
- ◑ PILE INSPECTED, FAIR CONDITION (DAMAGE OR DETERIORATION BETWEEN 50% AND 25%)
- ● PILE INSPECTED, POOR CONDITION (DAMAGE OR DETERIORATION GREATER THAN 50%)

NOTES:

1. THIS DRAWING IS A SCHEMATIC OF THE STRUCTURAL FRAMING SYSTEM BASED UPON LIMITED FIELD MEASUREMENTS OF REPRESENTATIVE CONDITIONS NO DRAWINGS ARE AVAILABLE OF THE PIER STRUCTURE.

FIGURE 4

MOFFATT & NICHOL ENGINEERS
WALNUT CREEK, CALIFORNIA

CONDITION ASSESSMENT: PILES

ROMEO PIER
JOB NO. 4062

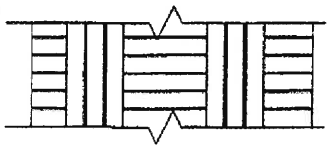
DECK PLANKS

DECK PLANK SPAN (Stringer Spacing)	ALLOWABLE TRUCK WEIGHT
16 INCHES	11,150 POUNDS
24 INCHES	8,780 POUNDS
30 INCHES	7,870 POUNDS
36 INCHES	7,080 POUNDS
42 INCHES	6,070 POUNDS
48 INCHES	5,310 POUNDS

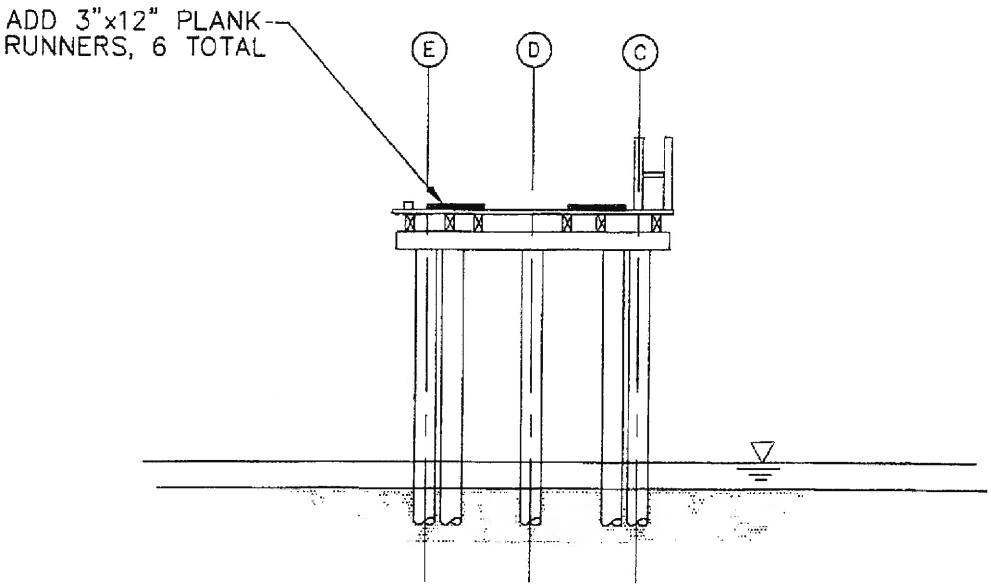
STRINGERS

STRINGER SPAN	ALLOWABLE TRUCK WEIGHT
14 FEET	12, 420 POUNDS
17.5 FEET	9,940 POUNDS
21 FEET	8,300 POUNDS

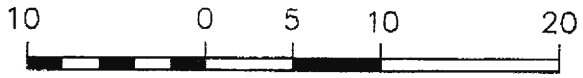
ALLOWABLE TRUCK WEIGHT
BASED ON DECK PLANKS AND STRINGER SPANS
FIGURE NO. 5



PLAN



SECTION



1 inch = 10 ft.

FIGURE 6

MOFFATT & NICHOL ENGINEERS

WALNUT CREEK, CALIFORNIA

WHEEL PLANK IMPROVEMENT

ROMEO PIER

JOB NO. 4062

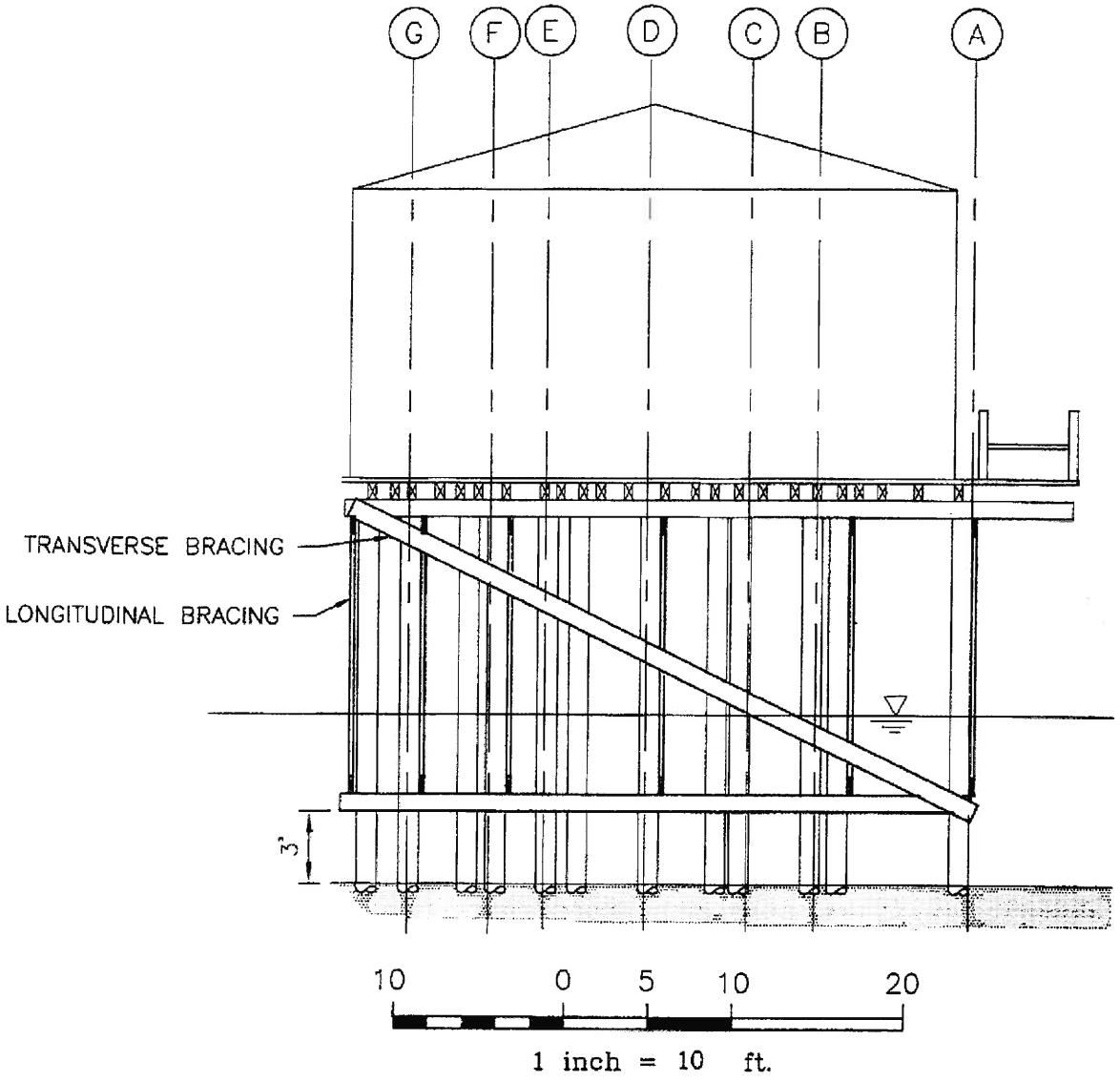
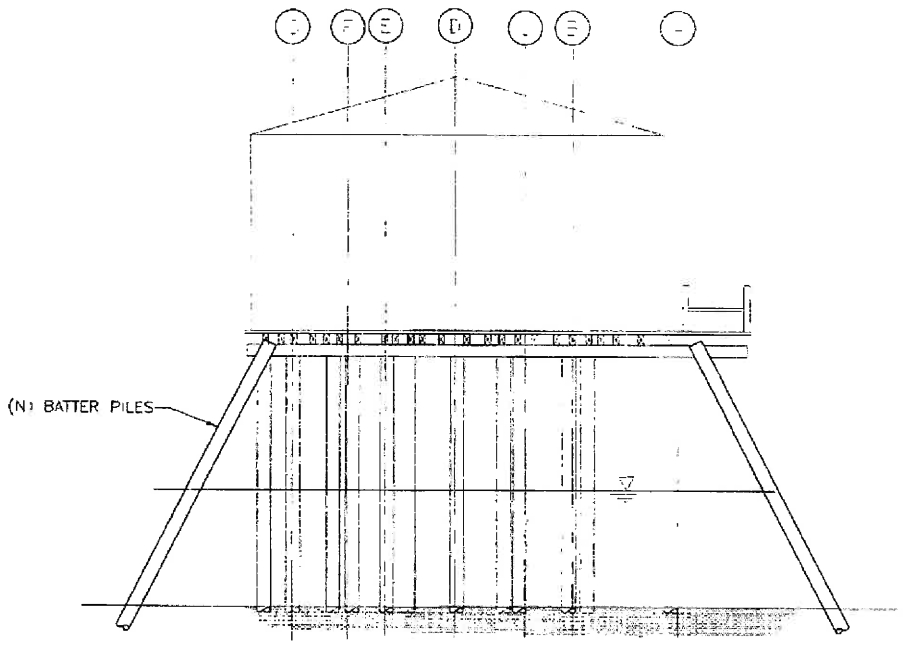


FIGURE 7

MOFFATT & NICHOL ENGINEERS

WALNUT CREEK, CALIFORNIA

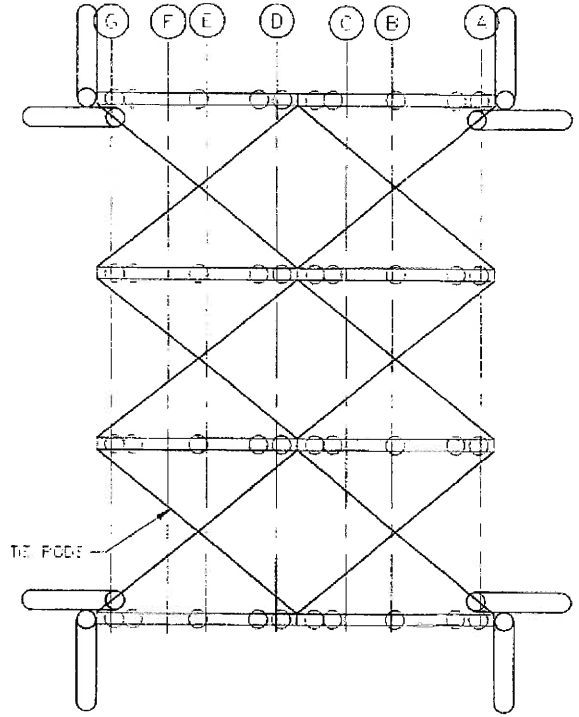
LATERAL LOAD RETROFIT
ALTERNATIVE 1– CROSS–BRACING
ROMEO PIER
JOB NO. 4062



NEW BATTER PILES--ELEVATION

10 0 5 10 20

1 inch = 10 ft

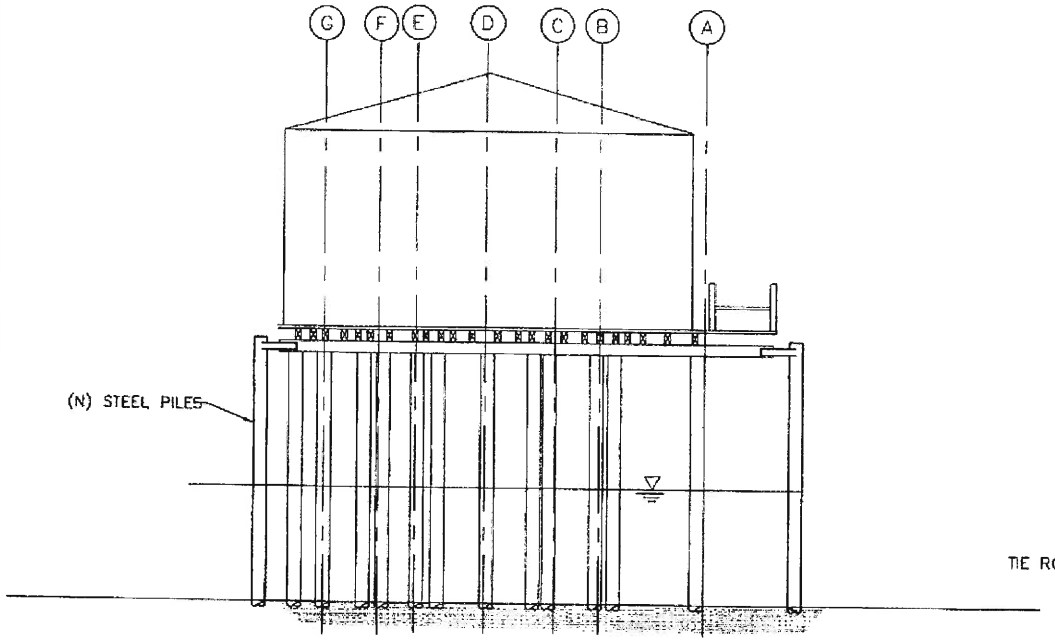


HORIZONTAL BRACING AND BATTER PILES--PLAN

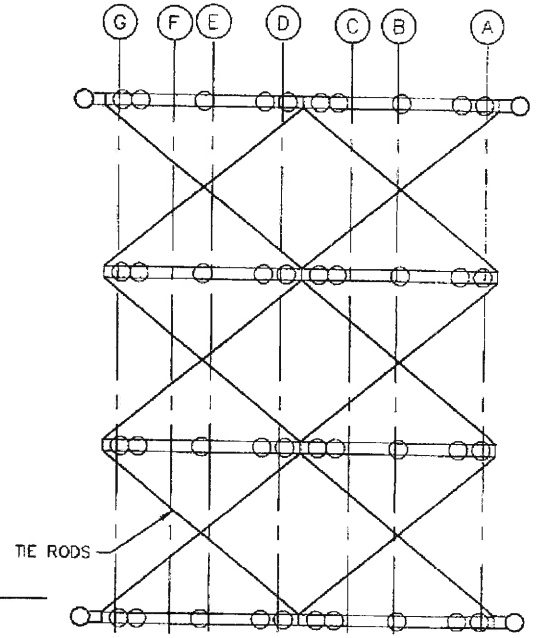
FIGURE 8

MOFFATT & NICHOL ENGINEERS
WALNUT CREEK, CALIFORNIA

LATERAL LOAD RETROFIT
ALTERNATIVE 2 - BATTER PILES
ROMEO PIER
JOB NO. 4062



NEW STEEL PILES--ELEVATION



HORIZONTAL BRACING--PLAN

FIGURE 9

MOFFATT & NICHOL ENGINEERS
WALNUT CREEK, CALIFORNIA

LATERAL LOAD RETROFIT
ALTERNATIVE 3 – VERTICAL STEEL PILES
ROMEO PIER
JOB NO. 4062

11. PHOTOGRAPHS

PIER FROM SHORE LOOKING SOUTH
PHOTOGRAPH NO. 1

SOUTH END OF PIER LOOKING WEST SHOWING FISH HANDLING BUILDING
PHOTOGRAPH NO. 2

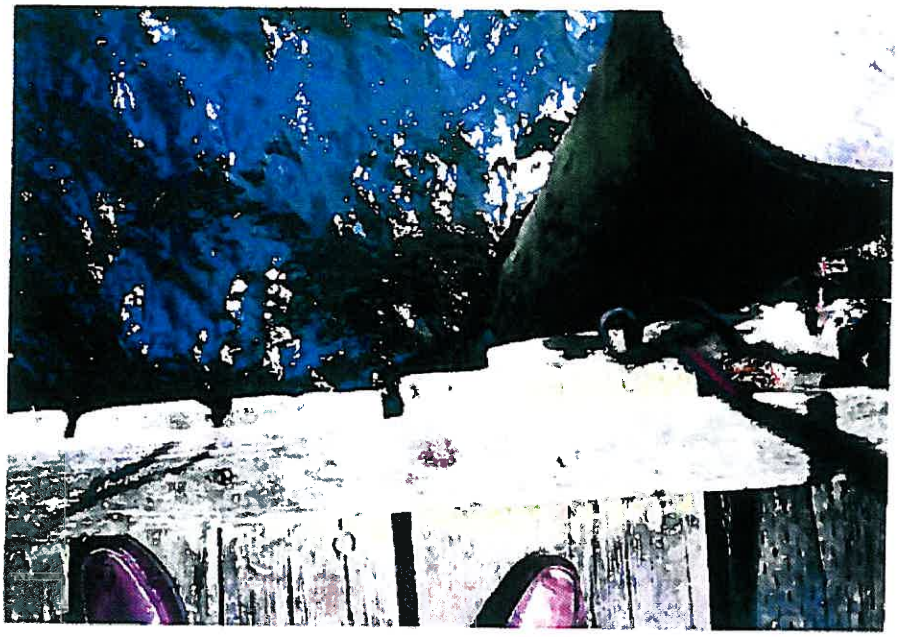
VIEW OF PIER FROM WATER AT GRIDLINE 20 SHOWING FRAMING PATTERN LINE
(NOTE CABLES HOLDING PIER)
PHOTOGRAPH NO. 3

FISH HANDLING BUILDING
PHOTOGRAPH NO. 4

STORAGE ON DECK
PHOTOGRAPH NO. 5

STRINGER AND PILE CAP INSPECTION
PHOTOGRAPH NO. 6

FENDER PILE CONENCTION DAMAGE AT DECK LEVEL
PHOTOGRAPH NO. 7



FENDER PILE BROKEN AT WATERLINE
PHOTOGRAPH NO. 8

12. PILE INSPECTION FORM

ROMEO PIER-PILE INSPECTION: SEPT 29, OCT 1, 1997

BENT	PILE #	PN NO	North (1)	East (1)	OBSERVED CONDITION (2)	DIVE COND	VIS COND	DIA	COMMENTS	CAP SPAN
1	1	11	0.0	15.0	S		3			6.0
1	2	12	0.0	14.0	S		3			4.0
1	3	13	0.0	8.0	S		3			1.5
1	4	14	0.0	2.0	S		3			2.0
1	5	15	0.0	1.0	S		3			2.3
2	1	21	15.0	15.0	S		3			1.0
2	2	22	15.0	14.0	S		3			1.0
2	3	23	15.0	8.0	S		3			1.0
2	4	24	15.0	2.0	S		3			1.0
2	5	25	15.0	1.0	S		3			6.0
3	1	31	30.0	15.0	S		3			6.0
3	2	32	30.0	14.0	S		3			4.2
3	3	33	30.0	8.0	S		3			5.5
3	4	34	30.0	2.0	S		3			6.0
3	5	35	30.0	1.0	S		3			1.0
4	1	41	45.0	15.0	S		3			1.8
4	2	42	45.0	14.0	S		3			1.0
4	3	43	45.0	8.0	S		3			1.0
4	4	44	45.0	2.0	S		3			-37.25
4	5	45	45.0	1.0	S		3			1.0
5	1	51	60.0	15.0	S		3			4.9
5	2	52	60.0	14.0	S		3			4.3
5	3	53	60.0	8.0	S		3			4.0
5	4	54	60.0	2.0	S		3			1.0
5	5	55	60.0	1.0	S		3			1.0
6	1	61	75.0	15.0	S		3			1.0
6	2	62	75.0	14.0	S		3			6.0
6	3	63	75.0	8.0	S		3			6.0
6	4	64	75.0	2.0	S		3			6.0
6	5	65	75.0	1.0	S		3			6.0
7	1	71	90.0	15.0	S		3			3.0
7	2	72	90.0	14.0	S		3			1.4
7	3	73	90.0	8.0	S		3			1.5
7	4	74	90.0	2.0	S		3			1.0
7	5	75	90.0	1.0	S		3			1.8
8	1	81	105.0	15.0	S		3			1.3
8	2	82	105.0	14.0	S		3			
8	3	83	105.0	8.0	S		3			1.2
8	4	84	105.0	2.0	S		3			5.3
8	5	85	105.0	1.0	S		3			
9	1	91	120.0	14.0	S		3			1.0
9	2	92	120.0	8.0	S		3			1.0
9	3	93	120.0	2.0	S		3			7.5
10	1	101	135.0	15.0	S		3			6.0
10	2	102	135.0	14.0	S		3			3.7
10	3	103	135.0	8.0	S		3			1.25
10	4	104	135.0	2.0	S		3			9
10	5	105	135.0	1.0	S		3			5.25
11	1	111	150.0	15.0	D1	1	1			7.75
11	2	112	150.0	14.0	D3	3	3			6.25
11	3	113	150.0	8.0	S		3			7.75
11	4	114	150.0	2.0	D2	2	2			6.0
11	5	115	150.0	1.0	D1	1	1			1.0
12	1	121	165.0	15.0	D4	4	4			2.3

ROMEO PIER-PILE INSPECTION: SEPT 29, OCT 1, 1997

BENT	*PILE #*	PN NO	North (1)	East (1)	OBSERVED CONDITION (2)	DIVE COND	VIS COND	DIA	COMMENTS	CAP SPAN
12	2	122	165.0	14.0	S		3			2.5
12	3	123	165.0	9.3	D1	1	1			2.8
12	4	124	165.0	8.0	S		3			
12	5	125	165.0	2.0	S1		1			
12	6	126	165.0	1.0	D3	3	3			8.0
13	1	131	180.0	15.0	D1	1	1			8.3
13	2	132	180.0	14.0	D4	4	4			1.5
13	3	133	180.0	8.0	S1		1		Crack/Checked	1.8
13	4	134	180.0	3.0	D4	4	4			3.8
13	5	135	180.0	2.0	D1	1	1			1.0
13	6	136	180.0	1.0	S		3			1.5
14	1	141	195.0	15.0	S		3			1.5
14	2	142	195.0	14.0	S		3			2.0
14	3	143	195.0	8.0	S		3			3.8
14	4	144	195.0	2.0	D1	1	1			5.8
14	5	145	195.0	1.0	D2	2	2			6.0
15	1	151	210.0	15.0	S		3	14		6.5
15	2	152	210.0	13.6	D4	4	4			16.4
15	3	153	210.0	9.3	S		3	8		1.0
15	4	154	210.0	8.0	D1	1	1	11		2.3
15	5	155	210.0	2.0	S		3			3.8
15	6	156	210.0	1.0	S		3			4.0
16	1	161	225.0	15.0	D3	3	3			4.5
16	2	162	225.0	14.0	D3	3	3			5.2
16	3	163	225.0	8.0	D1	1	1			8.2
16	4	164	225.0	2.0	D3	3	3			1.5
16	5	165	225.0	1.0	D1	1	1			1.5
17	1	171	240.0	15.0	S		3			1.5
17	2	172	240.0	9.3	D2	2	2			1.5
17	3	173	240.0	8.0	D1	1	1			5.8
17	4	174	240.0	2.0	S		3			6.0
17	5	175	240.0	1.0	S		3			7.8
18	1	181	255.0	15.0	S		3			7.8
18	2	182	255.0	14.0	S		3			7.8
18	3	183	255.0	8.0	S		3			3.8
18	4	184	255.0	2.0	S		3			3.8
18	5	185	255.0	1.0	S		3			3.8
19	1	191	270.0	15.0	S		3	12		3.8
19	2	192	270.0	14.0	S		3	8		5.5
19	3	193	270.0	8.0	D1	1	1			1.8
19	4	194	270.0	2.0	D4	4	4			2.0
19	5	195	270.0	1.0	D1	1	1			2.5
20	1	201	285.0	15.0	S		3	10		5.8
20	2	202	285.0	14.0	D4	4	4	14		6.0
20	3	203	285.0	8.0	S		3			
20	4	204	285.0	6.3	S1		1			1.5
20	5	205	285.0	2.0	S		3			1.5
20	6	206	285.0	1.0	S		3			4.3
21	1	211	300.0	15.0	S		3			5.5
21	2	212	300.0	14.0	S1		1		Hollowed out	5.8
21	3	213	300.0	8.0	S		3			5.8
21	4	214	300.0	2.0	D1	1	1			5.8
21	5	215	300.0	1.0	D1	1	1		Crack/Checked	2.3
22	1	221	315.0	15.0	D4	4	4	12		2.3

ROMEO PIER-PILE INSPECTION: SEPT 29, OCT 1, 1997

BENT	PILE #	PN NO	North (1)	East (1)	OBSERVED CONDITION (2)	DIVE COND	VIS COND	DIA	COMMENTS	CAP SPAN
22	2	222	315.0	14.0	S		3	9		2.4
22	3	223	315.0	8.0	S		3			3.0
22	4	224	315.0	2.0	S		3			3.8
22	5	225	315.0	1.0	S		3			4.0
23	1	231	330.0	15.0	S1		1		Hollowed out	7.0
23	2	232	330.0	14.0	S		3			7.8
23	3	233	330.0	8.0	S		3	8		1.3
23	4	234	330.0	6.6	D1	1	1		Split--Drilled 30%	1.5
23	5	235	330.0	2.0	S		3			2.3
23	6	236	330.0	1.0	S		3			5.5
24	1	241	345.0	15.0	S1		1		Hollowed out	5.5
24	2	242	345.0	14.0	S		3			5.5
24	3	243	345.0	8.0	S		3			5.5
24	4	244	345.0	2.0	S		3			5.8
24	5	245	345.0	1.0	S		3			1.5
25	1	251	360.0	15.0	S		3		Crack/Checked	1.8
25	2	252	360.0	14.0	S		3			1.8
25	3	253	360.0	8.0	S		3		Crack/Checked	3.0
25	4	254	360.0	6.7	D3	3	3		Crack/Checked	3.0
25	5	255	360.0	2.0	D1	1	1			5.3
25	6	256	360.0	1.0	S1		1		Hollowed out	1.0
26	1	261	375.0	15.0	S1		1		Bent is Leaning-was rebuilt	1.0
26	2	262	375.0	14.0	D4	4	4			1.0
26	3	263	375.0	8.0	S1		1		Hollowed out	1.2
26	4	264	375.0	1.0	S		3	9		1.5
27	7	275	388.5	0.0	S		3	10		6.5
27	8	276	388.6	-6.3	S		3			8.5
27	9	277	388.6	-12.1	D2	2	2			-35.9
27	10	278	388.6	-15.8	S		3			1.0
27	11	279	388.6	-17.3	S		3			1.0
27	1	271	390.0	15.0	S		3	10	Bent is leaning	5.0
27	2	272	390.0	14.0	S		3	15	Crack/Checked	5.3
27	3	273	390.0	8.0	S1		1			6.0
27	4	274	390.0	6.8	S		3	10		6.3
27	5	275	390.0	2.0	S		3			6.3
27	6	276	390.0	1.0	S		3		Crack/Checked	2.0
28	1	281	403.6	-0.6	D1	1	1			3.0
28	2	282	404.1	-6.0	D1	1	1			5.0
28	3	283	404.5	-11.8	S		3			5.0
28	4	284	404.8	-15.5	S		3		Crack/Checked	5.0
28	5	285	405.0	-17.0	S		3		Crack/Checked	1.0
28	6	286	405.0	15.0	S1		1		Hollowed out	1.5
28	7	287	405.0	14.0	D1	1	1	7		1.5
28	8	288	405.0	8.0	S1		1		Hollowed out	1.5
28	9	289	405.0	6.5	S		3			1.5
28	10	2810	405.0	2.0	S		3			1.9
28	11	2811	405.0	1.0	S		3			1.0
29	1	291	420.0	15.0	S1		1		Hollowed out	1.0
29	2	292	420.0	14.0	S		3			1.0
29	3	293	420.0	8.0	D4	4	4	8		-35.0
29	4	294	420.0	2.0	S		3		CAP GONE	-32.0
29	5	295	420.0	1.0	S		3			1.0
29	6	296	420.0	-0.5	S		3			1.0

ROMEO PIER-PILE INSPECTION: SEPT 29, OCT 1, 1997

BENT	PILE #	PN NO	North (1)	East (1)	OBSERVED CONDITION (2)	DIVE COND	VIS COND	DIA	COMMENTS	CAP SPAN
29	7	297	420.0	-6.0	D4	4	4			1.0
29	8	298	420.0	-11.8	S		3			5.5
29	9	299	420.0	-15.5	S		3			6.0
29	10	2910	420.0	-17.0	S		3			7.8
30	1	301	435.0	15.0	S		3			10.3
30	2	302	435.0	14.0	S1		1		Hollowed out	4.6
30	3	303	435.0	12.9	S		3			4.7
30	4	304	435.0	9.3	S		3	10		4.8
30	5	305	435.0	8.0	S1		1		Hollowed out	4.8
30	6	306	435.0	2.0	S2		2		Crack/Checked	1.5
30	7	307	435.0	1.0	S		3			2.3
30	8	308	435.0	-0.5	S1		1		Hollowed out	1.0
30	9	309	435.0	-6.0	S		3		Need to replace cap	1.3
30	10	3010	435.0	-11.8	S		3			1.0
30	11	3011	435.0	-15.5	S		3			1.0
30	12	3012	435.0	-17.0	S		3			1.0
31	1	311	450.0	15.0	D2	2	2			1.0
31	2	312	450.0	10.8	S		3			1.0
31	3	313	450.0	6.5	S		3		Crack/Checked	1.0
31	4	314	450.0	2.0	S		3			1.0
31	5	315	450.0	1.0	S		3			1.0
31	6	316	451.0	-0.5	S		3	9		1.0
31	7	317	451.0	-6.0	S		3	8		1.0
31	8	318	451.0	-11.8	D3	3	3			1.0
31	9	319	451.0	-15.5	S		3			1.0
31	10	3110	451.0	-17.0	S		3			1.0
32	1	321	465.0	15.0	S		3	14	replaced bent	1.0
32	2	322	465.0	9.2	S		3			1.0
32	3	323	465.0	8.0	S1		1			6.0
32	4	324	465.0	2.0	S		3			6.0
32	5	325	465.0	1.0	S		3			7.0
32	6	326	469.0	-0.5	S		3			11.3
32	7	327	469.0	-6.0	S		3			1.0
32	8	328	469.0	-11.8	S		3			1.0
32	9	329	469.0	-15.5	S		3			1.0
32	10	3210	469.0	-17.0	S		3			6.0
33	1	331	480.0	15.0	D2	2	2		Hollow @ waterline	6.0
33	2	332	480.0	13.0	S		3			6.0
33	3	333	480.0	8.0	D1	1	1			6.0
33	4	334	480.0	2.0	D4	4	4		Hole @1' above mudline	6.0
33	5	335	480.0	1.0	D1	1	1			6.0
33	6	336	485.0	-0.5	S		3			6.0
33	7	337	485.0	-6.0	S		3			6.0
33	8	338	485.0	-11.8	S		3			6.0
33	9	339	485.0	-15.5	S		3			6.0
33	10	3310	485.0	-17.0	S		3			6.0
34	1	341	495.0	15.0	D1	1	1			5.3
34	2	342	495.0	14.0	D3	3	3			5.5
34	3	343	495.0	8.0	S		3			6.0
34	4	344	495.0	6.9	S		3			6.0
34	5	345	495.0	2.0	D3	3	3			6.0
34	6	346	495.0	1.0	S		3			3.8
34	7	347	499.0	-0.5	S		3			4.3

ROMEO PIER-PILE INSPECTION: SEPT 29, OCT 1, 1997

BENT	PILE #	PN NO	North (1)	East (1)	OBSERVED CONDITION (2)	DIVE COND	VIS COND	DIA	COMMENTS	CAP SPAN
34	8	348	499.0	-6.0	S		3			4.5
34	9	349	499.0	-11.8	S		3			5.0
34	10	3410	499.0	-15.5	S		3			1.7
34	11	3411	499.0	-17.0	S		3			2.3
35	1	351	504.0	-0.5	S		3			2.5
35	2	352	504.0	-6.0	S		3			2.7
35	3	353	504.0	-11.8	D3	3	3			3.6
35	4	354	504.0	-15.5	S		3			1.3
35	5	355	504.0	-17.0	S		3			1.3
35	6	356	510.0	18.0	S		3			1.4
35	7	357	510.0	15.0	D1	1	1			7.5
35	8	358	510.0	14.0	S		3			9.0
35	9	359	510.0	8.0	S		3			10.3
35	10	3510	510.0	2.0	S		3			1.0
35	11	3511	510.0	1.0	S		3			1.1
36	1	361	525.0	18.0	S		3			6.0
36	2	362	525.0	15.0	S		3			6.0
36	3	363	525.0	14.0	S		3			6.0
36	4	364	525.0	8.0	S		3			6.0
36	5	365	525.0	7.0	S		3	10		6.0
36	6	366	525.0	2.0	D3	3	3	10		7.0
36	7	367	525.0	0.2	S		3			6.0
36	8	368	525.0	-2.1	S		3			6.0
36	9	369	525.0	-10.3	S		3			6.0
36	10	3610	525.0	-15.5	S		3			6.0
36	11	3611	525.0	-17.0	S		3			6.0
37	1	371	540.0	18.0	D4	4	4			6.0
37	2	372	540.0	15.0	S		3			6.0
37	3	373	540.0	14.0	S		3			6.0
37	4	374	540.0	8.0	S		3	10		6.0
37	5	375	540.0	7.0	S		3			6.0
37	6	376	540.0	2.0	S		3			6.0
37	7	377	540.0	1.0	D3	3	3			6.0
37	8	378	540.0	-1.3	S		3			6.0
37	9	379	540.0	-9.0	S		3			6.0
38	1	381	555.0	18.0	S		3			6.0
38	2	382	555.0	15.0	S		3		Crack/Checked	6.0
38	3	383	555.0	14.0	S		3			4.3
38	4	384	555.0	8.0	S		3			4.3
38	5	385	555.0	7.0	S		3			4.7
38	6	386	555.0	2.0	S		3			5.0
38	7	387	555.0	1.0	S		3			5.7
38	8	388	555.0	-1.3	S		3			5.8
38	9	389	555.0	-9.0	S		3			6.0
39	1	391	570.0	18.0	S		3			6.0
39	2	392	570.0	14.0	S		3			6.0
39	3	393	570.0	13.0	S1		1		Hollowed out	6.0
39	4	394	570.0	12.0	S		3			6.0
39	5	395	570.0	8.0	D3	3	3			1.0
39	6	396	570.0	7.0	D1	1	1			1.0
39	7	397	570.0	0.0	S		3		7,8,9 are a grou[	1.0
39	8	398	571.5	-1.3	D4	4	4		CRANE ROTTING OUT	1.1
39	9	399	571.5	-9.0	S		3			1.2
40	1	401	585.0	18.0	S		3			1.3

ROMEO PIER-PILE INSPECTION: SEPT 29, OCT 1, 1997

BENT	PILE #	PN NO	North (1)	East (1)	OBSERVED CONDITION (2)	DIVE COND	VIS COND	DIA	COMMENTS	CAP SPAN
40	2	402	585.0	15.0	S		3			1.5
40	3	403	585.0	14.0	S		3			2.8
40	4	404	585.0	8.0	S		3			2.8
40	5	405	585.0	7.0	D1	1	1		Hollowed out	4.0
40	6	406	585.0	2.0	D1	1	1		Hollowed out	5.5
40	7	407	585.0	1.0	S		3			5.5
41	8	418	597.7	-1.4	S		3			5.7
41	9	419	598.8	15.8	S		3			5.8
41	10	4110	598.9	-0.6	S		3			6.0
41	11	4111	599.9	-9.0	S		3			1.0
41	1	411	600.0	15.7	S		3			1.0
41	2	412	600.0	14.0	S		3			2.0
41	3	413	600.0	7.0	S		3			2.0
41	4	414	600.0	4.3	S		3			3.0
41	5	415	600.0	2.0	S		3			3.0
41	6	416	600.0	0.1	S		3		Hollowed out	3.0
42	7	427	614.8	-1.1	S		3			1.8
42	1	421	615.0	27.0	D4	4	4	11	Leaning	1.0
42	2	422	615.0	25.0	S		3			1.0
42	3	423	615.0	22.3	S		3			1.0
42	4	424	615.0	20.0	S		3			1.3
42	5	425	615.0	18.0	S		3			1.7
42	6	426	615.0	15.0	S		3			1.0
42	7	427	615.0	12.0	S		3			1.0
42	8	428	615.0	8.0	S		3			1.0
42	9	429	615.0	6.0	S		3			1.0
42	10	4210	615.0	2.0	S		3			1.0
42	11	4211	615.0	0.0	S		3			1.0
42	12	4212	615.0	-3.8	S		3			1.0
42	13	4213	615.0	-6.3	D2	2	2		drilled--ok, rerate 3	1.0
42	14	4214	615.0	-9.0	D2	2	2		drilled--single knot hole, borer hollowed out	1.0
43	1	431	630.0	28.5	S		3			1.0
43	2	432	630.0	27.0	S		3			1.0
43	3	433	630.0	16.8	S		3			1.0
43	4	434	630.0	11.3	S		3		Crack/Checked	1.0
43	5	435	630.0	-1.0	S		3			1.0
43	6	436	630.0	-7.5	S		3			1.0
43	7	437	630.0	-9.0	S		3			1.0
44	1	441	645.0	28.3	D2	2	2		extends through deck, cap does not bear	1.0
44	2	442	645.0	27.0	S		3		replacement-top block	1.0
44	3	443	645.0	18.0	S		3	14	replacement-top block	1.0
44	4	444	645.0	12.8	s2		4		replacement-top block	1.0
44	5	445	645.0	5.0	S		3		replacement-top block	1.0
44	6	446	645.0	-1.3	D3	3	3		replacement-top block	
44	7	447	645.0	-9.0	D1	1	1		replacement-top block	1.5
45	1	451	660.0	23.8	S		3			10.25
45	2	452	660.0	22.0	S		3			10.25
45	3	453	660.0	14.5	D4	4	4		open span	8.5
45	4	454	660.0	3.3	D2	2	2			1.5
45	5	455	660.0	-1.5	S		3			-32.75
45	6	456	660.0	-8.0	S		3			1.75
46	7	467	668.0	27.9	S		3			11.25

ROMEO PIER-PILE INSPECTION: SEPT 29, OCT 1, 1997

BENT	PILE #	PN NO	North (1)	East (1)	OBSERVED CONDITION (2)	DIVE COND	VIS COND	DIA	COMMENTS	CAP SPAN
46	1	461	675.0	27.0	S		3			4.75
46	2	462	675.0	25.3	s1				Hollowed out	6.5
46	3	463	675.0	23.8	D4	4	4			-35.8784
46	4	464	675.0	19.5	S		3			0.9
46	5	465	675.0	17.3	S		3			1.5
46	6	466	675.0	12.0	D1	1	1		Hollow @ waterline	4.3
46	7	467	675.0	10.3	D3	3	3			2.3
46	8	468	675.0	7.3	S		3			1.8
46	9	469	675.0	5.5	S		3			3.0
46	10	4610	675.0	3.3	S		3			1.8
46	11	4611	675.0	-4.8	S		3			2.3
46	12	4612	675.0	-6.5	S		3			8
46	13	4613	675.0	-8.8	S		3			1.75
47	1	471	690.0	26.9	D3	3	3		Hole @1' above mudline	2.25
47	2	472	690.0	22.9	S		3			4.0
47	3	473	690.0	20.1	S		3			2.8
47	4	474	690.0	17.6	S		3			2.5
47	5	475	690.0	12.1	S		3			5.5
47	6	476	690.0	10.1	S		3			2.0
47	7	477	690.0	4.9	S		3			5.3
47	8	478	690.0	0.6	S		3			4.3
47	9	479	690.0	-1.9	S		3			2.5
47	10	4710	690.0	-8.4	D4	4	4			6.5

SUMMARY

	Dive	Surf&Dive		Cond	Number
#piles	71	342		1	46
Avg Cond	2.31	2.75		2	11
SD Cond	1.23	0.75		3	266
				4	18
					341

Notes:

(1) Northing and Easting are theoretical coordinates with north origin at the pier abutment and the east edge of the deck at the abutment.

(2) The method of observation is indicated as:

S- Surface, observed from boat at -1.0 tide

D-Diving with SCUBA, but inspection from the bottom to the water surface

The number that follows the letter indicates the amount of damage to the pile at the worst location which is typically within the intertidal zone:

1	< 25% remains
2	25-50%
3	50-75%
4	>75%

example: D3 indicates I pile that was inspected by diving, and has 50-75% of the section remaining at the worst location on the pile.

All piles were observed from the surface. Those that have an "S" indication only, appeared to be sound and had no visible defects, except as noted in the comments column. Those surface piles that have a number indicated (e.g. S2) were sounded with a hammer or drilled.

ROMEO PIER
EVALUATION REPORT

Prepared For
SAN MATEO HARBOR DISTRICT
El Granada, California

Prepared By
MOFFATT & NICHOL ENGINEERS
3000 Citrus Circle, Suite 230
Walnut Creek, California

Date of Site Investigation
October 26, 2000

Investigating Staff
Brad Porter, P.E.
Don Coats

November 22, 2000
M&N File No. 4062-01

SUMMARY

The San Mateo Harbor District purchased Romeo pier in 1996. Soon after the purchase an evaluation of the structural condition of the pier was performed (Moffatt & Nichol Engineers, January, 1998) in which replacement of the pier was recommended and that certain minimum repairs be performed, if the pier was to remain in service prior to replacement. Since 1998, some of these repairs were made and the pier has remained in service. The Harbor District wants to continue to use the pier and requested an update to the previous evaluation, which is the focus of this report.

The current condition of the pier is substantially the same as it was in 1997, but with three years of additional deterioration. The structural framing consisting of the piles, pile caps, stringers and decking are in fair condition and are adequate to support a reduced load from the original condition. Replacement of pier members by the District since 1998 has been limited to the decking and stringers. Replacement of deteriorated piles and pile caps need to be performed, as well as ongoing replacement of the, more easily accessible, decking and stringers. If this work is performed, the useful life of the pier can be extended.

PURPOSE AND SCOPE OF WORK

The purpose of this investigation was to assess the change in condition of Romeo pier since the last evaluation in 1998. The level of detail presented in the previous report was not requested. Rather this investigation was to identify significant changes in the condition of the pier structure since the previous report.

PIER DESCRIPTION

Romeo Pier is a timber framed and timber pile supported structure which is approximately 50 years old. The pier in plan consists of a 16 foot wide by 390 foot long approach section and a 35 foot wide by 250 foot long head section, for a total length of 640 feet. It is oriented in a north/south direction with the landfall at the northern end. A plan view, elevation and sections of the structure are shown in Figure 1. Grid lines are shown on the plan view of the pier. These grid lines are used as a reference system in this report to help identify specific locations being discussed in the text. It should be emphasized that the gird is an idealized representation of the pier, and the actual pier is skewed in many locations. The pier deck is at Elevation +13.8 ft relative to Mean Lower Low Water (MLLW). This relatively high deck elevation is because the pier was constructed before the breakwater was built and therefore at one time required clearance for storm waves. Total plan area of the pier is 18,000 square feet. Photograph 1 provides a general view of the pier structure.

Framing consists of 3 x 12 deck planks supported on 6 x 12 stringers with 4 x 12s along the deck edges. The stringers are supported on 12 x 12 pile caps.

Timber piles range in diameter from 8-inch to 12-inch. Cores taken in 1997 indicate all framing is Douglas Fir timber.

The ocean bottom slopes down rather quickly to an elevation of –7.00 ft (MLLW) approximately 285 feet from the pier abutment on shore, and then continues relatively flat from that location to the end of the pier. Maximum height from mudline to deck is therefore approximately 21 feet.

The pier supports a two-story building used for fish handling operations. The building occupies approximately 2,800 square feet of pier area. Abalone tanks are located at the head of the pier under the shelter of the building. The pier also supports a number of storage containers along the western side. Utilities on the pier include water, gravity sewer, power, and a dry seawater line.

Fishing boats berth along the eastern face at the outer end for general fish offloading operations, and at the southwest corner for access to the abalone tanks. Timber fender piles, a boat access stair, and two cranes for offloading are located along the eastern face.

INVESTIGATION

An investigation was performed on October 26, 2000 by Moffatt & Nichol Engineers (Brad Porter, P.E.) with assistance from the Harbor District staff (Don Coats). The investigation consisted of visual observation of the pier structure from above and below deck. The below deck observation was conducted from a boat at low tide, to observe the condition of the piles. Field notes, photographs and a videotape recording was made to record the conditions observed. Prior to the field investigation, Harbor staff had marked (with colored paint) areas of the pier structure that had been replaced and those that needed repair/replacement. Blue paint marked areas that need repair and white paint marked areas that had been replaced. Figure 2 shows three different items: 1) needed repairs identified in the 1998 report, 2) repairs that have been made since the 1998 report and 3) additional repairs identified during this investigation.

DECKING

The overall condition of the decking is fair to good. Some members have recently been replaced. Splitting at the ends where deck members are nailed to stringers was observed and rotting of the deck members was observed at the end of the pier, particularly along the exterior walls of the building. Of particular concern is the west side of the building on that portion of the deck that cantilevers out from the deck (see Photograph 2).

The deck runners that were recommended in the 1998 report have yet to be installed. However, Harbor staff reported that there are plans to install these in

4. Replace piles as required (this can be investigated to identify those piles which must be replaced to help ensure a safe working environment).

5. Add wheel planks (adding the wheel planks adds a significant upgrade to the structure, as well as additional safety feature. The wheel planks could be limited to certain areas and then restrict loaded trucks to those areas).

6. Inspect and repair access ladders.

It is recommended that those repairs that have not been completed to date be performed in the near future. In particular, the following should be performed immediately:

1. Install an additional pile on the east side of bent 26.

2. Replace the pile caps at bents 29 and 30.

3. Repair the decking on the west side of the building or close the area.

4. Install additional stringers in the areas where spans exceed 3.5 ft.

5. Place a new posting sign at the pier entrance clearly indicating a maximum vehicle weight of 9,000 lbs.

6. Install wheel planks in all areas of vehicle access.

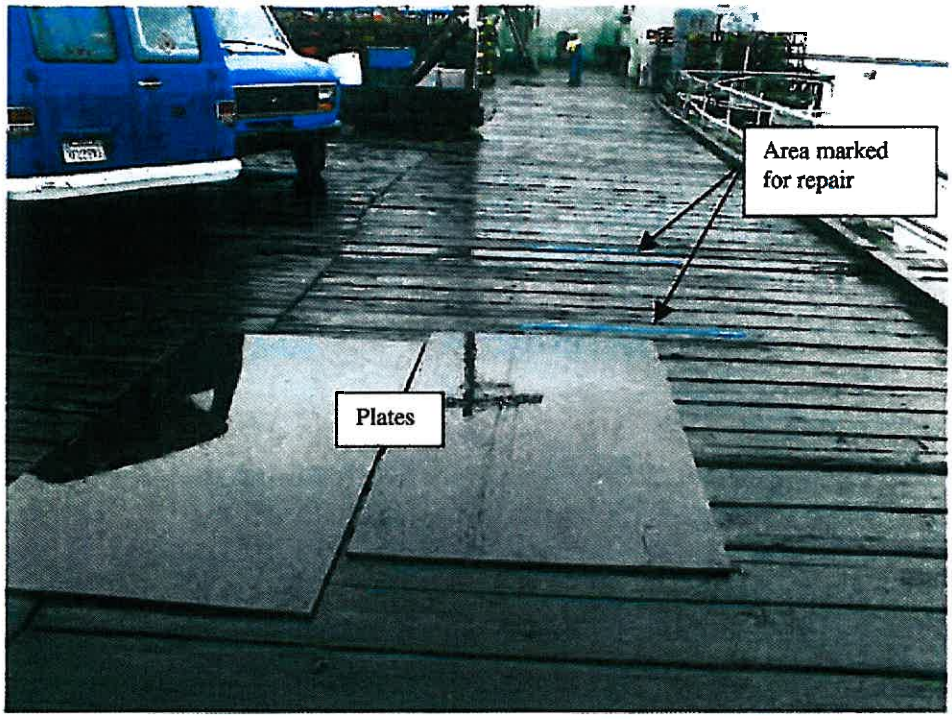
LIMITATIONS

This investigation and evaluation report of Romeo Pier was prepared based on an observation of the general condition of the pier. It is not intended to represent an investigation covering all details of the structure which might affect the operability of the pier. This report, therefore, does not provide a warranty that the structure will provide continued service without possible damage due to pier operations.

Photograph 1 – Romeo Pier

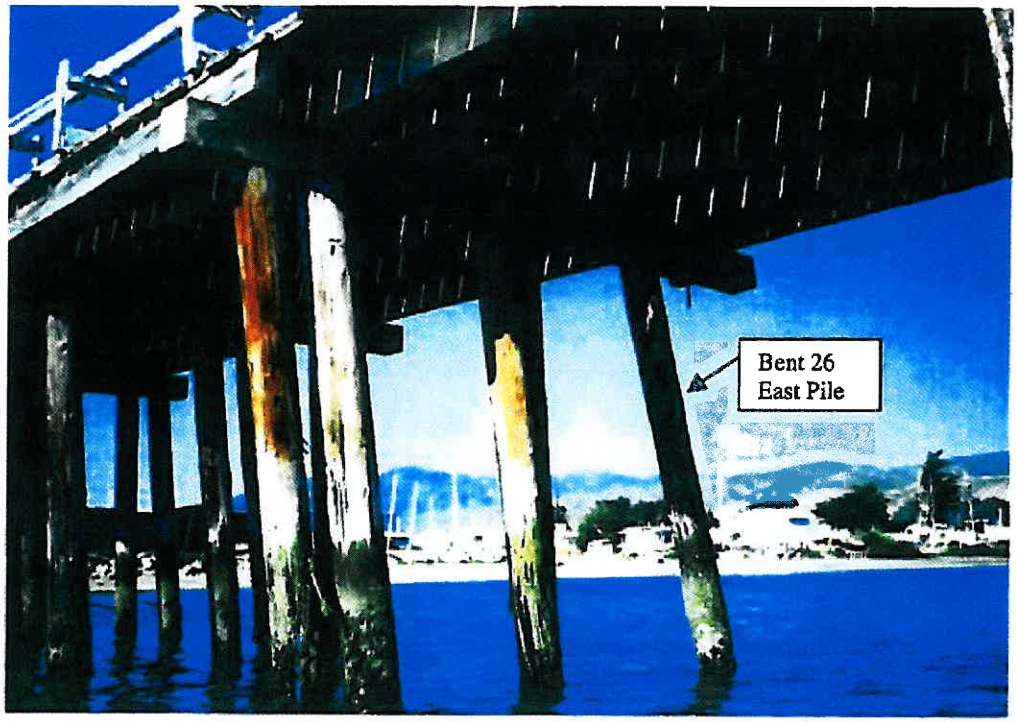
Photograph 2 – West Side of Building

Photograph 3

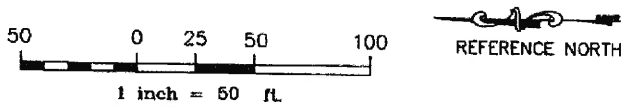


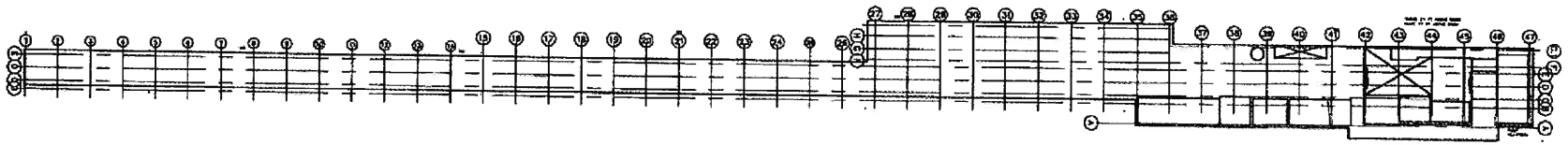
Photograph 4 – Plates over Damaged Pile Cap

Photograph 5

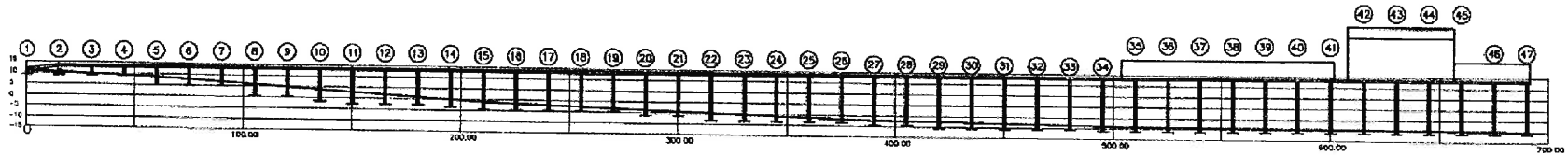


Photograph 6 Taken in 1997

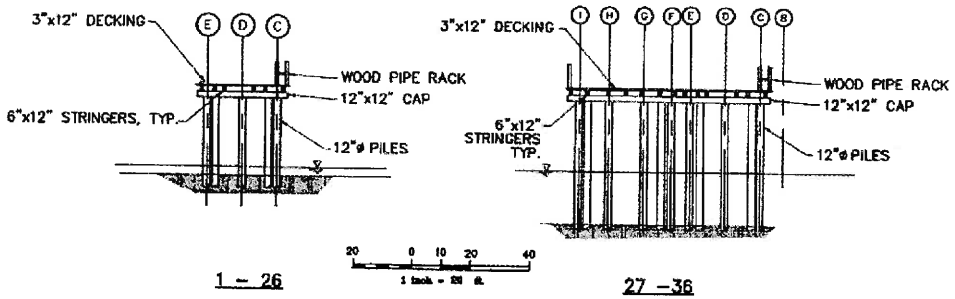




PLAN



ELEVATION



TYPICAL STRUCTURAL SECTION

FIGURE 1

MOFFATT & NICHOL ENGINEERS WALNUT CREEK, CALIFORNIA 11-22-00	EXISTING PIER – PLAN, ELEVATION & TYPICAL FRAMING ROMEO PIER JOB NO. 4062

REPAIRS PERFORMED SINCE 1997:

REPLACED 4 PILE CAPS
REPLACED 14 STRINGERS
REPLACED 30 DECK BOARDS

ADDITIONAL DEFICIENCIES NOTED 10/2000:

REPAIRS PERFORMED SINCE 1997:

REPLACED STRINGERS & DECKING

ADDITIONAL DEFICIENCIES NOTED 10/2000:

REPAIRS PERFORMED SINCE 1997:

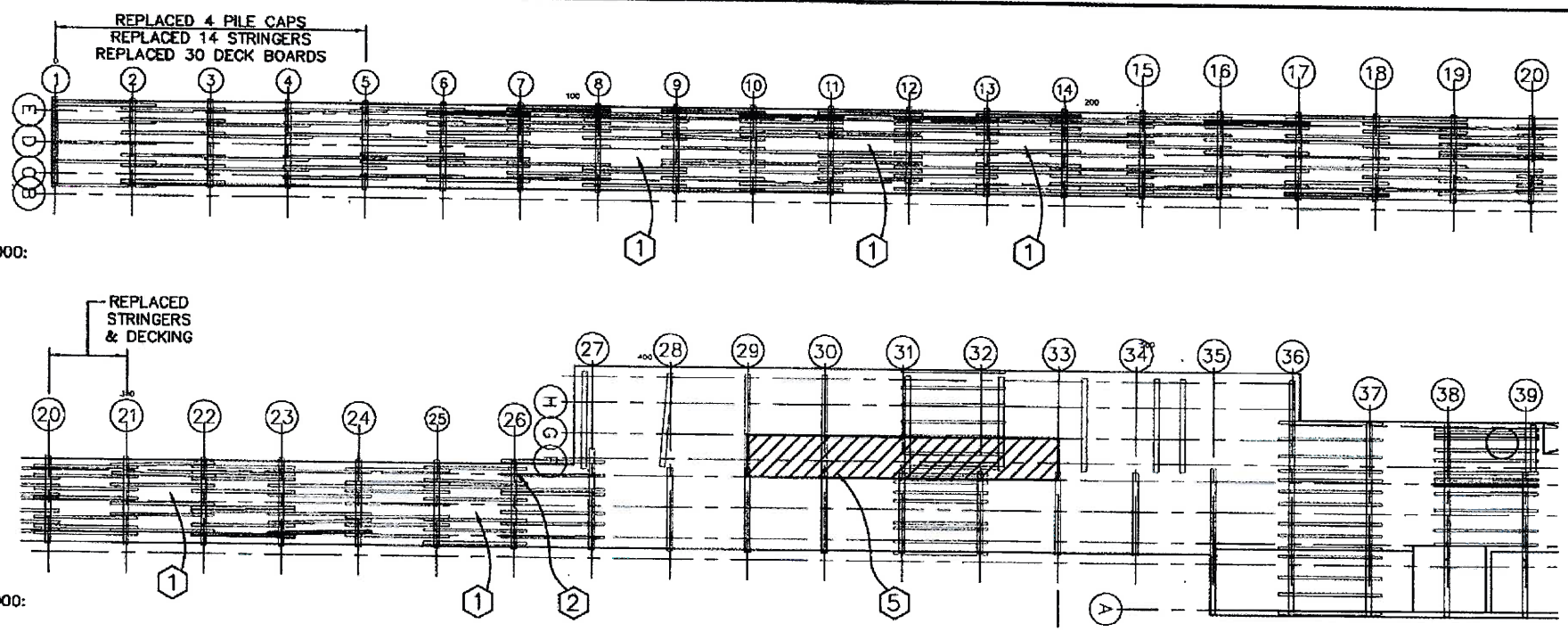
RIDGE 24 FT ABOVE DECK
EAVE 17 FT ABOVE DECK

PUMP PLATFORM

ADDITIONAL DEFICIENCIES NOTED 10/2000:

4 OR CLOSE AREA

4 OR CLOSE AREA



DEFICIENCIES IDENTIFIED IN 1997 REPORT:

CAP BEAM OR STRINGER, NO DAMAGE NOTED

CAP BEAM OR STRINGER, POOR CONDITION

ADDITIONAL DEFICIENCIES NOTED IN 2000:

1. ADD STRINGERS AS MARKED IN FIELD (BY HARBOR DISTRICT STAFF) IN BLUE.
2. INSTALL PILE ON EAST.
3. REPLACE STAIR AND FRAME, OR REMOVE AND BAR ACCESS.
4. REPLACE DECKING.
5. REPLACE DECKING THAT HAS SPLIT ENDS.

FIGURE 2

MOFFATT & NICHOL ENGINEERS
WALNUT CREEK, CALIFORNIA
11-22-00

CONDITION ASSESSMENT – STRINGERS & PILE CAPS

ROMEO PIER
JOB NO. 4062

Debbie Nixon

From: Ananda, Renee@Coastal <Renee.Ananda@coastal.ca.gov>
Sent: Thursday, April 23, 2015 1:47 PM
To: Scott Grindy
Cc: Cave, Nancy@Coastal; Manna, Jeannine@Coastal
Subject: RE: G-2-14-0016 (Romeo Pier)

Thank you Scott. The information that you've generated for the Emergency Permit application can be used for the CDP application, as long as it is still pertinent and applies to the proposed project. RTA

From: Scott Grindy [mailto:sgrindy@smharbor.com]
Sent: Wednesday, April 22, 2015 4:50 PM
To: Ananda, Renee@Coastal
Cc: Cave, Nancy@Coastal; Manna, Jeannine@Coastal; Scott Grindy
Subject: RE: G-2-14-0016 (Romeo Pier)

Understood.

Scott

From: Ananda, Renee@Coastal [mailto:Renee.Ananda@coastal.ca.gov]
Sent: Wednesday, April 22, 2015 4:49 PM
To: Scott Grindy
Cc: Cave, Nancy@Coastal; Manna, Jeannine@Coastal
Subject: RE: G-2-14-0016 (Romeo Pier)

Scott,

Just to circle back. I spoke with my District Supervisor and the District Manager and they concur that an ECDP is no longer appropriate. The proposal to remove Romeo Pier does not meet the criteria for issuance of an ECDP, as defined by Section 13009 of Coastal Commission Regulations. The proposed project is not required for a "sudden unexpected occurrence demanding immediate action to prevent or mitigate loss or damage to life, health, property or essential public services." Please prepare and submit a regular CDP application for the removal of Romeo Pier. Feel free to contact me if you have questions. Thank you, RTA

From: Scott Grindy [mailto:sgrindy@smharbor.com]
Sent: Wednesday, April 22, 2015 3:20 PM
To: Ananda, Renee@Coastal
Cc: Scott Grindy
Subject: RE: G-2-14-0016 (Romeo Pier)

Hi,

And thank you. Yes the district still needs to move forward, last year the budget had some issues at the board level, the Romeo pier was left on the budget but with no funding. With a new board this year, it is a concern and was even spoken with positive movement / action discussion at last week's budget work shop with the board. It is a high ticket disposal item at an estimate of over $600k.

Thanks for asking and checking.

Best

Scott

From: Ananda, Renee@Coastal [mailto:Renee.Ananda@coastal.ca.gov]
Sent: Wednesday, April 22, 2015 2:53 PM
To: Scott Grindy
Subject: RE: G-2-14-0016 (Romeo Pier)

Hello Scott,

We never received this memo. It has been a year since there was any activity, I just want to confirm that the Harbor District wants to proceed with processing an ECDP? I plan to make certain on my end that an ECDP is still appropriate. Thank you for the quick reply. RTA

From: Scott Grindy [mailto:sgrindy@smharbor.com]
Sent: Wednesday, April 22, 2015 2:07 PM
To: Ananda, Renee@Coastal
Cc: Scott Grindy
Subject: RE: G-2-14-0016 (Romeo Pier)

Hi Renee, not sure if Peter forwarded this memo but I have attached it.

The pier status:

1. Pier is gated/fenced off at its entry to prevent access by the public.
2. Ladders on the side of the pier have been removed to stop water access.
3. Each storm seems to have more lumber pieces etc. fall into the water.
4. The board has it on the agenda for the budget process for covering the cost of the demo of the pier.
5. My hope is we can obtain piling credits when the work is done so if we need to add pilings somewhere in the harbor, the credits could apply.

Let me know if this is enough info or if more is needed.

Best

Scott

From: Ananda, Renee@Coastal [mailto:Renee.Ananda@coastal.ca.gov]
Sent: Wednesday, April 22, 2015 12:06 PM
To: Scott Grindy
Subject: G-2-14-0016 (Romeo Pier)

Hello Scott,

We received the subject Emergency Coastal Development Permit (ECDP) application from the Harbor District on April 16, 2014 and subsequently requested additional project information. Please refer to the e-mail thread below, fyi. Can you please update me on the status of things? Thank you, RTA

From: Peter Grenell [mailto:pgrenell@smharbor.com]
Sent: Thursday, May 15, 2014 8:45 AM
To: Ananda, Renee@Coastal; Cave, Nancy@Coastal
Cc: Scott Grindy
Subject: RE: scanned document

Scott and I will follow up with M&N.

pg

From: Ananda, Renee@Coastal [mailto:Renee.Ananda@coastal.ca.gov]
Sent: Wednesday, May 14, 2014 4:32 PM
To: Peter Grenell; Cave, Nancy@Coastal
Cc: Scott Grindy
Subject: RE: scanned document

Hello Peter,

I look forward to receiving detailed answers to be generated by M & N, as their 4/21/14 memo does not include the following information:

1. How long will it take for the demo and removal
2. Identify any public access within the vicinity of the project site and describe how access will be addressed during the demo and removal work; specify how you will ensure there is no interference with public access as appropriate and to the extent is feasible.
3. Description of method of containment of debris material during activities
4. Re: the removal of the landward trestle portion of the pier, depict on a map the location of the proposed beach access route and equipment staging for removal activities.

Thank you. RTA

From: Peter Grenell [mailto:pgrenell@smharbor.com]
Sent: Wednesday, May 14, 2014 11:55 AM
To: Ananda, Renee@Coastal; Cave, Nancy@Coastal
Cc: Scott Grindy
Subject: FW: scanned document

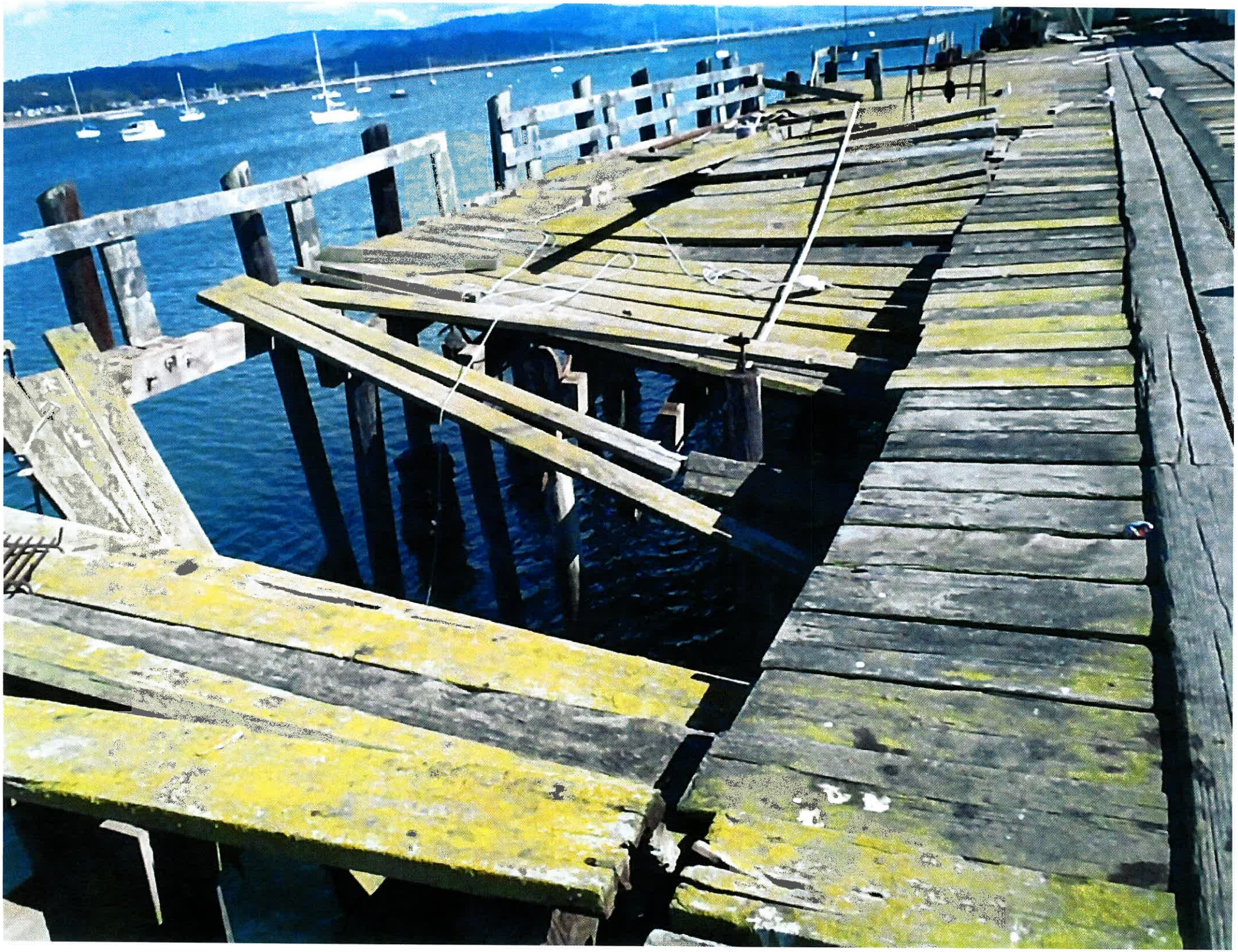
Renee,

1. Here, belatedly, is the 1998 Romeo Pier engineers investigation report. A following email will contain their 2000 update report.
2. The pier was built around 1950; we're trying to get a firm figure.
3. It was in use until the mid-2000s. Originally, Romeo Packing Co. used it to unload sardines for processing. Eventually the business switched over to production and packing of fertilizer, which continues today (although not on the pier). Morningstar Fisheries occupied the pier building for its fish handling operations until 2002, when they took over the Caito Fisheries lease on the Johnson Pier in the inner harbor. Morningstar vacated because of the Harbor District's safety concerns about Romeo Pier following the two engineering investigations. A private operator was permitted to pump sea water from on the pier for a short time afterward, but eventually the pier was closed for safety reasons.
4. Fish unloading, at the pier end building (two story, 2,800 sq. ft. footprint); brief sea water pumping (for aquariums).

5. The Harbor District identified a replacement pier for Romeo Pier as a priority; it remains, but now as a long term priority. In 1996, the Army Corps of Engineers produced a Phase I Reconnaissance Study for a deep water navigation channel from the federal breakwater entrance to the pier; it had a positive 2.5:1 benefit/cost ratio. Project was discontinued because the Harbor District had not established a location for a replacement pier. The District's Strategic Business Plan, just getting underway, will revisit the new pier possibility.
6. Remaining questions: I believe in late April you received a memo from Moffatt & Nichol regarding the proposed Romeo Pier removal method. That may answer some of your questions. Since then, M&N is now proceeding on a detailed preconstruction task which will generate answers to your remaining question.
7. Regarding our question about mitigation credits, FYI, the total pier area is approximately 18,000 sq. ft.

Peter Grenell

From: KonicaC451@SMHarbor.com [mailto:KonicaC451@SMHarbor.com]
Sent: Wednesday, May 14, 2014 12:46 PM
To: Peter Grenell
Subject: scanned document




SEA FISH

SAN MATEO COUNTY HARBOR DISTRICT

ROMEO PIER REMOVAL

50% Submittal - Estimate of Construction Cost 6/26/2014

Item	Description	Qty	Units	Unit Cost	Sub Total
1	**Mobilization & Demobilization (Barge, Crane)**	**1**	**LS**	**$ 70,000**	**$ 70,000**
2	**Remove Pier bents 27-47 from water**				**$ 100,000**
	Crane Barge Crew (2 weeks)	10	Crew Day	$ 10,000	$ 100,000
3	**Remove Trestle**				**$ 45,000**
	Landside Crew (2 weeks, 7 persons)	10	Crew Day	$ 4,500	$ 45,000
4	**Disposal**				**$ 243,000**
	Disposal -Pier	522	TON	$ 400	$ 209,000
	Disposal - Bldg	32	TON	$ 400	$ 12,800
	Disposal- Sheds, misc equip	24	TON	$ 400	$ 9,600
	Haul (20 tons/load, 4 hours /load)	116	HR	$ 100	$ 11,600
					$ -
				Subtotal	**$ 458,000**

Project Subtotal		$	458,000
Contingency	15%	$	69,000
Project With Contingency		**$**	**527,000**

1. Costs shown include contractor's overhead and profit. Numbers are rounded.
2. Costs are based upon bid results (escalated to present dollars) and generally prevailing costs for the work involved.
3. Costs are based on 50% design drawings.
4. Means and methods assumed are barge crane to perform work on southern portion of pier, land based equipment on trestle.

moffatt & nichol

2185 N. California Blvd., Suite 500
Walnut Creek, CA 94596-3500

(925) 944-5411 Fax (925) 944-4732
www.moffattnichol.com

MEMORANDUM

To: **Peter Grenell, General Manager, SMCHD**

From: **Brad Porter, PE**

Date: **July 17, 2014**

Subject: **Romeo Pier Removal –50% Progress Report**

M&N Job No.: **8281-03**

The purpose of this memorandum is to describe the removal of the existing Romeo Pier (see Figure 1 and Figure 7) located in Pillar Point Harbor (see Figure 2). Attached are 50% progress drawings for the removal of the pier, an estimate of the removal cost and description of the anticipated construction methods and considerations.

Figure 1 Romeo Pier in 2014

Removal Cost

The cost to remove the pier is estimated to be in the range of $458,000 to $527,000.
The breakdown of this cost is shown on the attached cost estimate, dated 6/26/2014.
A significant portion of the cost is the mobilization of the barge and crane. Considering this, the most cost effective method will be to remove the entire pier structure at one time rather than phasing the work and incurring the cost of mobilizing the equipment multiple times to the site.

Construction Methods and Considerations

Because of the deteriorated condition of the Pier, it is anticipated that the equipment to remove the timber will be staged from the water for the outer portion of the pier and from the beach for the trestle portion. The pier structure has deteriorated to the point that it cannot support construction equipment on the deck.

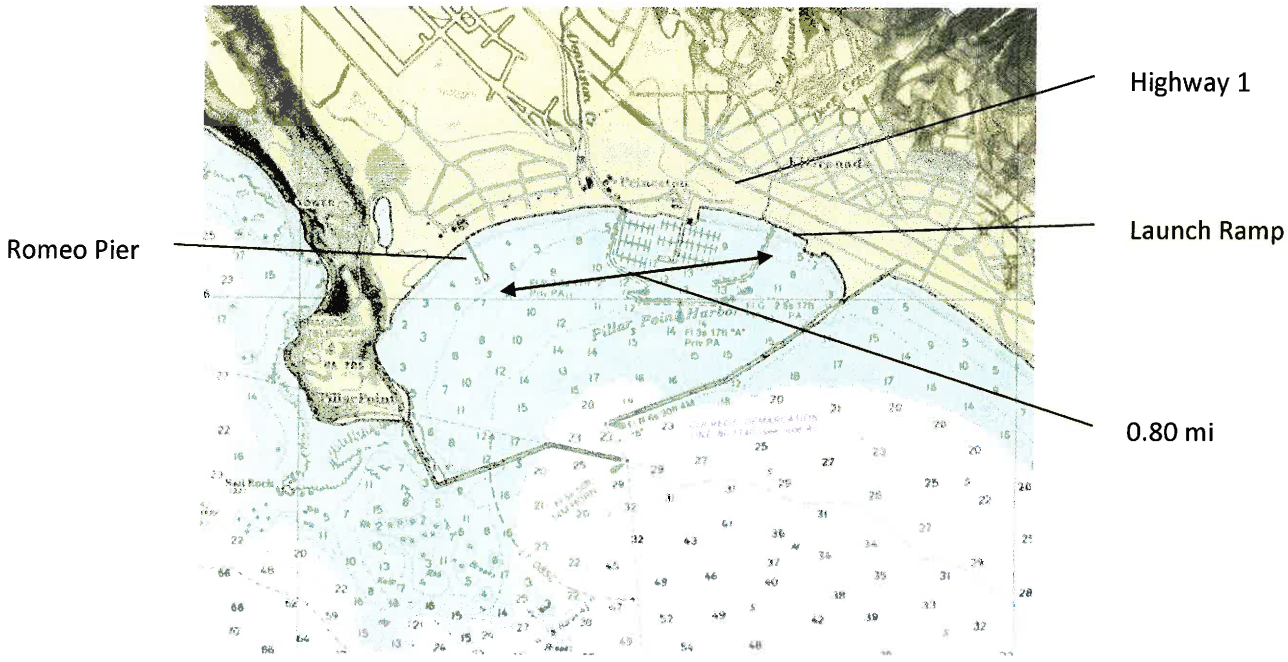


Figure 2 Pillar Point Harbor

Outer Pier

The majority of the timber (approximately 80%) is located on the outer 300 feet of the pier, which is the widened portion where the buildings are located. This portion would be removed by a floating barge mounted crane where there is adequate depth to access (see Figure 4). The buildings and wharf would be removed by the crane and loaded onto a barge for transfer and off load onto the land. The Outer Pier is estimated to be approximately 500 tons of material. It is possible that a marine demolition contractor could load all the material onto a single barge and transport it to their offload facility in the San Francisco Bay Area for removal and disposal to suitable landfill. Alternatively, a smaller barge could be used that would periodically be towed to the boat ramp located within the Harbor (see Figure 4) where the timber would be removed with a land-based mobile crane onto trucks for transport to the appropriate landfill.

Landward Trestle

The landward portion of the pier is too shallow for the crane barge to access; this is the trestle portion that leads from the land out to the wider wharf. It is anticipated that a mobile crane- either a track mounted crawler crane or rubber tired crane- would access the pier at lower tides from the sand beach and reach out to remove the decking. The material would then be loaded on to an adjacent truck for transport to the landfill.

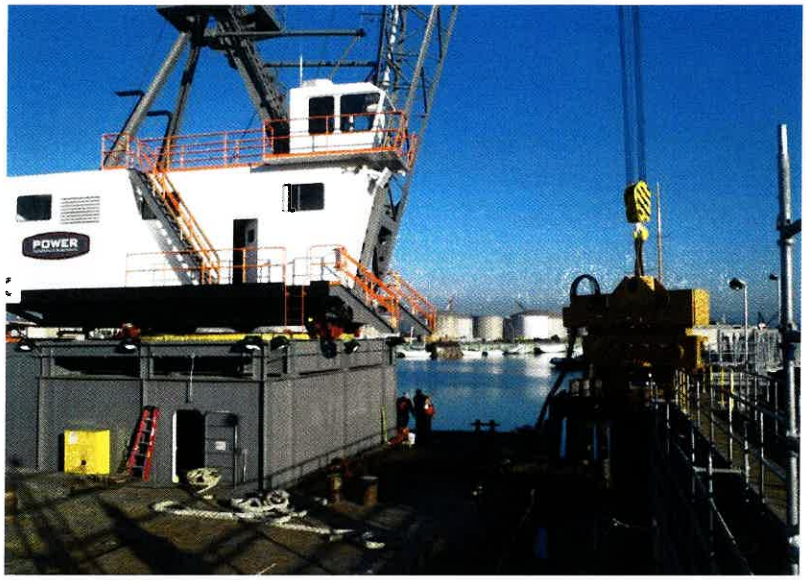


Figure 3 Barge Mounted Crane and Vibratory Hammer

Figure 4 Offloading Material at Boat Ramp with Containment Boom

The piles will be removed with a vibratory hammer for their entire length where possible. Due to the deteriorated condition of many of the piles below the waterline it would not be possible to vibrate these

out, those piles will be broken off with a cable attachment as far below the sand line as possible and as much of the pile extracted as practical.

Final construction methods will be determined by the construction contractor once the project is awarded, based upon the requirements and review by the San Mateo County Harbor District.

Permitting Considerations:

It is anticipated that the timber will be classified as construction debris and can be disposed of at a landfill in the San Francisco Bay Area. The timber will be tested for classification for proper disposal. The piles may have creosote treatment and the deck timbers may have been treated with preservatives. The buildings on top of the pier will be tested for the 17 components required by the California Administrative Manual (CAM – 17).

Loading of the material and transport will be performed in accordance with all applicable regulations for demolition using standard available construction equipment. Initial inquiry was made by the SMCHD to the California Coastal Commission regarding permitting for the emergency removal of the pier. Comments were received from the Coastal Commission (email of May 14, 2014) and the following responses were provided:

1. How long will it take for the demo and removal

   Response: It is estimated to take 8-10 weeks *(note: upon further investigation it is estimated that the removal can be accomplished in less than ½ of this time, on the order of 4 weeks).*

2. Identify any public access within the vicinity of the project site and describe how access will be addressed during the demo and removal work; specify how you will ensure there is no interference with public access as appropriate and to the extent is feasible.

   Response: There is public access on the beach below the Pier. The only impact to public access will occur during removal of the trestle. In order to keep continuous public access during the removal of the landward trestle, the contractor will be required to limit staging of equipment and operations to a limited area that does not block access and allows access across the trestle and to provide flaggers for safety when the full debris bins are transported from the beach to trucks for off haul.

3. Description of method of containment of debris material during activities.

   Response: The contractor will be required to provide continuous containment beneath all operations. The type of containment will be tight woven netting suspended above the water surface or continuous raft of floats or a combination of these 2 systems.

4. Re: the removal of the landward trestle portion of the pier, depict on a map the location of the proposed beach access route and equipment staging for removal activities.

   Response: Figures 5 and 6 depict these locations.

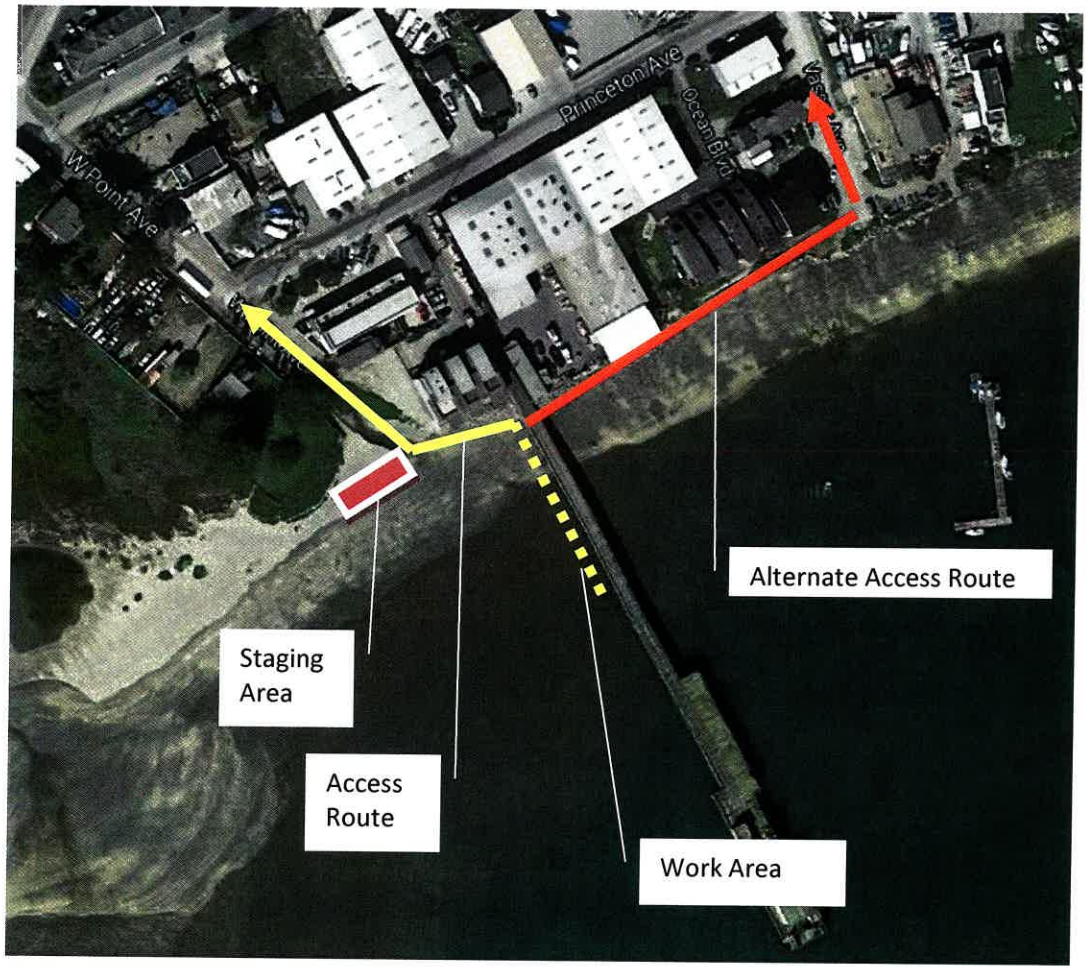


Figure 5 Beach Access Route and Staging (Google Maps Aerial)

Figure 6 Beach Area for Access Routes

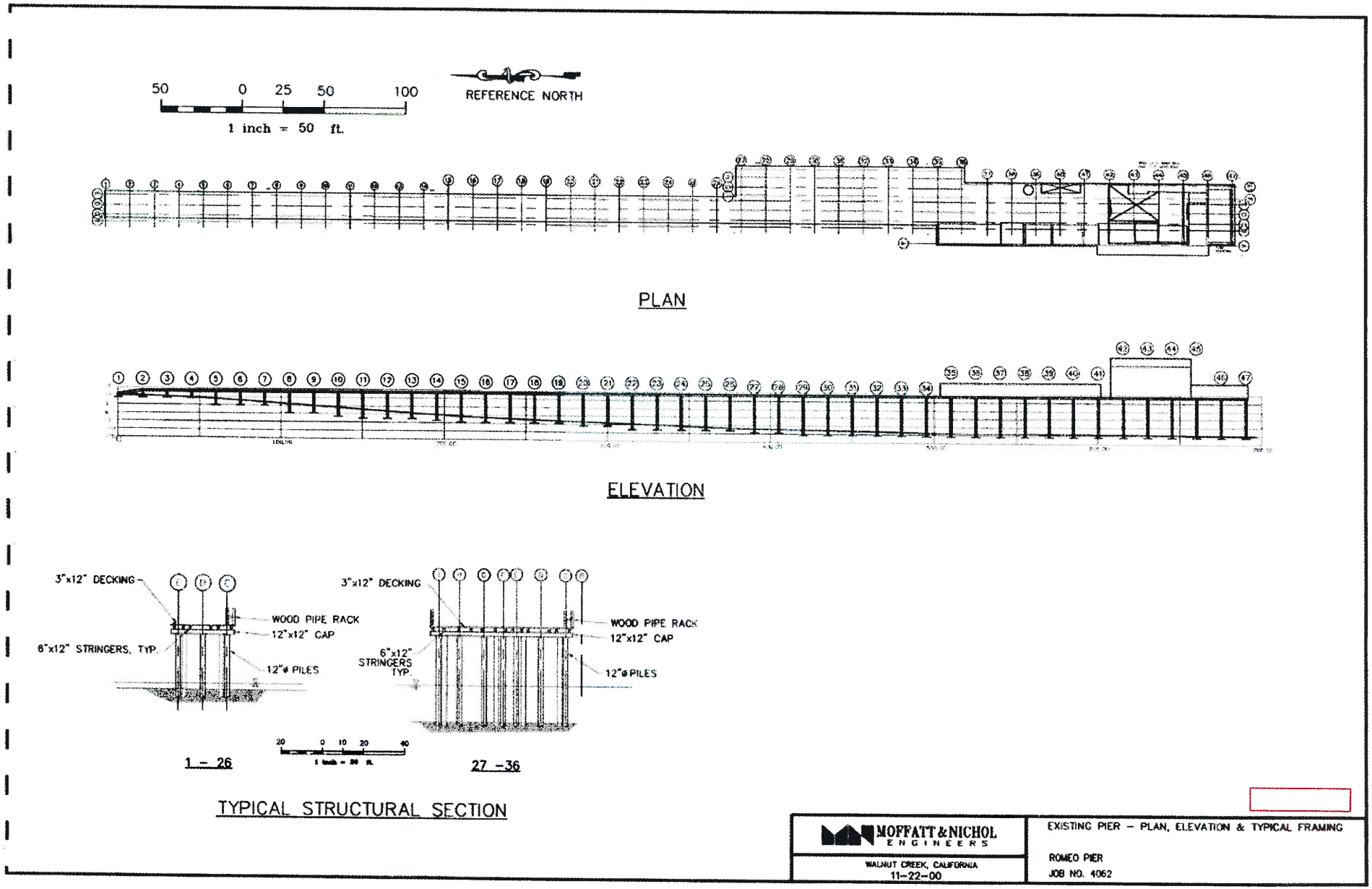
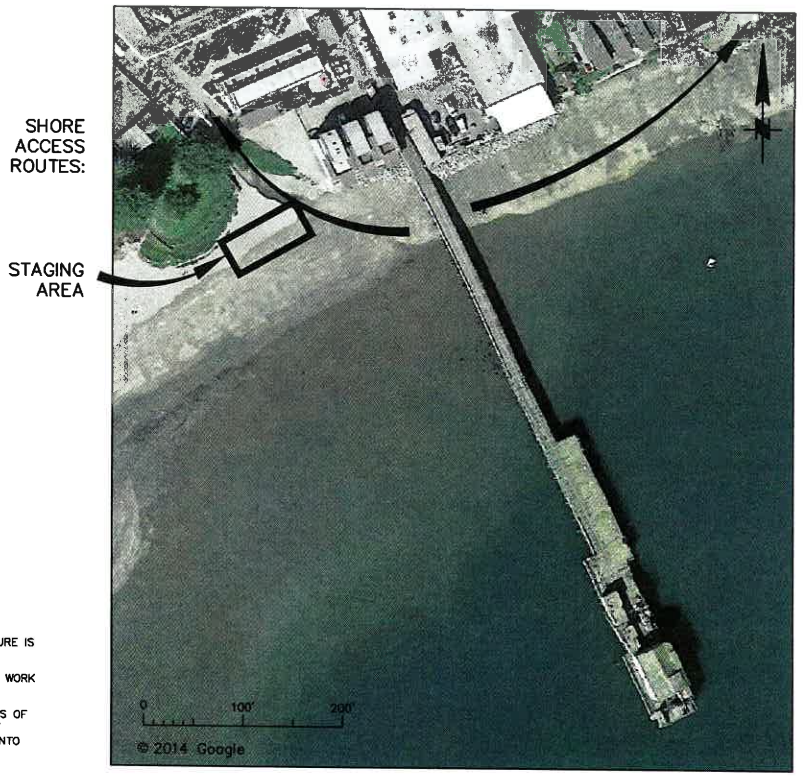


Figure 7 Pier Plan and Elevation

ROMEO PIER DEMOLITION

SAN MATEO COUNTY HARBOR DISTRICT
PILLAR POINT, CALIFORNIA

ROMEO PIER LOCATION PLAN



ROMEO PIER PLAN

INDEX OF DRAWINGS		
SHEET NUMBER	DRAWING NUMBER	TITLE
1	T1	TITLE, LEGEND AND GENERAL NOTES
2	C1	PLAN AND ELEVATION
3	C2	PLAN AND SECTIONS
4	C3	PHOTOS

GENERAL NOTES:

1. PILES ARE CREOSOTE TREATED TIMBER. TIMBER USED IN PIER STRUCTURE IS TREATED AND UNTREATED TIMBER.
2. DEMOLITION ACCESS LIMITED BY TIDAL STAGE AND SHALLOW DEPTH IN WORK AREA.
3. ALL WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE CONDITIONS OF THE PERMITS ISSUED BY REGULATORY AGENCIES (BCDC, RWQCB, ARMY CORPS). PROVIDE CONTAINMENT TO PREVENT DEBRIS FROM FALLING INTO WATER DURING OPERATIONS.
4. DO NOT BLOCK PUBLIC ACCESS ALONG THE SHORE AT ANY TIME.
5. THE PIER STRUCTURE IS DETERIORED, MINIMIZE ACCESS ON STRUCTURE, ANALYZE CAPACITY TO SUPPORT EQUIPMENT AND ACCESS PRIOR TO WORK.

50% REVIEW JUN 27, 2014

SAN MATEO COUNTY HARBOR DISTRICT
400 Oyster Point Blvd, Suite 300
South San Francisco, CA 94080
(650) 583-4400

REVISION	DESCRIPTION	BY	DATE

moffatt & nichol
2185 N.California Blvd, Suite 500
Walnut Creek, California 94596(925) 944-5411

DSGN	DR	CHK
BP	TAE	
JOB NO. 8281-02	SUBMITTED BY	TITLE

ROMEO PIER DEMOLITON	DATE 06/26/14
PILLAR POINT HARBOR	SHEET 1 OF 4
TITLE AND GENERAL NOTES	T1

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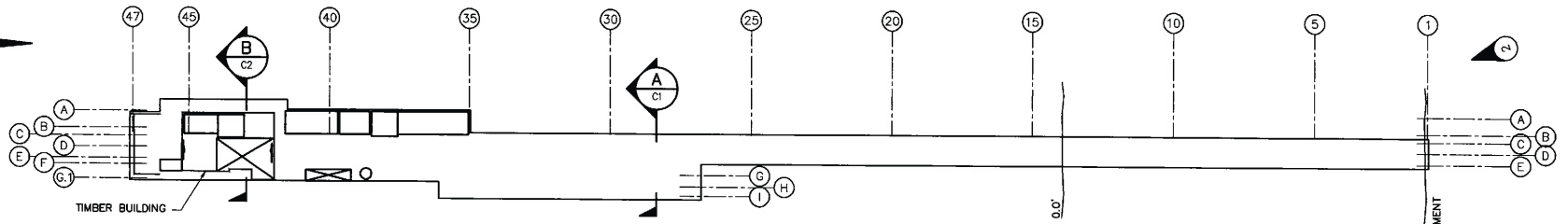
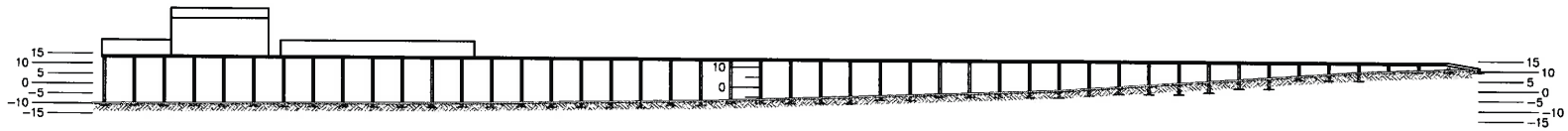


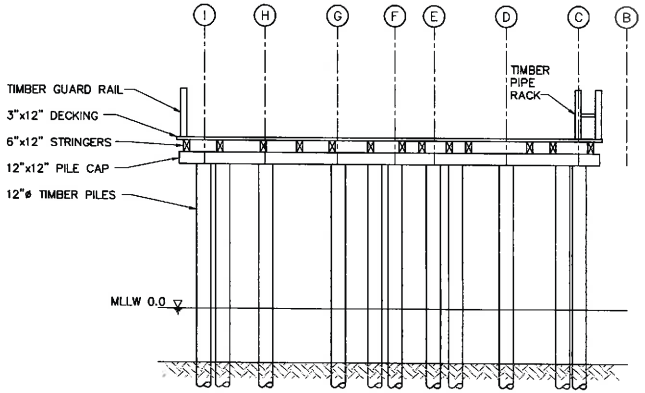
ROMEO PIER PLAN
SCALE: 1" = 30'



ROMEO PIER ELEVATION
SCALE: 1" = 30'

1 – PIER LOOKING WEST

2 – PIER LOOKING SSE



TYPICAL PIER STRUCTURE
A / C1 SECTION
SCALE: 1"=5'-0"

NOTES:

1. REMOVE ENTIRE PIER STRUCTURE (PILES, BEAMS, DECKING, BUILDINGS) AND DISPOSE OF LEGALLY OFFSITE.
2. PILES SHALL BE REMOVED FOR THEIR ENTIRE LENGTH. PILES BETWEEN BENTS 13 AND 27 MAY BE BROKEN OFF 2 FT BELOW THE BOTTOM IF REMOVAL OF ENTIRE LENGTH CANNOT BE ACCOMPLISHED AND IF USING LAND BASED EQUIPMENT.

30' 0 30' 60'
SCALE: 1"=30'-0"

5' 0 5' 10'
SCALE: 1"=5'-0"

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JOB NO. 8281-02	SUBMITTED BY	TITLE

ROMEO PIER DEMOLITON
PILLAR POINT HARBOR
PLAN AND ELEVATION

DATE 06/26/14
SHEET 2 OF 4
C1

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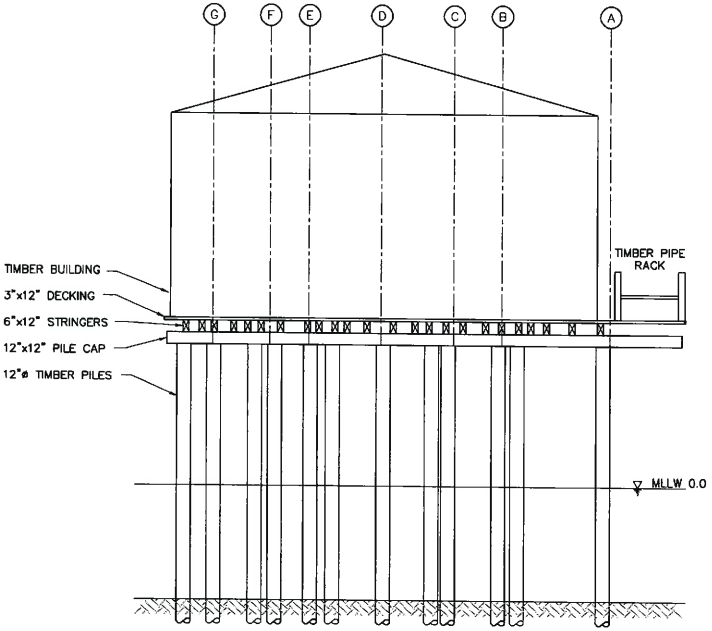
1

2



B / C2 SECTION
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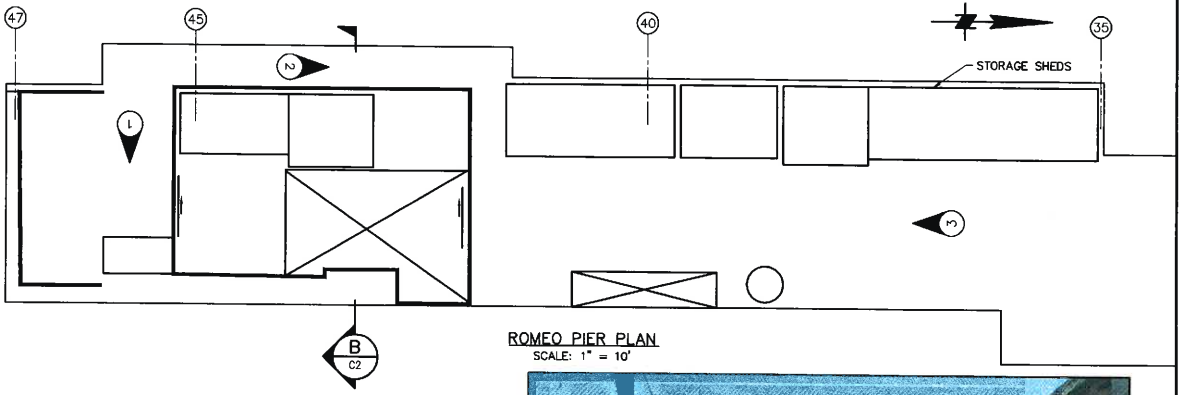

ROMEO PIER PLAN
SCALE: 1" = 10'

PHOTO 1

3

10' 0 10' 20'
SCALE: 1"=10'-0"

5' 0 5' 10'
SCALE: 1"=5'-0"

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ROMEO PIER DEMOLITON
PILLAR POINT HARBOR

PLAN AND SECTIONS

DATE 06/26/14
SHEET 3 OF 4
C2

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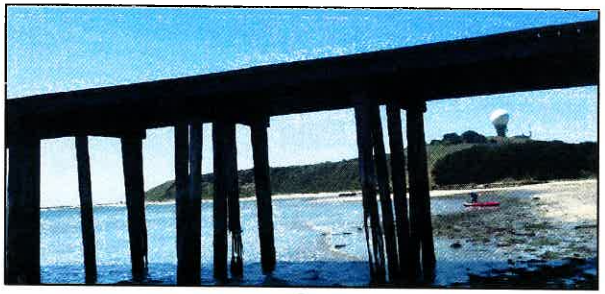
1



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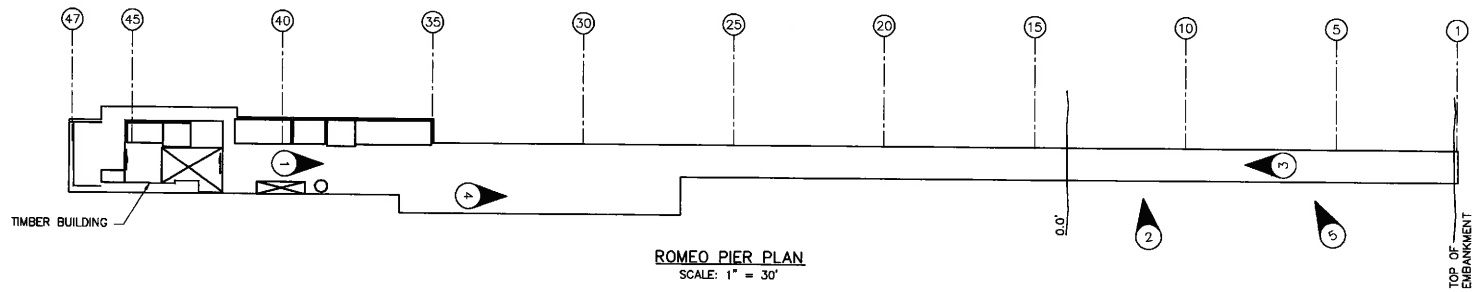

ROMEO PIER PLAN
SCALE: 1" = 30'

4

5

30' 0 30' 60'
SCALE: 1"=30'-0"

5' 0 5' 10'
SCALE: 1"=5'-0"

SAN MATEO COUNTY HARBOR DISTRICT
400 Oyster Point Blvd, Suite 300
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ROMEO PIER DEMOLITON
PILLAR POINT HARBOR

PHOTOS

DATE 06/26/14
SHEET 2 OF 4

C3

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moffatt & nichol

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www.moffattnichol.com

April 10, 2014

Peter Grenell, General Manager
San Mateo County Harbor District
400 Oyster Point Blvd, Suite 300
South San Francisco, CA 94080

Subject: **Proposal to Provide Engineering Services for Romeo Pier Removal**

M&N Project No. PWCGEN-19

Dear Peter,

We are writing to describe the services that we propose to provide to the San Mateo County Harbor District (the Harbor District) to assist in the preparation of construction documents to remove the Romeo Pier; a timber pier within the outer breakwater at Pillar Point Harbor. The pile structure has recently started to collapse due to its age and state of deterioration of the supporting members. An evaluation of the pier was performed in 1998 which recommended the pier be replaced at that time. The structure is at the end of its useful life and the Harbor District would like to remove the structure in order to reduce risk of injury or damage due to the collapse of the pier into the ocean water.

Based upon this, we propose to provide the following engineering services to the Harbor District.

SCOPE OF WORK

Construction Documents

1. Review existing drawings, reports, and other relevant documents that pertain to the construction and repair of the pier.
2. Conduct up to 2 site visits to document conditions of the pier. During the site visit we will verify dimensions and observe the overall condition of the pier, in addition we will:
    - Obtain samples of the painted timber on the buildings on the pier and have it tested for the 17 hazardous material metals (CAM-17) per California Administration Manual (CCR Title 23).
    - Prepare a a photographic record of existing conditions that will be documented for inclusion into the bid document package and to provide record of the pier for

the historic record. We will consult with and coordinate the efforts of the Half Moon Bay Historic Association in preparing the photographic records.

3. Prepare preliminary demolition plans and estimate quantities of pile and deck removal for use by the District to prepare permit applications.
4. Assist the District in their preparation Army Corps and Regional Water Board permit applications for the removal of the pier, if required. If consultation with other resource agencies (National Marine Fisheries, Fish & Wildlife Service, and Fish & Game) is required for the Corps permit, we will facilitate the process by contacting the appropriate agency staff.
5. Prepare a Bid Document package for the District, which will consist of the Bid Schedule, Design Drawings, and Technical Specifications. We assume the District will provide us with Standard General Conditions, review the Bid Document package, and issue the actual Call for Bids.

Bid Support

- Assist the District with identifying likely contractors for the work, answering questions related to the Call for Bids, attending a pre-Bid meeting, and providing assistance with Contractor selection.

Construction support

- Provide engineering support during construction by answering Requests for Information and attending up to 3 half-day meetings or site visits during the progress of the work.

FEE & SCHEDULE

We anticipate the following schedule for the proposed scope of work.

Task	Schedule `	Fee
Construction Documents		$38,500
Review Documents / Conduct Site Visits	3 wks from NTP	
Prepare Preliminary Demolition Plans	6 wks from NTP	
Prepare Draft Bid Document Package	12 wks from NTP	
Prepare Final Bid Document Package	2 wks from receipt of comments	
Provide Bid Support	6-8 wks	$ 6,800
Provide Engineering Support During Construction	6-12 wks	$15,900
Total		**$61,200**

We propose to provide these services on a time and material basis per our standard rates; we anticipate that the total will not exceed $61,200 and will not exceed this amount without your prior written approval.

We assume that if this proposal is accepted by the Harbor District they will provide a form of contract to provide these services.

Sincerely,
MOFFATT & NICHOL

Brad Porter, PE
Project Manager