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www.rinconconsultants.com

June 30, 2017

Mr. Gregg Ramirez
Senior Planner
City of Newport Beach
Community Development Department, Planning Division
100 Civic Center Drive
Newport Beach, CA 92660

Subject: City of Newport Beach Balboa Island Coping Repair Project (C-7066-1)

Dear Mr. Ramirez,

On behalf of the City of Newport Beach Public Works Department and COWI Marine North America (the project engineer), Rincon Consultants, Inc. (Rincon) is pleased to submit the enclosed Coastal Development permit application to the Community Development Department for the above referenced project. In submitting this application, the City is proposing repair and maintenance of the existing seawall coping located along the perimeter of the North/South Bay Front boardwalk on Balboa Island.

We have enclosed the following documents used by the City in processing this application:

Completed CDP application form

Attachment 1 – Project Description

Attachment 2 – Vicinity Map and Site Photographs

Attachment 3 – Project Plans

Attachment 4 – Bulkhead Condition Report

Attachment 5 – Consistency Analysis - Newport Beach Municipal Code Appendix A (*Sea Level Rise*)

Attachment 6 – Construction Access Plan

Attachment 7 – Bird Survey Protocol

Attachment 8 – Construction Management Plan

Attachment 9 – Construction Pollution Prevention Plan

Attachment 10 – Public Notice Materials

We look forward to working with you and the Planning Division Staff in the processing of this CDP request. If you have any questions regarding these application materials, please do not hesitate to contact us at 805.644.4455.

Sincerely,

RINCON CONSULTANTS, INC.

Lynette Leighton
Associate Environmental Planner

Jasch Janowicz
Principal

Community Development Department
Planning Permit Application

CITY OF NEWPORT BEACH
100 Civic Center Drive
Newport Beach, California 92660
949 644-3200
newportbeachca.gov/communitydevelopment

1. **Check Permits Requested:**

- ☐ Approval-in-Concept - **AIC #**
- ☒ Coastal Development Permit
  - ☐ Waiver for De Minimis Development
- ☐ Coastal Residential Development
- ☐ Condominium Conversion
- ☐ Comprehensive Sign Program
- ☐ Development Agreement
- ☐ Development Plan
- ☐ Lot Line Adjustment
- ☐ Lot Merger
- ☐ Limited Term Permit -
  - ☐ Seasonal ☐ < 90 day ☐ >90 days
- ☐ Modification Permit
- ☐ Off-Site Parking Agreement
- ☐ Planned Community Development Plan
- ☐ Planned Development Permit
- ☐ Site Development Review - ☐ Major ☐ Minor
- ☐ Parcel Map
- ☐ Staff Approval
- ☐ Tract Map
- ☐ Traffic Study
- ☐ Use Permit - ☐ Minor ☐ Conditional
  - ☐ Amendment to existing Use Permit
- ☐ Variance
- ☐ Amendment - ☐ Code ☐ PC ☐ GP ☐ LCP
- ☐ Other:

2. **Project Address(es)/Assessor's Parcel No(s)**

Seawall parallel to North/South Bay Front boardwalk on Balboa Island, at the terminus of 30 street ends (Marine Avenue to Emerald Avenue)

3. **Project Description and Justification (Attach additional sheets if necessary):**

See Attachment.

4. **Applicant/Company Name** City of Newport Beach, Public Works Department

Mailing Address 100 Civic Center Drive **Suite/Unit**

City Newport Beach **State** CA **Zip** 92660

Phone (949) 644-3319 **Fax** (949) 644-3318 **Email** mvukojevic@newportbeachca.gov

5. **Contact/Company Name** Mark Vukojevic, Deputy Public Works Director/City Engineer

Mailing Address 100 Civic Center Drive **Suite/Unit**

City Newport Beach **State** CA **Zip** 92660

Phone 949-644-3319 **Fax** **Email** mvukojevic@newportbeachca.gov

6. **Owner Name** City of Newport Beach

Mailing Address 100 Civic Center Drive **Suite/Unit**

City Newport Beach **State** CA **Zip** 92660

Phone 949-644-3319 **Fax** **Email** mvukojevic@newportbeachca.gov

7. **Property Owner's Affidavit***: (I) (We) _____ depose and say that (I am) (we are) the owner(s) of the property (ies) involved in this application. (I) (We) further certify, under penalty of perjury, that the foregoing statements and answers herein contained and the information herewith submitted are in all respects true and correct to the best of (my) (our) knowledge and belief.

Signature(s): _____ Title: _____ Date: _____ DD/M0/YEAR

Signature(s): _____ Title: _____ Date: _____

*May be signed by the lessee or by an authorized agent if written authorization from the owner of record is filed concurrently with the application. Please note, the owner(s)' signature for Parcel/Tract Map and Lot Line Adjustment Application must be notarized.

NOTICE OF APPLICATION FILING

THE PLANNING DIVISION OF THE COMMUNITY DEVELOPMENT DEPARTMENT OF THE CITY OF NEWPORT BEACH RECENTLY RECEIVED A **COASTAL DEVELOPMENT PERMIT** APPLICATION FOR THE FOLLOWING PROJECT:

PROPOSED PROJECT: Balboa Island Seawall Coping Repair Project

Repair and maintenance of existing seawalls, and increase height of seawalls by 9 inches.

LOCATION: Seawall parallel to North/South Bay Front on Balboa Island

APPLICANT: City of Newport Beach

APPLICATION NO.: _____

DATE NOTICE POSTED: _____

The public hearing for this application has not yet been scheduled. When the hearing, or determination are scheduled, further notice will be provided.

The application is available for your review at the Community Development Department Permit Center (Bay C-1st Floor), at 100 Civic Center Drive, Newport Beach, California, CA 92660. Prior to the public hearing, the agenda, staff report, and documents may be reviewed. For more information, call (949) 644-3200 (please reference the application number).

ATTACHMENT 1

CITY OF NEWPORT BEACH

Balboa Island Coping Repair Project Description

Introduction

The proposed project involves the repair and maintenance of the existing seawall located along the perimeter of North/South Bay Front boardwalk on Balboa Island in conformance with the City of Newport Beach Balboa Island Coping Repair Project (C-7066-1) and the City of Newport Beach (City) certified Coastal Land Use Plan (See Attachment 2 – Vicinity Map). The purpose of the repair is to preserve the structural integrity and increase the height of the seawall on Balboa Island. These improvements would reduce the potential for water overtopping the walls during high tides, local wind waves, storm surges, and periods of larger ocean swells by increasing the height of the seawalls by 9 inches. The project is not considered "new development" according to the California Coastal Act Section 30212(b)(4). The project would also be one of the City's first steps toward implementing plans to reduce the impact of sea level rise.

Surrounding Land Uses

Land uses located adjacent to the project area include public beaches, public walkways and streets, public ferry system, public and private docks, and privately owned parcels with the following certified Coastal Land Use Plan designations: RT-E (Two-Unit Residential), and MU-W (Mixed-Use Water Related). The majority of privately owned parcels are developed with single- and two-family residences. A number of private and publicly accessible docks have landings at the top of the seawall in order to provide access to boats moored in the bay or to provide the public with coastal recreational opportunities (See Attachment 2 – Site Photographs).

Balboa Island has approximately eight acres of public beaches around the island. There are 33 street ends and the Bay Front Boardwalk that provide access to and along the shoreline and to Balboa Island's public beaches. There are also four street ends that provide access to the Grand Canal. There are five public docks on Balboa Island for loading and unloading passengers, supplies, and boating gear and for similar purposes. Hand-carried boat launching is permitted at 22 street end beaches.

Project Timing and Schedule

The construction of the proposed project is anticipated to occur over eight months, from October through May to avoid active bird nesting and peak tourism seasons.

A total of six construction rotations are anticipated for the 17 work areas identified along the North/South Bay Front boardwalk. Construction of the seawall segments will be phased such that no more than three non-contiguous segments will be constructed during the first five rotations, and the final rotation will consist of two work areas. Construction of each segment will take approximately ten days to complete (See Attachment 8 – Construction Management Plan).

Construction activities will be limited to non-holiday weekdays from 7:00 A.M. to 5:00 P.M., per Section 10.28.040 of the Municipal Code. Any activity outside of the specified hours shall be authorized in writing by the Building Official with the incorporation of sound mitigation measures.

Project Construction Activities

Seawall repair and construction activities will consist of two phases. The initial pre-construction phase will last approximately two months, and involve equipment mobilization and minor demolition of the corners and tops of the seawall segments and roughening the existing exterior concrete surface of the seawall segments to create a proper bonding surface for construction of the reinforced concrete seawall cap (See Attachment 3 - Project Plans). Existing cracks will also be repaired or patched during the pre-construction phase.

The construction phase will last approximately six months, and entail:

1. The construction of a reinforced nine-inch high concrete cap on top of the existing seawall;
2. The construction of new concrete steps along portions of the seawall base fronting the North/South Bay Front boardwalk to preserve ease of access to each public or private dock; and,
3. The construction of three-foot wide "gaps" at pre-defined locations within the tops of the seawall segments fronting North/South Bay Front to preserve a sufficient level of vertical access to the waterside beaches. These gaps would be located where the beach sand is higher to preserve ease of entry for those wishing to access the beach. To provide for flood protection during high tide events, these gaps are designed to accommodate a removable, nine-inch high barrier.

The seawall cap, steps, and access "gaps" have been integrated directly onto or adjacent to the existing landside segments of the seawall and thus the improvements can be constructed without impacting marine resources within Newport Harbor, and with minimal impact to public access to beach and harbor areas.

Project Construction Equipment

The proposed seawall repair activities will require the use of medium-duty equipment, such as light-weight jackhammers, pneumatic impact equipment, saws, forms, and hand tools along the seawall. Other equipment, such as pick-up trucks, haul trucks, and cement trucks with pumping equipment will be staged at the end of the nearest street end adjacent to the work.

A total of 16 staging areas are identified in the construction management plan, amongst the 17 work areas. The contractor will have exclusive use of the street portion of the staging area, and keep sidewalks on both sides clear for pedestrians and public access. The Construction Management Plan (Attachment 8) provides further details regarding construction activities and contains a list of anticipated construction equipment.

Construction Management and Access

Construction plans have been developed such that the project site consists of a total of 17 consecutive work areas along the perimeter of Balboa Island (Figure 1). Contractors would occupy and work in three work areas during each of the first five rotations, and two work areas during the final rotation. The work areas included in each rotation would be cleaned and cleared of any and all construction debris upon completion of construction-related activities, prior to beginning work in the next rotation. Work areas within each rotation would be spaced apart (with five unoccupied work areas between each active area), which would minimize interference with public access to the boardwalk and docks on the perimeter of Balboa Island. Additional information is provided in the Construction Management Plan (Attachment 8).

Project haul routes are identified in Figure 1. No road closures would occur as a result of the project, and circulation around Balboa Island would not be impacted as a result of construction-related traffic, since all construction-related vehicles would be limited to traveling on the access routes identified in Figure 1, and all construction-related vehicles would be parked in active staging areas, thereby not detracting from any additional street parking spaces for residents or visitors.

All construction vehicles would enter and leave Balboa Island via the Balboa Island Bridge and Marine Avenue, which is considered a primary access road. Secondary access roads directly lead to respective work and staging areas where active construction take place and are specified in the Construction Management Plan (Attachment 8) and in Figure 1.

Public beach access is discussed in Attachment 6 and the Construction Management Plan (Attachment 8).

Figure 1 - Staging Areas and Construction Routes

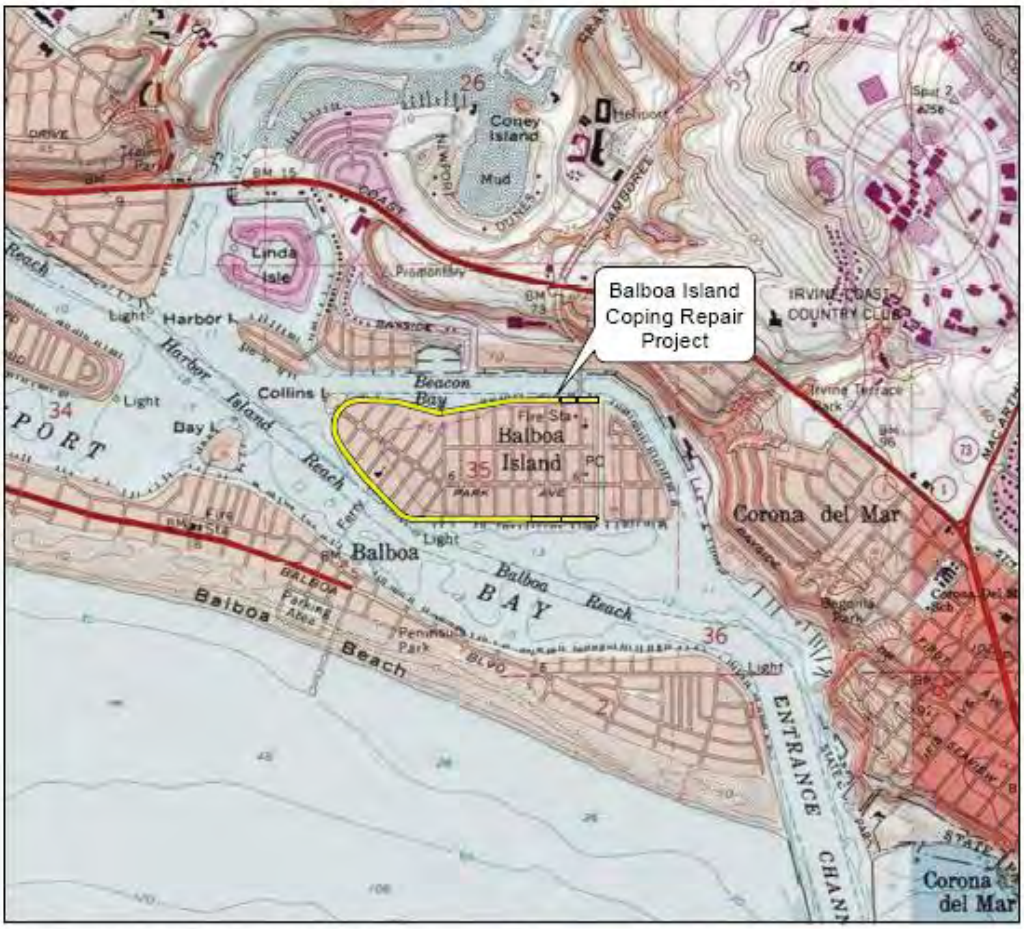
Imagery provided by Google and its licensors © 2017.
Additional data provided by City of Newport Beach, 2017.

Fig1 Work Areas and Construction Routes

ATTACHMENT 2

Vicinity Map and Site Photographs

City of Newport Beach
Balboa Island Seawall Coping Repair



Vicinity Map

Figure 1

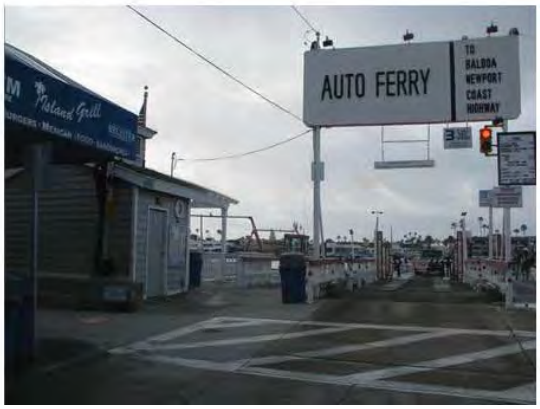
City of Newport Beach

PUBLIC DOCK

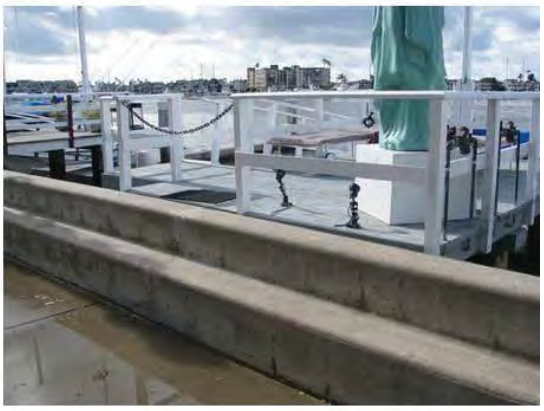
PRIVATE PIER
NO
TRESPASSING

PRIVATE
DOCK

PUBLIC DOCK


AUTO FERRY
TO
BALBOA
NEWPORT
COAST
HIGHWAY

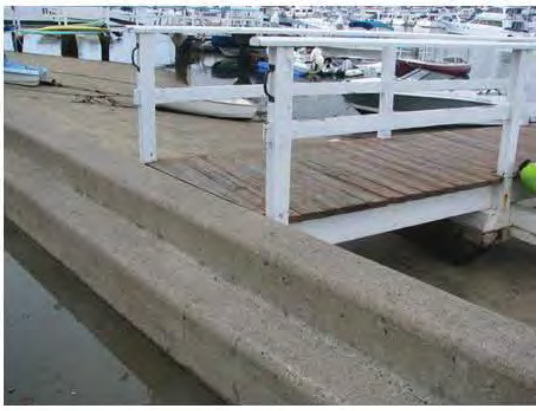
AUTO FERRY
TO
BALBOA
NEWPORT
COAST
HIGHWAY



PRIVATE
DOCK

PUBLIC DOCK
NO

PRIVATE DOCK



PUBLIC DOCK

ATTACHMENT 3

3 Sets of Full Size Project Plans

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

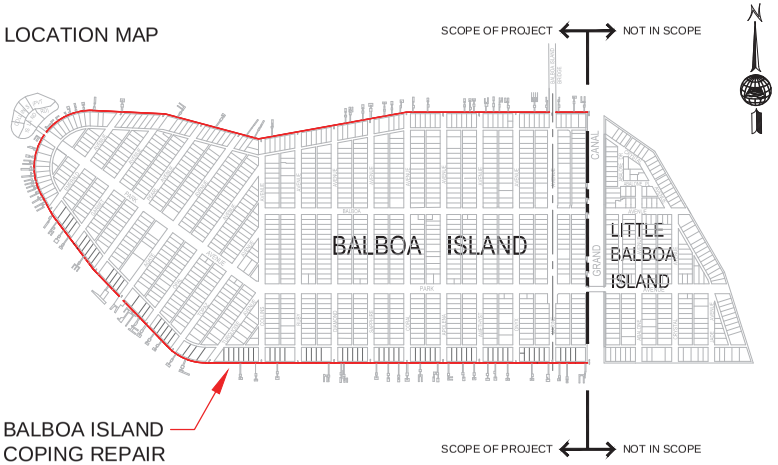
BALBOA ISLAND COPING REPAIR

CONTRACT NO. C-7066-1

VICINITY MAP

PROJECT LOCATION

LOCATION MAP



BALBOA ISLAND COPING REPAIR PROJECT

DRAWING INDEX

SHEET	SHEET TITLE
1	TITLE SHEET, VICINITY MAP, LOACTION MAP, DRAWING INDEX
2	GENERAL NOTES
3	OVERALL PLAN
4	SECTION PLANS
5	SECTION PLANS
6	SECTION PLANS
7	SECTION PLANS
8	SECTION PLANS
9	SECTION PLANS
10	SECTION PLANS

SHEET	SHEET TITLE
13	DETAILS
14	DETAILS
15	DETAILS
16	DETAILS
17	DETAILS
18	DETAILS

SHEET	SHEET TITLE

80% REVIEW SUBMITTAL NOT FOR CONSTRUCTION

CALL TOLL FREE
1-800-227-2600
BEFORE YOU DIG

BASIS OF BEARINGS:

BENCHMARK:

EMERGENCY TELEPHONE NUMBERS

	DAY	NIGHT
SOUTHERN CALIFORNIA GAS COMPANY	(800) 624-8153	
SOUTHERN CALIFORNIA EDISON COMPANY	(800) 611-1911	
AT&T TELEPHONE COMPANY	(800) 332-1321	
CITY OF NEWPORT BEACH UTILITIES DIVISION	(949) 644-3011	(949) 644-3717
ORANGE COUNTY SANITATION DISTRICT	(714) 962-2411	
TIME WARNER CABLE	(714) 542-6222	
COX COMMUNICATIONS	–	
ENGINEER OF RECORD		

NO.	DATE	REVISION

REVIEWED:

WARREN A. STEWART, RCE C41358
COWI MARINE NORTH AMERICA

DESIGNED: WNST
DRAWN: MCLS
CHECKED: GAVP
DATE: 03/18/16

BALBOA ISLAND COPING REPAIR

TITLE SHEET, VICINITY MAP, LOCATION MAP, DRAWING INDEX

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

SHEET 1 OF XX

GENERAL NOTES

SECTION 1 : GENERAL

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK . THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY.

2. THE CITY OF NEWPORT BEACH AND/OR THE ENGINEER SHALL BEAR NO RESPONSIBILITY FOR EXPENSES INCURRED AS A RESULT OF FAILURE ON THE PART OF THE CONTRACTOR TO VERIFY DIMENSIONS AND/OR VERIFIABLE SITE CONDITIONS PRIOR TO BEGINNING WORK.

3. NOTES AND DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER THESE GENERAL NOTES.

4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HERE ON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT IN CONJUNCTION WITH THE EXECUTION OF THIS WORK.

5. DIMENSIONS TAKE PRECEDENCE OVER SCALE.

6. SUBSTITUTIONS: NO SUBSTITUTIONS SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

7. DAMAGE TO EXISTING FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO EXISTING STRUCTURES, PAVEMENT, CONCRETE SIDEWALK, UNDERGROUND UTILITIES, LANDSCAPING, CONCRETE PILES, LANDINGS, BULKHEAD AND FACILITIES ON OR ADJACENT TO THE PROJECT AND SHALL REPAIR ANY DAMAGE AT NO COST AND TO THE SATISFACTION OF THE HOMEOWNER AND ENGINEER.

8. THE CONTRACTOR SHALL NOT USE THE SIDEWALK OR THE AREA BEHIND THE BULKHEAD FOR EQUIPMENT AND/OR MATERIAL STORAGE.

9. CLEAN-UP: ALL TRADES SHALL, AT ALL TIMES, KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THE WORK DURING CONSTRUCTION, AND AT THE COMPLETION OF THE WORK SHALL REMOVE ALL RUBBISH AND DEBRIS.

10. SCHEDULE: CONTRACTOR SHALL SUBMIT A DETAILED SCHEDULE OF WORK INDICATING THE SEQUENCE OF ALL CONSTRUCTION PHASES FOR APPROVAL BY THE ENGINEER.

11. DATUM: ALL ELEVATIONS SHOWN ARE BASED ON A DATUM OF MEAN LOWER LOW WATER -0.00.

SECTION 2 : REGULATORY REQUIREMENTS

1. THE CONTRACTOR SHALL, AT ALL TIMES, COMPLY WITH ALL OSHA AND STATE SAFETY ORDERS.

2. ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 2015 EDITION, INCLUDING SUPPLEMENTS (SSPWC).

SECTION 3 : CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF ACI 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" AND THE "2013 CALIFORNIA BUILDING CODE", CHAPTER19A, EXCEPT AS MODIFIED BY THE SUPPLEMENTAL REQUIREMENTS HEREIN AND IN THE PROJECT SPECIFICATIONS.

2. CAST IN PLACE CONCRETE SHALL BE HARD ROCK CONCRETE AND SHALL COMPLY WITH SSPWC SECTION 201-1.1.3

   A. CONCRETE TYPE 750-CSE-5000P

   B. MAX WATER-CEMENT RATIO = 0.40

   C. HIGH RANGE WATER REDUCER REQUIRED

   D. PUMP MIX ONLY IF PUMPING CONCRETE

3. ALL EXPOSED EDGES AND CORNERS SHALL BE ROUND WITH A 1-1/2" RADIUS, UNLESS OTHERWISE NOTED.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH ALL TRADES TO ENSURE THAT ALL EMBEDDED BOLTS, ANCHORS, BLOCKOUTS, PLATES, ETC. ARE PROPERLY LOCATED AND INSTALLED BEFORE POURING CONCRETE.

5.. REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING:

   TYPICAL REINFORCING.....ASTM A-615, GR. 60

   BARS TO BE WELDED.....ASTM A-706

6. ALL REINFORCING STEEL DETAILING, FABRICATION, ACCESSORIES AND PLACEMENT SHALL CONFORM TO ACI 315 "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT". PROVIDE 3 INCHES MINIMUM COVER FOR REINFORCING BARS UNLESS OTHERWISE NOTED. WHERE NEW CONCRETE IS TO BE POURED AGAINST EXISTING, MIN CLEARANCE SHALL BE 2".

7. CONTINUOUS REINFORCING STEEL SHALL BE DETAILED IN AS LONG A LENGTH AS PRACTICAL AND SHALL HOOK AROUND CORNERS FROM BOTH DIRECTIONS TO FORM A SPLICE LENGTH.

8. ALL LAP SPLICES SHALL BE TENSION CLASS "B" LAP SPLICES WHERE NO CALL OUT IS MADE ON THE DRAWINGS.

9. WELDING ELECTRODES FOR WELDED SPLICES SHALL BE E70XX. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS. ALL WELDED JOINTS SHALL BE AWS PREQUALIFIED.

10. HOOKS SHOWN BUT NOT DIMENSIONED SHALL CONFORM TO THE REQUIREMENTS FOR A "STANDARD HOOK" PER ACI 315.

11. ALL INSERT HOLES, SHE-BOLTS, ETC. AND OTHER IMPERFECTIONS ON THE SURFACES OF THE CONCRETE SHALL BE FILLED WITH GROUT, BRUSHED AND SACKED TO A UNIFORM FINISH.

12. TOP HORIZONTAL SURFACES OF CONCRETE SHALL BE FINISHED WITH A FLOAT FINISH.

13. GROUTED REBAR DOWELS AND ANCHOR RODS

   A. EPOXY GROUTING SHALL BE USED IN ALL LOCATIONS WHERE REINFORCING STEEL BARS AND ANCHOR RODS ARE BEING EMBEDDED INTO EXISTING CONCRETE. DESIGN IS BASED UPON SIMPSON STRONG-TIE SET ADHESIVE ANCHORS AS DEFINED IN C-A-2016. OTHER MANUFACTURES MAY BE APPROVED PROVIDING SIMILAR PERFORMANCE CAN BE DEMONSTRATED. COMPLY WITH THE FOLLOWING UNLESS MANUFACTURER'S RECOMMENDATIONS ARE MORE STRINGENT. SUBMIT TESTING INFORMATION FOR SYSTEM SELECTED. MIN EMBEDMENT FOR BARS IS SHOWN ON THE DRAWINGS.

   B. PRIOR TO DRILLING HOLES, LOCATE AND FIELD MARK ALL EXISTING REINFORCING. USE JAMES-METER OR 1/4" PILOT HOLES TO LOCATE BARS. ADJUST LOCATION OF BAR OR BOLT TO MISS REINFORCING BUT GENERALLY MAINTAIN SPACING AND EDGE DISTANCES SHOWN ON THE DRAWING. NOTIFY ENGINEER IF NOT POSSIBLE PRIOR TO DRILLING HOLE AND FOLLOW INSTRUCTIONS.

   C. HOLES FOR ANCHOR RODS AND BARS SHALL BE OF A DIAMETER RECOMMENDED BY THE MANUFACTURER AND DRILLED WITH A CARBIDE-TIP IMPACT DRILL. IMMEDIATELY BEFORE APPLYING EPOXY GROUT, HOLES SHALL BE REAMED WITH A CIRCULAR WIRE BRUSH ATTACHED TO DRILL MOTOR AND THEN BLOWN OUT WITH OIL FREE COMPRESSED AIR.

   D. EPOXY GROUT FOR DOWNWARD HOLES MAY BE EITHER NON-SAG OR LIQUID TYPE, NORMAL SET. EPOXY GROUT FOR HORIZONTAL OR OVERHEAD HOLES SHALL BE NON-SAG TYPE, NORMAL SET. LIQUID EPOXY SHALL BE POURED SLOWLY INTO THE HOLE TO AVOID TRAPPED AIR. NON-SAG EPOXY SHALL BE INJECTED INTO THE HOLE USING AN EXTENSION NOZZLE TO REACH THE BOTTOM OF THE HOLE. HOLES SHALL BE FILLED APPROXIMATELY HALF FULL WITH EPOXY.

   E. THE BAR OR ROD SHALL BE INSERTED SLOWLY INTO THE HOLE AND THEN ROTATED. DO NOT MOVE THE BAR OR ROD UP AND DOWN WHEN INSTALLING. REMOVE ANY EPOXY GROUT AROUND THE HOLE BEFORE IT HAS SET.

   F. ALL WORK SHALL BE PERFORMED UNDER FULL TIME SPECIAL INSPECTION. DO NOT INSTALL BARS OR RODS UNLESS INSPECTOR IS PRESENT.

SECTION 4 : REPAIRS TO EXISTING CAPS

1. CONTRACTOR SHALL REPAIR CRACKS NOTED AS "1/8 CRACKS" AND SPALLED CONCRETE IN THE EXISTING CONCRETE CAP AT LOCATIONS NOTED ON THE DRAWINGS. SIKA PRODUCTS OR APPROVED EQUAL ARE LISTED. CONTRACTOR SHALL MEASURE CRACK WIDTH WIDTH AND REPAIR AS FOLLOWS:

   A. FOR EXISTING CRACKS 1/8" WIDE OR GREATER

   ROUT OUT ANY LOOSE MATERIAL, FLUSH WITH FRESH WATER AND INJECT WITH SIKADUR 52 EPOXY ADHESIVE. DURING THE CRACK REPAIR EFFORT, IF THE REINFORCING IS EXPOSED AND THE CROSS SECTIONAL AREA OF THE REINFORCING CAN BE DETERMINED TO BE 50% OR LESS OF THE ORIGINAL AREA, CHIP CONCRETE, AND SPLICE WITH NEW LENGTH OF REINFORCING. NEW REINFORCING SHALL BE WELDED TO THE EXISTING REINFORCING AND LAPPED A MINIMUM OF TWELVE (12") INCHES. PATCH CONCRETE WITH DRY PACK TO EXISTING CONTOUR. REFER TO SECTIONS TITLED "CONCRETE PATCHING" AND "REINFORCING" FOR ADDITIONAL INFORMATION.

   B. FOR EXISTING CRACKS LESS THAN 1/8"

   APPLY SIKAPRONTO-19 TF METHACRYLATE JOINT SEALER PER MFR INSTRUCTUCTIONS.

2. EXPANSION JOINTS

   REMOVE ANY LOOSE MATERIAL, PRIME JOINT WITH SIKAFLEX 429 PRIMER. AFTER PRIMER HAS DRIED, INSTALL A CLOSED CELL FOAM BACKER ROD INTO JOINT SUCH THAT THE DEPTH OF THE JOINT IS ½ INCH. ALLOW THE BACKER MATERIAL TO BE EXPOSED TO THE AIR FOR A MINIMUM OF 20 MINUTES THEN APPLY SIKAFLEX 1A SEALANT ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

3. CONCRETE PATCHING (BULKHEAD COPING)

   WHERE THE CONCRETE HAS SPALLED WITH A LOSS OF ONE INCH OR MORE OF CONCRETE, OR AS INDICATED BY THE ENGINEER. THE CONTRACTOR SHALL PATCH THE AREA AS FOLLOWS:

   1. SAW CUT EDGES 1" DEEP, CHIP AND REMOVE ANY LOOSE MATERIAL. CHIP 1" BEYOND EXISTING REBAR.
   2. CLEAN THE AREA OF ALL DUST AND DEBRIS.
   3. DRY AREA TO BE PATCHED.
   4. IMMEDIATELY BEFORE PLACING CONCRETE, COAT THE AREA WITH SIKA ARMATEC 110 EPOCEM.
   5. FOR SPALLS THAT WILL NOT RECEIVE NEW CONCRETE THAT COVERS IT,PATCH CONCRETE WITH SIKATOP 122 PLUS TO EXISTING CONTOURS.

   NOTE: CONTRACTOR SHALL PLAN THE CONCRETE PATCHING EFFORT DURING LOW TIDE CONDITIONS TO PREVENT SALTWATER CONTAMINATION OF THE PREPARED SURFACES.

SECTION 5: METALS

1. STEEL SHALL BE DESIGNED, DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION AISC 360 "SPEDIFICATION FOR STRUCTURAL STEEL BUILDINGS", AND THE AMERICAN WELDING SOCIETY CODE AWS D1.1, "WELDING IN BUILDING CONSTRUCTION".

2. STAINLESS STEEL SHAPES SHALL BE ALLOY 316L, CONDITION A, COLD FINISHED CONFORMING TO STANDARD ASTM A 276.

3. SHEAR STUDS TO BE MADE OF STAINLESS STEEL, ALLOY 316L, CONFORMING TO STANDARD ASTM A 276 OR ASTM A 493, AS MANUFACTURED BY NELSON STUD WELDING OR APPROVED EQUAL. MIN YIELDING STRENGTH 50,000 PSI. MIN TENSILE STRENGTH 75,000 PSI.

4. ANCHOR RODS (ALL THREAD) SHALL CONFORM TO STANDARD ASTM F1554 GR.105; HEAVY HEX NUTS: ASTM A563 GR.DH; WASHERS: ASTM F436.

5. RODS, NUTS AND WASHERS SHALL BE GALVANIZED PER ASTM A-123 OR A-153 AS APPLICABLE.

6. WELDING ELECTRODES FOR CARBON STEEL SHALL BE E70XX. ELECTRODES FOR STAINLESS STEEL SHALL BE BEST SUITABLE FOR 316L STEEL. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS. ALL WELDED JOINTS SHALL BE AWS PREQUALIFIED. GROOVE AND BUTT WELDS ARE "COMPLETE PENETRATION", UNLESS OTHERWISE NOTED.

7. ALL STRUCTURAL STEEL ACCESSORIES OR INCIDENTAL ITEMS NOT SPECIFICALLY SHOWN OR HEREIN SPECIFIED, BUT NECESSARY TO FULLY CARRY OUT THE OBVIOUS INTENT OF THE PLANS SHALL BE INCLUDED UNDER THIS SECTION WITHOUT ADDITIONAL COST.

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BASIS OF BEARINGS:

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SOUTHERN CALIFORNIA GAS COMPANY	(800) 624-8153	
SOUTHERN CALIFORNIA EDISON COMPANY	(800) 611-1911	
AT&T TELEPHONE COMPANY	(800) 332-1321	
CITY OF NEWPORT BEACH UTILITIES DIVISION	(949) 644-3011	(949) 644-3717
ORANGE COUNTY SANITATION DISTRICT	(714) 962-2411	
TIME WARNER CABLE	(714) 542-6222	
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NO.	DATE	REVISION

REVIEWED:

WARREN A. STEWART, RCE C41358
COWI MARINE NORTH AMERICA

DESIGNED: WNST | DRAWN: MCLS
CHECKED: GAVP | DATE: 03/18/16

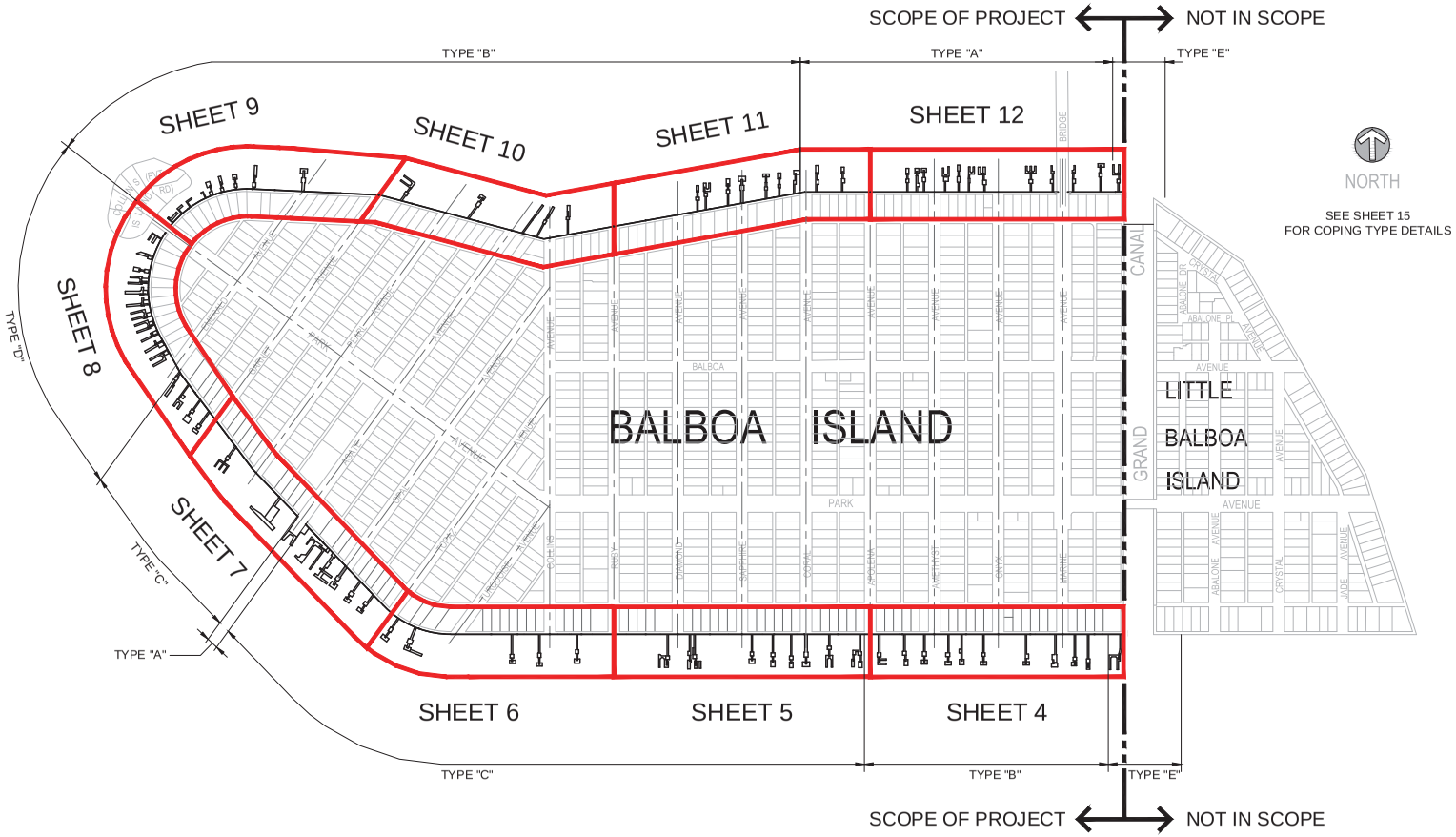
BALBOA ISLAND COPING REPAIR

GENERAL NOTES

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

SHEET 2 OF XX



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BALBOA ISLAND COPING REPAIR

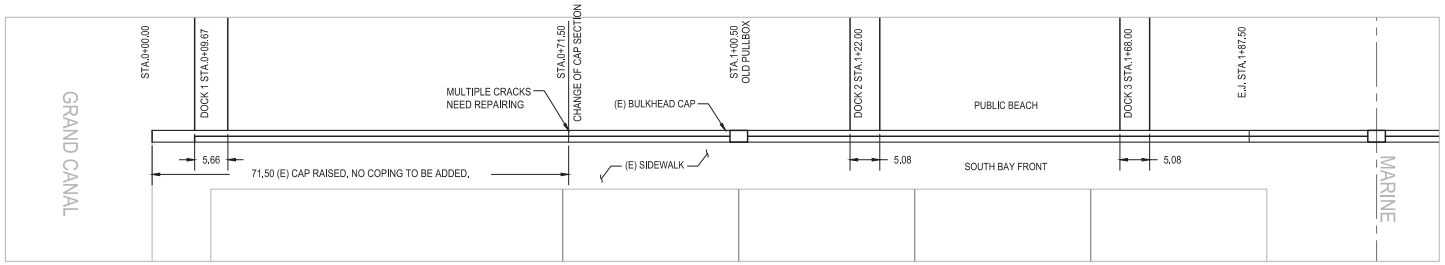
OVERALL PLAN

SCALE N.T.S.

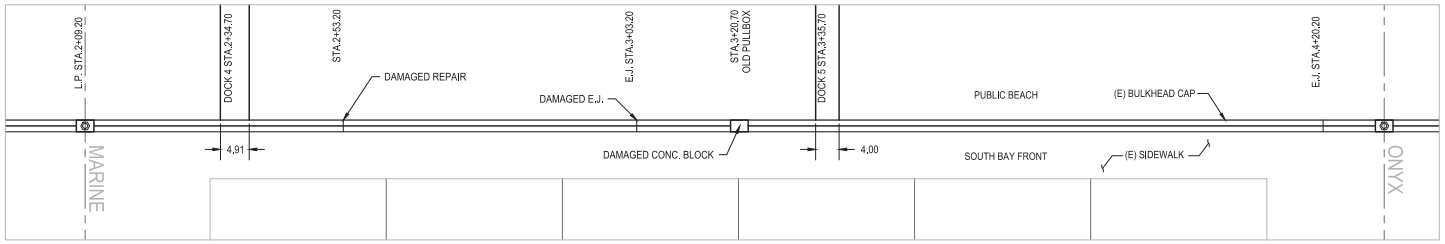
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

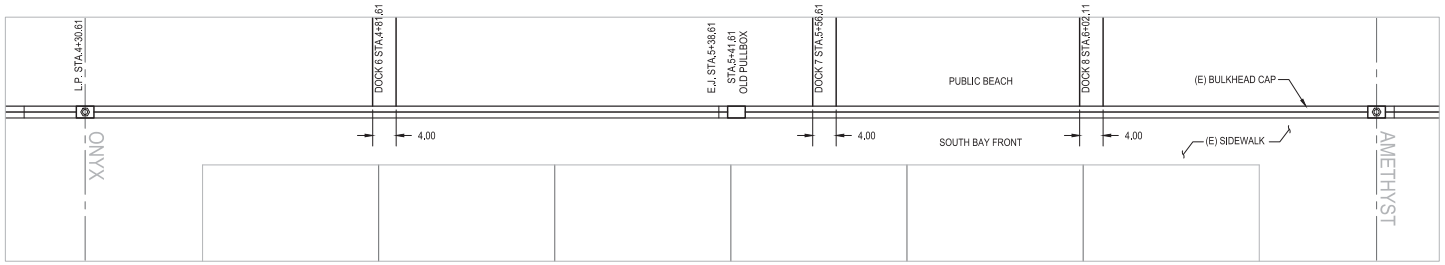
SHEET 3 OF XX



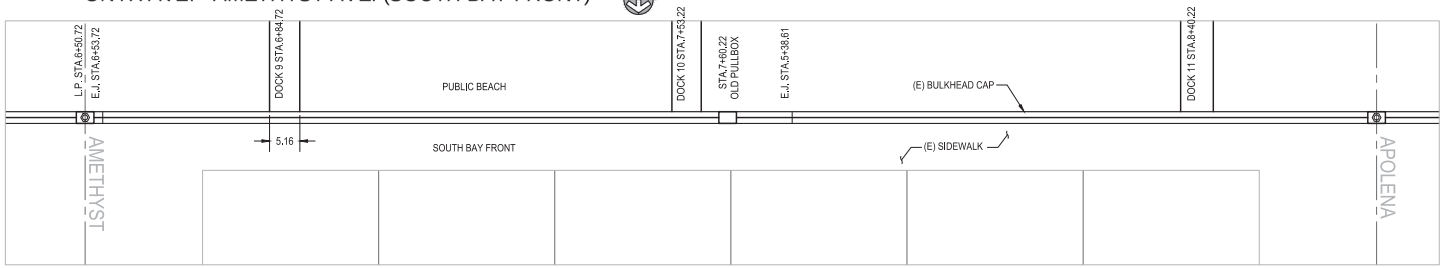
GRAND CANAL - MARINE AVE. (SOUTH BAY FRONT)



MARINE AVE. - ONYX AVE. (SOUTH BAY FRONT)



ONYX AVE. - AMETHYST AVE. (SOUTH BAY FRONT)



AMETHYST AVE. - APOLENA AVE. (SOUTH BAY FRONT)

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BALBOA ISLAND COPING REPAIR

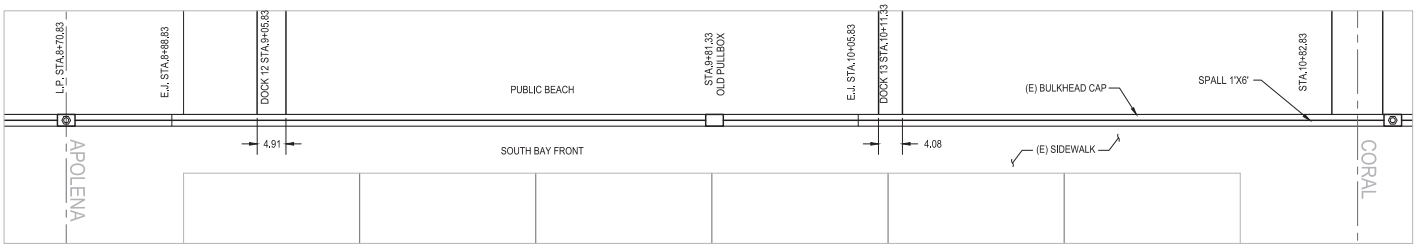
SECTION PLANS

SCALE 1:10

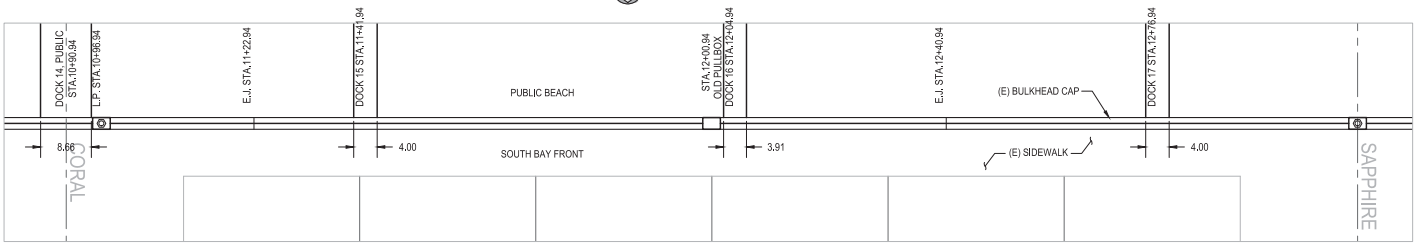
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

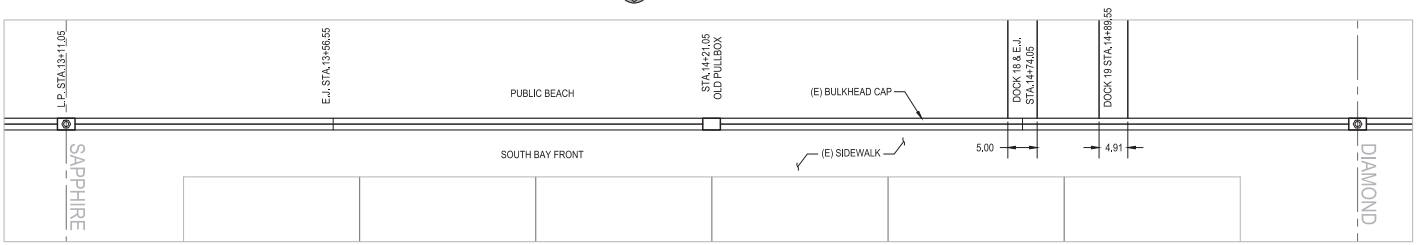
SHEET 4 OF XX



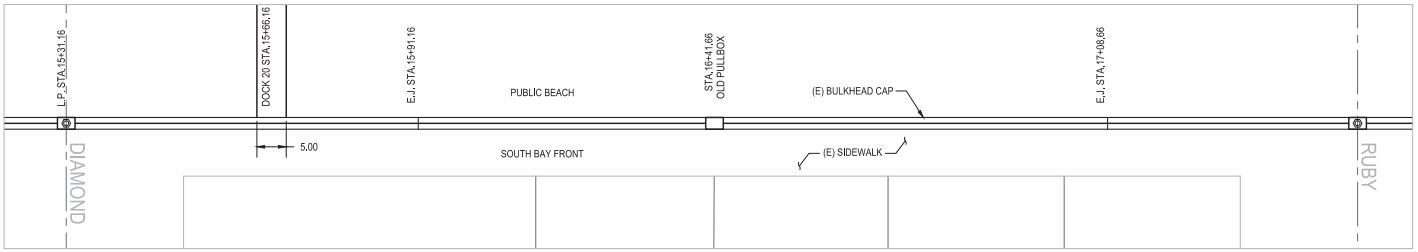
APOLENA AVE. - CORAL AVE. (SOUTH BAY FRONT)



CORAL AVE. - SAPPHIRE AVE. (SOUTH BAY FRONT)



SAPPHIRE AVE. - DIAMOND AVE. (SOUTH BAY FRONT)



DIAMOND AVE. - RUBY AVE. (SOUTH BAY FRONT)

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BALBOA ISLAND COPING REPAIR

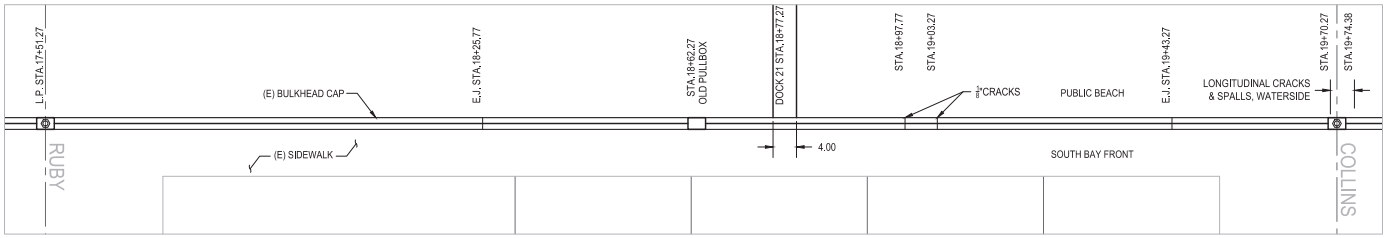
SECTION PLANS

SCALE 1:10

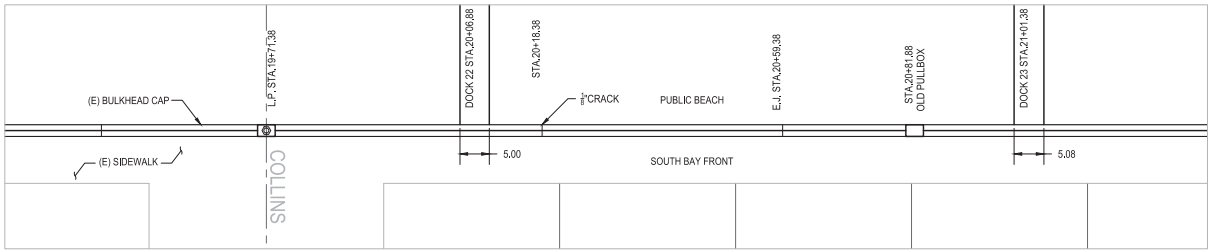
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

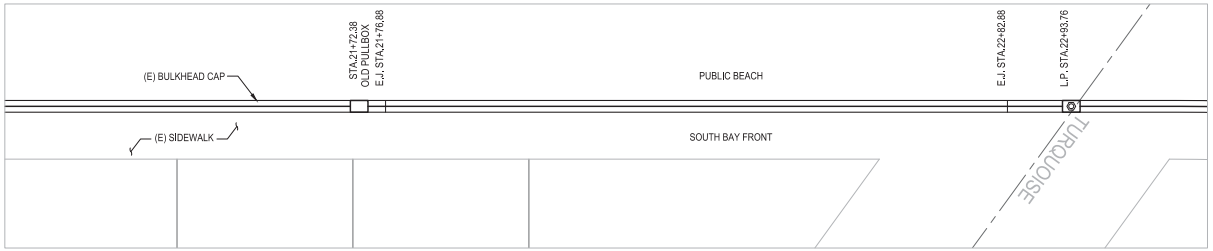
SHEET 5 OF XX



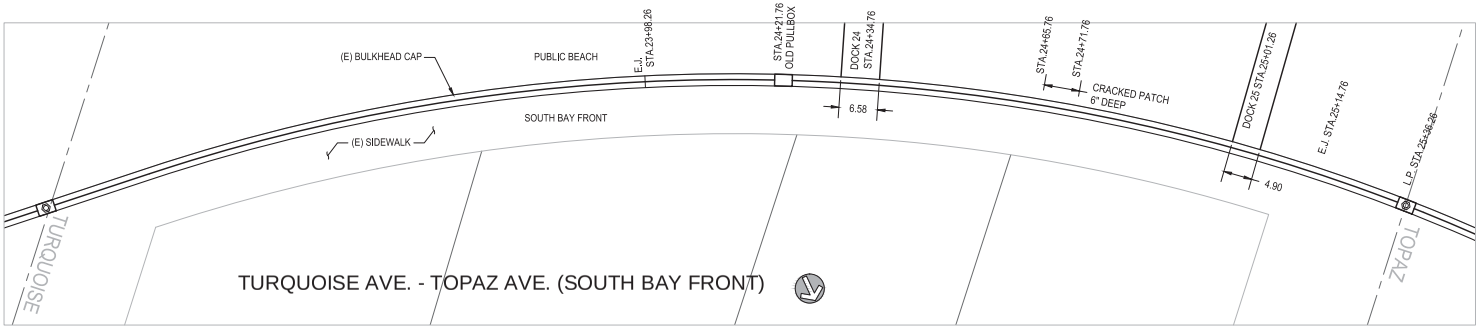
RUBY AVE. - COLLINS AVE. (SOUTH BAY FRONT)



COLLINS AVE. - DOCK 23 (SOUTH BAY FRONT)



DOCK 23 - TURQUOISE AVE. (SOUTH BAY FRONT)



TURQUOISE AVE. - TOPAZ AVE. (SOUTH BAY FRONT)

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BALBOA ISLAND COPING REPAIR

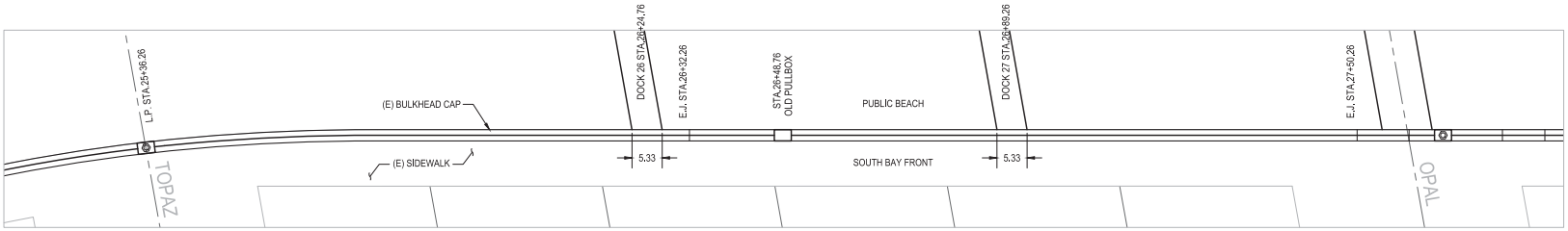
SECTION PLANS

SCALE 1:10

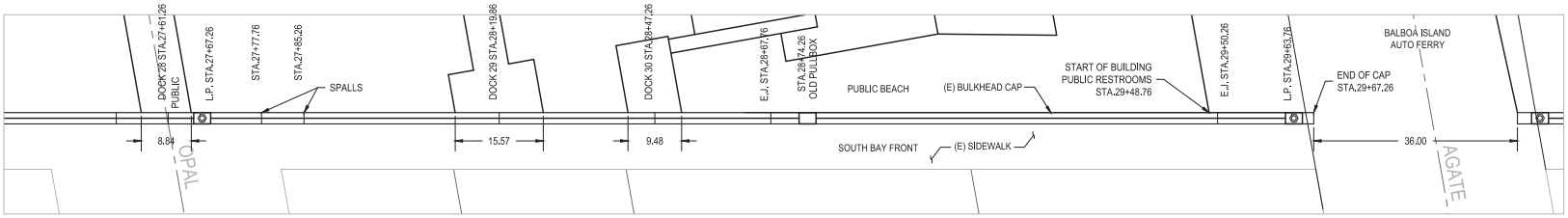
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

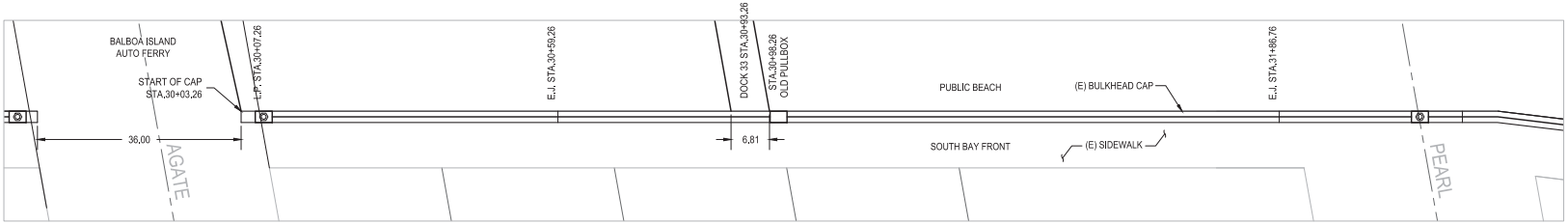
SHEET 6 OF XX



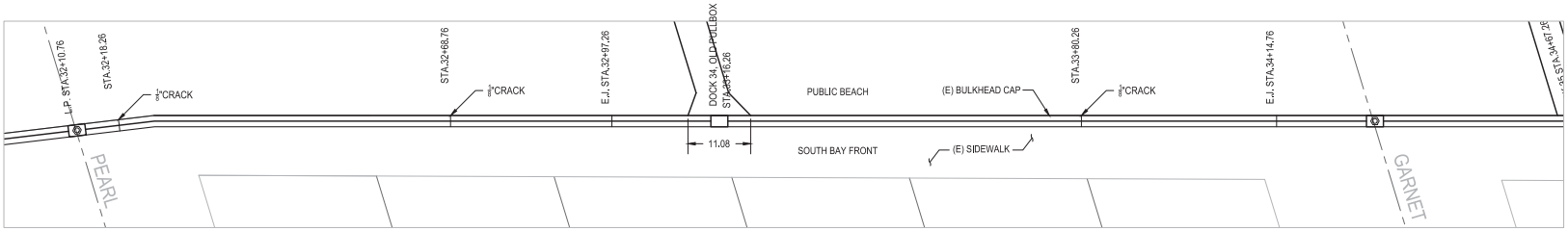
TOPAZ AVE. - OPAL AVE. (SOUTH BAY FRONT)



OPAL AVE. - AGATE AVE. (SOUTH BAY FRONT)



AGATE AVE. - PEARL AVE. (SOUTH BAY FRONT)



PEARL AVE. - GARNET AVE. (SOUTH BAY FRONT)

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BALBOA ISLAND COPING REPAIR

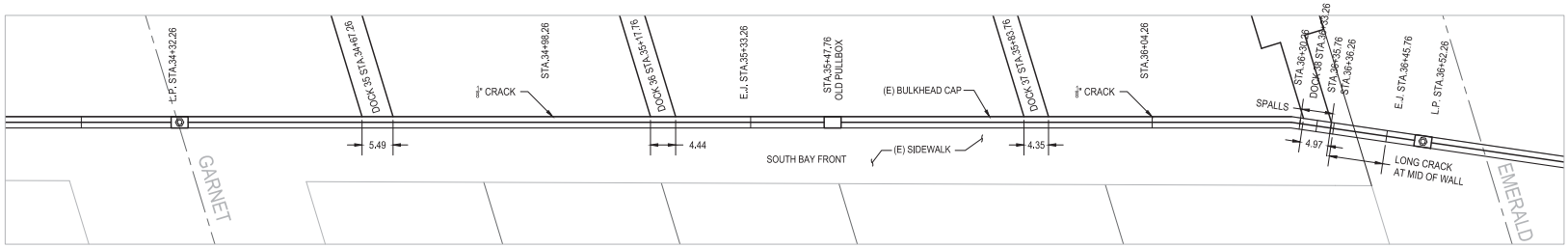
SECTION PLANS

SCALE 1:10

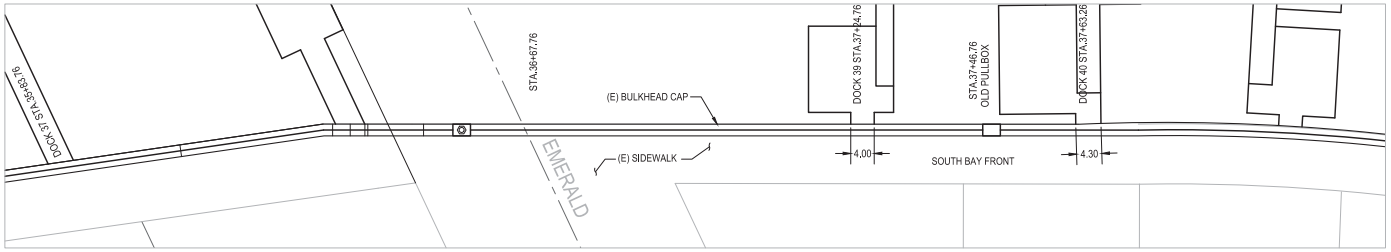
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

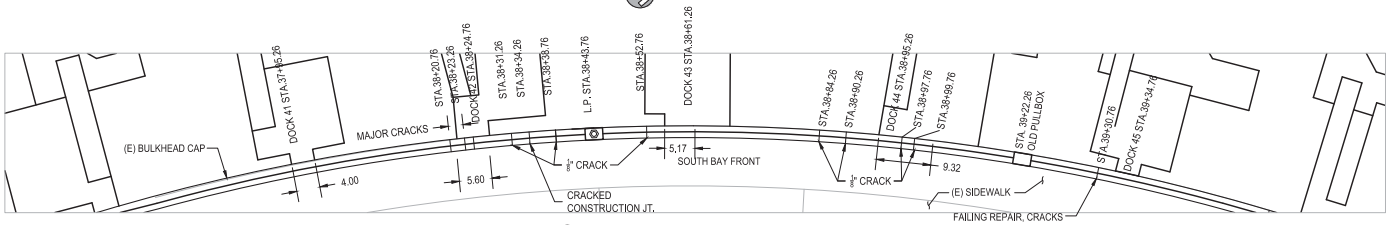
SHEET 7 OF XX



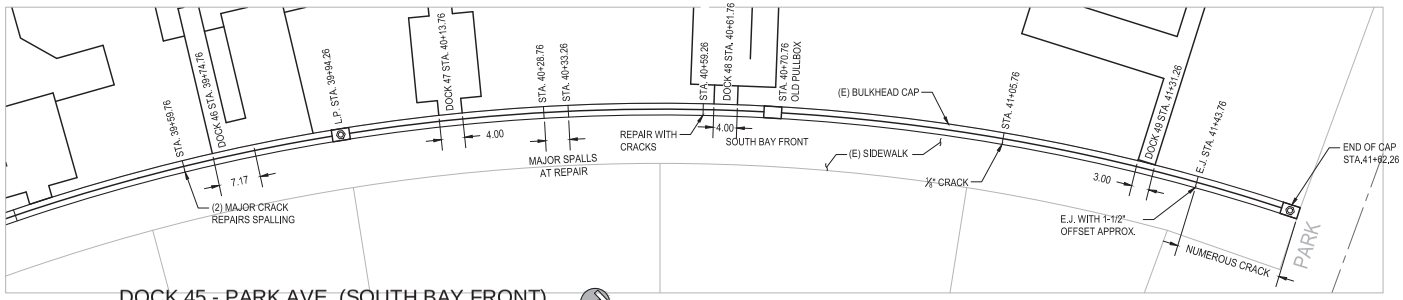
GARNET AVE. - EMERALD AVE. (SOUTH BAY FRONT)



EMERALD AVE. - DOCK 41 (SOUTH BAY FRONT)



DOCK 41 - DOCK 45 (SOUTH BAY FRONT)



DOCK 45 - PARK AVE. (SOUTH BAY FRONT)

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BALBOA ISLAND COPING REPAIR

SECTION PLANS

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CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

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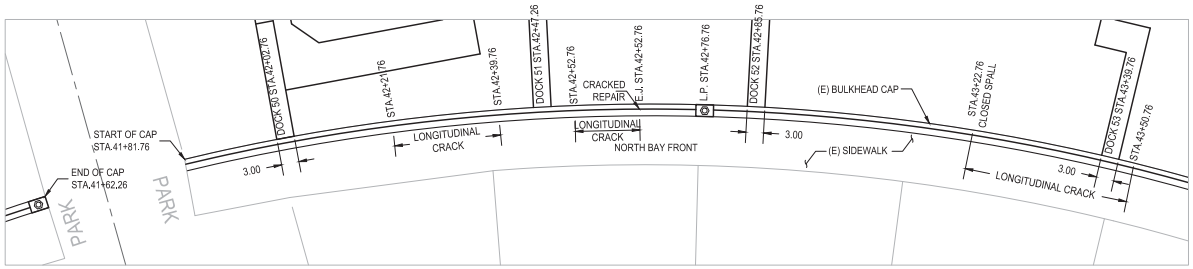
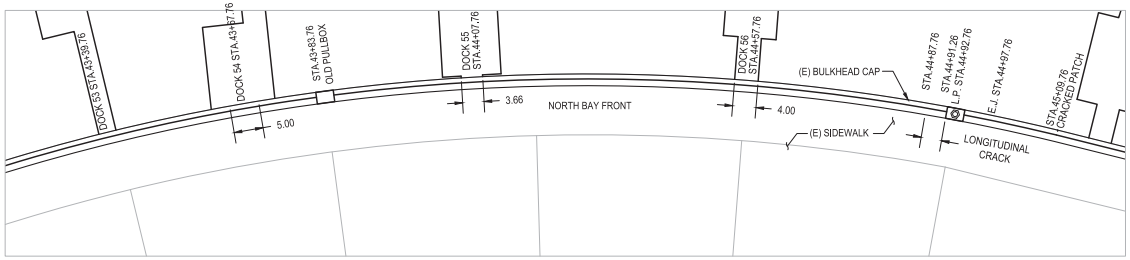
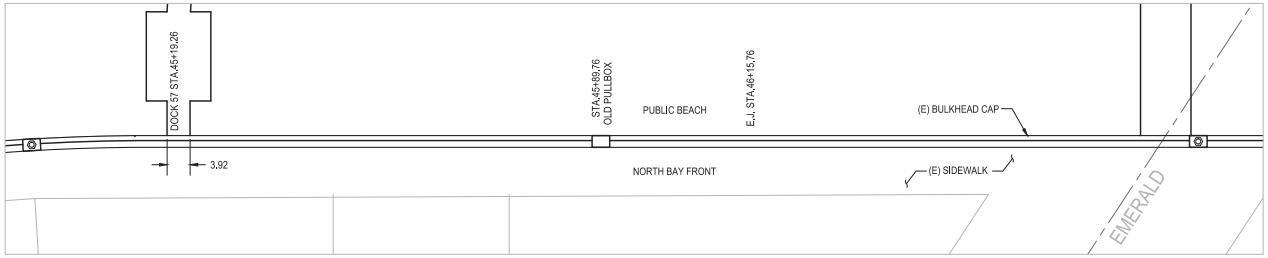
SHEET 8 OF XX



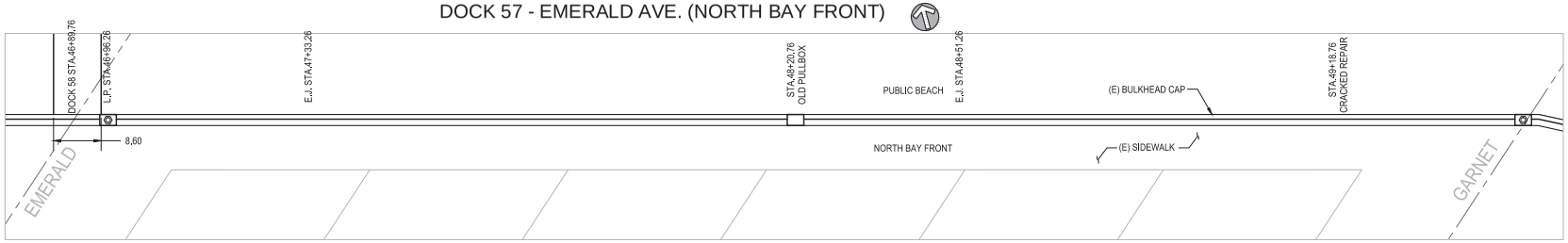
PARK AVE. - DOCK 53 (NORTH BAY FRONT)



DOCK 53 - DOCK 57 (NORTH BAY FRONT)



DOCK 57 - EMERALD AVE. (NORTH BAY FRONT)



EMERALD AVE. - GARNET AVE. (NORTH BAY FRONT)

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BALBOA ISLAND COPING REPAIR

SECTION PLANS

SCALE 1:10

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

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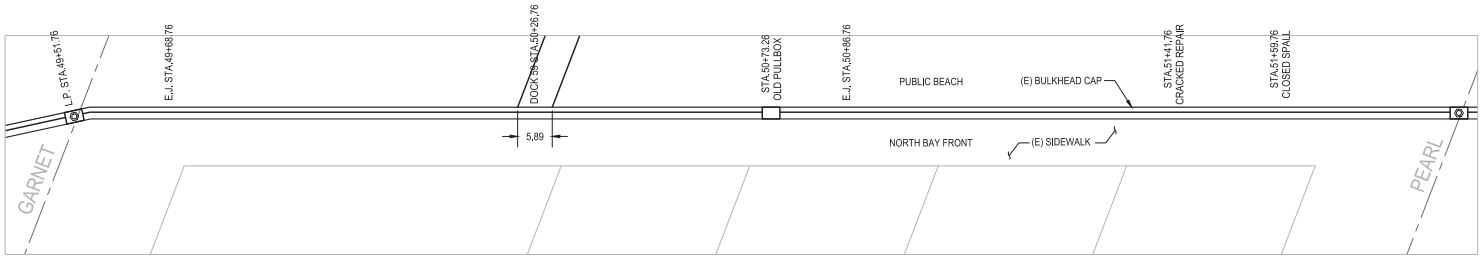
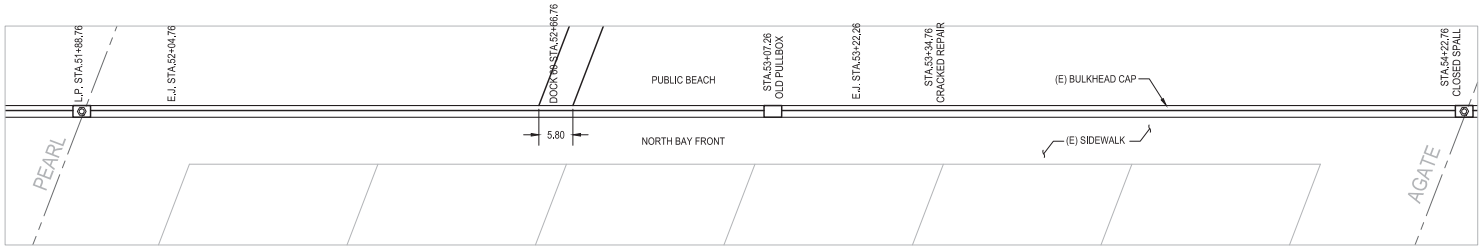
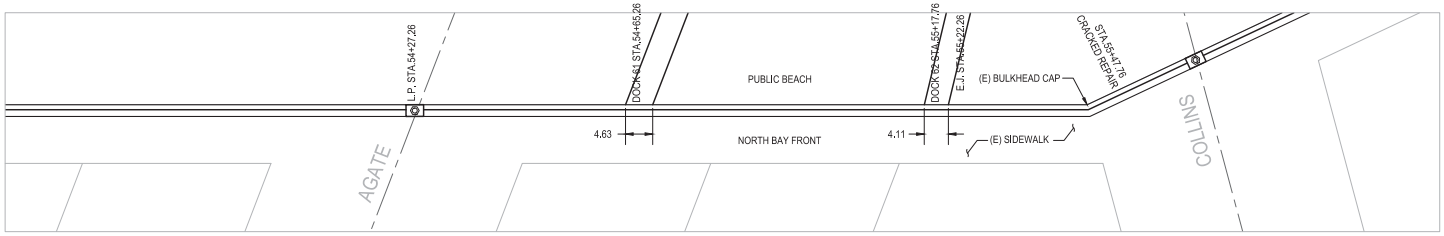
SHEET 9 OF XX



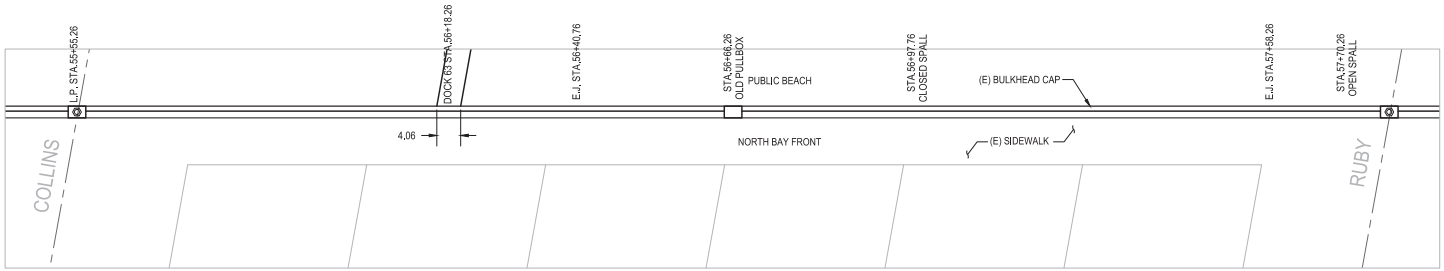
GARNET AVE. - PEARL AVE. (NORTH BAY FRONT)



PEARL AVE. - AGATE AVE. (NORTH BAY FRONT)



AGATE AVE. - COLLINS AVE. (NORTH BAY FRONT)



COLLINS AVE. - RUBY AVE. (NORTH BAY FRONT)

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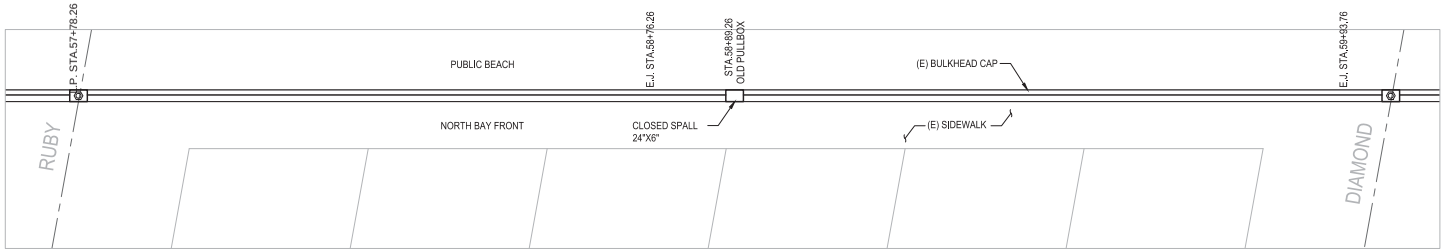
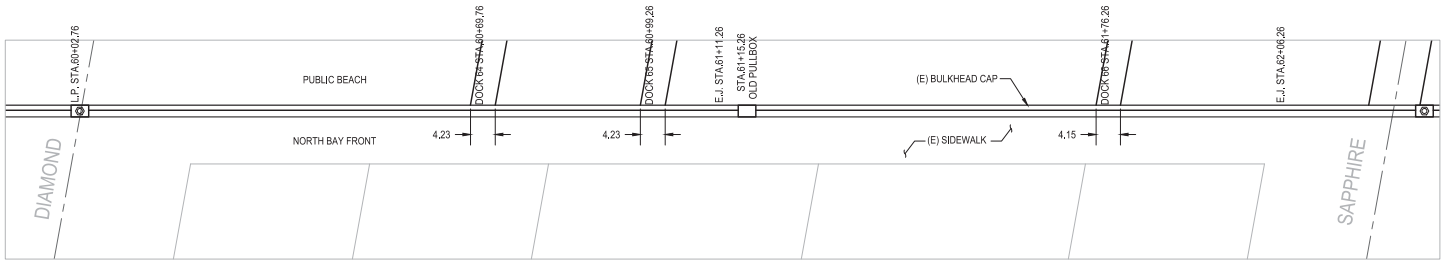
H-5235-S

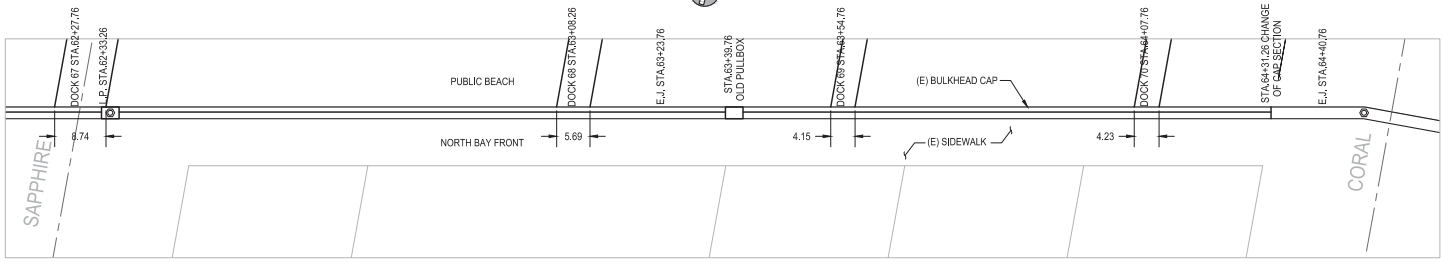
SHEET 10 OF XX



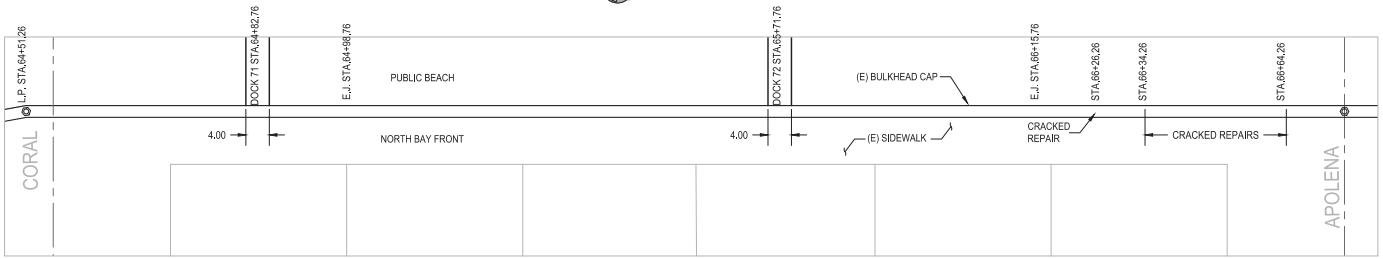
RUBY AVE. - DIAMOND AVE. (NORTH BAY FRONT)



DIAMOND AVE. - SAPPHIRE AVE. (NORTH BAY FRONT)



SAPPHIRE AVE. - CORAL AVE. (NORTH BAY FRONT)



CORAL AVE. - APOLENA AVE. (NORTH BAY FRONT)

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BASIS OF BEARINGS:

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SOUTHERN CALIFORNIA EDISON COMPANY	(800) 611-1911	
AT&T TELEPHONE COMPANY	(800) 332-1321	
CITY OF NEWPORT BEACH UTILITIES DIVISION	(949) 644-3011	(949) 644-3717
ORANGE COUNTY SANITATION DISTRICT	(714) 962-2411	
TIME WARNER CABLE	(714) 542-6222	
COX COMMUNICATIONS	–	
ENGINEER OF RECORD		

NO.	DATE	REVISION

REVIEWED:

WARREN A. STEWART, RCE C41358
COWI MARINE NORTH AMERICA

DESIGNED: WNST
DRAWN: MCLS
CHECKED: GAVP
DATE: 03/18/16

BALBOA ISLAND COPING REPAIR

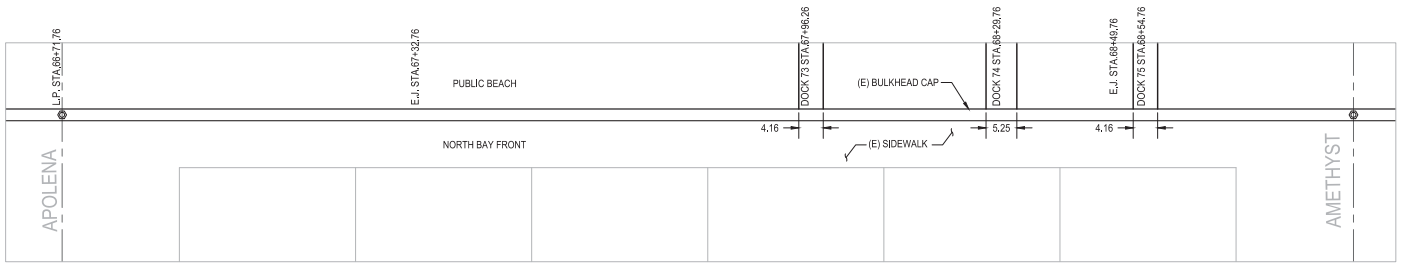
SECTION PLANS

SCALE 1:10

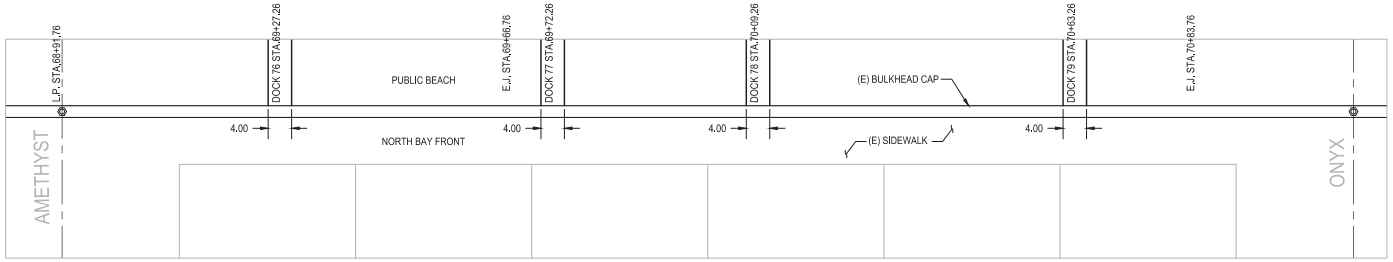
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

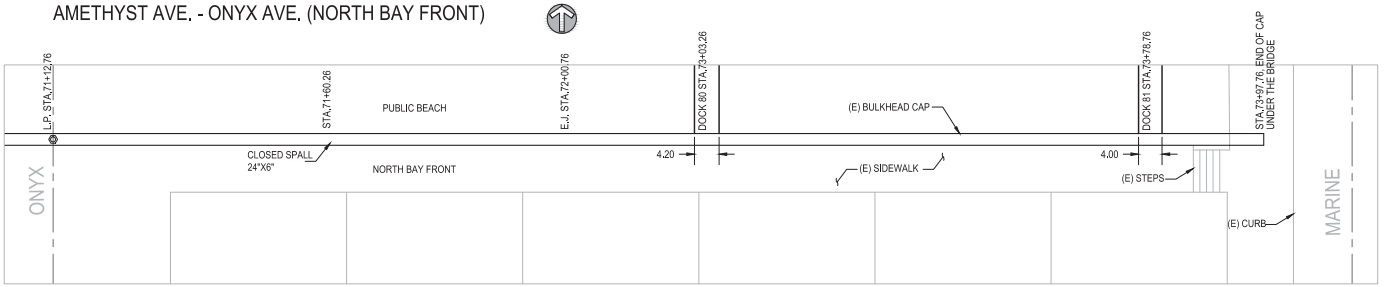
SHEET 11 OF XX



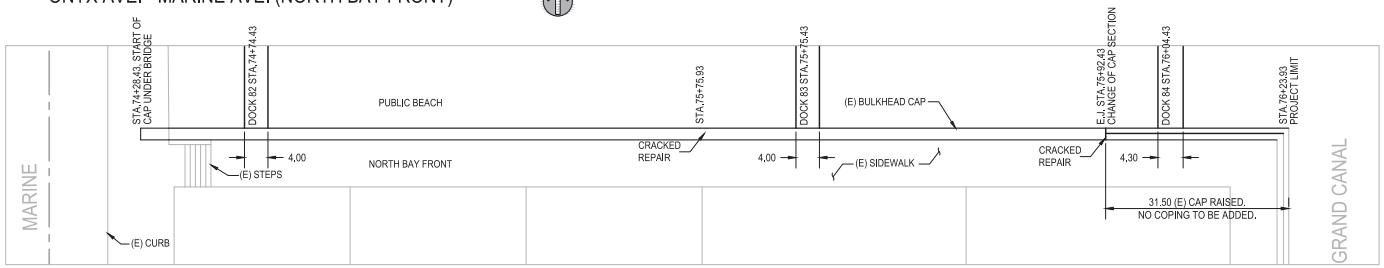
APOLENA AVE. - AMETHYST AVE. (NORTH BAY FRONT)



AMETHYST AVE. - ONYX AVE. (NORTH BAY FRONT)



ONYX AVE. - MARINE AVE. (NORTH BAY FRONT)



MARINE AVE. - GRAND CANAL (NORTH BAY FRONT)

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ENGINEER OF RECORD		

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BALBOA ISLAND COPING REPAIR

SECTION PLANS

SCALE 1:10

CITY OF NEWPORT BEACH
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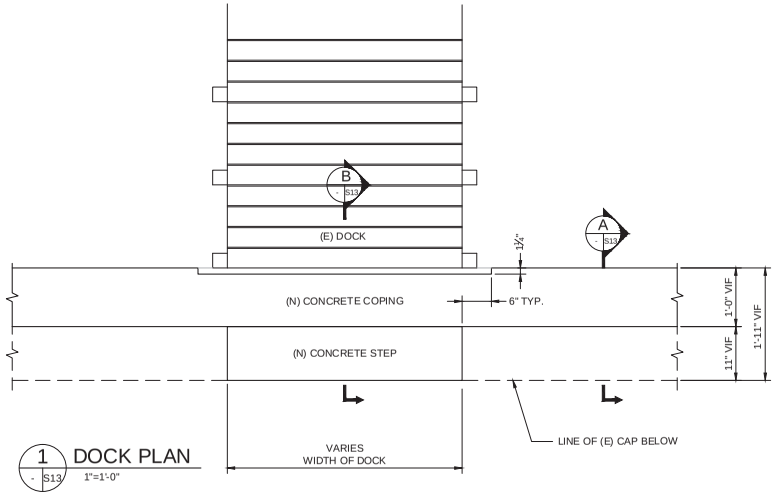
SHEET 12 OF XX



1 S13 DOCK PLAN
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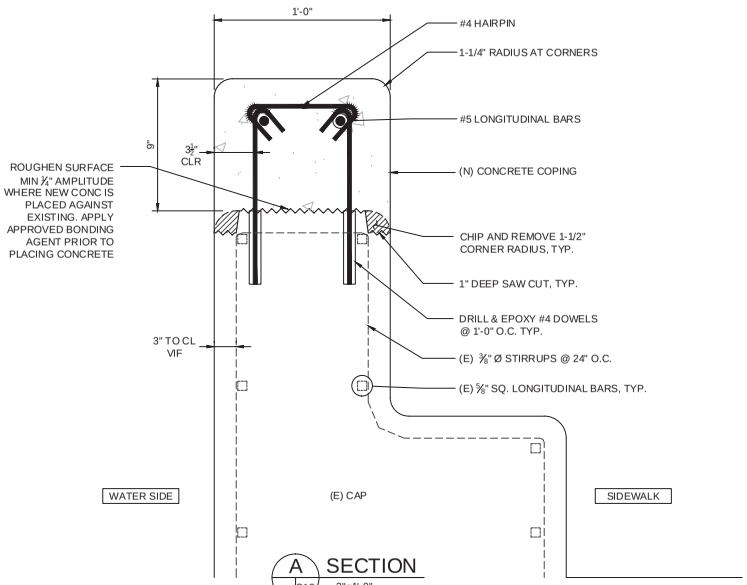

A S13 SECTION
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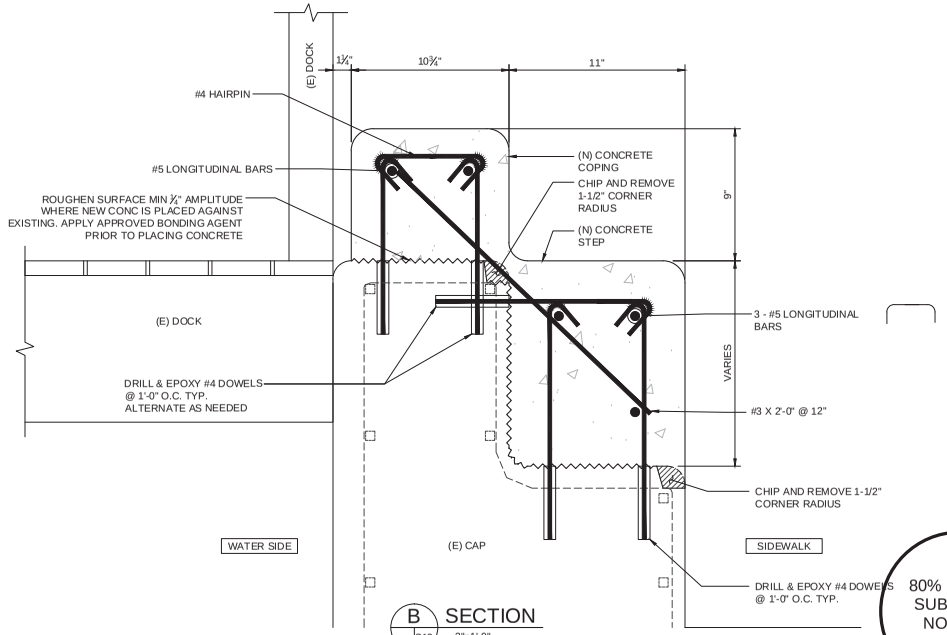

B S13 SECTION
3"=1'-0"

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BALBOA ISLAND COPING REPAIR

TYPICAL SECTION
DOCK SECTION

SCALE AS SHOWN

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

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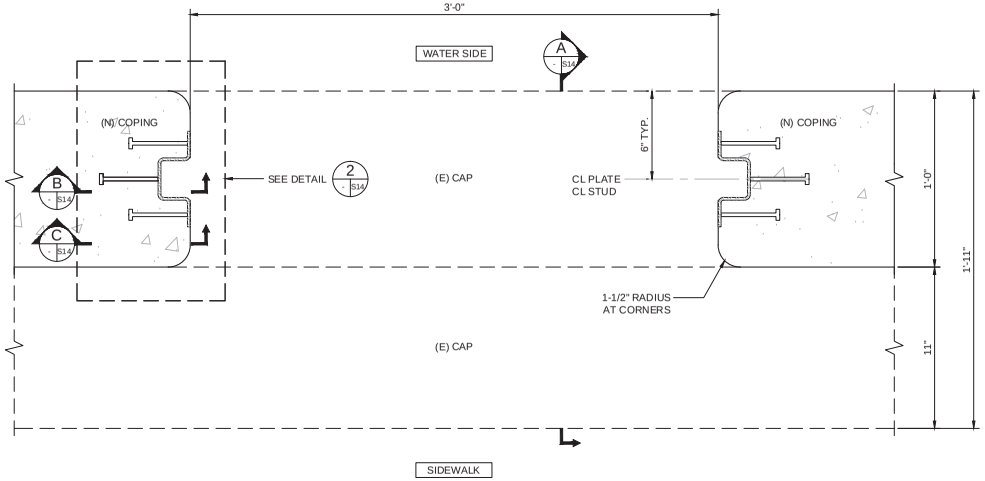
SHEET 13 OF XX



1 - S14 PLAN VIEW - PUBLIC ACCESS GAP DETAIL
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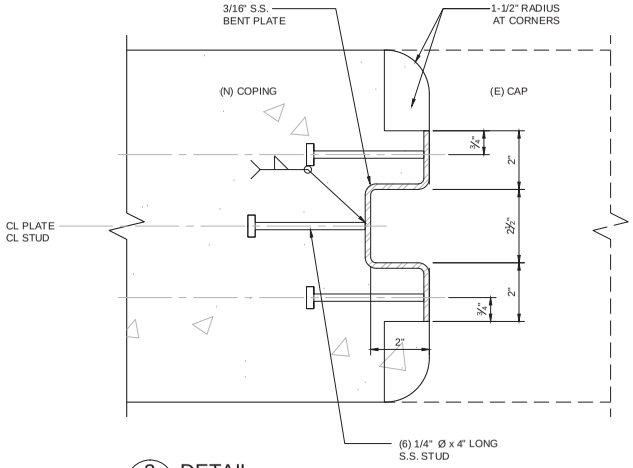

2 - S14 DETAIL
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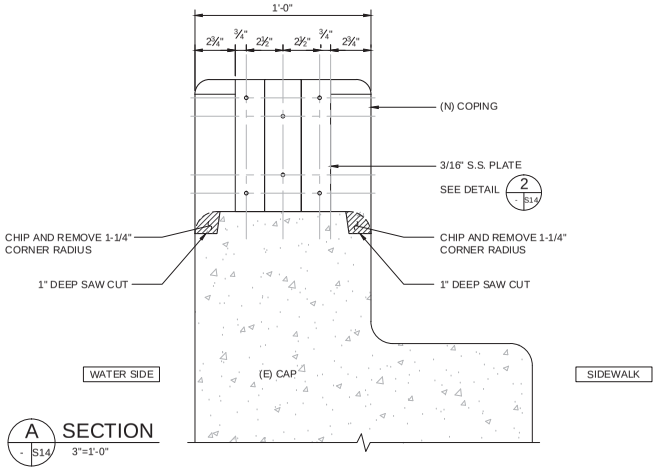

A - S14 SECTION
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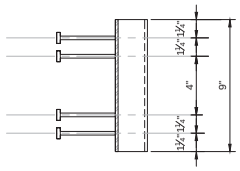

B - S14 SECTION
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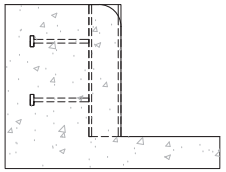

C - S14 SECTION
3"=1'-0"

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BALBOA ISLAND COPING REPAIR

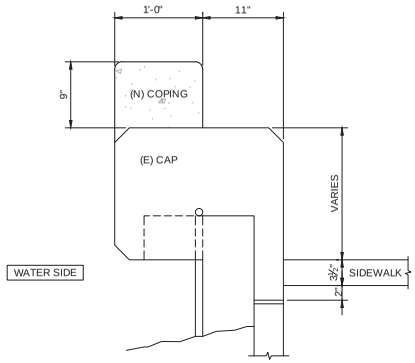
PUBLIC ACCESS
GAP DETAILS

SCALE
AS SHOWN

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

SHEET 14 OF XX



1 - S15 TYPE A COPING
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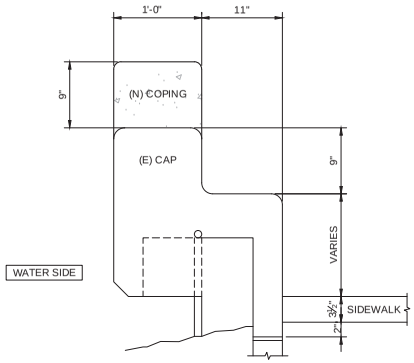

2 - S15 TYPE B COPING
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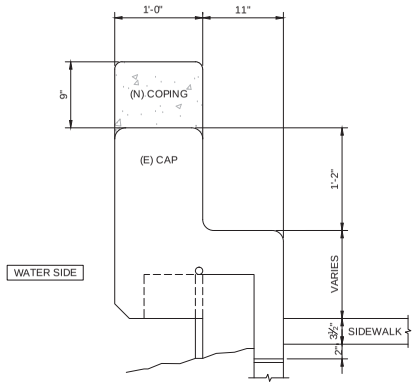

3 - S15 TYPE C COPING
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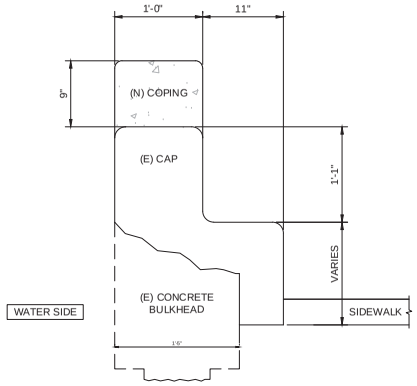

4 - S15 TYPE D COPING
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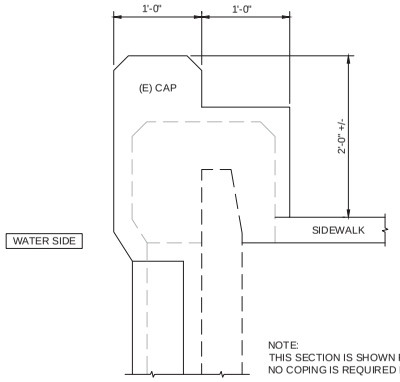

NOTE:
THIS SECTION IS SHOWN FOR REFERENCE ONLY.
NO COPING IS REQUIRED HERE.

5 - S15 TYPE E - NO COPING REQUIRED
1-1/2"=1'-0"

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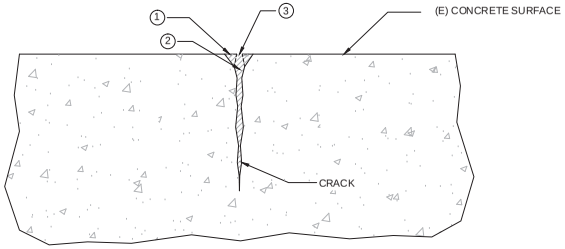
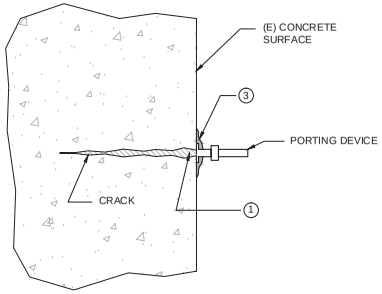
SHEET 15 OF XX

1. ROUT TOP OF CRACK TO FORM VEE-GROVE. THOROUGHLY CLEAN WITH COMPRESSED AIR AND WIRE-WHEEL TOOL.
2. FOR CRACKS ⅛" WIDE AND GREATER, FILL CRACK WITH OVEN DRIED SILCA SAND
3. APPLY METHACRYLATE SEALER FOLLOWING MANUFACTURER'S RECOMMENDATIONS AND ALLOW TO PENETRATE CRACK.
4. CAST OVEN DRY SILCA SAND ON TOP OF THE CRACK TO ABSORB EXCESS. SCRAPE OFF AFTER INITIAL SET.



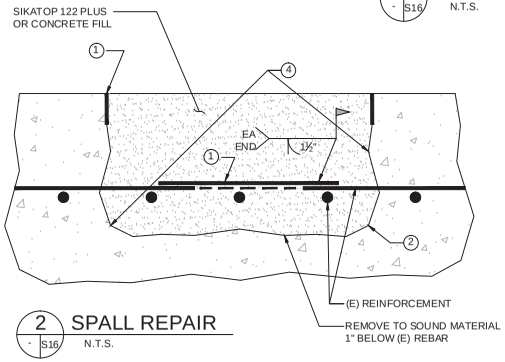
TOP SURFACE CRACKS ONLY



VERTICAL SURFACE CRACKS

1. THOROUGHLY CLEAN WITH COMPRESSED AIR AND WIRE-WHEEL TOOL. REMOVE ALL LOOSE DEBRIS.
2. FOR CRACKS ⅛" WIDE AND GREATER, FILL CRACK WITH OVEN DRIED SILCA SAND
3. SEAL SURFACE OF CRACK AND INSTALL INJECTION PORTS AT 8" O.C. USING CRACK SEALING (CAPPING OR PASTE-OVER) EPOXY PER MANUFACTURER'S INSTRUCTIONS.
4. START INJECTION AT THE LOWEST PORT UNTIL EPOXY SHOWS AT AN UPPER PORT, CLOSE LOWER PORT AND CONTINUE FROM UPPER PORT. REPEAT UNTIL ALL PORTS HAVE BEEN INJECTED.
5. WHEN INJECTED EPOXY HAS CURED, REMOVE PORTS AND SEALING EPOXY. GRIND SURFACE SMOOTH.
6. FOR SURFACES THAT WILL BE REMAIN VISIBLE AFTER PROJECT IS COMPLETE, FINISH TO MATCH SURROUNDING SURFACE.

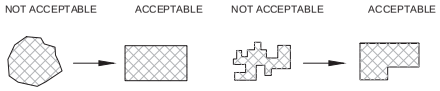
1 CRACK REPAIR
- S16 N.T.S.

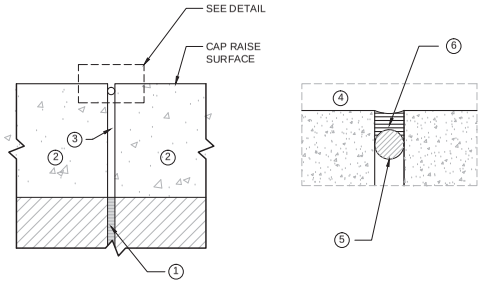


2 SPALL REPAIR
- S16 N.T.S.

SPALL REPAIR NOTES:

1. SAW CUT EDGES 1" DEEP.
2. CHIP AND REMOVE ALL LOOSE MATERIAL. CHIP 1" BEYOND EXISTING REBAR. PRESERVE ALL REBAR. USE SMALLEST CHIPPING HAMMER FOR THE WORK. DAMAGED REBAR WILL BE REPLACED AT NO ADDITIONAL COST TO THE CITY.
3. INSPECT REINFORCING REPLACE ANY REINFORCING SHOWING 20% LOSS OF SECTION OR GREATER BY CUTTING OUT DETERIORATED SECTION AND WELDING IN NEW SECTION. USE A706 REBAR OF SAME AREA OR LARGER. IF NEEDED, PRE-HEAT EXISTING STUBS.
3. CLEAN THE AREA OF ALL DUST AND DEBRIS AND DRY AREA TO BE PATCHED.
4. IMMEDIATELY BEFORE PLACING CONCRETE, COAT THE AREA WITH APPROVED BONDING AND ANTI-CORROSION AGENT.
5. FOR SPALLS THAT WILL NOT RECEIVE NEW CONCRETE THAT COVERS IT, PATCH CONCRETE WITH APPROVED CONCRETE PATCHING MATERIAL. MATCH THE EXISTING CONTOURS.
6. PATCH CONFIGURATIONS SHOULD BE KEPT AS SHOWN BELOW





3 EXPANSION JOINTS
- S16 N.T.S.

EXPANSION JOINT NOTES:

1. WHERE INDICATED ON DRAWINGS, COMPLETELY REMOVE EXISTING JOINT MATERIALS BEFORE CONSTRUCTING CAP RAISE AND MAKE ANY CONCRETE REPAIRS NEEDED AT CORNERS AND EDGES TO PROVIDE BASE FOR JOINT SEALANT. OTHERWISE START W/ NOTE #2.
2. CONSTRUCT NEW CAP RAISE WITH GAP FOR EXPANSION JOINTS ON TOP OF EXISTING. MATCH WIDTHS.
3. AFTER CAP RAISE HAS CURED, REMOVE ANY FORM MATERIALS IN GAP AND COMPLETELY CLEAN.
4. APPLY BONDING AGENT RECOMMENDED BY SEALANT MFR. FOLLOW MFR'S INSTRUCTIONS.
5. INSTALL BACKING ROD AS RECOMMENDED BY MFR. ROD SHOULD BE ½" BELOW SURFACE OF JOINT. FOLLOW RECOMMENDATION FOR MAKING 90° CORNERS.
6. FILL JOINTS (NEW & EXISTING IF INDICATED) WITH SEALANT AND ALLOW TO CURE. SEALANT SHALL COVER ENTIRE JOINT WITH NOT VOIDS. SCHEDULE JOINT SEALING SO THAT THEY WILL NOT BE IMPACTED BY HIGH TIDES UNTIL FULLY CURED.

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COWI MARINE NORTH AMERICA

DESIGNED: WNST
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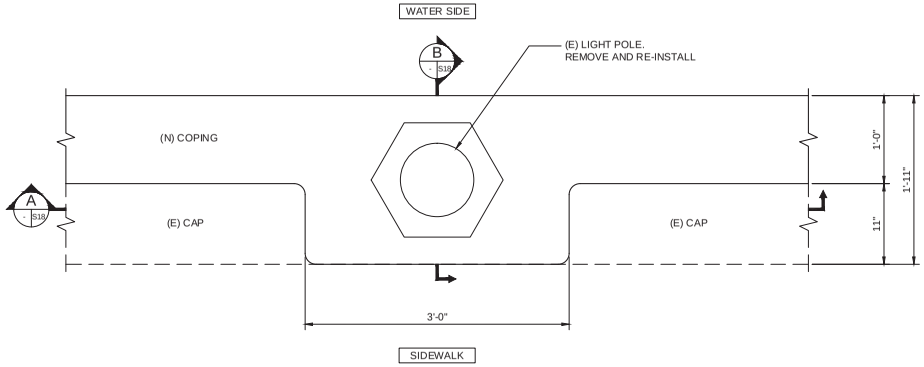
SHEET 16 OF XX



1 S17 PLANVIEW - (N) COPING AT LIGHT POLE
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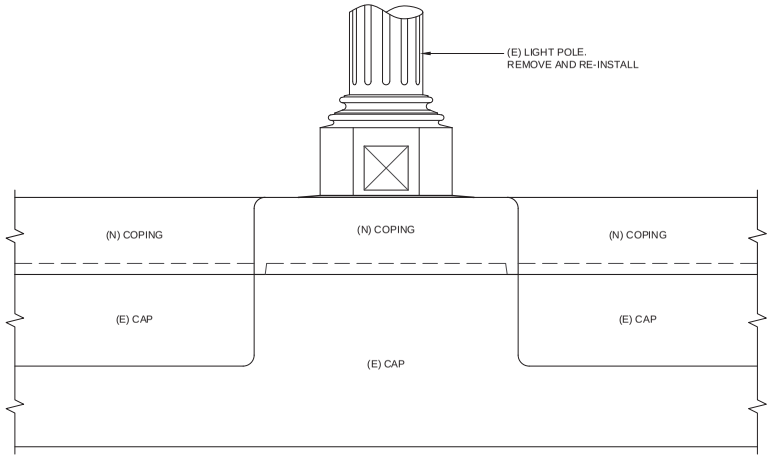
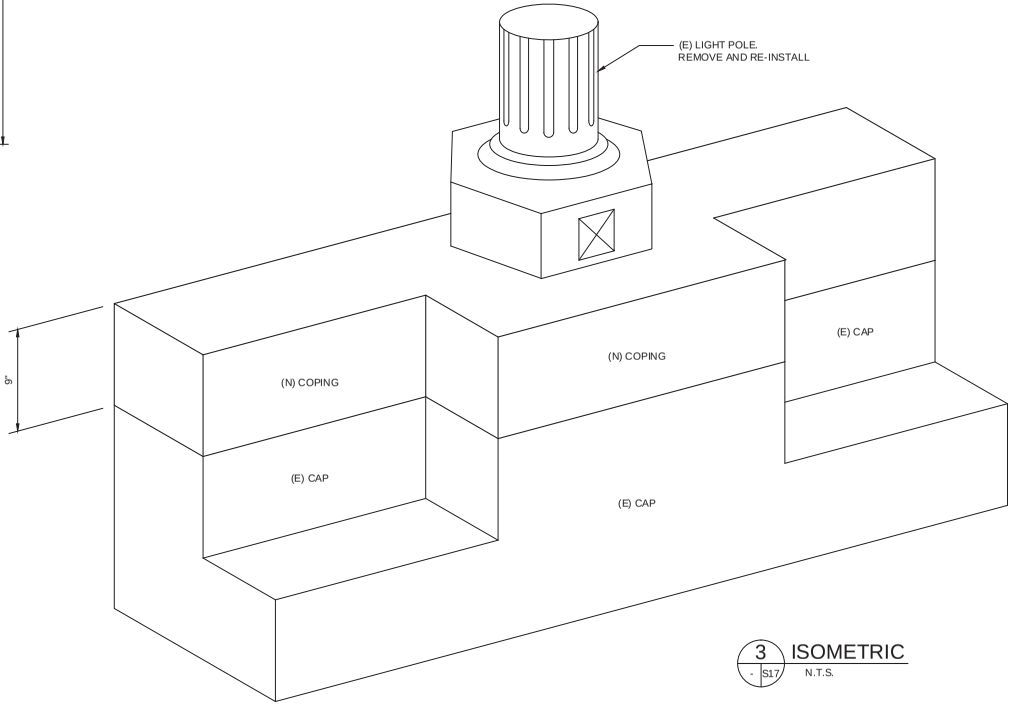


2 S17 FRONT ELEVATION
1-1/2"=1'-0"



3 S17 ISOMETRIC
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REVIEWED:

WARREN A. STEWART, RCE C41358
CONI MARINE NORTH AMERICA

DESIGNED: WNST
DRAWN: MCLS
CHECKED: GAVP
DATE: 03/18/16

BALBOA ISLAND COPING REPAIR

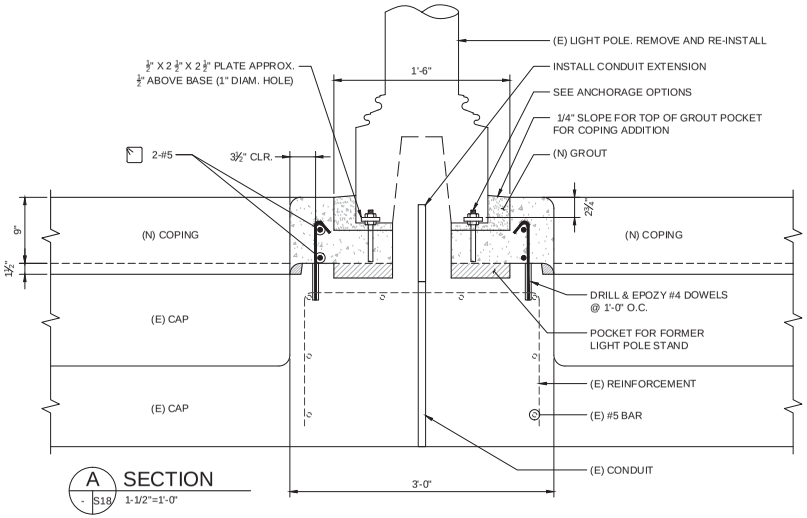
LIGHT POLE DETAILS

SCALE AS SHOWN

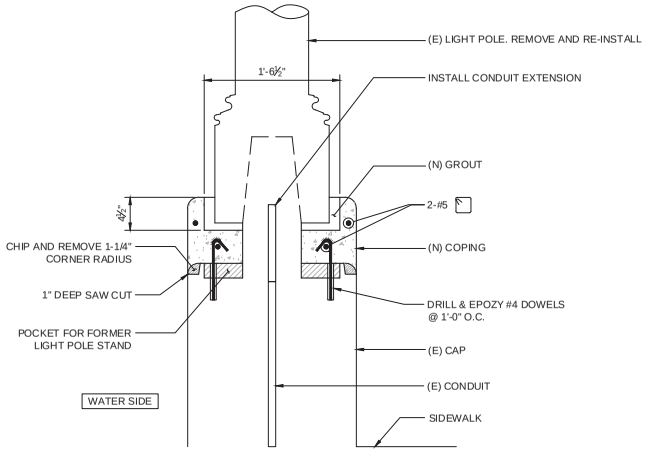
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

SHEET 17 OF XX



A SECTION
- S18 1-1/2"=1'-0"



B SECTION
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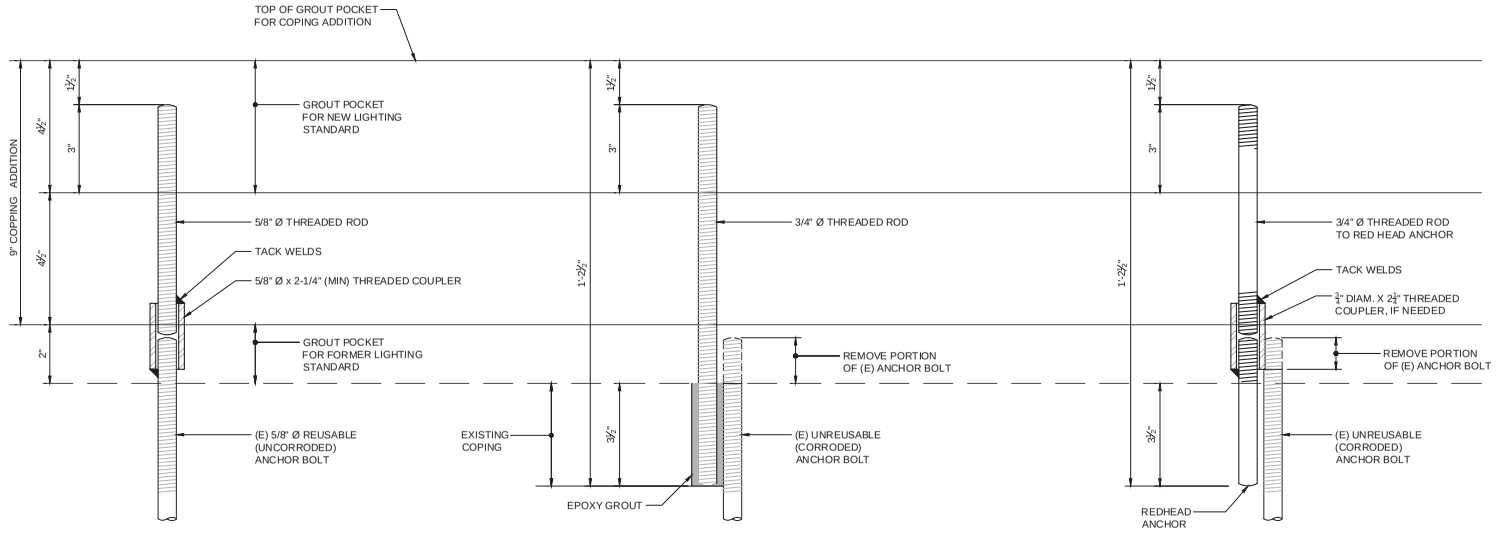

1 ANCHORAGE DETAIL A
- S18 6"=1'-0"

2 ANCHORAGE DETAIL B
- S18 6"=1'-0"

3 ANCHORAGE DETAIL C
- S18 6"=1'-0"

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ENGINEER OF RECORD		

NO.	DATE	REVISION

REVIEWED:

WARREN A. STEWART, RCE C41358
COWI MARINE NORTH AMERICA

DESIGNED: WNST
DRAWN: MCLS
CHECKED: GAVP
DATE: 03/18/16

BALBOA ISLAND COPING REPAIR

LIGHT POLE DETAILS

SCALE AS SHOWN

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5235-S

SHEET 18 OF XX

ATTACHMENT 4

Bulkhead Condition Report

JUNE 2017
CITY OF NEWPORT BEACH

Bulkhead Condition Report for Portions of the Balboa Island Seawall

COWI

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JUNE 2017
CITY OF NEWPORT BEACH

Bulkhead Condition Report for Portions of the Balboa Island Seawall

PROJECT NO.	DOCUMENT NO.
A074385	

VERSION	DATE OF ISSUE	DESCRIPTION	PREPARED	CHECKED	APPROVED
1	6/30/2017	Deliverable	WNSX	JWK	WNSX

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1 Executive Summary

The current height of the seawall is insufficient to resist flooding due to overtopping during very high tides, especially when combined with storm conditions. Refer to the main report "Assessment for Seawall Structural Integrity and Potential for Seawall Over-Topping for Balboa Island and Little Balboa Island" for complete details. Within the cover letter of Appendix C of the report (URS/Everest, 2011, p. iii), the first phase towards a long-term solution for the wall is to raise the current cap elevation. This recommendation is being implemented with this project.

In December 2015, the City of Newport Beach, Department of Public Works (City)commissioned COWI North America, Inc. (COWI) to prepare contract documents for the construction of a 9-in. high addition to the existing seawall coping of the bulkhead that surrounds Balboa Island. The project starts from Bayfront South and Grand Canal, continues around the west end of the island, and finishes at Bayfront North and Grand Canal. The total length of the proposed coping raise is approximately 7,400 LF. Prior projects raised the top of the coping along the Grand Canal (as well as all of Little Balboa Island); thus, this project raises only the coping not yet raised.

The purpose of this report is to provide a stand-alone attachments based on previous analyses and our own investigation per standard requirements. A statement of the preparer's qualifications is provided.

The current bulkhead for the majority of the perimeter of the island was rebuilt circa 1938 using plans completed a few years earlier (Newport Beach, 1935). The design utilized precast soldier concrete piles spaced typically at 11 ft – 8 in. on-center, with precast concrete in-fill panels between the piles. The soldier piles were restrained at the top with 1¼" steel tie-back rods anchored to Douglas fir timber pile dead men. A 500 ft reach of the then pre-existing concrete sheet pile wall at the west end of the island (between Emerald Avenue at Bayfront South and Park Avenue) was incorporated "as is", with just a partial replacement of the coping to match the rest of the project.

A number of previous condition reports and repair project drawings were provided by the City for this review. These included:

- Cash & Associates (1985) and Repair Project (1988)
- Little Balboa Island Seawall Raising (1989)
- Cash & Associates (2005)
- URS (2010/2011)
- COWI (2016)
- Current Project Inspection

The current condition of the Balboa Island seawall within the scope of this project is **Fair**, in accordance with the rating requirements of American Society of Civil Engineers, Manual of Standard Practice, MOP 130 – Waterfront Facilities Inspection and Assessment (ASCE, 2015, p. 64). As such, all primary structural elements are sound; but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce the load bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.

In constructing the coping raise, a number of the defects that still occur on top of the coping will be corrected by the process itself. Typically, the existing top surface will be roughened to bond the new concrete to the old. However where loose concrete is encountered, it will be removed to sound substrata before placing new concrete on top.

The condition of the tieback system has not been re-examined since 1985 and the tie rods are assumed to be in critical condition, either severely corroded or severed. Because of this, seawalls must not have a mudline or rip-rap in front of the wall lower than 4 ft below the pavement behind the wall. Otherwise, the seawall must have the tieback system restored. Based upon our most recent inspection (June 2017), there is only one reach, 350± ft from the Collins Island bridge along the Bayfront North boardwalk, that doesn't conform to this requirement. However, there is no visible signs of distress, and other factor maybe contributing to the success of this wall.

There is no positive connection provided between the top of the precast wall planks and soldier piles and the cast-in-place coping. The coping remains in place due to its own self-weight and any bond value and friction that might develop along the boundary between it and the pre-cast elements, which are embedded into the coping. This will be corrected with the project.

The coping raise will add 9 in. to the height of the walls. To accomplish this, the existing corner chamfers and rounds will be removed and the top of existing coping will be intentionally roughed to create a good bond with the new concrete. When found, any loose and deteriorated concrete will be removed to sound concrete. Next hooked rebar dowels will be drilled and grouted into the top of the existing concrete. Continuous rebar will be placed along the top, and the new raise will be poured. The positive connection between the coping and the piles below is made by extending one of the dowel holes that falls over each pile an additional 2 ft or so, through the cap and into the pile underneath. A singular, larger and longer dowel is grouted in place.

Any other repairs can be made at this time at the discretion of the City.

2 Background and Purpose

2.1 Project Background

In December 2015, the City of Newport Beach, Department of Public Works (City)commissioned COWI North America, Inc. (COWI) to prepare contract documents for the construction of a 9-in. high addition to the existing seawall coping[1] of the bulkhead that surrounds Balboa Island. The project starts from Bayfront South and Grand Canal, continues around the west end of the island, and finishes at Bayfront North and Grand Canal. The total length of the proposed coping raise is approximately 7,400 LF. Prior projects raised the top of the coping along the Grand Canal (as well as all of Little Balboa Island); thus, this project raises only the coping not yet raised.

In July 2016, the City requested COWI prepare a Coastal Development Permit (CDP) application to the California Coastal Commission (CCC) for the project. This was submitted in October, 2016. In November 2016, the CCC responded requesting more information regarding the project. One of the requested items was a Bulkhead Condition Report. Response to the CCC's November letter was submitted to the City in March of 2017. During this period, jurisdiction for the project switched from the CCC to the City's Planning Department, and the responses to the November CCC letter were re-directed to the Planning Department. In early May, 2017, COWI received a request to provide additional information from the Planning Department, of which one item was a Bulkhead Condition Report.

2.2 Report Purpose

The purpose of this report is (as defined by the City's Planning Department in their request for additional information):

"1. Create these stand-alone attachments:

a. Create a **Bulkhead Condition Report** (Section 21.30.15.E.3) – based on previous analyses and your own investigation per the standard requirements listed below. Include a statement that existing bulkhead is in good condition and can support the coping extension.

> *3. Bulkhead Condition Report. Where a coastal hazards report shows that an existing bulkhead on the site cannot be removed and/or an existing or replacement bulkhead is required to protect existing principal structures or public facilities, the applicant shall submit a bulkhead condition report that includes the following:*
>
> *a. A statement of the preparer's qualifications;*
> *b. An analysis of the condition of any existing bulkhead including whether the top elevation meets current City standards, the condition of the sheetpiles or panels, the condition of existing tiebacks and/or deadmen or similar, and any other relevant conditions;*

[1] The City's preferred term is "coping" to reference the cast-in-place concrete poured on top of the precast concrete slab and pile bulkhead system. These are the terms used in the original construction documents. Other terms (i.e., "cap") have also been used in previous reports.

c. Recommendations regarding the need for repair, augmentation or replacement of the bulkhead or any parts thereof;
d. If augmentation or replacement in the existing alignment is necessary, recommendations that will avoid seaward encroachment of the bulkhead;
e. If replacement is necessary and the existing bulkhead is not in alignment with adjacent bulkheads, recommended alternatives that will relocate the bulkhead in as much in alignment with adjacent bulkheads, and as far landward, as possible."

2.3 Statement of the Preparer's Qualifications

COWI is a highly competent specialty engineering firm, with over 85 years of experience in the design, repair, and construction of marine and coastal structures such as the Balboa Island Seawall. With more than 6,400 staff worldwide and 100 marine-specialty technical staff in 12 North American offices, our team has extensive experience in consultation, planning, inspection, analysis, and design services, solving structural engineering issues associated with the inspection and rehabilitation of existing structures. Our quality lies in the composition of our inspection teams: all of our inspections are performed by our in-house California registered Professional Engineers and Structural Engineers, including (when needed) our commercially trained engineer-divers.

The author of this report is a California registered Structural Engineer and has over 40 years of professional engineering experience on a variety of projects for local, state, and federal agencies, private utilities and institutional clients. This includes over 25 years managing marine, waterfront, port and harbor, transportation, and other infrastructure projects Southern California. On over 150 projects, he has been responsible for the production, coordination and review of engineering design and construction documents, cost estimates, project specifications, construction management, report writing and/or reviews. He was elected to the American Society of Civil Engineers (ASCE) Academy of Coastal, Ocean, Port & Navigation Engineers (ACOPNE) and has been a member of the Coasts, Oceans, Ports, & Rivers Institute (COPRI) Ports & Harbor Committee for a number of years. He sits on the national ASCE/COPRI committee that wrote *Waterfront Facilities Inspection and Assessment, Manual of Practice MOP-130*, which was recently published by ASCE.

3 Condition Assessment

3.1 Original Construction

According to a Cash & Associates Report (C&A, 2005), the current bulkhead for the majority of the perimeter of the island was rebuilt circa 1938 using plans completed a few years earlier (Newport Beach, 1935). The design utilized precast soldier concrete piles spaced typically at 11 ft – 8 in. on-center, with precast concrete in-fill panels between the piles. The soldier piles were restrained at the top with 1¼" steel tie-back rods anchored to Douglas fir timber pile dead men. Figure 1, taken from the original drawings, shows the typical cross-section of the seawall.

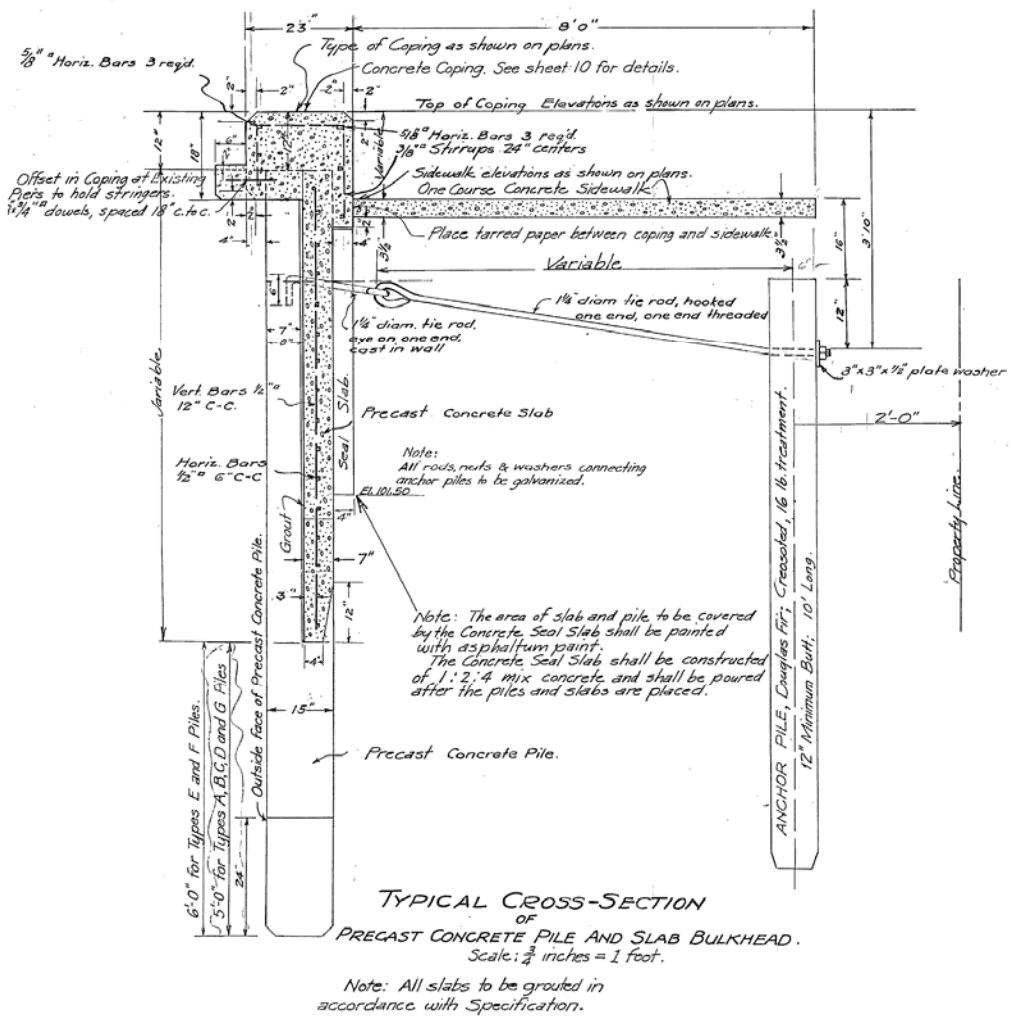

Figure 1 - Original Seawall Construction, 1938

Previously constructed timber bulkheads were replaced by this project. However, a 500 ft reach of the then pre-existing concrete sheet pile wall at the west end of the island (between Emerald Avenue at Bayfront South and Park Avenue) was incorporated "as is", with just a partial

replacement of the coping to match the rest of the project. Apparently, this wall was constructed in the mid-1920's, and evidently was considered sufficiently adequate to be incorporated into the project in lieu of removal and reconstruction. Figure 2, taken from the original drawings, shows the 1920's wall with the new coping.

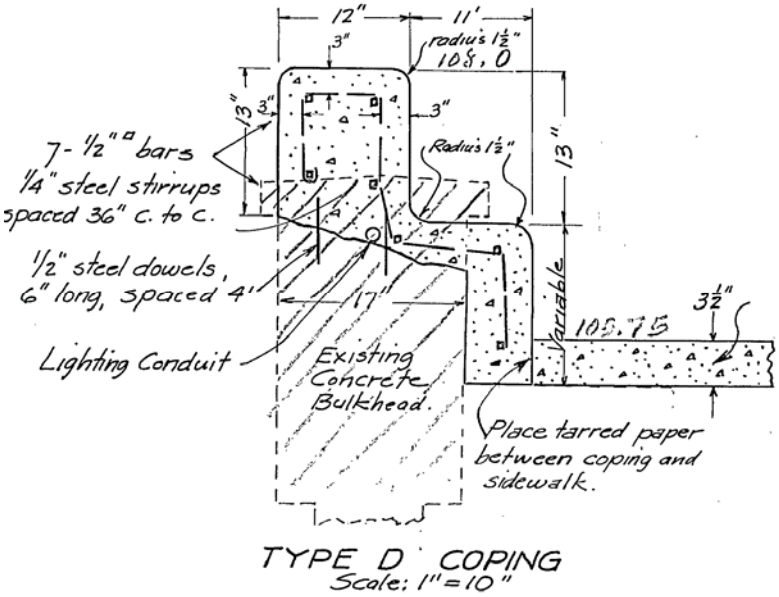

Figure 2 - Existing Seawall Incorporated into Project

3.2 Previous Reports

A number of previous reports and repair project drawings were provided by the City. Some of these had significant bearing on this report. All of the reports are included in the appendices. All of the reports specifically excluded seismic issues from the analysis and reporting. These reports are further discussed below.

3.2.1 Cash & Associates (1985) and Repair Project (1988)

A 1985 investigation of the entire seawall was conducted by Cash & Associates (C&A, 1985). They found a number of issues that resulted in repair projects being undertaken. Of foremost concern was the condition of the tiebacks (see Figure 1). Six locations were selected for excavation (test pits) to uncover the tiebacks and observe their conditions. Four of the pits were located on Little Balboa Island behind the 1938 wall, but are indicative of the probable condition of all 1938 tiebacks throughout. The remaining two pits were located at the west end behind the 1920's concrete sheet pile wall as described above. The drawings do not indicate that the tie-rods were replaced in 1938; hence they are assumed original. All tie-rods were found to be heavily corroded with significant loss of section or severed, and no longer effective. These conditions are probably representative of all the tiebacks throughout. However based upon calculation that they prepared,

tiebacks are not needed if the soil in front (waterside) of the seawall is not lower than 5 ft from the top of the coping[2].

Rather than replacing the tiebacks, a project was initiated to place rock rip-rap along portions of the bulkhead (Newport Beach, 1988). This provides a buttress for the wall. The capacity of the wall in the cantilever configuration was checked in the 1985 report, A subsequent independent calculation has not been made.

3.2.2 Little Balboa Island Seawall Raising (1989)

In 1987 a project to raise the seawall along East Bay Front, Little Balboa Island was undertaken as a Department of Public Works in-house project, and completed two years later (Newport Beach, 1989). The method used was similar to that proposed for the current project; i.e., constructing a new continuous raise on top of the existing coping. The new elevation was given to be 9.0 ft MLLW for the majority of length with the southern-most 150 ft at 9.5 MLLW.

3.2.3 Cash & Associates (2005)

In 2005, Cash & Associates completed another inspection and condition assessment for Balboa Island and Little Balboa Island (C&A, 2005). The seawall was generally noted in good condition; but in 274 pages, the report detailed defects requiring repairs, with photos. Repairs were categorized according to three priories: (1) non-seismic, structural repairs that posed greatest danger to life safety; (2) repair of property damage; and (3) cosmetic damage. Only one non-structural Priority 1 was noted (a cover for an electrical pull box).

A cost estimate for the repairs was provided along with typical details for completing the repairs.

3.2.4 URS (2010/2011)

In 2010 URS (successor to Cash & Associates) issued another condition assessment report. This report was included as Appendix C in the Everest Consulting, Inc. report (URS/Everest, 2011).

The stated purpose of the report was "to assess the current structural condition and remaining lifespan of the Balboa Island seawall and its ability to withstand existing tidal and swell events and future projections of sea level rise … [and] was not intended to include a detailed survey of individual distresses in the seawall, but rather to highlight general conditions for the purpose of determining remaining useful life of the seawall and repair/replacement options."

---

[2] It should be noted that the top of the coping is a convenient reference point but has little structural significance. The true measure of the wall stability is how far the soil in front of the wall (mudline) is below the top of the sidewalk behind the wall. Thus, any raising of the coping has no effect on the wall capacity or stability as thus calculated. Note that the 2011 URS report (discussed in § 3.2.4 below) states that the wall "would be stable without tie-rods for gravity loads, if the exposed height of support (i.e., the difference in elevation between top of boardwalk and top of mudline) was no greater than 5 feet." This is different than the 1985 statement. In reviewing the calculations included with the 1985 report, the top of side walk is assumed to be 13 in. below the top of coping, and the max distance to the mudline is shown as 4.85 ft. Thus, the statement above should say "… the difference in elevation between top of boardwalk and top of mudline was no greater than 4 feet", using rounded numbers.

The report notes that the "1985 Report prompted the City to stabilize the toe of the seawall at four locations around the Island by constructing rock revetments. These locations are at the three corners of Little Balboa and along the aforementioned 500-foot-long section of seawall at the western end of Big Balboa (see Photo 1). Rock revetments were also installed at the two corners of Big Balboa that form the Grand Canal. Observations also noted a separate seawall stabilization project performed along the seawall east of the Balboa Island Ferry Boat Landing. Earth anchors were installed, as shown in Photo 2, and a submerged concrete block revetment was placed at the toe of the seawall."

It further notes "The City of Newport Beach also pursued a repair and maintenance program in response to the 2005 Report which detailed extensive distress (i.e., cracks and spalls) in the Balboa Island seawalls. Most of the noted distresses in the seawall cap and soldier piles were repaired (see Photo 3 for an example of a typical repair)."

The report went on to document the various modifications that had been made over the years and additional repairs needed. It also included discussions on other elements (e.g. bridges, ferry) that are not included in this project.

3.2.5 COWI (2016)

At the request of the City, COWI completed an inspection and condition assessment of the west end bulkhead (COWI, 2016). Two primary areas were investigated: (1) the condition of 500 LF of wall south of Park Avenue (i.e., the old concrete sheet pile wall as described in § 3.1 above); and (2) the condition and panel tip elevation of a similar length of wall north of Park Avenue (typical soldier pile & infill panel construction). In addition to the condition of the concrete for both, the revetment placed in 1988 to buttress the old wall was checked for current condition and any signs of settlement or instability. The tip of the wall panels on the north side were probed to see how deep they were placed.

In general, the wall and coping conditions were rated as Fair per MOP-130 (ASCE, 2015), with isolated defects rated minor to major. The revetment along the south wall was found to be essentially as shown in the drawings and the tip elevations of the wall panels were found to be much deeper than shown on the drawings (surprising but welcomed news).

3.2.6 Current Project Inspection

Prior to starting design of the current project in 2016 to raise the coping, an inspection and condition assessment of the seawall was undertaken primarily to document defects that would need to be addressed in conjunction with the proposed construction. Cosmetic repairs that would not affect the new construction were not included in the project. The required repairs are included in the project drawings.

3.3 Current Structural Condition of the Seawall

The current condition of the Balboa Island seawall within the scope of this project is **Fair**, in accordance with the rating requirements of American Society of Civil Engineers, Manual of Standard Practice, *MOP 130 – Waterfront Facilities Inspection and Assessment* (ASCE, 2015, p. 64). In rating the wall as such, it is recognized that "all primary structural elements are sound; but

minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce the load bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low."

Most of the defects noted in the reports in §3.2 above are cosmetic in nature or of a low priority so that they can be repaired when most economically advantageous. All of the major defects noted in these earlier reports have been repaired along with some of the more unsightly cosmetic defects.

In constructing the coping raise, a number of the defects that still occur on top of the coping will be corrected by the process itself. Typically, the existing top surface will be roughened to bond the new concrete to the old. However where loose concrete is encountered, it will be removed to sound substrata before placing new concrete on top.

The condition of the tieback system has not been re-examined and the tie rods are assumed to be in critical condition, either severely corroded or severed. Because of this, seawalls must not have a mudline or rip-rap in front of the wall greater than 4 ft lower than the pavement behind the wall, as discussed in §3.2.1 above, including footnote 2. Otherwise, the seawall must have the tieback system restored. In the most recent inspections (July 2016 / June 2107) these conditions were all met, with the exception of ±350 ft of the north-west end seawall between Park Avenue / Collins Island Bridge and Emerald & North Bayfront. As discussed in the west-end seawall report noted above (COWI, 2016), the exact structural conditions are unknown. However, there does not appear to be structural distress to the wall even though the mudline is as much as 6 to 7 ft below the pavement in some locations.

It is also noted in the reports referenced above, and reiterated here, that seismic performance has not been evaluated and is specifically excluded from the analyses.

3.4 Capacity of the Wall to Resist Flooding

The current height of the seawall is insufficient to resist flooding due to overtopping during very high tides, especially when combined with storm conditions. Refer to the main report *"Assessment for Seawall Structural Integrity and Potential for Seawall Over-Topping for Balboa Island and Little Balboa Island"* for complete details. Within the cover letter of Appendix C of the report (URS/Everest, 2011, p. iii), the first phase towards a long-term solution for the wall is to raise the current cap elevation. This recommendation is being implemented with this project.

4 Structural Capacity for Coping Raise

4.1 Description of Existing Coping

As mentioned in previous reports and confirmed herein, there is no positive connection between the top of the 1938 precast wall planks (slabs) and cast-in-place coping. As shown below (Figure 3), reproduced to scale from the original construction drawings, the only connection is the lifting hook in the precast soldier pile (shown as a dashed line). We cannot be sure that this even exists, as there is the possibility it was burned-off to facilitate driving. In fact, there is a handwritten notation on the current version of the drawings that this hook does not exist for most of the piles. In any case, calculations show that this hook would not be sufficient to transmit all of the lateral loads against the coping into the wall (or more likely the soldier piles) below.

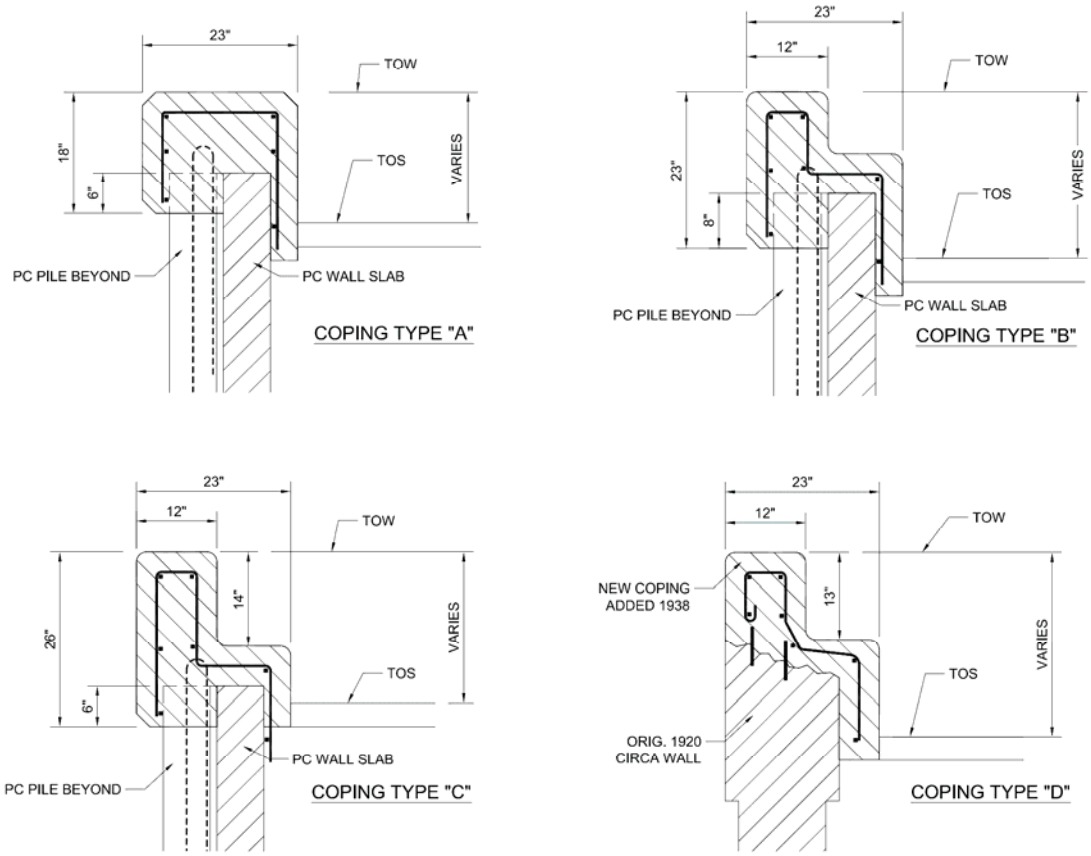

Figure 3 - Coping cross-sections, A, B, C, and D

Thus, the coping remains in place due to its own self-weight and any bond value and friction that might develop along the boundary between it and the pre-cast plank, embedded 6 to 8 in. into the coping. Coping type D is unique in that it re-uses an existing wall constructed before the 1938 project, and modifies the existing coping to resemble the other coping types used in the project.

The connection between the previous and modified is simply two pins extending across the cold joint, each pin embedded 3 in. on either side of the joint. The connections appears to have held over the years, but the joint is visible from the outside as shown in Figure 4.

Figure 4 - Cold joint visible along Coping Type D

The location of the various coping is shown in Figure 5.

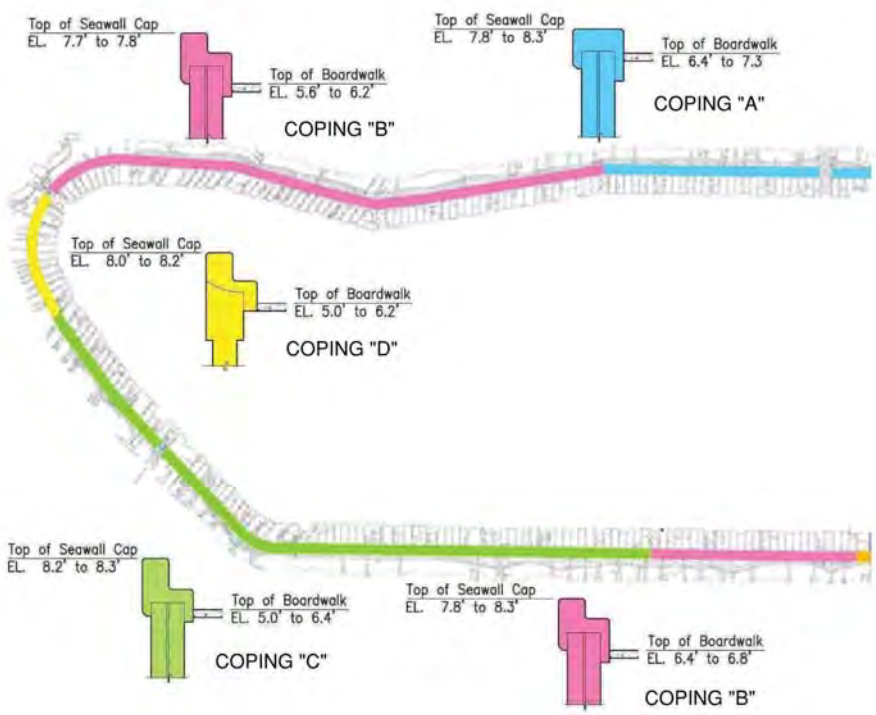

Figure 5 - Location of coping types

4.2 Details of the Coping Raise

The coping raise will add 9 in. to the height of the walls. To accomplish this, the existing corner chamfers and rounds will be removed and the top of existing coping will be intentionally roughed to create a good bond with the new concrete. Next hooked rebar dowels will be drilled and grouted into the top of the existing concrete. These will be staggered, and the exact spacing will be determined during design. Two continuous rebars will be placed at the top, and the new raise will be poured as shown in Figure 6. Reinforcing shown is preliminary and subject to change. Where needed for access, a concrete step about 3 ft long will be constructed as shown.

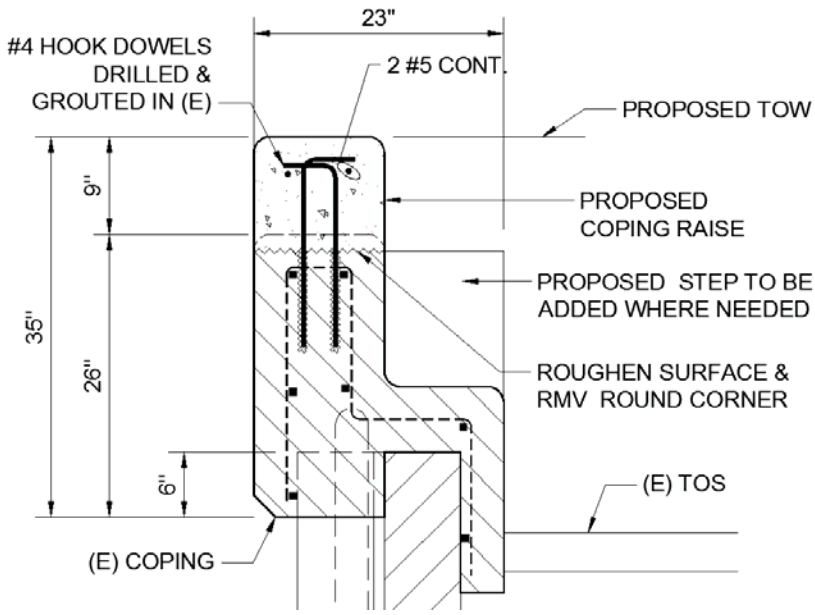

Figure 6 – Details of Typical Coping Raise

Because of the lack of a positive connection between the existing coping and the wall and piles below, and because the added height will add some extra lateral load to the wall, a positive connection is desirable. This can be easily accomplished by extending one of the dowel holes shown in Figure 6 that falls over each pile an additional 2 ft or so, through the cap and into the pile underneath. A singular, larger and longer dowel is grouted in place. See Figure 7.

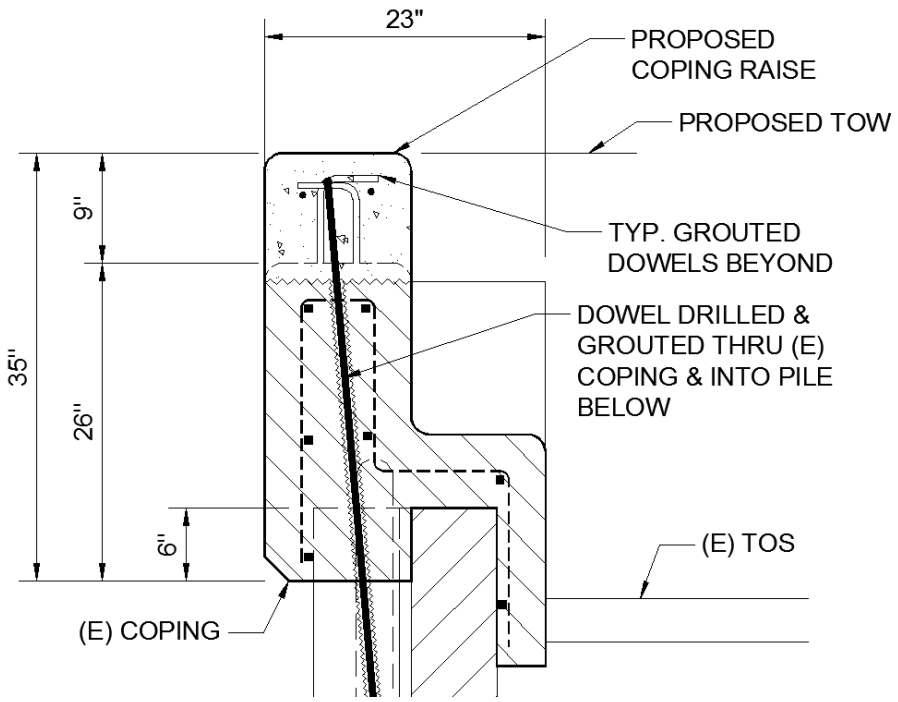

Figure 7 - Detail of Proposed Connection between (E) Coping and (E) Pile

4.3 Summary

Based upon the review of the previous reports and our more recent inspections, it is determined that the existing seawall can be raised 9 in. by constructing a new concrete coping raise on top of the existing coping providing the all of the following is including in the project:

- The top of the existing coping is removed and/or roughened to allow the new concrete to bond to the existing.
- When found, any loose and deteriorated concrete is removed to sound concrete and the void filled with the new raise pour.
- Anchor dowels are drilled and grouted into the top of the existing coping to provide a positive load resisting connection.
- A positive connection between the existing coping and the existing soldier piles below is made by extending one of the anchor dowel holes into the pile below using a longer and larger diameter rebar dowel.
- The new coping raise is adequately reinforced to accept all new loads applied.
- The new concrete be of high-strength, high quality, marine-grade concrete.

5 References

ASCE. (2015). *MOP 130 – Waterfront Facilities Inspection and Assessment.* Reston VA: American Society of Civil Engineers.

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Appendices

Appendix 1

Cash & Associates (1985) and Repair Project (1988)

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INTRODUCTION

Cash & Associates Engineers has been requested by the City of Newport Beach to evaluate the structural integrity of the existing bulkheads in specified areas around Balboa Island. The investigation was accomplished by observation and measurements at the project site and calculations evaluating the observed existing condition. The existing bulkheads included in this study are all over 50 years old. We have been told that in 1935 the concrete caps were extended in several areas around the perimeter of the island to provide greater protection from storm conditions.

This study was conducted at two basic localities on Balboa Island. Site No. 1 is considered "Little Balboa Island" just east of The Grand Canal. Site No. 2 is a 496 foot length of curved bulkhead on the far west end of Balboa Island across from Collins Island. See Figure 1 for the vicinity map locating the two sites and the test pits excavated in the investigation.

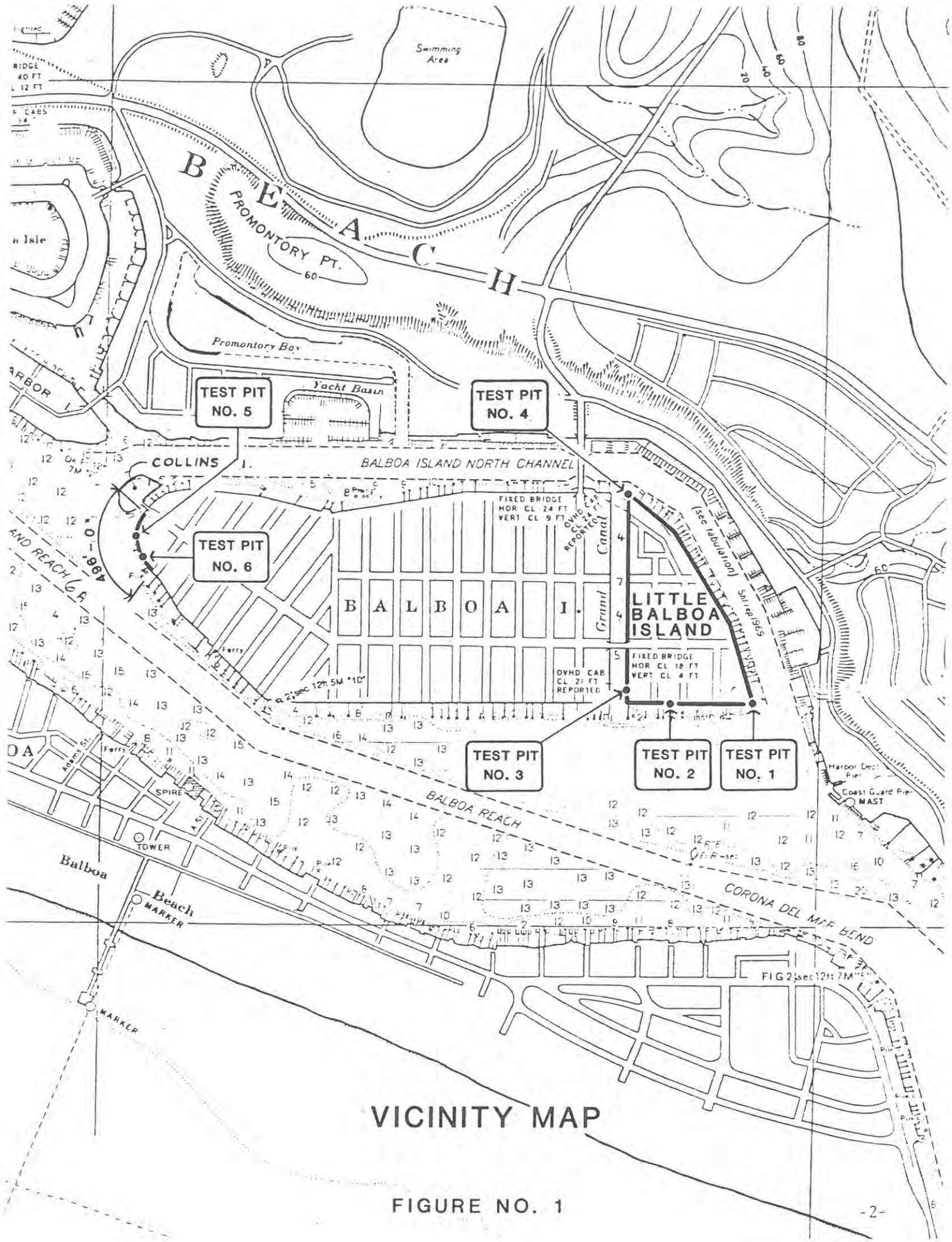
The scope of the investigation was as follows:

- Make a visual condition survey of the bulkhead cap and wall
- Administer the unearthing of tie-rods at six (6) representative locations
- Evaluate the structural integrity of the existing tie-rods and tie-back system
- Evaluate, if possible, the condition of the timber piles being utilized as dead men
- Provide documentation regarding the existing mudline elevations around the island
- Provide calculations evaluating the structural stability of the existing bulkhead systems
- Provide alternative concepts and conceptual cost estimates for bulkhead repair.

EXECUTIVE SUMMARY

Based on the test pits investigated, measurements taken and calculations made to determine existing adequacy of the bulkhead support systems, the following conclusions can be summarized:

- The 496'-0" curved bulkhead on the west end of Balboa Island is at high risk of failure if severe soils movements, seismic and/or tidal activity were to occur. Tie-rods are corroded and severed and the cap has shown evidence of structural cracking and movement.
- All tie-rods observed have accumulated heavy amounts of deposits and scale attributable to corrosion. No evidence of any corrosion protection currently exists.



VICINITY MAP

FIGURE NO. 1

- In most cases, the timber piles acting as dead men lie within the active pressure zone of the soil behind the wall and should not be considered as fully resisting the lateral forces imposed.

- The concrete caps require remedial repair at designated locations as indicated in this report. In general, cap condition is satisfactory.

- Concrete sheet and soldier piles are also in good condition.

SITE CONDITIONS

Bulkhead Types

The bulkheads observed fall into two (2) basic types:

Type 1

- Concrete soldier pile and horizontal concrete lagging w/tie-backs to a timber pile dead man.

Type 2

- Vertical concrete sheet piles and cap w/tie-backs to a timber pile dead man[1]

See Figures No. 2 and 3 illustrating the two basic types of systems involved in this investigation.

FIELD INVESTIGATIONS

Approach

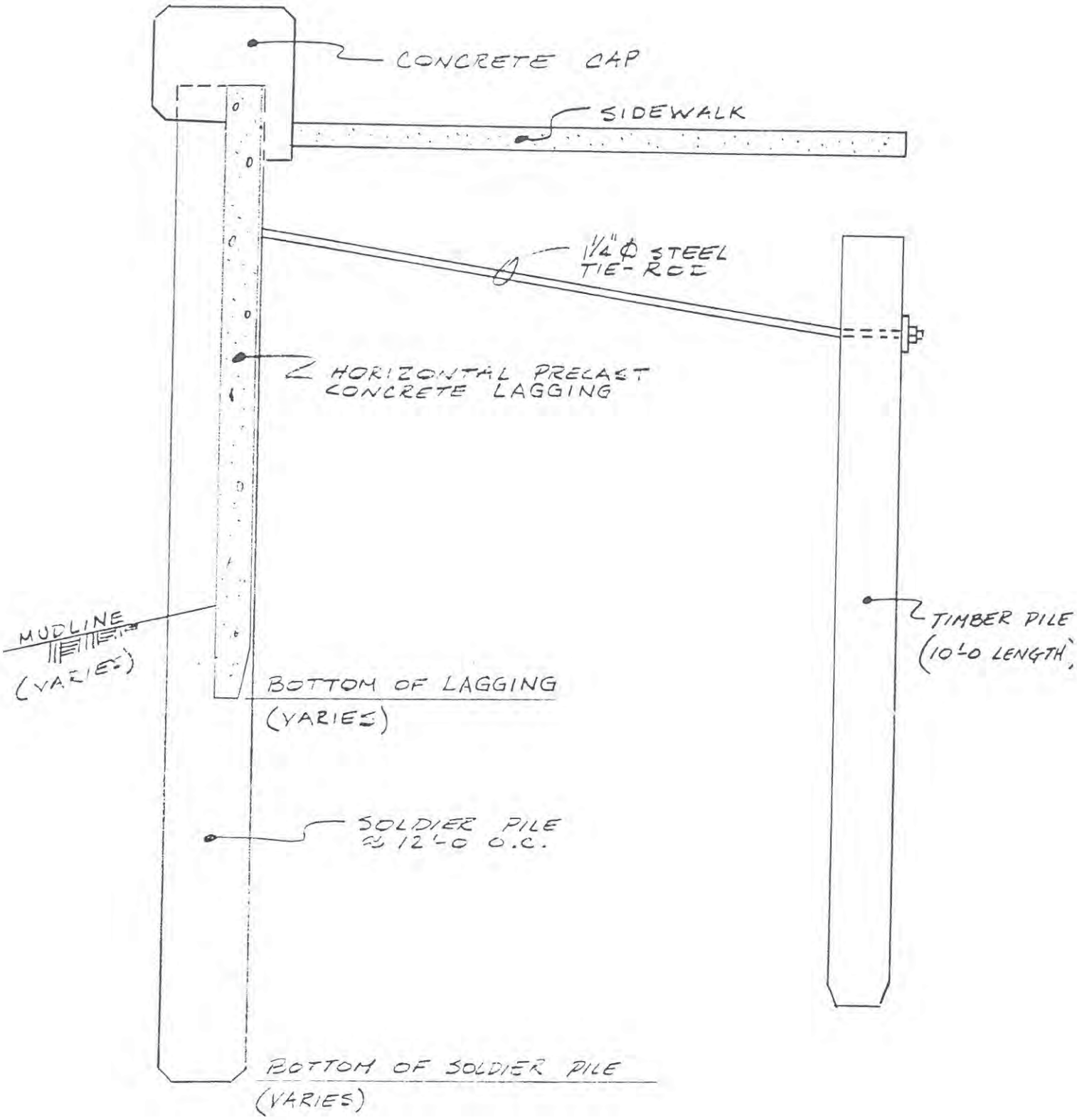
Six (6) sites were chosen to observe the existing condition of tie-rods and timber pile dead men. These sites were selected because they either represented the different basic conditions around the island or showed visible evidence of cap damage. The length of excavations parallel to the bulkhead were selected at between 15 and 20 feet to assure locating at least one tie-rod per test pit.

Excavation was accomplished by demolishing the existing concrete sidewalks at the designated sites and digging by hand to uncover the steel tie-rods beneath the surface. Photographs were taken of all rods both before removing the scale and deposits around the rods and then again after the material was removed. See Appendix for reference photographs taken of representative conditions encountered. Measurements were taken of the rod diameters and condition of the timber piles were logged.

Samples of special conditions were removed and tagged for reference (Exhibits A, B and C).

The concrete cap was visually surveyed and existing mudlines measured around the perimeter of the island.

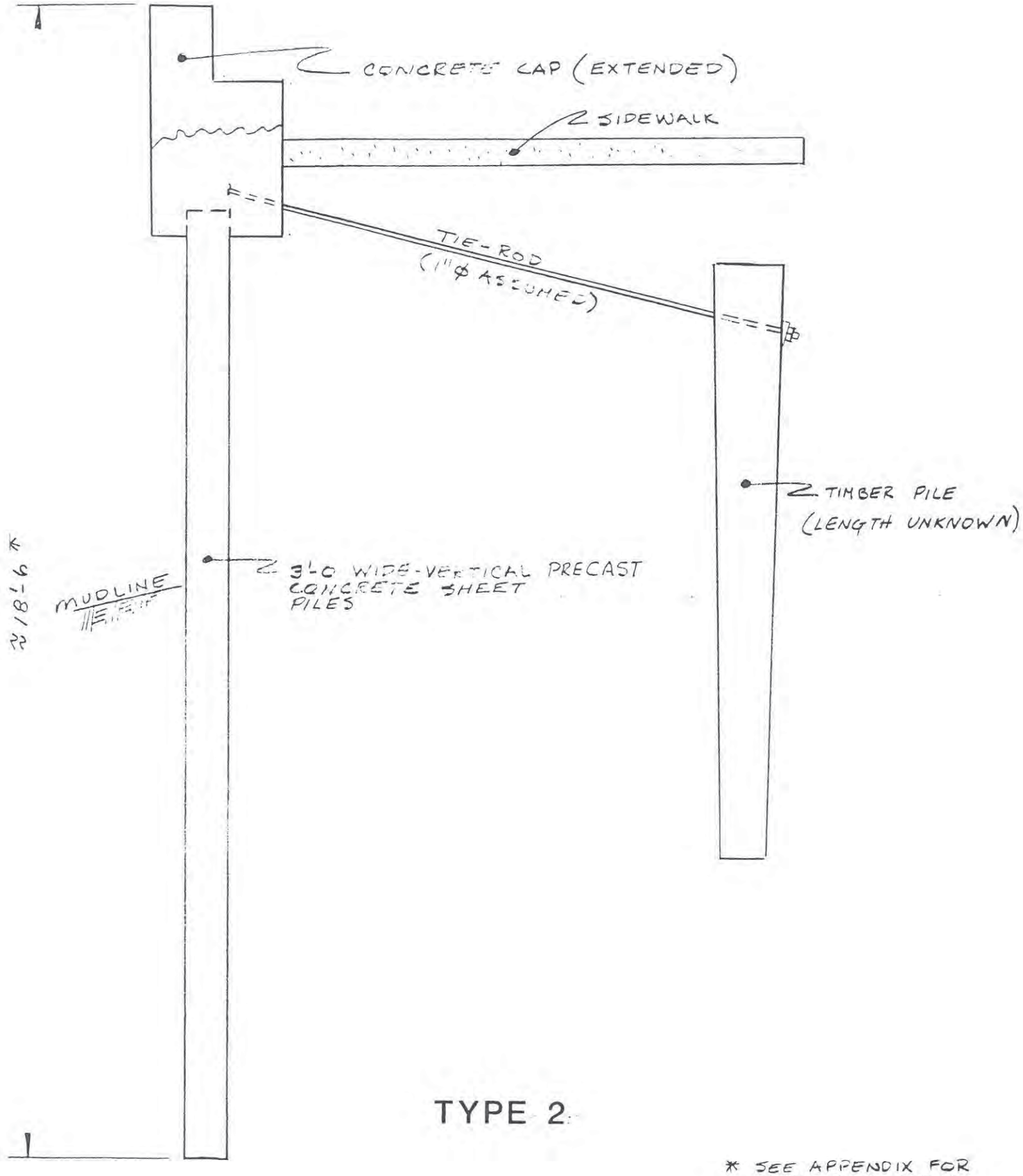
[1] No existing as-built drawings can be located for the Type 2 condition.



TYPE 1

FIGURE NO. 2

JUNE 13, 1983



TYPE 2

FIGURE NO. 3

* SEE APPENDIX FOR SURVEY OF WALL BY THE CITY OF NEWPORT BEACH-PUBLIC WORKS

DATA COLLECTION

Test Pit No. 1 (See Figure No. 4)

Rods

1. All rods observed evidenced excessive corrosion (See Exhibit A)
2. Rods ranged from 40% to 90% of their original cross-sectional area
3. All rods appeared to be in tension
4. Rods did not show any evidence of corrosion protection
5. Rod interface at soldier piles and timber pile appeared good
6. Rods were in one piece from soldier pile to timber pile without splice, eyes or turnbuckles

Timber Piles

1. Diameter of the butt end of those piles observed was approximately 13 inches.
2. Piles were only exposed in their uppermost 1'-6" to 2'-0" of length.
3. Pile #4 was located well within the residential property boundary line.
4. Pile #3 was excessively out-of-plumb.
5. Piles appeared to be in satisfactory condition in regards to integrity of the timber.
6. Excessive corrosion deposits formed at the timber piles (See Exhibit B).

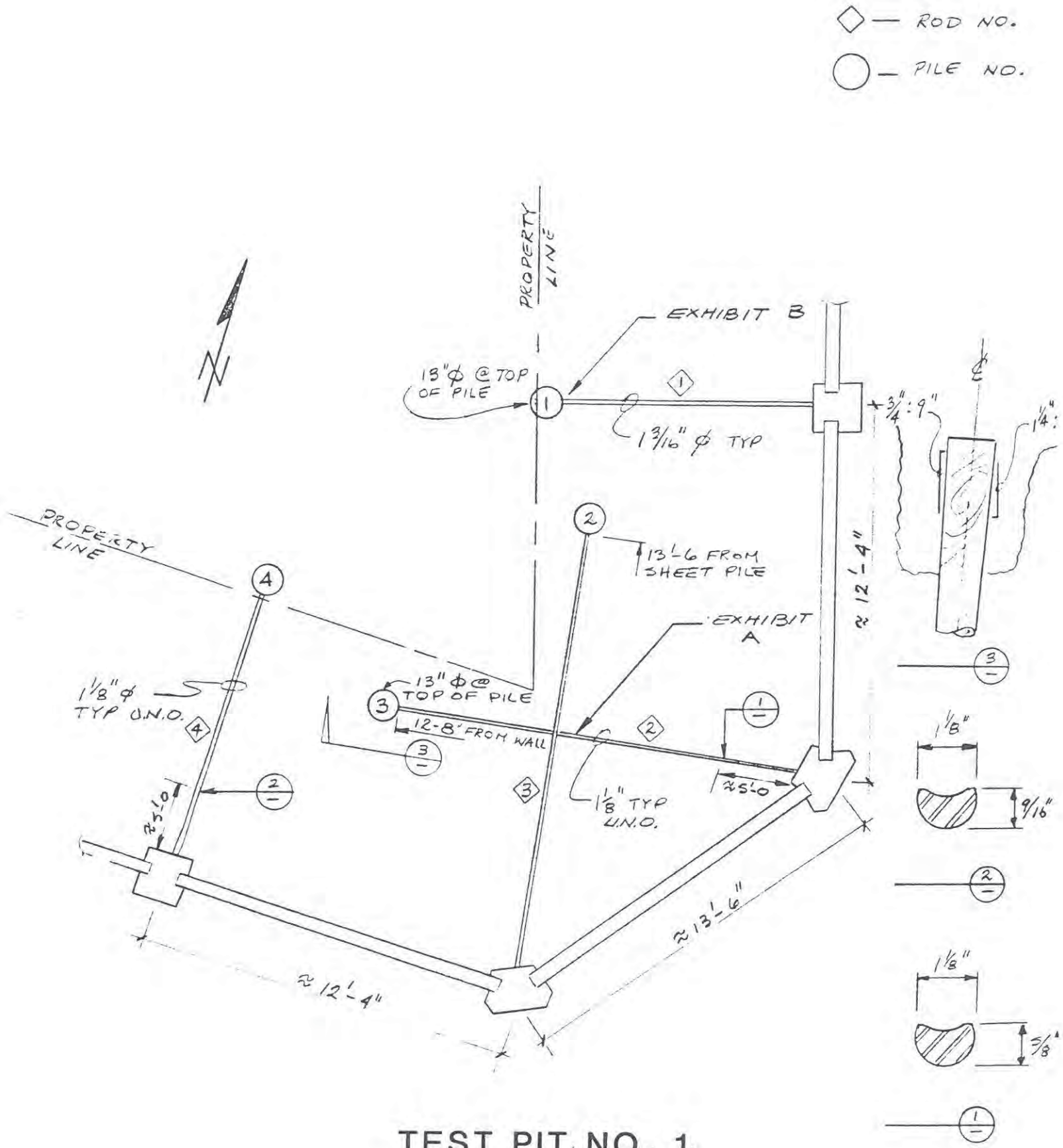
Test Pit No. 2

1. No tie-back support system was uncovered at this test pit.

Test Pit No. 3 (See Figure No. 5)

Rods

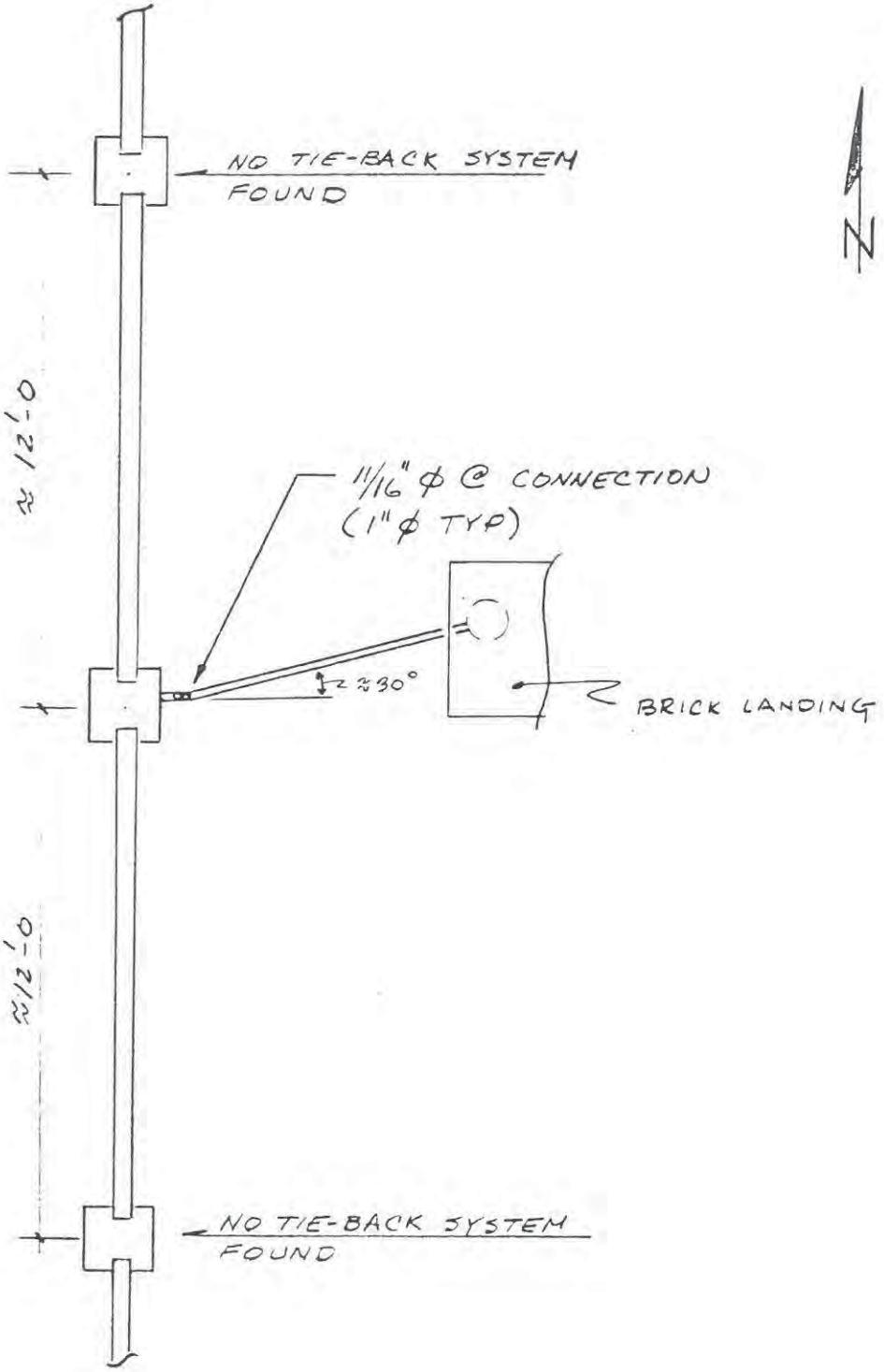
1. Of the three soldier piles within this pit, only one tie-rod was observed
2. The tie-rod observed was approximately 50% of its original cross-sectional area, assuming a 1-inch original diameter
3. The tie-rod showed no evidence of any existing corrosion protection
4. The tie-back assembly consisted of a "U" bar embedded into the cap and a tie-rod with a hook engaging the "U" bar. This assembly was not in the plane of the line of stress. See Photos - Test Pit No. 3 - Frames 23 and 3A.



TEST PIT NO. 1

FIGURE NO. 4

JUNE 13, 1985



TEST PIT NO. 3

FIGURE NO. 5

Timber Pile

1. The timber pile was beneath existing improvements and could not be fully observed, but appeared to be in satisfactory condition based on the portion of the pile which was observed.

Test Pit No. 4 (See Figure No. 6)

Rods

1. All conditions were similar to that observed in Pit No. 1 with the following additional findings:

   a. Rod #3 was found to be completely corroded and severed within the timber pile (See Exhibit C).

Timber Piles

1. All conditions were similar to that observed in Pit No. 1.

Cap, Sheet and Soldier Pile Investigation ("Little Balboa Island")
See Dwg. No. 2565-1

In general, the soldier and sheet piles observed were in good condition and showed little evidence of concrete deterioration or reinforcing bar corrosion.

The caps around Little Balboa Island are of two basic types. The cap along the Grand Canal was extended by doweling and casting additional concrete on top of the original cap. The remaining two sides of the island remain in their original condition.

As illustrated on Drawing No. 2565-1, the most prevalent cap condition around the island is evidenced by a longitudinal cracking or spalling of concrete on the waterside of the cap. This condition is sometimes accompanied by the exposure of the reinforcing bar or the evidence of corroding steel.

Cracks in the cap can also be seen at installations of power pull-boxes.

Major cap distress can be seen at the southeastern most tip of the island at the site of Test Pit No. 1. The cap has heaved and fractured. (See photo frame #19 - Pit No. 1.)

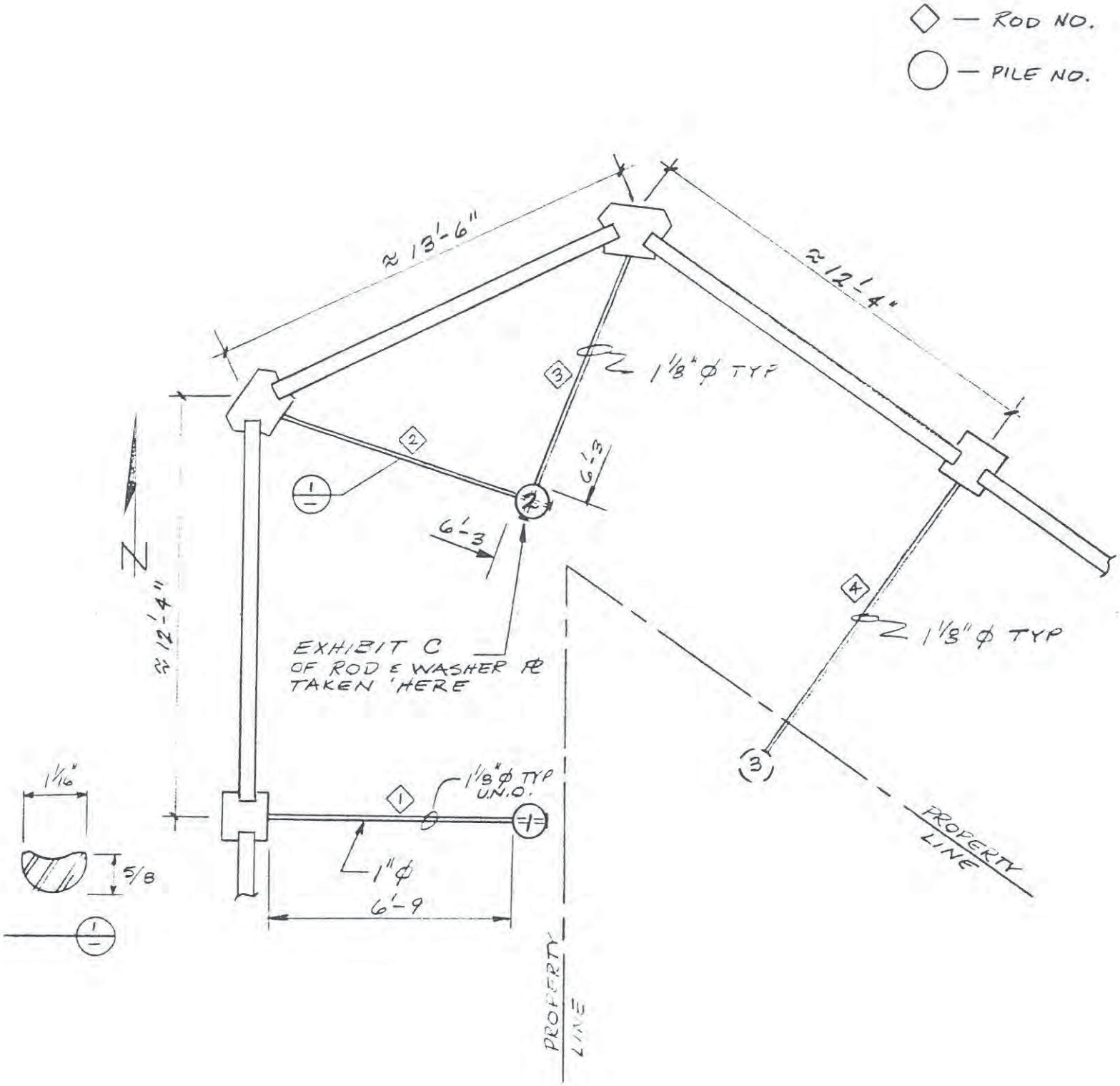
Test Pits No. 5 and 6 (See Figure No. 7)

Rods

1. Two rods in both Pits No. 5 and 6 were uncovered.

2. All rods were severely corroded and severed within 2'-0" of the timber pile.

3. Based on the existing spacing of the rods uncovered, one rod was missing in Test Pit No. 6.



TEST PIT NO. 4

FIGURE NO. 6

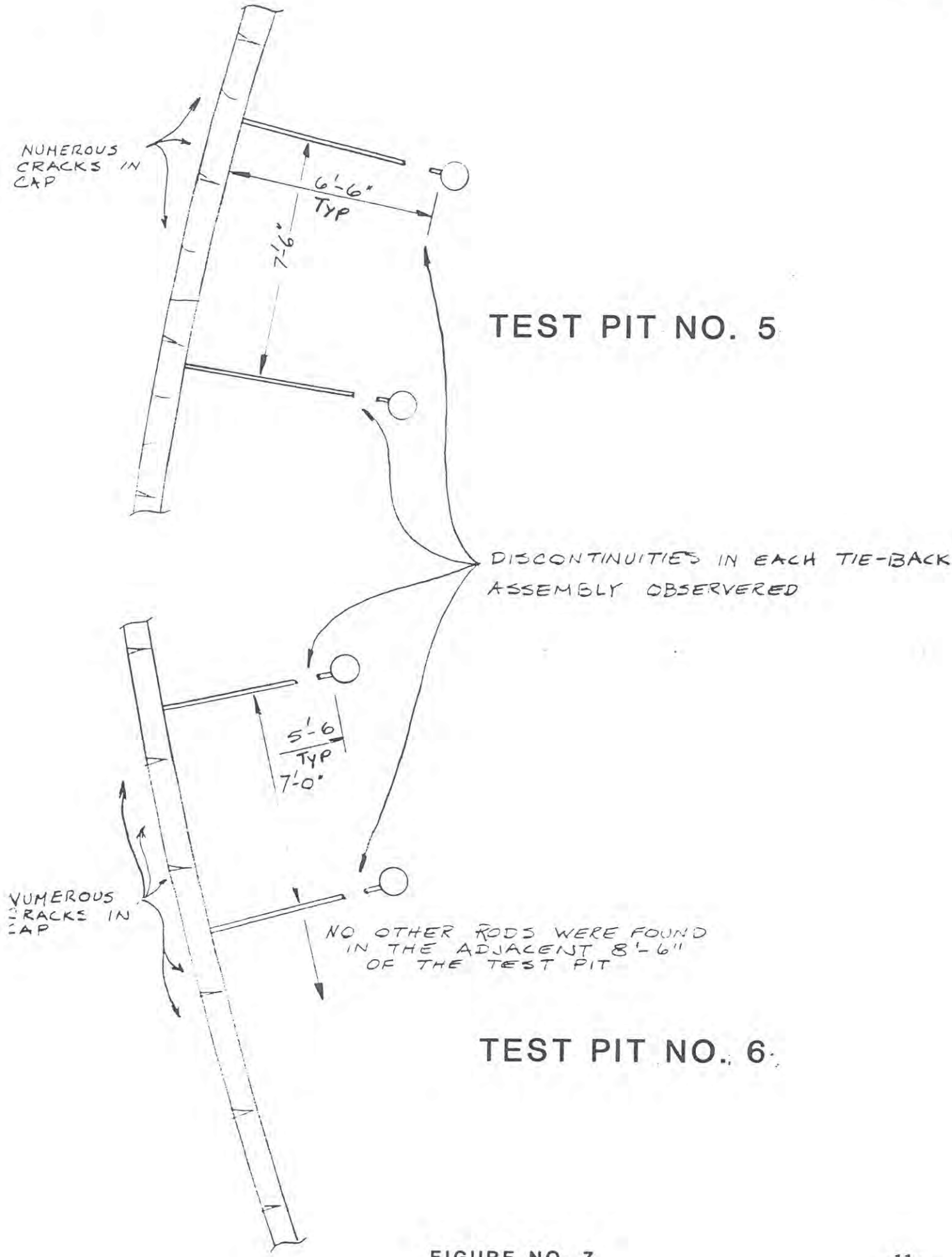

NUMEROUS CRACKS IN CAP
6'-6" Typ
7'-6"
TEST PIT NO. 5
DISCONTINUITIES IN EACH TIE-BACK ASSEMBLY OBSERVERED
5'-6" Typ
7'-0"
NUMEROUS CRACKS IN CAP
NO OTHER RODS WERE FOUND IN THE ADJACENT 8'-6" OF THE TEST PIT
TEST PIT NO. 6

FIGURE NO. 7

Timber Piles

1. Timber piles observed appeared to be in satisfactory condition.

Cap and Sheet Pile Investigation (West end of Balboa Island)

1. The cap in this 496'-0" section has shown definite signs of distress. Structural cracks occur continuously along the cap and a re-distribution of load has resulted. The cap and wall show signs that a seaward movement has occurred, but it can not be ascertained at this time if this condition is in an active state.

2. The sheet piles appear to be in satisfactory condition.

RESULTS AND CONCLUSIONS

A. "Little Balboa Island"

1. Test Pit No. 1

Of the four rods uncovered in Test Pit No. 1, two rods have approximately 40% of their original area. The corrosion process is excessive, but the rods appear to still be in tension and carrying load. All timber piles observed within this pit are out-of-plumb to some extent. It is difficult to ascertain if the piles have rotated over time or if they were originally installed in this fashion. Most probably, the piles were both installed out-of-plumb to some extent and have rotated over time as well. It does appear that the timber piles are in a stable condition at present and are carrying load.

The damage to the concrete cap at Pit No. 1 appears to have been caused by two conditions.

a) Rotation of timber piles seaward.

b) A settlement of the bulkhead centered around the soldier pile connected to rod number 3.

These conditions combined would account for the cap damage observed. It can not, at this time, be determined if this condition is in an active state.

It should also be noted that the conditions observed do not coincide with the existing drawing information. Drawings indicated that a common timber pile existed at the intersection of rod numbers 2 and 3. The condition which exists is that shown in Figure No. 4. The as-built geometry has greater lateral resistance than that shown on Dwg. No. R-5457-S sheet 10.

2. Test Pit No. 2

No tie-back system was found within this test pit. Calculations indicate that if the mudline is no greater than approximately 5'-0" below the top

of cap, no tie-back system is necessary and the wall system can support lateral forces as a cantilevered wall. Since the mudline at Test Pit No. 2 was much less than this 5'-0" criteria, there is no cause for concern, unless a drastic loss of beach sand were to occur.

3. Test Pit No. 3

   Only one tie-back system was observed in this test pit. Since the mudline is greater than 5'-0" from top of cap, each soldier pile should be tied-back. The one tie rod assembly observed was poorly designed and would conceivably allow the wall to move seaward before receiving full value of the timber pile deadman. Excessive corrosion was also evidenced at this rod.

4. Test Pit No. 4

   The conditions found in Test Pit No. 4 were similar to those found in Test Pit No. 1. Rod No. 3 was fully severed within the timber pile.

5. The concrete cap around "Little Balboa Island" requires remedial repair at locations indicated on Dwg. No. 2565-1. If the corrosion process at these locations is to be corrected, the damaged areas should be chipped back to expose good rebar, splice new bars to the old, and patch the cap with poured-in-place concrete.

   At the location of Test Pit No. 1, it may be worthwhile to set-up a long term monitoring program to determine if the wall is in an active or stable condition. If stable, a simple patching procedure would suffice.

6. Along the full length of bulkhead, evidence of a grouting effort to seal the joints at soldier piles was observed. Since the excavation was no more than 2 to 3 feet deep, only the top section of this grouting effort could be observed. Large amounts of grout were observed near the surface (approximately 2 CF/FT) but diminished rapidly 1 to 2 feet below the slab level. No determination of the effectiveness of this effort could be made during our investigation.

B. West End of Balboa Island (496'-0")

1. The 496'-0" bulkhead is at high risk of failure if severe soils movement, seismic and/or tidal activity were to occur. Tie-rods are corroded and severed and the cap has shown evidence of structural cracking and movement.

2. Timber pile dead men are located between 5'-6" and 6'6" of the inside face of sheet pile. This distance lies within the active pressure zone of the soil loads and can be only partially effective as restraint for the wall.

3. At the end of the 496'-0" bulkhead near Park Ave., a vertical construction joint exists. The relative position of the walls on either side of this joint indicate a seaward displacement of the bulkhead has occurred. This is coupled with evidence of large gaps between the sidewalk and cap; all indicating that wall movement has occurred and may be in an active state.

4. It is our opinion that the structural integrity of the reinforced concrete cap has redistributed the stresses and is now resisting the lateral forces imposed on the wall in a "hoop stress" mode.

C. General Discussion

Based on calculations, the Type 1 bulkhead can support lateral load as a cantilevered system when the mudline is no greater than 5'-0" below the top of cap. Therefore, where the mudline is high, the effect of the tie-rods and timber pile is redundant, since these tie-back devices are not required to support the wall.

The locations where the mudline is greater than 5'-0" below top of cap occurs in the following areas;

1. The three (3) corners of Little Balboa Island

2. The entire length of bulkhead facing The Grand Canal

The conclusions reached above are based on the current mudline elevations. If future erosion of the mudline were to occur, a re-evaluation of those areas requiring attention would be required.

For calculations supporting the results above, see Appendix.

There is another condition which exists at the bulkheads in question that requires added comment. Through the years, sidewalks have rotated and/or heaved creating an uneven walking surface. Since there is no evidence that a loss of sand is occurring creating cavities or pockets beneath the slabs, it is our opinion that the condition of the slabs is the result of the tidal cycle and soil saturation.

As the base material supporting the slabs becomes saturated, a shift of sand can take place thus causing the slabs to rotate. Although movements during any one cycle would be imperceivable, over time these movements could accumulate until a difference in elevation between two adjacent slabs could result.

It is our opinion that this situation does not constitute a major structural condition.

Where the mudline is near the elevation of the bottom of the bulkhead, a flow net analysis by a Soils Consultant would evaluate the stability of the soil behind the wall.

RECOMMENDATIONS

The following recommendations are based on our opinion from the point-of-view of 1) relative degree of risk to residential structures and 2) project phasing.

PRIORITY NO. 1

Based on our investigations, it is our opinion that the bulkhead at the west end of Balboa Island should be repaired as soon as possible. Several methods of repair should be investigated including:

1. Toe Piles and a waler on the waterside of the wall and re-establishment of new tie-rods to the timber pile dead men. (See Figure No. 8.)

2. Battered piles on the waterside of the wall, keyed into the cap. (See Figure No. 9.)

3. Earth anchors through the wall with a waler, if necessary. (See Figure No. 10.)

We estimate that the probable construction cost range of these possible repairs could run from between $550.00 and $800.00 dollars per foot of bulkhead length. Structural design and cost analysis of these alternatives is required to determine the best and most economical method of repair.

PRIORITY NO. 2

The three (3) corners of "Little Balboa Island" should be reinforced by re-establishing the structural integrity of the tie-back system. This could be accomplished using the methods stated above or additionally by placing rock on the waterside of the wall.

PRIORITY NO. 3

Re-establish the structural integrity of the tie-back system on the west face of "Little Balboa Island" by using one of those methods stated previously.

It is our opinion that even though the timber piles acting as dead men are not fully effective to restrain the lateral forces imposed, tie-rods should be reinstalled to the timber piles to afford the wall support during the repair process utilizing one of the methods described in the Priority No. 1 work. This would mitigate the possibility of a wall failure <u>during</u> the repair phase.

We strongly recommend that a Soils Consultant begin evaluations of the existing conditions and the proposed repairs as soon as possible so that design of the repair can begin.

We recommend that a Soils Consultant with waterfront experience be selected. Cash & Associates Engineers could provide the City of Newport Beach with a list of such consultants if requested.

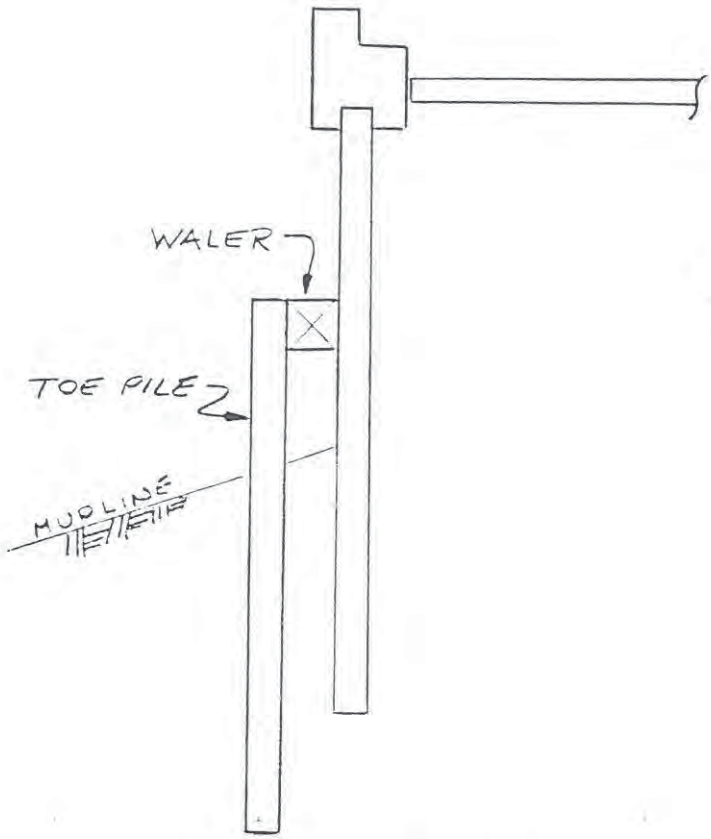


FIGURE NO. 8

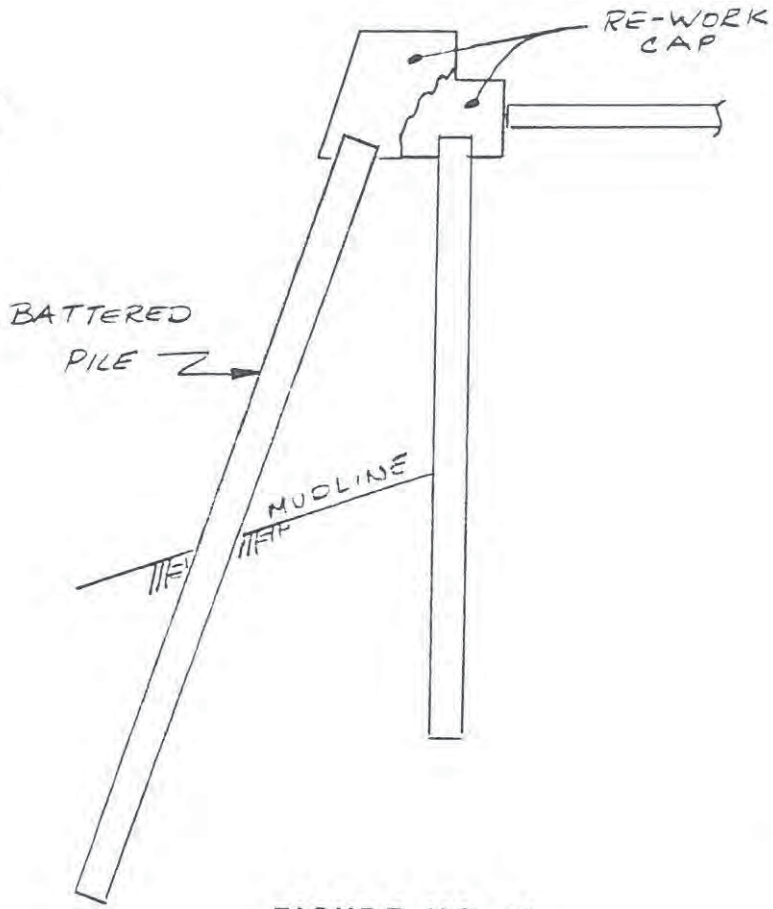


FIGURE NO. 9

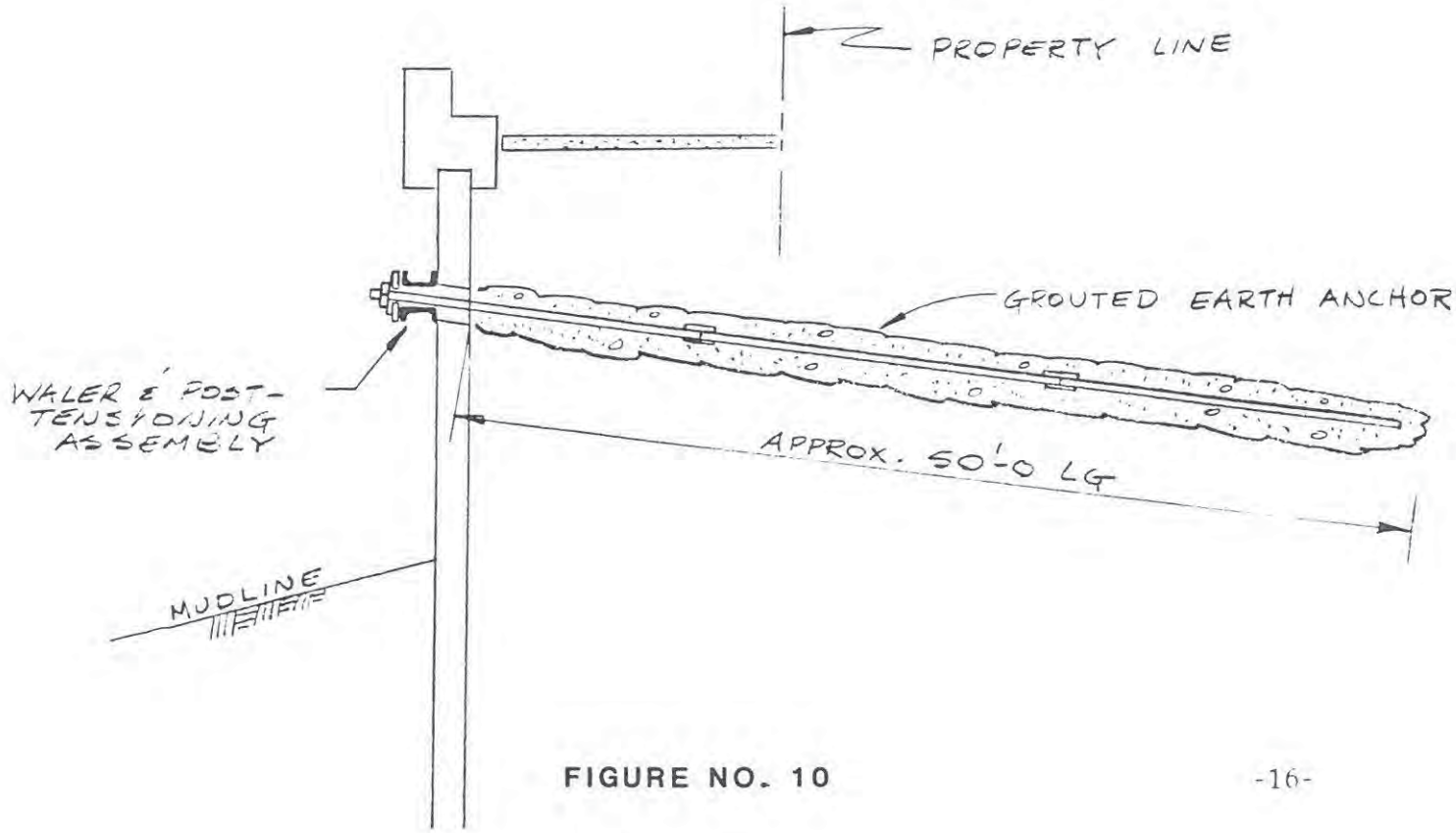
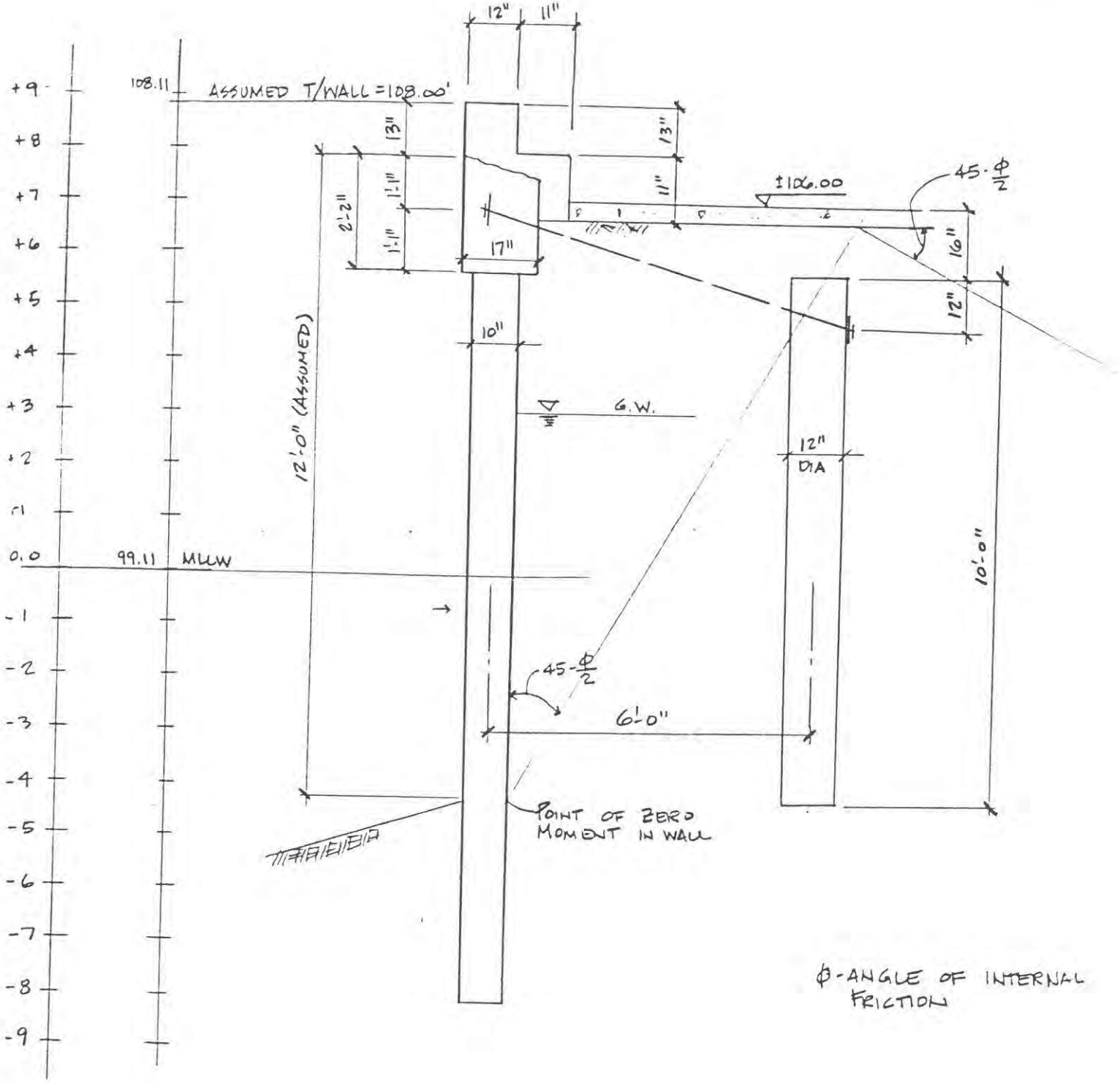


FIGURE NO. 10

CASH & ASSOCIATES ENGINEERS

CLIENT CITY OF NEWPORT BEACH
PROJECT BULKHEAD
CALCULATIONS FOR
TYPE 2

JOB NO. 2565.00
SHEET 1 OF
MADE BY BE DATE 5/6/85
CHECKED BY DATE



φ - ANGLE OF INTERNAL FRICTION

ASSUMED BULKHEAD SECTION
(WEST END - BTWN PARK & EMERALD AVE)

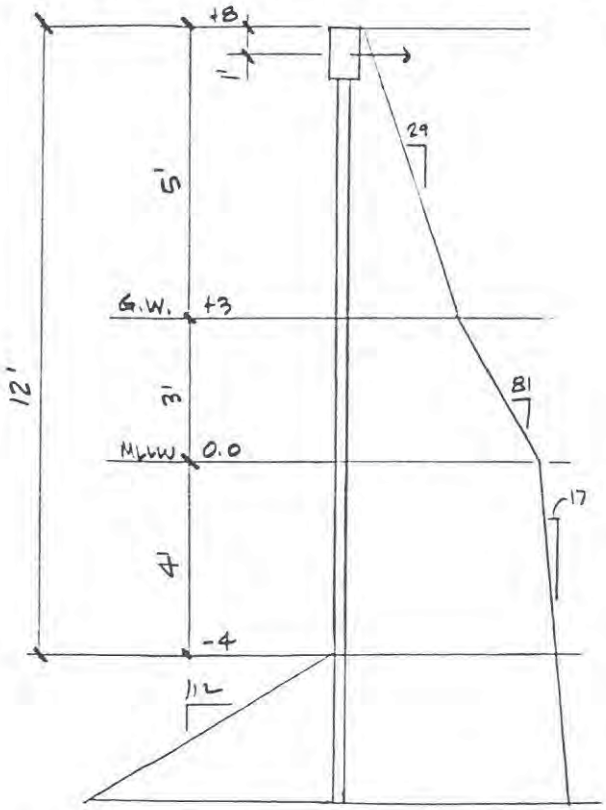
CASH & ASSOCIATES ENGINEERS

CLIENT CITY OF NEWPORT BEACH
PROJECT BULKHEAD
CALCULATIONS FOR
JOB NO. 2565.00
SHEET 2 OF
MADE BY BE DATE 5/6/85
CHECKED BY DATE

TYPE 2

REFERENCES-

1) CITY OF NEWPORT BEACH PLAN Nº 400 · SEPT 30, 1935
2) C&A JOB #1719.03
3) L.A. CITY BLDG CODE



ACTIVE PRESSURE (P_a) = 29 PCF (ABOVE G.W.)

ACTIVE PRESSURE (P_a') = 81 PCF (BELOW G.W.)

PASSIVE PRESSURE (P_p):

$\phi = 30°$ SLOPE = 1:4 $K_p = 1.867$
$\phi = 30°$ " = 1:6 $K_p = 2.224$

SUBMERGED WT OF SOIL = 60 PCF
SATURATED WT OF SOIL = 110 PCF

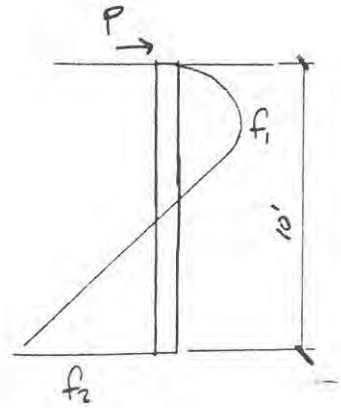
$P_p = 1.867(60) = 112$ PCF

$P_p = 2.224(60) = 133$ PCF

USE 112 PCF

CHECK CAPACITY OF ANCHOR PILE

DESIGN ASSUMPTION-
POLE W/O LATERAL RESTRAINT
PER L.A. CITY BLDG CODE



$$f_1 = \frac{2.85P}{bd} + \frac{f_2}{4}$$

$$f_2 = \frac{7.62P(2h+d)}{bd^2}$$

IF $h = 0$
$b = 1'$
$d = 10'$

CASH & ASSOCIATES ENGINEERS

CLIENT CITY OF NEWPORT BEACH — JOB NO. 2565.00

PROJECT BULKHEAD — SHEET 3 OF

CALCULATIONS FOR — MADE BY BE — DATE 5/7/85

CHECKED BY — DATE

TYPE 2

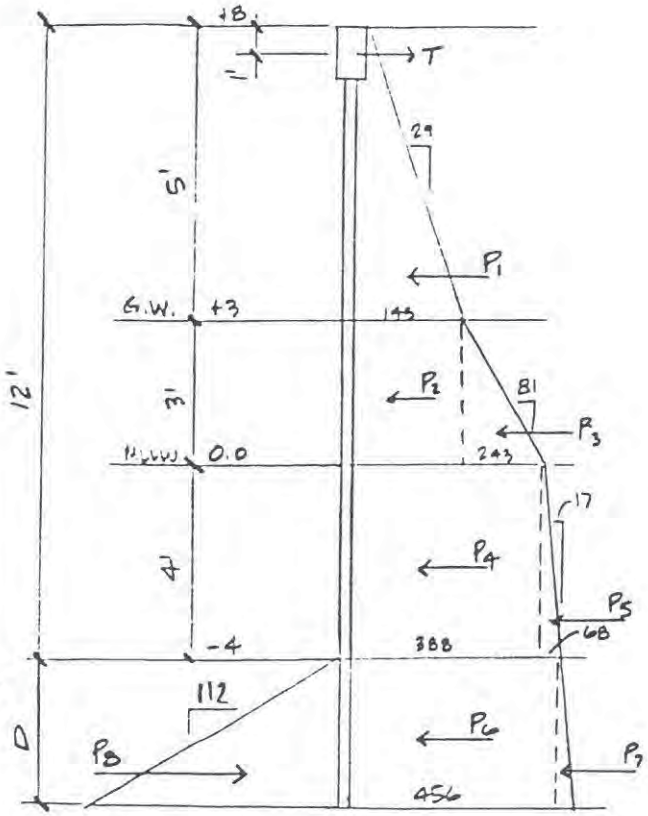
$$f_2 = \frac{7.62(P)(2(0)+10)}{1(10)^2} = .762P$$

$$f_1 = \frac{2.85(P)}{1(10)} + \frac{.762(P)}{4} = .476P$$

ASSUME MAX BEARING PRESSURE = 4000 PSF (L.A.C.B.C.)

$$\therefore \quad P = \frac{4000}{.762} = 5249\#$$

$$P = \frac{4000}{.476} = 8403\#$$



FIND DEPTH REQUIRED

$P_1 = \frac{1}{2}(145)(5) = 362.5\#$

$P_2 = 145(3) = 435$

$P_3 = \frac{1}{2}(243)(3) = 364.5$

$P_4 = 388(4) = 1552$

$P_5 = \frac{1}{2}(68)(4) = 136$

$P_6 = 456(D)$

$P_7 = \frac{1}{2}(17)(D)^2$

$P_8 = \frac{1}{2}(112)(D)^2$

TAKE MOMENTS ABOUT ANCHOR -

CASH & ASSOCIATES ENGINEERS

CLIENT: CITY OF NEWPORT BEACH — JOB NO. 2565.00

PROJECT: BULKHEAD — SHEET 4 OF

CALCULATIONS FOR: — MADE BY BE — DATE 5/7/85

CHECKED BY — DATE

TYPE 2

#	LOAD	ARM (W.R.T. ANCHOR)	-	D	D^2	D^3
P1	362.5	2.33	844.6			
P2	435.0	5.50	2392.5			
P3	364.5	6.00	2187.0			
P4	1552.0	9.00	13968.0			
P5	136.0	9.667	1314.7			
P6	456(D)	11 + .5D		5016D	$228D^2$	
P7	$8.5(D)^2$	11 + .667D			$93.5D^2$	$5.67D^3$
P8	$-56(D)^2$	11 + .667D			$-616D^2$	$-37.35D^3$
			20706.8	5016D	$-294.5D^2$	$-31.68D^3$

$$-31.68(D)^3 - 294.5(D)^2 + 5016(D) + 20706.8 = 0$$

$$\therefore \underline{D = 10.85'}$$

$$T = 456(D) + 8.5(D)^2 - 56(D)^2 + 2850$$

$$\therefore \underline{T = 2205.8\ \#/'}$$

APPROXIMATE MAX. ANCHOR PILE SPACING - $\frac{5249.}{2205.8} = 2.38'$

$$P_6 = 456(10.85) = 4947.6^{\#}$$

$$P_7 = 8.5(10.85)^2 = 1000.6^{\#}$$

$$P_8 = -56(10.85)^2 = -6592.5^{\#}$$

ANCHOR PILES FROM FIELD INV. ARE ≈ 7 APART -

$$\text{LOAD} = 2205.8(7) = 15441^{\#}$$

CASH & ASSOCIATES ENGINEERS

CLIENT: CITY OF NEWPORT BEACH
JOB NO. 2565.00
PROJECT: BULKHEAD
SHEET 5 OF
CALCULATIONS FOR
MADE BY BE DATE
CHECKED BY DATE

TYPE 2

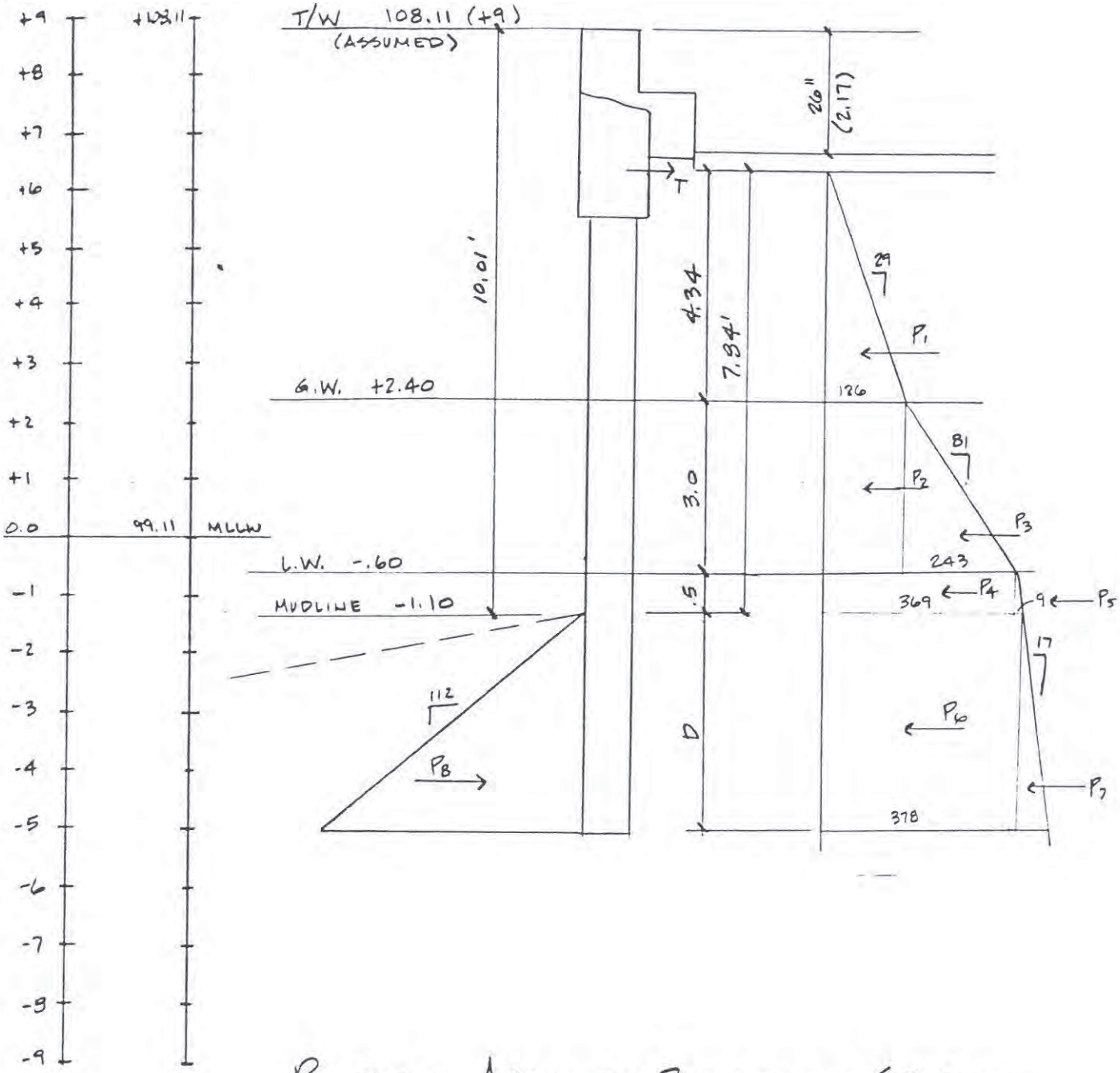
BACKCHECK - TAKE MOMENTS ABOUT BASE -

#	LOAD	ARM	
P1	362.5	19.52	7076.0
P2	435.0	16.35	7112.3
P3	364.5	15.85	5777.3
P4	1552.0	12.85	19943.2
P5	136.0	12.18	1656.5
P6	4947.6	5.43	26865.5
P7	1000.6	3.62	3622.2
P8	-6592.5	3.62	-23864.5
T	-2205.8	21.85	-48196.7
			-8.2 OK

CASH & ASSOCIATES ENGINEERS

CLIENT: CITY OF NEWPORT BEACH
PROJECT: BULKHEAD
CALCULATIONS FOR:
JOB NO. 2565.00
SHEET 6 OF
MADE BY BE DATE 5/10
CHECKED BY DATE

TYPE 2



REVISED ASSUMED BULKHEAD SECTION
(WEST END - BTWN PARK & EMERALD AVE)
(FROM FIELD INVESTIGATION)

CASH & ASSOCIATES ENGINEERS

CLIENT: CITY OF NEWPORT BEACH
PROJECT: BULKHEAD
CALCULATIONS FOR:
JOB NO. 2565.00
SHEET 7 OF
MADE BY BE DATE 5/10
CHECKED BY DATE

TYPE 2

$P_1 = \frac{1}{2}(126)(4.34) = 273.4$

$P_2 = 126(3) = 378.0$

$P_3 = \frac{1}{2}(243)(3) = 364.5$

$P_4 = 369(.5) = 184.5$

$P_5 = \frac{1}{2}(9)(.5) = 2.3$

$P_6 = 378(D)$

$P_7 = \frac{1}{2}(17)(D)^2$

$P_8 = \frac{1}{2}(112)(D^2)$

#	LOAD	ARM	—	D	D^2	D^3
P1	273.4	2.89	790.2			
P2	378.0	5.84	2207.5			
P3	364.5	6.34	2310.9			
P4	184.5	7.59	1400.4			
P5	2.3	7.67	17.6			
P6	378(D)	7.84+.5D		2963.5(D)	189$(D)^2$	
P7	8.5$(D)^2$	7.84+.667D			66.6$(D)^2$	5.7$(D)^3$
P8	−56$(D)^2$	7.84+.667D			−439.1$(D)^2$	−37.4$(D)^3$
			6726.6	2963.5(D)	−183.5$(D)^2$	−31.7$(D)^3$

$-31.7(D)^3 - 183.5(D)^2 + 2963.5(D) + 6726.6 = 0$

$\therefore D = 8.35'$

$T = 378(D) + 8.5(D)^2 - 56(D)^2 + 1202.7$

$\therefore T = 1047\ \#/_1$

CASH & ASSOCIATES ENGINEERS

CLIENT CITY OF NEWPORT BEACH
PROJECT BULKHEAD -
CALCULATIONS FOR
JOB NO. 2565.00
SHEET 8 OF
MADE BY BE DATE 5/17/85
CHECKED BY DATE

TYPE 2

EARTH ANCHOR

REF. SUPPLEMENTAL GEOTECHNICAL STUDY
BAYSIDE MARINA BULKHD.
by MOORE & TABER

ULTIMATE FRICTION COEFF = .60

F.S. = 2

WORKING FRICTION COEFF = .30

WEIGHT OF OVERBURDEN = 120 PCF

ASSUME DIAMETER OF ANCHOR = 8"

CIR = πd = 25.2 IN = 2.1 FT

AVG DEPTH BELOW GROUND = 4'

ALLOW LOAD = .3 (4)(120)(2.1) = 302 #/1

SPACING OF ANCHOR = 7'

P = 2205.8 (7) = 15441 #

$\ell = \frac{15441}{302}$ = 51.1 FT

10" DIAMETER -

CIR = 2.62'

ALLOW LOAD = .3 (4)(120)(2.62) = 378 #/1

ℓ = 40.8 FT

CASH & ASSOCIATES ENGINEERS

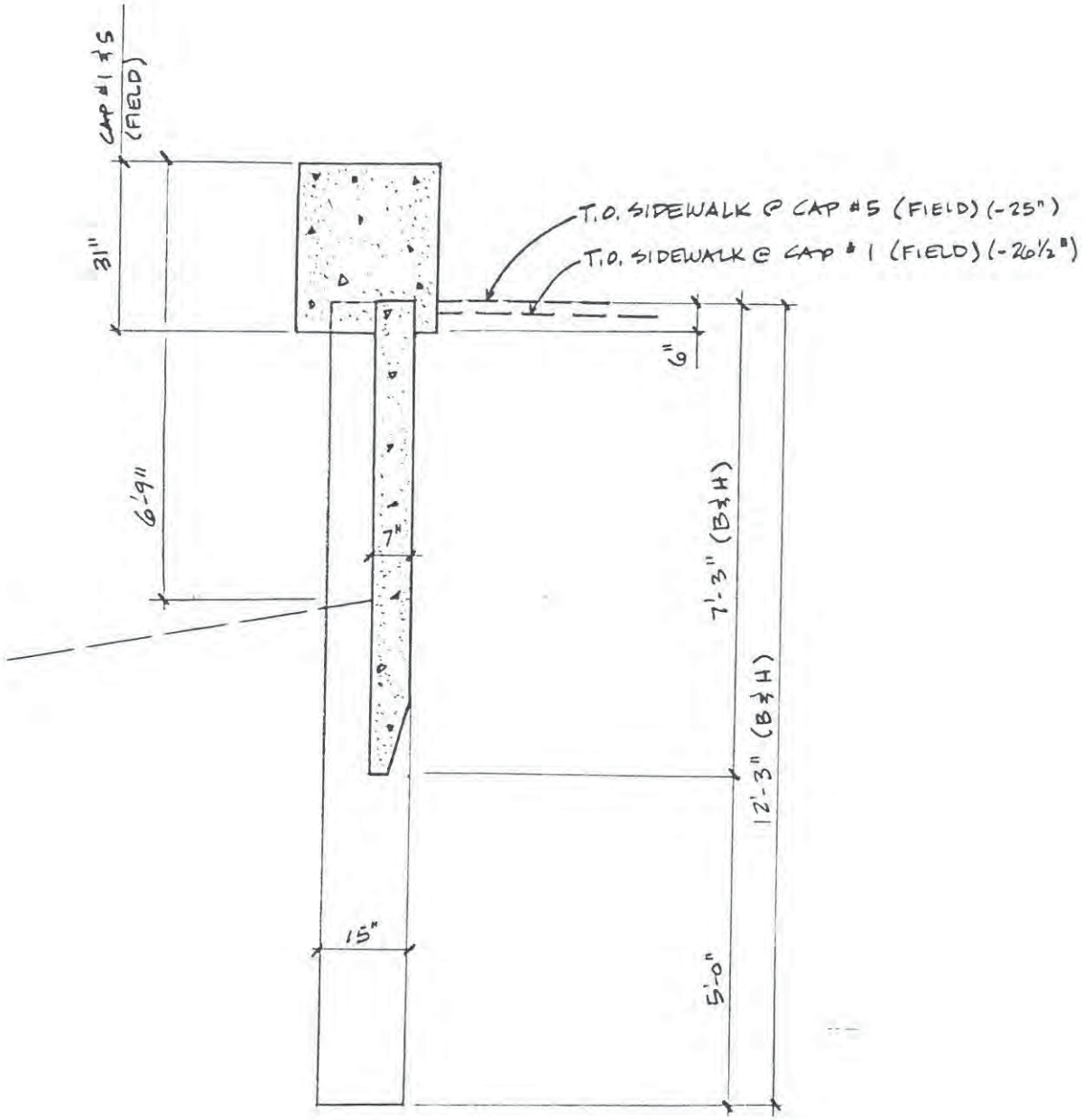
CLIENT CITY OF NEWPORT BEACH JOB NO. 2565.00

PROJECT BULKHEAD SHEET 9 OF

CALCULATIONS FOR MADE BY BE DATE 6/10/85

CHECKED BY DATE

TYPE 1



(SOUTH-WEST CORNER @ LITTLE BALBOA)

PILE TYPE "B" OR "H", SHEET TYPE "B" OR "H"

CASH & ASSOCIATES ENGINEERS

CLIENT CITY OF NEWPORT BEACH JOB NO. 2565.00

PROJECT BULKHEAD SHEET 10 OF

CALCULATIONS FOR MADE BY BE DATE 6/10/85

CHECKED BY DATE

TYPE 1

PILE TYPES -

PILE	LENGTH	SHEET	WIDTH	
B	12'-3"	B	7'-3"	
D	13'-3"	D	8'-3"	
E	14'-3"	E	9'-3"	
F	14'-3"	F	8'-3"	@ CORNER
G	15'-3"	G	9'-3"	@ CORNER
H	12'-3"	H	7'-3"	

NOTE - ALL SHEETS ARE 10'-10" LONG

CASH & ASSOCIATES ENGINEERS

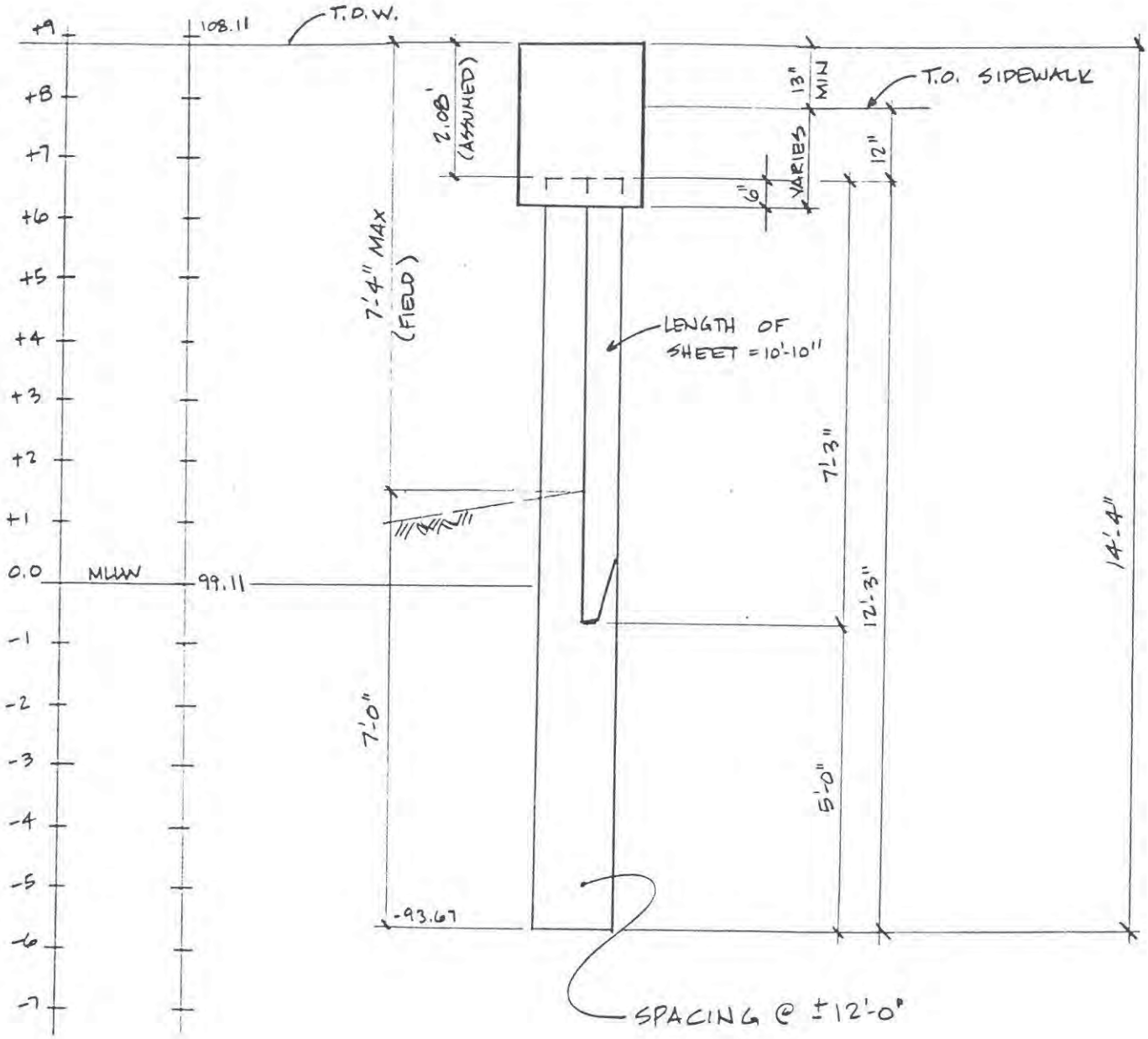
CLIENT CITY OF NEWPORT BEACH JOB NO. 2565.00

PROJECT BULKHEAD SHEET 11 OF

CALCULATIONS FOR MADE BY BE DATE 6/10/8

CHECKED BY DATE

TYPE 1

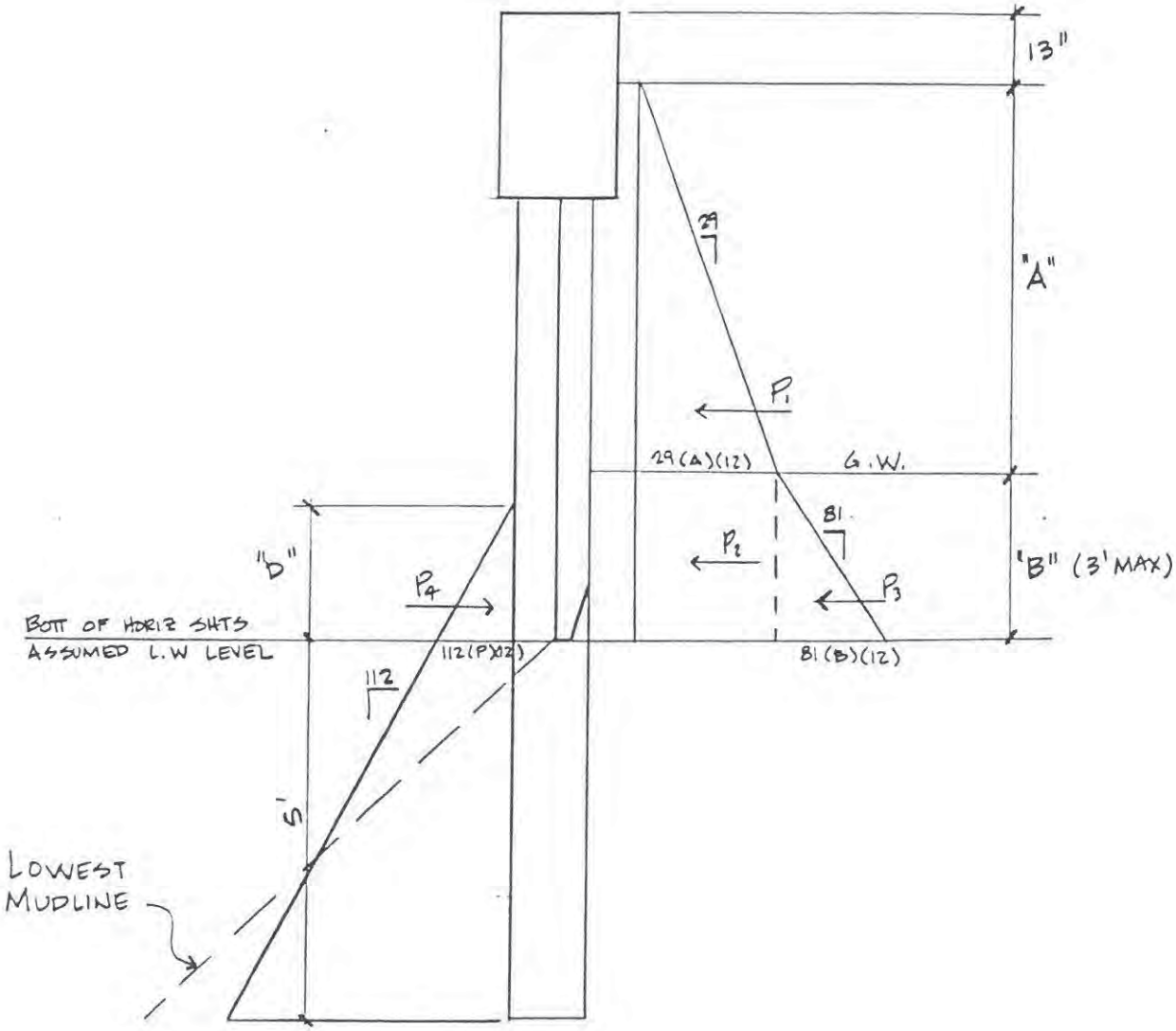


ASSUMED SECTION @ SOILDER PIPE

CASH & ASSOCIATES ENGINEERS

CLIENT CITY OF NEWPORT BEACH
JOB NO. 2565.00
PROJECT BULKHEAD
SHEET 12 OF
CALCULATIONS FOR
MADE BY BE DATE 6/12/8
CHECKED BY DATE

TYPE 1



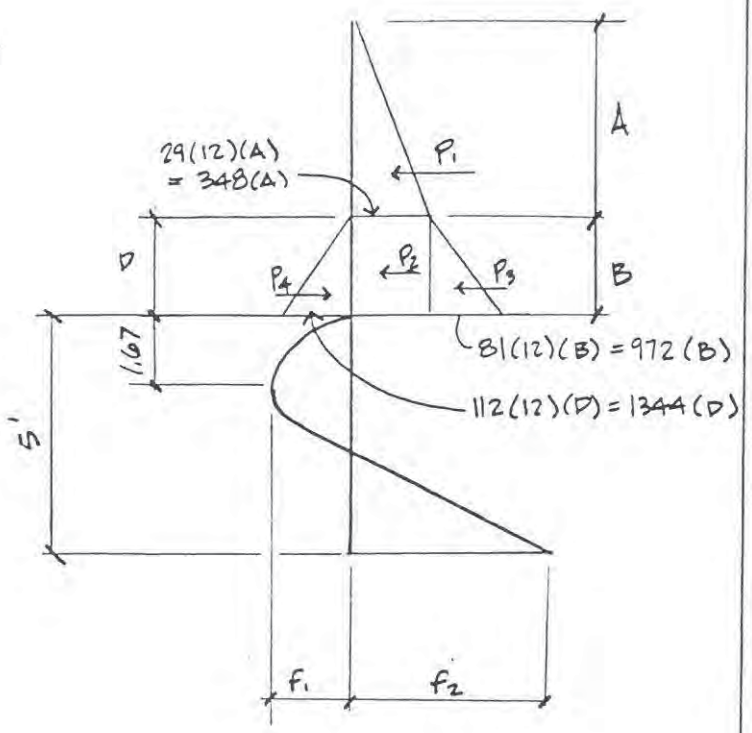
ASSUMED DESIGN SECTION

(DESIGN BASED ON L.A.C.B.C.)

CASH & ASSOCIATES ENGINEERS

CLIENT: CITY OF NEWPORT BEACH
PROJECT: BULKHEAD
CALCULATIONS FOR:
JOB NO. 2565.00
SHEET 13 OF
MADE BY BE DATE 6/12/89
CHECKED BY DATE

TYPE 1



$$f_1 = .298(P) + .25(f_2)$$

$$f_2 = \frac{7.62(P)(2h+5)}{47.75}$$

R = RESULTANT FORCE

$$= P_1 + P_2 + P_3 - P_4$$

$$F_{1\,MAX} = 112\,PCF\,(1.67) = 187\,PSF$$

$$F_{2\,MAX} = 112(5) = 560\,PSF$$

$$f_1 = \frac{2.85(P)}{b(D)} + \frac{f_2}{4}$$

$$f_2 = \frac{7.62(P)(2h+D)}{b D^2}$$

$$b = 1.27(\overset{18''}{1.5}) = 1.91'$$

$$D = 5'$$

$$h = \frac{P_1(.33A+B) + P_2(.5)(B) + P_3(.33)(B) - P_4(.33)(D)}{P_1 + P_2 + P_3 + P_4}$$

$P_1 = .5(348)(A)$

$P_2 = 348(A)(B)$

$P_3 = .5(972)(B)$

$P_4 = (.5)(1344)(D)(D)$

CASH & ASSOCIATES ENGINEERS

CLIENT CITY OF NEWPORT BEACH JOB NO. 2565.00

PROJECT BULKHEAD SHEET 14 OF

CALCULATIONS FOR MADE BY BE DATE 6/12/

CHECKED BY DATE

TYPE 1

A FT	B FT	D FT	WALL HT FT	P(1) LBS	P(2) LBS	P(3) LBS	-P(4) LBS	R LBS	H FT	f(1) PSF	f(2) PSF
0.00	0.86	0.00	6.94	0.00	0.00	359.45	0.00	359.45	0.28	187.11	319.36
0.00	0.90	0.25	6.98	0.00	0.00	393.66	42.00	351.66	0.28	182.85	311.60
0.00	1.04	0.50	7.12	0.00	0.00	525.66	168.00	357.66	0.30	186.64	319.63
0.00	1.23	0.75	7.31	0.00	0.00	735.27	378.00	357.27	0.35	187.92	325.22
0.00	1.45	1.00	7.53	0.00	0.00	1021.82	672.00	349.82	0.42	185.89	325.97
0.00	1.69	1.25	7.77	0.00	0.00	1388.06	1050.00	338.06	0.50	181.68	323.17
0.00	1.95	1.50	8.03	0.00	0.00	1848.02	1512.00	336.01	0.58	182.76	329.95
0.00	2.22	1.75	8.30	0.00	0.00	2395.20	2058.00	337.20	0.66	185.68	340.19
0.00	2.49	2.00	8.57	0.00	0.00	3013.25	2688.00	325.25	0.75	181.29	336.90
0.00	2.77	2.25	8.85	0.00	0.00	3729.03	3402.00	327.03	0.83	184.55	347.80
0.14	3.00	2.50	9.22	3.41	146.16	4374.00	4200.00	323.57	0.92	184.86	353.18
0.86	3.00	2.75	9.94	128.69	897.84	4374.00	5082.00	318.53	1.02	184.57	358.04
1.52	3.00	3.00	10.60	402.01	1586.88	4374.00	6048.00	314.89	1.14	185.34	365.48
2.14	3.00	3.25	11.22	796.85	2234.16	4374.00	7098.00	307.01	1.26	183.68	368.25
2.74	3.00	3.50	11.82	1306.32	2860.56	4374.00	8232.00	308.88	1.38	187.93	382.99
3.32	3.00	3.75	12.40	1917.90	3466.08	4374.00	9450.00	307.98	1.51	190.55	394.54
3.88	3.00	4.00	12.96	2619.47	4050.72	4374.00	10752.00	292.19	1.64	183.79	386.35
4.44	3.00	4.25	13.52	3430.17	4635.36	4374.00	12138.00	301.53	1.77	192.83	411.40
4.98	3.00	4.50	14.06	4315.27	5199.12	4374.00	13608.00	280.39	1.90	182.22	394.18
→ 5.52	3.00	4.75	14.60	5301.85	5762.88	4374.00	15162.00	276.73	2.04	182.74	400.63
6.05	3.00	5.00	15.13	6368.84	6316.20	4374.00	16800.00	259.03	2.17	173.75	385.78

- SEE SHT 15 -

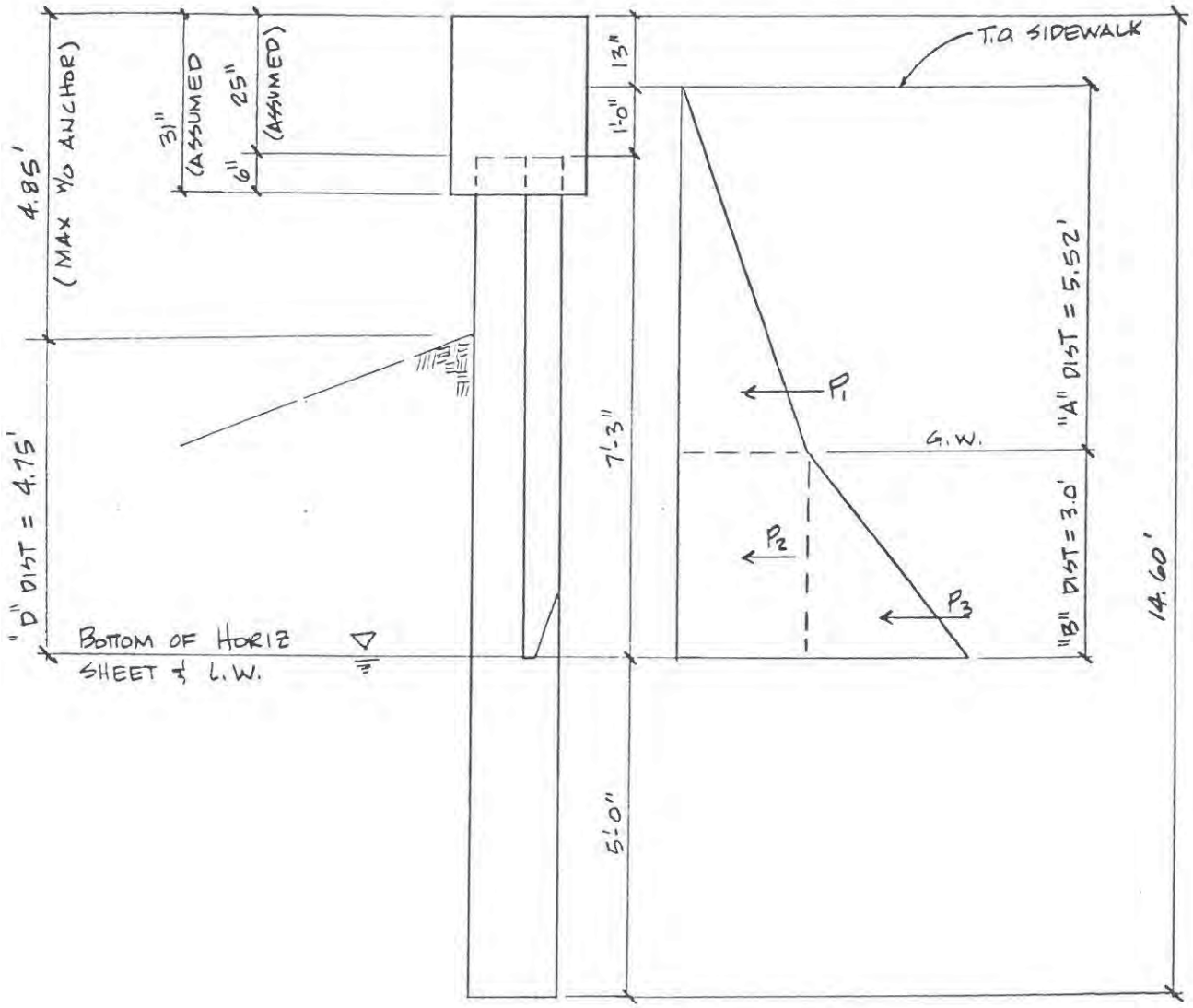
ASSUMPTIONS -

1) LOW WATER LEVEL IS AT THE BOTTOM OF HORIZ. SHEETS
2) MUDLINE WILL NEVER GO BELOW HORIZ. SHEETS
3) SPACING OF SOLDIER PILES = 12'-0"
4) WIDTH OF SOLDIER PILES = 1.5'

CASH & ASSOCIATES ENGINEERS

CLIENT: CITY OF NEWPORT BEACH
JOB NO. 2565.00
PROJECT: BULKHEAD
SHEET 15 OF
CALCULATIONS FOR
MADE BY BE DATE 6/12/
CHECKED BY DATE

TYPE 1



TYPICAL WALL SECTION

REFERENCE DOCUMENTS

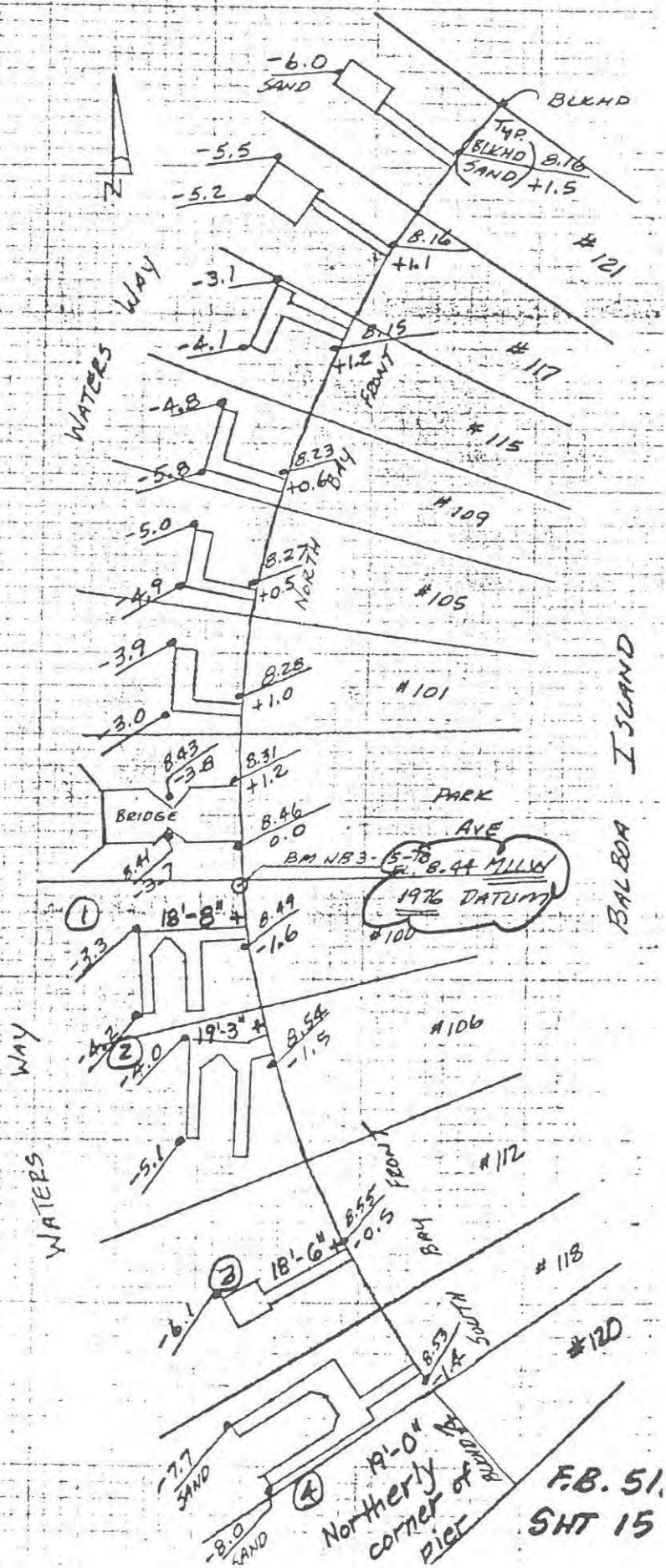
1. City of Newport Beach

   Plan No. 400
   September 30, 1935
   R-5457-6 Sheet Nos. 1 thru 12

2. Misc. Soundings Near Collins Isle/Balboa Island
   Sheet 1 of 1 and attached profile

BY RLJ-JDM DATE 5/9/83 SUBJECT MISC SOUNDINGS NEAR COLLINS ISLE / BALBOA ISLAND ELEV'S SHOWN ~ MLLW DATUM SHEET NO. 1 OF 1

CHKD. BY DATE JOB NO.

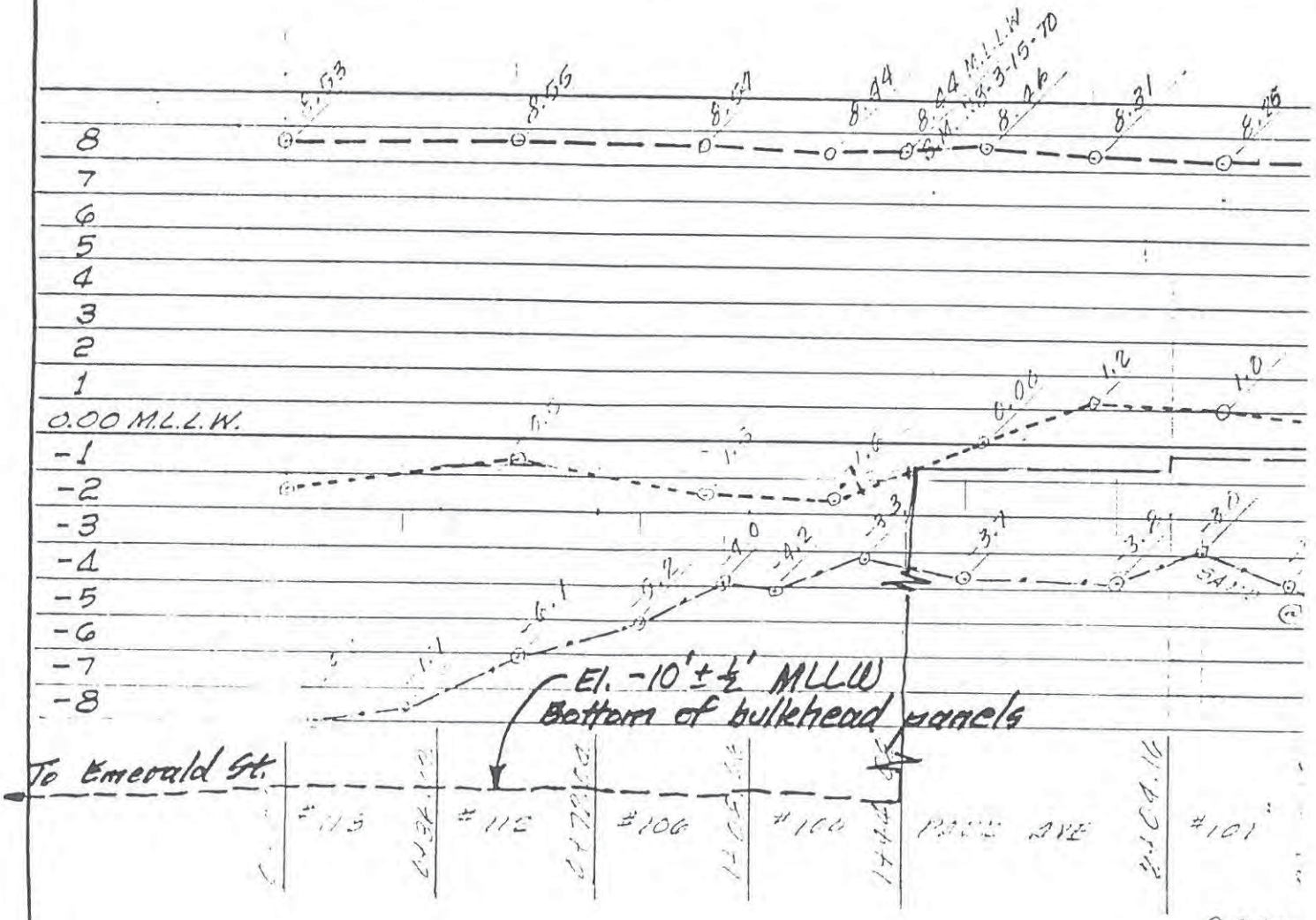


(5) 18'-7"
℄ between #124 & #130

(6) 19'-0"
Southerly corner of pier in front of #132

F.B. 51
SHT 15

PRINTED ON CLEARPRINT 1000 H



SCALE
HORIZON
VERTICAL

DATE	BY	DESCRIPTION

REVISION

CITY OF NEWPORT BEACH PUBLIC WORKS DEPARTMENT

BALBOA ISLAND BULKHEAD REPAIR NEAR WATERS WAY

CONTRACT NO. 2525

INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	PLAN & PROFILES
4	STRUCT. DETAILS
5	WALKWAY RECONSTRUCTION

SYMBOL LEGEND

- POWER POLE
- MANHOLE
- FIRE HYDRANT
- METER BOX
- VALVE
- POWER POLE ANCHOR
- MONUMENT
- FENCE
- BLOCK WALL
- TREE
- SHRUBBERY
- ASPHALT PAVEMENT
- BRICKWALK
- CONCRETE
- BUILDING
- EXISTING CONSTRUCTION
- NEW CONSTRUCTION
- CENTERLINE
- SEWER LINE
- WATER LINE
- GAS LINE
- POWER LINE
- TELEPHONE LINE
- CABLEVISION LINE
- SPRINKLER SYSTEM
- STREET LIGHT

EMERGENCY TELEPHONE NUMBERS

AGENCY	NUMBER
SOUTHERN CALIFORNIA GAS COMPANY	634-0251
SOUTHERN CALIFORNIA EDISON COMPANY	895-0221
PACIFIC TELEPHONE COMPANY	551-7736
CITY OF NEWPORT BEACH (PUBLIC UTILITIES)	644-3011
COUNTY SANITATION DISTRICTS	962-2411 EXT. 222
GROUP W CABLE OF CALIFORNIA	642-3280
COMMUNITY CABLEVISION	720-2056
UNDERGROUND SERVICE ALERT	1-800-422-4133

APPROVED Benjamin O. Nolan DATE 9-15-87
PUBLIC WORKS DIRECTOR
R.E. NO. 12806

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN R. NOLAN
No. C 039808
EXP. 3-31-88
CIVIL
STATE OF CALIFORNIA

AERIAL PHOTO

AS BUILT

CA
CASH & ASSOCIATES ENGINEERS
(213) 426-6141
Long Beach, CA

H-5111-S
SHT. 1 OF 5

H-5111-S
1 of 5

GENERAL

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY.

2. THE CITY OF NEWPORT BEACH AND/OR THE ENGINEER SHALL BEAR NO RESPONSIBILITY FOR EXPENSES INCURRED AS A RESULT OF FAILURE OR THE PART OF THE CONTRACTOR TO VERIFY DIMENSIONS AND/OR VERIFIABLE SITE CONDITIONS PRIOR TO BEGINNING WORK.

3. NOTES AND DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER THESE GENERAL NOTES.

4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT IN CONJUNCTION WITH THE EXECUTION OF THIS WORK.

5. DIMENSIONS TAKE PRECEDENCE OVER SCALE.

6. SUBSTITUTIONS: NO SUBSTITUTIONS SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

7. DAMAGE TO EXISTING FACILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO EXISTING STRUCTURES, PAVEMENT, CONCRETE SIDEWALK, UNDERGROUND UTILITIES, LANDSCAPING, CONCRETE PILES, LANDINGS, BULKHEAD AND FACILITIES ON OR ADJACENT TO THE PROJECT AND SHALL REPAIR ANY DAMAGE AT NO COST AND TO THE SATISFACTION OF THE HOMEOWNER AND ENGINEER.

8. THE CONTRACTOR SHALL NOT USE THE SIDEWALK OR THE AREA BEHIND THE BULKHEAD FOR EQUIPMENT AND/OR & STAGING AREA FOR ROCK TO PROTECT THE WALL FROM PREMATURE SURCHARGE DAMAGE.

9. CLEAN-UP: ALL TRADES SHALL, AT ALL TIMES, KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THE WORK DURING CONSTRUCTION, AND AT THE COMPLETION OF THE WORK SHALL REMOVE ALL RUBBISH AND DEBRIS.

10. SCHEDULE: CONTRACTOR SHALL SUBMIT A DETAILED SCHEDULE OF WORK INDICATING THE SEQUENCE OF ALL CONSTRUCTION PHASES FOR APPROVAL BY THE ENGINEER.

11. DATUM: ALL ELEVATIONS SHOWN ARE BASED ON A DATUM OF MEAN LOWER-LOW-WATER = 0.00.

REGULATORY REQUIREMENTS:

12. THE CONTRACTOR SHALL, AT ALL TIMES, COMPLY WITH ALL OSHA AND STATE SAFETY ORDERS.

13. ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION, 1985 EDITION, INCLUDING SUPPLEMENTS.

GEOTEXTILE

14. GEOTEXTILE SHALL BE OF NEEDLEPUNCHED NONWOVEN CONSTRUCTION. THE GEOTEXTILE SHALL BE SUPAC-8NP (NV) AS MANUFACTURED BY PHILLIPS 66 OR APPROVED EQUAL WITH THE FOLLOWING MINIMUM PHYSICAL PROPERTIES:

PROPERTY	TEST METHOD	VALUE
TENSILE STRENGTH, LBS	ASTM D1682	330
PUNCTURE STRENGTH, LBS	ASTM D751	65
MULLEN BURST STRENGTH, PSI	ASTM D751	140
COEFFICIENT OF WATER PERMEABILITY, CM/SEC	CONSTANT HEAD	0.22
ABRASION RESISTANCE, LBS	ASTM D1175 TABOR TEST (1000 CYCLES)	140
WEIGHT		8 OZ/SQ YD

LOCAL REPRESENTATIVE:

PHILLIPS FIBERS CORPORATION
5109 CIRCLE VISTA
LA CRESCENTA, CA 91214
(818) 248-2585 OR (800) 952-5769
PAUL KADEMACHER

15. THE GEOTEXTILE SHALL BE PLACED, AS SHOWN ON THE DRAWINGS, ON THE EXISTING BUDLINE AND AROUND PILES IN THE DIRECTION OF THE SLOPE. THE GEOTEXTILE SHALL BE PLACED ON THE SLOPE SO AS TO PROVIDE A MINIMUM OVERLAP OF 24 INCHES BETWEEN ADJACENT CLOTH. THE GEOTEXTILE SHALL BE PLACED IN ACCORDANCE WITH THE MANUFACTURERS WRITTEN RECOMMENDATIONS. WHERE GEOTEXTILE IS PLACED UNDER WATER, THE CONTRACTOR SHALL SUBMIT FOR THE ENGINEERS APPROVAL A MEANS FOR KEEPING THE GEOTEXTILE SECURE AND IN PLACE UNTIL THE ROCK IS INSTALLED.

ARMOR ROCK

16. ARMOR ROCK SHALL BE 18 INCH MAXIMUM SIZE ROCK. ALL ROCK SHALL BE PLACED TO THE LINES AND GRADES SHOWN ON DRAWINGS (+/- 6 INCHES).

17. ARMOR ROCK SHALL BE QUARRIED ROCK (NOT RIVER RUN) WHICH IS SOUND, HARD, DURABLE, AND ANGULAR. ROCK SHALL BE OF SUITABLE QUALITY TO INSURE PERMANENCY. THE ROCK SHALL BE FREE FROM DELETERIOUS SUBSTANCES.

18. EVERY LOAD OF ARMOR ROCK SHALL HAVE A SUFFICIENTLY UNIFORM GRADING FROM FINE TO COARSE PARTICLES TO ACHIEVE THE ANGLE OF REPOSE SHOWN ON THE DRAWINGS. NO PIECE OF ARMOR ROCK SHALL WEIGH LESS THAN 165 POUNDS PER DRY SOLID CUBIC FOOT.

19. THE ARMOR ROCK SHALL BE PROCESSED AND GRADED TO CONFORM TO THE FOLLOWING REQUIREMENTS:

SIZE	PERCENT PASSING
18"	100
12"	70 TO 100
9"	15 TO 70
6"	0 TO 15

20. ARMOR ROCK SHALL BE PLACED IN SUCH A MANNER AS NOT TO DAMAGE THE GEOTEXTILE OR OTHER ADJACENT STRUCTURES. THE CONTRACTOR SHALL SUBMIT FOR THE ENGINEERS APPROVAL THE METHOD FOR PLACING THE ROCK.

DREDGING (IN FRONT OF THE BULKHEAD - WATERSIDE)

21. DREDGING SHALL BE DONE IN SUCH A MANNER AS TO PREVENT TOE FAILURE, TO MINIMIZE THE POSSIBILITY OF WALL FAILURE DURING THE PLACEMENT OF THE ARMOR ROCK. CONTRACTOR SHALL FOLLOW THE PROCEDURES AS OUTLINED IN THE SECTION TITLED "EXCAVATION (BEHIND BULKHEAD - LANDSIDE)".

22. THE CONTRACTOR SHALL DREDGE IN FRONT OF THE WALL AS SHOWN IN DETAIL 6 SHEET 4. THE SOIL THAT HAS BEEN REMOVED IN FRONT OF THE WALL AT THE TOE OF THE NEW ARMOR ROCK INDICATED BY "ZONE A" ON DETAIL 6 SHEET 4, DOES NOT NEED TO BE REPLACED.

23. DREDGE MATERIAL SHALL BE EXPORTED TO AN APPROVED DISPOSAL SITE.

EXCAVATION (BEHIND BULKHEAD - LANDSIDE)

24. TO MINIMIZE THE POSSIBILITY OF WALL FAILURE DURING CONSTRUCTION, THE CONTRACTOR SHALL CREATE A TRENCH AND REMOVE EXISTING CONCRETE SIDEWALK, SOIL AND OTHER MATERIALS, SUCH AS EXISTING FLYASH CONCRETE SUBSEAL, AS INDICATED ON THE DRAWINGS PRIOR TO THE DREDGING AND PLACING OF THE ARMOR ROCK IN FRONT OF THE BULKHEAD. THE CONTRACTOR SHALL MAINTAIN THIS TRENCH DURING ALL DREDGING AND PLACING OF ARMOR ROCK.

25. THE CITY OF NEWPORT BEACH PUBLIC WORKS SHALL ALLOCATE AN AREA IN ADJACENT STREETS FOR THE STOCKPILING OF CLEAN, EXCAVATED MATERIALS TO BE RE-UTILIZED FOR BACKFILL.

26. AFTER THE ARMOR ROCK HAS BEEN PLACED IN FRONT THE WALL AS INDICATED ON THE DRAWINGS AND HAS BEEN APPROVED BY THE ENGINEER, THE CONTRACTOR SHALL BACKFILL BEHIND THE BULKHEAD UTILIZING EXISTING NATURAL SOILS OR IMPORTED FILL OF CLEAN SAND. BACKFILL SHOULD BE PLACED IN RELATIVELY THIN LAYERS AND MECHANICALLY COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 95 PERCENT PER ASTM 1557.

27. CONTRACTOR SHALL BACKFILL BEHIND BULKHEAD 4" BELOW NEW SIDEWALK GRADES. REFER TO SHEET 8 PREPARED BY THE CITY OF NEWPORT BEACH FOR GRADE LINES.

28. EXISTING TIE RODS AND ANCHOR PILES: DURING THE EXCAVATION EFFORT BEHIND THE BULKHEAD THE CONTRACTOR MIGHT ENCOUNTER EXISTING TIE ROD ANCHORS OR EXISTING ANCHOR PILES. THE ANCHOR AND PILES ARE SPACED APPROXIMATELY SEVEN FEET APART. THESE ITEMS MAY BE REMOVED AS REQUIRED TO ACCOMPLISHED THE INDICATED WORK.

EPOXY ADHESIVES FOR CRACK REPAIR

29. EPOXY ADHESIVE SHALL BE A TWO COMPONENT, SOLVENTLESS, LOW VISCOSITY LIQUID ADHESIVE FOR PRESSURE INJECTION GROUTING OF CRACKED CONCRETE.

30. EPOXY ADHESIVE SHALL BE AS MANUFACTURED BY "ADHESIVE ENGINEERING COMPANY", SAN CARLOS, CALIFORNIA, OR APPROVED EQUAL.

LOCAL REPRESENTATIVE:

APPLIED LIQUID POLYMER SYSTEMS, INC.
2120 WEST 15TH STREET
LONG BEACH, CA 90813
(213) 435-0106

CRACK REPAIR IN CAP (BULKHEAD COPING)

31. CONTRACTOR SHALL REPAIR ALL CRACKS AND SPALLED CONCRETE IN THE EXISTING CONCRETE CAP AS INDICATED ON THE CAP BY THE ENGINEER BASED ON THE FOLLOWING PROCEDURES.

32. FOR EXISTING CRACKS IN CAP (1/16" WIDE OR GREATER): ROUT OUT ANY LOOSE MATERIAL; FLUSH WITH FRESH WATER AND INJECT WITH EPOXY ADHESIVE. DURING THE CRACK REPAIR EFFORT, IF THE REINFORCING IS EXPOSED AND THE CROSS SECTIONAL AREA OF THE REINFORCING CAN BE DETERMINED TO BE 50% OF LESS OF THE ORIGINAL AREA, CHIP CONCRETE AND SPLICE WITH NEW LENGTH OF REINFORCING. NEW REINFORCING SHALL BE WELDED TO THE EXISTING REINFORCING AND LAPPED A MINIMUM OF TWELVE (12") INCHES. PATCH CONCRETE WITH DRY PACK TO EXISTING CONTOUR. REFER TO SECTIONS TITLED "CONCRETE PATCHING" AND "REINFORCING" FOR ADDITIONAL INFORMATION.

33. FOR EXISTING CRACKS IN CAP (LESS THAN 1/16" WIDE): REPAIR WITH EPOXY ADHESIVE IS NOT REQUIRED FOR CRACKS LESS THAN 1/16" IN WIDTH.

34. EXPANSION JOINTS: REMOVE ANY LOOSE MATERIAL. PRIME JOINT WITH SIKAFLEX 429 PRIMER. AFTER PRIMER HAS DRIED, INSTALL A CLOSED CELL FOAM BACKER ROD INTO JOINT SUCH THAT THE DEPTH OF THE JOINT IS EQUAL TO ONE HALF THE WIDTH OF THE JOINT. ALLOW THE BACKER MATERIAL TO BE EXPOSED TO THE AIR FOR A MINIMUM OF 20 MINUTES THEN APPLY SIKAFLEX 1A SEALANT ACCORDING TO MANUFACTURERS SPECIFICATIONS.

SIKA CORPORATION
(213) 941-0231

35. PIPE PENETRATIONS: ANGULAR SPACE AROUND PIPES THAT PENETRATE THE BULKHEAD WALL SHALL BE SEALED USING "WATERPLUG" OR "THORITEX" AS MANUFACTURED BY THORO SYSTEM PRODUCTS, MIAMI, FLORIDA, AND APPLIED IN ACCORDANCE WITH MFGR'S WRITTEN INSTRUCTIONS. LOCAL REPRESENTATIVE:

THORO SYSTEMS PRODUCTS
JOHN GREGORY
(714) 898-4983

LOCAL DISTRIBUTOR:

KDM PRODUCTS
(213) 435-9123

36. CONCRETE PATCHING (BULKHEAD COPING): WHERE THE CONCRETE HAS SPALLED WITH A LOSS OF ONE INCH OR MORE OF CONCRETE, OR AS INDICATED ON THE CAP BY THE ENGINEER, THE CONTRACTOR SHALL PATCH THE AREA AS FOLLOWS:

1. REMOVE ANY LOOSE MATERIAL.
2. CLEAN THE AREA OF ALL DUST AND DEBRIS.
3. DRY AREA TO BE PATCHED.
4. SEAL THE AREA WITH MASTER BUILDERS BRUTEM 17 EPOXY BONDING AGENT. APPLY ACCORDING TO THE MANUFACTURES WRITTEN RECOMMENDATIONS.
5. PATCH CONCRETE WITH MASTER BUILDERS MASTERPATCH 20 TO EXISTING CONTOURS.
6. COAT PATCH WITH MASTER BUILDERS MASTERSEAL, MB-429 OR MASTERCURE CURING COMPOUND IN STRICT ACCORDANCE WITH LABEL DIRECTIONS.

NOTE: CONTRACTOR SHALL PLAN THE CONCRETE PATCHING EFFORT DURING LOW TIDE CONDITIONS TO PREVENT SALTWATER CONTAMINATION OF THE PREPARED SURFACES.

LOCAL REPRESENTATIVE:

MASTER BUILDERS
RORY KRISKOVIC
(800) 824-8441

LOCAL DISTRIBUTOR:
ATLAS CONSTRUCTION SUPPLIERS
(818) 912-1519

37. CONTRACTOR SHALL PROVIDE FOUR (4) CORED HOLES IN THE CAP, TO OBSERVE THE QUALITY CONTROL OF THE CRACK REPAIR. THE CORED HOLES SHALL BE 1-1/2" DIAMETER BY 6" LONG. THE LOCATIONS OF THE CORED HOLES SHALL BE DETERMINED BY THE ENGINEER. THE TEST SHALL BE INITIATED PRIOR TO COMPLETING MORE THAN 30 PERCENT OF THE INJECTION WORK.

38. AFTER CRACKS AND CONCRETE IN THE CAP ARE REPAIRED, THE CONTRACTOR SHALL GRIND REPAIR WORK SMOOTH AND SANDBLAST THE ENTIRE CAP TO REMOVE PAINT, LAITANCE, STAINS, ETC. AND TO PRESENT A UNIFORM, CLEAN CONCRETE SURFACE.

REINFORCING

39. ALL REINFORCING SHALL CONFORM TO ASTM A615 GRADE 40 OR BETTER WITH MINIMUM 30 DIAMETER LAP. WHERE SPLICED, REINFORCING SHALL BE GALVANIZED.

CHEMICAL GROUTING

40. CHEMICAL GROUTING BEHIND THE BULKHEAD SHALL BE A TWO PART SODIUM SILICATE TYPE GROUT WITH A CATALYST. THE GROUT SHALL BE COMPATIBLE WITH THE SURROUNDING MATERIALS AND OCEAN WATER. THE GROUT SHALL BE PLACED IN SUCH A MANNER AS TO SEAL THE FULL DEPTH OF ALL BULKHEAD PANEL JOINTS, WITHIN THE SCOPE OF THE PROJECT, TO PREVENT THE EROSION AND TO STABILIZE THE SOIL BEHIND THE BULKHEAD.

41. DEPTH OF PENETRATION FOR CHEMICAL GROUTING SHALL BE A MINIMUM OF 20 FEET BELOW TOP OF BULKHEAD CAP.

42. GROUTING CONTRACTOR SHALL COORDINATE HIS EFFORT WITH THE PLACEMENT OF THE NEW SIDEWALK AND DRAINAGE SYSTEM AS SHOWN ON SHEET 5.

SUBMITTALS

43. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL THE MANUFACTURERS INFORMATION OR SPECIFICATION FOR THE FOLLOWING ITEMS PRIOR TO THE PROCUREMENT OF SUCH ITEMS.

1. GEOTEXTILE
2. A MEANS TO SECURE THE GEOTEXTILE BELOW WATER
3. CHEMICAL GROUT
4. EPOXY ADHESIVE
5. ARMOR ROCK

44. FOR WATERS WAY ONLY: ASSUME THE FOLLOWING QUANTITIES:

LENGTH OF BULKHEAD TO BE REPAIRED:	496 LF
APPROXIMATE WIDTH OF PANELS:	3.5 FT
LENGTH OF CRACKS IN CAP TO BE REPAIRED:	675 LF
DREDGE MATERIAL (FRONT OF WALL):	1109 CY
EXCAVATION (BEHIND WALL):	514 CY
ARMOR ROCK:	1139 CY ≈ 2005 TONS
APPROXIMATE LENGTH OF GEOTEXTILE (BASED ON 16' FOOT WIDE ROLL):	707 LF
NUMBER OF VERTICAL PANEL JOINTS:	142 JOINTS
NUMBER OF PIPE PENETRATIONS:	6
NUMBER OF EXPANSION JOINTS:	2

45. STRUCTURAL ENGINEER:

CASH & ASSOCIATES ENGINEERS
2599 E. 28TH STREET
LONG BEACH, CA 90806
(213) 426-6145

GEOTECHNICAL ENGINEER:

ACTION GEOTECHNICAL CONSULTANTS, INC.
1421 NORTH HUNDLEY STREET
ANAHEIM, CA 92806
(714) 630-9534

AS BUILT

C-2525

CASH & ASSOCIATES ENGINEERS
(213) 426-6145
Long Beach, CA

2565.00

DATE	BY	DESCRIPTION	APPR.

REVISIONS

APPROVED: [signature]
PUBLIC WORKS DIRECTOR
R.E. NO. 22866
DATE: 9-17-86

DESIGNED: BRE
DRAWN: JSH
CHECKED:
DATE:

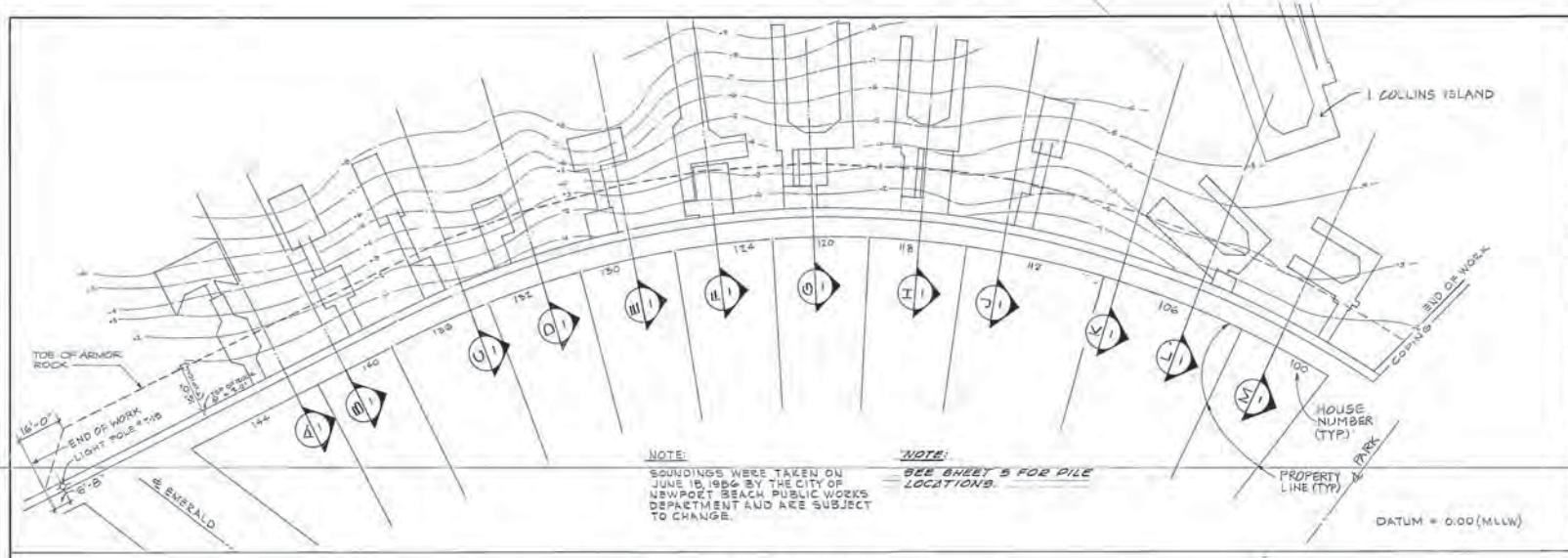
BALBOA ISLAND BHD RESTORATION

GENERAL NOTES

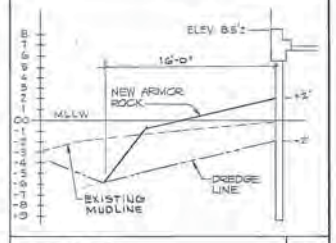
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

R-5111-S
SHEET 2 OF 5

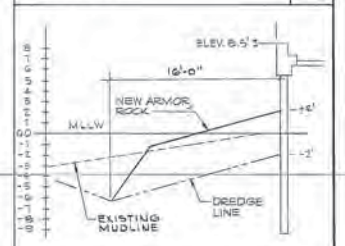
H-5111-S
2 of 5



PLOT PLAN 100 BLOCK SOUTH BAY FRONT SCALE: 1"=20'-0"



SECTION A



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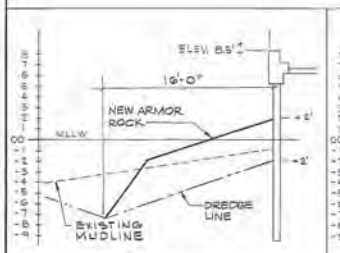

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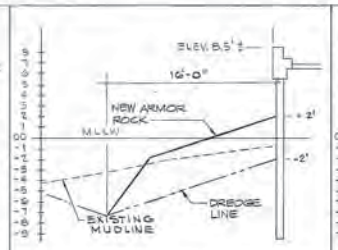

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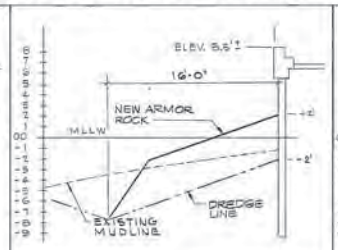

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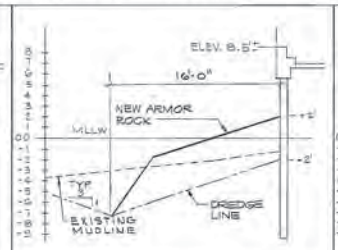

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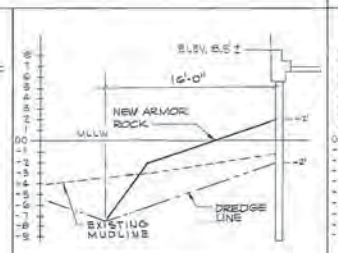

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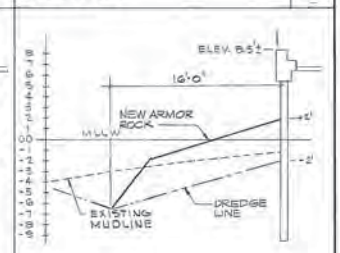

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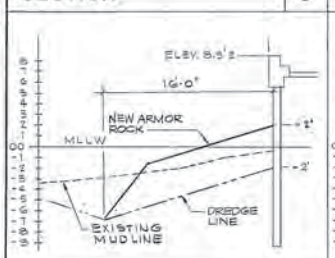

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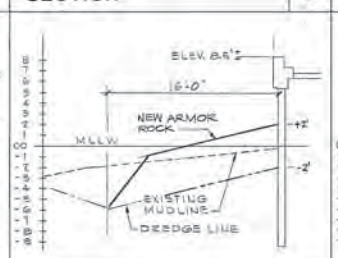

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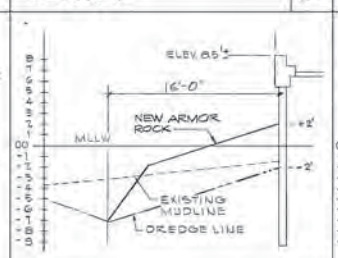

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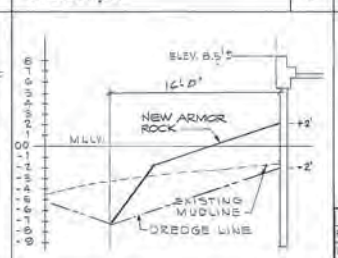


SECTION M

AS BUILT

C-2525

CA
DASH & ASSOCIATES ENGINEERS
(213) 432-8410
Long Beach, CA

2565.00

SCALE: 3/16"=1'-0" EXCEPT AS NOTED

DATE	BY	DESCRIPTION	APPD.
8-1987	R.K	REVISE FOR ROCK ALTERNATE	
1-1988	J.S.H	FOR FINAL APPROVAL	
7-13-88	J.S.H	FOR APPROVAL	

REVISIONS

APPROVED
PUBLIC WORKS DIRECTOR
R.E. NO. 22806
DATE 9-15-87

DESIGNED R.E.E.
DRAWN J.S.H
CHECKED
DATE

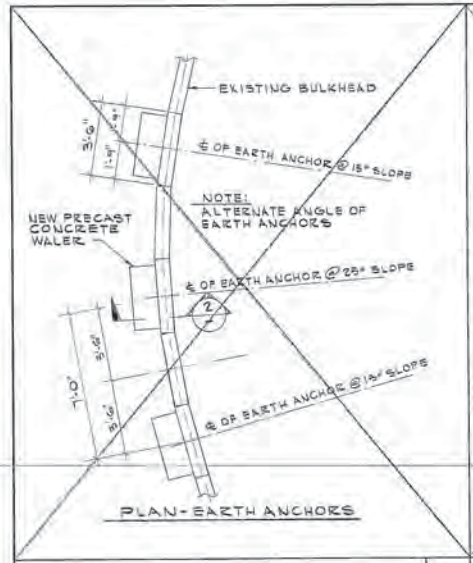
BALBOA ISLAND BULKHEAD RESTORATION

PLAN AND PROFILES

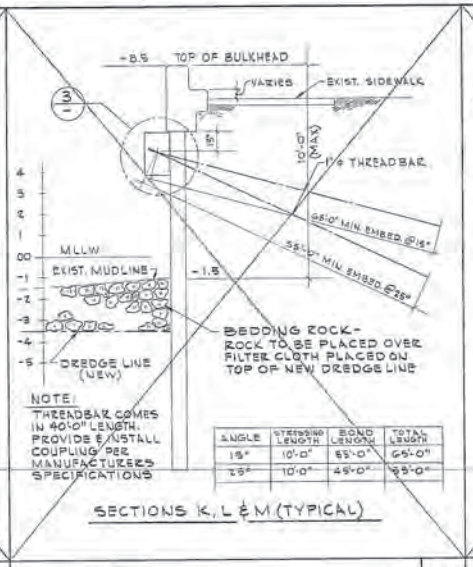
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5111-S
SHEET 3 OF 5

H-5111-S
3 of 5

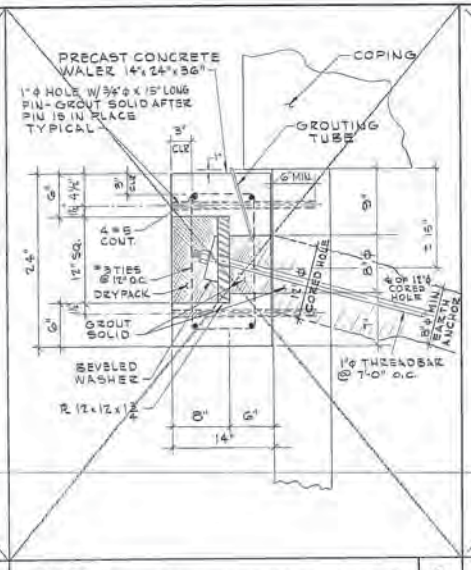


DETAIL SCALE: 3/8"=1'-0" (ALTERNATE 2) | 1

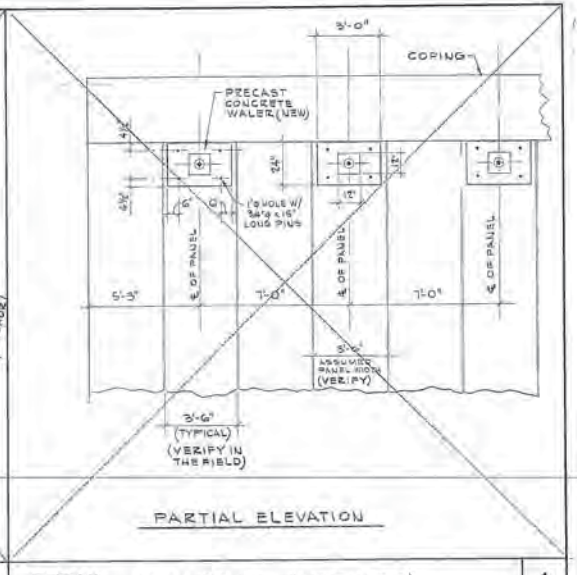


ANGLE	STRESSING LENGTH	BOND LENGTH	TOTAL LENGTH
15°	10'-0"	65'-0"	65'-0"
25°	10'-0"	45'-0"	55'-0"

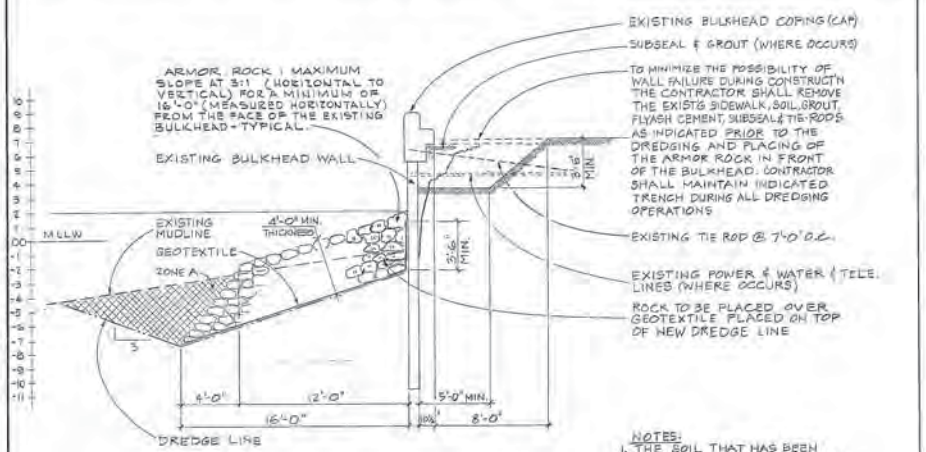
DETAIL SCALE: 3/8"=1'-0" (ALTERNATE 2) | 2



DETAIL SCALE: 1 1/2"=1'-0" (ALTERNATE 2) | 3



DETAIL SCALE: 3/8"=1'-0" (ALTERNATE 2) | 4



NOTES:
1. THE SOIL THAT HAS BEEN REMOVED IN FRONT OF THE WALL AT THE TOE OF THE ARMOR ROCK (ZONE A) DOES NOT NEED TO BE REPLACED
2. PLATFORM & GUIDE PILES NOT INDICATED - SEE SHT. 5

DETAIL SCALE: 1/4"=1'-0" | 6

AS BUILT

C-2525

CASH & ASSOCIATES ENGINEERS (213) 436-6161 Long Beach, CA.

2565.00

DATE	BY	DESCRIPTION	APPD
3-19-81	R.R.	REVISE FOR ROCK ALTERNATIVE	
1-19-81	J.S.H.	FOR FINAL APPROVAL	
9-30-80	J.S.H.	FOR APPROVAL	

REVISIONS

APPROVED: PUBLIC WORKS DIRECTOR T.E. NO. 1280 DATE 9-11-80

DESIGNED SRE | DRAWN JSH | CHECKED | DATE

SALBOA ISLAND BULKHEAD RESTORATION

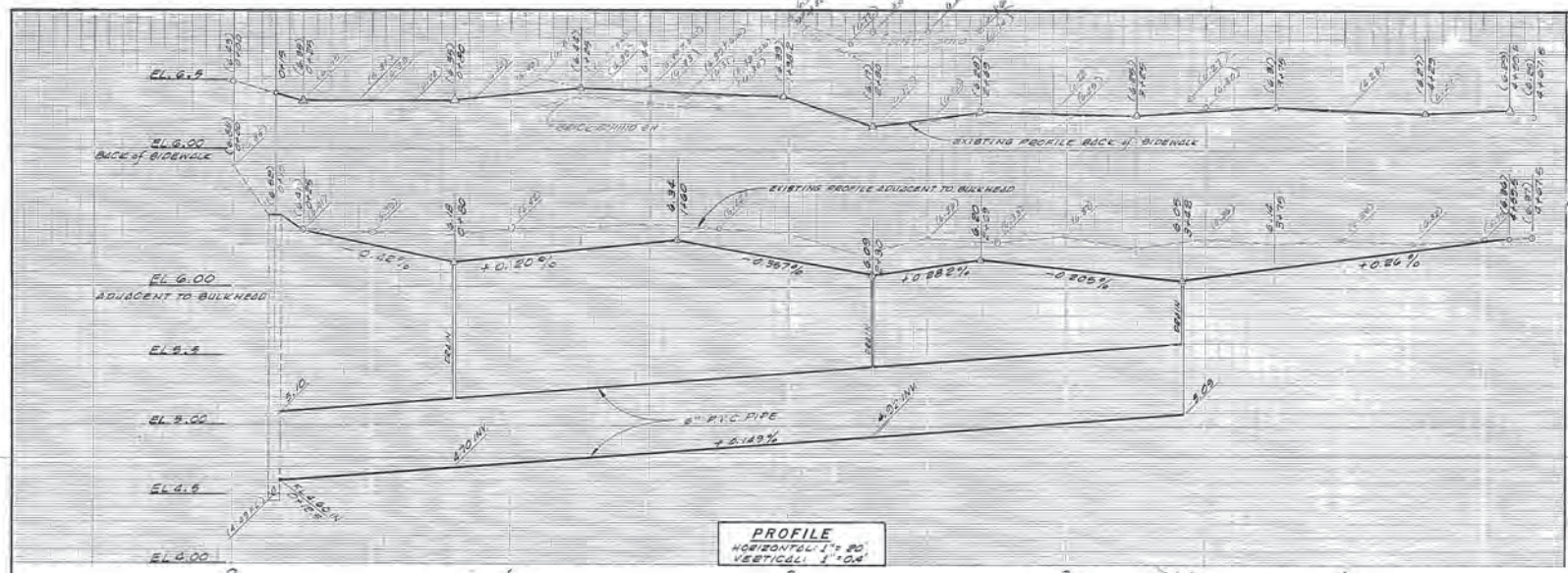
STRUCT. DETAILS

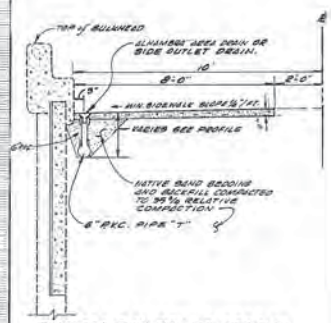
CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5111-S
SHEET 4 OF 5

NUMBER: H-5111-S 4 & 5

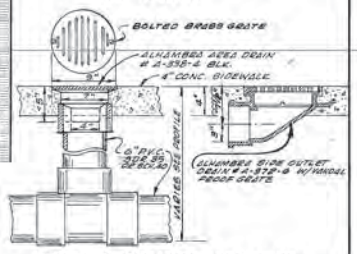
ENGINEER





TYPICAL BAY FRONT SECTION

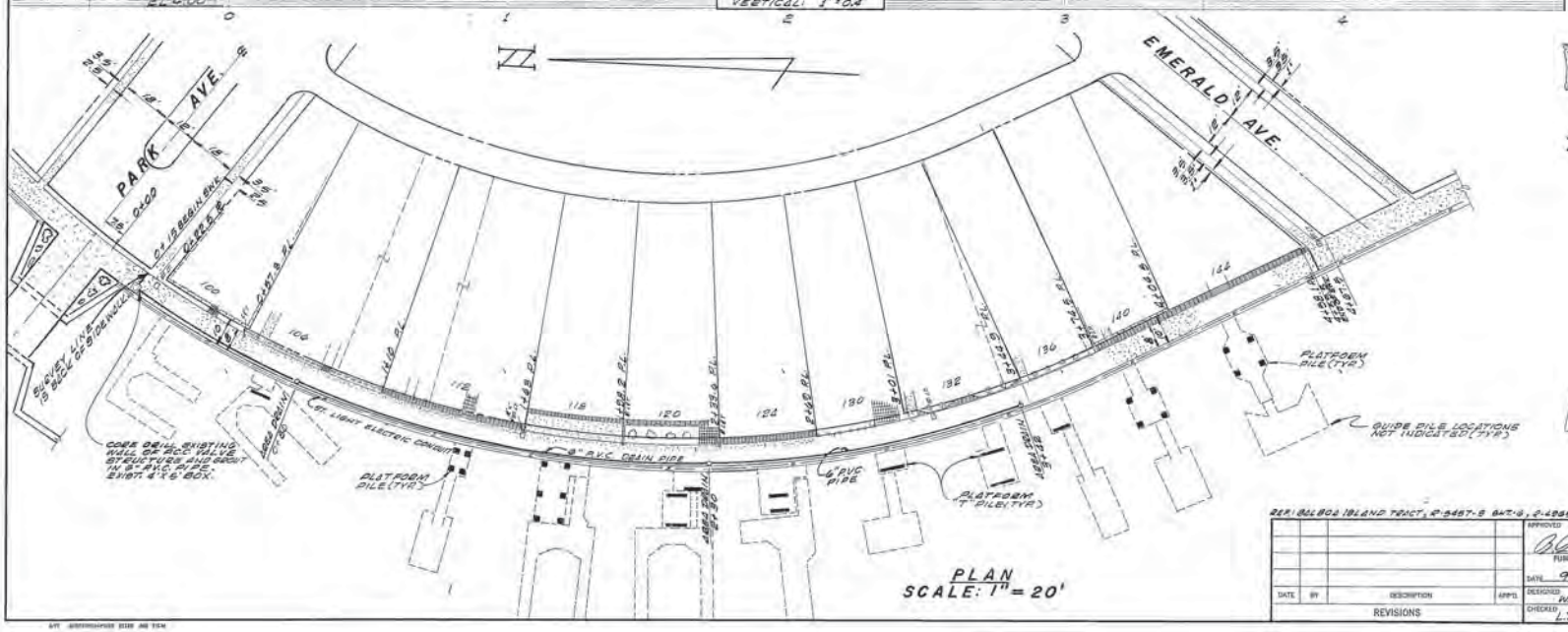
NOT TO SCALE



WALKWAY DRAIN CONNECTIONS

SCALE: 1½" = 1'-0"

NOTE:
DRAINS TO BE GALVANIZED.



PLAN
SCALE: 1" = 20'

REF: BALBOA ISLAND TRACT, R-9457-B, BKT-8, R-4986-B, FIELD BOOK 619 SHEET 90 C-2525

DATE	BY	DESCRIPTION	APPD.
		REVISIONS	

APPROVED: PUBLIC WORKS DIRECTOR R.E. NO. 12806 DATE 9-15-87

DESIGNED W.B. CHECKED L.D. DRAWN W.B. DATE 9-11-87

BALBOA ISLAND BULKHEAD RESTORATION

WALKWAY RECONSTRUCTION

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5111-S
SHEET 5 of 5

DRAWING NUMBER H-5111-S
SHEET 5 of 5

Appendix 2

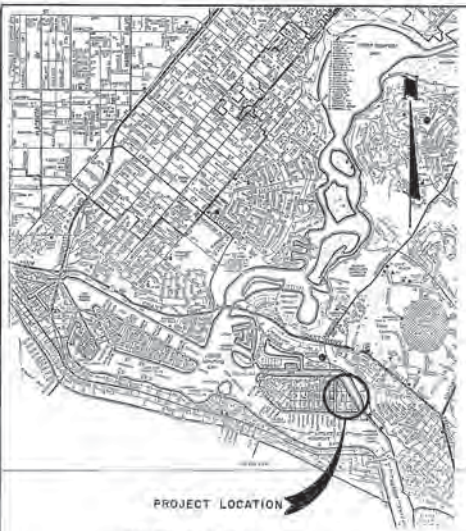
Little Balboa Island Seawall Raising (1989)

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT
LITTLE BALBOA ISLAND SEAWALL RAISING

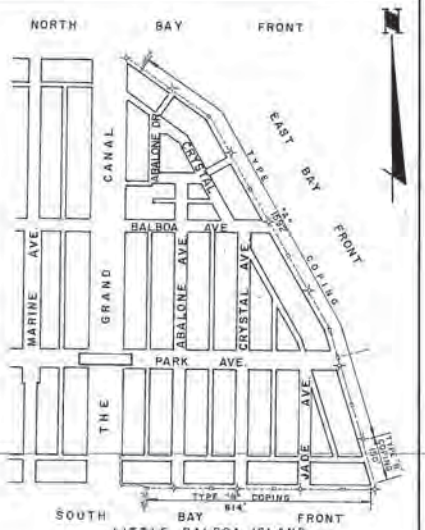
CONTRACT NO. 2468

APPROVED Benjamin A. Nolan DATE 7-22-88
PUBLIC WORKS DIRECTOR R.C.E. NO. 12806

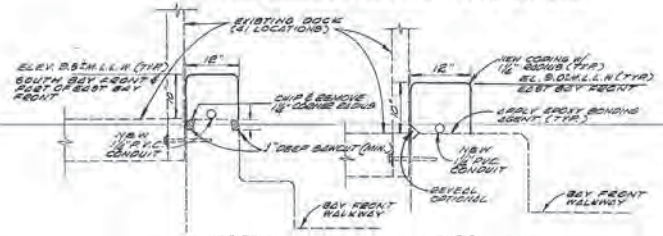
REGISTERED PROFESSIONAL ENGINEER BENJAMIN A. NOLAN No. C 012806 EXP. 3-31-89 CIVIL STATE OF CALIFORNIA



VICINITY MAP
SCALE: 1" = 1/2 MI.

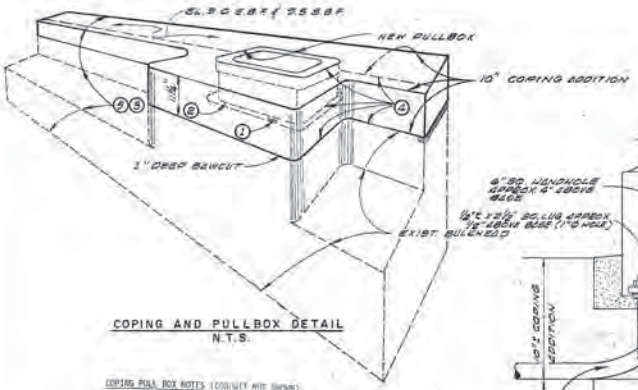


LITTLE BALBOA ISLAND
SCALE: 1" = 200'



TYPE "B" COPING
N.T.S.

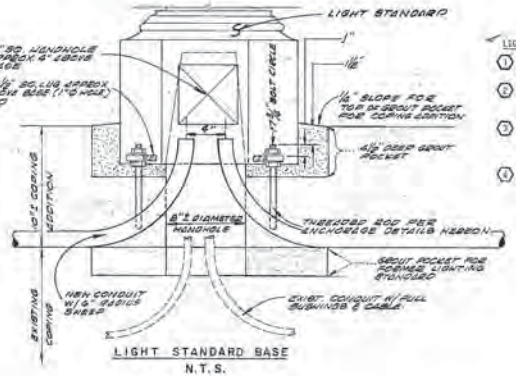
TYPE "A" COPING
N.T.S.



COPING AND PULLBOX DETAIL
N.T.S.

COPING PULL BOX NOTES (CONDUIT NOT SHOWN)

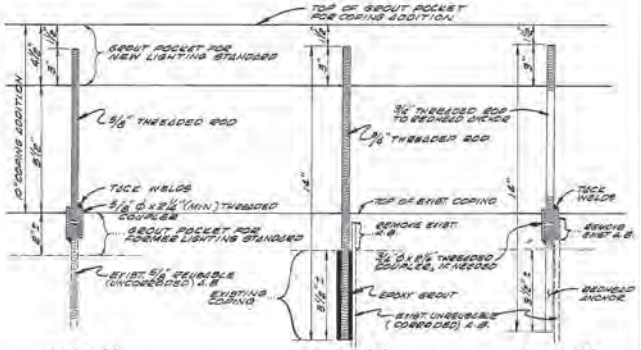
1. CHIP EX. BULKHEAD COPING TO REMOVE EX. METAL PULL BOX.
2. SAWCUT NEW PULL BOX TO 8" HEIGHT TO ALLOW NEW PULL BOX TO BE CAST INTO COPING ADDITION.
3. REPAIR EXISTING COPING AND EXPANSION JOINTS.
4. APPLY EPOXY BONDING AGENT TO ALL CONCRETE SURFACES THAT THE COPING ADDITION WILL BE CAST AGAINST.
5. CLEAN AND SANDBLAST EXISTING COPING AND ADDITION.



LIGHT STANDARD BASE
N.T.S.

LIGHTING STANDARD NOTES

1. CHIP EX. BULKHEAD COPING TO EXPOSE EX. 5/8" A.B.
2. UNSCREW OR TORCH OFF A.B. NUTS, REMOVE LIGHTING STANDARD AND DELIVER TO UTILITIES YARD.
3. COUPLE NEW 5/8" THREADED ROD TO EX. A.B. IF EX. A.B. ARE CORRODED, SWELL AND EPOXY 3/4" THREADED RODS OR INSTALL 3/4" WEDGE ANCHORS. SEE DETAILS A, B & C HEREIN.
4. DOUBLE NUT NEW LIGHTING STANDARD. BACKFILL AND FINISH GROUT POCKET TO SHED WATER FROM LIGHTING STANDARD.



DETAIL "A" DETAIL "B" DETAIL "C"

ANCHORAGE DETAILS
N.T.S.

AS BUILT
5/21/'89 W.B.

REF: 2-5467-S, H-5098-S

C-2468

DATE	BY	DESCRIPTION	APP'D
		REVISIONS	

APPROVED: PUBLIC WORKS DIRECTOR R.E. NO. 12806 DATE 7-22-88
DESIGNED L.D. DRAWN W.B.
CHECKED DATE DEC. '87

LITTLE BALBOA ISLAND SEAWALL RAISING

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

H-5122-S
SHEET 1 OF 1

Appendix 3

Cash & Associates (2005)

CASH & ASSOCIATES
Engineering and Architecture

January 31, 2005

City of Newport Beach
Public Works Department
3300 Newport Boulevard
Newport Beach, CA 92663

Attention: Mr. Lloyd R. Dalton, P.E.

Subject: BALBOA ISLAND AND LITTLE BALBOA ISLAND BULKHEADS AND COLLINS ISLAND BRIDGE INSPECTIONS AND REPORTS (C&A Project No. 6253.00)

Dear Mr. Dalton:

Cash & Associates is pleased to provide two DRAFT copies of our inspection reports for the Balboa Island and Little Balboa Island Bulkheads and the Collins Island Bridge for review and comment.

Upon receipt of written comments from you, we will prepare five (5) copies of the final report as requested for your use. If you have any questions, please do not hesitate to contact me.

Very truly yours,

CASH & ASSOCIATES

Christopher T. Mansour, P.E.
California Civil Engineer No. C058566

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BALBOA AND LITTLE BALBOA ISLAND
BULKHEAD INSPECTION REPORT

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SECTION I. FIELD INVESTIGATION

1.0 Introduction

Cash & Associates was contracted by the City of Newport Beach, Public Works Department, to inspect and report on the condition of 2.5 miles of bulkhead walls around Balboa Island and Little Balboa Island. The work included field inspection and photographic documentation of the walls and preparation of the following report. This report defines the inspection procedures used, identifies observed defects, and discusses findings in regards to the structural integrity and physical condition of the Balboa Island and Little Balboa Island bulkheads. This report also contains photographic documentation of observed conditions, recommendations for repairs, sketches for repair methods, and estimates of construction cost for repairs.

As noted on the map below, Balboa Island and Little Balboa Island are divided into specific blocks. For ease of reference, this report has been organized by street blocks that have been identified by the corresponding street names, as shown in the Table of Contents. Each block section includes a list of observed distress, photographs from the site visit, and an estimate of construction cost for repairs.

FIG 1. Balboa Island Street Map

1.1 Executive Summary

Based on the field investigations, measurements taken and calculations made to determine the adequacy of the bulkheads, we have made the following conclusions:

1. The majority of sealant at construction joints is cracked and split and in need repair.

2. Transverse shrinkage cracking of the concrete bulkhead cap occurs throughout both islands and can be easily mitigated with the use of modern surface applied sealants or epoxy injection technology.

3. Shotcrete coverings on the Grand Canal bulkhead are cracked and spalling throughout. The bottom of the shotcrete covering has been subjected to seawater intrusion that has caused areas of delamination of the shotcrete from the base materials. This area has a high potential for the shotcrete to delamination from the base material. The scope of Cash & Associates inspection did not include methods to observe the condition of the bulkhead beneath the shotcrete surface, therefore no determination as to the condition of the original bulkhead is included in this report.

4. Leakage and piping through and/or under the bulkhead was observed during extreme high tides.

5. Concrete sheets and solder piles, where exposed for visual inspection, are in good condition. Concrete caps are spalled and cracked throughout the length of the bulkhead on both islands but does not pose a structural problem at this time.

6. Overall, the majority of the bulkheads pose little danger of failure during a seismic event. Areas around the west end of Balboa Island between Emerald Avenue and Park Avenue have the greatest potential for failure during a seismic event.

1.2 History of Balboa Island/Little Balboa Island Bulkheads

Prior to 1906, much of what is now Balboa Island, Harbor Island, Collins Island and Little Balboa Island was underwater at high tide. In 1906, W.S. Collins, an early day developer, brought a small steam dredge into Newport Harbor and began dredging up sand to build what was is now known as Balboa Island. The first "bulkhead", a wooden structure that protected part of Balboa Island, was constructed in 1909. This structure was partially replaced by a cement barrier in 1912.

In 1913, the Grand Canal, separating Little Balboa Island, was created, and dredging to complete Balboa Island was finished. In 1918 the Balboa Island Improvement Association (BIIA) was started. The BIIA was a strong motivating force in working with the City of Newport Beach on repair of the bulkhead, instituting ferry service, and providing a sewer system, water, gas and electricity service, paved streets and sidewalks, and street lighting.

The Balboa Island Bulkhead was rebuilt in 1922 and the Grand Canal wooden bulkhead and walk were rebuilt in concrete in 1929. The present day North, South and East Bay Front bulkheads, walks and public piers were completed in 1938[1]. In the 1980's and 1990's, a series of public works projects placed shotcrete over the existing bulkheads along the Grand Canal east and west promenades. In addition, the bulkhead coping on Little Balboa Island was raised approximately 12 inches around the entire island.

1.3 Construction of Bulkheads

With the exception of the bulkhead along South Bay Front between Park Avenue and Emerald Avenue, all bulkheads are constructed using concrete solder piles tied back to a wooden "deadman" pile. Concrete sheets, placed between the solder piles, span the walls horizontally between the solder piles and retain earth behind the walls. The bulkhead located along South Bay Front between Park Avenue and Emerald Avenue originally was designed using a concrete sheet embedded into sand and tied back to wood piles placed at seven feet on center. The concrete sheets span vertically between the concrete cap and the embedment into the mud. In 1987, a bulkhead investigation

[1] *Balboa Island History web site - www.balboaislandmuseum.com.*

performed by Cash & Associates, concluded that these sheet pile wall tiebacks were corroded and inadequate. Subsequently, rock was placed in front of the bulkhead to provide stability to the system on the assumption that all tie-backs were corroded and not providing adequate support to the wall. The addition of this rock work in front of the wall, effectively turned the simply-supported bulkhead into a cantilevered bulkhead. Additional calculations prepared by Cash & Associates for bulkhead stability established that the original walls were not designed to withstand seismic loads or the potential loads and differential settlement resulting from liquefaction.

SECTION II. DATA COLLECTION

2.0 Survey Methods Used

1. The survey performed for this investigation was a visual survey, only. Testing and/or measuring (except location from known points) was not included in Cash & Associates Scope of Work. All visual information was taken during low tides.

2. All notations for locations of repairs are related to the center line of streets and/or light poles located at the ends of streets. (Refer to Photographs).

3. In addition to field investigation, we reviewed as-built and design drawings furnished by the City of Newport Beach, Public Works Department. A list of these drawings is provided in Section V Appendix, 5.0 Reference Drawings.

4. The notations relate only to the wall visible above the sand elevation.

5. No attempt was made to determine the elevation of the bottom of the panels; or, to inspect tie backs. If the City of Newport Beach wishes to assess the structural stability of bulkheads in the future, an assessment of the wall depth of penetration will be required.

6. No calculations were made to determine the stresses in the wall.

7. Photographs were taken of each area of distress to facilitate the identification of the condition of the walls. Copies of the photographs taken will be provided on separate electronic media. These photos can also be used in future wall investigations to assess historical wall distress.

8. Repair Identification

a. Cracks. Cracks are divided into two categories, small and large. Repair of small cracks will not require use of a form. Repair of larger cracks will require a form. Pressure injection using epoxy is the recommended method of repair for cracks. Refer to Section V, Appendix, 5.1 Repair Methods for illustrations of repair methodology as follows:

Sketch C-1 Small cracks, no form required.
Sketch C-2 Larger cracks, form required.

b. Spalling. Repair of spalling will involve removal of loose concrete and pouring or placing new concrete by hand. Refer to Section V, Appendix, 5.1 Repair Methods for illustrations of repair methodology for spalling as follows:

Sketch S-1 Does not include existing reinforcing.
Sketch S-2 Does include existing; or, new reinforcing.

c. Sealant Repair. Repair of cracked and splitting sealant at existing construction joints or crack control joints will involve removing the existing sealant from the joints and replacing damaged or missing joint material with new backing rod between the concrete caps. New sealant will then be applied over the construction joint to provide a water tight seal. Refer to Section V, Appendix, 5.1 Repair Methods for an illustration of repair methodology for substrate failure, Refer to Sketch J-1.

d. Shotcrete Repair. Repair of shotcrete will involve the use of either crack injection as described in Section 8a above, spall repair as explained in Section 8b above, or removal of shotcrete material back to sound base material. Refer to Section V, Appendix, 5.1 Repair Methods, Sketch SC-1 for illustrations of repair methodology for substrate failure.

2.1 Approach

Visual inspections from the landside and waterside of the Balboa Island and Little Balboa Island bulkheads were performed over a period of several days as follows: December 17, 20, 21 and 27, 2004 and January 5, 6, 10 and 21, 2005. Tide charts were used to determine the best time to observe the bulkheads at low tide to ensure maximum exposure of the walls. During the site investigations, measurements, photographs and soundings were taken to determine the condition of the bulkheads.

2.2 Measurements

All measurements along the bulkheads were taken from the centerline of street and/or light poles as a reference of 0.0 feet. All measurements were made using a calibrated distance wheel. The wheel was placed on top of the bulkhead and distances from the reference point to the point of note were observed and recorded. All elevations, where mentioned, are based on visual estimation relative to MLLW.

2.3 Obstructions

During each site investigation every attempt was made to gain access to every visible part of the bulkhead. Bulkheads or portions of the bulkheads obscured by rocks, high sand levels, and piers were assumed to be in good condition. A minimum of two passes from both landside and waterside of all bulkheads were made to identify any problems or areas of deficiencies. Sketches were made and photographs were taken to document areas of observed deficiencies. Where cracks or spalls were observed and partially obstructed by sand, the sand was removed to the greatest extent possible with hand tools to observe potential problem areas.

2.4 Soundings

Sounding where spalling has occurred can determine if the area is a spall (loose material), or a crack (solid material with a crack present). During Cash & Associates site investigations, if spalling was observed or suspected, a sounding of the area was made using a 16 ounce hammer on and around the suspect spalled area. Where

spalling was identified, the location of the spall was traced to determine the approximate size of the spall. Depth of the spall, where available, was determined through visual inspection. The sounding method is not accurate in determining spall depth.

2.5 Limitations

The majority of the concrete sheets were buried in sand and could not be observed. In areas where these sheets could be observed, no damage was evident. Based on the condition of the concrete sheets that could be inspected, this report assumes that the buried sheets are in good condition and further investigation is not necessary at this time. Due to operational conditions and obstructions at the ferry landing on South Bay Front at Agate Avenue, no investigation could be performed under the loading ramp and electrical equipment room adjacent to Agate Avenue. A visual survey by boat was performed with no apparent observed damage to the seawall in this area.

This report is based on the assumption that the bulkheads were designed and constructed conforming to the codes in effect at the time of construction. This investigation was limited to the visual observation of items noted in this report. No assurances can be given or otherwise implied that all deficiencies were uncovered.

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Registered Engineers practicing in this or similar localities. Our professional opinions, conclusions and recommendations are based on visual observation of those parts of the structure which are noted in this report. No opinions are expressed or implied concerning the actual condition of parts of the structure we did not observe.

SECTION III. PRIORITY AND COST OF REPAIR SUMMARY

3.0 Repairs

Detailed breakdowns by block, defined by individual street names, together with recommendations for repairs and the associated estimates for construction costs are contained in Section IV Inspection.

3.1 Priority for Repairs

Although the overall condition of the Balboa Island and Little Balboa Island bulkheads is good, there are some problem areas. The order of priority for recommended repairs is broken down into three levels as:

Priority 1: Non-seismic, structural repairs that posed greatest danger to life safety.

Priority 2: Repair of property damage

Priority 3: Cosmetic damage.

A prioritized list of recommended repairs follows:

3.1.1 Priority 1 – Life Threatening Structural Damage Repairs

1. No life threatening repairs of the bulkheads are required at this time.

2. Electrical Pull Box, North Bay Front Between Garnet Avenue and Pearl Avenue. The pull box lid is accessible to the general public through the loss of the access cover bolts. Access bolts should be replaced and tightened to prevent the general public access to the pullbox.

3.1.2 Priority 2 – Property Damage Repairs

Intrusion of seawater through cracks in the bulkhead or failed joints is the greatest threat for property damage. Intrusion is most likely to occur during high tides, or high tides coupled with heavy rains. These conditions were observed during the January 10th inspection of the bulkheads when both maximum high tide levels and heavy rainfall occurred. During these conditions leaking through construction joints, cracks in the bulkheads and piping under the sidewalks were observed. Cracks in the bulkheads can be easily corrected. Due to hydrostatic forces, piping under the sidewalks can be the difficult to repair. Sealing the bulkhead, concrete sheets and sidewalk will correct the piping problem temporarily but this is not a long term solution.
Recommended repairs include:

1. Repair construction/expansion joints using sealant throughout both islands.

2. Repair cracks in the bulkheads using crack injection.

3. Sealing bulkheads and sidewalks against piping to the property lines.

Refer to Section V, Appendix, 5.1 Repair Methods for sketches of these repairs.

3.1.3 Priority 3 – Cosmetic Damage, All Bulkheads

Cosmetic damage exists throughout the bulkheads however it poses little danger to the structural integrity of the wall or potential for property damage. The greatest danger posed by the observed cosmetic damage would be injuries to persons through tripping hazards or abrasions to persons walking on or playing near the bulkheads. This has the potential of being a liability issue and Public Works may want to consider addressing this issue. Observed cosmetic damage includes:

1. Grand Canal East and West Promenades. Shotcrete placed over the piles and concrete sheets is spalling off or being undermined. In general, the shotcrete coating is cracked and spalled throughout the length of the wall. In addition, large areas of corrosion and spalling were detected at the bottom of cap on the waterside of the bulkhead.

2. Waterside cracking and spalling at the bottom of the cap, located directly over the soldier piles, was observed on the bulkheads outside the Grand Canal area.

3. Cracking and spalling was observed in areas previously repaired. These conditions appear to be the result of continued corrosion of the existing reinforcing bars.

3.2 COST ESTIMATE FOR REPAIRS

The quantities used to prepare estimates are based on visual observations from the bulkhead, floating docks; or, where necessary, a boat. Sample repair methods are shown on attached sketches contained in Section V, Appendix 5.1 Repair Methods. The unit prices for this estimate were compiled from historical data obtained from similar projects over the past several years. The following is a summary of the estimated construction cost by block. Breakdowns of these costs are provided at the end of each tabbed section in Section IV Inspection of this report.

1. North Bay Front Between Park and Emerald ..... $ 16,345
2. North Bay Front Between Emerald and Garnet ..... $ 1,120
3. North Bay Front Between Garnet and Pearl ..... $ 2,016
4. North Bay Front Between Pearl and Agate ..... $ 1,540
5. North Bay Front Between Agate and Collins ..... $ 2,265
6. North Bay Front Between Collins and Ruby ..... $ 5,047
7. North Bay Front Between Ruby and Diamond ..... $ 3,332
8. North Bay Front Between Diamond and Sapphire ..... $ 5,110
9. North Bay Front Between Sapphire and Coral ..... $ 4,914
10. North Bay Front Between Coral and Apolena ..... $ 7,826
11. North Bay Front Between Apolena and Amethyst ..... $ 8,736
12. North Bay Front Between Amethyst and Onyx ..... $ 2,576

13.	North Bay Front Between Onyx and Marine	$ 4,228
14.	North Bay Front Between Marine and Grand Canal	$ 1,470
15.	South Bay Front Between Park and Emerald	$ 8,722
16.	South Bay Front Between Emerald and Garnet	$ 6,874
17.	South Bay Front Between Garnet and Pearl	$ 2,954
18.	South Bay Front Between Pearl and Agate	$ 8,148
19.	South Bay Front Between Agate and Opal	$ 1,876
20.	South Bay Front Between Opal and Topaz	$ 4,823
21.	South Bay Front Between Topaz and Turquoise	$ 14,917
22.	South Bay Front Between Turquoise and Collins	$ 3,374
23.	South Bay Front Between Collins and Ruby	$ 1,651
24.	South Bay Front Between Ruby and Diamond	$ 1,106
25.	South Bay Front Between Diamond and Sapphire	$ 504
26.	South Bay Front Between Sapphire and Coral	$ 14,364
27.	South Bay Front Between Coral and Apolena	$ 10,808
28.	South Bay Front Between Apolena and Amethyst	$ 10,416
29.	South Bay Front Between Amethyst and Onyx	$ 2,856
30.	South Bay Front Between Onyx and Marine	$ 9,240
31.	South Bay Front Between Marine and Grand Canal	$ 10,990
32.	South Bay Front Between Grand Canal and Abolena	$ 2,478
33.	South Bay Front Between Abolena and Crystal	$ 4,340
34.	South Bay Front Between Crystal and Jade	$ 14,118
35.	South Bay Front Between Jade and East Bay Front	$ 9,548
36.	Grand Canal West Between North Bay Front and Balboa	$ 48,853
37.	Grand Canal West Between Balboa and Park	$ 65,611
38.	Grand Canal West Between Park and South Bay Front	$ 24,759
39.	Grand Canal East Between South Bay Front and Park	$ 14,497
40.	Grand Canal East Between Balboa and Park	$ 27,783
41.	Grand Canal East Between Balboa and East Bay Front	$ 61,838
42.	East Bay Front Between Grand canal and Balboa	$ 67,900
43.	East Bay Front Between Balboa and Park	$ 58,828
44.	East Bay Front between Park and South Bay Front	$ 29,855
	GRAND TOTAL	**$610,556**

SECTION IV. INSPECTION

This section has been organized for ease of reference. Each tabbed section (1 through 45) contains the results, by block, of our field investigation together with representative photographs and the associated estimate of construction cost for repairs

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42. East Bay Front Between Grand Canal East and Balboa Avenue
43. East Bay Front Between Balboa Avenue and Park Avenue
44. East Bay Front Between Park Avenue and South Bay Front
45. Leaking Bulkheads Around Both Islands

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

Item	Location	Description
1	0' West of Emerald Avenue	Reference point at center line of street / public pier
2	17' West of Emerald Avenue	Waterside, mooring anchor insert, rusted
3	60'-74' West of Emerald Avenue	Waterside, crack at bottom of cap
4	74' West of Emerald Avuenue	Construction joint, landside missing sealant at bottom of joint, both sides sealant in good condition
5	85' West of Emerald Avenue	Waterside, 72" crack above pile
6	97' West of Emerald Avenue	Waterside, 60" crack above pile
7	108' West of Emerald Avenue	Waterside, 72" crack above pile
8	120' West of Emerald Avenue	Waterside, 84" crack above pile
9	132' West of Emerald Avenue	Waterside, 72" crack at top of cap
10	143' West of Emerald Avenue	Waterside, 72" crack above pile
11	155' West of Emerald Avenue	Waterside, 72" crack above pile
12	167' West of Emerald Avenue	Waterside, 12" crack with rust above pile
13	178' West of Emerald Avenue	Waterside, 72" crack under pier
14	178' West of Emerald Avenue	Landside, crack at lower step 60"
15	190' West of Emerald Avenue	Construction joint, landside missing sealant at bottom of joint, sealant both sides cracked and split
16	197' West of Emerald Avenue	Landside, lightpole spalled on landside
17	225' West of Emerald Avenue	Waterside, crack with rust over pile extending under pier 120"
18	237' West of Emerald Avenue	Waterside, crack with rust 72" long
19	248' West of Emerald Avenue	Waterside, crack over pile with rust 84"
20	260' West of Emerald Avenue	Waterside, longitudinal and transverse crack over pile. 72" long longitudinal crack
21	261' West of Emerald Avenue	Landside, transverse crack and repair. Repair in good shape
22	274' West of Emerald Avenue	Landside, transverse crack through cap
23	295' West of Emerald Avenue	Waterside, crack over pile with rust 60"
24	310' West of Emerald Avenue	Construction joint, sealant on both sides split and cracked
25	310' West of Emerald Avenue	Waterside, crack on east side of construction joint 48" long
26	342' West of Emerald Avenue	Waterside, crack at pile 2 each: (1) 48" long, (1) 36" long
27	356' West of Emerald Avenue	Waterside, crack at pile 48" long
28	367' West of Emerald Avenue	Waterside, crack at pile 36" long, void 12"x1/2"
29	369' West of Emerald Avenue	Landside, transverse crack through cap
30	377' West of Emerald Avenue	Waterside, crack over pile 60"x 1/8" with rust present
31	415' West of Emerald Avenue	Landside, lightpole crack at cap
32	428' West of Emerald Avenue	Construction joint, sealant cracked and split
33	428' West of Emerald Avenue	Waterside, crack 60" long extending east from construction joint
34	428' West of Emerald Avenue	Landside, spall on east side of construction joint
35	463' West of Emerald Avenue	Waterside, 60" crack above pile
36	475' West of Emerald Avenue	Waterside, 30" crack above cap

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

North Bay Front, 60' West of Emerald

North Bay Front, 73' West of Emerald

North Bay Front, 85' West of Emerald

North Bay Front, 97' West of Emerald

North Bay Front, 108' West of Emerald

North Bay Front, 120' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

North Bay Front, 132' West of Emerald

North Bay Front, 143' West of Emerald

North Bay Front, 155' West of Emerald

North Bay Front, 167' West of Emerald

North Bay Front, 178' West of Emerald

North Bay Front, 179' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

North Bay Front, 190' West of Emerald

North Bay Front, 191' West of Emerald

North Bay Front, 197' West of Emerald

North Bay Front, 225' West of Emerald

North Bay Front, 237' West of Emerald

North Bay Front, 248' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

North Bay Front, 260' West of Emerald

North Bay Front, 261' West of Emerald

North Bay Front, 274' West of Emerald

North Bay Front, 295' West of Emerald

North Bay Front, 307' West of Emerald

North Bay Front, 310' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

North Bay Front, 356' West of Emerald

North Bay Front, 367' West of Emerald

North Bay Front, 369' West of Emerald

North Bay Front, 377' West of Emerald

North Bay Front, 415' West of Emerald

North Bay Front, 428' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

North Bay Front, 428' West of Emerald

North Bay Front, 463' West of Emerald

North Bay Front, 475' West of Emerald

ACTIVITY	CASH & ASSOCIATES		
Balboa Island Bulkhead Inspection	Engineering and Architecture		
STREET LOCATION	INSPECTOR: CTM	INSPECTION DATE: January 10, 2005	REVISION:
North Bay Front	ASSISTANT:		
Between Park Ave and Emerald Ave			

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
2	17' West of Emerald Avenue, mooring anchor	1	EA					$25.00	$25
3	60'-74' West of Emerald Avenue, crack injection	14	LF					$70.00	$980
5	85' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
6	97' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
7	108' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
8	120' West of Emerald Avenue, crack injection	7	LF					$70.00	$490
9	132' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
10	143' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
11	155' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
12	167' West of Emerald Avenue, crack injection	1	LF					$70.00	$70
13	178' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
14	178' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
15	190' West of Emerald Avenue, sealant repair	6	LF					$25.00	$150
16	197' West of Emerald Avenue, spall repair	2	SF					$70.00	$140
17	225' West of Emerald Avenue, crack injection	10	LF					$70.00	$700
18	237' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
19	248' West of Emerald Avenue, crack injection	7	LF					$70.00	$490
20	260' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
22	274' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
23	295' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
24	310' West of Emerald Avenue, sealant repair	6	LF					$25.00	$150
25	310' West of Emerald Avenue, crack injection	4	LF					$70.00	$280
26	342' West of Emerald Avenue, crack injection	7	LF					$70.00	$490
27	356' West of Emerald Avenue, crack injection	4	LF					$70.00	$280
28	367' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
29	369' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
30	377' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
31	415' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
32	428' West of Emerald Avenue, sealant repair	6	LF					$25.00	$150
33	428' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
34	428' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
35	463' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
36	475' West of Emerald Avenue, crack injection	3	LF					$70.00	$210

Continued onto next page

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 18, 2005	REVISION:

Subtotal		$11,675
Contingency	20 %	$2,335
Contractor OH & P	10 %	$1,168
City Cost Index	10 %	$1,168
GRAND TOTAL		$16,345

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **North Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

Item	Location	Description
1	0' East of Emerald Avenue	Reference point, centerline of lightpole
2	37' East of Emerald Avenue	Construction joint, sealant on both sides in good condition
3	125' East of Emerald Avenue	Pullbox, landside cracks, waterside cracks through previous repair
4	154' East of Emerald Avenue	Construction Joint, sealant waterside in good condition, landside cracked and split
5	223' East of Emerald Avenue	Top of cap cracked, spall repair 4 SQ FT
6	255' East of Emerald Avenue	Mooring anchor insert. Reference point centerline of lightpole at Garnet Avenue

North Bay Front, 37' East of Emerald

North Bay Front, 37' East of Emerald

North Bay Front, 125' East of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 125' East of Emerald

North Bay Front, 125' East of Emerald

North Bay Front, 154' East of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 154' East of Emerald

North Bay Front, 223' East of Emerald

North Bay Front, 223' East of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 223' East of Emerald

North Bay Front, 255' East of Emerald

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:

		QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
Item	Description	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
3	125' East of Emerald Avenue, crack injection	6	LF					$70.00	$420.00
4	154' East of Emerald Avenue, sealant repair	3	LF					$25.00	$75.00
5	223' East of Emerald Avenue, spall repair	4	SF					$70.00	$280.00
6	255' East of Emerald Avenue, mooring anchor	1	EA					$25.00	$25.00

Subtotal		$800.00
Contingency	20 %	$160.00
Contractor OH & P	10 %	$80.00
City Cost Index	10 %	$80.00
GRAND TOTAL		$1,120.00

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:

Item	Location	Description
1	0' East of Garnet Avenue	Reference point, centerline of lightpole at Garnet Avenue
2	17' East of Garnet Avenue	Waterside, mooring anchor
3	17' East of Garnet Avenue	Construction joint, sealant good on both sides
4	17' East of Garnet Avenue	Waterside, crack through previous spall.
5	43' East of Garnet Avenue	Waterside, mooring anchor, 3 each
6	121' East of Garnet Avenue	Pullbox, crack repair through previous spalls
7	121' East of Garnet Avenue	Pullbox, access cover is accessible to general public through the loss of closure bolts
8	134' East of Garnet Avenue	Construction joint, sealant good on both sides
9	187' East of Garnet Avenue	Waterside, crack at bottom of cap, 36" long
10	224' East of Garnet Avenue	Waterside, mooring anchor insert.
11	230' East of Garnet Avenue	Waterside, crack at bottom of cap, 60" long
12	237' East of Garnet Avenue	Waterside, mooring anchor at centerline of Pearl Avenue lightpole
13	237' East of Garnet Avenue	Reference point, centerline of lightpole at Pearl Avenue

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

17 feet East of Garnet

17 feet East of Garnet

17 feet East of Garnet

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

43 feet East of Garnet

121 feet East of Garnet

121 feet East of Garnet

121 feet East of Garnet

134 feet East of Garnet

134 feet East of Garnet

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

187 feet East of Garnet

224 feet East of Garnet

230 feet East of Garnet

237 feet East of Garnet

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
2	17' East of Garnet Avenue, mooring anchor	1	EA					$25.00	$25
4	17' East of Garnet Avenue, crack injection	3	LF					$70.00	$210
5	43' East of Garnet Avenue, mooring acnhor	3	EA					$25.00	$75
6	121' East of Garnet Avenue, crack injection	6	LF					$70.00	$420
7	121' East of Garnet Avenue, pullbox bolts	4	EA					$25.00	$100
9	187' East of Garnet Avenue, crack injection	3	LF					$70.00	$210
10	224' East of Garnet Avenue, mooring anchor	1	EA					$25.00	$25
11	230' East of Garnet Avenue, crack injection	5	LF					$70.00	$350
12	237' East of Garnet Avenue, mooring anchor	1	EA					$25.00	$25

Subtotal		$1,440
Contingency	20 %	$288
Contractor OH & P	10 %	$144
City Cost Index	10 %	$144
GRAND TOTAL		$2,016

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Pearl Ave and Agate Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

Item	Location	Description
1	17' East of Pearl Avenue	Construction joint, sealant in good shape both water and landsides
2	40' East of Pearl Avenue	Waterside, crack at bottom of cap 60" long
3	110' East of Pearl Avenue	Pullbox, waterside west and landside west corners are cracked 12" long
4	90' West of Agate Avenue	Landside, spall on lower step 24" long x 5" x 5"
5	105' West of Agate Avenue	Construction joint, sealant in good shape both water and landside
6	22' West of Agate Avenue	Waterside, crack at bottom of cap 18" long, rust present
7	12' West of Agate Avenue	Waterside, mooring anchor insert, rust present
8	2' West of Agate Avenue	Waterside, mooring anchor insert, rust present
9	General Notes	Shrinkage cracks at 10' o.c. nothing serious, seawall is straight and in good condition

North Bay Front, 40' East of Pearl

North Bay Front, 110' East of Pearl

North Bay Front, 90' West of Agate

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Pearl Ave and Agate Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 22' West of Agate

North Bay Front, 12' West of Agate

North Bay Front, 12' West of Agate

North Bay Front, 2' West of Agate

North Bay Front, 2' West of Agate

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Pearl Ave and Agate Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:

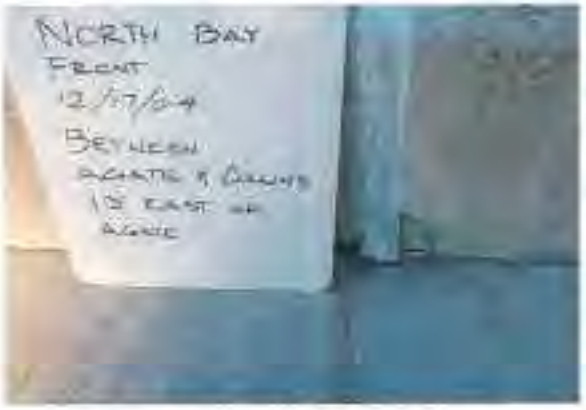
Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
2	40' East of Pearl Avenue, crack injection	5	LF					$70.00	$350
3	110' East of Pearl Avenue, crack injection	6	LF					$70.00	$420
4	90' West of Agate Avenue, crack injection	2	LF					$70.00	$140
6	22' West of Agate Avenue, crack injection	2	LF					$70.00	$140
7	12' West of Agate Avenue, mooring anchor	1	EA					$25.00	$25
8	2' West of Agate Avenue, mooring anchor	1	EA					$25.00	$25

Subtotal		$1,100
Contingency	20 %	$220
Contractor OH & P	10 %	$110
City Cost Index	10 %	$110
GRAND TOTAL		$1,540

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Agate Ave and Collins Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:

Item	Location	Description
1	13' East of Agate Avenue	Waterside, mooring anchor, rust present
2	13' East of Agate Avenue	Construction joint, sealant in good shape land side and water side
3	13' East of Agate Avenue	Landside, spall at sidewalk 2" x 3" x 1"
4	32' West of Collins Avenue	Construction joint, sealant cracked and split on waterside, sealant missing on landside and top
5	8' West of Collins Avenue	Spall repair 60" long at top x 6" x 9"; Spall repair at bottom 48" long x 3" x 7"
6	At Collins Avenue	Mooring anchor insert, rust present

North Bay Front, 13' East of Agate



North Bay Front, 13' East of Agate

North Bay Front, 13' East of Agate

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Agate Ave and Collins Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 32' West of Collins

North Bay Front, 32' West of Collins

North Bay Front, 8' West of Collins

North Bay Front, 8' West of Collins

North Bay Front, at Collins

ACTIVITY
Balboa Island Bulkhead Inspection

CASH & ASSOCIATES
Engineering and Architecture

STREET LOCATION
North Bay Front
Between Agate Ave and Collins Ave

INSPECTOR: CTM
ASSISTANT:

INSPECTION DATE: DEC 17, 2004

REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	13' East of Agate Avenue, mooring anchor	1	EA					$25.00	$25
3	13' East of Agate Avenue, spall repair	0.25	SF					$70.00	$18
4	32' West of Collins Avenue, sealant repair	6	LF					$25.00	$150
5	8' West of Collins Avenue, spall repair, steps	20	SF					$70.00	$1,400
6	At Collins Avenue, mooring anchor	1	EA					$25.00	$25

Subtotal		$1,618
Contingency	20 %	$324
Contractor OH & P	10 %	$162
City Cost Index	10 %	$162
GRAND TOTAL		$2,265

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Collins Ave and Ruby Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:

Item	Location	Description
1	14' East of Collins Avenue	Waterside, mooring anchor insert, rust present
2	50' East of Collins Avenue	Landside, transverse shrinkage crack across cap
3	85' East of Collins Avenue	Construction joint, sealant cracked and split on waterside, sealant missing on landside and top
4	110' East of Collins Avenue	Pullbox, landside spall through previous repair 30" long x 6" x 5"
5	81' West of Ruby Avenue	Landside, spall at lower step 2" long
6	78' West of Ruby Avenue	Waterside, crack at bottom of cap, 24" long
7	75' West of Ruby Avenue	Waterside, crack at bottom of cap, 60" long
8	66' West of Ruby Avenue	Landside, large shrinkage cracks
9	55' West of Ruby Avenue	Waterside, large shrinkage cracks
10	54' West of Ruby Avenue	Waterside crack 72" long, location of previous repair
11	28' West of Ruby Avenue	Waterside, crack at bottom of cap, 72" long
12	19' West of Ruby Avenue	Construction joint, sealant in good condition land side and water side
13	19' West of Ruby Avenue	Waterside, crack at bottom of cap 30" x 3"
14	7' West of Ruby Avenue	Waterside, crack at bottom of cap 36" long

North Bay Front, 14' East of Collins

North Bay Front, 50' East of Collins

North Bay Front, 50' East of Collins

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Collins Ave and Ruby Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 85' East of Collins

North Bay Front, 85' East of Collins

North Bay Front, 110' East of Collins

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Collins Ave and Ruby Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 110' East of Collins

North Bay Front, 110' East of Collins

North Bay Front, 81' West of Ruby
North Bay Front, 138' East of Collins

North Bay Front, 76' West of Ruby
North Bay Front, 141' East of Collins

North Bay Front, 75' West of Ruby
North Bay Front, 144' East of Collins

North Bay Front, 66' West of Ruby
North Bay Front, 153' East of Collins

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Collins Ave and Ruby Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 17, 2004	REVISION:	

North Bay Front, 55' West of Ruby
North Bay Front, 164' East of Collins

North Bay Front, 55' West of Ruby
North Bay Front, 164' East of Collins

North Bay Front, 28' West of Ruby
North Bay Front, 191' East of Collins

North Bay Front, 19' West of Ruby
North Bay Front, 200' East of Collins

North Bay Front, 7' West of Ruby
North Bay Front, 212' East of Collins

ACTIVITY
Balboa Island Bulkhead Inspection

CASH & ASSOCIATES
Engineering and Architecture

STREET LOCATION
North Bay Front
Between Collins Ave and Ruby Ave

INSPECTOR: CTM
ASSISTANT:

INSPECTION DATE: DEC 17, 2004

REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE
(714)896-2072
HUNTINGTON BEACH, CA

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	14' East of Collins Avenue, mooring anchor	1	EA					$25.00	$25
2	50' East of Collins Avenue, crack injection	3	LF					$70.00	$210
3	85' East of Collins Avenue, sealant repair	6	LF					$25.00	$150
4	110' East of Collins Avenue, spall repair	2	SF					$70.00	$140
5	81' West of Ruby Avenue, spall repair	2	SF					$70.00	$140
6	78' West of Ruby Avenue, crack injection	2	LF					$70.00	$140
7	75' West of Ruby Avenue, crack injection	5	LF					$70.00	$350
8	66' West of Ruby Avenue, crack injection	10	LF					$70.00	$700
9	55' West of Ruby Avenue, crack injection	6	LF					$70.00	$420
10	54' West of Ruby Avenue, crack repair	7	LF					$70.00	$490
11	28' West of Ruby Avenue, crack injection	6	LF					$70.00	$420
13	19' West of Ruby Avenue, crack injection	3	LF					$70.00	$210
14	7' West of Ruby Avenue, crack injection	3	LF					$70.00	$210

Subtotal		$3,605
Contingency	20 %	$721
Contractor OH & P	10 %	$361
City Cost Index	10 %	$361
GRAND TOTAL		$5,047

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

Item	Location	Description
1	At Ruby Avenue lightpole	Waterside, mooring anchor insert, rust present
2	At Ruby Avenue lightpole	Waterside, 84" long crack at bottom of cap
3	17' East of Ruby Avenue	Waterside, crack at middle of cap 84' long
4	22' East of Ruby Avenue	Waterside, spall and crack landside lower steep 36" long
5	28' East of Ruby Avenue	Waterside, 60" long crack with rust present
6	65' East of Ruby Avenue	Waterside, spall 6" long x 2" high x 2" deep
7	97' East of Ruby Avenue	Construction joint, sealant in good condition both sides
8	111' East of Ruby Avenue	Electrical pull box spall, land and water side 25" long x 3" high x 3" deep
9	134' East of Ruby Avenue	Waterside, crack bottom of cap 24" long
10	215' East of Ruby Avenue at Diamond Avenue	Construction joint, waterside sealant needs repair

North Bay Front, at Ruby

North Bay Front, at Ruby

North Bay Front, at Ruby

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			CA
STREET LOCATION **North Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: OTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 17' East of Ruby

North Bay Front, 17' East of Ruby

North Bay Front, 22' East of Ruby

North Bay Front, 28' East of Ruby

North Bay Front, 65' East of Ruby

North Bay Front, 65' East of Ruby

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 97' East of Ruby

North Bay Front, 97' East of Ruby

North Bay Front, 111' East of Ruby

North Bay Front, 111' East of Ruby

North Bay Front, 134' East of Ruby

North Bay Front, 215' East of Ruby

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 215' East of Ruby

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	At Ruby Avenue lightpole, mooring anchor	1	EA					$25.00	$25
2	At Ruby Avenue lightpole, crack injection	7	LF					$70.00	$490
3	17' East of Ruby Avenue, crack injection	7	LF					$70.00	$490
4	22' East of Ruby Avenue, spall repair	7	SF					$70.00	$490
5	28' East of Ruby Avenue, crack injection	5	LF					$70.00	$350
6	65' East of Ruby Avenue, spall repair	0.5	SF					$70.00	$35
8	111' East of Ruby Avenue, spall repair	3	SF					$70.00	$210
9	134' East of Ruby Avenue, crack injection	2	LF					$70.00	$140
10	215' East of Ruby Avenue, sealant repair	6	LF					$25.00	$150

Subtotal		$2,380
Contingency	20 %	$476
Contractor OH & P	10 %	$238
City Cost Index	10 %	$238
GRAND TOTAL		$3,332

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Diamond Ave and Sapphire Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Location	Description
1	15' East of Diamond Avenue	Waterside, crack at bottom of cap, 60" long
2	28' East of Diamond Avenue	Waterside, crack at middle of cap, 36" long
3	38' East of Diamond Avenue	Waterside, crack at bottom of cap, 72" long
4	62' East of Diamond Avenue	Waterside, crack at bottom of cap, 60" long
5	102' East of Diamond Avenue	Landside, spall 48" long x 5" high x 6" deep
6	108' East of Diamond Avenue	Construction joint, sealant cracked and split land and water side
7	112' East of Diamond Avenue	Pullbox, small spall 12"x1"x1/2" at southwest corner of pull box cover
8	132' East of Diamond Avenue	Waterside, crack at bottom of cap 72" long
9	144' East of Diamond Avenue	Waterside, crack at bottom of cap 36" long
10	156' East of Diamond Avenue	Waterside crack at bottom of cap, 72" long
11	167' East of Diamond Avenue	Waterside, crack at bottom of cap, 72" long
12	202' East of Diamond Avenue	Construction joint, sealant needs repair on landside
13	202' East of Diamond Avenue	Spall top of cap 6" long x 9" high x 1/2" deep

North Bay Front, 15' East of Diamond

North Bay Front, 28' East of Diamond

North Bay Front, 38' East of Diamond

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Diamond Ave and Sapphire Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 62' East of Diamond

North Bay Front, 102' East of Diamond

North Bay Front, 108' East of Diamond

North Bay Front, 108' East of Diamond

North Bay Front, 112' East of Diamond

North Bay Front, 132' East of Diamond

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Diamond Ave and Sapphire Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 144' East of Diamond

North Bay Front, 166' East of Diamond

North Bay Front, 167' East of Diamond

North Bay Front, 202' East of Diamond

North Bay Front, 202' East of Diamond

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Diamond Ave and Sapphire Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	15' East of Diamond Avenue, crack injection	5	LF					$70.00	$350
2	28' East of Diamond Avenue, crack injection	3	LF					$70.00	$210
3	38' East of Diamond Avenue, crack injection	6	LF					$70.00	$420
4	62' East of Diamond Avenue, crack injection	5	LF					$70.00	$350
5	102' East of Diamond Avenue, spall repair	2	SF					$70.00	$140
6	108' East of Diamond Avenue, sealant repair	6	LF					$25.00	$150
7	112' East of Diamond Avenue, spall repair	1	SF					$70.00	$70
8	132' East of Diamond Avenue, crack injection	6	LF					$70.00	$420
9	144' East of Diamond Avenue, crack injection	3	LF					$70.00	$210
10	156' East of Diamond Avenue, crack injection	6	LF					$70.00	$420
11	167' East of Diamond Avenue, crack injection	6	LF					$70.00	$420
12	202' East of Diamond Avenue, sealant repair	6	LF					$70.00	$420
13	202' East of Diamond Avenue, spall repair	1	SF					$70.00	$70

Subtotal		$3,650
Contingency	20 %	$730
Contractor OH & P	10 %	$365
City Cost Index	10 %	$365
GRAND TOTAL		$5,110

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Sapphire Ave and Coral Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

Item	Location	Description
1	7' East of Sapphire Avenue	Waterside, spall at bottom of cap, 72" long
2	34' East of Sapphire Avenue	Waterside, crack at bottom of cap 36" long
3	52' East of Sapphire Avenue	Waterside, spall along cap, 60" long and 24" high
4	90' East of Sapphire Avenue	Construction Joint, sealant on land and water side in good condition
5	105' East of Sapphire Avenue	Pullbox, top cap spalled land and water side 24" long x 6" highx 6" deep
6	125' East of Sapphire Avenue	Waterside, crack at bottom of cap 60" long (adjacent to pier)
7	135' East of Sapphire Avenue	Waterside, crack at bottom of cap 60" long (adjacent to pier)
8	148' East of Sapphire Avenue	Waterside, crack at bottom of cap, 72" long
9	158' East of Sapphire Avenue	Waterside, spall at bottom of cap, 60" long x 12" high
10	206' East of Sapphire Avenue	Waterside, spall 48" long x 12" x 1"
11	206' East of Sapphire Avenue	Construction joint, waterside sealant cracked and split, top and landside missing sealant

North Bay Front, 7' East of Sapphire

North Bay Front, 52' East of Sapphire

North Bay Front, 90' East of Sapphire

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Sapphire Ave and Coral Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 90' East of Sapphire

North Bay Front, 105' East of Sapphire

North Bay Front, 105' East of Sapphire

North Bay Front, 105' East of Sapphire

North Bay Front, 105' East of Sapphire

North Bay Front, 125' East of Sapphire

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Sapphire Ave and Coral Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 135' East of Sapphire

North Bay Front, 148' East of Sapphire

North Bay Front, 158' East of Sapphire

North Bay Front, 206' East of Sapphire

North Bay Front, 206' East of Sapphire

ACTIVITY
Balboa Island Bulkhead Inspection

CASH & ASSOCIATES
Engineering and Architecture

STREET LOCATION
North Bay Front
Between Sapphire Ave and Coral Ave

INSPECTOR: CTM
ASSISTANT:

INSPECTION DATE: DEC 20, 2004

REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	7' East of Sapphire Avenue, crack injection	6	LF					$70.00	$420
2	34' East of Sapphire Avenue, crack injection	3	LF					$70.00	$210
3	52' East of Sapphire Avenue, spall repair	10	SF					$70.00	$700
5	105' East of Sapphire Avenue, spall repair	4	SF					$70.00	$280
6	125' East of Sapphire Avenue, crack injection	5	LF					$70.00	$350
7	135' East of Sapphire Avenue, crack injection	5	LF					$70.00	$350
8	148' East of Sapphire Avenue, crack injection	6	LF					$70.00	$420
9	158' East of Sapphire Avenue, spall reapir	5	SF					$70.00	$350
10	206' East of Sapphire Avenue, spall repair	4	SF					$70.00	$280
11	206' East of Sapphire Avenue, sealant repair	6	LF					$25.00	$150

Subtotal		$3,510
Contingency	20 %	$702
Contractor OH & P	10 %	$351
City Cost Index	10 %	$351
GRAND TOTAL		$4,914

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **North Bay Front** Between Coral Ave and Apolena Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

Item	Location	Description
1	8' East of Coral Avenue	Waterside, crack at bottom of cap, 60" long
2	47' East of Coral Avenue	Construction joint, waterside sealant split and cracked, landside and top sealant missing
3	58' East of Coral Avenue	Waterside, crack at bottom of cap 48" long
4	108' East of Coral Avenue	Pullbox spall both sides of box, 24" x 9" x 6"
5	116' East of Coral Avenue	Waterside, crack at bottom of cap 96" long
6	162' East of Coral Avenue	Construction joint, waterside sealant split and cracked, landside and top sealant missing
7	172' East of Coral Avenue	Top of cap spalled 48" long x 2' wide x 3" deep
8	187' East of Coral Avenue	Waterside top corner of cap spalled and previously repaired, spalling 168" long x 24" high x 12" deep
9	196' East of Coral Avenue	Landside, spall, 48" long x 12" high x 12" deep
10	202' East of Coral Avenue	Waterside, spall 48" long at top of cap
11	207' East of Coral Avenue	Landside, spall at top of cap, 48" long x 18" wide, 9" deep
12	213 East of Coral Avenue	Waterside, crack at bottom of cap 48" long

North Bay Front, 8' East of Coral

North Bay Front, 47' East of Coral

North Bay Front, 47' East of Coral

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Coral Ave and Apolena Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 58' East of Coral

North Bay Front, 108' East of Coral

North Bay Front, 108' East of Coral

North Bay Front, 116' East of Coral

North Bay Front, 162' East of Coral

North Bay Front, 162' East of Coral

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Coral Ave and Apolena Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 172' East of Coral

North Bay Front, 172' East of Coral

North Bay Front, 187' East of Coral

North Bay Front, 187' East of Coral

North Bay Front, 187' East of Coral

North Bay Front, 187' East of Coral

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Coral Ave and Apolena Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 196' East of Coral

North Bay Front, 202' East of Coral

North Bay Front, 202' East of Coral

North Bay Front, 207' East of Coral

North Bay Front, 213' East of Coral

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Coral Ave and Apolena Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)895-3072 HUNTINGTON BEACH, CA

Item	Description	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
		Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
1	8' East of Coral Avenue, crack injection	5	LF					$70.00	$350
2	47' East of Coral Avenue, sealant repair	6	LF					$40.00	$240
3	58' East of Coral Avenue, crack injection	4	LF					$70.00	$280
4	108' East of Coral Avenue, spall reapir	6	SF					$70.00	$420
5	116' East of Coral Avenue, crack injection	8	LF					$70.00	$560
6	162' East of Coral Avenue, sealant repair	6	LF					$40.00	$240
7	172' East of Coral Avenue, spall repair	8	SF					$70.00	$560
8	187' East of Coral Avenue, Spall reapir	24	SF					$70.00	$1,680
9	196' East of Coral Avenue, spall repair	4	SF					$70.00	$280
10	202' East of Coral Avenue, Spall repair	4	SF					$70.00	$280
11	207' East of Coral Avenue, spall repair	6	SF					$70.00	$420
12	213 East of Coral Avenue, crack injection	4	LF					$70.00	$280

Subtotal		$5,590
Contingency	20 %	$1,118
Contractor OH & P	10 %	$559
City Cost Index	10 %	$559
GRAND TOTAL		$7,826

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Location	Description
1	13' East of Apolena Avenue	Top of cap spalled 60" x 24" x 6"
2	26' East of Apolena Avenue	Waterside, crack at bottom of cap 72" long
3	32' East of Apolena Avenue	Waterside, crack at bottom of cap 72" long
4	38' East of Apolena Avenue	Waterside, crack at bottom of cap 72" long
5	60' East of Apolena Avenue	Construction joint, waterside sealant cracked and split, landside and top missing sealant
6	94' East of Apolena Avenue	Waterside and top of cap spalled 24" long x 12" high x 2" deep
7	109' East of Apolena Avenue	Pull box, spalls both sides 24" long x 9" high x 3" deep
8	176' East of Apolena Avenue	Construction joint, waterside sealant cracked and split, landside and top missing sealant
9	181' East of Apolena Avenue	Landside, at top of cap crack, 36" long
10	186' East of Apolena Avenue	Landside face, spall 48" long x 24" high x 3" deep
11	186' East of Apolena Avenue	Waterside at top of cap, spall 36" long x 12" high x 6" deep
12	200' - 216' East of Apolena Avenue	Top cap spalled 180" long x 24" wide x 12" deep

North Bay Front, 13' East of Apolena

North Bay Front, 13' East of Apolena

North Bay Front, 26' East of Apolena

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

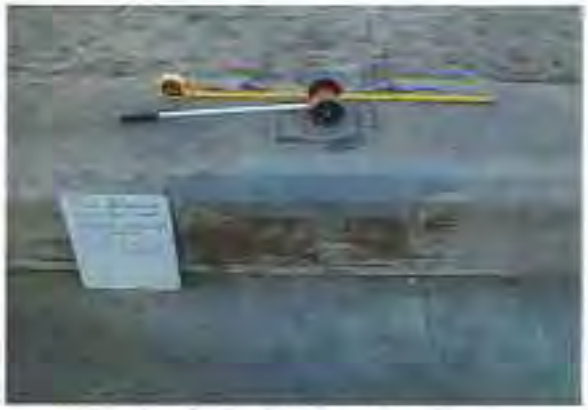
North Bay Front, 32' East of Apolena

North Bay Front, 38' East of Apolena

North Bay Front, 60' East of Apolena

North Bay Front, 60' East of Apolena

North Bay Front, 94' East of Apolena



North Bay Front, 109' East of Apolena

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 109' East of Apolena

North Bay Front, 176' East of Apolena

North Bay Front, 176' East of Apolena

North Bay Front, 181' East of Apolena

North Bay Front, 181' East of Apolena

North Bay Front, 186' East of Apolena

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 186' East of Apolena

North Bay Front, 203' East of Apolena

North Bay Front, 203' East of Apolena

North Bay Front, 203' East of Apolena

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	13' East of Apolena Avenue, spall repair	12	SF					$70.00	$840
2	26' East of Apolena Avenue, crack injection	6	LF					$70.00	$420
3	32' East of Apolena Avenue, crack injection	6	LF					$70.00	$420
4	38' East ot Apolena Avenue, crack injection	6	LF					$70.00	$420
5	60' East of Apolena Avenue, sealant repair	6	LF					$25.00	$150
6	94' East of Apolena Avenue, spall reapir	3	SF					$70.00	$210
7	109' East of Apolena Avenue, spall repair	4	SF					$70.00	$280
8	176' East of Apolena Avenue, sealant repair	6	LF					$70.00	$420
9	181' East of Apolena Avenue, crack injection	3	LF					$70.00	$210
10	186' East of Apolena Avenue, spall repair	8	SF					$70.00	$560
11	186' East of Apolena Avenue, spall repair	3	SF					$70.00	$210
12	200' - 218' East of Apolena Avenue, spall repair	30	SF					$70.00	$2,100

Subtotal		$6,240
Contingency	20 %	$1,248
Contractor OH & P	10 %	$624
City Cost Index	10 %	$624
GRAND TOTAL		$8,736

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **North Bay Front** Between Amethyst Ave and Onyx Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

Item	Location	Description
1	5' East of Amethyst Avenue	Top of cap, crack, 3' long
2	11' East of Amethyst Avenue	Top of cap, crack, 3' long
3	74' East of Amethyst Avenue	Construction joint, waterside sealant cracked and split, landside and top sealant missing
4	110' East of Amethyst Avenue	Pull box, spall 24" long x 3" high x 9" deep
5	190' East of Amethyst Avenue	Construction joint, waterside sealant cracked and split, landside and top sealant missing
6	195' East of Amethyst Avenue	Waterside, spall at bottom of cap 72" long x 12" high x 12" deep

North Bay Front, 5' East of Amethyst

North Bay Front, 11' East of Amethyst

North Bay Front, 74' East of Amethyst

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			CA
STREET LOCATION **North Bay Front** Between Amethyst Ave and Onyx Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 74' East of Amethyst

North Bay Front, 110' East of Amethyst

North Bay Front, 110' East of Amethyst

North Bay Front, 190' East of Amethyst

North Bay Front, 190' East of Amethyst

North Bay Front, 195' East of Amethyst

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Amethyst Ave and Onyx Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	5' East of Amethyst Avenue, spall repair	6	SF					$70.00	$420
2	11' East of Amethyst Avenue, spall repair	6	SF					$70.00	$420
3	74' East of Amethyst Avenue, sealant repair	6	LF					$25.00	$150
4	110' East of Amethyst Avenue, spall repair	4	SF					$70.00	$280
5	190' East of Amethyst Avenue, sealant repair	6	LF					$25.00	$150
6	195' East of Amethyst Avenue, spall repair	6	SF					$70.00	$420

Subtotal		$1,840
Contingency	20 %	$368
Contractor OH & P	10 %	$184
City Cost Index	10 %	$184
GRAND TOTAL		$2,576

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Onyx Ave and Marine Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Location	Description
1	5' East of Onyx Avenue	Waterside, crack lower half of cap 36" long
2	32' East of Onyx Avenue	Waterside, crack at bottom of cap 144" long
3	42' East of Onyx Avenue	Waterside, crack at bottom of cap, 24" long
4	53' East of Onyx Avenue	Waterside, spall at bottom of cap 60" long x 12" high x 6" deep
5	62' East of Onyx Avenue	Waterside, crack at bottom of cap, 60" long
6	74' East of Onyx Avenue	Waterside, spall at bottom of cap, 60" long x 12" high x 6" deep
7	87' East of Onyx Avenue	Construction joint, waterside sealant cracked and split, landside and top sealant missing
8	109' East of Onyx Avenue	Pull box, landside spall 24" long x 6" high x 4" deep
9	122' East of Onyx Avenue	Waterside, crack at bottom of cap, 36" long

North Bay Front, 5' East of Onyx

North Bay Front, 32' East of Onyx

North Bay Front, 42' East of Onyx

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **North Bay Front** Between Onyx Ave and Marine Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

North Bay Front, 53' East of Onyx

North Bay Front, 62' East of Onyx

North Bay Front, 74' East of Onyx

North Bay Front, 87' East of Onyx

North Bay Front, 87' East of Onyx

North Bay Front, 109' East of Onyx

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Onyx Ave and Marine Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 122' East of Onyx

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Onyx Ave and Marine Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	5' East of Onyx Avenue, crack injection	3	LF					$70.00	$210
2	32' East of Onyx Avenue, crack injection	12	SF					$70.00	$840
3	42' East of Onyx Avenue, crack repair	2	LF					$70.00	$140
4	53' East of Onyx Avenue, spall repair	5	SF					$70.00	$350
5	62' East of Onyx Avenue, crack injection	5	LF					$70.00	$350
6	74' East of Onyx Avenue, spall repair	5	SF					$70.00	$350
7	87' East of Onyx Avenue, sealant repair	6	LF					$25.00	$150
8	109' East of Onyx Avenue, spall repair	6	SF					$70.00	$420
9	122' East of Onyx Avenue, crack repair	3	LF					$70.00	$210

Subtotal		$3,020
Contingency	20 %	$604
Contractor OH & P	10 %	$302
City Cost Index	10 %	$302
GRAND TOTAL		$4,228

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **North Bay Front** Between Marine Ave Grand Canal West	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

Item	Location	Description
1	61' East of Marine Avenue	Waterside, spall at bottom of cap, 36" long
2	95' East of Marine Avenue	Waterside, spall at top of cap, 24" square x 2" deep
3	166' East of Marine Avenue	Waterside, cracked above pile, longitudinal crack 60" long
4	173' East of Marine Avenue	Waterside, crack with rust at center of cap, 36" long

North Bay Front, 61' East of Marine

North Bay Front, 95' East of Marine

North Bay Front, 166' East of Marine

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **North Bay Front** Between Marine Ave Grand Canal West	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:	

North Bay Front, 166' East of Marine

North Bay Front, 173' East of Marine

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **North Bay Front** Between Marine Ave Grand Canal West	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	61' East of Marine Avenue, crack injection	3	LF					$70.00	$210
2	95' East of Marine Avenue, spall repair	4	SF					$70.00	$280
3	166' East of Marine Avenue, crack injection	5	LF					$70.00	$350
4	173' East of Marine Avenue, crack injection	3	LF					$70.00	$210

Subtotal		$1,050
Contingency	20 %	$210
Contractor OH & P	10 %	$105
City Cost Index	10 %	$105
GRAND TOTAL		$1,470

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

Item	Location	Description
1	86' West of Emerald Avenue	Landside, cracking at lower step 72"
2	95' West of Emerald Avenue	Pullbox, cracked on landside, 30", waterside repaired and in good shape
3	144' West of Emerald Avenue	Waterside, vertical crack through cap 30" long
4	153' West of Emerald Avenue	Waterside, vertical crack at panel joints
5	160' West of Emerald Avenue	Waterside, vertical crack through previous repair
6	170' West of Emerald Avenue	Landside, crack through previous repair
7	195' West of Emerald Avenue	Landside, transverse crack through cap at lightpole
8	212' West of Emerald Avenue	Landside, transverse crack through cap
9	263' West of Emerald Avenue	Waterside, vertical crack through previous repair
10	280' West of Emerald Avenue	Landside, transverse crack through cap at previous repair
11	309' West of Emerald Avenue	Landside, transverse crack through cap at previous repair
12	327' West of Emerald Avenue	Waterside, vertical crack through cap 30" long
13	340' West of Emerald Avenue	Waterside, crack at bottom of cap
14	354' West of Emerald Avenue	Waterside, spall at bottom of cap 24"long x12" high x 1" deep
15	354' West of Emerald Avenue	Waterside, vertical crack through previous repair
16	354' West of Emerald Avenue	Waterside, panel joint opened up
17	379' West of Emerald Avenue	Construction joint, at bottom of previous repair pulling away
18	408' West of Emerald Avenue	Landside, transverse crack through lower step
19	416' West of Emerald Avenue	Waterside, vertical crack through cap 30" long
20	420' West of Emerald Avenue	Pullbox, cracked on both sides
21	445' West of Emerald Avenue	Construction joint spall at bottom of cap 48" long x 16" high x 6" deep
22	492' West of Emerald Avenue	Construction joint, sealant landside and waterside in good condition
23	492' West of Emerald Avenue	Spall and cracked on west side of construction joint

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2006	REVISION:

South Bay Front, 86' West of Emerald

South Bay Front, 95' West of Emerald

South Bay Front, 95' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

South Bay Front, 101' West of Emerald

South Bay Front, 144' West of Emerald

South Bay Front, 153' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

South Bay Front, 153' West of Emerald

South Bay Front, 160' West of Emerald

South Bay Front, 170' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

South Bay Front, 172' West of Emerald

South Bay Front, 195' West of Emerald

South Bay Front, 212' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

South Bay Front, 263' West of Emerald

South Bay Front, 280' West of Emerald

South Bay Front, 300' West of Emerald

South Bay Front, 309' West of Emerald

South Bay Front, 327' West of Emerald

South Bay Front, 340' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2006	REVISION:

South Bay Front, 352' West of Emerald

South Bay Front, 352' West of Emerald

South Bay Front, 354' West of Emerald

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Park Ave and Emerald Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 10, 2005	REVISION:

South Bay Front, 378' West of Emerald

South Bay Front, 378' West of Emerald

South Bay Front, 379' West of Emerald

South Bay Front, 408' West of Emerald

South Bay Front, 416' West of Emerald

South Bay Front, 420' West of Emerald

South Bay Front, 420' West of Emerald

South Bay Front, 420' West of Emerald

South Bay Front, 445' West of Emerald

South Bay Front, 492' West of Emerald

South Bay Front, 492' West of Emerald

ACTIVITY
Balboa Island Bulkhead Inspection

CASH & ASSOCIATES
Engineering and Architecture

STREET LOCATION
South Bay Front
Between Park Ave and Emerald Ave

INSPECTOR: CTM
ASSISTANT:

INSPECTION DATE: January 10, 2005

REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	86' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
2	95' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
3	144' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
4	153' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
5	160' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
6	170' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
7	195' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
8	212' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
9	263' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
10	280' West of Emerald Avenue, crack injection	4	LF					$70.00	$280
11	309' West of Emerald Avenue, crack injection	4	LF					$70.00	$280
12	327' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
13	340' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
14	354' West of Emerald Avenue, spall repair	2	SF					$70.00	$140
15	354' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
18	408' West of Emerald Avenue, crack injection	5	LF					$70.00	$350
19	416' West of Emerald Avenue, crack injection	3	LF					$70.00	$210
20	420' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
21	445' West of Emerald Avenue, crack injection	6	LF					$70.00	$420
23	492' West of Emerald Avenue, spall reapir	2	SF					$70.00	$140

Subtotal		$6,230
Contingency	20 %	$1,246
Contractor OH & P	10 %	$623
City Cost Index	10 %	$623
GRAND TOTAL		$8,722

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE:	REVISION:

Item	Location	Description
1	66' West of Garnet Avenue	Landside, transverse crack through cap
2	67' West of Garnet Avenue	Waterside, crack over pile 60" long
3	101' West of Garnet Avenue	Construction joint, sealant waterside and landside cracked and split
4	113' West of Garnet Avenue	Waterside, 72" crack over pile, spall 12" long x12" wide x 4" high on west side of pile bottom of cap
5	115' West of Garnet Avenue	Pullbox, spall on waterside and landside
6	125' West of Garnet Avenue	Waterside, crack 60" long over pile
7	148' West of Garnet Avenue	Waterside, crack 60" long over pile
8	159' West of Garnet Avenue	Waterside, crack at bottom of cap 96" long
9	172' West of Garnet Avenue	Waterside, crack at bottom of cap 120" long
10	185' West of Garnet Avenue	Waterside, cross crack 24" long x 12" high
11	194' West of Garnet Avenue	Waterside, crack 36" long over pile
12	201' West of Garnet Avenue	Landside, crack at top of walk going to waterside 24" long
13	213' West of Garnet Avenue	Construction joint, sealant in good shape
14	213' West of Garnet Avenue	Landside, longitudinal crack to east of construction joint 72" long lower step
15	220' West of Garnet Avenue	(Reference centerline of Emerald Avenue)

South Bay Front, 66' West of Garnet

South Bay Front, 67' West of Garnet

South Bay Front, 101' West of Garnet

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE:	REVISION:	

South Bay Front, 113' West of Garnet

South Bay Front, 115' West of Garnet

South Bay Front, 115' West of Garnet

South Bay Front, 125' West of Garnet

South Bay Front, 148' West of Garnet

South Bay Front, 159' West of Garnet

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE:	REVISION:	

South Bay Front, 172' West of Garnet

South Bay Front, 185' West of Garnet

South Bay Front, 194' West of Garnet

South Bay Front, 201' West of Garnet

South Bay Front, 213' West of Garnet

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Emerald Ave and Garnet Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE:	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	66' West of Garnet Avenue, crack injection	6	LF					$70	$420.00
2	67' West of Garnet Avenue, crack injection	5	LF					$70	$350.00
3	101' West of Garnet Avenue, sealant repair	6	LF					$25	$150.00
4	113' West of Garnet Avenue, crack injection	8	LF					$70	$560.00
5	115' West of Garnet Avenue, spall repair	6	SF					$70	$420.00
6	125' West of Garnet Avenue, crack injection	5	LF					$70	$350.00
7	148' West of Garnet Avenue, crack injection	5	LF					$70	$350.00
8	159' West of Garnet Avenue, crack injection	8	LF					$70	$560.00
9	172' West of Garnet Avenue, crack injection	10	LF					$70	$700.00
10	185' West of Garnet Avenue, crack injection	4	LF					$70	$280.00
11	194' West of Garnet Avenue, crack injection	3	LF					$70	$210.00
12	201' West of Garnet Avenue, crack injection	2	LF					$70	$140.00
14	213' West of Garnet Avenue, crack injection	6	LF					$70	$420.00

Subtotal		$4,910
Contingency	20 %	$982
Contractor OH & P	10 %	$491
City Cost Index	10 %	$491
GRAND TOTAL		$6,874

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Location	Description
1	17' East of Garnet Avenue	Construction joint, waterside and landside sealant in good shape
2	17' East of Garnet Avenue	Waterside, minor cracking
3	51' East of Garnet Avenue	Waterside, transverse crack through cap
4	64' East of Garnet Avenue	Waterside, transverse crack through cap
5	85' East of Garnet Avenue	Waterside, transverse crack through cap
6	115' east of Garnet Avenue	Pull box, in good shape, no spalling
7	134' East of Garnet Avenue	Construction joint, waterside sealant cracked and split, landside and top missing sealant
8	221' East of Garnet Avenue	Waterside spall at bottom of cap 108" long x 18" tall x 6" deep

South Bay Front, 17' East of Garnet

South Bay Front, 17' East of Garnet

South Bay Front, 51' East of Garnet

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 51' East of Garnet

South Bay Front, 64' East of Garnet

South Bay Front, 64' East of Garnet

South Bay Front, 85' East of Garnet

South Bay Front, 115' East of Garnet

South Bay Front, 134' East of Garnet

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 134' East of Garnet

South Bay Front, 221' East of Garnet

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Garnet Ave and Pearl Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
		Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
2	17' East of Garnet Avenue, crack injection	1	LF					$70.00	$70
3	51' East of Garnet Avenue, crack injection	6	LF					$70.00	$420
4	64' East of Garnet Avenue, crack injection	6	LF					$70.00	$420
5	85' East of Garnet Avenue, crack injection	6	LF					$70.00	$420
7	134' East of Garnet Avenue, sealant repair	6	LF					$25.00	$150
8	221' East of Garnet Avenue, crack injection	9	LF					$70.00	$630

Subtotal		$2,110
Contingency	20 %	$422
Contractor OH & P	10 %	$211
City Cost Index	10 %	$211
GRAND TOTAL		$2,954

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Pearl Ave and Agate Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	23' East of Pearl Avenue	Construction joint, waterside sealant cracked, landside sealant in good shape
2	33' East of Pearl Avenue	Waterside, spall at bottom of cap 96" long x 18" tall x 3" deep
3	45' East of Pearl Avenue	Landside, spall at lower step 48" long x 6" high x 4" deep
4	92' East of Pearl Avenue	Waterside spall at top of cap 2" long x 2" high x 4" deep
5	112' East of Pearl Avenue	Pullbox, spall 30" long x 7" high x 5" deep
6	141' East of Pearl Avenue	Construction joint, waterside sealant cracked, landside sealant in good shape
7	Note	Transverse cracks at 7' - 12' on center along cap

South Bay Front, 23' East of Pearl

South Bay Front, 23' East of Pearl

South Bay Front, 33' East of Pearl

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Pearl Ave and Agate Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

South Bay Front, 45' East of Pearl

South Bay Front, 92' East of Pearl

South Bay Front, 112' East of Pearl

South Bay Front, 141' East of Pearl

South Bay Front, 141' East of Pearl

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Pearl Ave and Agate Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	23' East of Pearl Avenue, sealant repair	3	LF					$25.00	$75
2	33' East of Pearl Avenue, crack injection	8	LF					$70.00	$560
3	45' East of Pearl Avenue, spall repair	4	SF					$70.00	$280
4	92' East of Pearl Avenue, spall repair	6	SF					$70.00	$420
5	112' East of Pearl Avenue, spall repair	3	SF					$70.00	$210
6	141' East of Pearl Avenue, sealant repair	3	LF					$25.00	$75
7	Note, transverse cracks at 7' o.c. shrinkage cracks	60	LF					$70.00	$4,200

Subtotal		$5,820
Contingency	20 %	$1,164
Contractor OH & P	10 %	$582
City Cost Index	10 %	$582
GRAND TOTAL		$8,148

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Agate Ave and Opal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	34' East of Agate Avenue	Construction joint, waterside obstructed by "electrical room", landside missing sealant
2	110' East of Agate Avenue	Pull box, in good condition
3	116' East of Agate Avenue	Construction joint, landside and top missing sealant, waterside cracked and needs reapir
4	116' East of Agate Avenue	Waterside, spall at bottom of cap 36" long
5	79' East of Agate Avenue	Previously reapired spall, cracked 60" long x 6" high x 2" deep, bottom half of cap
6	209' East of Agate Avenue	Waterside, bottom of cap spalled 72" long x 9" high

South Bay Front, 34' East of Agate

South Bay Front, 79' East of Agate

South Bay Front, 110' East of Agate

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Agate Ave and Opal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 116' East of Agate

South Bay Front, 116' East of Agate

South Bay Front, 116' East of Agate

South Bay Front, 209' East of Agate

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Agate Ave and Opal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
		Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
1	34' East of Agate Avenue, sealant repair	3	LF					$25.00	$75
3	116' East of Agate Avenue, sealant repair	3	LF					$25.00	$75
4	116' East of Agate Avenue, crack injection	6	LF					$70.00	$420
5	79' East of Agate Avenue, crack repair	5	LF					$70.00	$350
6	209' East of Agate Avenue, crack injection	6	LF					$70.00	$420

Subtotal		$1,340
Contingency	20 %	$268
Contractor OH & P	10 %	$134
City Cost Index	10 %	$134
GRAND TOTAL		$1,876

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Opal Ave and Topaz Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Location	Description
1	3' East of Opal Avenue	Waterside, spall at bottom of pier support, 18" long x 12" high x 4" deep
2	17' East of Opal Avenue	Construction joint, landside sealant and top in good shape, waterside sealant cracked and split
3	17' East of Opal Avenue	Waterside, crack at bottom of cap 36" long
4	27' East of Opal Avenue	Wateside, crack at bottom of cap 60" long
5	51' East of Opal Avenue	Waterside, crack at bottom of cap 168" long
6	63' East of Opal Avenue	Waterside, crack at bottom of cap, 108 long
7	74' East of Opal Avenue	Waterside, crack at bottom of cap, 48" long
8	96' East of Opal Avenue	Waterside, crack at bottom of cap 24" long, light spalling
9	108' East of Opal Avenue	Waterside, crack at bottom of cap, 24" long light spalling
10	116' East of Opal Avenue	Pullbox, spalling at landside and waterside 24" long x 3" wide x 3" deep
11	132' East of Opal Avenue	Construction joint, sealant landside and top missing; waterside sealant cracked and split

South Bay Front, 3' East of Opal

South Bay Front, 17' East of Opal

South Bay Front, 27' East of Opal

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Opal Ave and Topaz Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 51' East of Opal

South Bay Front, 63' East of Opal

South Bay Front, 74' East of Opal

South Bay Front, 96' East of Opal

South Bay Front, 108' East of Opal

South Bay Front, 116' East of Opal

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Opal Ave and Topaz Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 132' East of Opal

South Bay Front, 132' East of Opal

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Opal Ave and Topaz Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)895-2072 HUNTINGTON BEACH, CA

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	3' East of Opal Avenue, spall repair	2	SF					$70.00	$140
2	17' East of Opal Avenue, sealant repair	3	LF					$25.00	$75
3	17' East of Opal Avenue, crack injection	3	LF					$70.00	$210
4	27' East of Opal Avenue, crack injection	5	LF					$70.00	$350
5	51' East of Opal Avenue, crack injection	13	LF					$70.00	$910
6	63' East of Opal Avenue, crack injection	9	LF					$70.00	$630
7	74' East of Opal Avenue, crack injection	4	LF					$70.00	$280
8	96' East of Opal Avenue, crack injection	2	LF					$70.00	$140
9	108' East of Opal Avenue, crack injection	2	LF					$70.00	$140
10	116' East of Opal Avenue, spall repair	6	LF					$70.00	$420
11	132' East of Opal Avenue, sealant rpair	6	LF					$25.00	$150

Subtotal		$3,445
Contingency	20 %	$689
Contractor OH & P	10 %	$345
City Cost Index	10 %	$345
GRAND TOTAL		$4,823

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Topaz Ave and Turquoise Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	22' East of Topaz Avenue	Construction joint, waterside sealant cracked and split, landside and top sealant missing
2	68' East of Topaz Avenue	Top of cap, spalled at previous repair location 66" long x 10" high x 12" deep
3	115' East of Topaz Avenue	Pullbox, waterside, previous crack repair, spalling "hollow sounding" 24" long x 3" high x 1" deep
4	115' East of Topaz Avenue	Pullbox, area in line with the seawall spalling adjacent to box 12" long x 2" high x 1" deep.
5	139' East of Topaz Avenue	Construction joint, waterside sealant cracked and split, landside and top sealant in good shape
6	173' East of Topaz Avenue	Waterside, spall at bottom of cap 48" long x 12" high x 2" deep
7	General comments	Shrinkage cracks at 120" on center transverse through cap, typical

South Bay Front, 22' East of Topaz

South Bay Front, 22' East of Topaz

South Bay Front, 68' East of Topaz

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Topaz Ave and Turquoise Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 68' East of Topaz

South Bay Front, 115' East of Topaz

South Bay Front, 139' East of Topaz

South Bay Front, 139' East of Topaz

South Bay Front, 173' East of Topaz

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Topaz Ave and Turquoise Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	22' East of Topaz Avenue, sealant repair	6	LF					$25.00	$150
2	68' East of Topaz Avenue, spall repair	6	SF					$70.00	$420
3	115' East of Topaz Avenue, spall repair	6	SF					$70.00	$420
4	115' East of Topaz Avenue, spall repair	3	SF					$70.00	$210
5	139' East of Topaz Avenue, sealant repair	3	LF					$25.00	$75
6	173' East of Topaz Avenue, crack injection	4	LF					$70.00	$280
7	General, transverse cracks, minor, optional	130	LF					$70.00	$9,100

Subtotal		$10,655
Contingency	20 %	$2,131
Contractor OH & P	10 %	$1,066
City Cost Index	10 %	$1,066
GRAND TOTAL		$14,917

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Turquoise Ave and Collins Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	8' East of Turquoise Avenue	Storm drain junction box, severe spalling
2	13' East of Turquoise Avenue	Construction joint, sealant waterside and landside cracked and split
3	60' East of Turquoise Avenue	Waterside, longitudinal crack through top of cap 60" long x 6" down from top
4	118' East of Turquoise Avenue	Construction joint, sealant waterside and landside cracked and split
5	124' East of Turquoise Avenue	Pullbox, cracking around box, previous repairs appear to be in good shape
6	214' East of Turquoise Avenue	Pullbox, spall on waterside only, 48" long x 7" high x 7" deep
7	235' East of Turquoise Avenue	Construction joint, sealant waterside and landside cracked and split
8	322' East of Turquoise Avenue	Waterside, lightpole at Collins Avenue, spalled at top of cap, landside spall behind plaque

South Bay Front, 8' East of Turquoise

South Bay Front, 13' East of Turquoise

South Bay Front, 13' East of Turquoise

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Turquoise Ave and Collins Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 60' East of Turquoise

South Bay Front, 60' East of Turquoise

South Bay Front, 118' East of Turquoise

South Bay Front, 118' East of Turquoise

South Bay Front, 124' East of Turquoise

South Bay Front, 124' East of Turquoise

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Turquoise Ave and Collins Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 124' East of Turquoise

South Bay Front, 214' East of Turquoise

South Bay Front, 214' East of Turquoise

South Bay Front, 235' East of Turquoise

South Bay Front, 235' East of Turquoise

South Bay Front, 322' East of Turquoise

ACTIVITY
Balboa Island Bulkhead Inspection

CASH & ASSOCIATES
Engineering and Architecture

STREET LOCATION
South Bay Front
Between Turquoise Ave and Collins Ave

INSPECTOR: CTM
ASSISTANT:

INSPECTION DATE: DEC 21, 2004

REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	8' East of Turquoise Avenue, spall repair	10	SF					$70.00	$700
2	13' East of Turquoise Avenue, sealant repair	6	LF					$25.00	$150
3	60' East of Turquoise Avenue, crack injection	6	LF					$70.00	$420
4	118' East of Turquoise Avenue, sealant repair	6	LF					$25.00	$150
5	124' East of Turquoise Avenue, crack injection	3	LF					$70.00	$210
6	214' East of Turquoise Avenue, spall repair	3	SF					$70.00	$210
7	235' East of Turquoise Avenue, sealant repair	6	LF					$25.00	$150
8	322' East of Turquoise Avenue, spall repair	6	SF					$70.00	$420

Subtotal		$2,410
Contingency	20 %	$482
Contractor OH & P	10 %	$241
City Cost Index	10 %	$241
GRAND TOTAL		$3,374

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Collins Ave and Ruby Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	29' East of Collins Avenue	Construction joint, sealant in good shape all around
2	29' East of Collins Avenue	Landside, spall at top of cap 14" long x 3" high x 2" deep
3	110' East of Collins Avenue	Pullbox, waterside spall 36" x 6" x 3", landside spall 24" long x 6" high x 7" deep
4	146' East of Collins Avenue	Construction joint, landside and top missing sealant, waterside sealant cracked and split
5	219' East of Collins Avenue	Waterside, Ruby Avenue lightpole, spall and "hollow sounding" 24" long x 5" high x 3" deep

South Bay Front, 29' East of Collins

South Bay Front, 29' East of Collins

South Bay Front, 110' East of Collins

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Collins Ave and Ruby Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

South Bay Front, 110' East of Collins

South Bay Front, 146' East of Collins

South Bay Front, 146' East of Collins

South Bay Front, 219' East of Collins

ACTIVITY
Balboa Island Bulkhead Inspection

CASH & ASSOCIATES
Engineering and Architecture

STREET LOCATION
South Bay Front
Between Collins Ave and Ruby Ave

INSPECTOR: CTM
ASSISTANT:

INSPECTION DATE: DEC 21, 2004

REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)895-2072 HUNTINGTON BEACH, CA

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
2	29' East of Collins Avenue, crack injection	4	LF					$70.00	$280
3	110' East of Collins Avenue, spall repair	6	SF					$70.00	$420
4	146' East of Collins Avenue, sealant repair	6	LF					$25.00	$150
5	219' East of Collins Avenue, spall repair	6	SF					$70.00	$420

Subtotal		$1,270
Contingency	10 %	$127
Contractor OH & P	10 %	$127
City Cost Index	10 %	$127
GRAND TOTAL		$1,651

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	43' East of Ruby Avenue	Construction joint, landside and top missing sealant, waterside sealant cracked and split
2	110' East of Ruby Avenue	Pullbox, spall on landside and waterside 24" long x 6" high x 6" deep
3	160' East of Ruby Avenue	Construction joint, landside and top missing sealant, waterside sealant cracked and split
4	219' East of Ruby Avenue	Waterside, lightpole, spall at top of cap 24" long x 5" high x 3" deep over previous repair

South Bay Front, 43' East of Ruby

South Bay Front, 43' East of Ruby

South Bay Front, 110' East of Ruby

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 110' East of Ruby

South Bay Front, 160' East of Ruby

South Bay Front, 160' East of Ruby

South Bay Front, 219' East of Ruby

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Ruby Ave and Diamond Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
		Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
1	43' East of Ruby Avenue, sealant repair	6	LF					$25.00	$150
2	110' East of Ruby Avenue, spall repair	4	SF					$70.00	$280
3	160' East of Ruby Avenue, sealant repair	6	LF					$25.00	$150
4	219' East of Ruby Avenue, spall repair	3	SF					$70.00	$210

Subtotal		$790
Contingency	20 %	$158
Contractor OH & P	10 %	$79
City Cost Index	10 %	$79
GRAND TOTAL		$1,106

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **South Bay Front** Between Diamond Ave and Sapphire Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Location	Description
1	57' East of Diamond Avenue	Construction joint, waterside sealant obscured by pier, landside sealant cracked
2	109' East of Diamond Avenue	Pullbox, waterside spall 24" long x 5" high x 3" wide landside "hollow sound"
3	173' East of Diamond Avenue	Construction joint, top and landside sealant in good shape, waterside sealant missing

South Bay Front 57' East of Diamond

South Bay Front 110' East of Diamond

South Bay Front 110' East of Diamond

South Bay Front 173' East of Diamond

South Bay Front 173' East of Diamond

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Diamond Ave and Sapphire Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	57' East of Diamond Avenue, sealant repair	3	LF					$25.00	$75
2	109' East of Diamond Avenue, spall repair	3	SF					$70.00	$210
3	173' East of Diamond Avenue, sealant repair	3	LF					$25.00	$75

Subtotal		$360
Contingency	20 %	$72
Contractor OH & P	10 %	$36
City Cost Index	10 %	$36
GRAND TOTAL		$504

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Sapphire Ave and Coral Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	16' East of Sapphire Avenue	Waterside, spall at bottom of cap 48" long x 7" tall x 4" deep
2	71' East of Sapphire Avenue	Construction joint, landside sealant in good condition, waterside sealant cracked and split
3	110' East of Sapphire Avenue	Pullbox, spalled on landside (30"long x 5"high x 6"wide) and waterside (30"long x 12"high x 9"wide)
4	188' East of Sapphire Avenue	Construction joint, landside sealant missing; waterside sealant cracked and split
5	210' East of Sapphire Avenue	Waterside, spall at bottom of cap 36" long x 6" high x 1" deep
6	206' East of Sapphire Avenue	Waterside, spall at bottom of cap over previous repair, 18" long x 6" high x 1/2" deep
7	General comments	Shrinkage cracks at 10' on center, transverse through cap, typical

South Bay Front, 16' East of Sapphire

South Bay Front, 71' East of Sapphire

South Bay Front, 71' East of Sapphire

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Sapphire Ave and Coral Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 110' East of Sapphire

South Bay Front, 116' East of Sapphire

South Bay Front, 188' East of Sapphire

South Bay Front, 188' East of Sapphire

South Bay Front, 206' East of Sapphire

South Bay Front, 210' East of Sapphire

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Sapphire Ave and Coral Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	16' East of Sapphire Avenue, crack injection	4	LF					$70.00	$280
2	71' East of Sapphire Avenue, sealant repair	4	LF					$25.00	$100
3	110' East of Sapphire Avenue, spall repair	4	SF					$70.00	$280
4	188' East of Sapphire Avenue, sealant repair	6	LF					$25.00	$150
5	210' East of Sapphire Avenue, crack injection	3	LF					$70.00	$210
6	206' East of Sapphire Avenue, crack injection	2	LF					$70.00	$140
7	General, transverse cracks at 10' o.c. minor	130	LF					$70.00	$9,100

Subtotal		$10,260
Contingency	20 %	$2,052
Contractor OH & P	10 %	$1,026
City Cost Index	10 %	$1,026
GRAND TOTAL		$14,364

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Coral Ave and Apolena Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)895-2072 HUNTINGTON BEACH, CA

Item	Location	Description
1	91' East of Coral Avenue	Construction joint, waterside sealant is cracked and split, landside sealant is missing
2	116' East of Coral Avenue	Pullbox, spall and landside and waterside at top of cap, 24" long x 5" high x 6" wide
3	207' East of Coral Avenue	Construction joint, waterside sealant is cracked and split, landside sealant is missing
4	General comments	Shrinkage cracks at 10'-20' on center transverse through cap, typical

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Coral Ave and Apolena Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 91' East of Coral

South Bay Front, 91' East of Coral

South Bay Front, 116' East of Coral

South Bay Front, 116' East of Coral

South Bay Front, 207' East of Coral

South Bay Front, 207' East of Coral

ACTIVITY	CASH & ASSOCIATES		
Balboa Island Bulkhead Inspection	Engineering and Architecture		
STREET LOCATION	INSPECTOR: CTM	INSPECTION DATE: DEC 21, 2004	REVISION:
South Bay Front	ASSISTANT:		
Between Coral Ave and Apolena Ave			

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	91' East of Coral Avenue, sealant repair	6	LF					$25.00	$150
2	116' East of Coral Avenue, spall repair	6	SF					$70.00	$420
3	207' East of Coral Avenue, sealant repair	6	LF					$25.00	$150
4	General, transverse cracks through cap, minor	100	LF					$70.00	$7,000

Subtotal		$7,720
Contingency	20 %	$1,544
Contractor OH & P	10 %	$772
City Cost Index	10 %	$772
GRAND TOTAL		$10,808

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Location	Description
1	44' East of Apolena Avenue	Waterside, crack at bottom of cap 132" long
2	56' East of Apolena Avenue	Waterside, crack at bottom of cap 36" long
3	76' East of Apolena Avenue	Waterside, crack at bottom of cap 48" long
4	100' East of Apolena Avenue	Construction joint, waterside sealant split, landside and top sealant missing
5	110' East of Apolena Avenue	Pullbox, waterside and landside spall 30" long x 7" high x 6" wide
6	216' East of Apolena Avenue	Construction joint, waterside sealant split, landside and top sealant missing
7	General comments	Shrinkage cracks at 10'-20' on center transverse through cap, top 12" of cap typical

South Bay Front, 44' East of Apolena

South Bay Front, 44' East of Apolena

South Bay Front, 56' East of Apolena

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 76' East of Apolena

South Bay Front, 100' East of Apolena

South Bay Front, 100' East of Apolena

South Bay Front, 110' East of Apolena

South Bay Front, 110' East of Apolena

South Bay Front, 216' East of Apolena

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 216' East of Apolena

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Apolena Ave and Amethyst Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE
(714)895-2072
HUNTINGTON BEACH, CA

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	44' East of Apolena Avenue, crack injection	11	LF					$70.00	$770
2	56' East of Apolena Avenue, crack injection	3	LF					$70.00	$210
3	76' East of Apolena Avenue, crack injection	4	LF					$70.00	$280
4	100' East of Apolena Avenue, sealant repair	6	LF					$25.00	$150
5	110' East of Apolena Avenue, spall repair	4	SF					$70.00	$280
6	216' East of Apolena Avenue, sealant repair	6	LF					$25.00	$150
7	General, transverse shrinkage cracks, minor	80	LF					$70.00	$5,600

Subtotal		$7,440
Contingency	20 %	$1,488
Contractor OH & P	10 %	$744
City Cost Index	10 %	$744
GRAND TOTAL		$10,416

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Amethyst Ave and Onyx Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	31' East of Amethyst Avenue	Waterside, crack at bottom of cap 6" long
2	46' East of Amethyst Avenue	Waterside, crack at bottom of cap, 36" long
3	111' East of Amethyst Avenue	Pullbox, spall on waterside 36"long x 6"high x 4"wide, spall on landside 24"long x 6"high x 4"wide
4	111' East of Amethyst Avenue	Construction joint, waterside sealant split and cracked, landside and top sealant missing
5	198' East of Amethyst Avenue	Waterside, crack at bottom of cap 108" long
6	218' East of Amethyst Avenue	Waterside, crack at bottom of cap, 48" long

South Bay Front, 31' East of Amethyst

South Bay Front, 46' East of Amethyst

South Bay Front, 111' East of Amethyst

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Amethyst Ave and Onyx Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 111' East of Amethyst

South Bay Front, 198' East of Amethyst

South Bay Front, 218' East of Amethyst

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Amethyst Ave and Onyx Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	31' East of Amethyst Avenue, crack injection	6	LF					$70.00	$420
2	46' East of Amethyst Avenue, crack injection	3	LF					$70.00	$210
3	111' East of Amethyst Avenue, spall reapir	5	SF					$70.00	$350
4	111' East of Amethyst Avenue, sealant repair	6	LF					$25.00	$150
5	198' East of Amethyst Avenue, crack injection	9	LF					$70.00	$630
6	218' East of Amethyst Avenue, crack injection	4	LF					$70.00	$280

Subtotal		$2,040
Contingency	20 %	$408
Contractor OH & P	10 %	$204
City Cost Index	10 %	$204
GRAND TOTAL		$2,856

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Onyx Ave and Marine Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

Item	Location	Description
1	10' East of Onyx Avenue	Construction joint, waterside sealant cracked and split, landside and top sealant missing
2	21' East of Onyx Avenue	Waterside, crack at bottom of cap 48" long
3	109' east of Onyx Avenue	Pullbox in good condition
4	116' East of Onyx Avenue	Waterside, crack at bottom of cap 72" long
5	126' East of Onyx Avenue	Construction joint, waterside sealant plyable in good shape, landside sealant missing
6	General comments	Shrinkage cracks at 10'-20' on center transverse through cap, top 12" of cap typical

South Bay Front, 10' East of Onyx

South Bay Front, 10' East of Onyx

South Bay Front, 21' East of Onyx

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Onyx Ave and Marine Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 109' East of Onyx

South Bay Front, 109' East of Onyx

South Bay Front, 116' East of Onyx

South Bay Front, 126' East of Onyx

South Bay Front, 126' East of Onyx

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Onyx Ave and Marine Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

		QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
Item	Description	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
1	10' East of Onyx Avenue, sealant repair	6	LF					$25.00	$150
2	21' East of Onyx Avenue, crack injection	4	LF					$70.00	$280
4	116' East of Onyx Avenue, crack injection	6	LF					$70.00	$420
5	126' East of Onyx Avenue, sealant repair	6	LF					$25.00	$150
6	General, transverse cracking through cap, minor	80	LF					$70.00	$5,600

Subtotal		$6,600
Contingency	20 %	$1,320
Contractor OH & P	10 %	$660
City Cost Index	10 %	$660
GRAND TOTAL		$9,240

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Marine Ave and Grand Canal West	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

Item	Location	Description
1	24' East of Marine Avenue	Construction joint, waterside sealant cracked and split, landside sealant missing
2	58' East of Marine Avenue	Waterside, crack at bottom of cap 48" long x 9" high x 3" deep
3	83' East of Marine Avenue	Waterside, crack at bottom of cap 48" long x 9" high x 3" deep
4	109' East of Marine Avenue	Pullbox, previous repairs to waterside and landside spalls are "hollow" 24" long x 6" high x 7" wide
5	116' East of Marine Avenue	Waterside, crack at bottom of cap, 36" long
6	130' East of Marine Avenue	Waterside, spalled at bottom of cap 156" long x 12" high x 12" deep
7	General comments	Shrinkage cracks at 10'-20' on center transverse through cap, top 12" of cap typical

South Bay Front, 24' East of Marine

South Bay Front, 24' East of Marine

South Bay Front, 58' East of Marine

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Marine Ave and Grand Canal West	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 83' East of Marine

South Bay Front, 109' East of Marine

South Bay Front, 109' East of Marine

South Bay Front, 116' East of Marine

South Bay Front, 130' East of Marine

South Bay Front, 130' East of Marine

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Marine Ave and Grand Canal West	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:	

South Bay Front, 130' East of Marine

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Marine Ave and Grand Canal West	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 21, 2004	REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)898-2077 HUNTINGTON BEACH, CA

Item	Description	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
		Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
1	24' East of Marine Avenue, sealant repair	6	LF					$25.00	$150
2	58' East of Marine Avenue, crack injection	4	LF					$70.00	$280
3	83' East of Marine Avenue, crack injection	4	LF					$70.00	$280
4	109' East of Marine Avenue, spall repair	6	LF					$70.00	$420
5	116' East of Marine Avenue, crack injection	3	LF					$70.00	$210
6	130' East of Marine Avenue, spall rpair	13	SF					$70.00	$910
7	General, shrinkage cracks, minor	80	LF					$70.00	$5,600

Subtotal		$7,850
Contingency	20 %	$1,570
Contractor OH & P	10 %	$785
City Cost Index	10 %	$785
GRAND TOTAL		$10,990

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Grand Canal and Abalone Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:

Item	Location	Description
1	Corner	Waterside, cracking on face of cap
2	11' East of Grand Canal East	Waterside, spall at bottom of cap, 48" long x 5" high
3	11' East of Grand Canal East	Construction joint, sealant waterside and landside cracked and split
4	24' East of Grand Canal East	Waterside, cracking of surface of cap, 2'-3' on center
5	103' East of Grand Canal East	Pullbox, landside cracking of top of cap, 36" long
6	138' East of Grand Canal East	Waterside, cracking through cap 12" below top of cap, 30" long vertical crack through cap 12" long
7	187' East of Grand Canal East	Construction joint, sealant waterside and landside cracked and split

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Grand Canal and Abalone Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 3' East of Grand Canal

South Bay Front, 11' East of Grand Canal

South Bay Front, 11' East of Grand Canal

South Bay Front, 24' East of Grand Canal

South Bay Front, 103' East of Grand Canal

South Bay Front, 103' East of Grand Canal

CASH & ASSOCIATES

Between Grand Canal and Abalone Ave

South Bay Front, 103' East of Grand Canal

South Bay Front, 138' East of Grand Canal

South Bay Front, 187' East of Grand Canal

South Bay Front, 187' East of Grand Canal

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Grand Canal and Abalone Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:

Item	Description	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
		Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
1	Corner, crack injection	10	LF					$70.00	$700
2	11' East of Grand Canal East, spall repair	2	SF					$70.00	$140
3	11' East of Grand Canal East, sealant repair	6	LF					$25.00	$150
4	24' East of Grand Canal East, crack injection	3	LF					$70.00	$210
5	103' East of Grand Canal East, crack injection	3	LF					$70.00	$210
6	138' East of Grand Canal East, crack injection	3	LF					$70.00	$210
7	187' East of Grand Canal East, sealant repair	6	LF					$25.00	$150

Subtotal		$1,770
Contingency	20 %	$354
Contractor OH & P	10 %	$177
City Cost Index	10 %	$177
GRAND TOTAL		$2,478

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture			
Balboa Island Bulkhead Inspection				
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

Item	Location	Description
1	30' East of Abalone Avenue	Crack through cap, 12" high x 1/4" wide
2	54' East of Abalone Avenue	Crack through cap, 12" high x 1/4" wide
3	64' East of Abalone Avenue	Crack through cap, 12" high x 1/4" wide
4	74' East of Abalone Avenue	Crack through cap, 12" high x 1/4" wide
5	93' East of Abalone Avenue	Construction Joint, sealant split and cracked both sides
6	102' East of Abalone Avenue	Previously reapired crack though cap still moving, cracked
7	110' East of Abalone Avenue	Pullbox, cracked though cap top 12" at east end of pullbox and horizontally through cap
8	152' East of Abalone Avenue	Crack through cap, 12" high x 1/4" wide
9	159' East of Abalone Avenue	Crack through cap, 12" high x 1/4" wide
10	183' East of Abalone Avenue	Crack through cap, 12" high x 1/16" wide
11	190' East of Abalone Avenue	Crack through cap, 12" high x 1/16" wide
12	199' East of Abalone Avenue	Crack through cap, 12" high x 1/8" wide
13	201' East of Abalone Avenue	Construction joint, sealant split and cracked both sides
14	201' East of Abalone Avenue	Waterside, spall 18" long x 7" high x 7" deep

South Bay Front, 30' East of Abalone

South Bay Front, 30' East of Abalone

South Bay Front, 54' East of Abalone

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 54' East of Abalone

South Bay Front, 64' East of Abalone

South Bay Front, 64' East of Abalone

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 64' East of Abalone

South Bay Front, 74' East of Abalone

South Bay Front, 74' East of Abalone

South Bay Front, 93' East of Abalone

South Bay Front, 93' East of Abalone

South Bay Front, 102' East of Abalone

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 102' East of Abalone

South Bay Front, 110' East of Abalone

South Bay Front, 110' East of Abalone

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 110' East of Abalone

South Bay Front, 110' East of Abalone

South Bay Front, 152' East of Abalone

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 152' East of Abalone

South Bay Front, 159' East of Abalone

South Bay Front, 159' East of Abalone

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 175' East of Abalone

South Bay Front, 175' East of Abalone

South Bay Front, 183' East of Abalone

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 183' East of Abalone

South Bay Front, 190' East of Abalone

South Bay Front, 190' East of Abalone

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Abalone Ave and Crystal Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)895-2072 HUNTINGTON BEACH, CA

		QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
Item	Description	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
1	30' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
2	54' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
3	64' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
4	74' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
5	93' East of Abalone Avenue, sealant repair	6	LF					$25.00	$150
6	102' East of Abalone Avenue, crack injection	6	LF					$70.00	$420
7	110' East of Abalone Avenue, crack injection	5	LF					$70.00	$350
8	152' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
9	159' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
10	183' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
11	190' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
12	199' East of Abalone Avenue, crack injection	3	LF					$70.00	$210
13	201' East of Abalone Avenue, sealant repair	6	LF					$25.00	$150
14	201' East of Abalone Avenue, spall repair	2	SF					$70.00	$140

Subtotal		$3,100
Contingency	20 %	$620
Contractor OH & P	10 %	$310
City Cost Index	10 %	$310
GRAND TOTAL		$4,340

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Crystal Ave and Jade Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

Item	Location	Description
1	20' East of Crystal Avenue	Crack through cap at 2'-5' on center, top 12" of cap
2	23' East of Crystal Avenue	Crack through cap at 2'-5' on center, top 12" of cap
3	25' East of Crystal Avenue	Crack through cap at 2'-5' on center, top 12" of cap
4	30' East of Crystal Avenue	Waterside, spall repair loose at lower edges. 48" long x 7" high
5	94' East of Crystal Avenue	Waterside, crack at bottom of cap 30" long
6	106' East of Crystal Avenue	Construction joint, sealant on waterside and landside cracked and split
7	110' East of Crystal Avenue	Pullbox, landside horizontal crack 12" down from top 36" long
8	116' - 190' East of Crystal Avenue	Crack through cap @ 2'-5' o.c., top 12" of cap.
9	195' East of Crystal Avenue	Waterside, crack at bottom of cap, 96" long
10	220' East of Crystal Avenue (at Jade Avenue)	Waterside, crack at bottom of wall, 60" long

South Bay Front, 20' East of Crystal

South Bay Front, 20' East of Crystal

South Bay Front, 30' East of Crystal

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Crystal Ave and Jade Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 94' East of Crystal

South Bay Front, 106' East of Crystal

South Bay Front, 106' East of Crystal

South Bay Front, 110' East of Crystal

South Bay Front, 110' East of Crystal

South Bay Front, 110' East of Crystal

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Crystal Ave and Jade Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 195' East of Crystal

South Bay Front, 220' East of Crystal

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Crystal Ave and Jade Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	Transverse cracks at 5' o.c., shrinkage cracks	130	LF					$70.00	$9,100
4	30' East of Crystal Avenue, crack injection	4	LF					$70.00	$280
5	94' East of Crystal Avenue, crack injection	3	LF					$70.00	$210
6	106' East of Crystal Avenue, sealant repair	6	LF					$25.00	$150
7	110' East of Crystal Avenue, crack injection	3	LF					$70.00	$210
9	195' East of Crystal Avenue, crack injection	8	LF					$70.00	$560
10	220' East of Crystal Avenue, crack injection	5	LF					$70.00	$350

Subtotal		$10,860
Contingency	10 %	$1,086
Contractor OH & P	10 %	$1,086
City Cost Index	10 %	$1,086
GRAND TOTAL		$14,118

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **South Bay Front** Between Jade Ave and East Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:

Item	Location	Description
1	4' East of Jade Avenue	Construction joint, waterside cracked and split
2	11' East of Jade Avenue	Waterside, crack at bottom of cap 180" long
3	37' East of Jade Avenue	Waterside, crack at bottom of cap 96" long
4	51' East of Jade Avenue	Waterside, spall at bottom of cap 72" long x 12" high x 6" long
5	61' East of Jade Avenue	Waterside, crack at bottom of cap 72" long
6	71' East of Jade Avenue	Waterside, crack at bottom of cap 72" long
7	84' East of Jade Avenue	Waterside, crack at bottom of cap 48" long
8	96' East of Jade Avenue	Waterside, crack at bottom of cap 120" long
9	119' East of Jade Avenue	Construction joint, waterside cracked and split
10	119' East of Jade Avenue	Waterside, crack at bottom of cap 12" long
11	132' East of Jade Avenue	Waterside, crack at bottom of cap 72" long
12	177' East of Jade Avenue	Waterside, crack at bottom of cap 60" long
13	187' East of Jade Avenue	Waterside, crack at bottom of cap 36" long
14	212' East of Jade Avenue	Waterside, crack at bottom of cap 60" long
15	235' East of Jade Avenue	Construction joint, sealant split and cracked on waterside, landside in good condition
16	235' East of Jade Avenue	Landside, 72" long crack at lower step
17	235' East of Jade Avenue	Waterside, previously repaired crack and spall appears to be holding, conditon questionable Concrete Is pushed out of plain of wall and could pose future problem

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Jade Ave and East Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 4' East of Jade

South Bay Front, 4' East of Jade

South Bay Front 11' East of Jade

South Bay Front, 37' East of Jade

South Bay Front, 51' East of Jade

South Bay Front, 61' East of Jade

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Jade Ave and East Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 71' East of Jade

South Bay Front, 96' East of Jade

South Bay Front, 119' East of Jade

South Bay Front, 119' East of Jade

South Bay Front, 132' East of Jade

South Bay Front, 152' East of Jade

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Jade Ave and East Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	

South Bay Front, 177' East of Jade

South Bay Front, 187' East of Jade

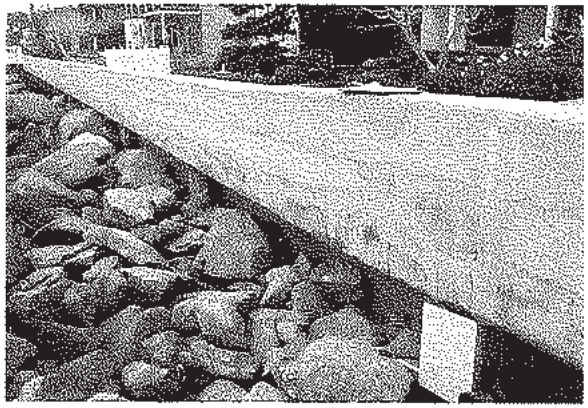
South Bay Front, 212' East of Jade

South Bay Front, 235' East of Jade

South Bay Front, 235' East of Jade

South Bay Front, 235' East of Jade

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **South Bay Front** Between Jade Ave and East Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: Dec 27, 2004	REVISION:	CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)896-2072 HUNTINGTON BEACH, CA



South Bay Front, 235' East of Jade

ACTIVITY	CASH & ASSOCIATES		
Balboa Island Bulkhead Inspection	Engineering and Architecture		
STREET LOCATION	INSPECTOR: CTM	INSPECTION DATE: Dec 27, 2004	REVISION:
South Bay Front	ASSISTANT:		
Between Jade Ave and East Bay Front			

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)895-2072 HUNTINGTON BEACH, CA

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
1	4' East of Jade Avenue, sealant repair	6	LF					$25.00	$150
2	11' East of Jade Avenue, crack injection	15	LF					$70.00	$1,050
3	37' East of Jade Avenue, crack injection	8	LF					$70.00	$560
4	51' East of Jade Avenue, spall repair	6	SF					$70.00	$420
5	61' East of Jade Avenue, crack injection	6	LF					$70.00	$420
6	71' East of Jade Avenue, crack injection	6	LF					$70.00	$420
7	84' East of Jade Avenue, crack injection	4	LF					$70.00	$280
8	96' East of Jade Avenue, crack injection	10	LF					$70.00	$700
9	119' East of Jade Avenue, sealant repair	6	LF					$25.00	$150
10	119' East of Jade Avenue, crack injection	1	LF					$70.00	$70
11	132' East of Jade Avenue, crack injection	6	LF					$70.00	$420
12	177' East of Jade Avenue, crack injection	5	LF					$70.00	$350
13	187' East of Jade Avenue, crack injection	3	LF					$70.00	$210
14	212' East of Jade Avenue, crack injection	5	LF					$70.00	$350
15	235' East of Jade Avenue, sealant repair	6	LF					$25.00	$150
16	235' East of Jade Avenue, crack injection	6	LF					$70.00	$420
17	235' East of Jade Avenue, crack injection	10	LF					$70.00	$700

Subtotal		$6,820
Contingency	20 %	$1,364
Contractor OH & P	10 %	$682
City Cost Index	10 %	$682
GRAND TOTAL		$9,548

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:

Item	Location	Description
1	0' North of Balboa	Reference point, centerline of Balboa Avenue
2	15' North of Balboa Avenue	Waterside, crack on face of pile
3	41' North of Balboa Avenue	Construction joint at top of cap only, sealant cracked and split
4	47' North of Balboa Avenue	Construction joint at lower step only, sealant cracked and split
5	70' North of Balboa Avenue	Waterside, crack on sides of pile
6	81' North of Balboa Avenue	Waterside, crack on south side of pile
7	103' North of Balboa Avenue	Waterside, crack on face and south side of pile
8	114' North of Balboa Avenue	Waterside, crack on face of pile
9	235' North of Balboa Avenue	Waterside, crack on face of pile
10	235' North of Balboa Avenue	Construction joint, sealant split and crack
11	290' North of Balboa Avenue	Waterside, crack on face and sides of pile
12	329' North of Balboa Avenue	Waterside, 60" long crack at bottom of cap
13	356' North of Balboa Avenue	Waterside, crack and spalled face of pile
14	362' North of Balboa Avenue	Waterside, crack at midline of cap, 96" long
15	400' North of Balboa Avenue	Waterside, crack on face of pile
16	412' North of Balboa Avenue	Waterside, crack on sides of pile
17	422' North of Balboa Avenue	Waterside, crack on south side of pile
18	435' North of Balboa Avenue	Construction joint, sealant split and cracked on land side, waterside obscured by dock
19	444' North of Balboa Avenue	Waterside, crack on sides of pile
20	467' North of Balboa Avenue	Waterside, crack on sides of pile
21	478' North of Balboa Avenue	Waterside, crack on sides of pile
22	490' North of Balboa Avenue	Waterside, crack on north side of pile
24	500' North of Balboa Avenue	Waterside, crack on face and sides of pile
25	500' North of Balboa Avenue	Waterside, wall spall, 2 square feet
26	511' North of Balboa Avenue	Waterside, crack on face and sides of pile
27	534' North of Balboa Avenue	Waterside, crack on face and sides of pile
28	545' North of Balboa Avenue	Waterside, crack on south side of pile
29	556' North of Balboa Avenue	Waterside, crack on sides of pile
30	567' North of Balboa Avenue	Waterside, crack on sides of pile
31	567' North of Balboa Avenue	Waterside, crack at middle of cap, 60" long
32	578' North of Balboa Avenue	Waterside, spall at mudline of pile
33	578' North of Balboa Avenue	Waterside, crack at middle of cap, 96" long
34	589' North of Balboa Avenue	Waterside, crack on face and sides of pile, obscured by rocks
35	597' North of Balboa Avenue	Construction joint, sealant split and crack

Continued onto next page

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:

36	601' North of Balboa Avenue	Reference point, outside corner of cap at North Bay Front
37	general note	Waterside, underside of cap has spalls, cracks and loose material
38	Address 0' - 120'	Top of cap "hollow spalled" sounds. Little of no signs of spalling, high potential for problems

15' North of Balboa Avenue

41' North of Balboa Avenue

41' North of Balboa Avenue

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:

47' North of Balboa Avenue

70' North of Balboa Avenue

81' North of Balboa Avenue

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

103' North of Balboa Avenue

114' North of Balboa Avenue

235' North of Balboa Avenue

235' North of Balboa Avenue

290' North of Balboa Avenue

329' North of Balboa Avenue

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

356' North of Balboa Avenue

362' North of Balboa Avenue

400' North of Balboa Avenue

412' North of Balboa Avenue

422' North of Balboa Avenue

435' North of Balboa Avenue

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

444' North of Balboa Avenue

467' North of Balboa Avenue

478' North of Balboa Avenue

490' North of Balboa Avenue

500' North of Balboa Avenue

511' North of Balboa Avenue

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

534' North of Balboa Avenue

545' North of Balboa Avenue

556' North of Balboa Avenue

567' North of Balboa Avenue

578' North of Balboa Avenue

589' North of Balboa Avenue

ACTIVITY: **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION: **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:

597' North of Balboa Avenue

597' North of Balboa Avenue

ACTIVITY	CASH & ASSOCIATES		
Balboa Island Bulkhead Inspection	Engineering and Architecture		
STREET LOCATION	INSPECTOR: CTM	INSPECTION DATE: January 21, 2005	REVISION:
Grand Canal West	ASSISTANT:		
Between North Bay Front and Balboa Ave			

Item	Description	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
		Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
2	15' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
3	41' North of Balboa Avenue, sealant repair	2	SF					$70.00	$140
4	47' North of Balboa Avenue, sealant repair	3	SF					$70.00	$210
5	70' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
6	81' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
7	103' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
8	114' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
9	235' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
10	235' North of Balboa Avenue, sealant repair	7	LF					$25.00	$175
11	290' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
12	329' North of Balboa Avenue, crack injection	5	LF					$70.00	$350
13	356' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
14	362' North of Balboa Avenue, crack injection	8	LF					$70.00	$560
15	400' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
16	412' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
17	422' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
18	435' North of Balboa Avenue, sealant repair	7	LF					$25.00	$175
19	444' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
20	467' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
21	478' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
22	490' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
24	500' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
25	500' North of Balboa Avenue, spall repair	2	SF					$70.00	$140
26	511' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
27	534' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
28	545' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
29	556' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
30	567' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
31	567' North of Balboa Avenue, crack injection	5	LF					$70.00	$350
32	578' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
33	578' North of Balboa Avenue, crack injection	8	LF					$70.00	$560
34	589' North of Balboa Avenue, shotcrete repair	6	SF					$70.00	$420
35	597' North of Balboa Avenue, sealant repair	7	LF					$25.00	$175
37	general note	200	SF					$70.00	$14,000

Continued onto next page

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **Grand Canal West** Between North Bay Front and Balboa Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE (714)285-2070 HUNTINGTON BEACH, CA

38	Address 0' - 120'	120	SF	$70.00	$8,400

Subtotal		$34,895
Contingency	20 %	$6,979
Contractor OH & P	10 %	$3,490
City Cost Index	10 %	$3,490
GRAND TOTAL		$48,853

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **Grand Canal West** Between Balboa Ave and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:

CASH & ASSOCIATES ENGINEERING & ARCHITECTURE
(714)855-2079
HUNTINGTON BEACH, CA

Item	Location	Description
1	0' North of Park Avenue	Reference point, face of bridge
2	36' North of Park Avenue	Waterside, vertical crack on south side of construction joint
3	36' North of Park Avenue	Waterside, crack on north side of pile
4	37' - 43' North of Park Avenue	Waterside, crack at bottom of cap
5	47' North of Park Avenue	Waterside, vertical crack on cap above pile 24" long
6	70' North of Park Avenue	Waterside, crack on sides of pile
7	81' North of Park Avenue	Waterside, hole on underside of cap north side of pile
8	97' North of Park Avenue	Waterside, change in quality under cap, spalls, cracks, and loose material under cap.
9	103' North of Park Avenue	Waterside, spalled face of pile
10	114' North of Park Avenue	Waterside, crack on sides of pile
11	136' North of Park Avenue	Waterside, crack on face and sides of pile
12	158' North of Park Avenue	Waterside, crack on face and sides of pile
13	169' North of Park Avenue	Waterside, crack on north side of pile
14	192' North of Park Avenue	Consrtuction joint, sealant cracked and split
15	203' North of Park Avenue	Waterside, cracked pile
16	214' North of Park Avenue	Waterside, spalled south side of pile
17	225' North of Park Avenue	Waterside, cracked face and sides of pile
18	236' North of Park Avenue	Waterside, crack on north side of pile
19	247' North of Park Avenue	Waterside, crack on sides of pile
20	258' North of Park Avenue	Waterside, crack on face and north side of pile
21	269' North of Park Avenue	Waterside, crack on face and sides of pile
22	280' North of Park Avenue	Waterside, spalled face of pile
23	291' North of Park Avenue	Waterside, crack on sides of pile
24	300' North of Park Avenue	Consrtuction joint, sealant cracked and split
25	302' North of Park Avenue	Waterside, crack on face of pile
26	313' North of Park Avenue	Waterside, crack on sides of pile
27	346' North of Park Avenue	Waterside, crack on south side of pile
28	369' North of Park Avenue	Waterside, crack on north side of pile
29	380' North of Park Avenue	Waterside, crack on face and sides of pile
30	391' North of Park Avenue	Waterside, crack on face of pile
31	399' North of Park Avenue	Consrtuction joint, sealant cracked and split
32	413' North of Park Avenue	Waterside, crack on face of pile
33	424' North of Park Avenue	Waterside, crack on north side of pile
34	446' North of Park Avenue	Waterside, crack on face of pile
35	453' North of Park Avenue	Reference point, centerline of Balboa Avenue
36	0' - 400' North of Park Avenue	Landside, top of cap has a "Hollow" sound, significant potential for spalling

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Balboa Ave and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

36 feet North of Park

47 feet North of Park

70 feet North of Park

81 feet North of Park

103 feet North of Park

114 feet North of Park

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Balboa Ave and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

136 feet North of Park

158 feet North of Park

169 feet North of Park

192 feet North of Park

192 feet North of Park

203 feet North of Park

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Balboa Ave and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2008	REVISION:	

214 feet North of Park

225 feet North of Park

236 feet North of Park

247 feet North of Park

258 feet North of Park

269 feet North of Park

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Balboa Ave and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

280 feet North of Park

291 feet North of Park

302 feet North of Park

313 feet North of Park

346 feet North of Park

369 feet North of Park

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Balboa Ave and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:	

380 feet North of Park

391 feet North of Park

399 feet North of Park

399 feet North of Park

413 feet North of Park

424 feet North of Park

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **Grand Canal West** Between Balboa Ave and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: January 21, 2005	REVISION:

453 feet North of Park

ACTIVITY
Balboa Island Bulkhead Inspection

CASH & ASSOCIATES
Engineering and Architecture

STREET LOCATION
Grand Canal West
Between Balboa Ave and Park Ave

INSPECTOR: CTM
ASSISTANT:

INSPECTION DATE: January 21, 2005

REVISION:

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
2	36' North of Park Avenue, crack injection	3	LF					$70.00	$210
3	36' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
4	37' - 43' North of Park Avenue, crack injection	6	LF					$70.00	$420
5	47' North of Park Avenue, crack injection	2	LF					$70.00	$140
6	70' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
7	81' North of Park Avenue, spall repair	1	SF					$70.00	$70
8	97' North of Park Avenue, spall repair	200	SF					$70.00	$14,000
9	103' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
10	114' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
11	136' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
12	158' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
13	169' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
14	192' North of Park Avenue, sealant repair	7	LF					$25.00	$175
15	203' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
16	214' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
17	225' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
18	236' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
19	247' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
20	258' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
21	269' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
22	280' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
23	291' North of Park Avenue, shotcrete repair	6	SF					$70.00	$420
24	300' North of Park Avenue, sealant repair	7	LF					$25.00	$175
25	302' North of Park Avenue	6	SF					$70.00	$420
26	313' North of Park Avenue	6	SF					$70.00	$420
27	346' North of Park Avenue	6	SF					$70.00	$420
28	369' North of Park Avenue	6	SF					$70.00	$420
29	380' North of Park Avenue	6	SF					$70.00	$420
30	391' North of Park Avenue	6	SF					$70.00	$420
31	399' North of Park Avenue, sealant repair	7	LF					$25.00	$175
32	413' North of Park Avenue	6	SF					$70.00	$420
33	424' North of Park Avenue	6	SF					$70.00	$420
34	446' North of Park Avenue	6	SF					$70.00	$420
36	0' - 400' North of Park Avenue	300	SF					$70.00	$21,000

Continued onto next page

Subtotal		$46,865
Contingency	20 %	$9,373
Contractor OH & P	10 %	$4,687
City Cost Index	10 %	$4,687
GRAND TOTAL		$65,611

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & Janaury 21, 2005	REVISION:

Item	Location	Description
1	0' North of South Bay Front	Reference point, outside corner of bulkhead cap
2	23' North of South Bay Front	Waterside, cracked on south side of pile, bottom of shotcrete exposed
3	34' North of South Bay Front	Waterside, cracked on face of pile, bottom of shotcrete exposed
4	34'-46' North of South Bay Front	Waterside, crack under cap, crack inection 144"
5	46' North of South Bay Front	Waterside, cracked on south side of pile, bottom of shotcrete exposed, crack control joint (CCJ)
6	57' North of South Bay Front	Waterside, cracked face and sides of pile, bottom of shotcrete exposed
7	68' North of South Bay Front	Waterside, cracked sides of pile, bottom of shotcrete exposed
8	79' North of South Bay Front	Waterside, cracked on north side of pile, bottom of shotcrete exposed
9	79' - 90' North of South Bay Front	Waterside, crack under cap, crack inection 132"
10	90' North of South Bay Front	Waterside, cracked face and sides of pile, bottom of shotcrete exposed
11	101' North of South Bay Front	Waterside, pile in good shape, bottom of shotcrete exposed, CCJ
12	101' - 112' North of South Bay Front	Waterside, holes at underside of cap.
13	112' North of South Bay Front	Waterside, cracked face of pile, bottom of shotcrete exposed
14	123' North of South Bay Front	Waterside, cracked face of pile
15	134' North of South Bay Front	Waterside, no damage
16	144' North of South Bay Front	Waterside, cracked face of pile
17	144' North of South Bay Front	Construction joint, waterside sealant cracked and split
18	156' North of South Bay Front	Waterside, cracked face of pile, south side of pile at mudline, spalled
19	178' North of South Bay Front	Waterside, cracked face of pile
20	189' North of South Bay Front	Waterside, cracked face of pile
21	189' North of South Bay Front	Construction joint, waterside sealant cracked and split
22	200' North of South Bay Front	Waterside, spall at mudline of pile
23	200' - 211' North of South Bay Front	Waterside, holes at underside of cap.
24	211' North of South Bay Front	Waterside, spall at cap and mudline of pile
25	211' - 222' North of South Bay Front	Waterside, holes at underside of cap.
26	222' North of South Bay Front	Waterside, cracked and spalled pile
27	231' North of South Bay Front	Construction joint, waterside sealant cracked and split
28	233' North of South Bay Front	Waterside, cracked face and sides of pile
29	244' North of South Bay Front	Waterside, cracked face of pile
30	255' North of South Bay Front	Waterside, cracked face of pile
31	266' North of South Bay Front	Waterside, cracked face and sides of pile
32	277' North of South Bay Front	Construction joint, waterside sealant cracked and split
33	321' North of South Bay Front	Crack control joint, sealant in good shape.
34	321' North of South Bay Front	Waterside, cracked at top of pile

Continued onto next page

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & January 21, 2005	REVISION:	

35	332' - 343' North of South Bay Front	Waterside, underside of cap cracked and spalled
36	343' North of South Bay Front	Waterside, cracked face and sides of pile
37	354' - 365' North of South Bay Front	Waterside, underside of cap cracked and spalled
38	365' North of South Bay Front	Construction joint, waterside sealant cracked and split
39	376' North of South Bay Front	Waterside, cracked face of pile
40	387' - 398' North of South Bay Front	Waterside, crack at bottom of cap 96" long
41	398' North of South Bay Front	Waterside, cracked face of pile
42	408' North of South Bay Front	Construction joint, waterside sealant cracked and split
43	408' North of South Bay Front	Waterside, spall at south side of pile
44	433' North of South Bay Front	Waterside, diagonal crack at bridge abutment, 96"

23 feet North of South Bay Front

34 feet North of South Bay Front

46 feet North of South Bay Front

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & Jansury 21, 2005	REVISION:	

57 feet North of South Bay Front

68 feet North of South Bay Front

79 feet North of South Bay Front

90 feet North of South Bay Front

101 feet North of South Bay Front

112 feet North of South Bay Front

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & Janaury 21, 2005	REVISION:	

123 feet North of South Bay Front

144 feet North of South Bay Front

156 feet North of South Bay Front

178 feet North of South Bay Front

189 feet North of South Bay Front

200 feet North of South Bay Front

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & Janaury 21, 2005	REVISION:	

211 feet North of South Bay Front

222 feet North of South Bay Front

231 feet North of South Bay Front

233 feet North of South Bay Front

244 feet North of South Bay Front

255 feet North of South Bay Front

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & Janaury 21, 2005	REVISION:	

266 feet North of South Bay Front

277 feet North of South Bay Front

321 feet North of South Bay Front

332 feet North of South Bay Front

343 feet North of South Bay Front

354 feet North of South Bay Front

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & Janaury 21, 2005	REVISION:

365 feet North of South Bay Front

376 feet North of South Bay Front

387 feet North of South Bay Front

398 feet North of South Bay Front

408 feet North of South Bay Front

408 feet North of South Bay Front

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal West** Between Park Ave and South Bay Front	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: DEC 20, 2004 & December 21, 2004 & Janaury 21, 2005	REVISION:	

433 feet North of South Bay Front

ACTIVITY	CASH & ASSOCIATES			
Balboa Island Bulkhead Inspection	Engineering and Architecture			
STREET LOCATION	INSPECTOR: CTM	INSPECTION DATE: DEC 20, 2004 &	REVISION:	
Grand Canal West	ASSISTANT:	December 21, 2004 & Janaury 21, 2005		
Between Park Ave and South Bay Front				

Item	Description	QUANTITY Number	QUANTITY Unit	MATERIAL COST Unit Cost	MATERIAL COST Total	LABOR COST Unit Cost	LABOR COST Total	ENGINEERING ESTIMATE Unit Cost	ENGINEERING ESTIMATE Total
2	23' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
3	34' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
4	34'-46' North of South Bay Front, crack injection	12	LF					$70.00	$840
5	46' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
6	57' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
7	68' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
8	79' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
9	79' - 90' North of South Bay Front, crack injection	11	LF					$70.00	$770
10	90' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
12	101' - 112' North of South Bay Front, spall repair	5	SF					$70.00	$350
13	112' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
14	123' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
16	144' North of South Bay Front, shotcrete repair	8	SF					$70.00	$560
17	144' North of South Bay Front, sealant repair	7	LF					$25.00	$175
18	156' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
19	178' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
20	189' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
21	189' North of South Bay Front, sealant repair	7	LF					$25.00	$175
22	200' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
23	200' - 211' North of South Bay Front, spall repair	5	SF					$70.00	$350
24	211' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
25	211' - 222' North of South Bay Front, spall repair	5	SF					$70.00	$350
26	222' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
27	231' North of South Bay Front, sealant repair	7	LF					$25.00	$175
28	233' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
29	244' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
30	255' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
31	266' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
32	277' North of South Bay Front, sealant repair	7	LF					$70.00	$490
34	321' North of South Bay Front, shotcrete repair	6	SF					$25.00	$150
35	332' - 343' North of South Bay Front, spall repair	5	SF					$70.00	$350
36	343' North of South Bay Front, shotcrete repair	6	SF					$70.00	$420
37	354' - 365' North of South Bay Front, spall repair	5	SF					$70.00	$350
38	365' North of South Bay Front, sealant repair	7	LF					$25.00	$175

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ACTIVITY	CASH & ASSOCIATES			
Balboa Island Bulkhead Inspection	Engineering and Architecture			
STREET LOCATION	INSPECTOR: CTM	INSPECTION DATE: DEC 20, 2004 &	REVISION:	
Grand Canal West	ASSISTANT:	December 21, 2004 & Janaury 21, 2005		
Between Park Ave and South Bay Front				

39	376' North of South Bay Front, shotcrete repair	6	SF	$70.00	$420
40	387' - 398' North of South Bay Front, crack inject.	11	LF	$70.00	$770
41	398' North of South Bay Front, shotcrete repair	6	SF	$70.00	$420
42	408' North of South Bay Front, sealant repair	7	LF	$25.00	$175
43	408' North of South Bay Front, shotcrete repair	6	SF	$70.00	$420
44	433' North of South Bay Front, crack injection	8	LF	$70.00	$560

Subtotal		$17,685
Contingency	20 %	$3,537
Contractor OH & P	10 %	$1,769
City Cost Index	10 %	$1,769
GRAND TOTAL		$24,759

ACTIVITY	CASH & ASSOCIATES Engineering and Architecture		
Balboa Island Bulkhead Inspection			
STREET LOCATION **Grand Canal East** Between South Bay Front and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: December 21, 2004	REVISION:

Item	Location	Description
1	5' North of South Bay Front	Landside, hollow patch on top of cap, 24" long x 12" wide
2	7' North of South Bay Front	Waterside, spall 96" long, rebar exposed
3	41' North of South Bay Front	Waterside, crack at bottom of cap, 96" long
4	68' North of South Bay Front	Waterside, shotcrete cracked at pile
5	78' North of South Bay Front	Waterside, shotcrete cracked at pile
6	82'-92' North of South Bay Front	Landside, hollow patch on top of cap, 120" long x 12" wide
7	91' North of South Bay Front	Waterside, shotcrete cracked at pile
8	92'-103' North of South Bay Front	Landside, hollow patch on top of cap, 72" long x 12" wide
9	116' North of South Bay Front	Construction joint, sealant missing on landside, waterside sealant in good shape.
10	119' North of South Bay Front	Waterside, spall at bottom of cap 180" long x 6" x 12"
11	133' North of South Bay Front	Waterside, shotcrete at pile lost at base
12	133' North of South Bay Front	Waterside, crack at bottom of cap 120" long
13	145' North of South Bay Front	Construction joint, shotcrete over construction joint sealant missing
14	165' North of South Bay Front	Waterside, bottom of shotcrete exposed at mudline
15	189' North of South Bay Front	Waterside, shotcrete cracked and falling off of pile
16	190' North of South Bay Front	Construction joint, sealant cracked and split on both waterside and landside
17	217' North of South Bay Front	Waterside, shotcrete at wall spalled off
18	240' North of South Bay Front	Waterside, shotcrete at pile cracked and loss of shotcrete on wall
19	240' North of South Bay Front	Waterside, crack at bottom of cap, 120" long
20	234' North of South Bay Front	Construction joint, landside sealant cracked and split, waterside sealant obscured by dock
21	268' North of South Bay Front	Waterside, crack at bottom of cap, 48" long
22	279' North of South Bay Front	Construction joint, spalled at landside, sealant cracked and split both sides
23	323' North of South Bay Front	Construction joint, landside sealant cracked and split, waterside sealant obscured by dock
24	329' North of South Bay Front	Waterside, shotcrete over pile cracked and spalled
25	341' North of South Bay Front	Waterside, shotcrete over pile cracked and spalled
26	367' North of South Bay Front	Construction joint, sealant cracked and split on land and water side
27	372' North of South Bay Front	Waterside, shotcrete spalled at pile base
28	394' North of South Bay Front	Waterside, shotcrete spalled off at pile, entire length
29	394' North of South Bay Front	Waterside, crack at bottom of cap 48" long
30	411' North of South Bay Front	Construction joint, landside and top sealant in good shape, waterside sealant cracked and split
31	Bridge supports	Park Avenue bridge supports need thorough inspection, supports are cracked

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture		
STREET LOCATION **Grand Canal East** Between South Bay Front and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: December 21, 2004	REVISION:

Grand Canal East, 5 ft N. of South Bay Front

Grand Canal East, 7 ft N. of South Bay Front

Grand Canal East, 41 ft N. of South Bay Front

Grand Canal East, 68 ft N. of South Bay Front

Grand Canal East, 68 ft N. of South Bay

Grand Canal East, 78 ft N. of South Bay Front

ACTIVITY **Balboa Island Bulkhead Inspection**	CASH & ASSOCIATES Engineering and Architecture			
STREET LOCATION **Grand Canal East** Between South Bay Front and Park Ave	INSPECTOR: CTM ASSISTANT:	INSPECTION DATE: December 21, 2004	REVISION:	

Grand Canal East, 82 ft N. of South Bay Front

Grand Canal East, 91 ft N. of South Bay

Grand Canal East, 97 ft N. of South Bay Front

Grand Canal East, 116 ft N. of South Bay Front

Grand Canal East, 119 ft N. of South Bay

Grand Canal East, 119 ft N. of South Bay Front