CALIFORNIA COASTAL COMMISSION
South Coast Area Office
200 Oceangate, Suite 1000
Long Beach, CA 90802-4302
(562) 590-5071

ADDENDUM

Th10c

August 3, 2012

Click here to go to the original staff report.

TO: Coastal Commissioners and Interested Parties

FROM: South Coast District Staff

SUBJECT: ADDENDUM TO **ITEM Th10c**, COASTAL COMMISSION PERMIT APPLICATION **#5-12-066** FOR THE COMMISSION MEETING OF **August 2012**.

Correspondence

Attached are letters received in opposition to Item Th10c from Christian Nielsen 16852 at Baruna Lane and Greg J. Buchanan at 16822 Baruna Lane. Both Mr. Buchanan and Mr. Nielsen expressed concerns regarding the proposed Tetra Tech bulkhead repair construction methods. Attached is Tetra Tech's response to the opponents' comments.

The use of sheetpile will result in fill of open coastal waters. As stated in the staff report, these impacts to soft bottom habitat have already been mitigated by Tetra Tech through the creation of soft bottom habitat in the vicinity of Huntington Harbor at Bolsa Chica. Furthermore, the Commission imposes a special condition requiring revised plans and final as-built plans to ensure that placement of the sheetpile is as close to the existing bulkhead as possible and also requiring further minimization of the footprint of the proposed re-placement of rock at the toe of the bulkhead to protect from erosion in the future. As stated in the staff report, Tetra Tech has provided information that toe stone protection was included in the original pre-Coastal Act bulkhead construction design, therefore, reapplying toe stone as part of the bulkhead repair is not considered "new" fill.

Recommended Revision to Special Condition

Commission staff recommends the following revision to Special Condition 4. Deleted language is in ~~strike through~~ and new language is in ***bold, underlined italic***, as shown below:

On page 7 of the staff report for Item Th10c (CDP 5-12-066) modify Special Condition 4, Bulkhead Monitoring Plan as follows:

4. **Bulkhead Monitoring Plan.** The applicants shall maintain the bulkhead reinforcement in good condition throughout the life of the development. PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicants shall submit a Bulkhead Monitoring

Plan to the Executive Director for review and approval. The applicants and their successors in interest shall be responsible for carrying out all provisions of the approved Bulkhead Monitoring Plan for as long as the bulkhead reinforcement remains in place. The monitoring plan, at a minimum, shall provide for: (a) regular inspections by a ~~licensed engineer~~ ***qualified person familiar with bulkhead structures who is able to document via photos and provide written descriptions based on personal observation of the sheetpile***. These inspections shall be performed at least every 2 years; (b) inspections shall examine the exposed portions of the bulkhead reinforcement (to the mud line) for signs of weakness or possible failure, including, but not limited to cracking, bending, splitting, splintering, or flaking. All weak or potential failure areas should be marked on an as-built plan of the bulkhead reinforcement, and there should be photographs and text to explain the nature and extent of each weakness; (c) the footprint of the toe stone shall be inspected and examined for signs of settlement and or movement, each site photographed and observations logged.

Inspection reports shall be prepared and conveyed to the Executive Director within 30 days of the inspection work. These reports shall provide information on and photographs from the date of the inspection, the name and qualifications of the person performing the inspection, and an overall assessment of the continued integrity of the bulkhead reinforcement. If the inspection identifies any areas where the bulkhead reinforcement has been damaged, the report shall identify alternatives to remedy the damage.

In the event that any sections of the bulkhead reinforcement are damaged or flaking, the applicants shall notify the Commission within 10 days; and in such event, within 30 days of such notification, submit to the Commission a complete application for any coastal development permit amendment, or new permit, necessary for the repair or replacement of the bulkhead reinforcement.

Christian Nielsen
16852 Baruna Lane
Huntington Beach CA 92649

RECEIVED
South Coast Region
JUL 30 2012
CALIFORNIA
COASTAL COMMISSION

28 July 2012

Ms. Liliana Roman
California Coastal Commission
South Coast Area Office
200 Oceangate, Suite 1000
Long Beach, CA 90802-5071

Christian Nielsen
Opposed

Ref: Coastal Permit No 5-12-066

Agenda No. **TH10c**

Dear Ms. Roman;

I was an applicant on the referenced coastal permit and by email correspondence of March 20 2012 with Meg Vaughn notified the Coastal Commission of my decision that Tetra Tech was no longer my authorized representative, that I opted to have the necessary repairs performed utilizing the minimally invasive carbon fiber sheet pile and this work was subsequently completed under CDP 5-12-006.

The Staff report for the referenced Coastal Permit indicates my neighbor at 16842 Baruna will have rock placed outboard of the sea wall after having repaired existing timber pile, driven sheet pile and pressure grouting the existing voids. In addition it is anticipated that work will impact and take slightly over six square feet of soft bottom. Furthermore, all work contemplated under this application will consume and take approximately three hundred square feet of soft bottom. Considering my sea wall was virtually in the same condition as that of my neighbor, 16842 Baruna Lane, and the repairs to my sea wall yielded a net gain in soft bottom, how can the Coastal Commission justify the taking of soft bottom when there are alternative repairs that benefit the marine environment?

As noted above, repairs to my sea wall are complete and marine growth has made the repair nearly undetectable. I am therefore voicing my objection to Staff recommendation for approval when it is quite apparent there is a superior option which provides a solution and actually yields more "soft bottom" than it takes.

Sincerely,

Chris Nielsen

Chris Nielsen

RECEIVED
South Coast Region

JUL 30 2012

CALIFORNIA
COASTAL COMMISSION

Greg J. Buchanan
16822 Baruna Lane
Huntington Beach, CA 92649

27 July 2012

Ms. Liliana Roman
California Coastal Commission
South Coast Area Office
200 Oceangate, Suite 1000
Long Beach, CA 90802-5071

Greg Buchanan
Opposed

Ref: Permit No 5-12-065 and 5-12-066

Agenda Nos. **TH10b and TH10c**

Dear Ms. Roman;

In response to the Coastal Permit Application, Public Hearing Notice dated 20 July 2012, I would like to voice my opposition against both applications for the following reasons.

1. With exception to pile repair and void filling both designs require rip rap placement to prevent future erosion due to tidal currents, propeller wash from boats docked perpendicular to the sea wall, and routine maintenance dredging of the main channel and the dock slips. With respect to tidal currents, attached is a study, recently preformed, refuting the premise that tidal currents have anywhere close to the velocity to cause erosion.

2. The second argument for placement of rock suggests perpendicular docking and propeller wash causing erosion. Without debating the merits of this argument but only evaluating the Summaries of Status and Proposed Work for both Coastal Development Applications it is clear there is no justification at the subject properties that perpendicular docking causes or exasperates erosion. In fact, of the 27 properties under application, only 5 have slip configurations perpendicular to the sea wall and one is skewed. The remaining 21 properties have slips configured parallel to the seawall which would not direct propeller thrusts towards the seawall. In addition, five of these non-parallel slips exhibited the least scour when considering the proposed cubic yards of rock placed per linear foot of sea wall than all the other properties under application. This seems to imply that perpendicular docking does not result in an increase in the amount of material displaced from along the seawall.

3. The Applicant further states another potential cause of erosion may be due to routine maintenance dredging of the main channel and dock slips. Having lived in the harbor for over twenty years, I can safely say dredging is anything but routine. However, assuming it was, and the toe stone was placed alongside the sea wall footing as proposed then subsequently dredging activities commenced, obviously out board of the rock and at a depth below the rock fill, without the rock being keyed in at a depth below the dredge line, how is the rock prevented from ultimately migrating down slope?

4. Summary of Staff Recommendations and Existing Conditions indicates the project will replace previously placed toe stone and therefore this "re-applying" does not constitute a " 'new' fill of open coastal waters". Perhaps in rare circumstances rock was placed during the construction of the harbor but my firm, Harbour Constructors, Co has been actively diving these Huntington Harbour sea walls along with installing carbon fiber sheet pile and pressure grouting existing voids. With exception to permitted rock previously placed, construction or illegally dumped materials, the only "original construction" rock we have encountered was three inch bedding rock at 3341 Bounty Circle CDP 5-12-173, Th6b, and its presence, well beneath the footing, is indicative of pre-Coastal Act placement.

5. The applicant's premise for all designs is erosion was and is the sole contributing factor in the degradation of the sea floor which ultimately causes the cut off wall to fail thus exposing the underside of the footing and timber pile to marine borers. Assuming the premise is correct, with the cut off wall intact, soils beneath the footing would not be exposed to the alleged tidal currents, propeller wash, and burrowing fish and therefore it would be logical to anticipate that soil remains behind the cut off wall and beneath the footing (i.e. no voids behind the cut off wall). Our findings are contrary and typically what has occurred to the sea floor out board of the footing is a good indication of what has occurred behind the cut off wall. For example, CDP 5-12-007 (Wirtz) had minimal separation between the cut off wall and the bottom of the footing and no voids observed beneath the cut off wall. However, drilling through the cut off wall, forty-five feet away from the separation, showed a sizable void beneath the entire footing. The same applies to CDP 5-12-019 (Nichols) except there were no separations between the cut off wall and bottom of footing. However the void was sizable enough to accommodate over two tons of grout placement. These findings support the determination that consolidation of the soft materials beneath and along the seawall footing is the primary cause of the voids and loss of material along the footing. In the case of CDP 5-12-065, TH10b, the applicant's plan is solely to dump rock fill without regard to what has occurred or is occurring beneath the footing and behind the cut off wall where the timber pile may already have been exposed. In short, this has the guise of selling soft bottom credits and rock while covering up a potentially serious problem under the auspices of stopping a non-existent erosion issue.

6. We will be seeking owner permission at 16417 Ladona to drill through the exposed cut off wall in the close proximity to 16411 Ladona, a property previously repaired under CDP 5-99-6 with course rock placement. In this case, there is no apparent cut off wall separation. Should we find a void at the repair to non-repaired interface it is highly likely the void extends well into the repaired area. If this is the case, ultimate repairs to 16411 Ladona will require removal of the rock to gain access for sheet pile installation and pressure grouting to protect the timber pile. This will cause significantly more disturbance to the marine environment by disturbing the soft bottom and releasing turbidity. In addition, it puts all prior "rock only" repairs in question and leaves the home owner with a potentially greater liability than had no work been performed.

7. The applicant implies that the design of the seawall relies on the rock to help shore the structure. However, our review of the available plans for the original seawall construction reveals that rock was not called for along the toe of the footing. Upon further consideration of the proposed rock providing shoring, through our construction experience and discussions with engineers experienced in seawall design, it is our understanding that the proposed rock will provide no shoring (support) to the structure since the rock is simply being placed on the existing unconsolidated materials along the top of a slope. In order for the rock to provide shoring to the seawall, the underlying, existing materials would need to be compacted and the rock would need to extend up and away from the footing in order to have a lateral load on the footing. This would result in a significant fill that would fill the harbor and would not be an

appropriate seawall design. Therefore the seawalls were designed to be supported by the timber piles which do not rely on rock for additional support.

8. Staff report is contradictory where the need for rock is predicated upon erosion, tidal currents etc. but later on within the report, as a rebuttal to the fifth alternative opposing cement slurry the applicant states ***"...over time it is anticipated by the applicant that sediment will settle upon the proposed stone"***. The argument for the need for rock to stop erosion, then suggest that though the rock is environmentally damaging it is an acceptable solution because silts will ultimately bury the rock through sedimentation is illogical.

Sincerely,

Greg J. Buchanan

July 19, 2012

Mr. Greg Reid
Exeltech Consulting, Inc.
921 SW Washington St., Suite 464
Portland, OR 97205

RE: Huntington Harbour Water Quality Measurements

Dear Greg:

Introduction

Nearshore and Wetland Surveys made a series of water quality measurements at four sites in Huntington Harbour between July 3 and July 9, 2012. The purpose of the measurement program was to assess the potential for current induced bottom scour along the toe of the existing seawalls and the need for scour protection. The primary parameters that were monitored were water current, turbidity, and depth. In addition temperature, pH, conductivity, and Oxidation Reduction Potential (ORP) data were recorded. Data were recorded at the Myers/Rieder (July 3 – 4), Zamboni (July 4 -5), Wood, (July 5 -6), and Pryor (July 6 – 9) properties. The monitoring period was selected to take advantage of extreme tides.

Instrumentation

An In Situ TROLL 9500 water quality probe was used to record turbidity, water depth, temperature, pH, conductivity, and ORP. Note that the depth is the height of the water surface above the instrument and is not tied to a specific tidal datum. The TROLL 9500 probe was programmed to record a single set of data every minute during the monitoring period. The manufacture's calibration procedure was conducted prior to the initial deployment. An InterOcean Systems S-4 current meter was used to measure water current, depth, and temperature. The S-4 current meter was programmed to average one minute of data, which was recorded every two minutes during the monitoring period.

Installation

The instruments typically were connected to a mount that held them as a constant elevation above the bottom for the duration of the recording period. At each site, a reinforcing steel rod was driven into the bottom and the mount with the instruments was lowed over the rod and attached with a set screw. In each case, the x-axis of the current meter was aligned perpendicular to the seawall. At the Woods' property, the TROLL 9500 probe was secured to a floating dock near the water surface to provide a comparison between surface and bottom turbidity.

3248 Park Vista Drive
La Crescenta, CA 91214
Phone: (818) 269-1421 Fax: (818) 957-0607
www.nearshoresurveys.com

Myers/Rieder Property

Location:	4002 Morning Star Drive
Deployment Date:	July 4 - 5, 2012
TROLL 9500:	6 in off bottom; 3 ft from seawall
S-4	12 in off bottom; 2 ft from seawall

Zamboni Property

Location:	16591 Nalu Circle
Deployment Date:	July 5 - 6, 2012
TROLL 9500:	6 in off bottom; 3 ft from seawall
S-4	12 in off bottom; 2 ft from seawall

Wood Property

Location:	4031 Morning Star Drive
Deployment Date:	July 5 - 7, 2012
TROLL 9500:	surface; 10 ft from seawall
S-4	12 in off bottom; 6 ft from seawall

Pryor Property

Location:	3341 Bounty Circle
Deployment Date:	July 6 - 9, 2012
TROLL 9500:	6 in off bottom; 7 ft from seawall
S-4	12 in off bottom; 6 ft from seawall

See the attached Site Plan showing the property locations.

Data Processing and Plots

Following each deployment, the raw data from the TROLL 9500 and S-4 were downloaded from the instruments and processed using the manufacture's software. The data were tabulated and spurious values were excised from the data set. Spurious data were those that fell greater than 3 times the standard deviation (95% confidence interval) from the parameter average.

The component of the current perpendicular to the seawalls (x-axis), as expected, was near zero. Therefore, only the y-axis, parallel to the seawalls, are discussed and presented in the plots that accompany this report. In all cases, the average y-axis current was near zero over the recording period. The current data shows evidence of an approximate 70-minute period seiche within the Harbour that masks any correlation between the tide level and current. A 72-minute average of the current data was calculated and is plotted along with the one-minute average data.

Plots presenting the turbidity, current, and depth are attached to this report.

Summary of Results

Myers/Rieder Property	Average	Maximum	Minimum
Current (cm/sec)	~0	5.9	-5.3
Turbidity (FNU)	6.6	10.3	3.4

Zamboni Property	Average	Maximum	Minimum
Current (cm/sec)	~0	10.5	-18.5
Turbidity (FNU)	7.8	14.1	4.3

Wood Property	Average	Maximum	Minimum
Current (cm/sec)	~0	3.6	-3.6
Turbidity (FNU)	3.1	5.1	2.0

Pryor Property	Average	Maximum	Minimum
Current (cm/sec)	~0	5.7	-14.2
Turbidity (FNU)	5.7	12.0	3.0

The current data show varying degrees of correlation with tide phase depending on location within the Harbour. Data from the Pryor property shows the highest correlation while data from the Wood property exhibits the lowest correlation. The magnitude of the seiche component of the data appears to be greater than the tidal component.

The turbidity data vary over a small interval of 2.0 to 12.0 FNU with little correlation to tide level or current velocities. To provide a visual reference, photographs of water samples with various turbidity levels accompany this report. Review of the water samples reveal no observable difference between the turbidity levels recorded at the site. It appears that the recorded turbidity levels represent the natural background turbidity levels for the area and was not found to be the result of current induced scour. Review of published sediment transport data validated these findings since the current velocities observed at the sites do not exceed erosion velocities which were indicated to be initiated at 50 cm/s. The velocities were also found to not reach transitional velocities (20 cm/s) for very small (0.001 mm), unconsolidated sediments (Hjulström, 1935). See the attached diagram. According to these findings, current induced bottom scour was not observed at the subject sites.

Thank you for allowing me to assist you in this endeavor. Should you have any questions or comments, please do not hesitate to contact me.

Sincerely,
Nearshore and Wetland Surveys,

Rick Hollar
Hydrographic Engineer

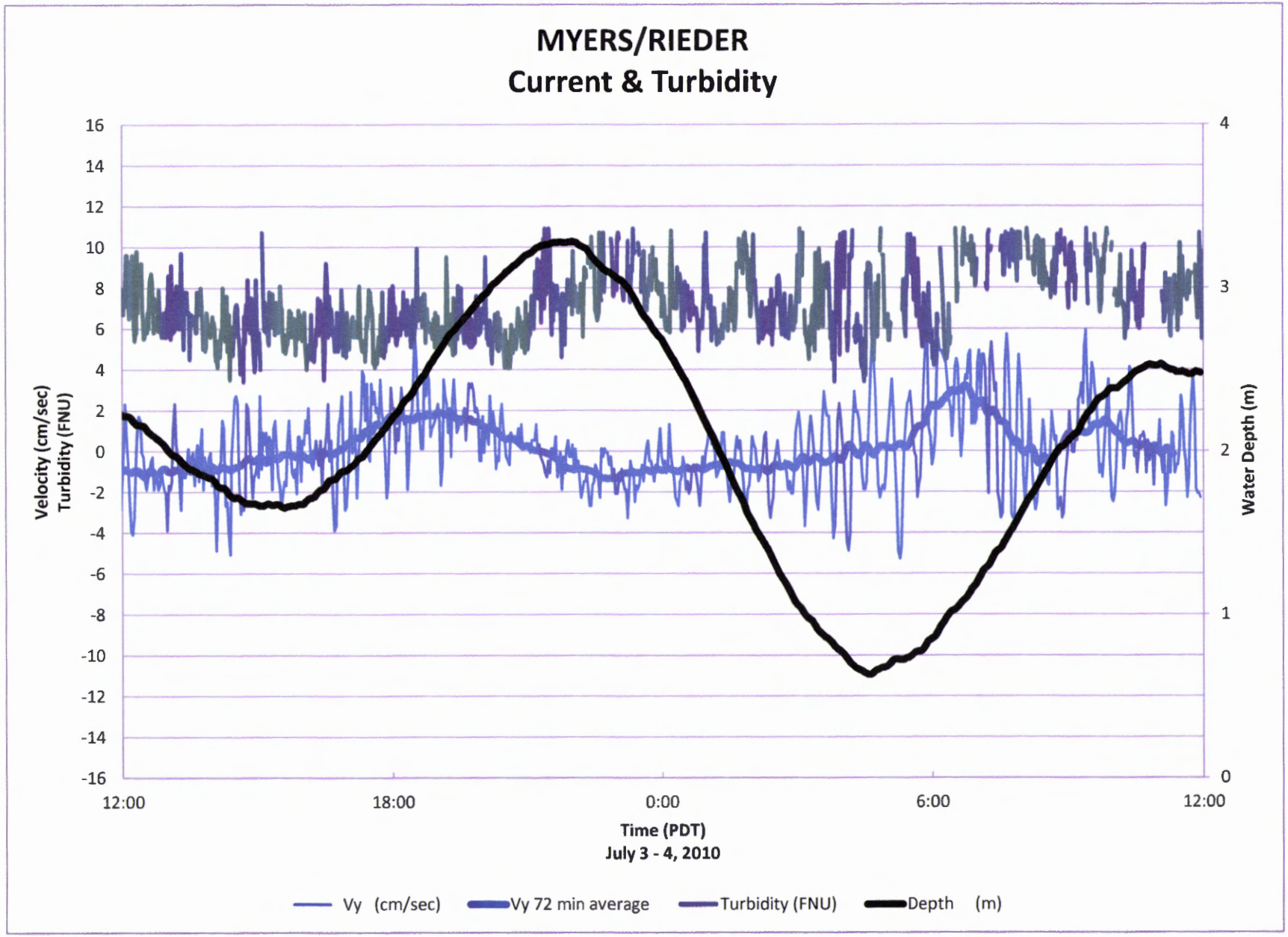
CC: Greg Buchanan, Harbour Constructors, Co.

Attachment A – Site Plan

Huntington Harbour Current and Turbidity Locations

- Prior
  3341 Bounty Circle
- Zamboni
  16591 Nalu Circle
- Myers/Rieder
  4002 Morning Star Drive
- Wood
  4031 Morning Star Drive

Attachment B – Turbidity, Current and Depth Plots


MYERS/RIEDER
Current & Turbidity
Velocity (cm/sec)
Turbidity (FNU)
Water Depth (m)
16
14
12
10
8
6
4
2
0
-2
-4
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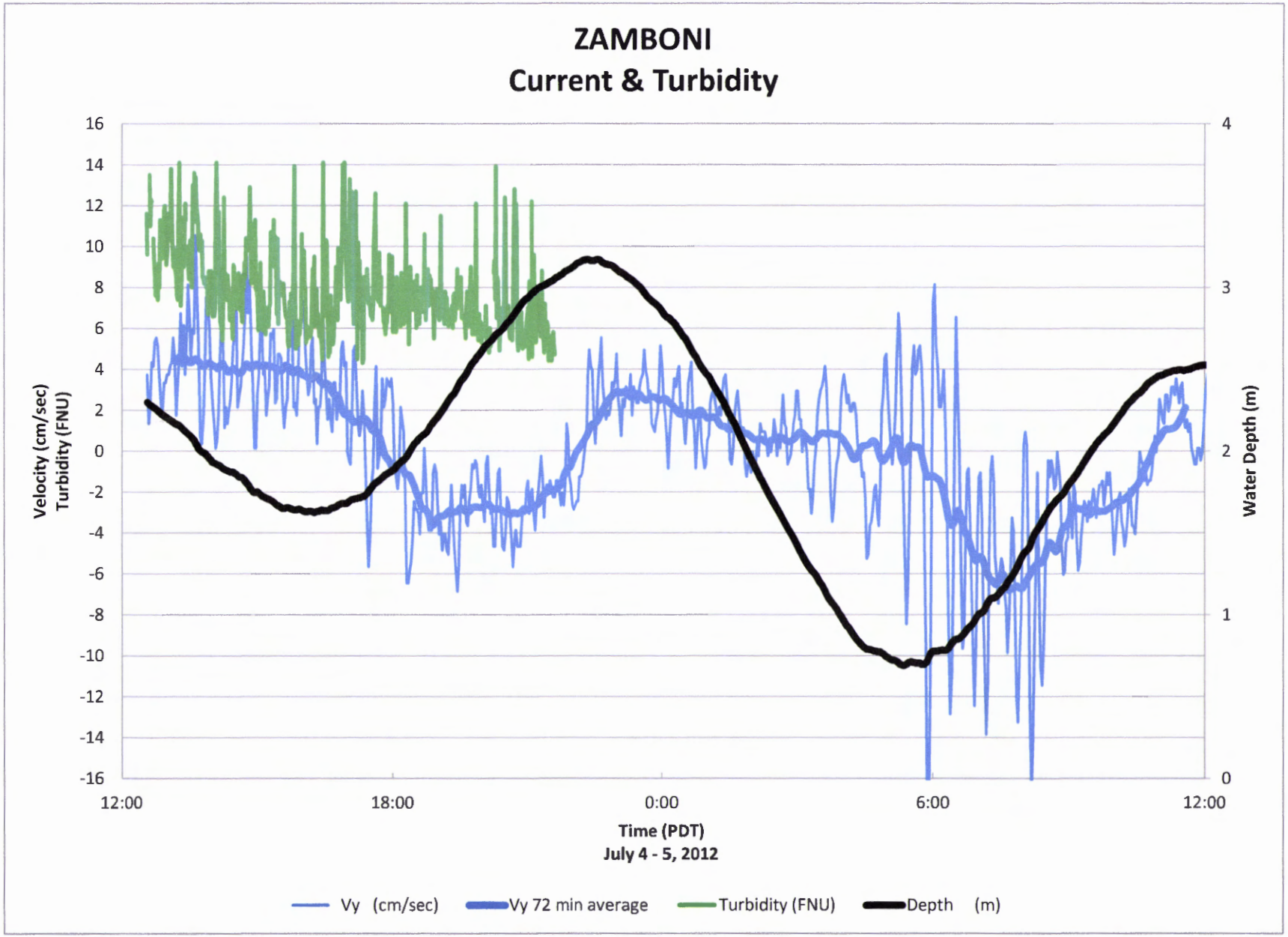
-10
-12
-14
-16
4
3
2
1
0
12:00
18:00
0:00
6:00
12:00
Time (PDT)
July 3 - 4, 2010
Vy (cm/sec)
Vy 72 min average
Turbidity (FNU)
Depth (m)

5


ZAMBONI
Current & Turbidity
Velocity (cm/sec)
Turbidity (FNU)
Water Depth (m)
16
14
12
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2
0
-2
-4
-6
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-12
-14
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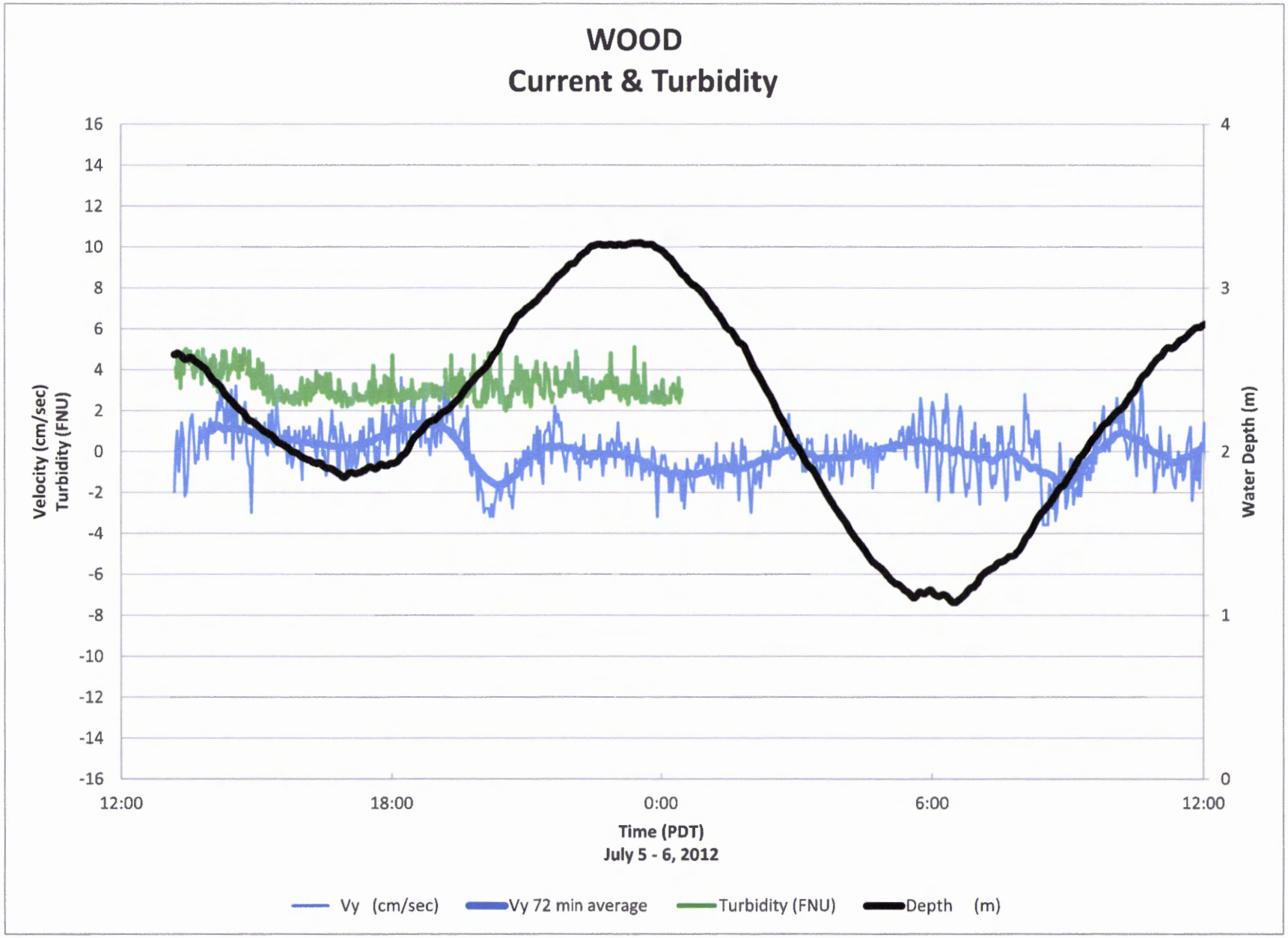
Time (PDT)
July 4 - 5, 2012
Vy (cm/sec)
Vy 72 min average
Turbidity (FNU)
Depth (m)


WOOD
Current & Turbidity
Velocity (cm/sec)
Turbidity (FNU)
Water Depth (m)
16
14
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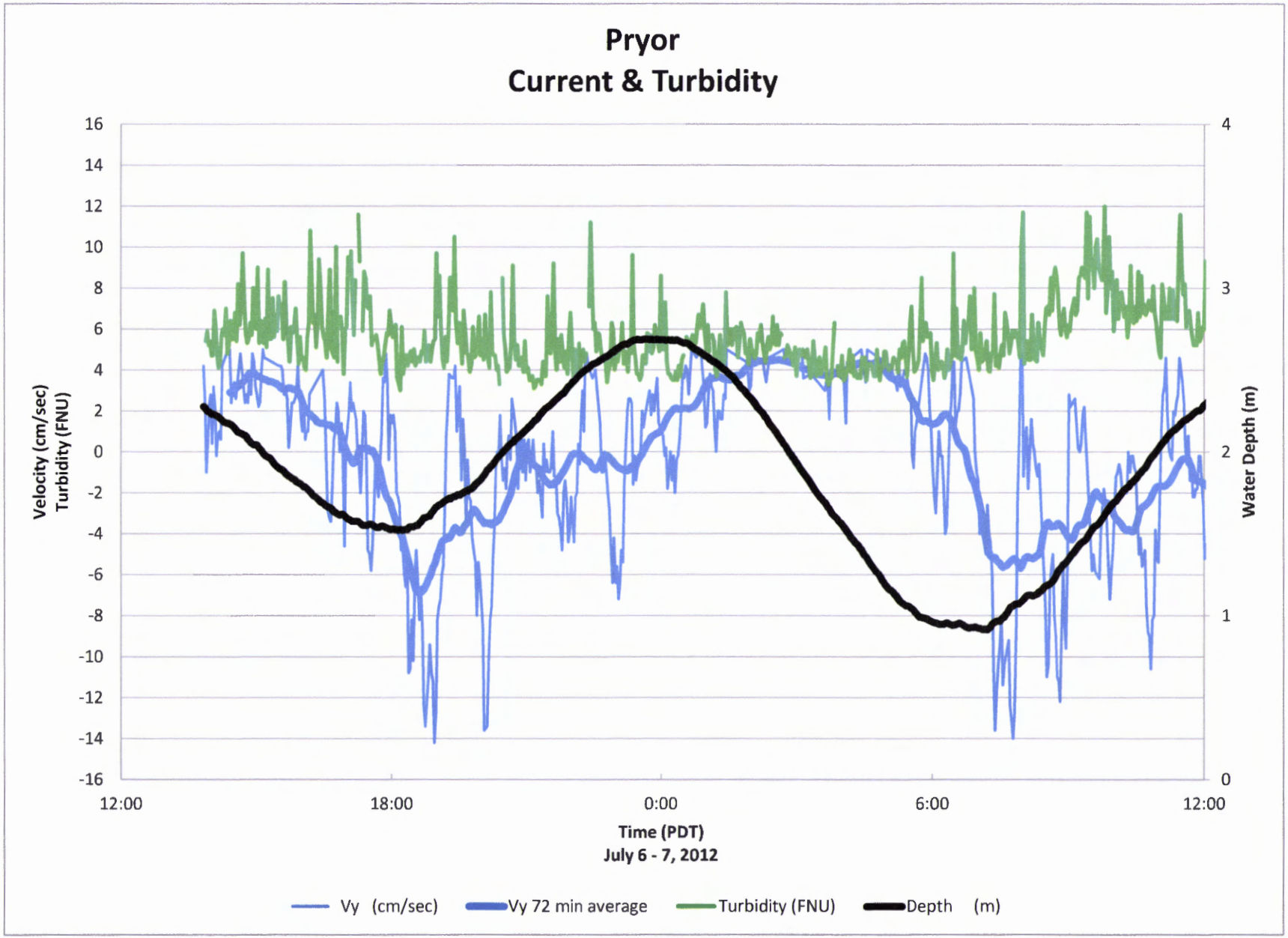
Time (PDT)
July 5 - 6, 2012
Vy (cm/sec)
Vy 72 min average
Turbidity (FNU)
Depth (m)

9 b


Pryor
Current & Turbidity
Velocity (cm/sec)
Turbidity (FNU)
Water Depth (m)
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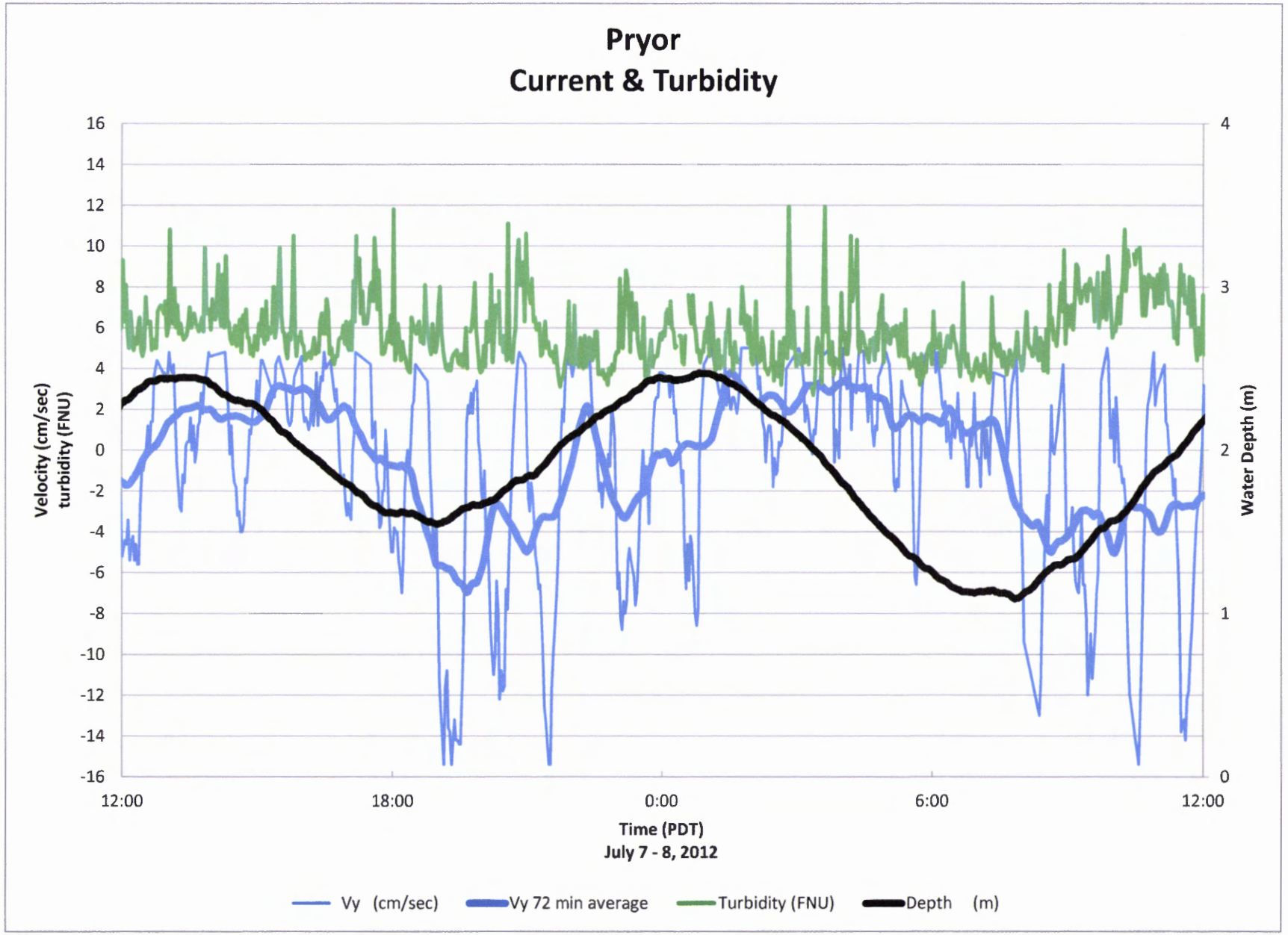
Time (PDT)
July 6 - 7, 2012
Vy (cm/sec)
Vy 72 min average
Turbidity (FNU)
Depth (m)


Pryor
Current & Turbidity
Velocity (cm/sec)
turbidity (FNU)
Water Depth (m)
16
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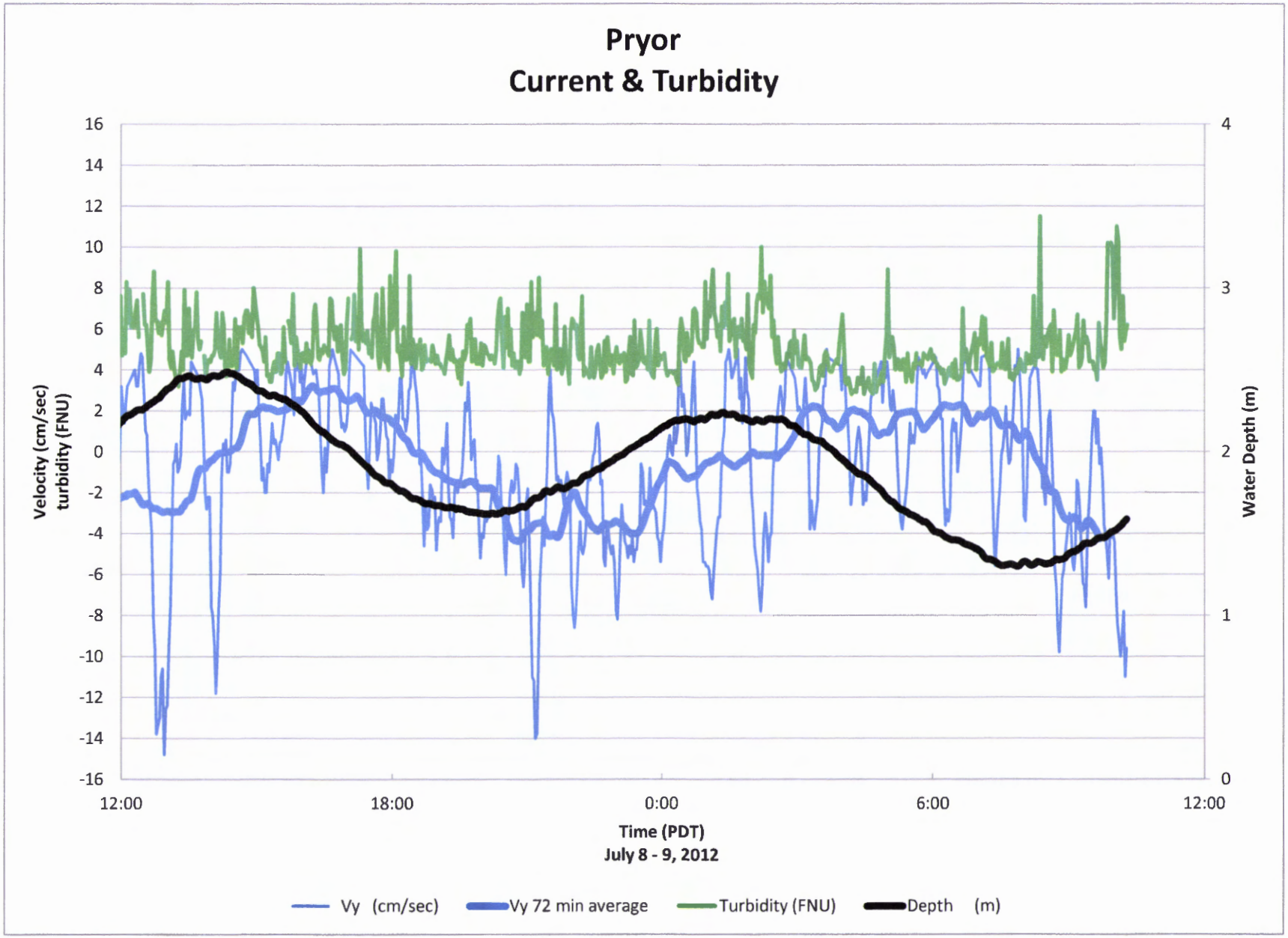
12:00
Time (PDT)
July 7 - 8, 2012
Vy (cm/sec)
Vy 72 min average
Turbidity (FNU)
Depth (m)


Pryor
Current & Turbidity
Velocity (cm/sec)
turbidity (FNU)
Water Depth (m)
16
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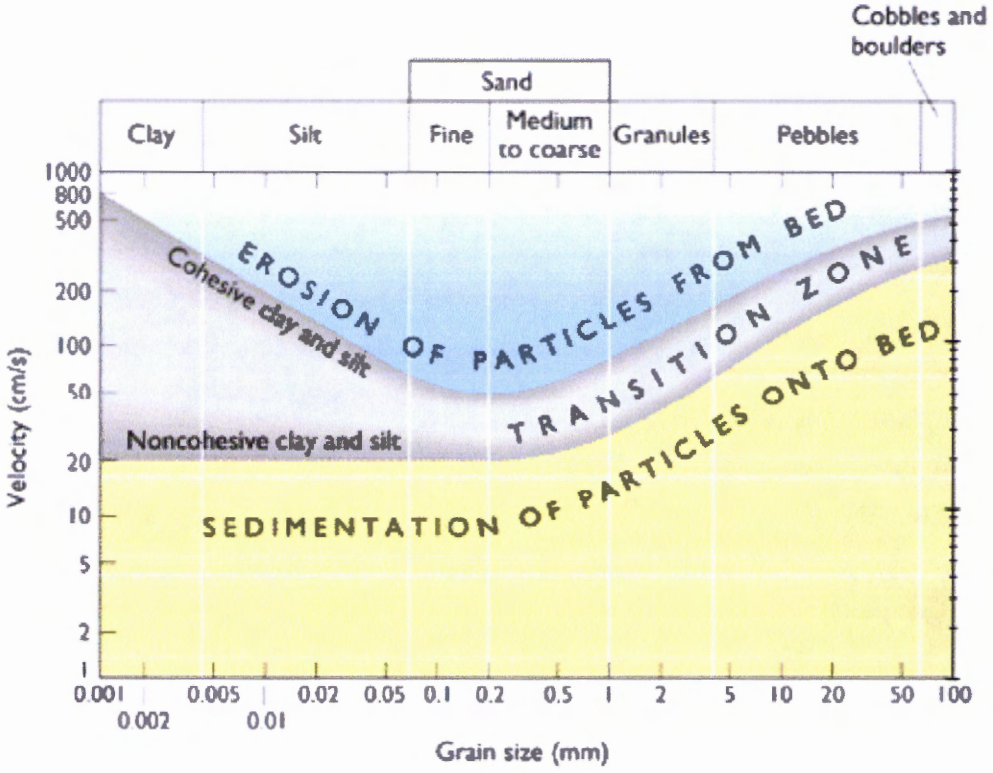
12:00
Time (PDT)
July 8 - 9, 2012
Vy (cm/sec)
Vy 72 min average
Turbidity (FNU)
Depth (m)

Attachment C - Hjulström Diagram



Attachment D – Turbidity Photographs

Photo 1: Turbidity of 9.1 FNU that is not noticeable within instrument when held at arms length.

Photo 2: Turbidity of 14.4 FNU that is not noticeable within instrument when held at arms length.

Photo 3: Turbidity of 36.2 FNU that is not clearly noticeable within instrument when held at arms length.

Photo 4: Turbidity of 77.9 FNU that is just noticeable within instrument when held at arms length.

Photo 5: Turbidity of 339.0 FNU that is clearly noticeable within the instrument.

TETRA TECH

August 3, 2012

Ms. Liliana Román
Coastal Program Analyst
California Coastal Commission
South Coast Area Office
200 Oceangate, Suite 1000
Long Beach, CA 90802-4302

Dear Ms. Román:

RE: CDP 5-12-065 and 5-12-066 in response to the letter to the California Coastal Commission from Greg Buchanan dated July 27, 2012; please find Tetra Tech's professional opinions and response.

1. The study conducted by Nearshore and Wetlands Surveys, conducted for Mr. Buchanan was conducted during a short period of time at discrete locations. While the staff conducting the study, Mr. Rick Hollar, is a well-qualified oceanographic technician, the methodology and extent of the study will not necessarily reflect the existing hydrodynamics of Huntington Harbour. In addition, this study does not address other possible sources of erosion such as propeller wash, boat wake, stormwater discharge, etc.

2. Erosion caused by propeller wash is a fact regardless of direction or slip orientation. Although it is obvious that propeller wash perpendicular to the bulkhead should be worse than under a parallel orientation, the extent of erosion depends highly on the vessel operator and his berthing practices. A boater berthing a vessel on a parallel-to-wall dock can generate as much thrust and propeller wash than another boater berthing a vessel on a perpendicular-to-wall dock.

3. Maintenance dredging is a fact in Huntington Harbour since its construction in the 1960s. The County of Orange has a maintenance dredging permit for Huntington Harbour and maintenance dredging has been conducted and continues to be conducted throughout the harbor. In fact, another dredging project is scheduled to take place in the near future. This can be confirmed by the County of Orange Department of Beaches and Parks.

Tetra Tech, Inc.
401 East Ocean Boulevard, Suite 420, Long Beach, CA 90802
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The dredging limits and slopes are delineated taking into consideration the proximity of the bulkheads. The placement of scour protection out to 6 feet from the face of the footing does in fact protects the footing from further erosion and is sufficiently distant from the limits of dredging to cause slope failure, or "migrating down the slope".

4. Tetra Tech, as well as other specialized coastal engineering firms including Moffat and Nichols, and Cash and Associates (now URS), have been studying and applying similar remedial designs in Huntington Harbour for over 15 years. Our firm has inspected over 150 properties and has observed evidence of rock of different sizes in different areas and different depths, suggesting that its placement was uncontrolled or not inspected. Appropriately graded rock is required to prevent its settlement. It is for that fact, that the proposed rock protection is specified with a filter fabric and a well graded rock matrix.

5. As documented in previous occasions, there are several causes of erosion in front of the footing and cutoff wall and beneath the footing. If there is separation between the cutoff wall and the bottom of footing, it is likely that hydraulic conductivity exists behind the cutoff wall. This does not necessarily imply that the piles are exposed. In the cases where a separation has occurred and a void observed, the recommendation has been typically to remove a section of cutoff wall to visually confirm the condition of the pile behind the void. In such instances, a sheetpile is installed and concrete and grout are injected as required.

   The information provided for the two reported instances (Wirtz and/or Nichols) is not sufficient to assess the presence of exposed piles, or assess the effectiveness of the injected grout. The injected grout may have been displacing water and/or unconsolidated sediments beneath one or more contiguous property throughout hydraulically connected areas, but this would be completely speculative since there was no visual inspection. Although there might be localized settlement beneath the wall, unless there is oxygen and light reaching out to the piles, the marine borers do not attack the piles. The presented argument of possible voids without cutoff wall separation, would lead one to believe that all properties through Huntington Harbour may require pressure grouting. Pressure grouting all properties may be have some benefits, however it

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is our professional engineering opinion that this is not founded, justified or documented by visual observation and it is therefore not believe to be a feasible repair option to the homeowners due to unknowns and potentially high costs.

The last sentence of Mr. Buchanan's point no. 5 is speculative in nature and accusative of misrepresentation and lack of professionalism. Tetra Tech has not profited from selling soft-bottom habitat as this was a requirement imposed by the CCC, NMFS, and CDFG to offset loss of soft-bottom, which did not include the placement of rock.

6. Injecting grout beneath the wall and below the mean high tide line constitutes discharge of material within US waters and may require a Section 404 permit from the USACE.

   Injecting grout beneath the wall is an uncontrolled effort which will not prove or demonstrate that piles are exposed or degraded, or that the grout has any beneficial effect. The repair methods proposed herein by the applicants are based on sound engineering inspection, evaluation, and proven conventional measures which can be visually inspected and documented. Again, the last sentence of Mr. Buchanan's point no. 6 is speculative in nature and introduces unfounded uncertainties which evidences his intent to discredit the collective engineering and construction efforts of several reputable specialized coastal engineering firms and marine contractors with over 20 years of experience conducting this work in Huntington Harbour.

7. The applicant does not rely on toe protection for bulkhead stability. The proposed rock blanket is primarily installed for scour protection. However, not placing this rock material in front of the cutoff wall (which is not structurally attached to the footing) will result in displacement and failure as it has been observed and documented throughout Huntington Harbour. This failure will eventually create void and potentially expose the untreated timber piles.

8. Staff report is not contradictory and clearly states that cement slurry will provide a long-term solution against erosion, however placing the toe stone would create a suitable substrate for colonization by marine organisms. Furthermore, suspended sediments transported throughout the harbor will settle over the toe

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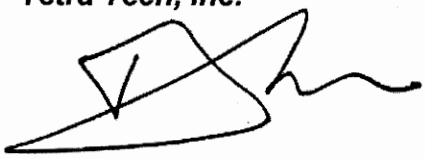
stone improving even further the biodiversity opportunities. This has been observed throughout the areas which have been already improved by slope protection.

Should you have any questions or require any additional information or explanation, please do not hesitate to contact me directly at 626.688.1017.

Best regards,

Tetra Tech, Inc.



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Th10c

Filed:	May 13, 2012
180th Day:	October 20, 2012
Staff:	L. Roman-LB
Staff Report:	July 19, 2012
Hearing Date:	August 9, 2012

STAFF REPORT: REGULAR CALENDAR

Application No.: **5-12-066**

Applicants: **Paula D'Onofrio**
Tad Fujioka
Al & Sharon Appel/Stanko
Walter Nisbet
Michael Woods
Michael & Pamela Myers/Rieder
R. Bruce Rieser
Dick & Joyce Opdahl
Isaac Azoulay

Agent: Tetra Tech, Inc.

Project Location: 17019 Edgewater Lane, 16842 Baruna Lane, 16771 Bolero Lane, 16777 Bolero Lane, 16781 Bolero Lane, 4002 Morning Star Drive, 4171 Morning Star Drive, 4181 Morning Star Drive, 3592 Venture Drive, Huntington Beach, Orange County

Project Description: Repair existing bulkheads by cutting timber piles deteriorated 25 percent or more and installing a jack between the pile and the bulkhead, placement of new sheet piles, cement-grout, concrete footing and rock slope protection to provide toe protection to inhibit any future scouring/erosion at nine (9) locations on various islands throughout Huntington Harbor.

Staff Recommendation: Approval with conditions.

SUMMARY OF STAFF RECOMMENDATION

The subject application requests approval for bulkhead repairs/enhancements for nine properties in Huntington Harbor utilizing plastic sheetpile and the placement of filter fabric and toe stone. The existing timber pile supported concrete bulkheads were constructed in the 1960s and the original project design included rock protection at the toe of the bulkhead and are in need of repair due to erosion at the toe of bulkhead that has exposed the timber piles and scouring that formed voids behind footing of the concrete bulkhead. The proposed bulkhead repair and enhancement is necessary to repair/restore the foundation of the existing bulkheads and to provide toe protection to prevent future erosion/scour which would continue to expose the bulkhead footing foundation and compromise the bulkhead's structural integrity; thus, protecting the existing bulkhead and the existing residential structures landward of the bulkhead.

The use of sheetpile will result in fill of open coastal waters, these impacts to soft bottom habitat have already been mitigated for by the creation of soft bottom habitat in the vicinity of Huntington Harbor at Bolsa Chica. However, to ensure the proposed project is consistent with the marine resource protection policies of the Coastal Act, the Commission imposes a special condition requiring revised plans and final as-built plans to ensure that placement of the sheetpile is as close to the existing bulkhead as possible and also requiring further minimization of the footprint of the proposed replacement of rock at the toe of the bulkhead while still providing protection to the bulkhead from further erosion. Additionally, the Commission imposes a special conditions which requires that the applicants submit an amendment or new coastal development permit application if, in the future, environmentally superior alternatives to the proposed plastic bulkhead become available and for submittal of a bulkhead monitoring plan. These special conditions are necessary to assure that the proposed project is consistent with the marine resource protection policies of the Coastal Act.

Staff recommends that the Commission **APPROVE** the proposed project subject to **EIGHT (8) SPECIAL CONDITIONS**. The **SPECIAL CONDITIONS** require: 1) revised plans; 2)final as-built plans; 3) a requirement that the applicant comply with construction responsibilities and debris removal measures; 4) bulkhead monitoring plan; 5) alternatives to plastic; 6) that approval of the permit does not constitute a waiver of any public rights that may exist at the site; 7) pre- and post-construction eelgrass surveys; and 8) pre-construction caluerpa taxifolia surveys

The City of Huntington Beach has a certified Local Coastal Program ("LCP"). However, the proposed projects are located seaward of the mean high tide line and thus are within the Coastal Commission's original permit jurisdiction area. Therefore, pursuant to Section 30519 of the Coastal Act, the standard of review is the Chapter 3 policies of the Coastal Act. The certified LCP may be used for guidance in evaluating the proposed project for consistency with the Chapter 3 policies of the Coastal Act.

TABLE OF CONTENTS

I. MOTION AND RESOLUTION

Motion:

*I move that the Commission **approve** Coastal Development Permit No. 5-12-066 pursuant to the staff recommendation.*

Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

Resolution:

The Commission hereby approves a Coastal Development Permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned, located on public trust tidelands and submerged lands, will be in conformity with the policies of Chapter 3 of the Coastal Act and will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that will substantially lessen any significant adverse impacts of the development on the environment.

II. STANDARD CONDITIONS

This permit is granted subject to the following standard conditions:

1. **Notice of Receipt and Acknowledgment**. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. **Expiration**. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. **Interpretation**. Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.

4. **Assignment**. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. **Terms and Conditions Run with the Land**. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

III. SPECIAL CONDITIONS

1. **Submittal of Revised Plans.** PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicants shall submit to the Executive Director for review and approval two (2) full size sets of a Revised Project Plans. The Revised Plans Plan shall be in substantial conformance with the plans received by South Coast District staff on February 23, 2012, except they shall be modified to further minimize fill of open coastal waters associated with the placement of sheet pile and to minimize impacts from placement of rock toe protection as follows: 1) the proposed sheetpile shall be placed as close as possible to the to the seaward edge of the bulkhead footing depending on site specific conditions; but shall encroach seaward of the bulkhead footing no more than 1'7'; 2) in order to place the proposed sheetpile as close as possible to the seaward edge of the bulkhead footing, the applicants shall remove sections of the cutoff wall where it exists; 3) any cutoff wall sections that may have toppled over beyond the footing shall be removed in order to place the proposed sheetpile as close as possible to the seaward edge of the bulkhead footing; 4) any existing over-spilled concrete seaward from the toe of the footing, shall be removed in order to place the proposed sheetpile as close as possible to the seaward edge of the bulkhead footing; 5) proposed rock toe protection shall extend no more than 1 foot above the bottom of the footing and the horizontal (seaward) extent of the rock toe protection material shall be limited to 3'- 4' from the seaward edge of the bulkhead footing at a 2(h) to 1(v) slope.

   The applicants shall undertake development in accordance with the approved final plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plans shall occur without a Commission amendment to this Coastal Development Permit unless the Executive Director determines that no amendment is legally required.

2. **Final As-Built Plans.** Within 6-months after completion of the bulkhead repairs, the applicants shall submit final as-built plans demonstrating the final sheetpile location and the final footprint of the proposed rock toe protection at each of the nine project sites. Each final as-built plan shall include a narrative explaining the constraints encountered at each location.

3. **Construction Responsibilities and Debris Removal.** The applicants shall comply with the following construction related requirements:

   A. No demolition or construction materials, equipment, debris, or waste shall be placed or stored where it may enter sensitive habitat, receiving waters or a storm drain, or be subject to wave, wind, rain or tidal erosion and dispersion;

B. Any and all debris resulting from demolition or construction activities, and any remaining construction material, shall be removed from the project site within 24 hours of completion of the project;

C. Demolition or construction debris and sediment shall be removed from work areas each day that demolition or construction occurs to prevent the accumulation of sediment and other debris that may be discharged into coastal waters;

D. Machinery or construction materials not essential for project improvements will not be allowed at any time in the intertidal zone;

E. In order to control turbidity a geotextile fabric shall be installed in the area where the toe stone will be placed prior to placement of the toe stone;

F. Toe stone shall be placed, not dumped, using means to minimize disturbance to bay sediments and to minimize turbidity;

G. If turbid conditions are generated during construction a silt curtain will be utilized to control turbidity;

H. Floating booms will be used to contain debris discharged into coastal waters and any debris discharged will be removed as soon as possible but no later than the end of each day;

I. Non buoyant debris discharged into coastal waters will be recovered by divers as soon as possible after loss;

J. The applicant shall provide adequate disposal facilities for solid waste, including excess concrete, produced during demolition or construction;

K. Debris shall be disposed of at a legal disposal site or recycled at a recycling facility. If the disposal site is located in the coastal zone, a Coastal Development Permit or an amendment to this permit shall be required before disposal can take place unless the Executive Director determines that no amendment or new permit is legally required;

L. All stock piles and construction materials shall be covered, enclosed on all sides, shall be located as far away as possible from drain inlets and any waterway, and shall not be stored in contact with the soil;

M. Sand from the beach, cobbles, or shoreline rocks shall not be used for construction material;

N. Machinery and equipment shall be maintained and washed in confined areas specifically designed to control runoff. Thinners or solvents shall not be discharged into sanitary or storm sewer systems;

O. The discharge of any hazardous materials into any receiving waters shall be prohibited;

P. Spill prevention and control measures shall be implemented to ensure the proper handling and storage of petroleum products and other construction materials. Measures shall include a designated fueling and vehicle maintenance area with appropriate berms and protection to prevent any spillage of gasoline or related petroleum products or contact with runoff. The area shall be located as far away from the receiving waters and storm drain inlets as possible;

Q. Best Management Practices (BMP's) and Good Housekeeping Practices (GHP's) designed to prevent spillage and/or runoff of demolition or construction-related materials, and to contain sediment or contaminants associated with demolition or construction activity, shall be implemented prior to the on-set of such activity; and

R. All BMP's shall be maintained in a functional condition throughout the duration of construction activity.

4. **Bulkhead Monitoring Plan.** The applicants shall maintain the bulkhead reinforcement in good condition throughout the life of the development. PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicants shall submit a Bulkhead Monitoring Plan to the Executive Director for review and approval. The applicants and their successors in interest shall be responsible for carrying out all provisions of the approved Bulkhead Monitoring Plan for as long as the bulkhead reinforcement remains in place. The monitoring plan, at a minimum, shall provide for: (a) regular inspections by a licensed engineer. These inspections shall be performed at least every 2 years; (b) inspections shall examine the exposed portions of the bulkhead reinforcement (to the mud line) for signs of weakness or possible failure, including, but not limited to cracking, bending, splitting, splintering, or flaking. All weak or potential failure areas should be marked on an as-built plan of the bulkhead reinforcement, and there should be photographs and text to explain the nature and extent of each weakness; (c) the footprint of the toe stone shall be inspected and examined for signs of settlement and or movement, each site photographed and observations logged.

   Inspection reports shall be prepared and conveyed to the Executive Director within 30 days of the inspection work. These reports shall provide information on and photographs from the date of the inspection, the name and qualifications of the person performing the inspection, and an overall assessment of the continued integrity of the bulkhead reinforcement. If the inspection identifies any areas where the bulkhead reinforcement has been damaged, the report shall identify alternatives to remedy the damage.

   In the event that any sections of the bulkhead reinforcement are damaged or flaking, the applicants shall notify the Commission within 10 days; and in such event, within 30 days of such notification, submit to the Commission a complete application for any coastal development permit amendment, or new permit, necessary for the repair or replacement of the bulkhead reinforcement.

5. **Alternatives to Plastic.** By acceptance of this permit, the applicants agrees to submit an application for an amendment to this permit or a new coastal development permit if new information becomes available that indicates that plastic has harmful effects on the marine environment, and that environmentally superior, feasible alternative(s) are available. The amendment or new coastal development shall include measures to eliminate or significantly reduce the adverse impacts of the plastic including, if necessary, the replacement of the bulkhead.

6 . **Public Rights.** The Coastal Commission's approval of this permit shall not constitute a waiver of any public rights that exist or may exist on the property. The applicants shall not use this permit as evidence of a waiver of any public rights that may exist on the property.

7. **Pre-Construction Eelgrass Survey.** A valid pre-construction eelgrass (*Zostera marina*) survey shall be completed during the period of active growth of eelgrass (typically March through October). The pre-construction survey shall be completed prior to the beginning of construction and shall be valid until the next period of active growth. If any portion of the project commences in a previously undisturbed area after the last valid eelgrass survey expires, a new survey is required prior to commencement of work in that area. The survey shall be prepared in full compliance with the "*Southern California Eelgrass Mitigation Policy*" Revision 8 (except as modified by this special condition) adopted by the National Marine Fisheries Service and shall be prepared in consultation with the California Department of Fish and Game. The applicant shall submit the eelgrass survey for the review and approval by the Executive Director within five (5) business days of completion of each eelgrass survey and in any event no later than fifteen (15) business days prior to commencement of any development. If the eelgrass survey identifies any eelgrass within the project area, which would be impacted by the proposed project, the development shall require an amendment to this permit from the Coastal Commission or a new Coastal Development Permit to ensure that there will be no adverse impacts to the eelgrass from the proposed project.

   Post-Construction Eelgrass Survey. If any eelgrass is identified in the project area by the survey required in this special condition, within one month after the conclusion of construction, the applicant shall survey the project site to determine if any eelgrass was adversely impacted. The survey shall be prepared in full compliance with the "*Southern California Eelgrass Mitigation Policy*" Revision 8 (SCEMP) (except as modified by this special condition) adopted by the National Marine Fisheries Service and shall be prepared in consultation with the California Department of Fish and Game. The applicant shall submit the post-construction eelgrass survey for the review and approval by the Executive Director within thirty (30) days after completion of the survey. If any eelgrass has been impacted, the applicant shall replace the impacted eelgrass at a minimum 1.2:1 ratio on-site, or at another location, in accordance with the SCEMP. All impacts to eelgrass habitat shall be mitigated at a minimum ratio of 1.2:1 (mitigation:impact). The exceptions to the required 1.2:1 mitigation ratio found within SCEMP shall not apply. Implementation of mitigation shall require an amendment to this permit or a new Coastal Development Permit unless the Executive Director determines that no amendment or new permit is legally required.

8. **Pre-Construction Caulerpa taxifolia Survey.** Not earlier than 90 days nor later than 30 days prior to commencement or re-commencement of any development authorized under this Coastal Development Permit (the "*project*"), the applicant shall undertake a survey of the project area and a buffer area at least 10 meters beyond the project area to determine the presence of the invasive alga *Caulerpa taxifolia*. The survey shall include a visual examination of the substrate. If any portion of the project commences in a previously undisturbed area after the last valid *Caulerpa taxifolia* survey expires, a new survey is required prior to commencement of work in that area.

   The survey protocol shall be prepared in consultation with the Regional Water Quality Control Board, the California Department of Fish and Game, and the National Marine Fisheries Service. Within five (5) business days of completion of the survey, the applicant shall submit the survey:

   (1) to the Executive Director for the review and approval; and

   (2) to the Surveillance Subcommittee of the Southern California Caulerpa Action Team (SCCAT). The SCCAT Surveillance Subcommittee may be contacted through William Paznokas, California Department of Fish & Game (858/467-4218) or Robert Hoffman, National Marine Fisheries Service (562/980-4043), or their successors.

   If *Caulerpa taxifolia* is found within the project or buffer areas, the applicant shall not proceed with the project until 1) the applicant provides evidence to the Executive Director that all *Calurpa taxifolia* discovered within the project and buffer area has been eliminated in a manner that complies with all applicable governmental approval requirements, including but not limited to those of the California Coastal Act, or 2) the applicant has revised the project to avoid any contact with *Calurpa taxifolia*. No revisions to the project shall occur without a Coastal Commission approved amendment to this Coastal Development Permit unless the Executive Director determines that no amendment is legally required.

IV. FINDINGS AND DECLARATIONS:

A. PROJECT LOCATION AND DESCRIPTION

The proposed development is for repair and enhancement of existing bulkheads/seawalls at nine properties located within Huntington Harbor at 17019 Edgewater Lane, 16842 Baruna Lane, 16771 Bolero Lane, 16777 Bolero Lane, 16781 Bolero Lane, 4002 Morning Star Drive, 4171 Morning Star Drive, 4181 Morning Star Drive, 3592 Venture Drive, in the City of Huntington Beach, Orange County (Exhibit 1). These artificial islands created at the time Huntington Harbor was developed in the 1960s by filling tide and submerged lands, are developed primarily with single family residences and are surrounded by cast in place, concrete seawall/bulkheads with toe stone to prevent scour/erosion constructed during the original development of Huntington Harbor. The majority of development in Huntington Harbor is dependant upon these

types of bulkheads. The existing bulkhead systems in Huntington Harbor were all constructed at approximately the same time, primarily using similar bulkhead designs. Many of these bulkheads are now approaching ages of 40 to 50 years, and thus are in need of repair.

The proposed bulkhead repair and enhancement is necessary to repair/restore the foundation of the existing bulkheads and to provide toe protection to prevent future erosion/scour which may expose the bulkhead footing foundation and compromise the bulkhead's structural integrity; thus, protecting the existing bulkhead and the existing residential structures landward of the bulkhead.

The existing bulkheads are reinforced concrete cast in place structures supported on vertical and battered (i.e. angled) timber piles built in the 1960's. The applicant has stated that the bulkheads in Huntington Harbor were originally designed with toe stone placed seaward of the footing at a slope of 3(h) to 1(v). Due to the size and weight of the formerly present toe stone, the protective stones have either sunk into the bay mud or migrated away from the bulkhead. In absence of the toe stone, the unconsolidated fine silty and sandy sediments adjacent to the bulkheads have subsized due to regular settlement of sediments (from the original creation of the man-made islands); and have easily eroded due to tidal currents, propeller wash from docking of recreational boats on private residential docks adjacent to each site, routine maintenance dredging of the main navigation channel and dock areas, and the activity of burrowing fish (e.g. the specklefin midshipman).

The proposed repairs and enhancements specifically entail cutting any timber piles deteriorated 25% or more and installing a jack between the pile and the concrete footing. Installing a total of 331 linear feet of 6' high vinyl sheet pile 1 foot 7 inches seaward of the existing bulkhead and filling the voids between the bulkhead and sheet pile, and under the bulkhead and around the jacks with concrete and grouting. The project includes: clearing the bottom of the existing bulkhead footing, cutting piles, installing jacks, installing PVC piping for concrete, driving sheetpile in front of the existing wall until flush with top of footing, and pumping concrete in the void which displaces water.

Rigid vinyl sheet pile backfilled with concrete/grout is only proposed for properties which have evidence of erosion at the footing of the bulkhead. In addition, rock rip-rap slope protection (a.k.a. toe stone) is proposed at a 2(h) to 1(v) slope, at a maximum of 6' seaward of the existing bulkhead at all nine subject sites to prevent future erosion that would then require sheet pile and backfill. A layer of geotextile fabric will be placed beneath the proposed toe stone to prevent the toe stone from sinking into the bay mud and will greatly reduce the likelihood of significant turbidity. The proposed slope protection toe stone consists of 8-inch diameter or less quarry waste with a mixture of particles ranging from sand to stones less than 8 inches in diameter. As previously noted, a layer of coarse material (i.e., toe protection) was found about 2'-3' below the top of footing. The original extent of this layer was not determined by the applicant. The proposed new toe protection material, intended to replace the settled material, will be placed on filter fabric to reduce any potential settlement. The applicants' coastal engineer has stated that this type of toe stone will not migrate or accrete to other areas under the observed hydrodynamic conditions within the Harbor. Therefore, the proposed solution is not anticipated to replicate the problems associated with the original pre-Coastal Act protective toe stone.

The applicants' agent, Tetra Tech proposes five different possible repair scenarios (Case I through Case V) depending on the amount of sediment loss and the conditions of each pile at each specific project location (Exhibit 2). In addition to pile repair, there are two basic types of repairs depending on the degree of erosion and damage to the foundation. Three of the proposed scenarios are variations of the same plan which will be selected depending on the need for support wales. One scenario includes removal of the cutoff wall below the footing. As the bulkhead at each location varies in length, several of the repair scenarios may be utilized for each site.

In other areas where the loss of sediment is less, the bulkhead has not yet been compromised and the timber piles not yet extensively damaged., However, the bulkhead will continue to experience erosion over time causing those areas to require greater repairs to avoid collapse. In these areas, Tetra Tech proposes repair scenario Case IV – "Rock Slope Protection on Geotextile Only". If erosion protective measures are not implemented at this stage, additional damage to the bulkhead would result, causing future failure of the bulkhead and damage to the residential structures landward of the bulkhead.

The length of bulkhead involved at each property varies as does the length of sheet pile to be installed, and the quantity of toe stone to be placed. The width of the proposed toe stone is a maximum of 6' from the existing bulkhead. The following chart provides specific bulkhead repair details for all proposed nine sites:

Table 1. Summary of Status and Proposed Work for Properties in Coastal Development Permit Application 5-12-066.

Name	Address	Tract	Lot	Bulkhead Length	Extent of Rock	Estimated Rock Footprint	Estimated Volume of Rock	Number of Piles Needing Repair	Proposed Sheet Pile Length	Impact to Soft Bottom	Eelgrass Area	Caulerpa Present
				(ft)	(ft)	(ft^2)	CY		(ft)	(ft^2)	(ft^2)	yes/no
D'Onofrio	17019 Edgewater Lane	4880	24	54.1	6	325	9.9	0 to 7	37.5	38.9	0	no
Fujioka	16842 Baruna Lane	5050	3	50	6	300	9.6	0 to 1	6	6.2	0	no
Appel/Stanko	16771 Bolero Lane	5050	51	80.99	6	486	19.4	0 to 12	49.5	43.4	0	no
Nisbet	16777 Bolero Lane	5050	52	72	6	432	11.7	0 to 9	42	43.6	0	no
Woods	16781 Bolero Lane	5050	53	80.7	6	484	12.2	0 to 17	81.0	84.1	0	no
Myers/Rieder	4002 Morning Star Drive	5360	73	102	6	612	33.8	0 to 4	23	23.9	0	no
Rieser	4171 Morning Star Drive	5360	89	50	6	300	18.4	0 to 3	13	13.5	0	no
Opdahl	4181 Morning Star Drive	5360	90	50	6	300	17.5	0 to 2	8	8.3	0	no
Azoulay	3592 Venture Drive	8636	6	60	6	360	7.9	0	36	37.4	0	no
OVERALL TOTAL		9 Properties		599.8	6	3598.7	140.4	0 to 55	296.0	299.3	0	0
OVERALL MEAN				66.6	6	399.9	15.6	0 to 11	32.9	33.3	0	0

The total duration of the project construction is anticipated to take approximately one month. The most recent eelgrass surveys for the subject sites indicate that no eelgrass will be impacted by the proposed bulkhead repairs.

The sheet pile and concrete/grout backfill between the sheet pile and bulkhead will permanently impact soft bay bottom habitat in the project area. The applicant has mitigated the loss of the

soft bottom habitat by restoring a tidal mud flat near the intersection of Pacific Coast Highway and Warner Avenue in the Bolsa Chica Ecological Reserve (Exhibit 4). The applicants have completed the necessary soft bottom habitat mitigation pursuant to coastal development permit No. 5-01-020 (Tetra Tech).

The City of Huntington Beach has a certified Local Coastal Program ("LCP"). However, the proposed projects are located seaward of the mean high tide line and thus are within the Coastal Commission's original permit jurisdiction area. Therefore, pursuant to Section 30519 of the Coastal Act, the standard of review is the Chapter 3 policies of the Coastal Act. However, the certified LCP may be used for guidance in evaluating the proposed project for consistency with the Chapter 3 policies of the Coastal Act.

Other Agency Review

- The City of Huntington Beach issued an Approval-in-Concept (AIC) for each site and issued Mitigated Negative Declaration No. 08-010(Huntington Harbour Bulkhead Repair Project) on September 3, 2008.

- The applicant has submitted proof that the appropriate California State Lands Commission leases were obtained for work proposed within the harbor on property owned by the State of California.

- California Department of Fish & Game (CDFG) and National Marine Fisheries Service (NMFS) consultation is not required as the project does not anticipate impacts to eelgrass habitat.

- The U.S. Army Corps of Engineers (USACOE) has set up a Regional General Permit (RGP 84) for bulkhead repairs in Huntington Harbor using the methods proposed under this CDP application. The final RGP for the project will be issued once the CDP is approved. A copy of the RGP Public Notice has been provided by the applicant.

- Regional Water Quality Control Board (RWQCB) has issued a Section 401 Permit for the proposed project.

B. MARINE ENVIRONMENT, MARINE RESOURCES AND BIOLOGICAL PRODUCTIVITY

Section 30230 of the Coastal Act states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231 of the Coastal Act states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Section 30235 of the Coastal Act states, in relevant part:

> *Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply.*

Existing Conditions

The Huntington Harbor bulkheads constructed in the 1960's are made of reinforced cast-in-place concrete and untreated timber piles support its footing. Some sections of bulkhead have been found to have a cutoff wall typically 15 to 21 inches deep. The original bulkhead design as as-built conditions establish a top of footing elevation of -1.0 ft mllw. The original design design drawings of the bulkhead (Exhibit 3) specified backfill material from the top of footing seaward at a slope of 3(h) to 1(v). Field inspection revealed that an 8- to 12- inch coarse material sub-layer extends seaward of the bulkhead footing at a depth of about 2 feet below the bottom of the footing or cutoff wall. However, slopes have changed throughout the years due to natural and man-induced hydrodynamic effects which have caused erosion.

The sediments at the toe of the bulkhead are primarily unconsolidated fine silty sands which are easily erodible. Some portion of the drop in sediments adjacent to the bulkhead may be attributed to settlement of the sediments beneath the fill that created the man-made islands in the 1960's. The perpendicular configuration of private boat docks at each of the sites may exacerbate erosion caused by propeller wash from boats which occupy the slips. Another potential cause of erosion may be routine maintenance dredging in the main channel and the dock slips. Tidal currents in Huntington Harbor are not typically high during normal, non-storm conditions. In addition burrowing fish (plainfin midshipman) were observed in the voids that have formed underneath the bulkhead further contributing to the problem of erosion benath the bulkhead and its footing.

No new seawalls/bulkheads are proposed. The proposed project is one of repairs to existing seawall/bulkhead structures originally constructed in the 1960s at the time Huntington Harbor and the man-made islands within the Harbor were created. The existing single family homes were subsequently built behind the seawall/bulkheads. The proposed bulkhead repair and enhancement is necessary to repair/restore the foundation of the existing bulkheads and to provide toe protection to prevent future erosion/scour which may expose the bulkhead footing

foundation and the timber piles supporting the bulkhead and compromise the bulkhead's structural integrity; thus, protecting the existing bulkhead and the existing residential structures landward of the bulkhead.

The proposed development is designed to shore-up the existing bulkhead, repair the existing damage, and re-apply toe stone prevent future erosion and deterioration of the bulkhead necessary to protect existing homes at nine sites located along Huntington Harbor or on islands within the Harbor. At some of the subject sites the slope seaward of the bulkhead has eroded, creating a void between the footing of the bulkhead and the bottom of the harbor floor. This has allowed water to enter behind (i.e. landward of) the bulkhead and undermine the bulkhead foundation. Further, the void and erosion has exposed the bulkhead's supporting timber piles to deterioration from burrowing marine organisms.

The applicant's agent, Tetra Tech proposes five different possible repair scenarios (Case I through Case V) depending on the amount of sediment loss at the bulkhead foundation and the conditions of each pile at each specific project location (Exhibit 2). In areas where the loss of sediment is less and the bottom of the bulkhead has not yet been exposed and the timber piles not yet been extensively damaged, Tetra Tech proposed Case IV – "Rock Slope Protection on Geotextile Only" to protect the bulkhead foundation from further erosion. If the erosion protective measure is not implemented at this stage, additional damage to the bulkhead would result from continued erosion, causing future failure of the bulkhead and damage to the residential structures landward of the bulkhead.

Project Alternatives

The applicant's coastal engineer indicates that the proposed project is the least environmentally damaging feasible alternative. Section 30108 of the Coastal Act states that "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors. Alternative methods of repair considered were: 1) no project; 2) soft bottom fill; 3) placement of cement slurry to form a protective concrete shield; 4) placement of coarse rock; 5) placement of a deepened sheetpile; and 6) installation of sheetpile landward of existing bulkhead.

According to the applicant, the no project alternative would not be the least environmentally damaging feasible alternative because without halting the erosion infront of the bulkhead and repairing damaged piles, the bulkhead would loose structural integrity and fail. If the bulkhead were allowed to fail, it would collapse into the harbor. Debris from the collapsed bulkhead would likely fall upon sensitive marine habitat resulting in impacts upon that habitat. In addition, sediment released from behind the collapsed bulkhead would enter the water column causing turbidity and potentially smothering eelgrass beds which exist in the general project vicinity. Furthermore, debris from the collapsed bulkhead would result in the fill of coastal waters, covering soft bottom habitat. The proposed project would have less impact than the no project alternative because impacts upon eelgrass and any permanent impacts upon soft bottom habitat will be controlled and mitigated under the proposed project while such impacts from the no project alternative would be uncontrolled and much more extensive.

The second alternative is to use soft bottom fill to fill in the gap forming at the base of the bulkhead/seawall. Such soft bottom fill could come from dredging projects undertaken in the

harbor, similar to the routine dredging projects in Newport Bay which dispose of suitable dredge material in front of the bulkheads in Newport Bay to protect those bulkheads. In Newport Bay, the bulkheads are designed without the type of timber pile foundation used in Huntington Harbor and which must be protected using toe stone. Unlike in Huntington Harbour, the bulkhead/seawalls in Newport Bay are not reliant upon a protective swath of toe stone. Therefore, the use of soft bottom fill in Newport Bay provides adequate protection to the bulkhead. Meanwhile, the threat of damage to the bulkhead/seawall system in Huntington Harbour due to erosion and undermining is much greater at the project sites than in Newport Bay due to the differences in the design of the bulkhead systems in each harbor. The bulkheads in Huntington Harbour were originally designed with timber piles including a batter pile which provide the foundation for the concrete bulkhead/seawall. A protective swath of toe stone at the base of the bulkhead/seawall was part of the design (See Exhibit 3). The original bulkhead design included placement of protective toe stone to ensure that soil does not erode from around the timber pilings exposing them to marine boring organisms. The applicant has stated that the soft bottom fill alternative is not a feasible solution in Huntington Harbour because it would replicate the existing condition. Once placed against the footing, erosive forces would rapidly erode the unconsolidated fine silty and sandy sediments in the same fashion that the existing sediment has eroded. In addition, if soft bottom fill were used to protect the subject sites, re-nourishment of the soft bottom fill would need to occur frequently. This frequent re-nourishment would cause frequent disturbance to marine habitat and any eelgrass which may exist in the vicinity of the project site. Whereas, the use of toe stone is anticipated to provide protection for several decades, thus reducing the frequency of disturbance to the site. Therefore, the proposed solution is less environmentally damaging than the second alternative.

The third alternative, placement of cement slurry for slope protection, would not be less environmentally damaging than the proposed solution. It is anticipated that the proposed toe stone will provide a suitable substrate for colonization by marine organisms. In addition, over time it is anticipated by the applicant that sediment will settle upon the proposed toe stone. Providing that there is adequate sunlight it is also anticipated that conditions may allow colonization of the toe stone by eelgrass. However, the use of a cement slurry for slope protection would not provide a suitable substrate for colonization by marine organisms. Therefore, the proposed solution is less environmentally damaging than the third alternative. Furthermore, the placement of cement slurry only would not provide the shoring that is necessary to stabilize the existing bulkhead.

The fourth alternative, placement of coarse rock only, would also have greater environmental impact than the proposed solution. The placement of rock, instead of the proposed mixture of 8-inch diameter or smaller quarry waste, would replicate the problems associated with the previous protective structure. Due to the presence of unconsolidated fine silty bay mud and existing hydrodynamic conditions, coarse rock would tend to sink into the bay mud or migrate from the slope targeted for protection. Accordingly, the coarse rock would need to be replaced over time, with the attendant construction related impacts upon the marine environment. Therefore, the proposed solution is less environmentally damaging than the fourth alternative. Furthermore, the placement of coarse rock only would not provide the shoring that is necessary to stabilize the existing bulkhead.

The fifth alternative, placement of a deepened sheet pile in place of the proposed shallower sheet piles and toe stone, is not feasible for several reasons. First, deepened sheetpiles would intersect the existing battered (i.e. angled) timber piles which angle seaward under the bulkhead below the harbor floor, cutting into those support piles (see Exhibit 3). To avoid this, the deepened sheetpile would have to be located substantially seaward in order to avoid intersecting the battered timber piles. The proposed shallower sheet pile could be placed closer to the bulkhead but still would have to be placed at a minimum of 1' 7" distance from the bulkhead in order to fully avoid intersecting the battered timber pile. This distance is the minimum necessary to clear the footing and to provide structural mass to shore the existing bulkhead. Second, PVC sheetpiles are not long enough to extend deep enough into the harbor bottom. Steel sheetpiles, which are long enough, would be more difficult to install at this site than the PVC sheetpiles and the steel would be subject to corrosion. Although corrosion of the steel could be addressed, the difficulty of installing the heavier steel piles would lead to more significant construction impacts than that involved with PVC sheetpiles. Therefore, the fifth alternative is not a feasible solution to the present problem nor is it the least environmentally damaging alternative.

The sixth alternative would involve the installation of a sheetpile landward of the face of the existing bulkhead and then removing the portion of the existing bulkhead seaward of the newly installed sheet pile. The applicant has stated that this alternative is not technically feasible because the foundation slab for the existing bulkhead extends at least 10 feet landward of the face of the existing bulkhead to a point underneath existing patios and houses which are built upon the lot. If a sheet pile were installed landward of the existing bulkhead the sheet pile would need to penetrate through the foundation slab of the existing bulkhead. First, a plastic or steel sheet pile is not strong enough to penetrate the concrete foundation slab of the bulkhead. In addition, even if a strong material could be found to penetrate the concrete foundation slab, the portion of the existing bulkhead seaward of the newly installed sheet pile would loose structural integrity and collapse into the harbor. Any methods used to temporarily stabilize the bulkhead seaward of the sheet pile would require the placement of structures in the water, resulting in impacts similar or greater than the proposed project. Therefore, the sixth alternative is neither technically feasible or the least environmentally damaging feasible alternative.

The proposed project alternative is to minimize the impact of the proposed design by minimizing the seaward encroachment of the bulkhead and by minimizing the amount of toe stone placed in front of the bulkhead. Minimizing the seaward encroachment of the bulkhead and the width of the toe stone from the bulkhead also minimizes permanent impacts upon soft bottom habitat and eelgrass in the project vicinity. In addition, the applicant is proposing to mitigate for the loss of soft bottom habitat. Therefore, the proposed project is the least environmentally damaging feasible alternative.

The proposed bulkhead repair and reinforcement is necessary to protect an existing bulkhead and single family residences. In addition, the proposed development mitigates adverse impacts upon shoreline sand supply and is the least environmentally damaging feasible alternative. Therefore, the Commission finds that the proposed project is consistent with Section 30235 of the Coastal Act.

Shoreline Protective Devices

The proposed development involves structural reinforcements to protect an existing bulkhead constructed in the 1960s at the time Huntington Harbor and the man-made islands within the Harbor were created and is necessary to protect existing homes. At the subject sites the slope seaward of the bulkhead has eroded, creating a gap between the footing of the bulkhead and the bottom of the harbor floor. This has allowed water to enter behind (i.e. landward of) the bulkhead and undermine the bulkhead foundation. Further, the gap and erosion has exposed the bulkhead's supporting timber piles to deterioration from burrowing marine organisms. Damage to the supporting timber piles is the cause of breaking/failing of the bulkhead. In other areas, the timber piles have not yet been extensively damaged, but will deteriorate over time causing those areas to collapse. If protective measures are not implemented at this stage, additional damage to the bulkhead would result, causing failure of the bulkhead and damage to the structures landward of the bulkhead. The proposed development is designed to shore the existing bulkhead, repair the damage, and prevent similar deterioration in the future.

The proposed development involves the fill of coastal waters with a sheet pile, concrete/grout backfill between the sheet pile and the bulkhead, and with toe stone. The purpose of the proposed fill is to protect existing structures, which is not one of the eight allowable uses enumerated under section 30233 of the Coastal Act. However, as stated in the policy above, section 30235 of the Coastal Act requires the Commission to approve revetments and other similar structures provided that such structures are for the purpose of protecting existing structures and provided that the structures are designed to eliminate or mitigate adverse impacts on local shoreline sand supply. The proposed sheetpile and concrete/grout backfill is for the purpose of protecting existing structures. In addition, the proposed project is occurring within an urban harbor at a location isolated from the nearest open coastal shoreline and longshore littoral sand transport mechanisms.

The applicants' agent, Tetra Tech proposes to place a shallower sheet pile that could be placed closer to the bulkhead (as opposed to a deepened sheetpile that would likely intersect the battered pile supporting the concrete bulkhead foundation) but still would have to be placed at a distance of 1' 7" from the bulkhead to fully clear the bulkhead footing in order to completely avoid intersecting the battered timber pile behind the bulkhead. The timber piles shore the existing bulkhead foundation. However, Tetra Tech has indicated that the location of the piles, specifically the battered timber piles varies from site to site and that the 1'7" distance is the "one size fits all" distance required to avoid what would be the worst case scenario of having the sheet pile intersect the battered pile. Having the contractor follow plans that specify the location of the sheetpile they are to install at 1' 7" distance from the face of the bulkhead footing at all nine sites would streamline the construction work, but it would not minimize the fill associated with the new sheetpile and backfill when in fact the sheetpile may be able to be placed closer to the bulkhead depending on specific site conditions. Therefore, staff imposes **Special Condition 1** which requires submittal of revised plans to minimize the fill associated with the proposed sheetpile to the maximum extent practicable. Furthermore, **Special Condition 2** requires submittal of final as-built plans clearly marking the final seaward extent of the sheetpile and identifying each site specific details/restrictions.

Furthermore, in addition to pile repair and placement of a sheetpile with cement/grout backfill, toe rock protection on top of geotextile is proposed at all nine project sites at a 2(h) to 1(v) slope,

at a maximum of 6' seaward of the existing bulkhead to prevent future erosion of sediments at the bulkhead toe.

Tetra Tech has indicated that the original bulkhead design drawings specified backfill material from the top of the footing seaward at a slope of 3(h) to 1(v). Their field inspections revealed that an 8- to 12- inch coarse material sub-layer extends seaward of the bulkhead footing at a depth of about 2 feet below the bottom of the footing or cutoff wall. Tetra Tech was not able to locate specific data on the type of material or the original extent of this layer beyond the bulkhead. This material may have settled since construction of the bulkheads in the 1960s beyond the footing due to the unconsolidated nature of the native underlying sediments. The proposed new toe protection material at a 2(h) to 1(v) slope, at a maximum of 6' seaward of the existing bulkhead is intended to replace the settled material and therefore isn't considered "new" fill of open coastal waters.

The toe stone as proposed at a 2(h) to 1(v) slope would cover a smaller footprint than the original design at a slope of 3(h) to 1(v). However, the horizontal (seaward) extent of the material out to a maximum of 6' from the existing bulkhead (to approximately the location of existing residential boat docks in the Harbor) is again a "one size fits all" distance when in fact that distance may be shortened based on specific site conditions. Therefore, **Special Condition 1** requires revised project plans indicating that the proposed rock toe protection shall extend no more than 1 foot above the bottom of the existing bulkhead footing and the horizontal (seaward) extent of the material shall be limited to 3'- 4' from the seaward edge of the bulkhead footing at a 2(h) to 1(v) slope.

Ms. Lesley Ewing, the Commission's staff coastal engineer has reviewed the proposed plans and concurs that as conditioned, the proposed sheetpile with concrete/grout backfill would adequately repair the compromised bulkhead foundations and the proposed toe rock protection would address future erosion concerns at these locations.

Therefore, in this case, as conditioned with placement of the sheetpile and backfill as close as possible to the bulkhead but no further seaward than 1'7" from the bulkhead and to further minimize the footprint of the proposed toe rock provides a greater amount of uncovered soft bay bottom which mitigates adverse impacts on local shoreline sand supply. Accordingly, the proposed project is approvable under section 30235 of the Coastal Act rather than section 30233 of the Coastal Act.

Biological Productivity

Huntington Harbor is hydrologically connected to Anaheim Bay National Wildlife Refuge to the north and Bolsa Chica Ecological Reserve to the south. Coastal Act Section 30230 requires that marine resources be maintained, enhanced, and where feasible, restored and provides special protection to areas and species of special biological or economic significance. Coastal Act Section 30231 further requires that the biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health be maintained and, where feasible, restored. The Commission considers Anaheim Bay National Wildlife Refuge and Bolsa Chica Ecological Reserve to be unique and important coastal wetlands and finds that any development proposed within the connected Huntington Harbor must be undertaken in such a manner to avoid impacts

that would significantly degrade the biological productivity and quality of these connected coastal waters and wetlands. Furthermore, the waters of Huntington Harbor are used extensively for boating, and to a lesser degree fishing. Thus, it is important that the proposed project protect the health of recreational users of these waters consistent with Section 30231.

1. Soft Bottom Habitat

The proposed development is occurring in the waters of Huntington Harbour. The subject sites are not designated in the certified local coastal program as an environmentally sensitive habitat area. Except at extreme low tides, the proposed development area would be underwater. The proposed project will result in the coverage of unvegetated soft bottom habitat. Placement of the sheetpile 1'7" away from the bulkhead will result in permanent impacts to soft bottom habitat. Additionally, rock slope protection against the toe of the bulkhead in front of the new protective sheetpile will result in temporary soft bottom impacts. These soft bottom areas contain infaunal clam beds consisting of wavy chione, California chione, and common littlenecks. The applicant estimates that while the toe stone will bury the existing soft bottom habitat and clam beds, the toe stone will be re-colonized naturally by marine organisms within three to five years.

Mitigation for the permanent loss of soft bottom habitat arising from the proposed project will come from a "soft bottom mitigation bank" previously established in compliance with CDP #5-01-020 (Tetra Tech, Inc.) for the restoration of 5,358 square feet of wetlands including removal of concrete and debris, grading to match elevation of adjacent wetlands, replacement of two 15 inch pipes with 18 inch pipes to improve tidal exchange, and placement of 30.52 square feet of rip rap for erosion control which will fill 30.52 square feet of wetland. The mitigation site is located near the corner of Pacific Coast Highway and Warner Avenue within the Bolsa Chica Ecological Reserve approximately 1 mile southwest of Huntington Harbor. The Soft Bottom Mitigation Plan was completed in 2002 by Tetra Tech, Inc.

Of the 5,358 sq. ft. restored soft bottom, 2,819 sq. ft. has already been used as mitigation for past approved Tetra Tech and Cash & Associates bulkhead repair projects in Huntington Harbor [e.g., 5-98-179, 5-98-201, 5-98-443, 5-98-444, 5-99-108, 5-99-473, 5-00-389, 5-03-078, 5-06-436, 5-06-437, 5-06-438 and 5-06-439]. The remainder of restored soft bottom in the Bolsa Chica Soft Bottom Mitigation Area "bank" will be used as mitigation for impacts which may occur under future bulkhead repair projects.

The total soft bottom impacted by the installation of sheetpile 1'7" seaward of the existing bulkhead at the subject properties under this CDP application results in 299.3 sq. ft. of fill. At a 2:1 mitigation ratio, 598.7 sq. ft. area of mitigation is required. Subtracting this figure from the Bolsa Chica Mitigation Area bank will result in a remainder of 1,940 sq. ft. still be available for mitigation impacts of future bulkhead repair projects at other locations within Huntington Harbor. See Chart below:

STATUS		SITE ADDRESS	TRACT	LOT	Sheetpile	Impact to Soft Bottom		2:1 Mitigation Area		CDP
	ISLAND				(linear ft)	(m^2)	(ft^2)	(m^2)	(ft^2)	
	EW	17019 Edgewater Lane	4880	24	37.5	3.6	38.9	7.2	77.9	5-12-066

DAV	16842 Baruna Lane	5050	3	6	0.6	6.2	1.2	12.5	5-12-066
DAV	16771 Bolero Lane	5050	51	49.5	4.0	43.4	8.1	86.8	5-12-066
DAV	16777 Bolero Lane	5050	52	42	4.1	43.6	8.1	87.2	5-12-066
DAV	16781 Bolero Lane	5050	53	81	7.8	84.1	15.6	168.2	5-12-066
MS	4002 Morning Star Drive	5360	73	23	2.2	23.9	4.4	47.8	5-12-066
MS	4171 Morning Star Drive	5360	89	13	1.3	13.5	2.5	27.0	5-12-066
MS	4181 Morning Star Drive	5360	90	8	0.8	8.3	1.5	16.6	5-12-066
TRN	3592 Venture Drive	8636	6	36	3.5	37.4	6.9	74.8	5-12-066
Total Impacts for Projects Proposed Under CDP 5-12-066				**296.0**	**27.8**	**299.3**	**55.6**	**598.7**	

Bolsa Chica Soft Bottom Mitigation Area (CDP 5-01-020)	5,358
Bolsa Chica Soft Bottom Mitigation Area Total Square Footage Used to Date	- 2,819
Bolsa Chica Soft Bottom Mitigation Area Mitigation Required by this Project (CDP 5-12-066)	- 598.7
Bolsa Chica Soft Bottom Mitigation Area Remaining to Remain for Future Repair Projects	1,940

In addition to the permanent impacts upon soft bottom habitat resulting from the installation of the sheet pile and backfilling the gap between the sheetpile and bulkhead with concrete and grout, the proposed project will have temporary impact upon soft bottom caused by the replacement of the toe stone.

As proposed, the replacement toe stone will be placed at a slope of 2(h):1(v) rather than the 3(h):1(v) present in the original bulkhead design, there will be less toe stone covering the soft bay bottom with the repaired bulkhead than there was with the original design. To further minimize the toe stone footprint, **Special Condition 1** requires revised project plans indicating that the proposed rock toe protection shall extend no more than 1 foot above the bottom of the footing and the horizontal (seaward) extent of the material shall be limited to 3'- 4' from the seaward edge of the bulkhead footing at a 2(h) to 1(v) slope.

Tetra Tech has asserted that the riprap will not move for the life of the project. However, it is reasonable to say that it can't be known with certainty that the toe stone will never move. For example, the project design standard assumes a water depth at the sheetpile of –1 MLLW. However, this assumption does not consider conditions during storms or due to future sea level rise or other factors such as periodic dredging may have effects on the toe stone. Under these conditions it is possible the toe rock may move, potentially affecting other soft bottom habitat areas. The high degree of likelihood that the toe stone will not move provides a basis to approve the project. If it were likely the toe stone would shift, the project may not be found consistent with Coastal Act policies regarding protection of the marine environment. Even though the applicant's engineering consultant asserts that the proposed toe stone will not shift, conditions in the harbor are dynamic and it is feasible that harbor conditions could change. Monitoring every other year, would verify that the rock has indeed not moved and created disturbance of soft bottom habitat elsewhere within the harbor. If disturbance has occurred, action can then be taken, minimizing adverse impacts that may occur if left undetected. Therefore, **Special Condition 4** is imposed requiring a complete bulkhead monitoring plan (monitoring of both the sheetpile and toe rock). Only as conditioned can the proposed project be found to be consistent with Sections 30230 and 30231 of the Coastal Act.

2. Eelgrass and Caulerpa taxifolia

Eelgrass (Zostera marina) is an aquatic plant consisting of tough cellulose leaves which grows in dense beds in shallow, subtidal or intertidal unconsolidated sediments. Eelgrass is considered worthy of protection because it functions as important habitat for a variety of fish and other wildlife, according to the Southern California Eelgrass Mitigation Policy (SCEMP) adopted by the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG). For instance, eelgrass beds provide areas for fish egg laying, juvenile fish rearing, and water fowl foraging. Sensitive species, such as the California least tern, a federally listed endangered species, utilize eelgrass beds as foraging grounds.

The most recent eelgrass surveys for the subject sites were conducted in May 2008. Each of the eelgrass surveys were conducted by Tetra Tech, Inc. No eelgrass was found within the proposed area of work (between the bulkhead and private boat docks) at any of the sites. Only one property had an 11 sq. ft. patch of eelgrass in the vicinity (within 8 feet of the bulkhead), however, as proposed, the project will not have any direct impact to that eelgrass patch. The area of potential eelgrass habitat within the surveyed areas is shaded (caused by the island itself) and caused by private residential docks located off the bulkhead at all the project locations. Water clarity and tidal circulation also affect eelgrass growth. Water visibility was observed at between 3 to 10 feet, which is typical for the area. Reduced tidal circulation in the inlets of the islands also decreases the potential for eelgrass growth. Tetra Tech concludes that the areas where eelgrass does not currently occur are unsuitable for eelgrass growth due to these existing environmental factors. As proposed, no eelgrass will be impacted by the development at the subject sites.

However, even though no adverse impacts to eelgrass are anticipated, a significant amount of time has passed since the last eelgrass survey was conducted on the subject sites. Due to the ephemeral nature of eelgrass, the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the California Department of Fish and Game recommends that eelgrass surveys be conducted during the active growth phase of eelgrass (typically March through October in southern California). In addition, the resource agencies state that any eelgrass survey performed is only valid until the beginning of the next growing season ("Southern California Eelgrass Mitigation Policy"). Based on this criteria, the eelgrass surveys provided are outdated. Therefore, the Commission imposes **Special Condition 7** requiring a valid pre-construction eelgrass survey be conducted within the boundaries of the proposed project during the period of active growth of eelgrass (typically March through October). The pre-construction survey shall be completed prior to the beginning of construction and shall be valid until the next period of active growth.

The proposed development will occur in areas adjacent to existing eelgrass beds. The proposed toe stone will be placed using a 40 foot by 50 foot barge mounted crane which will retrieve the material for placement from a nearby 40 foot by 60 foot barge upon which the material is staged. Construction activity, including barge anchoring, vessel propeller wash, and propeller contact with the harbor bottom could cause scarring to eelgrass beds. The applicant has stated that the anchors for the barges will be placed to avoid eelgrass. However, construction activity could

inadvertently impact eelgrass. Therefore, the Commission finds that a post-construction eelgrass survey must be submitted to determine whether any eelgrass not expected to be impacted was inadvertently impacted. Therefore, **Special Condition 7** also requires post-construction eelgrass surveys and that any unexpected and inadvertent impacts to eelgrass during construction must be mitigated consistent with the Southern California Eelgrass Mitigation Policy.

In 1999, a non native and invasive aquatic plant species, Caulerpa taxifolia, was discovered in parts of Huntington Harbour (Emergency Coastal Development Permits 5-00-403-G and 5-00-463-G). Caulerpa taxifolia is a type of seaweed which has been identified as a threat to California's coastal marine environment because it has the ability to displace native aquatic plant species and habitats. Information available from the National Marine Fisheries Service indicates that Caulerpa taxifolia can grow in large monotypic stands within which no native aquatic plant species can co-exist. Therefore, native seaweeds, seagrasses, and kelp forests can be displaced by the invasive Caulerpa taxifolia. This displacement of native aquatic plant species can adversely impact marine biodiversity with associated impacts upon fishing, recreational diving, and tourism. Caulerpa taxifolia is known to grow on rock, sand, or mud substrates in both shallow and deep water areas. Since eelgrass grows in shallow sandy areas, Caulerpa taxifolia could displace eelgrass in Huntington Harbour.

If present in the project area, Caulerpa taxifolia could be dispersed through construction of the proposed project. The placement of rock in areas where Caulerpa taxifolia is present, could cause pieces of the plant to break off and settle elsewhere, where it can regenerate. By causing dispersal of Caulerpa taxifolia, the proposed project could have adverse impacts upon marine life, especially sensitive eelgrass habitat. In order to assure that the proposed project does not cause the dispersal of Caulerpa taxifolia, the Commission imposes **Special Condition 8** requiring the applicant, prior to commencement of development, to survey the project area for the presence of Caulerpa taxifolia. If Caulerpa taxifolia is present in the project area, no work may commence and the applicant shall seek an amendment or a new permit to address impacts related to the presence of the Caulerpa taxifolia, unless the Executive Director determines that no amendment or new permit is required.

As conditioned, the Commission finds that the proposed project is consistent with Section 30230 and Section 30231 of the Coastal Act.

3. Plastic (PVC) Material in the Marine Environment

The applicants' representative has submitted information that indicates that the PVC sheetpile (specifically Shoreguard sheet pile) is guaranteed for 50 years; the proposed project's PVC sheetpile has almost no opportunity to become plastic debris because it is designed to withstand the forces exerted during the installation process (the sheetpile is vibrated into place, section by section, with a vibrating hammer) and that forces comparable to those exerted during installation are not likely to occur after installation, and because the sheetpile will be completely encased in rock, sediment, and cement, there will be no opportunity for the sheetpile to crack, deteriorate, break, or otherwise contribute to marine debris.

Currently available scientific evidence regarding the use of plastic in the marine environment with regard to the question of leaching, points to the likelihood that leaching of chemicals is

minimal and not likely to have a significant effect on marine resources and the biological productivity and quality of coastal waters necessary to maintain optimum populations of marine organisms and for the protection of human health. Organotins, the primary leachates of concern, constitute 1% of the PVC chemical make-up. Studies have shown that even though the leaching of organotins does occur, the leachates tend to break down quickly and do not accumulate to levels approaching the reported effective concentrations for the biological indicators used. Similarly, laboratory extraction tests, employing stringent conditions, on CPVC[1] pipes have yielded leached organotin concentrations below even the conservative human health-based criteria. Therefore, even though organotins would be expected to leach from PVC plastic placed in the marine environment, especially immediately upon installation, mitigating factors in the environment such as the dilution provided by surrounding water, the speed with which they break down, and the fact that temperature extremes would not be a factor help ensure that the resultant organotin concentrations in the receiving water would be low and not pose significant adverse impacts to either human or ecological health. State Department of Housing and Community Development studies testing whether PVC plastic pipes are safe for use to convey drinking water have found them to be acceptable for such use, which indirectly supports the conclusion that leaching is not likely to be a significant factor.

Beyond the information referred to above, very little literature exists on the components of plastic leaching into the marine environment. The majority of literature available regarding plastic in the marine environment addresses the issue of plastic debris. Two papers generally addressing leaching were identified: "A Brief Analysis of Organic Pollutants Sorbed to Pre and Post- Production Plastic Particles from the Los Angeles and San Gabriel River Watersheds", by C.J.Moore, G. L. Lattin, A. F. Zellers, Algalita Marine Research Foundation; and, "Plastics in the Marine Environment: A Technical Perspective, by Tony L. Andrady PhD, Center for Engineering Technology. Both papers are "white papers" from the "Plastic Debris Rivers to Sea" 2005 Conference (September 7-9, 2005, held in Redondo Beach, Calif.). The main conclusion of both the papers cited above is that very few studies have been conducted regarding the effects of plastic leaching in the marine environment. Both papers support the need for future studies on the issue.

Based on currently available scientific evidence, it appears that leaching does not create adverse impacts on marine resources. However, scientific opinion is constantly evolving. It is possible that new information may become available in the future that reaches a different conclusion. Therefore, the Commission imposes **Special Condition 5** requiring that, should new scientific evidence become available at some point in the future indicating the use of PVC is not acceptable, the applicant agrees to submit an amendment or new permit application to address the new information and incorporate appropriate changes to the project to minimize or eliminate the adverse impacts that the PVC has on the marine environment. Only as conditioned, does the Commission find the permanent use of a plastic material in the marine environment consistent with Sections 30230 and 30231.

[1] CPVC consists of long chains of vinyl chloride, to which chlorine is added. PVC is essentially the parent polymer of CPVC. Because of the higher chlorine content, adverse impacts to water quality would be expected to be greater with CPVC than with PVC. Even so, impacts were found to be minor enough that CPVC is approved by the California State Department of Housing and Community Development for use in transporting human drinking water.

The question of plastic debris in the marine environment also remains of significant concern. Although plastic may break into smaller and smaller pieces, those pieces last for thousands of years. Even when broken into its smallest part, it still presents a problem as is often mistaken by marine life for food and ingested, resulting in illness and death. The proposed bulkhead repair project includes placement of PVC sheetpile within the marine environment. However, because the majority of the 6' tall sheetpile would be placed below the mudline, and/or covered with riprap, the likelihood that pieces would break off is dramatically reduced. Nevertheless, the possibility is not eliminated entirely.

It is the Commission's practice to take the position that is more likely to be protective of the resource in question, in this case the marine environment. At the same time the Commission recognizes the need to go forward with a project that will protect the existing single family residences that may be jeopardized if the bulkheads are not repaired. In an effort to achieve both goals, the Commission finds that the proposed projects must include a bulkhead monitoring requirement, and a requirement to consider environmentally superior alternatives should they become available in the future [such a conditions were also imposed on CDP 5-03-078 (Buchanan); CDP 3-03-057 (California Department of Parks and Recreation); 5-06-436(Lady et. al.); 5-06-437(Hutton, et. al.) and CDP 5-06-438 (Daniels, et. al.)]. Therefore the Commission imposes **Special Condition 4**, which requires a bulkhead monitoring plan, and **Special Condition 5** which requires consideration of future alternatives to plastic sheetpiles. Only as conditioned can the proposed development be found to be consistent with the marine resource policies of the Coastal Act in Section 30231.

4. Construction Phase Water Quality

The proposed development will occur within and adjacent to coastal waters. The proposed project involves the placement of toe stone consisting of 8-inch diameter or smaller quarry waste in coastal waters. If such materials are not placed in an appropriate manner, unconsolidated bay sediments may be disturbed causing turbidity in the water column. Additionally, construction will require the use of heavy machinery and require the stockpiling of construction materials. The applicant has stated that turbidity will be addressed by first installing the proposed geotextile fabric in the area where the toe stone will be placed and by placing, not dumping, the toe stone at the target location. The applicant has additionally stated that a silt curtain will be used in the event that turbid conditions are generated during construction. Since the proposed methods are required to assure compliance with Section 30231 of the Coastal Act, the Commission imposes **Special Condition 2**.

In order to protect the marine environment from degradation, **Special Condition 2** requires that all construction materials and machinery shall be stored away from the water. In addition, no machinery or construction materials not essential for the project improvements shall be placed in coastal waters. Local sand, cobbles, or shoreline rocks, not presently used in the existing development, shall not be used for backfill or construction material.

Furthermore, the California Regional Water Quality Control Board (RWQCB), Santa Ana Region has issued a 401 Water Quality Standards Certification (ID #302009-37). Therefore, as

the conditioned, the Commission finds the proposed development is consistent with Section 30231 of the Coastal Act.

C. PUBLIC ACCESS

Section 30212 of the Coastal Act states in relevant part:

> *(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where:*
>
> *(2) adequate access exists nearby, or,*
>
> *(b) For purposes of this section, "new development" does not include:*
>
> *(4) The reconstruction or repair of any seawall; provided, however, that the reconstructed or repaired seawall is not a seaward of the location of the former structure.*

The subject sites are located on various locations throughout Huntington Harbor, including locations on Trinidad, Humboldt, Davenport Islands in Huntington Harbour. Much of the Huntington Harbour waterfront is inaccessible to the public. Trinidad Island is publicly accessible via a bridge from the mainland. On-street parking is the major source of public parking. In addition, a small public beach flanks Trinidad Lane at the entrance to Trinidad Island, and public fishing docks are located at the ends of Sundancer Lane and Typhoon Lane on Trinidad Island. A public walkway extends for much of the length of Venture Drive and along Typhoon Lane. A public park runs through the center of Trinidad Island. Humbolt Island is publicly accessible via a bridge from the mainland. On street parking is also publicly available. A small public beach flanks Humbolt Drive at the entrance to Humbolt Island. Davenport Island is publicly accessible via a bridge from the mainland, off of Davenport Drive. On-street parking is the major source of public parking. There is a small public beach area and parking lot on the inland side of Davenport Drive before the bridge into Davenport Island.

The proposed development involves structural reinforcements to an existing bulkhead which would result in seaward encroachment of the structure. Therefore, the proposed project is considered new development for the purposes of Coastal Act section 30212. However, the proposed project would be underwater. There is no beach area which provides lateral public access on-site upon which the proposed project would encroach. Further, there is no beach area off-site which provides public access that could be eroded as a result of changes in shoreline processes due to the proposed project. In addition, a special condition is imposed to make it clear that approval of this permit does not constitute a waiver of any public rights that exist or may exist on the property.

Therefore, the Commission finds that no public access dedication is necessary with the proposed development and that the proposed project is consistent with section 30212 of the Coastal Act.

D. LOCAL COASTAL PROGRAM

Coastal Act section 30604(a) states that, prior to certification of a local coastal program ("LCP"), a coastal development permit can only be issued upon a finding that the proposed development is in conformity with Chapter 3 of the Act and that the permitted development will not prejudice the ability of the local government to prepare an LCP that is in conformity with Chapter 3. An LCP for the City of Huntington Beach was effectively certified in March 1985 and subsequently updated. However, the proposed development is occurring within an area of the Commission's original permit jurisdiction, due to the project location seaward of the mean high tide line. Consequently, the standard of review is the Coastal Act and the City's LCP is used only as guidance. As conditioned, the proposed development is consistent with Chapter 3 of the Coastal Act and with the certified LCP for the area.

E. CALIFORNA ENVIRONMENTAL QUALITY ACT (CEQA)

Section 13096 Title 14 of the California Code of Regulations requires Commission approval of a coastal development permit application to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment.

The City of Huntington Beach is the lead agency responsible for CEQA review. As determined by the City, a Mitigated Negative Declaration No. 2008-010 was prepared in compliance with Article 6 of CEQA.

The project is located in an existing harbor in an urbanized area. Development already exists on the subject site. The project site does not contain any known sensitive marine resources, therefore the impacts arising from the proposed project will be minimal. In addition, the proposed development has been conditioned to assure the proposed project is consistent with the resource protection policies of the Coastal Act. The conditions also serve to mitigate significant adverse impacts under CEQA. The conditions are: 1) revised plans and final as-built plans; 2) compliance with construction responsibilities and debris removal measures; 3) bulkhead monitoring plan; 4) alternatives to plastic; 5) that approval of the permit does not constitute a waiver of any public rights that may exist at the site; 6) assumption of risk, waiver of liability and indemnity; 7) pre- and post- construction eelgrass surveys; and 8) pre-construction caluerpa taxifolia surveys. There are no other feasible alternatives or mitigation measures available which will lessen any significant adverse impact the activity would have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, is the least environmentally damaging feasible alternative and can be found consistent with the requirements of the Coastal Act to conform to CEQA.

APPENDIX A

SUNSTANTIVE FILE DOCUMENTS

City of Huntington Beach Mitigated Negative Declaration No. 08-010(Huntington Harbor Bulkhead Repair) dated September 3, 2008

Approval-in-Concept from the City of Huntington Beach dated September 16, 2008

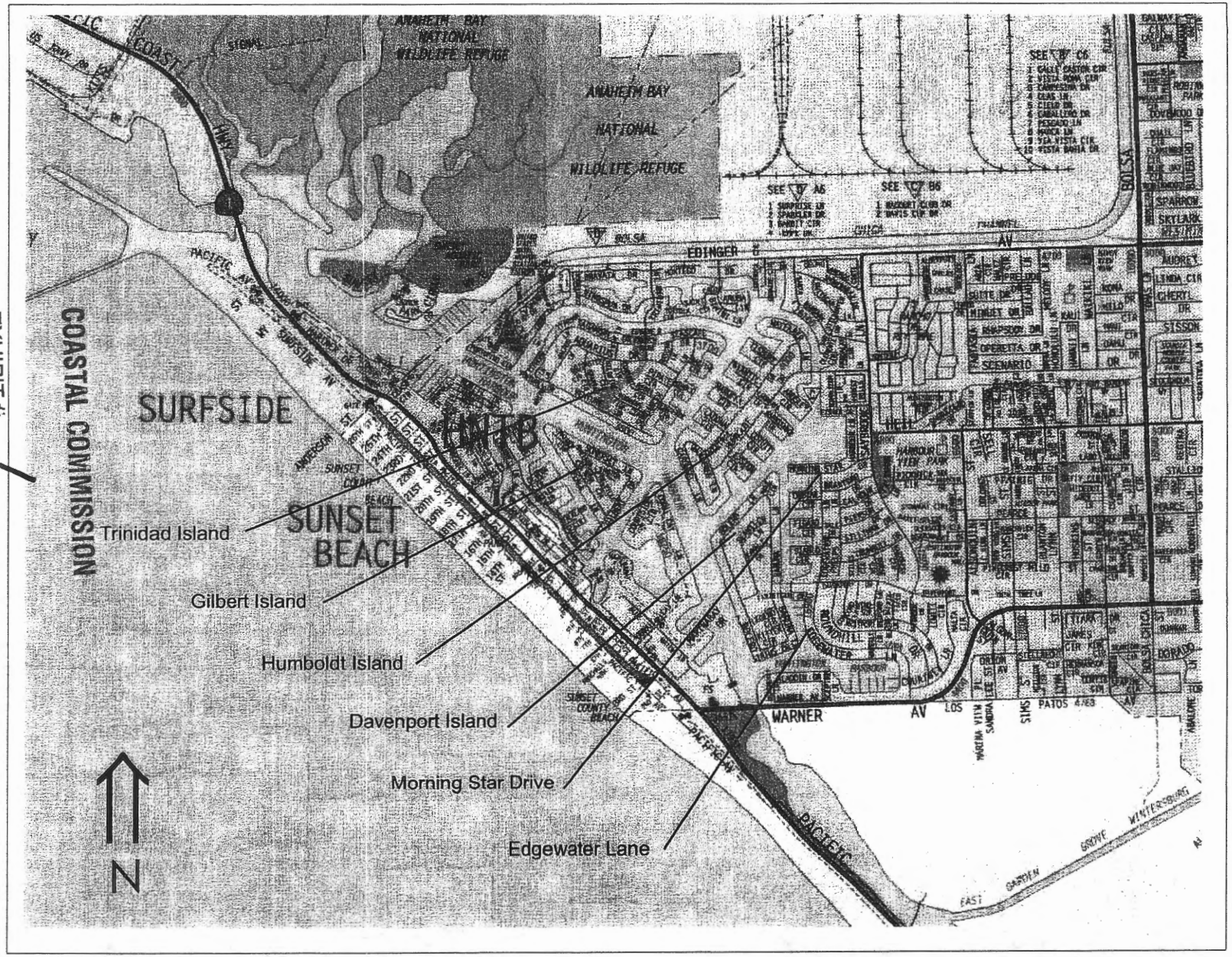
Davenport Bulkhead Repair Group Eelgrass Survey, May 2008, Huntington Harbour, Huntington Beach, California; prepared for Huntington Harbour Homeowners; prepared by Tetra Tech Inc., 401 E. Ocean Blvd. Suite 420, Long Beach CA 90802

Soft Bottom Mitigation Plan, Humboldt Island & Trinidad Island Bulkhead Repair Project, Huntington Beach, CA, April 2000, prepared for Huntington Harbour Homeowners; prepared by Tetra Tech Inc., 670 N. Rosemead Blvd., Pasadena, California

US Army Corps of Engineers, Los Angeles District, Regional General Permit No. 84, File No. SPL-2009-00652-FBV

CDP 5-03-078 (Buchanan); CDP 3-03-057 (California Department of Parks and Recreation); 5-06-436(Lady et. al.); 5-06-437(Hutton, et. al.) and CDP 5-06-438 (Daniels, et. al.)

EXHIBIT # 1
PAGE 1 OF 2



Source: Thomas Bros. Maps

Tetra Tech, Inc.
401 East Ocean Blvd., Suite 420
Long Beach, California 90802
Ph. (562) 495-0495 Fax (562) 495-5029

Vicinity Map
Davenport Bulkhead Repair Group

May 2008
Figure 1

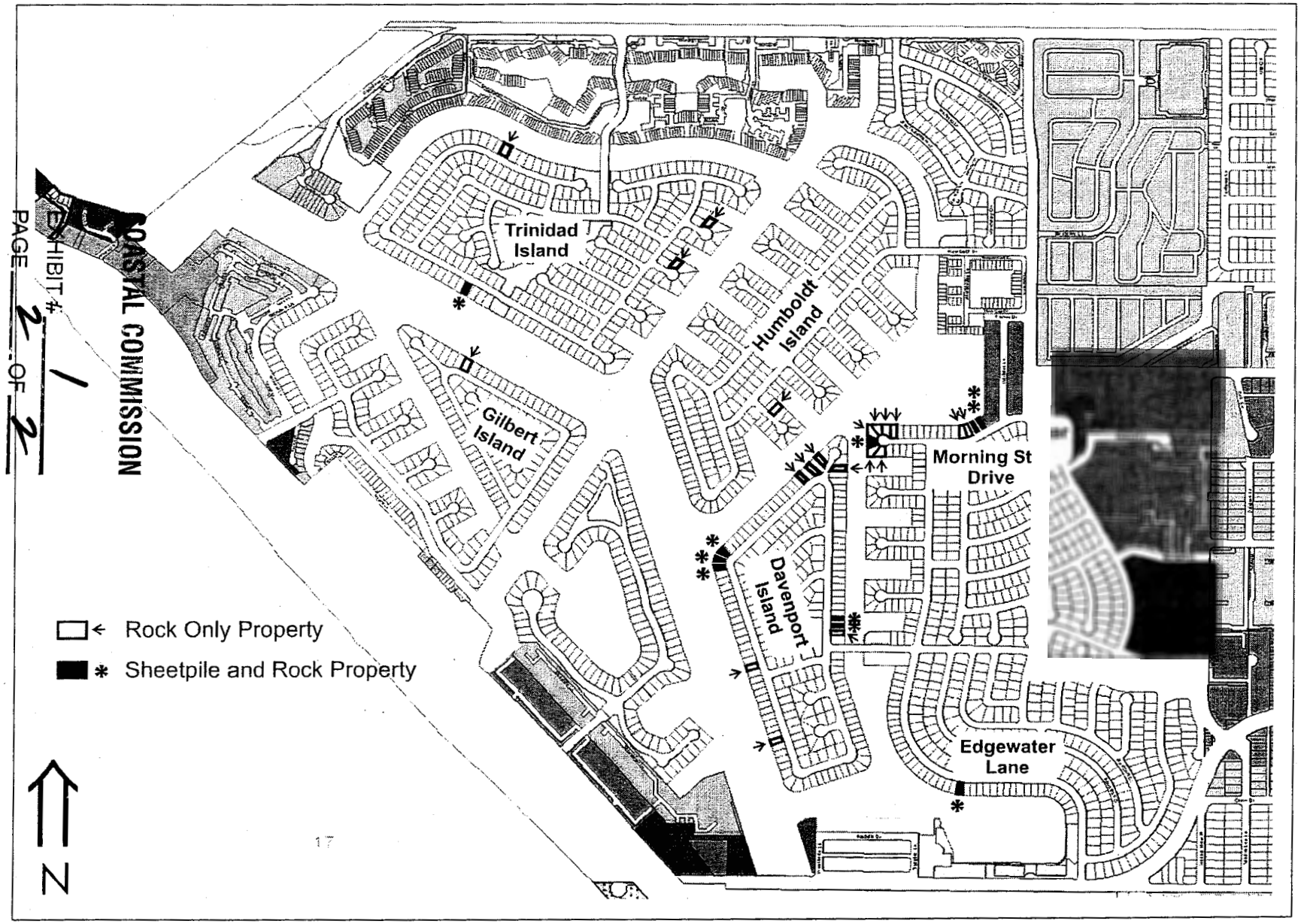


EXHIBIT # 1
PAGE 2 OF 2

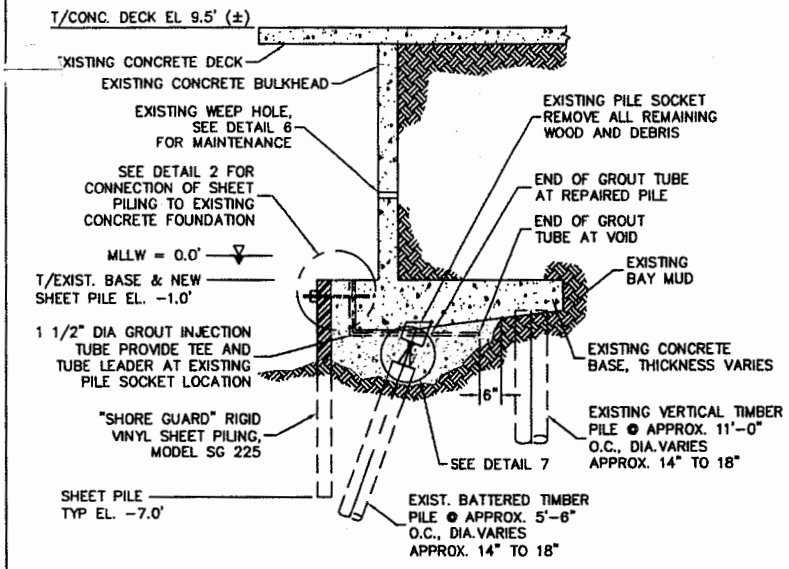
COASTAL COMMISSION

Source: City of Huntington Beach GIS

Tetra Tech, Inc.
401 East Ocean Blvd., Suite 420
Long Beach, California 90802
Ph. (562) 495-0495 Fax (562) 495-5029

Property Location Map
Davenport Bulkhead Repair Project

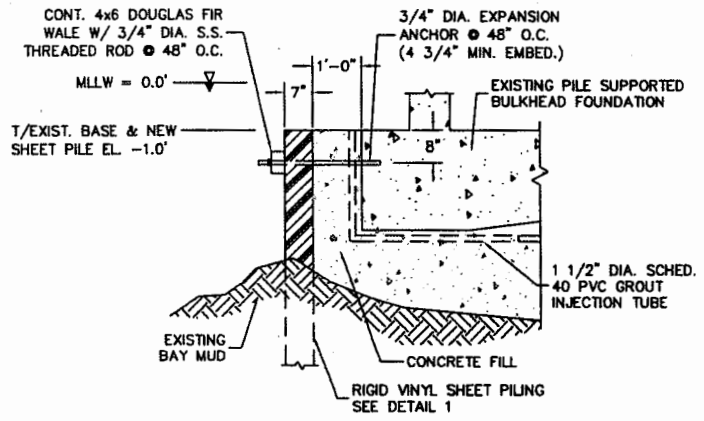
February 2009
Figure 3



SECTION AT TIMBER PILE REPAIR

SCALE: 1/8" = 1'-0"

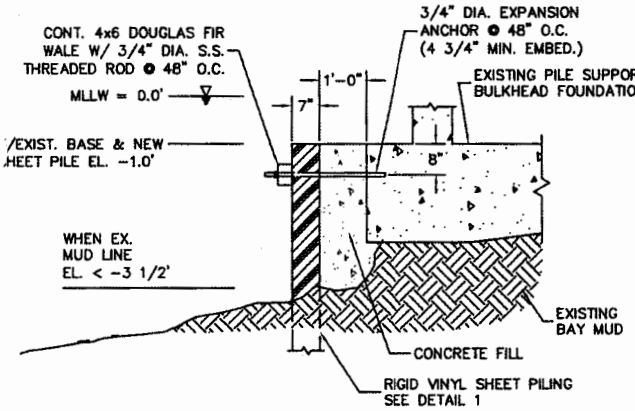
1



SECTION AT WALE: CASE I

SCALE: 1/4" = 1'-0" (FOUNDATION UNDERMINED)

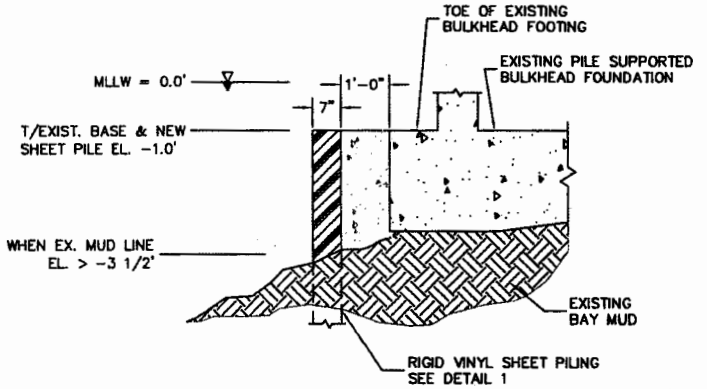
2



SECTION AT WALE: CASE II

SCALE: 1/4" = 1'-0" (FOR CANTILEVERED SPANS OF 30" OR MORE SUPPORT WALE REQUIRED)

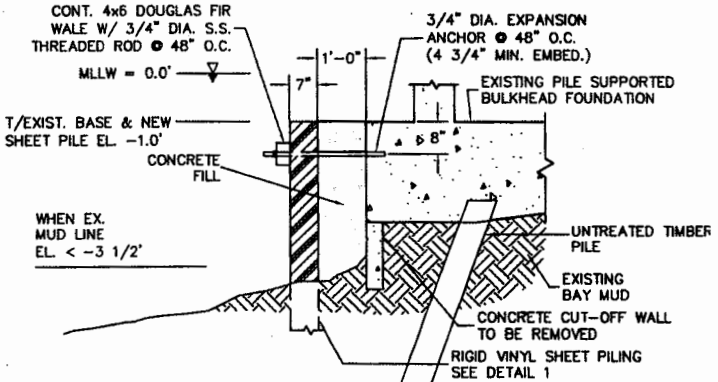
3



SECTION AT SHEET PILE: CASE III

SCALE: 1/4" = 1'-0" (FOR CANTILEVERED SPANS OF 30" OR LESS SUPPORT WALE NOT REQUIRED)

4



SECTION AT SHEET PILE: CASE V

SCALE: 1/4" = 1'-0" (CUT-OFF WALL REMOVAL)

5

TETRA TECH
401 East Ocean Blvd., Suite 420
Long Beach, CA 90802
(562)495-0495, Fax (562)495-5029

PURPOSE: Repair Existing Seawall

Datum: MLLW = 0

1. Property Owners: See Attached List
2.
3.

SECTION VIEW

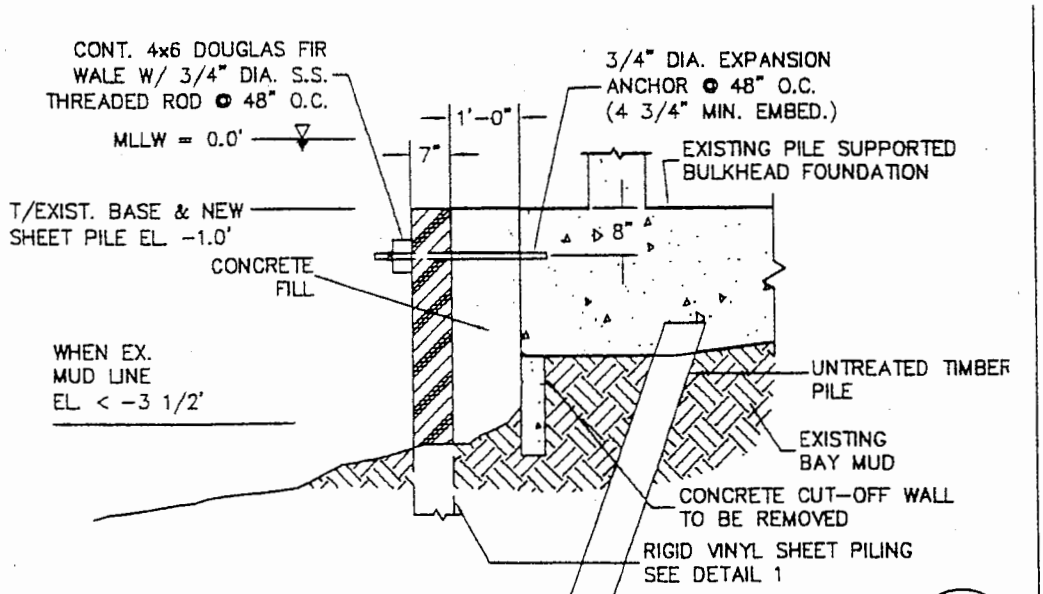
COASTAL COMMISSION

EXHIBIT # 2

PAGE _____ OF _____

Proposed Repair of Existing Seawall

IN: Huntington Harbour
AT: Location Island,
Huntington Beach
County of Orange State: CA
Application By: Name



SECTION AT SHEET PILE: CASE V (5)

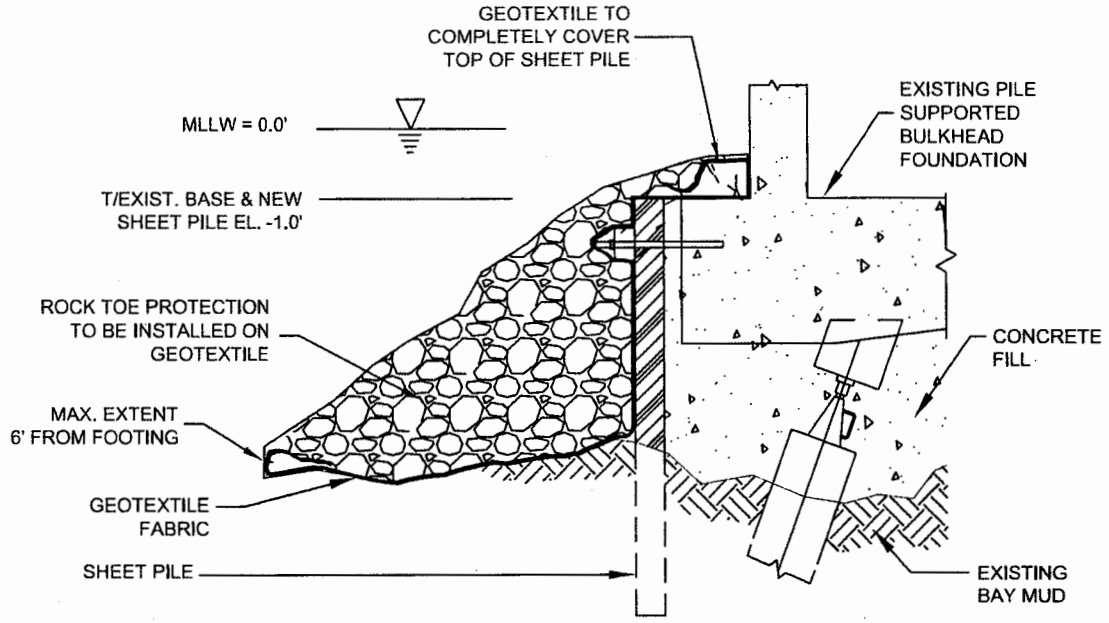
SCALE: 1/4" = 1'-0" (CUT-OFF WALL REMOVAL)

Larger detail of Case V

COASTAL COMMISSION

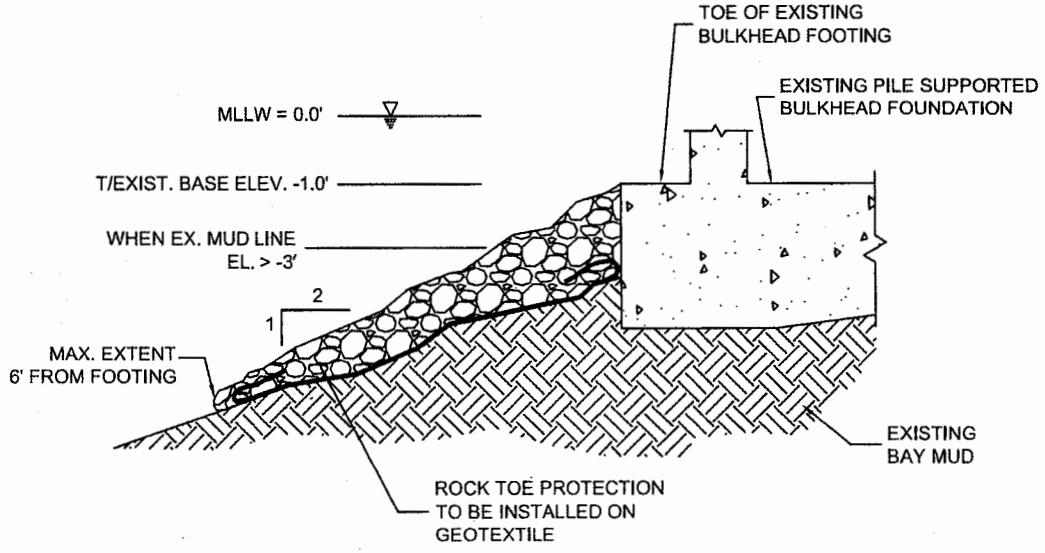
EXHIBIT # 2

PAGE 2 OF 4



SECTION AT SHEET PILE: (CASE I, II, & III) 10

SCALE: 3/8" = 1'-0" (ROCK SLOPE PROTECTION AT SHEET PILE)



SECTION AT FOOTING TOE: CASE IV 11

SCALE: 3/8" = 1'-0" (ROCK SLOPE PROTECTION ONLY)

PURPOSE: Repair Existing Seawall

Datum: MLLW = 0

TETRA TECH
401 E. Ocean Blvd. Ste. 420
Long Beach, CA 90802
(562) 495-0495 Fax (562) 495-5029

FIGURE 3 - Page 2

SECTION VIEW

COASTAL COMMISSION

EXHIBIT # 2

PAGE 3 OF 4

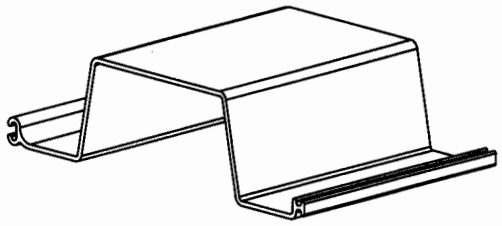
Proposed Repair of Existing Seawall
IN: Huntington Harbour
AT: Huntington Beach, CA
County of Orange State: CA

CRANE MATERIALS INTERNATIONAL

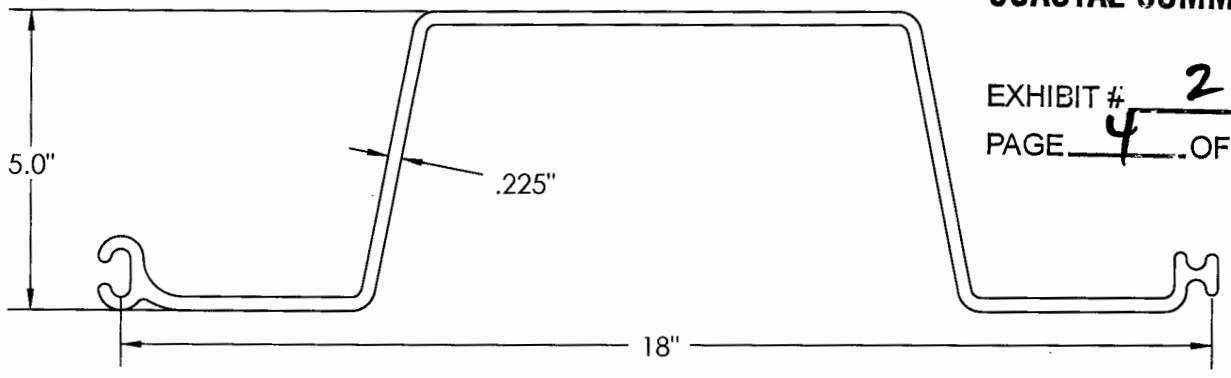
SHOREGUARD®
Synthetic Sheet Piling

Updated January 1, 2011

SG-225



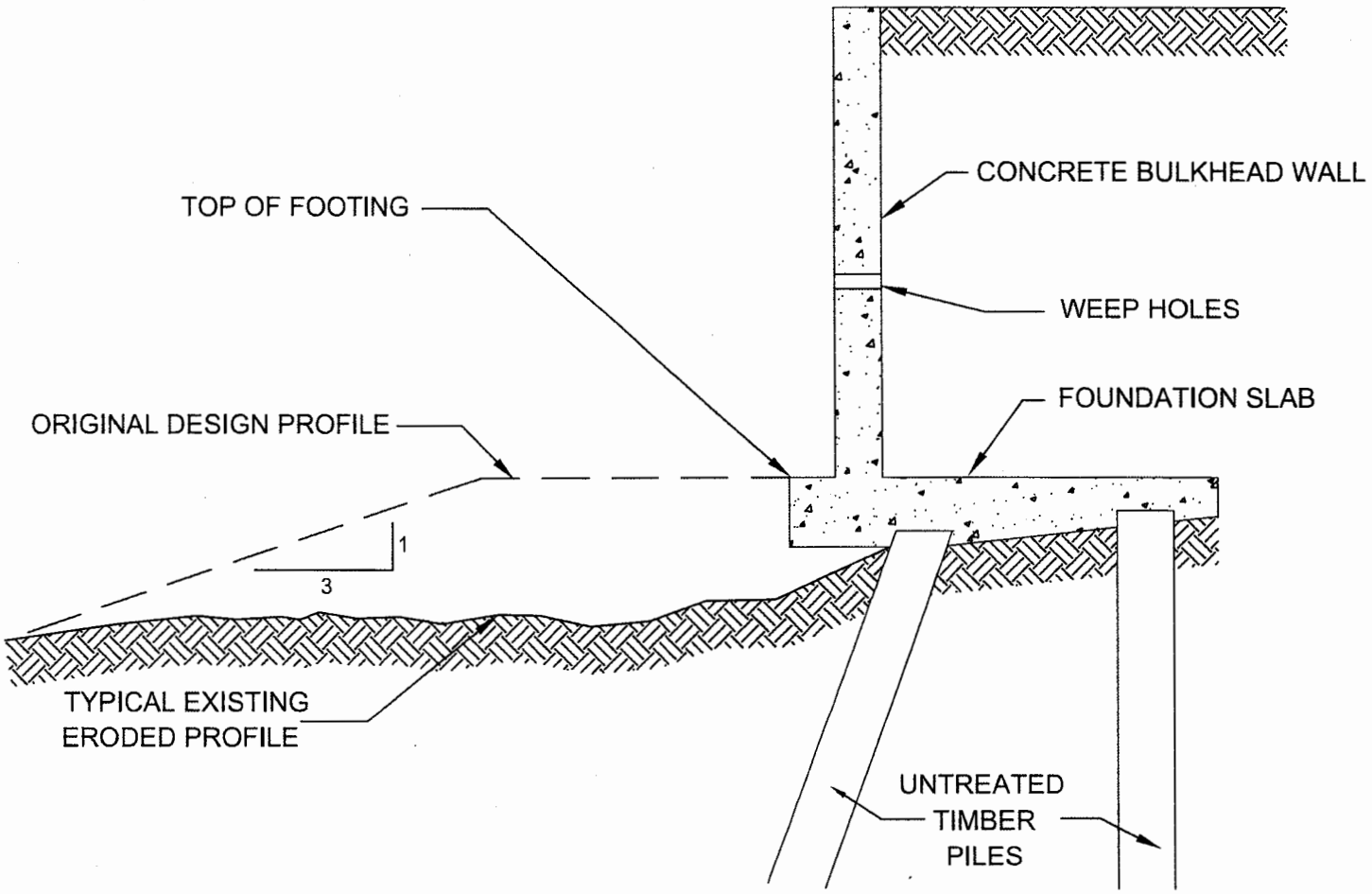
Allowable Moment (M)	1,920 ft-lb/ft	8.54 kN-m/m
Section Modulus (Z)	7.2 in^3/ft	387 cm^3/m
Moment of Inertia (I)	18 in^4/ft	2,458 cm^4/m
Impact Strength	11,000 in-lbs/in^2	1,925 N-mm/mm^2
Thickness (t)	0.225 in	5.7 mm
Section Depth	5.0 in	127 mm
Section Width	18 in	457 mm
Material	Weatherable Rigid Vinyl	
Standard Colors	Grey, Clay	
Technology	Box Profile, I-Beam Lock, XCR™	
Standard Packaging	15 sheets/bundle	



COASTAL COMMISSION

EXHIBIT # 2
PAGE 4 OF 4

Physical properties are defined by ASTM testing standards, The Aluminum Association Design Manual, The Naval Facilities Design Manual DM 7.2, The US Army Corps of Engineers General Design Guide: PVC Sheet Pile and/or standard engineering practice. The values shown are nominal and may vary. The information found in this document is believed to be true and accurate. No warranties of any kind are made as to the suitability of any CMI product for particular applications or the results obtained there from. Crane Materials International is a Crane Building Products® company. ShoreGuard®, The ShoreGuard Seawall System™, C-Loc®, TimberGuard®, GeoGuard®, Dura Dock®, Shore-All®, GatorGates®, GatorDock Elite™, ArmorWare™, ArmorRod™, Box Profile™, UltraComposite™, Elite Wall™, Elite Panel™, Elite Fascia Panel™, Flat Panel™, XCR™, XCR Technology™, XCR Vinyl™, GatorBridge™, Gator Aluminum™, Gator Sheet Piling™, GatorDock™, I-Beam Lock™, Textured Slate™, Crane Materials International™ logo, CMI Sheet Piling Solutions™, Aqua Terra System™, Endurance™, Endurance CSP™, Polaris™, Eclipse™, GridSpine™, 21 Poly™, PileClaw™, SheerScape™, SheerScape Retaining Wall Systems™, Sheer Panel™ and CMI Waterfront Solutions™ are trademarks, service marks or trade names of Crane Materials International. United States and International Patent numbers 4,674,921; 4,690,588; 5,292,208; 5,145,287; 6,000,883; 6,033,155; 6,053,666; D420,154; 6,575,667; 7,059,807; 7,056,066; 7,025,539; 7,393,482; 5,503,503; 5,803,672; 6,231,271; 1,245,061CA and other patents pending. © 2011 Crane Materials International. All Rights Reserved.



COASTAL COMMISSION

EXHIBIT # 3
PAGE 1 OF 2

401 E. Ocean Blvd., Ste. 420
Long Beach, CA 90802
(562) 495-0495, Fax (562) 495-5029

PURPOSE: Repair Existing Seawall

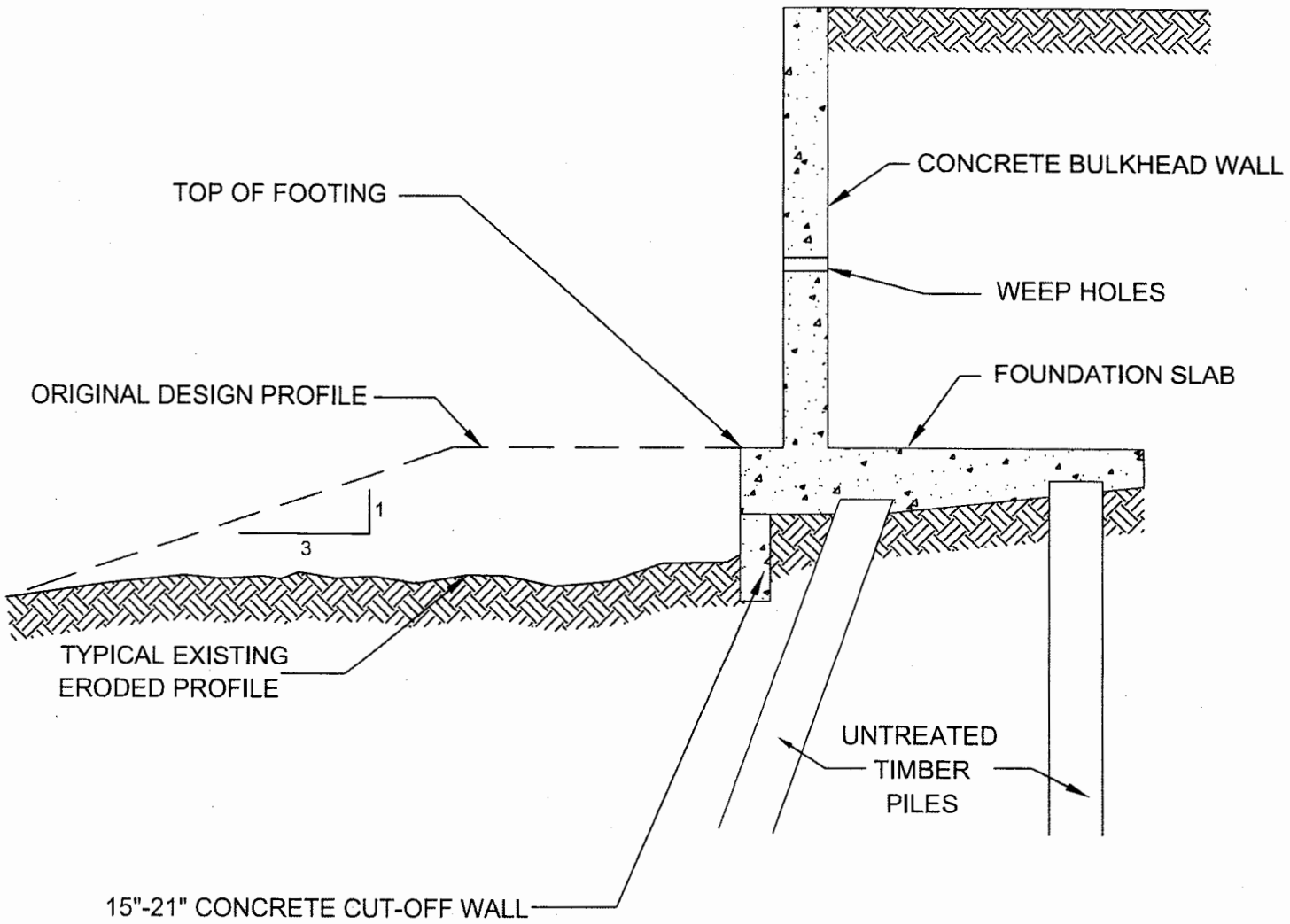
Datum: MLLW = 0

FIGURE 1.
ORIGINAL BULKHEAD DESIGN
NO CUT-OFF WALL

Huntington Harbour
Huntington Beach, CA 92649

Proposed Repair of Existing Seawall

Supplemental Info. Report



COASTAL COMMISSION

EXHIBIT # 3

PAGE 2 OF 2

401 E. Ocean Blvd., Ste. 420
Long Beach, CA 90802
(562) 495-0495, Fax (562) 495-5029

PURPOSE: Repair Existing Seawall

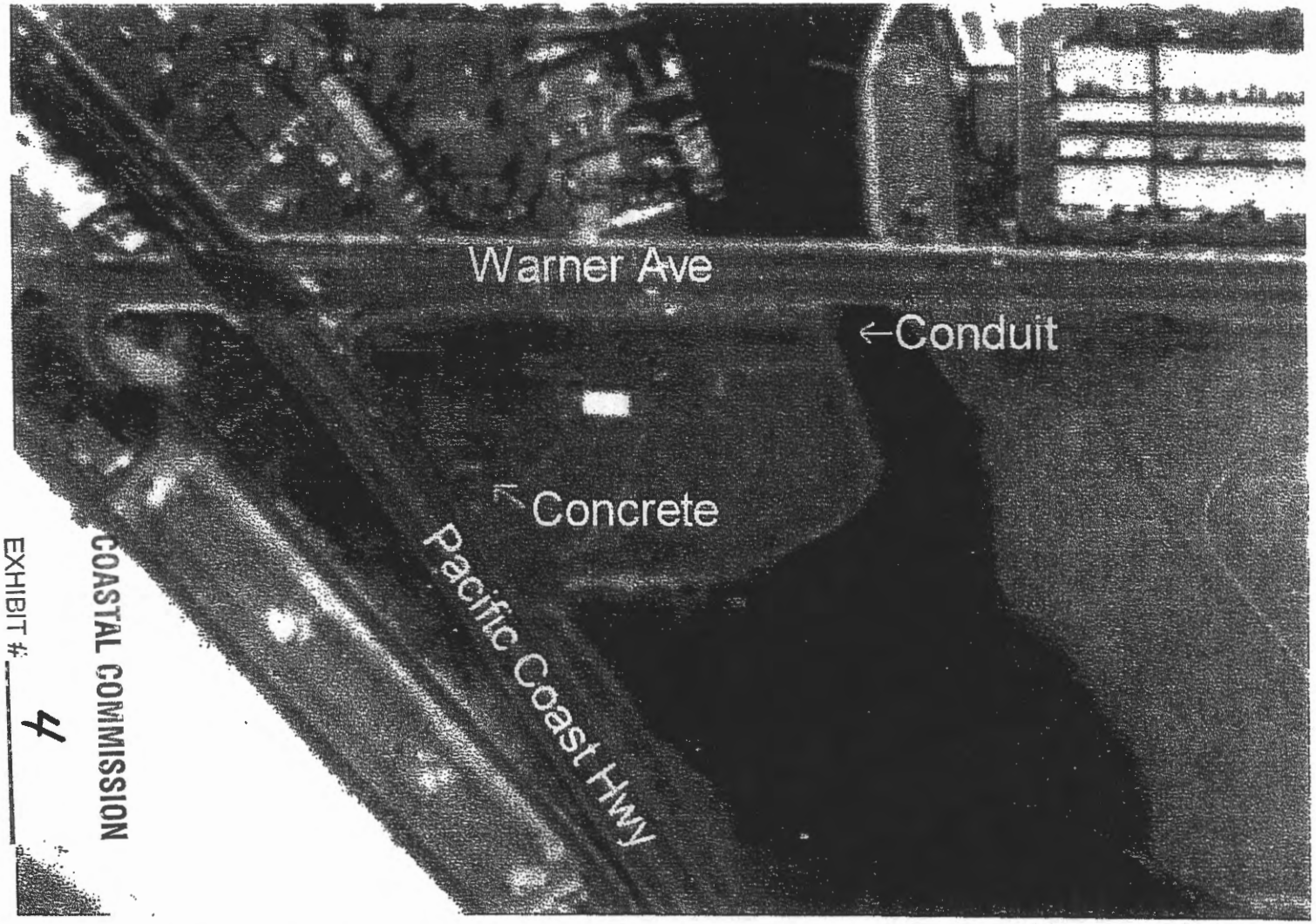
Datum: MLLW = 0

FIGURE 2.
ORIGINAL BULKHEAD DESIGN
WITH CUT-OFF WALL

Huntington Harbour
Huntington Beach, CA 92649

Proposed Repair of Existing Seawall

Supplemental Info. Report



COASTAL COMMISSION
EXHIBIT # 4
PAGE 1 OF 1

Photo 1. Aerial view of soft bottom mitigation site in Bolsa Chica Ecological Reserve depicting conduit repair location and concrete removal location, Soft Bottom Mitigation Plan, March 2000.