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Draft Memorandum

To: Orange County Coastkeeper
From: Anchor Environmental, L.L.C.
Date: April 13, 2005
Re: Review of Structural Components and Existing Conditions
Rhine Channel, Newport Beach, California

This memorandum provides a brief description of existing structural components and conditions along the banks of the Rhine Channel in Newport Beach, California. The work was conducted in November 2004 by Anchor Environmental using aerial photographs, surveys, and site visits.

1 SITE BACKGROUND

The Rhine Channel is a body of water located at the west end of Newport Harbor in the old, industrial cannery and shipyard sector (photo 1). The channel tops Southern California's Environmental Protection Agency (EPA) 1998 list of impaired water-bodies as a "toxic sediment hot spot." Early studies suggest high amounts of mercury, copper, zinc, PCB and DDE toxins as well as a suspected debris field of industrial and marine waste dumped there over the decades. Historic records indicate that the sediments in the Rhine Channel have been contaminated since the 1930s when the channel was lined with shipyards, metal plating facilities, and a cannery. It appears that a significant amount of debris such as batteries, engines, and large pieces of metal and wood have been deposited in the Rhine Channel over time. In addition, runoff from the facilities on the channel and in the surrounding watershed has contributed to chemical contamination of the sediments.



Photo 1. The Rhine Channel is located at the west end of Newport Harbor in the industrial sector.

2 PURPOSE OF PROJECT

Orange County Coastkeeper is the lead agency overseeing this study, which began June 8, 2004. The Rhine Channel Project is a continuing effort to improve water quality and is funded by the state of California through Proposition 13. Orange County Coastkeeper is partnering with the city of Newport Beach to conduct this 10 month long study and propose a remediation plan that would comply with the toxics TMDL. The proposed grant-funded project will also include a survey of the debris field and chemical characterization of the sediment in an effort to determine the quality and volume of sediment that is contaminated. The project will also include developing and evaluating alternatives for remediating the contaminated sediments.

3 CHANNEL CHARACTERISTICS

The Rhine Channel is approximately 2,300 feet long and consists of two reaches (photo 2). The outside reach (R1) extends from the mouth of the channel to the bend, and is oriented to the northwest. The inside reach extends from the bend in the channel to the end and is oriented to the north. Figures 2A and 2B in the main text of the accompanying report show a two-part plan view of the channel and includes station designations that will be used throughout this document. Table 1 displays the basic channel characteristics of both reaches.

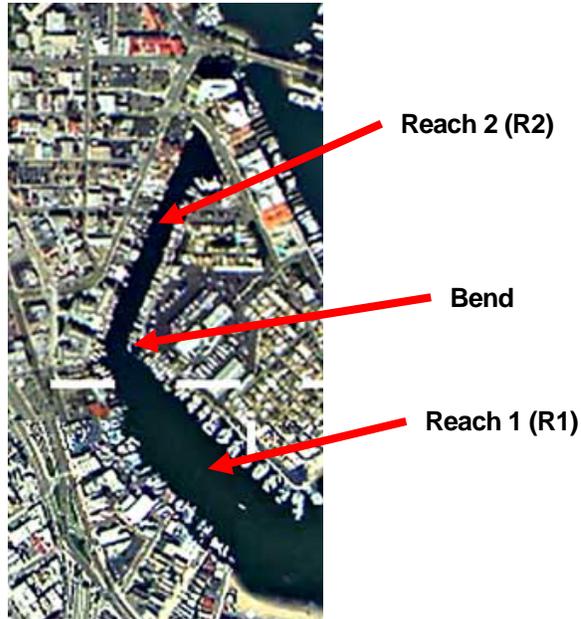


Photo 2. Two reaches of the Rhine Channel

Table 1
Channel Characteristics

Reach	Reach 1 (R1)	Reach 2 (R2)
Relative location	Outside	Inside
Length	1300 ft	1000 ft
Width, sea wall to sea wall	450 ft	200 ft
Working width	300 ft	100 ft
Depth of the middle	11.5 ft	11ft
Depth of the bend	11.5 ft	11.5 ft

4 DESCRIPTION OF CHANNEL BANK

4.1 Bulkheads

The entire bank of the Rhine Channel has been developed into housing, restaurants, small businesses, and marine support services. The channel's perimeter is approximately 5,000 feet long and mainly comprises a concrete slab bulkhead. Occasionally the bulkhead is supported by steel tiebacks as depicted in photo 3. Some of the tiebacks appear to have been installed post construction. The top of the bulkhead is at approximately 10 to 12 feet MLLW in elevation. A concrete cap rests on top of the bulkhead.



Photo 3. Steel tieback supporting concrete bulkhead

4.2 Rip Rap

One section of the bank is armored by rip rap instead of the concrete slab. The rip rap bank is about 60 feet long and appears to be in stable condition.



Photo 4. Rip rap at station 5+75

4.3 Natural Slope

On the east side of R2 from station 4 +50 to 6+00, an area of natural slope extends into the channel (photo 5). The bank contains some concrete debris and a timber bulkhead. The timber bulkhead is supported by soldier piles on 5 foot centers with wood laggings. The slope rises above the high water mark to the underside of a wood deck in front of private residences.



Photo 5. Natural slope at station 4 + 50 of Reach 2

4.4 Floating docks

Most docks along the channel are floating systems tied to concrete guide piles (photo 6). The docks are free to move with the water height on a series of rollers. The docks are oriented in various alignments; they are parallel, perpendicular, or diagonal to the bank. Along the west side of R1, the docks surrounding the channel typically extend 60 feet out into the waterway and are 15 feet apart. On the east side of R1, the docks can be up to 35 feet apart and house up to eight boats in a herringbone pattern. In R2, the west side docks are typically 35 feet long and 15 feet apart.



Photo 6. Typical floating dock with concrete piles

4.5 Ramps and Sinker Lifts

Two boat ramps are located near station 13+00 along R1. One is on the east side and one is on the west side of the channel. At station 16+00 in R1 on the west side there is a boat lift operated by a boatyard. And as depicted in photo 7, a sinker lift is located on the west side of the channel near station 18+00. The sinker lift has approximately 5 feet of clearance at mid-tide and has very little access underneath. Sonar images depict what appears to be a large debris field in the waterway near the sinker lift. Old boat parts, container doors, and perhaps a car are speculated to be in this debris field.



Photo 7. Sinker lift near station 18+00

5 INDICATIONS OF STRUCTURAL WEAR AND DAMAGE

The bulkhead appears to be structurally sound along most of its length with some cracking and deterioration of the outer surface material evident in many areas. There are three main locations where the integrity of the bulkhead appears to be in poor condition. Of the approximately 5,000 feet of concrete bulkhead, about 390 feet appear to be failing. This represents approximately 8 percent of the total length of bulkhead along the channel. However, if material is to be dredged near the bulkhead, measures may be needed to either shore up the failing portions or reconstruct the sections entirely.

5.1 Bulkhead Failure

Specifically on the west side R2 near station 7+00, disintegrating concrete in the cap has exposed rebar supports (photo 8). Spalling of the concrete is also prominent.



Photo 8. Bulkhead failure at station 7+00

On the east side of R2 near station 3 + 20, the bulkhead also appears to be failing. It is currently being supported by post-construction tiebacks.

Finally, on the west side of R1 near station 11+50, the bulkhead is cracking and the cap appears to be deteriorating (photo 9).



Photo 9. Bulkhead failure at station 11+50

5.2 Cracking Piles

Some of the floating piling appear to be in poor shape. Any disturbance of these piling during construction will likely require full replacement of the piles. Photo 10 shows excessive cracking of the concrete on the west side of R2 from station 7+50 to 11+00.



Photo 10. Cracks in concrete piling

5.3 Outfall pipes and storm drains

Storm drains release into the channel in various locations along the bulkhead. The stormwater is discharged directly into the channel. Photo 11 shows an exposed outfall pipe on the west side of the channel, off of 26th Street, near station 12+00.



Photo 11. Exposed storm drain

5.4 General Cracks and Deterioration

Some locations around the perimeter of the channel have superficial cracks in the apron or sidewalk above the bulkhead (Photo 12). There is also evidence of deterioration of the concrete that appears not to affect structural integrity of the bulkhead. If dredging operations and heavy machinery are working in the vicinity of these areas, attention will need to be paid to prevent worsening of the condition. In some areas, repairs or reconstruction will need to take place if significant damage is done.



Photo 12. Cracks in sidewalk



Photo 13. Cracks in apron

6 CONCLUSION

The entire shoreline of the Rhine Channel is developed either by residential housing or commercial businesses. The channel's perimeter is approximately 5,000 feet long and mainly comprises a concrete slab bulkhead. The perimeter also consists of one 60-foot section of rip rap and one 150-foot section of natural slope.

For the most part, the bulkhead is in stable condition and should withstand the effects of activity in the channel related to sediment remediation. About 390 feet (8 percent) of the bulkhead is in poor condition or completely failing, and would require shoring or complete replacement if work is to be conducted that would jeopardize the bulkhead integrity.

The other significant obstacles to sediment remediation are the floating piers and guide piles that line the banks of the channel. These structures will likely require demolition/disassembly and reassembly after the remediation work is completed.