Appendix D
Sediment Management Plan

November 24, 2020
Lower Newport Bay

ANCHOR QEA

Sediment Management Plan

Prepared for the City of Newport Beach

November 24, 2020
Lower Newport Bay

Sediment Management Plan

Prepared for
City of Newport Beach
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Newport Beach, California 92660

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Project Number: 180243-02.01

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ABBREVIATIONS

BMP	best management practice
BODR	Basis of Design Report
CAD	Confined Aquatic Disposal
CCC	California Coastal Commission
CCR	California Code of Regulations
CDF	confined disposal facility
CEQA	California Environmental Quality Act
City	City of Newport Beach
CSTF	Contaminated Sediments Task Force
CWA	Clean Water Act
cy	cubic yard
DMMP	dredge material management plan
DMMT	Southern California Dredged Material Management Team
EET	effluent elutriate test
ERM	effects range median
ESA	Endangered Species Act
FDA	U.S. Food and Drug Administration
LTMS	Long-Term Management Strategy
mg/kg	milligrams per kilogram
MLLW	mean lower low water
MPRSA	Marine Protection, Research, and Sanctuaries Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Services
ODMDS	ocean dredged material disposal site
OMMP	Operations, Management, and Monitoring Plan
OTM	*Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual*
PCB	polychlorinated biphenyl
POLB	Port of Long Beach
RGP 54	Regional General Permit 54
RWQCB	Regional Water Quality Control Board
SCOUP	Sand Compatibility Opportunistic Use Program
SMP	Sediment Management Plan
SP	solid phase
SPP	suspended particulate phase
STLC	soluble threshold limit concentration

SWAC	surface-weighted average concentration
TCLP	toxicity characteristic leaching procedure
TMDL	Total Maximum Daily Load
Toxics TMDL	*Total Maximum Daily Loads for Toxic Pollutants in San Diego Creek and Newport Bay, California*
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WDR	Waste Discharge Requirements
WET	Waste Extraction Test

1 Introduction

The U.S. Army Corps of Engineers (USACE), in partnership with the City of Newport Beach (City), is planning to conduct maintenance dredging within the Federal Channels in Lower Newport Bay, California, to maintain the federally authorized depths. Based on the pre-dredge sediment investigation, portions of the Federal Channels, including the Turning Basin and portions of Main Channel and Newport Channel, were determined to be unsuitable for unconfined open-water disposal because of elevated mercury and/or polychlorinated biphenyls (PCBs; Anchor QEA 2019). Although all samples passed bioassay and bioaccumulation testing, the U.S. Environmental Protection Agency (USEPA) expressed concerns regarding the degradation of the offshore disposal site because of mass loading of mercury and the potential for adverse effects caused by methylmercury. Following negotiations with USEPA and the Southern California Dredged Material Management Team (DMMT) in August 2019, sediments with mercury up to 1.5 milligrams per kilogram (mg/kg) were approved for ocean disposal if the City met the following conditions:

1. Develop a long-term Sediment Management Plan (SMP) to address dredged material determined to be unsuitable for open ocean disposal
2. Contribute partial funding towards USEPA monitoring at the LA-3 Ocean Dredged Material Disposal Site (ODMDS) with respect to potential bioaccumulation effects resulting from mercury disposal

This SMP was developed to meet the first of these conditions, as specified by USEPA and the DMMT, in support of the Federal Channels dredging program. This SMP summarizes existing sediment quality conditions and evaluates management alternatives for sediments that are suitable and unsuitable for open ocean disposal. Further, this document is intended as a pathway to sediment management within Newport Harbor. It will be updated, as warranted, to reflect changes in policy, availability of new technology to treat contaminated sediment, new disposal options, or changes in conditions.

1.1 Overview and Need for Sediment Management Plan

As previously described, USACE, in partnership with the City, is planning to conduct maintenance dredging in the Federal Channels in Lower Newport Bay to maintain authorized depths. Based on the pre-dredge sediment investigation, portions of the Federal Channels, including the Turning Basin and portions of Main Channel and Newport Channel, were determined to be unsuitable for unconfined open-water disposal because of elevated mercury and/or PCBs. Approximately 106,900 cubic yards (cy) of impacted material will require management. During the previous Federal Channels program in 2012 and 2013, approximately 120,000 cy of impacted material were placed at the Port of Long Beach's (POLB's) Middle Harbor Fill Site. Currently, there are no regional fill projects accepting material that would be available for the current Federal Channels program.

In addition to the Federal Channels, impacted sediments in other portions of Newport Bay have been determined unsuitable for open ocean disposal and thus require management. Since the mid-1970s, the City has maintained a Regional General Permit (RGP) 54 that provides a relatively streamlined process for permitting small dredging and dock maintenance projects between the bulkhead and pierhead lines in Newport Harbor. The City maintains and renews the sediment suitability for RGP 54 every 5 years. The most recent sediment investigation indicated that some areas required additional confirmatory sampling for mercury, DDTs, and/or PCBs prior to unconfined open-water disposal. Areas exceeding the confirmatory thresholds would be excluded from RGP 54. In addition, other areas of Lower Newport Bay are excluded from RGP 54 due to the presence of elevated chemical concentrations, including Promontory Bay, Balboa Yacht Basin, and Rhine Channel. In 2011, approximately 80,000 cy of impacted sediment were removed from Rhine Channel and placed at the POLB's Middle Harbor Fill Site. While that project was successful at removing a large amount of impacted sediments, some residual material remains on the surface, which may also require additional management.

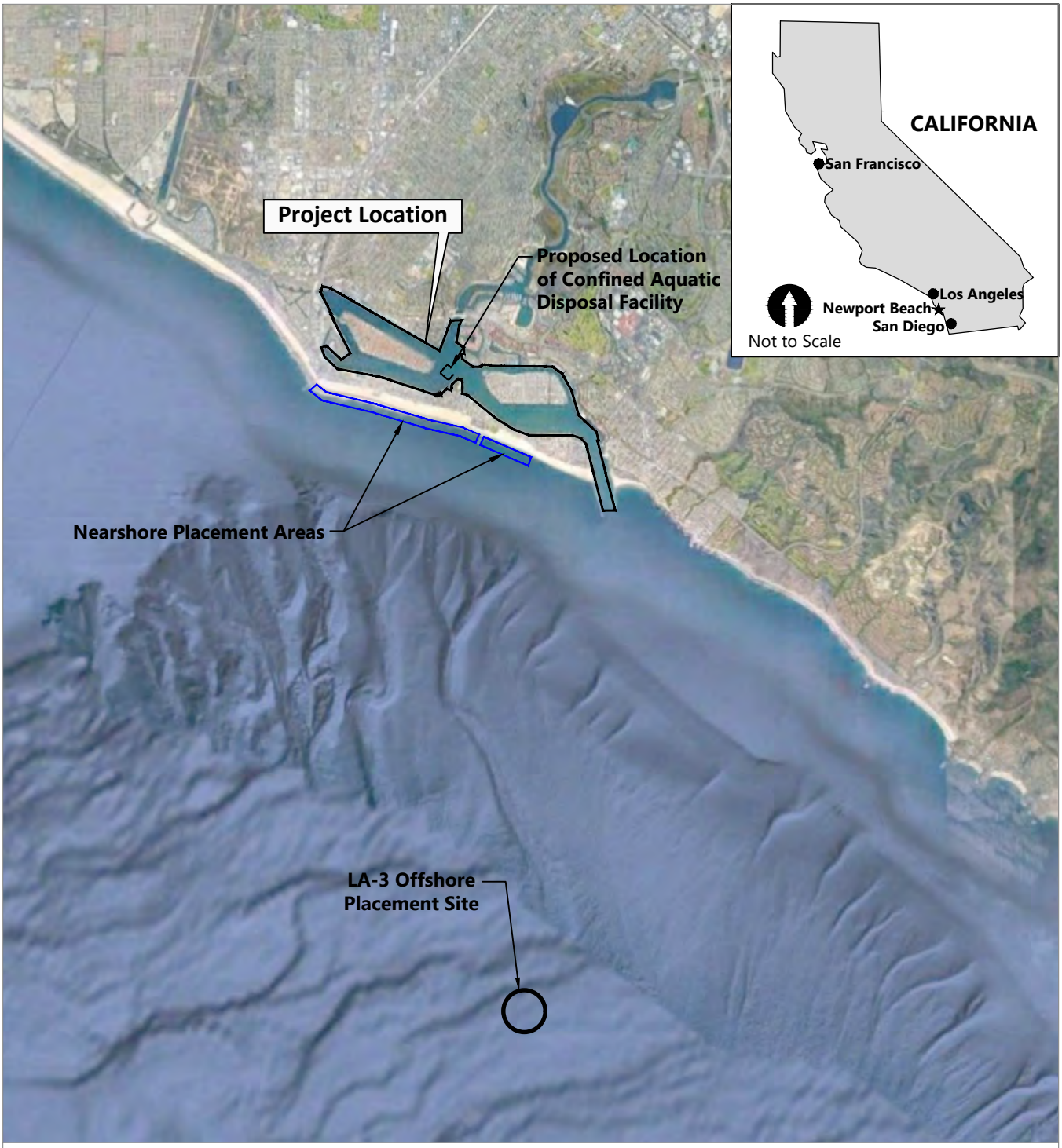
Currently, there are limited sediment management alternatives for sediments unsuitable for open ocean disposal in Newport Bay. Transporting and disposing of this material to an upland landfill is expensive and would cause impacts to air quality, traffic, noise, and other aspects associated with hauling the material via trucks on the local roads and highways. The City previously had the ability to manage impacted material at the POLB's Middle Harbor Fill Site, but this site is closed and no longer an option for future sediment management needs. Port fill sites are rare opportunities, and when they do arise, they are only able to receive sediment for a relatively short amount of time and usually from local sources within close proximity. The City is currently pursuing development of a Confined Aquatic Disposal (CAD) facility within Newport Harbor. The use of CAD sites to manage impacted sediments has been proven successful both nationally and internationally, with many examples across the United States. Locally, the North Energy Island Borrow Pit was developed in Long Beach approximately 20 years ago, and the Port Hueneme CAD site was developed approximately 10 years ago. There are currently two additional CAD sites in development within the POLB for their internal sediment management needs. Developing a CAD cell dedicated to Newport Harbor's material would provide a cost-effective and environmentally protected alternative for sediment management.

1.2 Setting: Newport Bay

The Newport Bay/San Diego Creek watershed is located in Central Orange County in the southwest corner of the Santa Ana River Basin, about 35 miles southeast of Los Angeles and 70 miles north of San Diego (Figure 1). The watershed encompasses 154 square miles and includes portions of the cities of Newport Beach, Irvine, Laguna Hills, Lake Forest, Tustin, Orange, Santa Ana, and Costa Mesa. Mountains on three sides encircle the watershed; runoff from these mountains drains across the Tustin Plain and enters Upper Newport Bay via San Diego Creek. Newport Bay is a combination of

two distinct waterbodies, Upper and Lower Newport Bay, which are generally divided by the Pacific Coast Highway Bridge. The majority of commerce and recreational boating exists in Lower Newport Bay, which is highly developed. Upper Newport Bay contains both a diverse mix of development in the lower reach and an undeveloped ecological reserve in the upper reach.

The rich history of agricultural and industrial activities in the watershed has resulted in a legacy of sediment contamination in Newport Bay. This contamination is specifically a result of historical releases from industrial sources and storm drains adjacent to the bay as well as ongoing runoff from the surrounding watershed. Contaminants of concern include metals, pesticides, and PCBs.



SOURCE: Image from Bing Maps.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83
VERTICAL DATUM: Mean Lower Low Water (MLLW)

Approximate Project Location:
33° 36.540', 117° 54.230'

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Miles

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Filepath: K:\Projects\0243-City of Newport Beach\Federal Channel\0243-RP-025 SMP VIC.dwg Figure 1

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Figure 1
Vicinity Map

Sediment Management Plan
Lower Newport Bay

1.3 Regional Sediment Management Regulatory Process

Dredging, disposal, and the long-term management of contaminated sediments in Orange County, Los Angeles County, and Ventura County are overseen by the DMMT. The DMMT includes representatives from USACE, USEPA, the National Marine Fisheries Services (NMFS), the California Coastal Commission (CCC), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife. This group is responsible for reviewing sampling plans, analyzing results, and making suitability determinations for Southern California dredging projects using guidance developed by the Contaminated Sediments Task Force (CSTF). The CSTF was formed in 1998 and includes the same regulatory and resource agencies as well as members of the POLB, Port of Los Angeles, City of Long Beach, Los Angeles County Beaches and Harbors, Heal the Bay, and other interested parties. The objective of the CSTF was to develop a Long-Term Management Strategy (LTMS) for the characterization, management, and beneficial reuse of contaminated sediments (CSTF 2005).

A similar process was initiated by USACE to develop a regional dredge material management plan (DMMP) that focused on materials within Federal Channels and included both clean and contaminated material management options (Everest and Anchor 2009). The sediment management strategies presented in this SMP are consistent with the regional policies, goals, strategies, and recommendations outlined in both the LTMS (CSTF 2005) and DMMP (Everest and Anchor 2009).

1.4 Regional General Permit 54

For approximately 40 years, the City has maintained RGP 54, which provides a relatively streamlined process for permitting small dredging and dock maintenance projects between the bulkhead and pierhead lines in Newport Harbor. The permit authorizes small-scale maintenance dredging for public and residential docks and commercial marinas within the harbor and outside of the federal government's responsibility. The permit includes approvals from USACE, RWQCB, and CCC. While the individual permits and approvals from each respective agency have different expiration dates, the City maintains and renews the sediment suitability every 5 years. The renewal includes a comprehensive bay-wide sediment investigation to evaluate suitability of proposed dredged material for beach nourishment or ocean disposal.

Under the existing RGP 54, the City and residential/commercial property owners are authorized to dredge to a maximum depth of -10 feet mean lower low water (MLLW), plus 2 feet of overdredge allowance. Individual projects are limited to no more than 8,000 cy, with a harbor-wide annual maximum volume of 75,000 cy for all projects. There are three disposal options currently approved by all agencies, including open ocean disposal, in-harbor beach nourishment, and upland disposal. The City is proposing two new alternatives in the latest permit renewal (nearshore ocean placement and disposal within a CAD site).

1.5 Toxics Total Maximum Daily Load for Newport Bay

As part of California's 1996 and 1998 Section 303(d) lists, RWQCB identified Newport Bay and San Diego Creek as water quality limited due to several toxic pollutants and designated the watershed as a high priority for Total Maximum Daily Load (TMDL) development. In 2002, USEPA established *Total Maximum Daily Loads for Toxic Pollutants in San Diego Creek and Newport Bay, California* (Toxics TMDL; USEPA 2002). A summary of toxic pollutants per waterbody is presented in Table 1. Sediment TMDLs specific to Lower Newport Bay and Rhine Channel included copper, chromium, lead, mercury, selenium, zinc, chlordane, dieldrin, DDTs, and PCBs (Table 1). As a result of the sediment TMDLs, some areas of Newport Harbor have been determined by the RWQCB to be above compliance thresholds and thus would be candidates for management (which could include removal and management), further supporting the benefits of an in-harbor CAD cell.

Table 1
Summary of Toxic Pollutants per Waterbody Listed in the Harbor Toxics TMDL (USEPA 2002)

Waterbody	Metals	Organic Compounds
San Diego Creek (freshwater)	Cadmium, copper, lead, selenium, and zinc	Chlorpyrifos, diazinon, chlordane, dieldrin, DDTs, PCBs, and toxaphene
Upper Newport Bay	Cadmium, copper, lead, selenium, and zinc	Chlorpyrifos, chlordane, DDTs, and PCBs
Lower Newport Bay	Copper, lead, selenium, and zinc	Chlordane, dieldrin, DDTs, and PCBs
Rhine Channel	Copper, chromium, lead, mercury, selenium, and zinc	Chlordane, dieldrin, DDTs, and PCBs

2 Existing Sediment Quality Conditions

This section summarizes existing sediment quality conditions for Newport Bay based on the most recent sediment investigations conducted for the Federal Channels dredging program (Anchor QEA 2019) and RGP 54 (Anchor QEA 2018). In addition, existing sediment quality conditions are presented for other areas of Lower Newport Bay that are excluded from RGP 54, including Balboa Yacht Basin and Promontory Bay (Anchor QEA 2013a, 2013b, 2013c) and Rhine Channel (Anchor QEA 2013d).

2.1 Lower Newport Federal Channels

The City and USACE are proposing to conduct dredging within the Federal Channels in Lower Newport Bay (Figure 2). Dredging is needed in areas of increased shoaling to improve navigation and maintain federal authorized design depths. The Federal Channels were most recently dredged between May 2012 and January 2013, at which time dredging to depths of -10 to -17 feet MLLW was performed throughout large areas of Lower Newport Bay. Contaminated material was placed at the POLB's Middle Harbor Fill Site and clean material was placed at the USEPA-designated LA-3 offshore disposal site (Figure 1). During this time, the Federal Channels were only partially dredged and not to the full authorized design depth. This was in part due to funding availability and capacity at the POLB's Middle Harbor Fill Site.

Based on the 2018 USACE harbor-wide bathymetric surveys, sedimentation has occurred in many areas of Lower Newport Bay such that dredging is needed within the Federal Channels to maintain safe navigation. The City is pursuing this program, in partnership with USACE, to dredge the Federal Channels to the currently authorized design depths, ranging from -10 to -20 feet MLLW. Areas that require the most dredging include the Entrance Channel, Main Channel North, Bay Island, Turning Basin, and Newport Channel (Figure 2). Dredging each of these areas is estimated to result in the sediment volumes summarized in Table 2, which includes 2 feet of overdredge allowance.

In December 2017, the City, as the local sponsor, initiated a sediment characterization study to determine the suitability of proposed dredged material from the Federal Channels for ocean disposal at the LA-3 offshore disposal site (Figure 1; Anchor QEA 2019). Sediment from the Entrance Channel was also evaluated to determine compatibility for nearshore placement. Sediment core sampling was conducted within the Turning Basin, Main Channel North, Bay Island, and the Entrance Channel in January 2018. Sediment cores were collected at 48 stations within 11 dredge units and composite samples were submitted for physical and chemical analysis and biological testing. Newport Channel was not initially included as part of the sediment characterization because of historical contamination but was added following exploratory sampling within the area that indicated sediments may be suitable for unconfined open-water disposal. Additional sampling was conducted at 12 stations in Newport Channel in January 2019. Based on individual core chemistry and coordination with USEPA, two composite samples were submitted for physical and chemical analysis and biological testing. The

western portion of Newport Channel (Newport Channel 1; Figure 2) was eliminated from the investigation because of elevated mercury.

Benthic and water column bioassay testing indicated that sediments were not acutely toxic to aquatic life. Bioaccumulation testing indicated low bioaccumulation potential, with all concentrations less than U.S. Food and Drug Administration (FDA) action levels and those that have been shown to cause toxicity to marine invertebrates. Based on composite sample results, archives from individual cores were analyzed for mercury, PCBs, and/or DDTs to further delineate the extent of contamination. Mercury, total DDT, and total PCB concentrations for individual core samples are presented in Appendix A.

Based on sediment chemistry results and effects-based testing (i.e., toxicity and bioaccumulation), sediments from Main Channel 3, 4, and 5, Bay Island, Newport Channel 3, and the Entrance Channel were determined suitable for open ocean disposal. In addition, based on the grain size compatibility assessment, the Entrance Channel was also determined to be suitable for nearshore placement. The total volume of material suitable for ocean disposal or nearshore placement is approximately 933,700 cy (Table 2). Because of elevated concentrations of mercury and/or PCBs, the Turning Basin and portions of Main Channel North 1 and 2 and Newport Channel 1 were deemed unsuitable for open ocean disposal, as shown in Figure 3. These sediments will require an alternative disposal option. The total volume of material unsuitable for unconfined open-water disposal is approximately 106,900 cy (Table 2).

Table 2
Federal Channels Maintenance Dredging Estimated Volumes and Suitability for Ocean or Nearshore Placement

Federal Channels	Design Depth (feet MLLW)	Estimated Volume to Design Depth (cy)	2-Foot Overdredge Allowance Volume (cy)	Total Volume (cy)	Suitable for Open Ocean Disposal (cy)	Not Suitable for Open Ocean Disposal or Nearshore Placement (cy)
Entrance Channel	-20	51,700	19,200	70,900	70,900[1]	0
Main Channel 1	-20	36,600	26,600	63,200	43,200	20,000
Main Channel 2	-20	37,600	23,200	60,800	40,400	20,400
Main Channel 3	-20	44,600	38,800	83,400	83,400	0
Main Channel 4	-20	28,300	26,700	55,000	55,000	0
Main Channel 5	-20	50,200	39,600	89,800	89,800	0
Turning Basin	-19[2]	5,200	14,300	19,500	0	19,500
Bay Island Area	-15	210,900	135,900	346,800	346,800	0
Newport Channel 1	-15	28,300	18,700	47,000	0	47,000
Newport Channel 2	-15	85,800	39,600	125,400	125,400	0
Newport Channel 3	-15	54,200	24,600	78,800	78,800	0
	Total	**633,400**	**407,200**	**1,040,600**	**933,700**	**106,900**

Notes:
All volumes include 3H:1V perimeter side slopes.
Volumes are based on the June 2018 conditional survey conducted by USACE for the City.

1. Suitable for nearshore placement and open ocean disposal
2. Because most of the Turning Basin is already at design depth of -20 feet MLLW, only the shoaled spots around the periphery of the Turning Basin are proposed for dredging. Therefore, a reduced design depth of -19 feet MLLW, plus 2 feet of overdredge allowance, is applied to the Turning Basin.

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Figure 2
Overview of Authorized Design Depths, Dredge Units, and Bathymetry for Federal Channels Maintenance Dredging

Sediment Management Plan
Lower Newport Bay

SOURCE: Drawing prepared from Bing Maps. Bathymetric contours from U.S. Army Corps of Engineers survey dated June 2018. Dredge units from U.S. Army Corps of Engineers.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

- Authorized Federal Channel Limits and Dredge Unit Boundaries
- (-20) Authorized Depth
- —10— Existing Bathymetry
- Dredged Material Not Suitable for Open Ocean or Nearshore Disposal
- Dredged Material Suitable for Open Ocean or Nearshore Disposal
- Nearshore Placement Area

0 1,800
Feet

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Filepath: K:\Projects\0243-City of Newport Beach\Federal Channel\0243-RP-018 SMP SUITABILITY.dwg Figure 3

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Figure 3
Federal Channels Maintenance Dredging Sediment Suitability Map

Sediment Management Plan
Lower Newport Bay

2.2 Regional General Permit 54 Managed Areas

As previously described, the City maintains and renews the RGP 54 sediment suitability every 5 years. The most recent bay-wide sediment investigation for suitability renewal was conducted from 2017 to 2018 (Anchor QEA 2018). During this investigation, proposed dredged material was evaluated for beach nourishment, nearshore placement, or ocean disposal at the USEPA-designated LA-3 offshore disposal site (Figure 1). Although nearshore placement was not included as part of the existing RGP 54, the City wanted flexibility in the next permit reauthorization to allow for placement at nearshore ocean beaches.

In September and October 2017, sediment core sampling was conducted at 54 stations within five areas and composite samples were submitted for physical and chemical analysis and biological testing. Benthic and water column bioassay testing indicated that sediments were not acutely toxic to aquatic life. Bioaccumulation testing indicated low bioaccumulation potential, with all concentrations less than FDA action levels and those that have been shown to cause toxicity to marine invertebrates. Based on the results of composite sediment chemistry, individual core samples from Area 1 were analyzed for mercury and PCBs, and individual core samples from Area 5 were analyzed for mercury, as requested by USEPA. Based on these results, additional sediment cores were collected in April 2018 to further delineate the horizontal extent of mercury and/or PCBs. Mercury and/or total PCB concentrations for individual stations within Areas 1 and 5 are presented in Appendix B.

Based on results of chemical and biological analyses and negotiations with the DMMT, the RGP 54 boundaries for the sediment suitability renewal are presented in Figure 4. Much of the material was determined to be suitable for unconfined aquatic disposal; however, certain areas of the harbor require additional confirmatory sampling for both the dredge cut and/or predicted Z layer[1] prior to beneficial reuse or open-water disposal. If confirmatory testing exceeds thresholds, sediments will require alternative disposal or management options and would not qualify under RGP 54. Promontory Bay, Balboa Yacht Basin, and Rhine Channel were not tested as part of this investigation due to historical contamination and are excluded from RGP 54 (Sections 2.3 and 2.4).

[1] The new surface following dredging to authorized depth and overdepth.

LEGEND:

- Suitable to -10 feet MLLW plus 2 feet of overdepth for unrestricted disposal at the LA-3 ODMDS. Grain size required prior to beach replenishment or nearshore placement to demonstrate suitability.
- Suitable to -7 feet MLLW plus 1 foot of overdepth for unrestricted disposal at the LA-3 ODMDS. Z-layer testing to confirm post-dredge surface contains mercury less than 1 ppm prior to dredging to demonstrate newly exposed surface is clean. Grain size required prior to beach replenishment or nearshore placement to demonstrate suitability.
- Area not included under RGP 54.
- Material proposed for disposal at LA-3 ODMDS must have chemical testing for mercury with agency concurrence to verify suitability prior to disposal. Z-layer testing is required to confirm post-dredge surface contains mercury less than 1 ppm prior to dredging to demonstrate newly exposed surface is clean. Material proposed for beach replenishment or nearshore placement must also have grain size verification prior to placement.
- Material proposed for disposal at LA-3 ODMDS must have chemical testing for mercury and PCBs with agency concurrence to verify suitability prior to disposal. Z-layer testing is required to confirm post-dredge surface contains mercury less than 1 ppm and PCBs less than 100 ppb prior to dredging to demonstrate newly exposed surface is clean. Material proposed for beach replenishment or nearshore placement must also have grain size verification prior to placement.
- Suitable to -10 feet MLLW plus 2 feet of overdepth for unrestricted disposal at the LA-3 ODMDS. Material proposed for beach replenishment or nearshore placement must have grain size verification and chemical testing for DDTs with agency concurrence to verify suitability prior to placement. Z-layer testing is required to confirm post-dredge surface contains DDT concentrations less than 18.0 ppb*.

SOURCE: Aerial from Bing Maps. Coastline extents from City of Newport Beach.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTE:
Areas included in RGP 54 are generally between the bulkhead and pierhead lines with the shoreline/boundary demarcated by the various colors/hatched lines. The colored lines, whether solid or dashed, always follow the shoreline rather than following individual fingers or docks. ODMDS (Ocean Dredged Material Disposal Site) and ppm (parts per million).

* Represents the 95% Upper Confidence Limit for surface sediment concentrations within the RGP permit area.

0 2000
Feet

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Filepath: K:\Projects\0243-City of Newport Beach\Federal Channel\0243-RP-019 SUITABLE.dwg Figure 4

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Figure 4
RGP 54 Boundaries
Sediment Management Plan
Lower Newport Bay

2.3 Areas Excluded from Regional General Permit 54

2.3.1 Balboa Yacht Basin and Promontory Bay

Historically, Balboa Yacht Basin and Promontory Bay were not included in RGP 54 (Figure 4). In 2013, as part of the RGP 54 bay-wide sediment investigation, sampling and testing was performed in these areas to provide a means for conducting maintenance dredging (Anchor QEA 2013a, 2013b). Phase I of the sediment investigation consisted of preliminary metals analysis on selected stations that potentially contained elevated levels of contaminants to determine whether they should be included within the larger composite areas or eliminated from further testing. Balboa Yacht Basin and Promontory Bay were new to the RGP 54 program; therefore, it was unknown whether concentrations of contaminants were elevated. Based on this preliminary analysis, sediment from Balboa Yacht Basin (Station 4-14) and Promontory Bay (Stations 4-15 and 4-16) were found to be unsuitable for ocean disposal based on elevated metals concentrations. Within Balboa Yacht Basin, mercury (1.91 mg/kg) was greater than the USEPA recommended threshold of 1.0 mg/kg and zinc (521 mg/kg) was greater than the effects range median (ERM)[2] value. Within Promontory Bay, mercury (1.39 mg/kg) was greater than the USEPA recommended threshold and zinc (580 mg/kg) and copper (411 mg/kg) were greater than the ERM value at one station (Station 4-16). Balboa Yacht Basin and Promontory Bay were not sampled as part of the subsequent RGP 54 renewal in 2018 and remain excluded from the existing RGP 54.

Based on the elevated metals concentrations within Promontory Bay, additional exploratory samples were collected following completion of RGP 54 sampling to further evaluate the extent of contamination (Anchor QEA 2013c). Three sediment grab samples (Stations 4-17-SG through 4-19-SG) and two sediment cores (Stations 4-20 and 4-21) were collected and submitted for metals analysis. Within these samples, mercury (1.05 mg/kg and 1.51 mg/kg) was greater than the USEPA recommended threshold at two stations (Stations 4-20 and 4-21), copper (293 mg/kg and 365 mg/kg) was greater than the ERM at two stations (Stations 4-18-SG and 4-19-SG), and zinc (520 mg/kg) was greater than the ERM at one station (Station 4-19-SG).

Existing bathymetry and sampling locations within Promontory Bay and Balboa Yacht Basin are presented in Figure 5. Mercury, copper, and zinc concentrations within Promontory Bay and Balboa Yacht Basin are presented in Appendix C. Based on these data, material expected to be unsuitable for open ocean disposal due to ERM or USEPA recommended threshold exceedances is presented in Figure 6. Based on existing data within Promontory Bay and Balboa Yacht Basin, the total volume of material expected to be suitable for ocean disposal is approximately 19,000 cy, pending a full Tier III evaluation (Table 3). The total volume of material expected to be unsuitable for unconfined open-

[2] While not designed as a regulatory limit for remediation, ERM values are typically used as guidance values for areas that likely would require separate management and would not be suitable for open ocean disposal at a USEPA-managed site. For panning purposes, this document uses ERM values as a screening tool for estimating potential sediment management volumes.

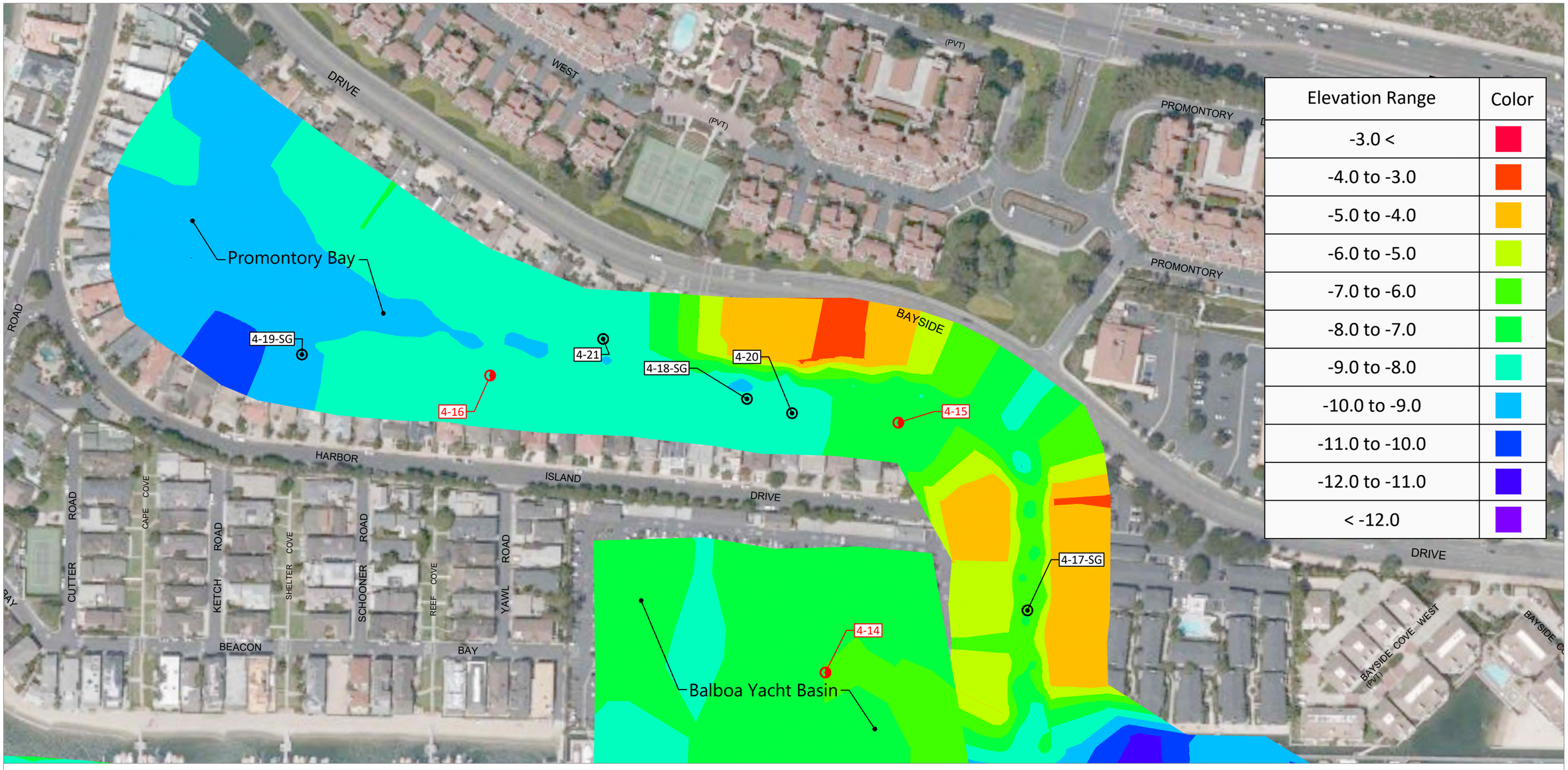
water disposal is approximately 50,000 cy. However, as shown in Figure 5, dredging is only required within the entrance of Promontory Bay to maintain adequate navigational depths. Within this area, depths range from -4 to -7 feet MLLW. Based on existing data, sediment from the entrance of Promontory Bay is expected to be suitable for open ocean disposal (Figure 6); therefore, only a small amount of material from within Promontory Bay would require an alternative disposal location at this time. Data within these areas are limited; therefore, additional sampling and analysis and updated bathymetric surveys would be required within Promontory Bay and Balboa Yacht Basin to fully delineate the extent of metals contamination and better define the volume of material that would require an alternative disposal location.

Table 3
Balboa Yacht Basin and Promontory Bay Estimated Volumes and Expected Suitability for Ocean Disposal

Area	Design Depth (feet MLLW)	Estimated Volume to Design Depth (cy)	1-Foot Overdredge Allowance Volume (cy)	Total Volume (cy)	Expected Suitable for Open Ocean Disposal (cy)	Expected Not Suitable for Open Ocean Disposal (cy)
Promontory Bay	-10	28,000	16,000	44,000	19,000	25,000[1]
Balboa Yacht Basin	-10	18,000	7,000	25,000	0	25,000
	Total	**46,000**	**23,000**	**69,000**	**19,000**	**50,000**

Note:

1. Based on existing bathymetry, only a small portion of this material requires dredging.



SOURCE: Promontory Bay survey from USACE, July 16 - August 5, 2019. Balboa leadline survey from September 15, 2019. Aerial provided by Bing Maps.

HORIZONTAL DATUM: California State Plane ,Zone VI North American Datum of 1983 (NAD83), U.S. Survey Feet

VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

- Exploratory Sampling Locations (2013)
- RGP 54 Sampling Locations (2013)

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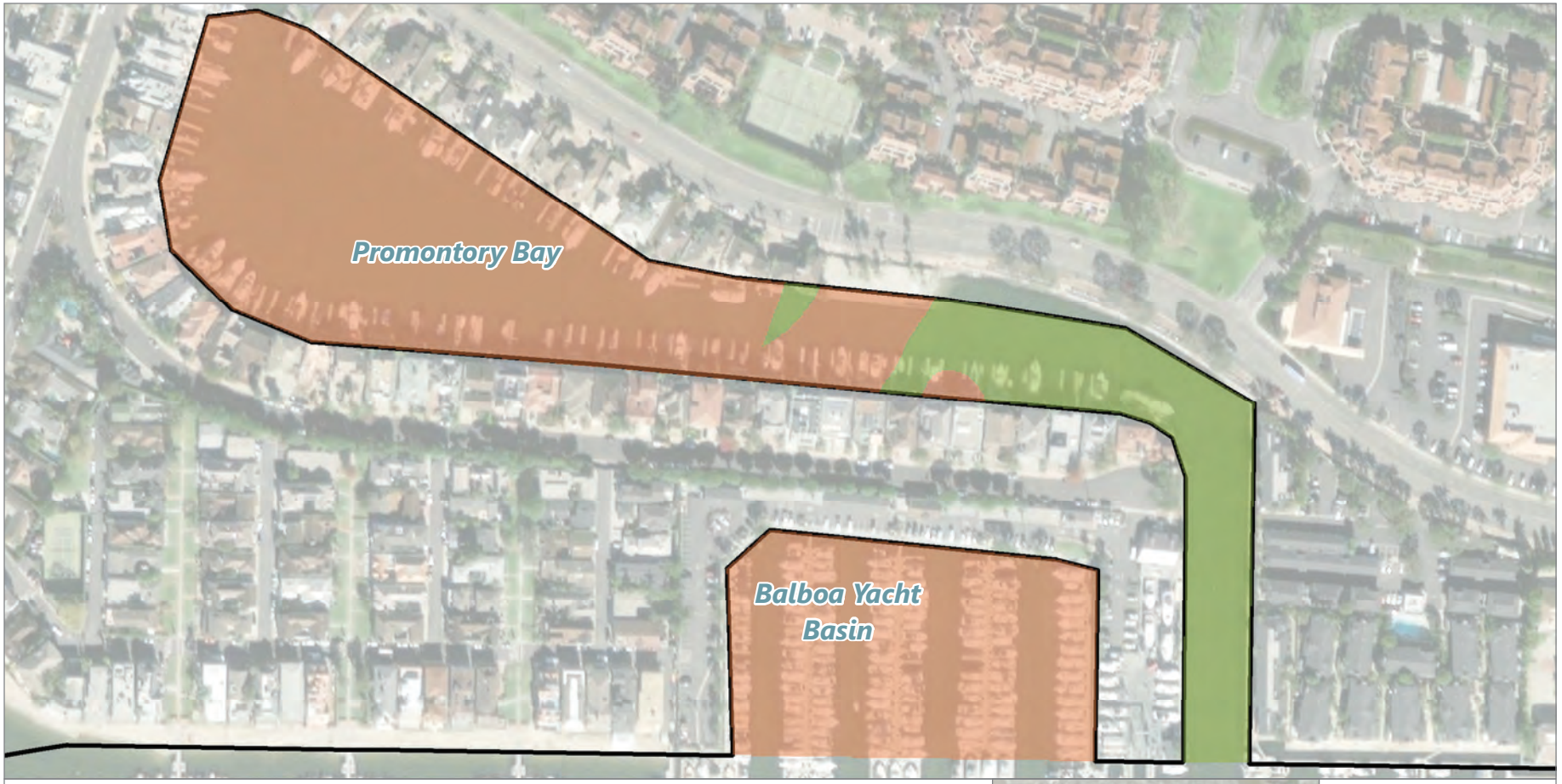
Filepath: K:\Projects\0243-City of Newport Beach\Federal Channel\0243-RP-027 RGP 54 Promontory Bay.dwg Figure 5

ANCHOR QEA

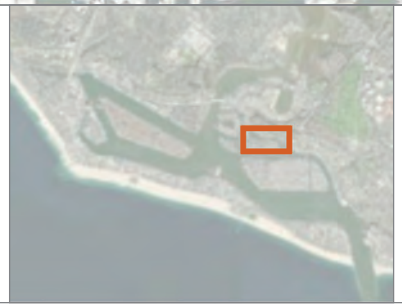
Figure 5
Existing Bathymetry and Sampling Locations within Promontory Bay and Balboa Yacht Basin

Sediment Management Plan
Lower Newport Bay



LEGEND:

- Dredged Material Not Expected to be Suitable for Open Ocean Disposal
- Dredged Material Expected to be Suitable for Open Ocean Disposal



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ANCHOR QEA

Figure 6
Expected Sediment Suitability within Promontory Bay and Balboa Yacht Basin
Sediment Management Plan
Lower Newport Bay

2.3.2 Rhine Channel

During the past 80 years, the Rhine Channel has served as the primary industrial area in Lower Newport Bay with current and past businesses including boatyards, metal plating facilities, and a seafood cannery (Anchor 2006). While some small boatyards and retail boat suppliers are still located along the Rhine Channel, the area is currently in transition from an industrial area to a residential and recreational area. Prior to 2011, the channel had not been dredged since its construction in circa 1920, and sediments were known to contain elevated concentrations of metals, polycyclic aromatic hydrocarbons, pesticides, and PCBs from decades of industrial discharges and stormwater runoff. As described in Section 1.5, USEPA released the Toxics TMDL in 2002, which contained TMDLs for several chemicals in Rhine Channel, including copper, chromium, lead, mercury, selenium, zinc, chlordane, dieldrin, DDTs, and PCBs (Table 1).

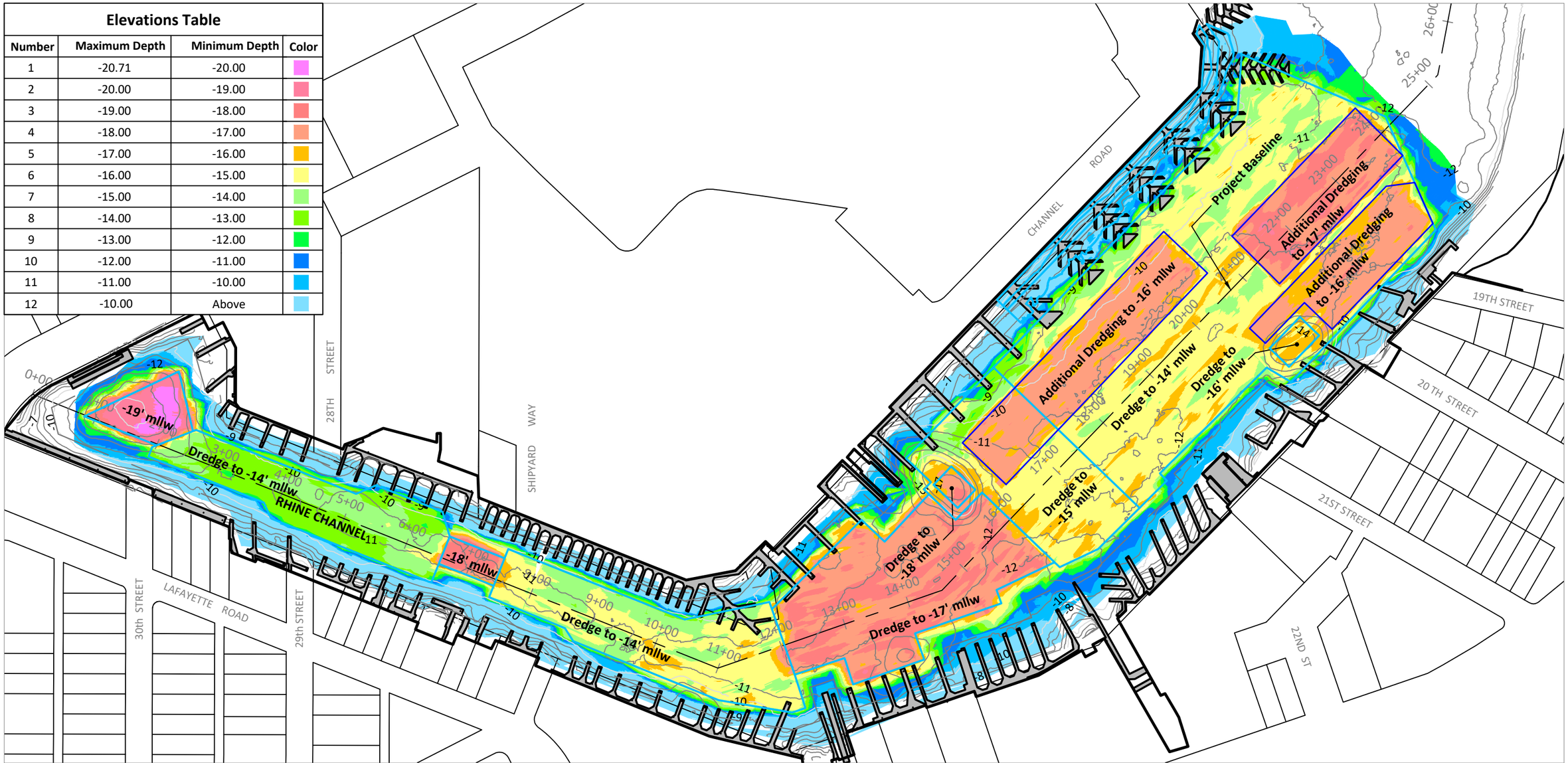
In 2006, a Feasibility Study was conducted to develop and evaluate remediation alternatives with the goal of restoring beneficial uses to Rhine Channel (Anchor 2006). Based on this evaluation, "Dredging with Upland Landfill Disposal" was selected as the preferred alternative. In May 2010, the POLB began accepting material for its Middle Harbor Fill Site, which presented an opportunity for beneficial use of contaminated sediment from the region. In 2011, approximately 80,000 cy of impacted sediment were removed from Rhine Channel and beneficially reused at the POLB's fill site. With the exception of one property located along the southeast end of Lido Isle, dredging was not performed along bulkhead structures in order to maintain geotechnical and structural stability adjacent to private, landside structures; therefore, some impacted sediments were left in place along the perimeter of Rhine Channel. A summary of dredge depths and final elevations is presented in Figure 7.

In compliance with RWQCB requirements, post-dredge sediment sampling and analysis was performed to verify removal of chemically impacted sediment and to determine final surface sediment chemical concentrations (Anchor QEA 2013d). This post-dredge investigation represents existing sediment quality conditions within the Rhine Channel. Sediment cores were collected at 11 stations within the dredge footprint of Rhine Channel to verify successful removal of chemically impacted sediments, and sediment grab samples were collected at 12 stations, as requested by RWQCB, to evaluate the new surface layer from a TMDL perspective.

Within the dredge area (excluding the perimeter of Rhine Channel), a comparison of surface-weighted average concentrations (SWACs) to pre-dredge weighted average concentrations indicated an 8% to 84% reduction in concentrations for all contaminants of concern. Although the SWAC of copper, mercury, and PCBs exceeded the TMDL numeric target from 0 to 0.5 foot, concentrations were all reduced when compared to pre-dredge concentrations.

As previously described, dredging was not performed along bulkhead structures in order to maintain geotechnical and structural stability adjacent to private, landside structures, resulting in approximately 26,000 cy of impacted material that was left in place along the perimeter of Rhine Channel. Based on post-dredge confirmatory sampling, some elevated dredge residuals remain in limited areas of the Rhine Channel. These residuals were found as thin layers of fine-grained material that resuspended during dredging and settled back onto the newly dredged surface. In some areas, it appears that material from the perimeter of the Rhine Channel had sloughed into the previously dredged area and created a thickened residual layer. Residuals are common in dredging projects where sediments are very fine grained. In general, surface sediment concentrations have improved, but a thin veneer of impacted residuals remains over the dredge footprint. Because the previous work included a bulk removal of sediment from the Rhine Channel, any potential future management actions would likely be limited to one or more alternate management techniques such as thin-layer capping or in situ treatment. As such, material from the Rhine Channel is not expected to be placed into the CAD cell.

Elevations Table			
Number	Maximum Depth	Minimum Depth	Color
1	-20.71	-20.00	
2	-20.00	-19.00	
3	-19.00	-18.00	
4	-18.00	-17.00	
5	-17.00	-16.00	
6	-16.00	-15.00	
7	-15.00	-14.00	
8	-14.00	-13.00	
9	-13.00	-12.00	
10	-12.00	-11.00	
11	-11.00	-10.00	
12	-10.00	Above	



SOURCE: Drawing prepared from City of Newport Beach and ESRI basemaps, and all Dutra surveys performed as of November 1, 2011.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83, feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES:
Contours shown are from pre-dredge bathymetric survey conducted by Gahagan & Bryant Associates, Inc., on July 1, 2011.

LEGEND:

- Dredge Footprint
- Additional Dredging
- Limits of Work (Top of Slope)
- Existing Docks

0 150
Feet

Publish Date: 2020/05/29 2:50 PM | User: bhurry
Filepath: K:\Projects\0243-City of Newport Beach\Federal Channel\0243-RP-028 Composite Elev Banding.dwg Figure 7

ANCHOR QEA

Figure 7
Dredge Depths and Final Elevations within Rhine Channel

Sediment Management Plan
Lower Newport Bay

2.4 Summary of Existing Conditions

Sediment quality within Newport Harbor was assessed based on the most recent sediment investigations conducted for the Federal Channels dredging program (Anchor QEA 2019) and RGP 54 (Anchor QEA 2018), exploratory and previous RGP 54 sampling at Balboa Yacht Basin and Promontory Bay (Anchor QEA 2013a, 2013b, 2013c), and post-dredge confirmatory sampling at Rhine Channel (Anchor QEA 2013d). These investigations revealed large areas of the harbor that are suitable for unconfined open-water disposal and smaller portions of the harbor that are unsuitable for unconfined open-water disposal, primarily due to elevated mercury and PCB concentrations. DDTs were also elevated within portions of the harbor at concentrations that may require post-dredge residuals management to meet TMDL compliance; however, no material was excluded for open-water disposal based solely on DDT concentrations.

As previously stated, within the Federal Channels, approximately 933,700 cy of sediment were suitable for ocean disposal or nearshore placement, and 106,900 cy of sediment were unsuitable for open-water disposal due to elevated mercury and/or PCB concentrations (Table 2). Areas unsuitable for open-water disposal include the Turning Basin and portions of Main Channel and Newport Channel, as shown in Figure 3.

RGP 54 boundaries are presented in Figure 4. Much of the RGP 54 Plan Area was determined to be suitable for unconfined aquatic disposal; however, within West Newport and around Lido Isle, confirmatory sampling is required to verify mercury and/or PCB concentrations prior to open-water disposal or beneficial reuse (beach replenishment). If confirmatory testing exceeds the RGP-specified thresholds, an alternative disposal location will be required. Other areas requiring only z-layer testing for DDTs include Linda Isle, Bayshore, Harbor Island, and north of Pacific Coast Highway Bridge. These areas are suitable for open-water disposal, but post-dredge residuals management may be required.

Promontory Bay and Balboa Yacht Basin were found unsuitable for open-water disposal based on elevated mercury, as well as copper and zinc, measured in 2013 (Anchor QEA 2013a, 2013b). Based on existing data, areas expected to be suitable and unsuitable for open-water disposal are shown in Figure 6. Areas expected to be unsuitable include the Entrance Channel to Promontory Bay and Balboa Yacht Basin. Based on existing data, the total volume of material expected to be suitable and unsuitable for ocean disposal is approximately 19,000 cy and 50,000 cy, respectively. As previously described, sediment chemistry data within Balboa Yacht Basin and Promontory Bay are limited; therefore, additional sampling and analysis and updated bathymetric surveys would be required to fully delineate the extent of metals contamination and better define the volume of material that would require an alternative disposal location.

3 Overview of Viable Sediment Management Alternatives

Sediment management alternatives in Southern California have been studied thoroughly and documented in two key regional documents: the LTMS (CSTF 2005) and DMMP (Everest and Anchor 2009). The LTMS recommends the following alternatives in order of priority for managing sediments determined to be suitable for unconfined aquatic disposal: beach replenishment, beneficial use in a port fill, in-water or upland storage for later reuse, beneficial reuse as cover material (upland or for a CAD facility), and ocean disposal. The LTMS recommends the following alternatives in order of priority for managing sediments determined to be unsuitable for unconfined open-water disposal: beneficial reuse in a port fill, treatment and other beneficial reuses, disposal in a CAD facility, and landfill disposal. Treatment of sediments for subsequent beneficial reuse is expensive and requires a large area for sediment stockpiling and construction of a treatment facility, which is not readily available or viable in Newport Bay.

Within Newport Bay, past dredging efforts included a combination of ocean disposal, beach or nearshore nourishment, or reuse of unsuitable sediment at the POLB's Middle Harbor Fill Site. Unfortunately, this fill site is no longer an option for management of unsuitable sediment; therefore, other options need to be considered. An overview of viable disposal and beneficial reuse options for Newport Harbor are presented in the following subsections.

3.1 Sediments Suitable for Unconfined Open-Water Placement

An overview of disposal and beneficial reuse options for clean sediment from Newport Harbor are presented in the following subsections.

3.1.1 Beach/Nearshore Nourishment

Beach or nearshore nourishment is a practical reuse option for Lower Newport Bay sediments that are free of chemical contaminants and have comparable grain size and aesthetic characteristics to that of the beach under consideration. Sandy sediments with appropriate characteristics can be placed on eroding beaches or in nearshore areas to widen, build-out, and/or protect the beach areas.

For RGP 54, beach nourishment is the preferred placement alternative. Individual applicants regularly reuse sandy sediments within the harbor. The City is currently proposing to add nearshore placement as part of the RGP 54 renewal to replenish nearshore ocean beaches. The proposed nearshore placement area spans from just south of the Balboa Pier to Newport Pier to the north (Figure 1). Based on the sediment characterization for the Federal Channels maintenance dredging, sandy sediment from the Entrance Channel has chemical and physical characteristics deemed as suitable for nearshore nourishment.

3.1.2 Clean Capping or Cover Material for a Confined Aquatic Disposal Facility or Capping Project

As recommended in the LTMS, sediments suitable for open-water placement may be beneficially reused as capping or cover material for a CAD facility or capping project. Capping involves the placement of clean sediment over contaminated material to chemically isolate underlying sediments. For a CAD facility, contaminated sediment is placed within a submerged depression and subsequently capped. Alternatively, contaminated sediment may be capped in place. Placement of a thin-layer sand cover is also commonly used for residuals management (USACE 2008a, 2008b). The thin-layer cover is placed to dilute surface sediment concentrations and promote natural recovery.

3.1.3 Open Ocean Disposal

For clean sediment that is not compatible with the receiver beach or nearshore area, sediment may be placed at a designated ODMDS. Prior to disposal, sediment must be tested in accordance with the *Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual* (OTM; USEPA/USACE 1991). Open ocean disposal is a cost-effective alternative that is widely used for maintenance dredging projects in Southern California. Because ocean-disposed dredged sediment does not require a re-handling step, sediment can be dredged and placed directly into a bottom-dump barge, hauled to one of several USEPA-managed open ocean disposal sites, and discharged. The closest open ocean disposal location to Newport Harbor, located approximately 5.4 miles to the south of the Entrance Channel, is the LA-3 ODMDS (Figure 1).

Based on the federal channel sediment characterization described in Section 2.1, select sediment from Main Channel 1 and Main Channel 2 and all sediment from the Entrance Channel, Main Channel 3, Main Channel 4, Main Channel 5, Bay Island Area, Newport Channel 2, and Newport Channel 3 are suitable for open ocean disposal (Table 2; Figure 3; Anchor QEA 2019). Based on the most recent bay-wide sediment investigation for RGP 54, much of the material outside the federal government's responsibility between the bulkhead and pierhead lines are suitable for open ocean disposal (Figure 4; Anchor QEA 2018).

3.2 Sediments Not Suitable for Unconfined Open-Water Placement

An overview of sediment management options for unsuitable sediment from Newport Harbor are presented in the following subsections.

3.2.1 Port Fill

For sediment that is unsuitable for ocean disposal, the preferred management alternative, as outlined in the LTMS and DMMP, is beneficial reuse in a fill project (nearshore confined disposal facility [CDF]). Nearshore CDFs are typically created by constructing a containment dike, placing contaminated dredged sediment and structural fill material (i.e., clean sand) behind a dike, using

weirs to dewater the material, and covering the material with asphalt and/or concrete. The resulting CDF can then be used to support port operations or other future uses.

The City previously had the ability to manage contaminated material at the POLB's Middle Harbor Fill Site, but as of 2018, this site is closed and no longer an option for future sediment management needs. Port fill sites are rare opportunities, and when they do arise, they are only able to receive sediment for a relatively short amount of time, and preference is usually reserved for material requiring management from within the overall port property as a first priority. Currently, there are no regional fill projects accepting material.

3.2.2 Confined Aquatic Disposal

Development of a CAD facility has been shown to be an effective long-term management solution for chemically impacted sediment under the right set of conditions. A CAD facility is constructed underwater by excavating a depression into the existing seabed, into which sediment can be placed, and then capped with a sufficient type and thickness of clean material (e.g., imported sand or dredged sediment) to keep the underlying sediments permanently isolated from the environment (Illustration 1).

The CAD facility concept has been used successfully both internationally and nationally (in northwestern and northeastern states such as Washington and Massachusetts), including the following projects in Southern California over the last 20 years:

1. Port Hueneme, which was jointly developed by the U.S. Navy, USACE, and the Oxnard Harbor District
2. North Energy Island Borrow Pit, located in the City of Long Beach

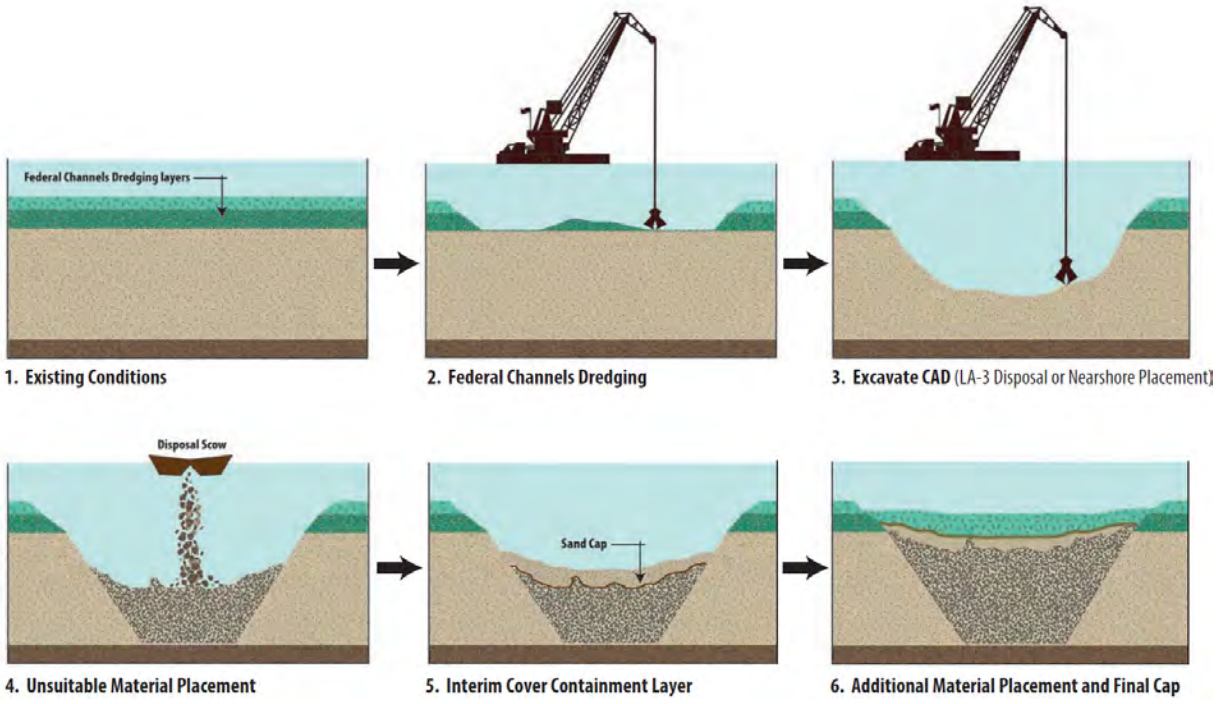
In 2009, the City performed a Feasibility Study for dredged sediment and determined that constructing a CAD facility in Lower Newport Bay was the most cost-effective alternative for managing the City's contaminated sediment (Anchor QEA 2009). Development of the CAD facility was suspended when Rhine Channel sediment was accepted into the POLB's Middle Harbor Fill Site. The CAD facility option was viewed favorably by regulatory agencies as the least environmentally damaging practical alternative. Lower Newport Bay offers a unique opportunity to develop a CAD facility in large part for the following reasons:

1. Newport Harbor is large enough to accommodate such an approach.
2. The sediment that would be removed to create the CAD depression appears to be a good match for nearby beaches—which are in need of nourishment—and would provide a low-cost disposal alternative for suitable sands dredged from within the CAD facility.

This alternative also has the advantage of requiring no re-handling because unsuitable dredged sediments can be placed directly into a bottom-dump haul barge, moved above the CAD facility, and

dropped into the depression which is similar to the process that would be used for open ocean disposal (and with a much shorter transportation distance).

Illustration 1
CAD Construction Overview



3.2.3 Upland Landfill Disposal

For sediments that do not qualify for open ocean disposal, beneficial reuse, or beach nourishment, more costly disposal scenarios must be considered. One commonly used alternative is to haul the sediment to an upland permitted landfill facility. Two factors to consider in determining the suitability of a specific permitted landfill for disposal of dredged sediment are the concentration of contaminants in the sediment and the total quantity of sediment to be disposed. In addition, dredged sediment disposed at a landfill must typically pass the "paint filter" test, which requires that the sediment must be sufficiently dewatered after dredging to prevent drainage during transport and to minimize excess infiltration during disposal.

The concentration of contaminants in dredged sediment determines its waste type and therefore the class of landfill that can accept the material. In California, landfills are identified as Class I, II, or III, as follows:

1. Class I landfills can accept materials that are classified by the State of California as hazardous wastes under Title 22 of the California Code of Requirements (CCR).

2. Class II landfills are similar in design to Class I landfills, but they accept only designated waste that has been determined to be below hazardous waste criteria concentrations.
3. Class III landfills can accept sediment with relatively lower concentrations of contaminants depending on the individual landfill design and location. Each Class III site operator must maintain a certification with the California State Integrated Waste Management Board specifying the facility's waste acceptance criteria and testing requirements in accordance with applicable state and federal discharge regulations.

Landfill disposal of marine sediments is not approved for all landfills within Southern California due to concerns related to salt leaching from the sediments and potential to impact groundwater resources. Los Angeles County has typically not allowed disposal of marine sediments, while in Orange County it is left up to the landfill to make the determination if the material meets the requirements of their waste acceptance permits. Marine sediments are commonly placed in landfills in San Diego County, and several recent examples from the Port of San Diego highlight this practice.

Upland landfill disposal is very expensive for several reasons. First, the sediment must be dewatered prior to transport in order to meet the paint filter test. The dewatering can be accomplished either actively using a mechanical dewatering device (e.g., belt presses, centrifugation, hydrocyclones, or via additives) or passively by constructing a large containment area to hold the sediment until the water evaporates or drains. Both processes require a significant landside staging area adjacent to the harbor. Next, the sediment must be trucked or shipped via railcar to the landfill. Lastly, the sediment would be subject to a tipping fee similar to any other waste product that the landfill receives.

Costs, while high, are not the only perceived disadvantage of upland landfill disposal. A potentially more significant factor on the greater public is the effect of numerous truck hauling trips carrying chemically impacted sediments over City streets and roads for an extended period of time. This activity will pose impacts on noise, emissions, traffic, public street use, and increased wear and tear on road surfacing. Furthermore, several acres of shoreline space will need to be set aside for the project duration to allow for transfer of sediments onto land, their stockpiling, dewatering and drying, water treatment, and placement into the trucks. The Lower Newport Bay area does not currently have any areas well suited for this purpose. Because of the reasons described above, upland landfill disposal is only viable for small volumes of sediment unsuitable for open-water placement.

4 Decision Tree for Sediment Management Alternatives

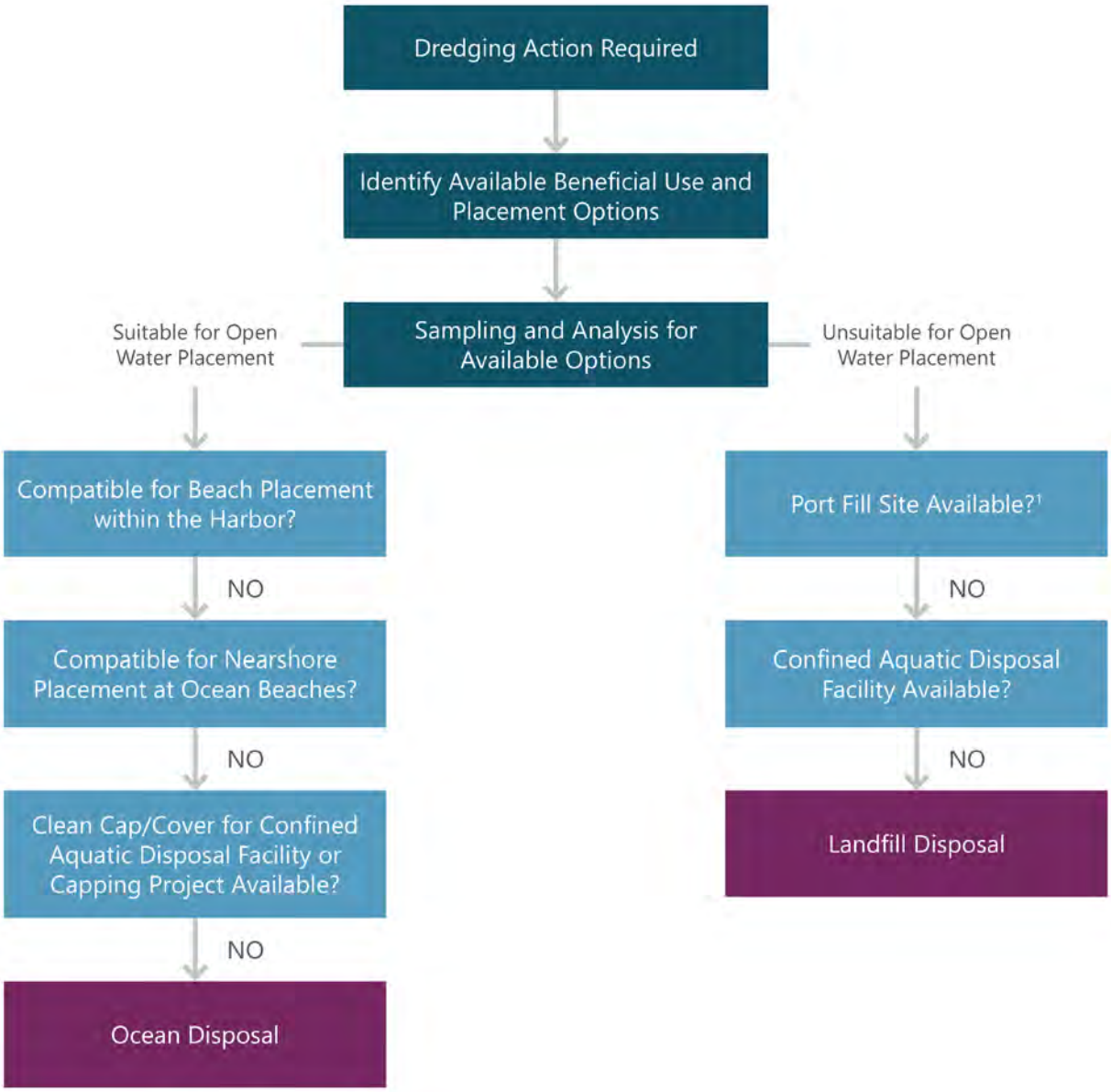
Using the LTMS (CSTF 2005) and DMMP (Everest and Anchor 2009) as a basis, the City's preferred sediment management alternative for sediments that are suitable for open-water placement is beneficial reuse as beach or nearshore nourishment or reuse as clean capping or cover material for a CAD facility or capping project. Sediment that is clean but not compatible with the receiver beach or nearshore area, and for which no other beneficial reuses are available, may be placed at a USEPA-designated ODMDS. The City's preferred sediment management alternative for sediments that are unsuitable for open-water placement is beneficial reuse in a port fill site, placement in a CAD facility, or upland landfill disposal.

Selecting appropriate sediment management alternatives for material suitable and unsuitable for open-water placement should be conducted in accordance with the decision tree shown in Figure 8. Upon determining a required dredging action, a preliminary evaluation of available beneficial reuse options and other regional placement options for material suitable and unsuitable for open-water placement should be conducted. The decision tree indicates the hierarchy of options, presenting two hierarchical pathways for evaluating preferred sediment management alternatives for material suitable and unsuitable for open-water placement. This sequence is appropriate and in compliance with the requirements of the Clean Water Act (CWA) and Marine Protection, Research, and Sanctuaries Act (MPRSA) and with the goals of the LTMS, which include maximizing beneficial reuse of dredged material and minimizing unconfined discharges of dredged material to the ocean or upland landfill disposal.

As shown in Figure 8, preferred sediment management alternatives for material suitable and unsuitable for open-water placement can be evaluated by using one of the two following hierarchical pathways:

1. If sampling and analysis indicates the material is clean, beneficial reuse as beach nourishment within Newport Bay should be considered first. If sediment is not compatible with the receiver beach, material should be evaluated for nearshore placement at ocean beaches. Source material may still be compatible for nearshore beaches despite a slightly lower sand content. If sediment is not compatible for nearshore placement, material should be evaluated for clean capping material if there is a CAD facility or capping project available. Unconfined ocean disposal should be the last alternative to be evaluated and only used for situations in which no other short- or long-term options are practical for clean sediment.
2. If sampling and analysis indicates that the material is contaminated at levels that suggest certain biological impacts, then beneficial reuse as port construction fill should initially be considered. If no immediate port construction fill project is available, then material should be evaluated for placement in a submerged CAD facility if available. If no immediate CAD facility is available or possible in the foreseeable future, then upland landfill disposal should be the last option evaluated and only used if other options are unavailable or not viable.

Figure 8
Decision Tree for Sediment Management Alternatives Assessment



Notes:
Decision tree modified from LTMS (CSTF 2005)
1. Assumes coordination of dredge and fill schedules.

5 Implementation Considerations for Each Sediment Management Alternative

Implementation considerations for each sediment management alternative are provided in the following subsections.

5.1 Sediments Suitable for Unconfined Open-Water Placement

5.1.1 Beach/Nearshore Nourishment

Beach or nearshore nourishment is a practical and cost-effective reuse option for sediments from Lower Newport Bay, with numerous beaches in need of replenishment. For RGP 54, beach nourishment is the preferred placement alternative. Individual applicants regularly reuse sandy sediments within the harbor. The City is currently proposing to add nearshore placement as part of the RGP 54 renewal to replenish nearshore ocean beaches. Factors that affect the cost of beach or nearshore nourishment include transport distance and quantity of material.

Sediments must be free of chemical contaminants and have comparable grain size and aesthetic characteristics to that of the beach under consideration. To determine compatibility with the receiver beach, sediments should be evaluated following guidance provided in the Sand Compatibility Opportunistic Use Program (SCOUP; Moffatt & Nichol 2006) and USACE (1989). Samples should be collected from the project site and receiver beach and analyzed for grain size to determine compatibility. For dredged material under RGP 54 to be suitable for beach nourishment, sediment must comprise at least 80% sand or be within 10% of the receiver beach.

For nearshore placement, grain size results from the project site should be compared to the grain size envelope for the receiver beach. The coarsest and finest gradation curves from the receiver beach should be plotted to create the grain size envelope. Source material samples should be plotted against the grain size envelope to determine compatibility. Based on guidance provided in the SCOUP (Moffatt & Nichol 2006) and USACE (1989), the source material curves should fall within the limits of the grain size envelope, with the following exceptions:

1. The coarse-grained portion of the source material curve may fall outside the envelope and still be considered compatible.
2. The fine-grained portion of the source material curve may also fall outside the envelope; however, the percent fines (less than 0.074 millimeter) shall not exceed that of the finest beach sample by more than 10%.

Other considerations associated with this beneficial reuse alternative include aesthetic impacts and requirements for sensitive and listed species and habitats per the Endangered Species Act (ESA) and

Magnuson-Stevens Fishery Management Act. Additional monitoring may be required during placement to ensure no biological impacts (e.g., grunion monitoring).

5.1.2 Clean Capping or Cover Material for a Confined Aquatic Disposal Facility or Capping Project

Beneficially reusing sediment as clean capping or cover material is a cost-effective regionally accepted management alternative. As previously described, regional examples include the cap for the Port Hueneme CAD facility and the North Energy Island Borrow Pit. Factors affecting the cost of this alternative include the area that requires capping, types of contaminants of underlying sediments, proximity of the capping site to source material, and thickness of capping material required. For clean capping or cover material, the sediment component of the cap should be clean as demonstrated by a Tier III evaluation in accordance with *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Inland Testing Manual* (USEPA/USACE 1998) guidelines. As with any capping project, a long-term monitoring program must be designed as part of this management alternative to evaluate long-term cap stability, containment/isolation of the underlying sediments, and/or biological re-colonization of the cap surface. Best management practices (BMPs) associated with placement of the cap include operational controls, such as reducing the rate of discharge or barge movement during discharge, or site containment such as use of a silt curtain or Gunderboom. Additional implementation considerations for a CAD facility are discussed in Section 5.2.2.

5.1.3 Open Ocean Disposal

Ocean disposal is a cost-effective management strategy commonly used for sediments from Newport Harbor. It is also one of the disposal options currently approved by all agencies under RGP 54; however, it is not the preferred management alternative because it is not considered a beneficial reuse. Factors that affect the cost of ocean disposal include transport distance and quantity of material. As previously described, the closest open ocean disposal location to Newport Harbor is LA-3 ODMDS, located approximately 5.4 miles to the south of the Entrance Channel (Figure 1).

To determine suitability for dredged material for placement at the LA-3 ODMDS, a Tier III evaluation should be conducted in accordance with OTM (USEPA/USACE 1991) guidelines. Testing includes physical and chemical analyses and biological testing. Biological testing includes solid phase (SP) and suspended particulate phase (SPP) toxicity testing and bioaccumulation potential testing. SP tests are conducted to evaluate the potential adverse toxicological impacts of dredged material on the benthic community after placement. SPP tests are conducted to evaluate the potential adverse toxicological impacts of dredged material on organisms that live in the water column during placement. Bioaccumulation tests are designed to evaluate the potential of benthic organisms to accumulate contaminants from sediment.

Transportation and disposal of dredged material at authorized ocean disposal sites are regulated pursuant to Section 103 of the MPRSA. USEPA has final jurisdictional authority over approval of dredged material proposed to be placed at ocean disposal sites, whereas USACE retains the final authority at "inland sites," typically defined as inside the baseline of the territorial seas.

BMPs to reduce water quality impacts associated with transport and placement at an ocean disposal site may include the following: eliminate barge overflow, avoid adverse weather, and seal flat deck barges/scows.

5.2 Sediments Not Suitable for Unconfined Open-Water Placement

5.2.1 Port Fill

The City previously had the ability to manage contaminated material at the POLB's Middle Harbor Fill Site; however, this site is closed and no longer an option for future sediment management needs. Port fill sites provide a rare and cost-effective opportunity to beneficially reuse sediment that is unsuitable for open-water placement. Factors that affect cost include transport distance and quantity of material. For the Middle Harbor Fill Site, the POLB worked closely with third parties and the CSTF to accept fill material from regional partners. The decision to accept material was based on schedule, fill composition, documentation (i.e., permits, insurance, licenses), and geographic source of the material.

A primary concern associated with creating a nearshore CDF is the effect of effluent discharge during and after filling the CDF (Everest and Anchor 2009). Testing to determine suitability for placement at a port fill site includes physical and chemical analyses of bulk sediment and elutriate testing using the effluent elutriate test (EET) in accordance with the *Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, and Upland Confined Disposal Facilities – Testing Manual* (USACE 2003). The EET is used to assess effluent discharged from the CDF (i.e., over the weir structure) after placement. This is consistent with testing that was conducted for placement at the POLB's Middle Harbor Fill Site. Heavily contaminated sediments, including hazardous waste, would not be suitable for placement within a port fill. There may also be restrictions on physical material types for constructability. Medium- and coarse-grained sands provide optimum fill material, and fine sands are also suitable structural material. Some fine-grained material can also be accommodated, but that amount is typically limited.

Regulations governing reuse in a port fill include the following:

1. National Environmental Policy Act (NEPA)
2. California Environmental Quality Act (CEQA)
3. CWA Section 404 and Rivers and Harbors Act Section 10 under the jurisdiction of USACE
4. California Coastal Act under the jurisdiction of CCC

5. CWA Section 401 and Porter-Cologne Waste Discharge Requirements (WDRs) under the jurisdiction of RWQCB

BMPs to minimize loss of sediment during transport and placement may include the following: reduce rate of discharge, reduce barge movement during discharge, place material further away from dike/weir, eliminate barge overflow, and use a silt curtain or Gunderboom.

5.2.2 Confined Aquatic Disposal Site

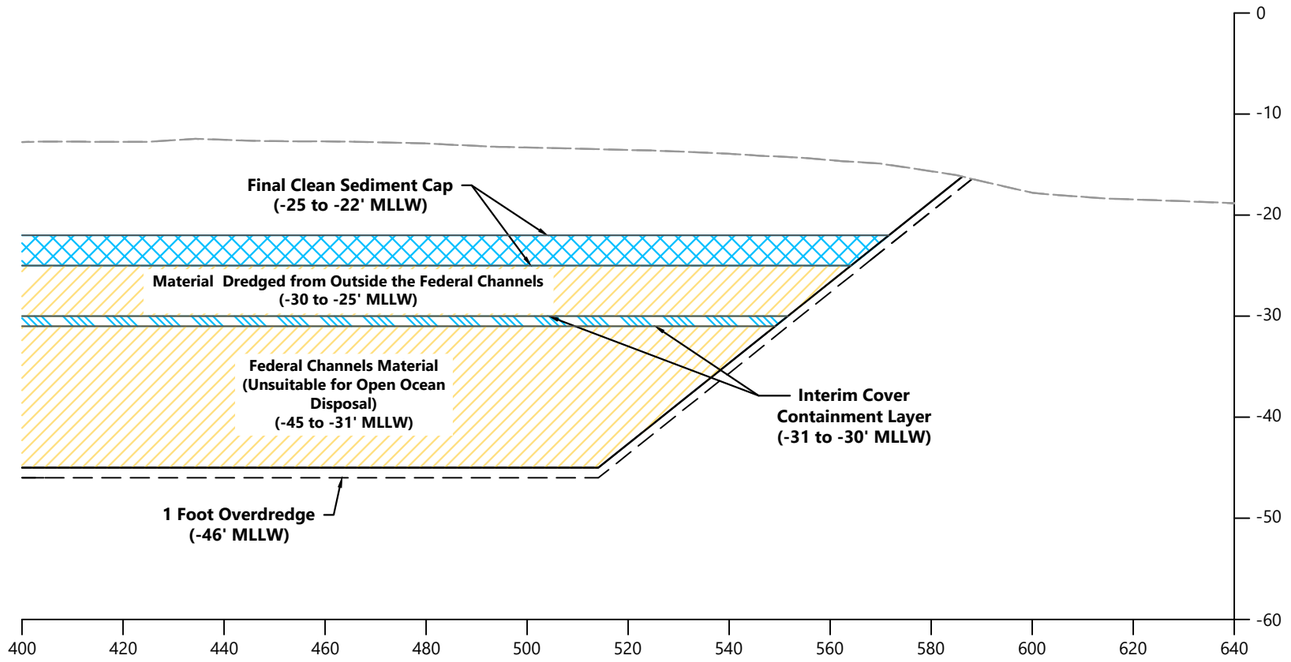
The basic concept for the CAD facility is that it be excavated to a selected depth and size and then be filled with sediments that are unsuitable for open-water placement. These sediments would be overlain by a cap layer that consists of clean material that is intended to permanently isolate the underlying sediments from the waters of Newport Bay and the environment.

The City is currently pursuing development of a CAD facility for management of sediments from the Federal Channels that are unsuitable for open-water placement. The use of CAD sites to manage contaminated sediments has been proven successful with the development of the North Energy Island Borrow Pit and Port Hueneme sites. In order to increase the benefits of the CAD facility for the Newport Beach community, the City also intends to provide additional capacity for subsequent placement of materials dredged from other locations within Lower Newport Bay and the southern section of the Upper Bay, which are also unsuitable for open ocean or nearshore disposal. The CAD facility would thereby accommodate additional fill volume from future maintenance dredging projects conducted as part of the City's RGP 54 program, along with sediment that is not covered as part of the program (e.g., Balboa Yacht Basin, Promontory Bay) and thus requires an alternative disposal option. Details on the proposed CAD facility, including engineering analyses to evaluate the overall technical feasibility and details associated with the proposed work, are presented in the Basis of Design Report (BODR; Anchor QEA 2020). Figure 9 depicts a cross section of the proposed CAD facility concept. The final elevation of the CAD facility infill would be restricted to an elevation that is at or below the water depths necessary for water use, mooring, and navigation within the harbor. Figure 10 shows a plan view of the proposed location and its relation to surrounding harbor features.

SOURCE: Aerial from Bing Maps, 2018.
HORIZONTAL DATUM: California State Plane, Zone 6, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

- Required Dredge Elevation
- Allowable Overdepth Elevation
- Existing Mudline



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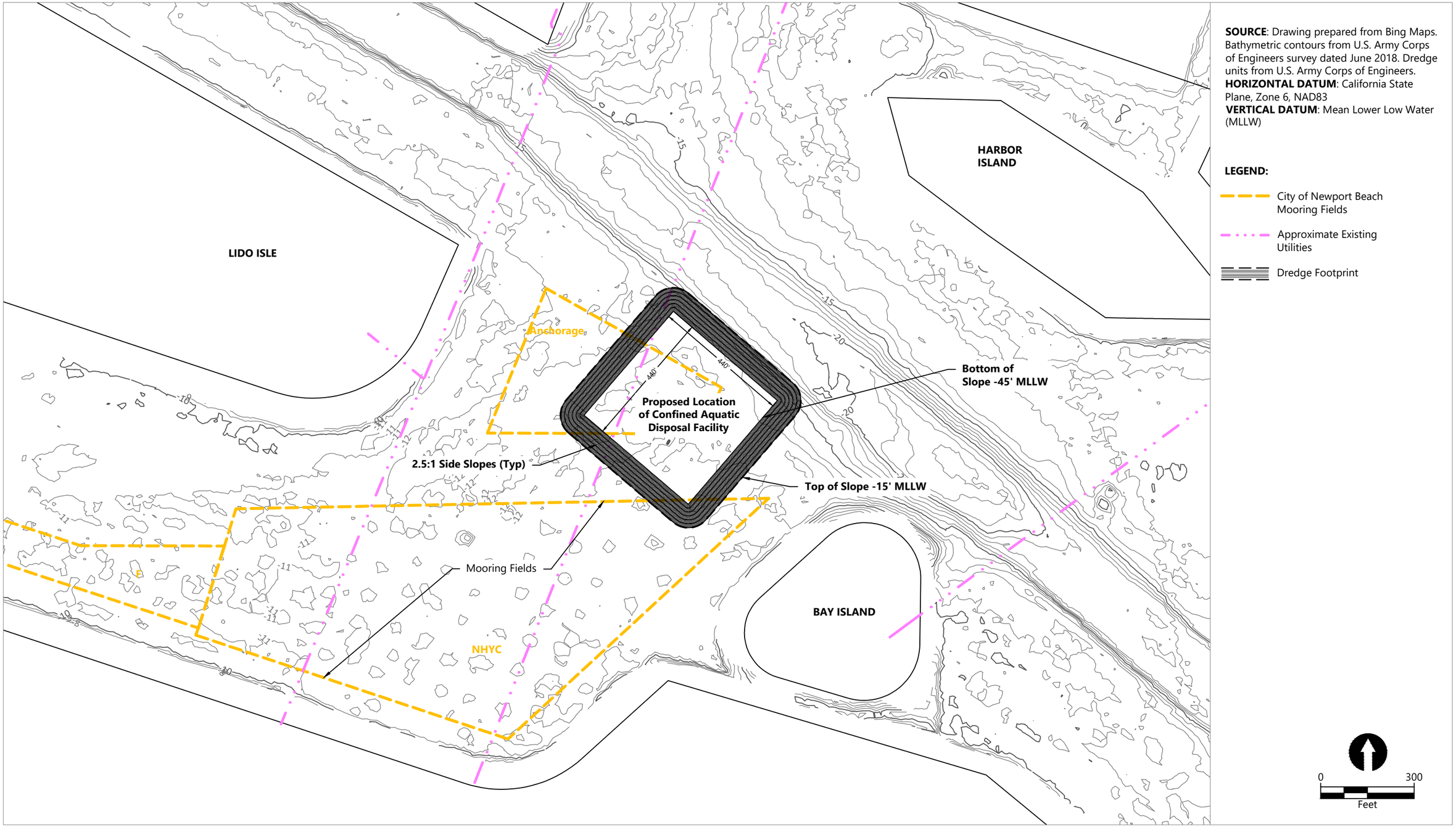
Filepath: K:\Projects\0243-City of Newport Beach\Federal Channel\0243-RP-029 SMP CAD SEC.dwg Figure 9

ANCHOR QEA

Figure 9
Cross Section of CAD Facility
Sediment Management Plan
Lower Newport Bay



SOURCE: Drawing prepared from Bing Maps. Bathymetric contours from U.S. Army Corps of Engineers survey dated June 2018. Dredge units from U.S. Army Corps of Engineers.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

- City of Newport Beach Mooring Fields
- Approximate Existing Utilities
- Dredge Footprint

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Filepath: K:\Projects\0243-City of Newport Beach\Federal Channel\0243-RP-030 SMP BAY ISLAND CAD.dwg Figure 10

ANCHOR QEA

Figure 10
Plan View of CAD Facility

Sediment Management Plan
Lower Newport Bay

Design of a permanent cap layer for a CAD facility must physically contain and chemically isolate sediments unsuitable for open-water placement. A properly designed capping layer to provide long-term isolation of underlying chemically impacted sediments requires consideration of several factors and must follow established national standards for CAD facility design and use (Palermo et al. 1998a, 1998b). The studies examine physical disturbance of the cap (i.e., propeller wash, anchoring), bioturbation, and chemical breakthrough. For the proposed CAD facility in Lower Newport Bay, results of these studies are presented in the BODR (Anchor QEA 2020). Based on the results of these studies, the final cap of the proposed CAD facility would be designed to a thickness of 3 feet.

Placement within a CAD facility is not currently approved under RGP 54; however, the City is proposing this alternative in the latest permit renewal. Regulations governing dredging and discharge of marine sediments and subsequent capping associated with a CAD facility include the following:

1. NEPA Compliance
2. CEQA Compliance
3. CWA Section 404 and Rivers and Harbors Act Section 10 under the jurisdiction of USACE
4. California Coastal Act under the jurisdiction of CCC
5. CWA Section 401 and Porter-Cologne WDRs under the jurisdiction of RWQCB
6. ESA consultations for federally listed species under the authority of the U.S. Fish and Wildlife Service and NMFS
7. Magnuson-Stevens Fishery Conservation and Management Act consultations for Essential Fish Habitat under the jurisdiction of NMFS
8. Surface Lease Agreement under the jurisdiction of the State Lands Commission

Regulatory and permitting agencies will require BMPs and operational controls and short-term monitoring during placement within the CAD facility of sediments that are unsuitable for open-water disposal and during capping operations. The LTMS provides a BMP toolbox that can be used to satisfy federal and state water quality requirements. An Operations, Management, and Monitoring Plan (OMMP) also must be developed to describe the plan for managing the CAD facility and detail the long-term monitoring program to evaluate potential environmental impacts. Long-term monitoring may include bathymetric surveys, sediment cap coring, porewater sampling, and/or benthic infauna analyses. The OMMP for the proposed CAD in Lower Newport Bay is presented in Appendix H of the BODR (Anchor QEA 2020).

5.2.3 Upland Landfill Disposal

As described in Section 3.2.3, upland landfill disposal is the costliest disposal option and should only be used for small volumes of sediment when other options are unavailable or not viable. Transporting and disposing of this material to an upland landfill is expensive and would cause

impacts to air quality, traffic, noise, and other aspects associated with hauling the material via trucks on the local roads and highways. Factors affecting cost include dewatering methods, transport distance, and quantity of material, which is subjected to a landfill tipping fee. Although not a preferred management option, landfill disposal is one of the disposal options currently approved by all agencies under RGP 54.

Testing for landfill disposal is landfill specific but includes chemical analysis and leachate testing. For landfill disposal, results of bulk sediment chemical analyses should be compared to total threshold limit concentrations, which indicate the level above which material must be managed as hazardous waste upon removal in accordance with 22 CCR. Results should also be compared to toxicity characteristic leaching procedure (TCLP) and soluble threshold limit concentration (STLC) trigger levels. It is necessary to perform actual leachate tests (TCLP and/or Waste Extraction Test [WET]) for samples in which analytes exceed these criteria. If leachate testing is performed, results of TCLP should be compared to TCLP regulatory values presented in 40 Code of Federal Regulations (CFR) 261. Results of the WET should be compared to the STLCs presented in 22 CCR, Division 4.5, Chapter 11, Article 3. In addition, sediment disposed at a landfill typically needs to pass the "paint filter" test, which requires that the sediment be sufficiently dewatered after dredging to prevent drainage during transport and to minimize excess infiltration during disposal.

The acceptability of material at a landfill is dependent on the site-specific permit conditions that indicate the volume and type of material that can be accepted by the landfill, and material suitability based upon analytical test results (may be different for each landfill). For contaminated sediments that exceed landfill analytical requirements (e.g., STLC and/or TCLP), the material must be disposed of as hazardous waste at a facility permitted to accept such material. A Class I landfill is permitted to accept hazardous waste (as defined in 40 CFR 261.20 and 22 CCR Article 9), including contaminated sediments that exceed the hazardous waste characterization threshold values. Class I landfills consist of several layers of natural and synthetic impervious material to prevent leachate from the landfill from reaching the underlying groundwater. As stated previously, the RWQCB has expressed concerns related to landfill placement of marine sediment due to salt leaching from the material and potentially impacting groundwater resources. This, combined with limited capacity within the nearby landfills and the elevated regional impacts associated with landfill disposal, make this alternative not ideal.

6 Next Steps

Managing sediment in Newport Harbor is complex and requires considering many factors. Nearly all of the properties along the harbor are privately owned, and dredging those properties is the sole responsibility of the landowners based on individual need. While the City cannot force these property owners to dredge under their private slips or marinas, the City can encourage dredging by offering innovative and creative programs such as the RGP 54 and potential CAD facility disposal opportunities. Because some areas of the harbor do not currently have viable alternatives for sediment disposal, the City feels these options will be well received by the harbor public as well as the regulatory and resource agencies. This SMP highlights the benefits of those opportunities.

The City commits to promoting the benefits of each of the options listed herein and to continually seeking ways to improve and streamline the dredging application and disposal process, which further encourages private party dredging especially within the impacted areas of Newport Harbor. Because parts of the harbor retain legacy contamination from historical watershed inputs, the more dredging that occurs the better the surface sediments will be from a chemical concentration standpoint. The City's goal for improving Lower Newport Bay's water quality conditions is to provide a cost-effective and streamlined approach that allows for City-managed and private residential properties to be dredged and to have the resulting materials managed in the most environmentally protective and feasible manner.

The next steps are as follows:

1. **RGP 54**: Continue the RGP 54 renewal process with USACE, CCC, and RWQCB. Because of sediment management limitations with the existing RGP 54, the City is proposing to include a new management option (nearshore placement). As previously described, the City maintains and renews the sediment suitability every 5 years. The next bay-wide sediment investigation will be conducted in 2023. The City is currently evaluating the option to construct a CAD facility in Newport Harbor. If the City certifies the CEQA document, then the RGP 54 would be amended to include the CAD facility as an alternate disposal option.

2. **Additional Sediment Characterization**: Sediment testing data within Balboa Yacht Basin and Promontory Bay is limited, with the most recent testing performed in 2013 (Section 2.3). Prior to dredging, sediments from within Balboa Yacht Basin and Promontory Bay would be characterized to delineate material that is suitable or unsuitable for open-water disposal. In addition, updated bathymetric surveys would be required. This testing, as well as other testing within Newport Harbor, will assist with defining and prioritizing areas for management within the proposed CAD facility.

3. **Federal Channels Dredging and Construction of Proposed CAD Facility**: A Draft Environmental Impact Report is currently being prepared and will be distributed for public input. The City will then respond to and incorporate public input before considering certification of the Final Environmental Impact Report. If the Final Environmental Impact Report is certified by the City, permit applications would then be submitted to regulatory agencies, and the design for dredging and construction of the proposed CAD facility will be completed. Federal channel dredging is anticipated to begin in late 2020 with an initial, small-quantity project focusing in the Entrance Channel area. Construction of the CAD facility, if approved, is anticipated to begin in late 2021 or 2022.

4. **Public Outreach**: During the 2-year period following construction of the proposed CAD facility, public outreach meetings will be held with the City and its residents to promote the proposed CAD facility and provide information for residents who may want to take advantage of the additional disposal capacity for unsuitable material which may be present within their slips or marinas. This would allow sufficient time for City and residential applicants to obtain permits for their respective projects prior to reopening of the CAD facility for additional placement after the Federal Channels project is complete.

5. **Port Fill**: Continue to track potential port fill opportunities in the region that may provide capacity for third-party material.

6. **LA-3 ODMDS Monitoring**: The City will contribute to USEPA monitoring at the LA-3 ODMDS with respect to mercury to meet sediment suitability conditions set by USEPA for the Federal Channels project.

7. **Update SMP**: This SMP is intended to be a living document and will be updated as needed to reflect changes in policy, availability of new technology to treat contaminated sediment, new disposal options, or changes in conditions.

7 References

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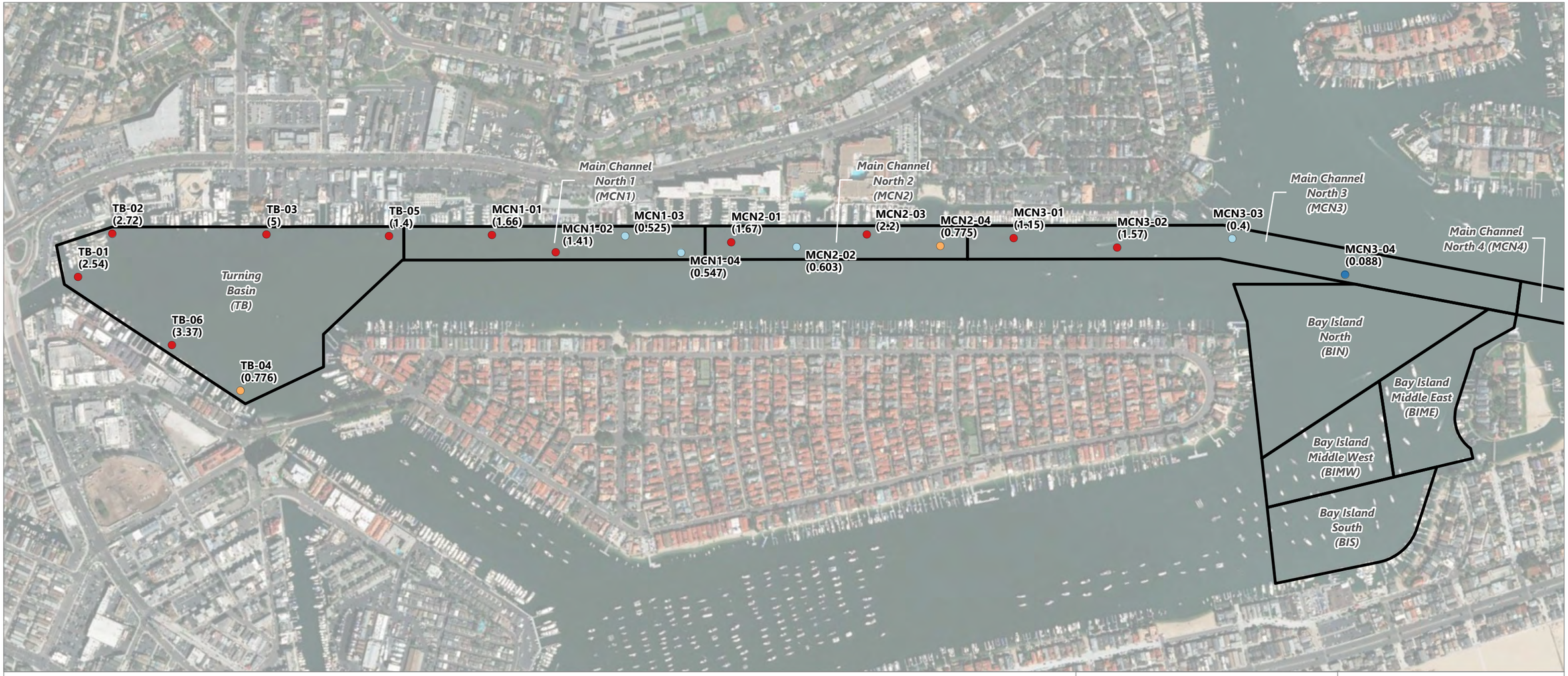
Appendix A
Contaminant Maps for Lower Newport Bay



LEGEND:

Mercury (mg/kg)

- 0.088 - 0.15 (< ERL)
- 0.151 - 0.71 (< ERM)
- 0.711 - 1 (< USEPA Recommended Threshold)
- 1.01 - 5 (> USEPA Recommended Threshold)

Dredge Units

NOTES:
Horizontal datum: California State Plane Zone 6, NAD83
Aerial photo: ESRI

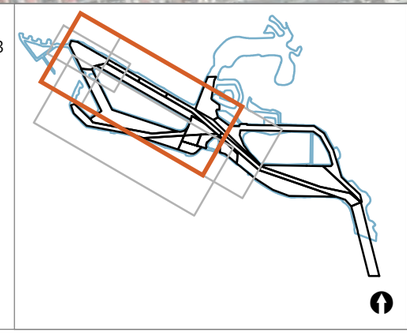


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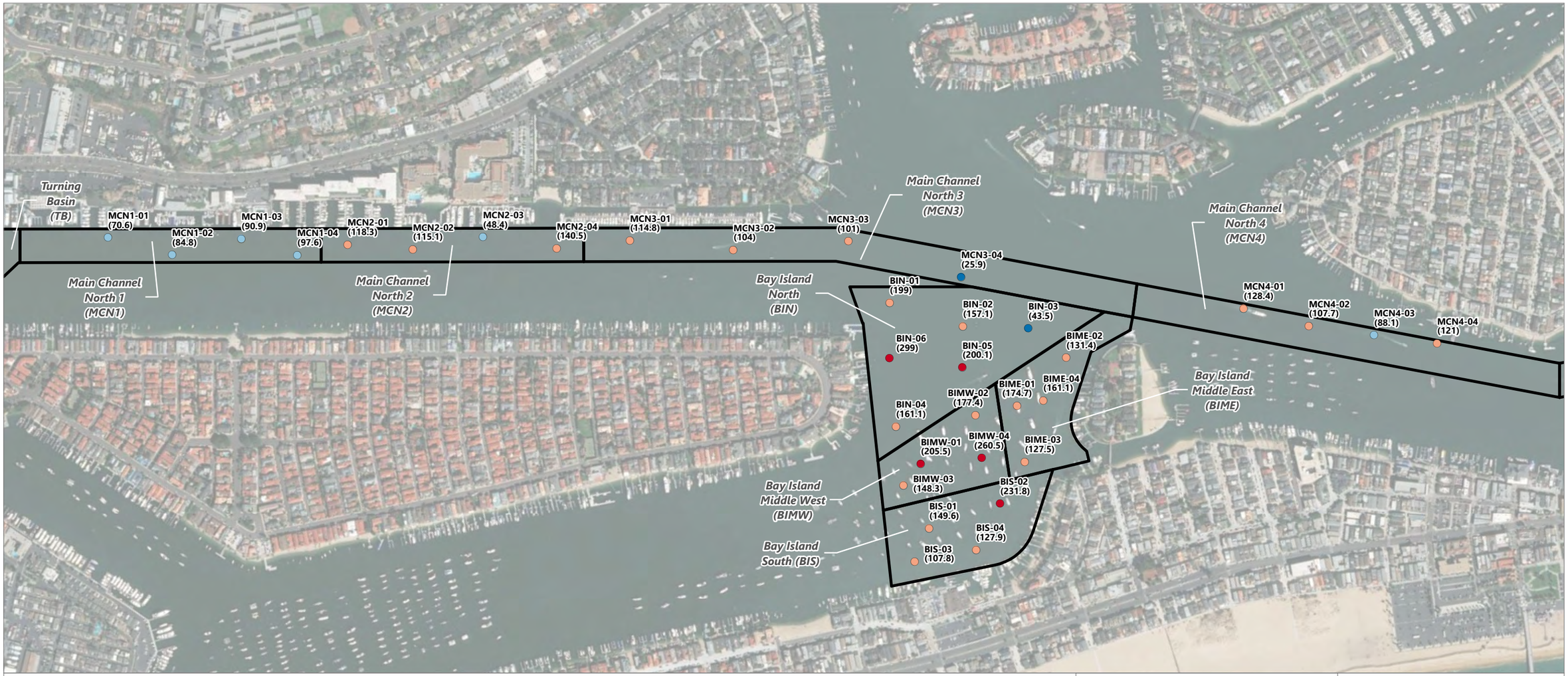
Figure 18
Mercury Concentrations for Individual Stations within Turning Basin and Main Channel North 1, 2, and 3
Lower Newport Sediment Characterization



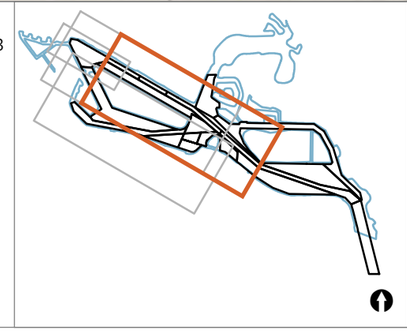
LEGEND:

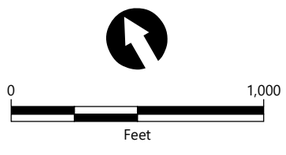
Total DDTs (µg/kg)

- 25.9 - 46.1 (< ERM)
- 46.2 - 100 (> ERM)
- 101 - 200
- 201 - 299

Dredge Units

NOTES:
Horizontal datum: California State Plane Zone 6, NAD83
Aerial photo: ESRI





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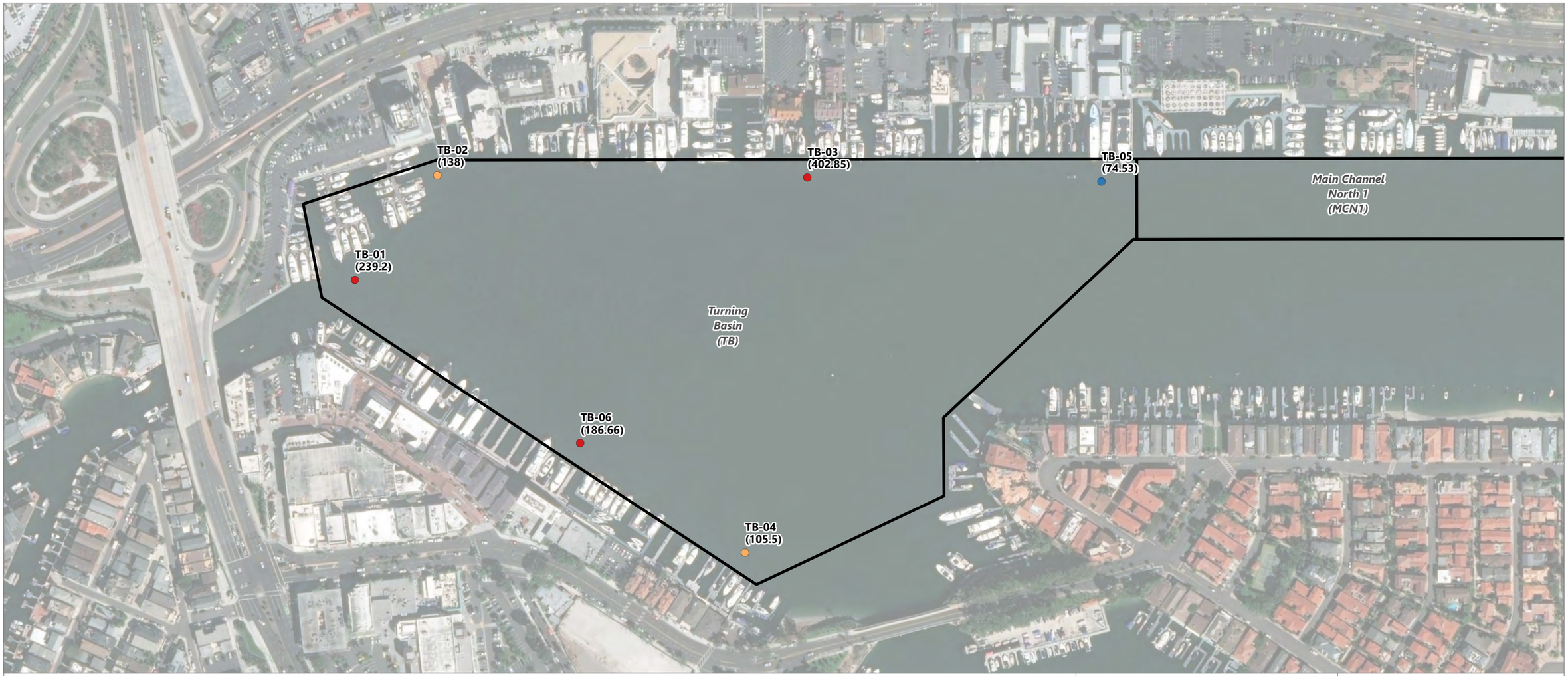
ANCHOR QEA

Figure 19
Total DDT Concentrations for Individual Stations within Main Channel North 1, 2, 3, and 4, and Bay Island
Lower Newport Sediment Characterization



LEGEND:

Total PCBs (µg/kg)

- 74.5 - 100
- 101 - 180 (< ERM)
- 181 - 403 (> ERM)

Dredge Units

NOTES:
Horizontal datum: California State Plane Zone 6, NAD83
Aerial photo: ESRI

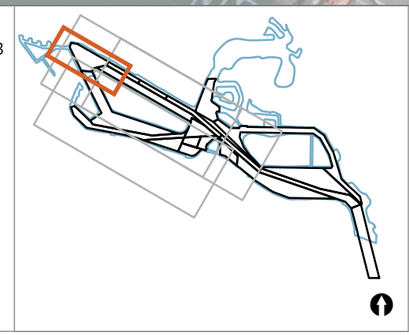


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Figure 20
Total PCB Concentrations for Individual Stations within the Turning Basin
Lower Newport Sediment Characterization

LEGEND:

Mercury (mg/kg)

- 0.088 - 0.15 (< ERL)
- 0.151 - 0.71 (ERL - ERM)
- 0.711 - 1
- 1.01 - 5
- 2019 Stations
- 2018 Exploratory Stations

Dredge Units

NOTES:
Horizontal datum: California State Plane Zone 6, NAD83
Aerial photo: ESRI

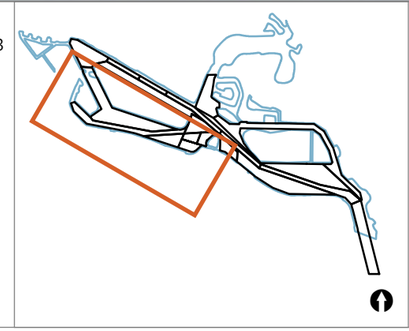

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Figure 21
Mercury Concentrations for Individual Stations within Newport Channel
Lower Newport Sediment Characterization

Appendix B
Contaminant Maps for RGP 54

LEGEND:

Mercury (mg/kg)

- 0.056 - 0.15 (< ERL)
- 0.16 - 0.71 (< ERM)
- 0.72 - 1 (< USEPA Recommended Threshold)
- 1.01 - 9.5 (> USEPA Recommended Threshold)

Area 1

NOTE:
1. Horizontal datum: California State Plane Zone 6, NAD83. Aerial photo: ESRI.

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ANCHOR QEA

Figure 12
Mercury Concentrations for Individual Stations Within Area 1
RGP 54 Sediment Characterization

LEGEND:

Total PCBs (µg/kg)

- Non-detect
- 0.540 - 22.7 (< ERL)
- 22.8 - 180 (< ERM)
- 181 - 506 (> ERM)

Area 1

NOTE:
1. Horizontal datum: California State Plane Zone 6, NAD83. Aerial photo: ESRI.

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Figure 13
Total PCB Concentrations for Individual Stations Within Area 1
RGP 54 Sediment Characterization

LEGEND:

Mercury (mg/kg)

- 0.15 (< ERL)
- 0.16 - 0.71 (< ERM)
- 0.72 - 1 (< USEPA Recommended Threshold)
- 1.01 - 2.4 (> USEPA Recommended Threshold)

Area 5

NOTE:
1. Horizontal datum: California State Plane Zone 6, NAD83. Aerial photo: ESRI.

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Figure 14
Mercury Concentrations for Individual Stations Within Area 5
RGP 54 Sediment Characterization

Appendix C
Contaminant Maps for Balboa Yacht Basin and Promontory Bay

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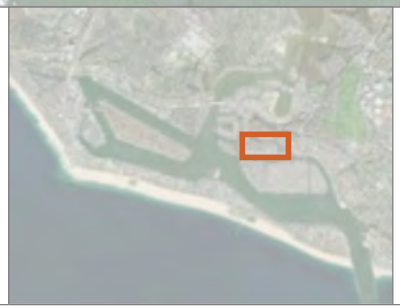
Figure 1.1
Copper Concentrations at Individual Stations within Promontory Bay and Balboa Yacht Basin
Sediment Management Plan
Lower Newport Bay

LEGEND:

- Sampling Locations
- < ERL
- ERL - ERM
- ERM - USEPA Threshold
- > USEPA Threshold

NOTES:

1. The ERL threshold for Mercury is 0.15 mg/kg.
2. The ERM threshold for Mercury is 0.71 mg/kg.
3. The USEPA threshold for Mercury is 1 mg/kg.
4. mg/kg: milligrams per kilogram
5. Horizontal Datum: California State Plane, Zone 6, NAD 83.
6. Core depth intervals are exaggerated by 25 feet.
7. SG: Surface Grab



Core Depth Interval (ft.)

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05
10

0 200
Feet

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Figure 1.2
Mercury Concentrations at Individual Stations within Promontory Bay and Balboa Yacht Basin
Sediment Management Plan
Lower Newport Bay

LEGEND:

- Sampling Locations
- < ERL
- ERL - ERM
- > ERM

NOTES:

1. The ERL threshold for Zinc is 150 mg/kg.
2. The ERM threshold for Zinc is 410 mg/kg.
3. The USEPA threshold for Zinc is not applicable.
4. mg/kg: milligrams per kilogram
5. Horizontal Datum: California State Plane, Zone 6, NAD 83.
6. Core depth intervals are exaggerated by 25 feet.
7. SG: Surface Grab

Core Depth Interval (ft.)

0
05
10

0 200
Feet

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Figure 1.3
Zinc Concentrations at Individual Stations within Promontory Bay and Balboa Yacht Basin
Sediment Management Plan
Lower Newport Bay

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ANCHOR QEA

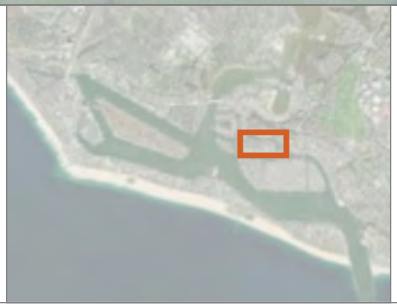
Figure 2.1
Copper Concentrations within Promontory Bay and Balboa Yacht Basin
Sediment Management Plan
Lower Newport Bay

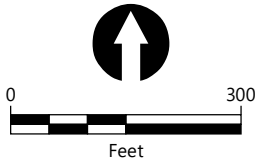
LEGEND:

- Sampling Locations
- < USEPA Threshold
- > USEPA Threshold

NOTES:

1. The ERL threshold for Mercury is 0.15 mg/kg.
2. The ERM threshold for Mercury is 0.71 mg/kg.
3. The USEPA threshold for Mercury is 1 mg/kg.
4. mg/kg: milligrams per kilogram
5. Horizontal Datum: California State Plane, Zone 6, NAD 83.
6. SG: Surface Grab
7. Concentration surfaces were interpolated using the maximum result value.





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ANCHOR QEA

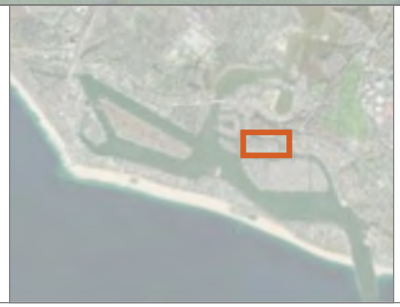
Figure 2.2
Mercury Concentrations within Promontory Bay and Balboa Yacht Basin
Sediment Management Plan
Lower Newport Bay

LEGEND:

- Sampling Locations
- < ERM
- > ERM

NOTES:

1. The ERL threshold for Zinc is 150 mg/kg.
2. The ERM threshold for Zinc is 410 mg/kg.
3. The USEPA threshold for Zinc is not applicable.
4. mg/kg: milligrams per kilogram
5. Horizontal Datum: California State Plane, Zone 6, NAD 83.
6. SG: Surface Grab
7. Concentration surfaces were interpolated using the maximum result value.



0 300
Feet

Publish Date: 2020/05/12, 10:35 AM | User: jquinley
Filepath: \\orcas\GIS\Jobs\City_of_Newport_Beach_0243\PromontoryBay_BalboaYachtBasin\Maps\AQ_Figure02_ConcentrationInterpolation_DDP.mxd

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Figure 2.3
Zinc Concentrations within Promontory Bay and Balboa Yacht Basin
Sediment Management Plan
Lower Newport Bay