FINAL
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

FOR THE

SANTA ANA RIVER MARSH
SEDIMENT REMOVAL PROJECT
NEWPORT BEACH, ORANGE COUNTY, CALIFORNIA

May 2017

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FINDING OF NO SIGNIFICANT IMPACT
SANTA ANA RIVER MARSH
SEDIMENT REMOVAL PROJECT
NEWPORT BEACH, ORANGE COUNTY, CALIFORNIA

I have reviewed the attached Supplemental Environmental Assessment (SEA) that has been prepared for the proposed Santa Ana River Marsh Sediment Removal Project, located in Newport Beach, Orange County, California. The project proposes to remove approximately 10,000 cubic yards of compatible material from 2.8 acres near one of the tide gates within the Marsh, and to beneficially reuse the excavated material to improve adjacent California least tern (*Sternula antillarum browni*) nesting habitat. All sediment has been tested in accordance with applicable regulations and found to be compatible with the designated placement site. Construction would occur between September 15, 2017 and April 15, 2018, to avoid impacts to sensitive species.

The proposed project would serve the following purposes: (1) remove sediment blocking the downstream tide gate; (2) beneficially reuse the sediment to improve California least tern nesting habitat on the tern island; and (3) increase tidal range and improve circulation of the tidal flow throughout the marsh, which will result in improved water quality and overall habitat quality for wildlife.

Alternatives to the Proposed Action have been included in this document, in compliance with the National Environmental Policy Act. This SEA is prepared in compliance with all applicable laws, and regulations including but not limited to the Clean Water Act, the Coastal Zone Management Act, the National Historic Preservation Act, the Endangered Species Act, and the Clean Air Act.

This SEA addresses impacts related to implementation of the proposed project for all environmental resources. The proposed project may result in short term minor and negligible impacts to environmental resources including but not limited to: biological, water, air, and noise. Environmental commitments have been developed in coordination with the resource agencies to avoid or minimize impacts to environmental resources.

The proposed project has been evaluated pursuant to Section 404(b)(1) of the Clean Water Act. The proposed project complies with the guidelines promulgated by the Administrator, Environmental Protection Agency, under authority of Section 404(b)(1) of the Clean Water Act (33 United States Code 1344). An amended Section 401 Water Quality Certification was received from the California Regional Water Quality Control Board on March 27, 2017.

The proposed project activities and related impacts have been analyzed as required by the Coastal Zone Management Act of 1972. The U.S. Army Corps of Engineers finds this project to be consistent to the maximum extent practicable with the articles and provisions of the Coastal Zone Management Act and the California Coastal Act. Concurrence on the project Negative Determination was received from the CCC on March 8, 2017.

This project complies with Section 106 of the National Historic Preservation Act (36 CFR 800). Dredging, excavation, and placement will occur in previously constructed areas. The environment and setting for proposed construction has been disturbed to such a degree that no significant cultural resources could have persisted. Therefore, the proposed project does not have the potential to cause effects.

Coordination with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service has been initiated and will continue throughout the duration of this project to ensure compliance with the Endangered Species Act and the Magnuson-Stevens Fishery Management and Conservation Act. The project area and vicinity support federally and state listed species, including the light-footed Ridgway's rail (*Rallus obsoletus levipes*), California least tern, western snowy plover (*Charadrius alexandrinus nivosus*), and Belding's savannah sparrow (*Passerculus sandwichensis beldingi*). Informal consultation with USFWS was requested, and concurrence was received on March 23, 2017. The project area also supports eelgrass. Impacts to eelgrass will be mitigated in coordination with NMFS, and concurrence was received on the Corps' proposed mitigation plan on March 3, 2017.

I have considered the available information contained in this SEA and it is my determination that impacts resulting from the proposed Santa Ana River Marsh Sediment Removal Project will not have a significant adverse effect upon the existing environment or the quality of the human environment. Preparation of an Environmental Impact Statement, therefore, is not required.

4 May 2017
Date

Scotty M. Autin
Major, U.S. Army
Acting Commander
and Acting District Engineer

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SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
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1.0 Introduction

The U.S. Army Corps of Engineers (Corps), Los Angeles District, completed the Final Environmental Assessment (FEA) for the Santa Ana River Marsh Dredging Project in July of 2012. A Finding of No Significant Impact (FONSI) was signed on July 19, 2012. Dredging took place from January to March 2013. Impacts to environmental resources in the project area from dredging activities were addressed in the FEA, including impacts associated with the No Action Alternative, and are incorporated in this Supplemental Environmental Assessment (SEA) by reference, as applicable. After completion of the previous project in 2013, additional material has deposited on the Santa Ana River Marsh (Marsh) side of the downstream tide gate. This shoaled sediment has blocked the opening of the tide gate, resulting in muted tides in the Marsh and diminished access for aquatic wildlife to and from the Marsh. The dampened tidal cycle has also prevented proper tidal flushing, which may eventually impact water quality.

The proposed project would involve the removal of approximately 10,000 cubic yards of sediment from the vicinity of the downstream tide gate in order to restore more natural tidal influence to the remainder of the Marsh channels. Sediment removed from the tide gate area would be placed on the California least tern (tern; *Sterna antillarum browni*) island, located adjacent to the blockage.

Additional project features include the replacement of fencing around the tern island to restrict predator access.

The purpose of the SEA is to address potential impacts that may result from the sediment removal and placement activities. The SEA has been prepared in compliance with the National Environmental Policy Act (NEPA). As the proposed project is fully federally funded, and has no local sponsor, a California Environmental Quality Act analysis is not required.

1.1 Background

The Corps' Santa Ana River Mainstem Project (SARMP) provides flood damage reduction along the Santa Ana River and its tributaries within San Bernardino, Riverside, and Orange counties. The project includes the construction of Seven Oaks Dam, modifications to Prado Dam, and improvements to the Santa Ana River mainstem from Prado Dam to the Pacific Ocean.

The 92-acre Santa Ana River Marsh was acquired, restored, and protected to offset impacts to coastal salt marsh by the SARMP. Eight acres of the Marsh site represent mitigation for the loss of 8 acres of coastal salt marsh from construction of the project and an additional 84 acres was restored above and beyond the mitigation requirements for the preservation and enhancement of endangered species habitat. At the time of purchase there were both active and abandoned oil wells on the site, which required extensive cleanup of oil contamination (Corps 1988). Restoration of the Marsh was completed by the Corps in 1992. The site now provides restored coastal salt marsh habitat for a variety of native plants and wildlife, including federally and/or state listed endangered species such as light-footed Ridgway's (formerly clapper) rail (*Rallus obsoletus levipes*) and Belding's savannah sparrow (*Passerculus sandwichensis beldingi*). An approximately 7-acre sand-capped island was constructed within the Marsh to provide nesting habitat for the federally endangered California least tern.

1.2 Purpose and Need for Project

The proposed project would serve the following purposes: (1) remove sediment blocking the downstream tide gate; (2) beneficially reuse the sediment to improve California least tern nesting habitat on the tern island; and (3) increase tidal range and improve circulation of the tidal flow throughout the Marsh, which would result in improved water quality and overall habitat quality for wildlife.

Without the project, sediment will continue to block the tide gate, ultimately reducing water circulation, further muting tidal influence, and preventing aquatic wildlife from passing through the gates.

2.0 Project Description

2.1 Project Location

The 92-acre Santa Ana River Marsh site is located in the City of Newport Beach, Orange County, California. The Marsh extends from approximately 0.25 miles to 1 mile upstream of the mouth of the Santa Ana River, on the east side of the River (Figure 1). The site is bounded by Pacific Coast Highway to the south, the Santa Ana River to the west, Newport Banning Ranch property to the east, and the Banning Channel bikeway trail extended from 19th Street to the north. The tern island totals approximately 7 acres and is located in the southwestern corner of the Marsh (Figure 2).

The proposed project would take place in the vicinity of the downstream tide gate and on the tern island (Figure 2).

2.2 No Action Alternative

Under the "No Action" alternative, no additional dredge activities would occur beyond those completed under the SARMP, including the project element completed in 2013. The approximately 10,000 cubic yards of shoaled sediment material would be left in place. The no action alternative would result in continued shoaling at the tide gate, which would further prevent tidal flushing and proper circulation in the Marsh. With an altered tidal prism, the sensitive habitats established in the Marsh would degrade, and the California least tern would continue to have limited nesting opportunities on the tern island.

2.3 Proposed Action

The proposed action would involve removal of sediment at the downstream tide gate over an approximately 2.8-acre area (see Figure 2). Approximately 10,000 cubic yards of material would be removed. The sandy material would be beneficially reused to cap the adjacent tern island to improve nesting habitat for the California least tern. Removal of sediment would be performed using two excavators and a small dozer. Excavators would place sediment directly on to tern island as much as possible; however, one to two dump trucks may be needed to place sediment in areas the excavator cannot reach.

Follow-up herbicide treatments of the tern island would be conducted, led by a qualified biologist, to ensure that non-native and dense growth vegetation does not re-establish. Selective planting of coastal strand vegetation may also be implemented prior to the 2017 nesting season.

The fencing currently surrounding the tern island is failing due to corroding fence posts. Replacement of the entire tern island fence (approximately 2,200 feet) would be included as part of the proposed action. The fence would be a six-foot-high chain-link fence topped with strands of barbed wire. The fence would be placed at a higher elevation on the island that would not be inundated to minimize corrosion in the future.

The proposed sediment removal and placement, and fence replacement would occur over approximately two weeks after the 2017 nesting season (between September 15, 2017 and April 15, 2018).

The Draft SEA had indicated that dredging would be completed prior to April 15, 2017. Due to delays in completing environmental documentation and awarding the contract, the work will instead be competed after the nesting season. As described below, environmental effects of the project would remain the same as long as the work is accomplished outside of the nesting season.

Access and Staging Area

Trucks and equipment needed for sediment removal may access the Marsh by use of the northbound lanes of Pacific Coast Highway to enter and exit the access road that passes through the Newport Banning Ranch property and onto the Marsh (Figure 3). The access road that bisects the Marsh is jointly owned by the Federal government and Newport Banning Ranch.

The tern island would be accessed via an existing small roadway that is used to cross the Marsh channel (Figure 3). In order to provide bearing support for the construction equipment, the roadway would be temporarily improved using gravel or steel plates.

The staging area for construction equipment would be located at the end of the access road located southeast of the tern island adjacent to an oil derrick site owned and operated by the City of Newport Beach (see Figure 2). The staging area would also be used for equipment storage.

Placement Site

Sediment removed from the Marsh would be placed directly onto tern island with the excavator as much as possible; however, one to two dump trucks may be needed to place sediment in areas the excavator cannot reach. Sediment would be spread as a six-inch (approximate or average thickness) cap onto the surface of the island with a small dozer.

2.4 Alternatives Considered but Eliminated

Dredging & Nearshore Placement Alternative

Dredging and/or excavation with nearshore disposal was considered as an alternative. Orange County Flood Control District (OCFCD) is performing maintenance dredging in the Santa Ana River, adjacent to the project area. The Corps coordinated with the OCFCD to evaluate a partnering whereby the Corps would dredge sediment from the project area and place the material in the Santa Ana River, and the OCFCD would remove the sediment from the river and place it in the nearshore with their ongoing dredge operation. While sediments were compatible for nearshore placement, the timing of the two project schedules, the logistics, and cost of double handling the material made this option less efficient and less economical. Furthermore, an operation whereby the Corps would place the dredged sediment in the nearshore as part of the proposed project would require a different pipeline to the nearshore, resulting in a longer construction period, and greater impact to environmental resources than the proposed action. This option was therefore removed from consideration.

3.0 Existing Conditions

Detailed descriptions of existing conditions within the Marsh can be found in the FEA for the Santa Ana River Marsh Dredging Project (July 2012), incorporated by reference. A summary of conditions that occur within the current project area is provided below.

3.1 Physical Environment

The Marsh is located near the mouth of the Santa Ana River. The Marsh site was once part of a much larger estuarine system associated with the Santa Ana River delta. Prior to 1920, the coastal wetlands associated with the Santa Ana River comprised 2,950 acres. After the 1920s, the site was diked during the process of land development and tidal circulation was reduced (Corps 1987).

West Newport Oil owned the land now occupied by the Santa Ana River Marsh as part of a larger 500-acre parcel from 1943 (when oil production began) until the land was acquired by the Corps for restoration. The restoration plan was approved in 1989 and a 92-acre parcel was acquired by the Corps from West Newport Oil (Corps 1988). At the time of purchase there were both active and abandoned oil wells on the site, which required extensive cleanup of oil contamination (Corps 1988). Restoration was completed by the Corps in 1992.

Sediment Sampling Results

Sediment sampling of the 92-acre Marsh was conducted on November 22, 2016. A total of eight borings were collected to a maximum depth of 4.8 feet. A total of three chemistry samples and 11 grain size samples were collected. Results of sediment sampling are summarized below and are further detailed in Appendix A (Moffat and Nichol 2017).

Marsh sediment contained two distinct layers generally describable as poorly graded sand and a silty-sand. On a composited weighted average basis, the sediment contained 3 percent fines and a median grain size of 0.20 millimeter (mm). Chemistry results from two composite samples collected in the Marsh were found to be below established screening levels from National Oceanic and Atmospheric Administration, California Environmental Protection Agency (Cal/EPA), and the U.S. Environmental Protection Agency (U.S. EPA; Moffat and Nichol 2017).

Sediments collected on the tern island receiver site are described as poorly graded sand with a median grain size of 0.25 mm and percent fines of 7.3 percent. Chemistry results from the one composite sample collected on the tern island were below established screening levels from National Oceanic and Atmospheric Administration, Cal/EPA, and the U.S. EPA. On a physical and chemical basis, all four Marsh boreholes were individually and collectively compatible for placement at the tern island receiver site (Moffat and Nichol 2017).

3.2 Biological Resources

The vicinity of the project area is comprised of the Santa Ana River Marsh, which is classified as a coastal salt marsh. Habitat communities include estuarine habitats, salt marsh habitats, riparian habitats, upland shrubland habitats, ruderal vegetation, and developed areas. The portion of the Santa Ana River adjacent to the project area is channelized, with rip rapped banks and a soft bottom.

The top of the tern island, where sediment would be placed, is currently dominated by saltgrass (*Distichlis spicata*). Other native species on the island include annual bursage (*Ambrosia acanthicarpa*), coastal goldenbrush (*Isocoma menziesii*), and alkali weed (*Cressa truxillensis*). The slopes of tern island are dominated by pickleweed (*Salicornia* sp.; AECOM 2016).

Eelgrass and Cordgrass

Within the northern and southern portions of the Marsh (defined by separate tidal inlets to the mainstem of the River), a combined total of less than 0.1 acre of eelgrass occurs within a scattered number of small patches that are mostly defined by a sparse few plants (Merkel & Associates 2016). The project area supports a few small patches of eelgrass, primarily north of the tern island. Small, scattered patches of eelgrass are located within the southeastern portion of the proposed sediment removal area.

Following completion of dredging activities in 2013, post-sediment removal activities, California cordgrass (*Spartina foliosa*) surveys were completed. Results of the survey found that the cordgrass population in the Marsh dredge area had expanded from its post-dredge acreage (AECOM 2014a). Within the project area, an approximately 0.1-acre cordgrass patch is found at the southwestern edge of the tern island. Nearby, another small patch is found on the northeastern edge of the island. These small patches are isolated from larger cordgrass areas in the southern Marsh (approximately 900 feet away) and in the northern Marsh (approximately 1,400 feet away) by the Marsh access roads, and may not be large enough to attract Ridgway’s rail.

Invertebrates

Following completion of dredging within the Marsh dredge areas in 2013, post-dredge benthic invertebrate surveys were conducted. Overall, 31 species were recorded across all samples during the survey, which is two species more than the 29 observed during the pre-dredge survey and 11 species less than the 42 observed during the fourth post-dredge survey. Of the 31 species recorded, 12 were from the phylum *Annelida*, 10 were from the phylum *Mollusca,* six were from the phylum *Crustacea*, one was from the phylum *Echinodermata*, and two miscellaneous species were observed. The highest species richness was found in the back low intertidal, with 17 species. Five of the six samples showed a reduction in both species and richness from the fourth survey to the fifth survey (AECOM 2014b).

The data were compared to pre-dredge benthic invertebrate populations. Results of the surveys indicated clear differences between samples on all parameters (i.e., abundance, species richness, and diversity), however, no significant difference was found among surveys. Overall, the analysis showed neither seasonal nor spatial trends in the community composition of benthic invertebrates within the Marsh (AECOM 2014b).

The proposed project area is located within the subtidal zone. Benthic surveys of this zone found 3 species from the phylum *Mollusca*, one from the phylum *Crustacea*, and eight from the phylum *Echinodermata*. Based on survey results, species abundance, richness, and diversity within the subtidal zone are not expected to change significantly between pre- and post-sediment removal activities.

Wildlife

Wildlife species observed within the vicinity of or in the island during surveys conducted between the months of July and September 2016 include cottontail (*Sylvilagus audubonii*), California ground squirrel (*Otospermophilus beecheyi*), and Belding's savannah sparrow (AECOM 2016).

During 2008, 2012, and 2013 breeding bird surveys of the Marsh, over 70 bird species were found (Hoffman 2013a, 2013b). Bird species found during these surveys include belted kingfisher (*Megaceryle alcyon*), eared grebe (*Podiceps nigricollis*), red-tailed hawk (*Buteo jamaicensis*), mute swan (*Cygnus olor*), green heron (*Butorides virescens*), peregrine falcon (*Falco pere*grinus), house finch (*Carpodacus mexicanus*), Cooper's hawk (*Accipiter cooperii*), western grebe (*Aechmophorus occidentalis*), brown pelican (*Peleccanus occidentalis*), great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), lesser scaup (*Aythya affinis*), bufflehead (*Bucephala albeola*), ruddy duck (*Oxyura jamaicensis*), willet (*Catoptrophorus semipalmaus*), ring-billed gull (*Larus delawarensis*), osprey (*Pandion haliaetus*), double-crested cormorant (*Phalacrocorax auritus*), Forster's tern (*Sterna forsteri*), white crowned sparrow (*Zonotrichia leucophrys*), song sparrow (*Melospiza melodia*), whimbrel (*Numenius phaeopus*), red breasted merganser (*Megus serrator*), turkey vulture (*Cathartes aura*), osprey (*Pandion haliaetus*), and long billed curlew (*Numenius americanus*).

Fish and Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act set forth a number of new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) for all managed species. The Act defines EFH as "[…] those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

For the Pacific region, EFH has been identified for a total of 89 species covered by three fishery management plans under the auspices of the Pacific Fishery Management Council. The Santa Ana River and Marsh provide habitat for several of these species, which are described in the 2012 FEA.

3.3 Threatened, Endangered, and Sensitive Species

Sensitive species, including federal and state threatened and endangered species, that have been observed or have the potential to occur within the immediate vicinity of the project area include California least tern (federally endangered), western snowy plover (*Charadrius alexandrinus nivosus*; federally threatened), Belding's savannah sparrow (state endangered), and light-footed Ridgway's rail (federally endangered).

California Least Tern

Observations of California least terns were noted during surveys in 2016 within the Huntington State Beach least tern colony southwest of the proposed project area, and outside the colony fence along the beach strand and Santa Ana River mouth. No terns were observed loafing or feeding in the Santa Ana River during 2016 monitoring efforts (Santa Ana Watershed Association 2016). No terns were observed within the tern island or other portions of the proposed project area.

Western Snowy Plover

No western snowy plover were observed during bird surveys of the Marsh in 2012 or 2013 (Hoffman 2013a and 2013b). Suitable foraging habitat is present along the beach strand, although frequent maintenance and intense recreation use of the area would likely preclude establishment of a successful nesting population. Mudflats within the Marsh may be used by plover for foraging and roosting; however, the presence of dogs and local residents recreating in the Marsh channels would likely also preclude any nesting activity.

Light-footed Ridgway's Rail

Within the 92-acre Marsh, 12 pairs of light-footed Ridgway's rails were detected in 2015 and 2016 during annual breeding season surveys. Most pairs were found within the eastern and central portions of the Marsh where cordgrass is extremely well developed (Zembal et al. 2016). No nesting light-footed Ridgway's rails were found within the proposed project area.

Within the project area, a cordgrass patch is found at the southwestern edge of the tern island. Nearby, another small patch is found on the northeastern edge of the island. These small patches are isolated from larger cordgrass areas in the southern Marsh (approximately 900 feet away) and in the northern Marsh (approximately 1,400 feet away) by the Marsh access roads, and may not be large enough to attract Ridgway's rail.

Belding's Savannah Sparrow

Belding's savannah sparrow surveys were conducted within the Marsh in April 2013. Two pairs were observed nest building within the Marsh during surveys and 10 individuals were observed (Hoffman 2013b).

3.4 Water Quality

Water quality samples were collected from 6 sites within the Marsh in February 2010. Dissolved oxygen, temperature, and pH were relatively similar at all of the sites and did not indicate any ecological stressors. Dissolved oxygen ranged from 9.79 milligrams per liter (mg/L) to 13.48 mg/L; temperature ranged from 54 to 60 degrees Fahrenheit (ºF); pH ranged from 7.81 to 8.09 (Weston Solutions 2010). All six sites had very low salinity values (0.28 to 6.12 parts per thousand [ppt]) relative to seawater (35 ppt), which was assumed to be attributed to increased fresh water flows due to recent rains at the time of the survey. Historical studies have measured salinity levels in the Marsh at 14 ppt to 34.5 ppt (California Wetland Information System 1997).

In general, water samples were clean with trace amounts of metals and nutrients detected (Weston Solutions 2010). No polycyclic aromatic hydrocarbons, chlorinated pesticides, organophosphorus pesticides, or dissolved metals were detected above reporting limits.

However, water quality in the Marsh varies daily and seasonally, primarily due to tidal influence and flushing via the tide gate system. Water quality can also be influenced locally by freshwater inputs, including urban runoff from storm drains, as well as growth of aquatic vegetation. The commonly measured water quality parameters discussed above (e.g., salinity, temperature, and dissolved oxygen) may vary daily, seasonally, and across the Marsh, where a gradient may form as distance from the tide gates and other water inputs changes.

3.5 Air Quality

The Marsh is located in the South Coast Air Basin (SCAB), which has a Mediterranean climate characterized by mild winters, when most rainfall occurs, and warm, dry summers. The most important climatic and meteorological characteristics influencing air quality in the project area are the persistent temperature inversions, predominance of onshore winds, mountain ridge and valley topography, and prevalent sunlight (Corps 2001).

The SCAB consists of the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, and all of Orange County. The potential for adverse air pollution conditions in the SCAB is high, particularly during the period from June through September. Poor ventilation caused by generally light winds and shallow vertical mixing is frequently insufficient to adequately disperse the large quantities of emissions generated in the basin. During the summer, these factors together with the long hours of sunlight result in the formation of high concentrations of ozone (O_3). During the winter, the same factors produce stagnant air that allows pockets of high concentrations of carbon monoxide (CO) to form.

The California Air Resources Board and the U.S. EPA have classified the SCAB as being in non-attainment of the California and National Ambient Air Quality Standards for ozone, inhalable particulates (particulate matter less than 2.5 and 10 microns in diameter [$PM_{2.5}$ and PM_{10}]), and only recently attained the standard for CO (South Coast Air Quality Management District [SCAQMD] 2012). The California Air Resources Board has also classified the SCAB as being in non-attainment of the California Ambient Air Quality Standards for nitrogen dioxide (NO_2).

The highest CO concentrations are found near heavily traveled and congested roadways. However, in the case of particulate matter, maximum concentrations primarily occur during high wind events or near man-made ground-disturbing activities, such as vehicular activities on roads and earth moving during construction activities. Mobile sources represent 60 percent of volatile organic compound (VOC) emissions, 90 percent of the nitrogen oxides (NOx) emissions, and 95 percent of CO emissions. For directly emitted $PM_{2.5}$, mobile sources represent 34 percent of the emissions with an additional 13 percent due to vehicle-related entrained road dust. Stationary sources emit the majority of the sulfur oxides (SOx) emissions with the point source category contributing 50 percent of the emissions (SCAQMD 2016).

Other sources of pollution include off-road vehicles; industries; petroleum processing, storage, and transfer; fuel combustion; and solvent use.

3.6 Noise

The principal source of noise in the general vicinity of the project area is motor vehicle traffic along Pacific Coast Highway and aircraft-noise from the local airport (John Wayne Airport, Orange County). Sensitive noise receptors such as single-family residential units and recreational trails are located in the vicinity of the project area. There is also a California least tern nesting colony located at the mouth of the Santa Ana River at Huntington State Beach, which would also be considered a sensitive noise receptor. Noise levels adjacent to these major highways and streets often exceed 70 A-weighted decibels, which is usually characterized as a moderately loud noise level.

The City of Newport Beach Municipal Code Section 10.28.040 restricts construction noise during nighttime hours and on Sundays. Construction may occur Monday through Friday between the hours of 7 a.m. and 6:30 p.m. and on Saturday between the hours of 8 a.m. and 6 p.m.

3.7 Land Use and Recreation

In general, the Orange County region can be characterized as primarily urban with areas preserved for open space. Light and heavy industrial uses surround the lower reaches of the Santa Ana River, as well as single- and multi-family residential and recreation uses. The Marsh is zoned as open space in the City of Newport Beach Local Coastal Program Coastal Land Use Plan.

The project area is generally bounded by the Pacific Coast Highway to the south, the Santa Ana River to the west, Newport Banning Ranch property (currently used by West Newport Oil Company) to the east, and a trail extended from 19th Street to the north. The Orange County Sanitation District operates a wastewater pipeline which crosses the Marsh property between the northern and southern Marsh areas. There are three active oil production wells on an easement within the Marsh site, which are owned and operated by the City of Newport Beach. Other nearby land uses include the Orange County Sanitation District Treatment Plant 2 directly across the Santa Ana River from the restored marsh; Huntington State Beach, including a protected least tern breeding colony; a series of restored marsh sites managed by the Huntington Beach Wetlands Conservancy; active petroleum production; and residential and commercial development. The Newport Banning Ranch lands to the east have been proposed for reuse as residential development.

Recreational uses in the vicinity of the project area include fishing, bird watching, biking, hiking, walking, and jogging. Bike trails and maintenance and access roads exist adjacent to the Santa Ana River on the levee to support these recreational uses. Homeowners along the southern boundary of the Marsh have access to open water within the Marsh site for non-motorized boating, via numerous boat docks that existed prior to marsh acquisition and restoration, and that were allowed to remain.

3.8 Aesthetics

The aesthetic character of the immediate project area is dominated by open space at the Marsh, adjacent (north) Talbert Regional Park, and the Santa Ana River, which although channelized, provides scenic views of open water and wildlife (i.e., birds). However, other surrounding land uses, including a mixture of residential and industrial uses, limit this open space character. Farther west, across the river, is Orange County Sanitation Treatment Plant 2. To the east is an oil field operated by the City of Newport Beach, and a bluff lined with residential homes. There are additional residences immediately south of the Marsh, and the Pacific Coast Highway crosses the Santa Ana River nearby.

3.9 Cultural

The area of potential effects was surveyed for the presence of cultural resources in 1985 as part of the original studies for the Santa Ana River Project. None were observed within the project area. In addition, the project area is previously disturbed, and unlikely to contain intact buried archeological resources.

3.10 Traffic

There are several major highways and streets that run parallel or perpendicular to the Santa Ana River, such as the Pacific Coast Highway and Victoria Street (Huntington Beach). The roadways have four to six lanes and the traffic volumes range from 28,000 to 44,000 Average Daily Traffic (California Department of Transportation 2014).

4.0 Impact Analysis

This section summarizes potential impacts that could occur during the sediment removal proposed project in the Marsh and reuse of that material on the tern island. Dredging-related impacts are also described in detail in the July 2012 FEA. It is estimated that construction may take approximately two weeks. Construction is scheduled to occur between September 15, 2017 and April 15, 2018 to avoid impacts to sensitive species. Impacts from the "No Action" alternative are also summarized.

4.1 Physical Environment

Proposed Action Alternative: Modifications to the existing bottom topography of the Marsh would be expected as a result of the proposed sediment removal project. Local changes to the bathymetry would result due to the removal of sediments from the Marsh channel. Impacts to the Marsh bathymetry would not be considered significant as sediment would be removed to design depths and removal of sediments would improve the functioning of the Marsh environment.

No Action Alternative: Under the no action alternative, no sediment removal activities would occur and no modifications to the existing bottom topography or tern island would occur. However, under this alternative the functioning of the marsh environment would not be improved.

4.2 Biological Resources

Proposed Action Alternative

Vegetation

Any vegetation within the sediment removal area and on the tern island where sediment will be placed would be disturbed or removed.

On the top of the tern island, saltgrass, bursage, coastal goldenbrush, and alkali weed areas would be covered by approximately 6 inches of sediment. This vegetation is expected to re-establish after project completion, and would be weeded and managed for 6 months to maintain a level of vegetative cover suitable for tern nesting (no more than 5 to 15 percent native cover). Up to approximately 0.5 acre of pickleweed may also be disturbed during fence replacement and sediment placement activities. When accessing the tern island, metal plates may be placed on the island slope to avoid discing pickleweed. Pickleweed is expected to re-establish after project completion, as was observed in areas where metal plates were used in the previous dredging.

Within the sediment removal area, approximately 0.1 acre of cordgrass and less than 0.1 acre of eelgrass would be removed. It is expected that vegetation would re-establish within impacted areas after sediment removal is complete and the Marsh's tidal cycle is restored. Cordgrass habitat is expected to re-establish in the Marsh channels over time as sediments settle, as was observed after the 2013 dredging.

The project area supports a few small patches of eelgrass (less than 0.1 acre), which would be directly impacted and removed with the sediment. Eelgrass in other adjacent portions of the Marsh may be indirectly impacted by turbidity during sediment removal, however, these impacts are expected to be temporary and insignificant. Coordination with NMFS regarding impacts to eelgrass is ongoing. The Corps would mitigate for impacts to eelgrass by transplanting eelgrass from the project area to other suitable locations in the Marsh that currently support eelgrass. The Mitigation Plan and transplant locations would be coordinated with and approved by NMFS prior to construction.

Pre- and post-sediment removal vegetation surveys would be performed to document acreage of cordgrass and pickleweed areas impacted by construction activities in staging, access, and work areas. The project area would be monitored for six months after construction to evaluate the re-establishment of Marsh vegetation. If vegetation does not adequately re-establish, planting would be performed in appropriate areas.

A survey for caulerpa, an invasive aquatic plant species, was conducted prior to sediment removal activities in 2013. No caulerpa was located in the project area. Per commitments to the NMFS and RWQCB, surveys for this species would be performed again prior to proposed sediment removal activities.

With implementation of mitigation measures, the proposed project is not expected to cause significant adverse impacts to Marsh or tern island vegetation. Any impacts would be minimal and localized.

Invertebrates

Sediment removal activities would cause disturbance and redistribution of bottom sediments which would persist for the duration of the sediment removal activities. Some invertebrates, especially small crustaceans and mollusks of the infauna, may be relocated with the sediment material and deposited on the tern island. Some may be smothered, become food for opportunistic birds, or survive at a new location. Sediment removal operations may cause some clogging to gills and suspension feeding apparatuses, resulting in smothering to invertebrates in the immediate vicinity.

Overall, the impacts to invertebrates are expected to be minimal, localized, and temporary, and would be considered less than significant.

Wildlife

Construction activities may temporarily degrade water quality and increase ambient noise levels, which could cause disturbances to some birds. Increased levels of activity within the Marsh may decrease waterfowl use of the water for resting and the use of any nearby structures for roosting. Sediment removal activities would also remove mudflats, which are used by shorebirds for foraging. Sediment removal operations would occur over a short duration, only during daytime hours, and would be localized within the Marsh. Birds are expected to vacate the area and find alternate foraging and roosting locations during construction activities. Birds are also expected to generally acclimate to construction noise, which occasionally occurs in the Marsh due to projects conducted along the access road by Orange County Sanitation District. All construction activities would take place outside the breeding season for birds.

Birds would benefit from the improved water circulation and tidal flows in the Marsh, which would maintain Marsh habitats and ecosystem diversity. Sediment removal activities may also suspend invertebrates to temporarily enhance foraging opportunities. With the implementation of mitigation measures, adverse impacts to birds would be avoided, and impacts would be considered less than significant.

The Marsh supports mostly small species of wildlife. Sediment removal would occur in inundated areas and wildlife is expected to be mostly impacted by noise and vibrations during construction. Sediment placement covering vegetation on the tern island may remove habitat for small reptiles and mammals, however, the slopes of the island would remain intact and provide refuge for these species. Wildlife is expected to vacate areas of high disturbance during construction, and return after construction is complete. Disturbance to wildlife species would be of a short duration, only during daytime hours, and would be localized within the Marsh. Impacts to wildlife are considered less than significant as any disruptions to pre-construction foraging or movement behaviors would be temporary and wildlife activities are expected to return to normal upon proposed project completion.

Fish and Essential Fish Habitat

Sediment removal in the Marsh could affect fish resources in a variety of ways. The sediment removal process could result in direct loss of foraging habitat and invertebrate prey items. Turbidity caused by sediment removal may also impact fish resources. Fish may be exposed to suspended sediment concentrations during sediment removal and up to 24 hours later. Sediment removal operations may cause some clogging to gills, resulting in smothering to fish in the immediate vicinity.

It is expected that most fish would avoid the immediate project area during sediment removal operations because of the increased turbidity, noise levels, and oxygen depletion caused by removal of bottom sediment. The sediment removal operation and water quality will be monitored to ensure that substantial increases in turbidity or decreases in dissolved oxygen are restricted to the immediate area around the sediment removal area (see Section 6.0). Any such sediment removal-related impacts would be temporary, controlled, and therefore, insignificant.

Sediment removal would benefit the Marsh habitats and species by increasing water circulation and tidal influence in the Marsh, which would indirectly benefit fish resources. Also, sediment removal activities sometimes suspend infauna and epifauna to temporarily enhance fish feeding activities. Fish are expected to re-colonize the project area from the Santa Ana River and other unimpacted portions of the Marsh after construction is complete.

With mitigation, impacts to EFH would be minimal and short term, and would not result in a significant, adverse impact.

No Action Alternative
The impacts associated with sediment removal and placement on the tern island would not occur under the no action alternative. However, shoaled sediment would continue to block the opening of the tide gate and the Marsh would continue to experience muted tides and diminished access for aquatic wildlife. The degraded condition of the Marsh would continue to have potential adverse effects on biological resources.

4.3 Threatened, Endangered, and Sensitive Species

Proposed Action Alternative

California Least Tern
Adverse effects to California least tern would be avoided by conducting activities outside the nesting season. California least terns generally arrive in southern California in mid-April and depart in mid-September, construction activities would occur between September 15 and April 15. Therefore, construction would not occur while California least tern are present in the area.

The California least tern would potentially benefit from the proposed clearing and capping of the tern island, which would expand the area of available nesting habitat. Therefore, the proposed project may beneficially affect, but is not likely to adversely affect the California least tern. USFWS concurred with this assessment via e-mail received on March 23, 2017.

Western Snowy Plover
Construction activities would occur outside the breeding season for the western snowy plover. Sediment removal would remove some of the mudflats where snowy plover may forage and roost during winter months. However, the plover, if present, would avoid the immediate area for the duration of construction as there are alternate foraging and roosting sites at the beach and adjacent wetland areas. Furthermore, construction activities would be temporary, lasting approximately two weeks, and would occur only during daytime hours.

Critical habitat for the western snowy plover would not be impacted by the proposed project. By scheduling construction outside the breeding season, adverse impacts to western snowy plover would be avoided. The proposed project may affect but is not likely to adversely affect the western snowy plover. USFWS concurred with this assessment via e-mail received on March 23, 2017.

Light-footed Ridgway’s Rail
The Ridgway’s rails found in the Marsh are concentrated in the cordgrass habitat in the northern Marsh, outside of the project area. One pair was noted in the large cordgrass patch in the southern Marsh, approximately 700 feet (0.13 mile) from the closest project boundary. Construction activities would occur outside the breeding season, which would avoid adverse impacts to the light-footed Ridgway’s rail. Cordgrass habitat for the Ridgway’s rail is present in the project area in one very small isolated patch. Removal of this patch of cordgrass is not expected to impact resident birds, which are expected to use the more expansive cordgrass habitat in the northern Marsh for foraging during

construction activities. Furthermore, construction activities would be temporary, lasting approximately two weeks, and would occur only during daytime hours.

With the avoidance of breeding season and known occupied habitat, and the implementation of mitigation measures, the proposed project may affect, but is not likely to adversely affect the light-footed Ridgway's rail. USFWS concurred with this assessment via e-mail received on March 23, 2017.

Belding's Savannah Sparrow
Construction would occur outside the breeding season for the Belding's savannah sparrow. The large patch of occupied pickleweed habitat in the southern Marsh, east of the tern island, would remain undisturbed. Resident birds are expected to avoid areas of high activity and relocate to alternate foraging and roosting areas in undisturbed portions of the Marsh. Furthermore, construction activities would be temporary and would occur only during daytime hours.

With the avoidance of breeding season and occupied sparrow habitat, impacts to Belding's savannah sparrow would be less than significant.

No Action Alternative
Under the no action alternative, shoaling of the Marsh in the vicinity of the tide gate would continue to dampen the tidal cycle, and degrade water quality and Marsh habitat. The degraded condition of the Marsh would continue to have potential adverse effects on threatened, endangered, and sensitive species.

4.4 Water Quality

Proposed Action Alternative
Temporary physical and chemical changes in water quality characteristics would result due to re-suspension of bottom sediments during sediment removal activities. However, since contaminant levels for the sediment removal area are within acceptable limits, impacts to water quality due to contaminants during activities are expected to be minimal and not significant.

Increases in turbidity during sediment removal would be localized and short term. Connections to the Marsh channels (via the tide gate and culverts) would be blocked during sediment removal to keep consistent water levels and prevent turbidity from entering the Santa Ana River and northern portion of the Marsh. Considering the existing tidal flows and turbidity, as well as mitigation measures to be implemented, impacts from turbidity due to sediment removal activities are expected to be localized, short term, and not significant.

Placement of sediment on tern island would not directly impact water quality because activities would be performed above the Marsh channels in the upland environment of the flat top of the island. Construction equipment would cross the Marsh channel to gain access to the island, however, crossings would be infrequent and short term. In addition, the channel crossing would be temporarily improved using gravel or steel plates, which would minimize vehicle direct contact with the Marsh channel water.

Sediment removal activities would comply with the 401 Water Quality Certification (WQC) received in July 2012 and amended in March 2017. With the implementation of mitigation measures, the proposed sediment removal and placement activities are not expected to cause significant or adverse impacts to water quality.

No Action Alternative

Under the no action alternative, sediments would continue to accumulate in the Marsh channel adjacent to the tide gate, which would continue to prevent proper circulation and tidal flushing. Water quality would likely degrade in the tern island portion of the Marsh. Marsh habitats that rely on tidal influence and flushing would be expected to degrade as well with the further dampening of the tidal cycle.

4.5 Air Quality

Proposed Action Alternative

Air Quality would be minimally impacted in the vicinity of the project area by the increase in emissions from a few pieces of equipment used on-site, and from commuting vehicles used by the work crews. This increase would be short term and minimal, lasting approximately two weeks. The impact to air quality, therefore, is negligible and not significant.

No Action Alternative

Under the no action alternative, no sediment removal or placement of sediment on tern island would occur. Therefore, no air quality impacts would occur under this alternative.

4.6 Noise

Proposed Action Alternative

Increased noise in the vicinity of the project area would occur due to the operation of construction equipment. Noise levels may reach 85 to 90 decibels at the source. Distances between the construction equipment and sensitive noise receptors, and subsequently the noise level, would vary based on the location of equipment at a given time.

Construction would only occur during daytime hours per the City of Newport Beach’s Municipal Code (Section 10.28.040) and the noise generated would diminish the farther the sensitive noise receptors are from the construction activity. Furthermore, construction would be temporary, lasting approximately two weeks. Residents would be notified as to when construction would be likely to occur.

Due to the temporary nature of the noise impacts and with the incorporated mitigation measures, noise impacts would be less than significant.

No Action Alternative
Under the no action alternative, there would be no noise related impacts associated with sediment removal activities. There would be no impacts to sensitive noise receptors in the area.

4.7 Land Use and Recreation

Proposed Action Alternative
The proposed action would not create incompatibilities between existing or planned uses with nearby or adjacent land uses. The proposed activities would not alter land use at the Marsh, which is currently open space, therefore no impacts to land use would occur.

There may be temporary impacts to recreation if the east levee road is used for ingress and egress of construction equipment. However, the east levee road is expected to already be closed during this time due to the on-going sediment removal of the Santa Ana River performed by Orange County. The Corps will coordinate any use of the levee road with Orange County to avoid impacts to their operations.

No Action Alternative
Under the no action alternative, no sediment removal activities would occur and no conflicts with applicable land use plans or policies would occur. In addition, this alternative would not result in incompatibilities between existing or planned uses of the area. The no action alternative would not result in nuisance impacts for local residents or sensitive receptors, and would not conflict with the enjoyment of the open space, beach, or ocean.

4.8 Aesthetics

Proposed Action Alternative
The aesthetic qualities of the project area would not be significantly impaired as a result of the presence of a few pieces of construction and other supporting equipment. Impacts would be temporary, short term, and less than significant.

No Action Alternative
Under the no action alternative, no sediment removal activities would occur and the Marsh channel adjacent to the tide gate would not be deepened to design depths. Over the long-term, habitat types within the Marsh are likely to change due to continued accumulation of sediment resulting in degraded water quality and habitats in the area. Degraded conditions would result in an adverse impact to the visual character of the Marsh.

4.9 Cultural

No cultural resources are present within the Area of Potential Effects. Therefore, there would be no impacts to cultural resources from the proposed project or the no action alternative.

4.10 Traffic

Proposed Action Alternative

Traffic would be minimally impacted in the vicinity of the project area from ingress and egress of a few pieces of equipment, and from commuting vehicles used by the work crews. This increase would be short-term and minimal, lasting approximately two weeks. The impact to traffic, therefore, is negligible and not significant.

No Action Alternative

Under the no action alternative, no sediment removal activities would occur and there would be no traffic or transportation impacts anticipated.

4.11 Cumulative Impacts

Under NEPA, a cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR 1508.70).

The Corps performed dredging in the southern Marsh in Spring 2013. Since that time, shoaled sediment at the downstream tide gate has dampened the tidal cycle and diminished access for aquatic wildlife. The proposed project, in concert with the previous 2013 dredging, would provide a cumulative benefit to the Marsh, whereby design depths are restored throughout the southern Marsh along with circulation and tidal cycles.

The Corps has coordinated with the City of Newport Beach and Orange County Public Works regarding other construction or maintenance activities scheduled to occur in the vicinity at the same time as this project.

The City of Newport Beach has been dredging the Seminuk Slough, which is adjacent and connected to the Marsh, and Orange County Public Works has been dredging in the Santa Ana River across the levee from the Marsh. The City and County have tested dredge sediments, implemented approved plans for disposal, complied with environmental laws and regulations, and obtained required permits. Air quality and noise impacts may be greater with additional equipment from the Corps' proposed project. Impacts to wildlife, particularly roosting and foraging birds, may also be greater with implementation of sediment removal in multiple, adjacent locations. However, the wetland complexes along Pacific Coast Highway would provide refuge for roosting birds, and dredging operations have been known to attract wildlife as prey items are released into the water column. Impacts of the Corps' proposed project would be temporary, occurring over two weeks. The City and County projects may also continue after September 15, 2017, to achieve full completion; however, the remaining project tasks would also be short term.

Given compliance with the environmental commitments in this SEA and those required by project permits, the proposed project would not result in significant cumulative impacts.

5.0 Coordination

Coordination occurred with applicable resource agencies as discussed below. These agencies have expressed support for the restoration activities as they will benefit Marsh habitats and federally and state listed endangered species. These agencies received the Draft SEA during the public review period. Correspondence with resource agencies is included in Appendix C, a complete mailing list is provided in Appendix D, and responses to public comments are included in Appendix E.

5.1 Dredge Materials Management Team

The Corps coordinated with the Dredge Materials Management Team (DMMT) in October 2016, December 2016, and January 2017, regarding the proposed project. Sediment sampling was conducted per an approved Sampling and Analysis Plan in November 2016. Sampling results were submitted to the DMMT in January 2017. Placement of sediment on the tern island was approved.

5.2 National Marine Fisheries Service

The Corps coordinated with the NMFS in December 2016. Surveys of the southern California region performed in 2016 showed that eelgrass is present within the Marsh (less than 0.1 acre) and within the proposed project area. Coordination with NMFS indicated that mitigation for impacts to eelgrass is necessary and that because the proposed project is intended to benefit Marsh habitats and species, including the persistence of eelgrass, NMFS may provide flexibility in mitigation. The Corps will survey for eelgrass in the project area, coordinate a Mitigation Plan with NMFS, and transplant eelgrass prior to project implementation. The NMFS concurred with the Corps' EFH determination and proposed Plan of Action for eelgrass transplant on March 3, 2017.The Corps will continue to coordinate with NMFS during development of the Eelgrass Transplant Plan.

5.3 U.S. Fish and Wildlife Service

The Corps coordinated with the USFWS in December 2016. USFWS provided recommendations for discussion topics in the SEA, including acreages of vegetation that would be impacted, methods for restoring impacted vegetation, post-project monitoring results from the 2013 dredging, and the type of monitoring that would be conducted during the proposed project. USFWS also recommended biological monitoring during sediment removal activities and repair of the fencing around the least tern island at project completion. Informal consultation for the California least tern, western snowy plover, and light-footed Ridgway's rail was requested in February 2017. Comments from USFWS were incorporated into this Final SEA, and concurrence was received on March 23, 2017.

5.4 California Department of Fish and Wildlife

The Corps coordinated with the California Department of Fish and Wildlife (CDFW) through the DMMT meetings in October and December 2016, and January 2017. The California Department of Fish and Wildlife did not express concerns during the meetings and requested to review the Draft SEA. The CDFW received a copy of the Draft SEA during the public review period.

5.5 California Coastal Commission

The Corps coordinated with the California Coastal Commission (CCC) in December 2016. CCC indicated that submittal of a Negative Determination would be sufficient, as the proposed project is not substantially different from the 2013 Marsh Dredging Project. At that time, the Corps received concurrence from CCC with a Negative Determination (ND-023-12) dated May 25, 2012. The Corps submitted a Negative Determination to CCC with the Draft SEA. Concurrence was received from CCC on March 8, 2017.

5.6 Regional Water Quality Control Board

The Corps coordinated with the Santa Ana Regional Water Quality Control Board (RWQCB) in December 2016 regarding the proposed project and the 401 WQC. The RWQCB indicated that an amended 401 WQC would be appropriate as the proposed project is not substantially different from the 2013 Marsh Dredging Project, for which a WQC was received in July 2012. An amended 401 WQC was received from RWQCB on March 27, 2017.

5.7 Environmental Protection Agency

The Corps coordinated with the U.S. EPA through the DMMT meetings in October and December 2016, and January 2017. The EPA did not express concerns regarding the proposed project, as sediments would not be placed in the ocean environment. Sediments were found to be compatible with placement on the tern island.

6.0 Commitments

The following is a summary of environmental commitments that have been developed to minimize the impacts associated with construction of the proposed project.

General

1. All sediment removal and placement activities will remain within the boundaries specified in the plans. There will be no placement of material outside of the placement area or within any adjacent aquatic community.

Physical Environment

PE-1. Sediment removal would only occur in areas with sediments compatible for placement on the tern island, as determined by sediment sampling completed in 2016 and approved by the SC-DMMT.

Biological Resources

BR-1. The Contractor shall keep construction activities under surveillance, management, and control to minimize interference with and disturbance to fish and wildlife.

BR-2. Construction activities shall occur between September 15 and April 15, outside the breeding season for most birds that occur in the area and the majority of the least tern and Ridgway’s rail breeding seasons.

BR-3. Pre- and post-sediment removal vegetation surveys would be performed to document acreage of habitat impacted by construction activities. The project area would be monitored for six months after construction to evaluate the re-establishment of Marsh vegetation in areas disturbed by the project. If vegetation does not adequately re-establish, native planting would be performed in appropriate areas.

BR-4. Prior to the 2018 least tern breeding season (i.e., before April 15, 2018) the Corps will prepare the least tern island for nesting by removing weeds and limiting native vegetation cover to less than 15%.

BR-5. When accessing the tern island, metal plates may be placed on the island slope to avoid discing pickleweed and support re-establishment after project completion.

BR-6. Any staging and access areas would be restored after construction is complete. The staging and access areas would be monitored and weeded, as needed, for six months after construction to evaluate the re-establishment of vegetation in those areas. If vegetation is not properly re-establishing, re-planting would be performed.

BR-7. Visual pre-sediment removal eelgrass and caulerpa (invasive aquatic plant species) surveys would be performed at low tide in the Marsh to document presence/absence and extent of these species. The Corps would mitigate for losses to eelgrass in coordination with NMFS. If caulerpa is found in the Marsh, the Corps would coordinate further with NMFS.

BR-8. Construction activities would be monitored daily by a qualified biologist to ensure there are no unanticipated impacts to federally listed species. No construction shall occur within 300 feet of an active Ridgway's rail nest site.

BR-9. Sediment removal will only occur in areas with sediments compatible for placement on the tern island, as determined by sediment sampling completed in 2016 and approved by the Southern California Dredge Materials Management Team.

BR-10. The fence replacement area along the tern island slopes would be monitored and weeded for six months after construction to evaluate re-establishment of pickleweed. If pickleweed is not properly re-establishing, replanting would be performed.

BR-11. A three-foot buffer will be provided between vegetated banks in the project area and the sediment removal footprint to preserve mudflat habitat for Ridgway's rail.

Water Quality

WQ-1. The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters.

WQ-2. The Contractor shall perform water quality monitoring before, during, and after sediment removal activities and implement BMPs per the 401 WQC (Appendix C).

WQ-3. For clearing and fence replacement activities on the tern island, the crossing would be temporarily improved using gravel or steel plates, which would minimize the equipment's direct contact with the water in the Marsh channel.

Air Quality

AQ-1. The Contractor shall obtain and observe all applicable SCAQMD or State Air Resources Board permits.

AQ-2. To reduce air quality impacts, trucks idling shall be limited to no more than 30 minutes.

Noise

NO-1. Construction would only occur during daytime hours per the City of Newport Beach's Municipal Code (Section 10.28.040). Construction may occur Monday through Friday between the hours of 7 a.m. and 6:30 p.m. and on Saturday between the hours of 8 a.m. and 6 p.m.

NO-2. Residents would be notified as to when construction would be likely to occur adjacent to their residence.

Land Use and Recreation

LR-1. In the event of any temporary levee bike path or other trail closure, the public would be notified of the closure, and appropriate signs would be posted to ensure safe access and, or, bypass/detour of the affected segment.

LR-2. The Corps shall coordinate with the appropriate agencies/land owners for access and use of entry points/access roads to minimize disturbance of routine operations.

Cultural

CR-1. Pursuant to 36 Code of Federal Regulations (CFR) § 800.13, in the event of any discoveries during construction of either human remains, archeological deposits, or any other type of historic property the Contractor shall immediately suspend all work in any area(s) where potential cultural resources are discovered. The Contractor shall not resume construction in the area surrounding, i.e., immediately adjacent to, the potential cultural resources until the Corps has complied with 36 CFR 800.13.

7.0 Compliance

This document is a supplement to the 2012 FEA, which provides a detailed description of compliance with all applicable regulations as identified below.

7.1 National Environmental Policy Act

This SEA has been prepared to address impacts and develop environmental commitments associated with the proposed project. The Draft SEA was circulated for public review and appropriate resource agencies, environmental groups, and other interested parties had an opportunity to provide comments on document adequacy. Comment responses have been incorporated into the Final SEA.

7.2 Clean Water Act

The Corps does not issue itself a permit for civil works projects. Therefore, a Section 404(b)(1) analysis was prepared and included in Appendix B. Section 404(b)(1) addresses project related impacts to the waters of the United States and provides appropriate mitigation measures to minimize impacts. Section 230.10(a)(2) of the 404(b)(1) guidelines states that an alternative is practicable if available and capable of being done after taking into consideration costs, existing technology and logistics in light of overall project purposes. This project is in compliance with the Section 404 of the Clean Water Act. Environmental commitments to minimize impacts to waters of the U.S. are included in this SEA.

The Corps requested an amended Section 401 WQC from the California RWQCB, Santa Ana Region, which was received on March 27, 2017

7.3 Endangered Species Act

The proposed project will not adversely affect federally listed endangered or threatened species and formal consultation under Section 7 of the Endangered Species Act (ESA) is not required. Coordination with USFWS and NMFS occurred during project development and at DMMT meetings. USFWS and NMFS received the Draft SEA..

Informal consultation for the California least tern, western snowy plover, and light-footed Ridgway’s rail was initiated in February 2017. Concurrence from USFWS was received on March 23, 2017.

7.4 Coastal Zone Management Act

The Corps initiated coordination with CCC staff during DMMT meetings. The CCC received a Negative Determination (ND) and the Draft SEA during the public review period. The CCC concurred with the Corps’ ND on March 8, 2017.

7.5 Clean Air Act

Project emissions are not expected to exceed “de minimis” levels established as a criteria for a finding of conformity. The CO, VOC, NOx, SOx and particulate matter emissions fall well below these de minimus levels as prescribed in 40 CFR 93.153(b). Therefore, this Proposed Action conforms to the Federal Clean Air Act as amended in 1990. A

Record of Non-Applicability was prepared for the July 2012 Final EA. The project is in compliance with the Clean Air Act.

7.6 National Historic Preservation Act

The Corps has an executed Programmatic Agreement for the entire Santa Ana River Project. This document puts the Corps in compliance with the National Historic Preservation Act.

7.7 Magnuson-Stevens Fishery Management and Conservation Act

This SEA contains an EFH Assessment as required by the Magnuson-Stevens Act (Section 4.2). Although construction will occur within EFH, the Corps has determined that the proposed project would not result in a substantial, adverse impact. In compliance with the coordination and consultation requirements of the Act, the Draft SEA was sent to the NMFS for their review and comment. The Corps also submitted a Plan of Action for eelgrass mitigation to NMFS during the public review period. NMFS concurred with the Corps' EFH determination and the mitigation plan of action on March 3, 2017.

8.0 Conclusion

The Corps has concluded that the proposed Santa Ana River Marsh Sediment Removal Project has been designed and scheduled to avoid, minimize, and mitigate the probable effects on the environment. Minimization measures will be implemented to avoid significant adverse effects. Construction would occur outside the nesting season for birds, including threatened and endangered species. Construction activities would occur during daytime hours only, in accordance with local noise ordinances. Water quality, including turbidity and pH, would be monitored per the 401 WQC to ensure minimal impacts to water quality.

This SEA, and coordination with the appropriate public agencies, indicates that the proposed project would not have a significant impact upon the existing environment or the quality of the human environment. As a result, preparation of an Environmental Impact Statement (EIS) is not required.

9.0 List of Preparers/Reviewers

Erin Jones, Corps, Biologist, Ecosystem Planning Section
Hayley Lovan, Corps, Chief, Ecosystem Planning Section
Karyl Palmer, RECON Environmental, Inc., Environmental Analyst
Susy Morales, RECON Environmental, Inc., NEPA Coordinator

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Sources:

Background is from the ESRI ArcGIS Online Basemap Sources

Coordinate System:
State Plane California VI (FIPS 0406, Feet)
Datum: NAD 1983

SUPPLEMENTAL EA FOR THE
SANTA ANA RIVER MARSH
RESTORATIVE SEDIMENT REMOVAL

FIGURE 1
REGIONAL LOCATION

CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SUPPLEMENTAL EA FOR THE
SANTA ANA RIVER MARSH
RESTORATIVE SEDIMENT REMOVAL

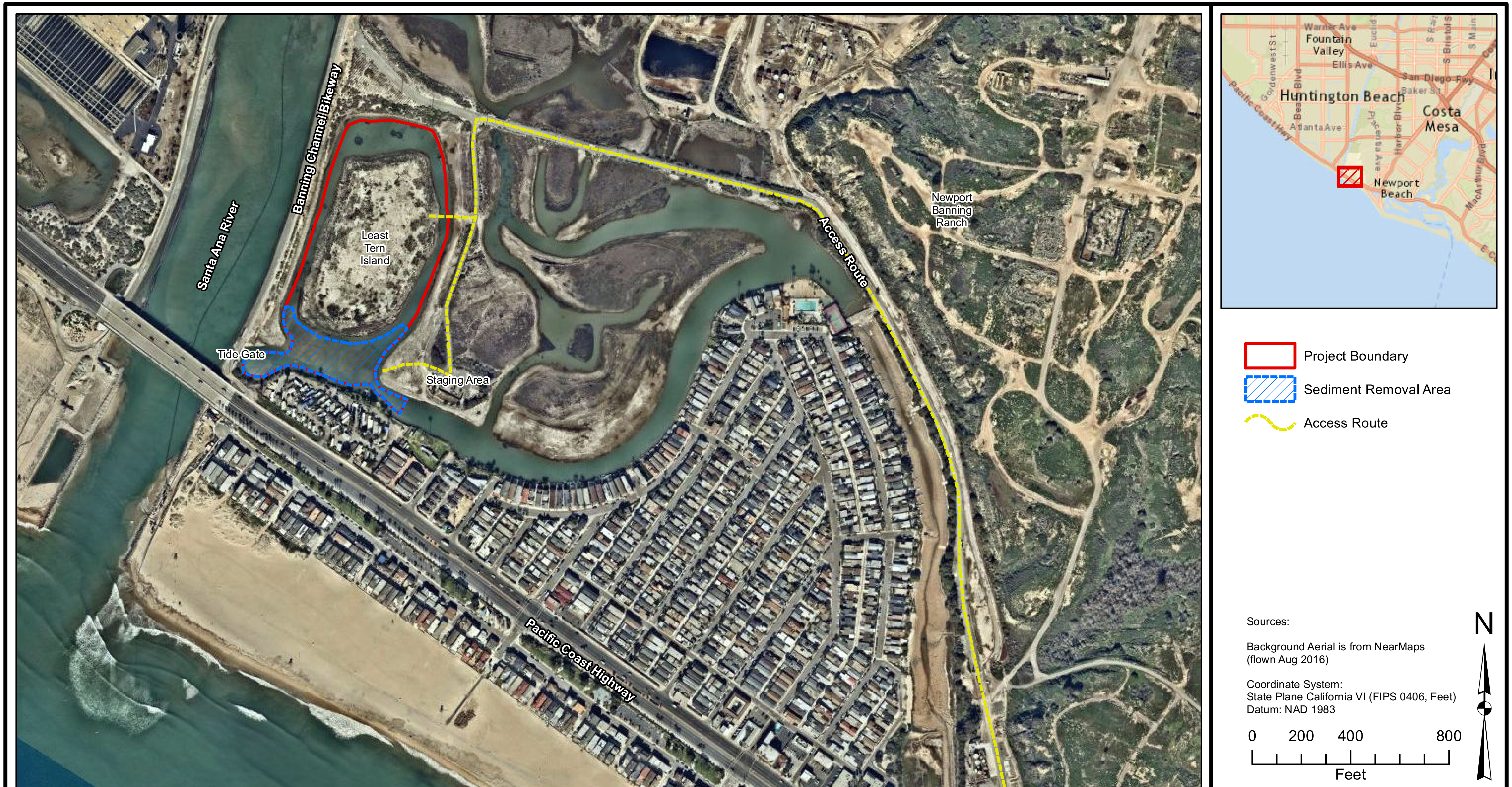
FIGURE 2
PROPOSED PROJECT LOCATION

Sources:

Background Aerial is from NearMaps
(flown Aug 2016)

Coordinate System:
State Plane California VI (FIPS 0406, Feet)
Datum: NAD 1983

CORPS OF ENGINEERS
LOS ANGELES DISTRICT



Sources:

Background Aerial is from NearMaps
(flown Aug 2016)

Coordinate System:
State Plane California VI (FIPS 0406, Feet)
Datum: NAD 1983

SUPPLEMENTAL EA FOR THE
SANTA ANA RIVER MARSH
RESTORATIVE SEDIMENT REMOVAL

FIGURE 3
PROPOSED PROJECT ACCESS AND STAGING AREA

CORPS OF ENGINEERS
LOS ANGELES DISTRICT

APPENDICES

APPENDIX A

Final Sampling and Analysis Investigation Report

Final Sampling and Analysis Investigation Report

Santa Ana River Marsh Restorative Sediment Removal Project

Source: Google Inc. 2016

Prepared For:

U.S. Army Corps of Engineers

Los Angeles District

W912PL-14-D-0054, Task Order 0013 (RECON Number 8044)

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1 INTRODUCTION

This report presents the results of the field investigations conducted in accordance with the Final Sampling and Analysis Plan (SAP) (Attachment A) that aimed to characterize the sediment within the Santa Ana River (SAR) Marsh, located in the City of Newport Beach, Orange County, California (City) (Figure 1). The Santa Ana River Marsh Restorative Sediment Removal Project (Project) proposes to dredge no more than 10,000 cubic yards (CY) of sediment from the marsh to restore tidal flow, which would improve water quality and habitat functions. This Sampling and Analysis Investigation Report (SAIR) evaluates sediment characteristics within the proposed Project area in order to allow U.S. Army Corps of Engineers (USACE) staff to determine its suitability with placement areas being considered. Sediment is proposed to be placed at either the Least Tern Island within the SAR Marsh or in the nearshore off of Newport Beach. Placement in the nearshore would be performed by Orange County Public Works (County) through their current Lower Santa Ana River Maintenance Dredging project, and would require close coordination with the County. The County's project proposes to place up to 1.1 million CY of export sand within the Newport Beach nearshore as part of restoring channel invert elevations within the Santa Ana River. Their project is currently under construction.

The USACE is the Federal lead agency for the project. This draft SAIR will be submitted to the Southern California Dredged Materials Management Team (SC-DMMT) for review and concurrence on sampling methods and results.

1.1 *Project Summary*

The USACE proposes to remove sediment in an approximately 90,000 square foot area of the SAR Marsh to a maximum design depth of -0.5 feet Mean Lower Low Water (MLLW) to remove an existing sand plug that impedes flow through the tide gate. Maintenance work is anticipated to be carried out by hydraulic dredge or excavator; thus, the maximum cut depth includes a sediment characterization overdepth allowance of 1.0 feet. The project footprint was separated into two areas, Areas A and B, with two design depths, as shown in Figure 2. Two representative cross-sections showing the extents of proposed sediment removal within the SAR Marsh are provided in Figure 3 and Figure 4. The depth of sediment removal from ground surface to design depth is depicted in Figure 5. Excavation work details within the SAR Marsh are provided in Table 1 below.

Table 1. Proposed Santa Ana River Marsh Excavation Volumes

Project Area Name	Project Area (sq. ft.)	Design Depth (ft, MLLW)	Depth with 1-foot Overdepth (ft, MLLW)	Approx. Volume (CY)
Area A	63,414	+0.5	-0.5	7,300
Area B	26,054	-0.5	-1.5	2,700
TOTAL	89,468			10,000

Final construction methods will be determined by the construction contractor and dictated by site-specific constraints such as the tidal gate, site access, cut depths, and timing. The Project is tentatively scheduled to begin March 2017.

The Project proposes beneficial reuse of export material generated for the purposes of habitat expansion of the Least Tern Island within the SAR Marsh, or beneficial reuse of export material in the nearshore area of Newport Beach. Least Tern Island sediment placement would entail the building up of the island's elevation. The proposed receiver sites are shown in Figure 6.

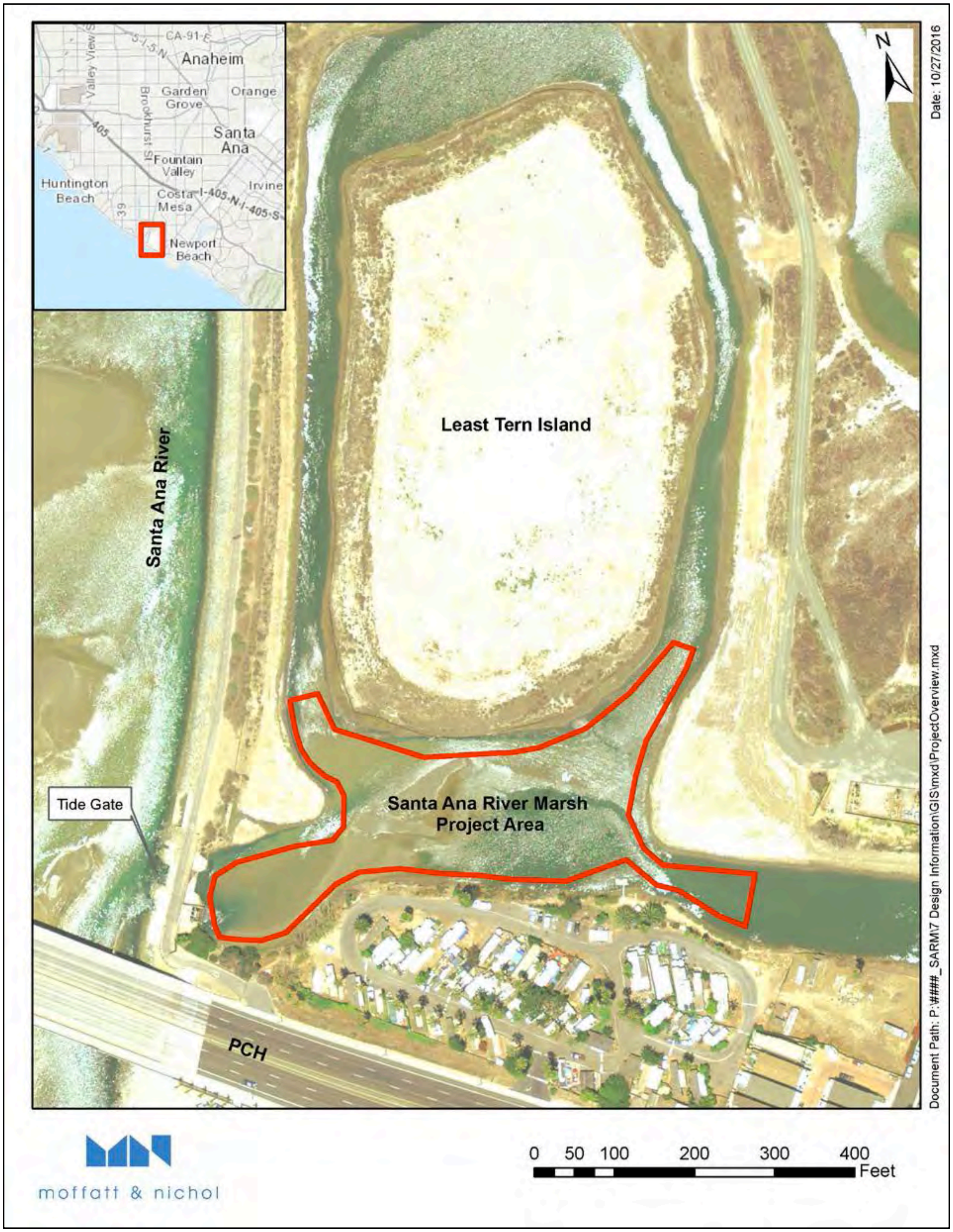

Figure 1. Vicinity Map - Santa Ana River Marsh, Orange County, CA

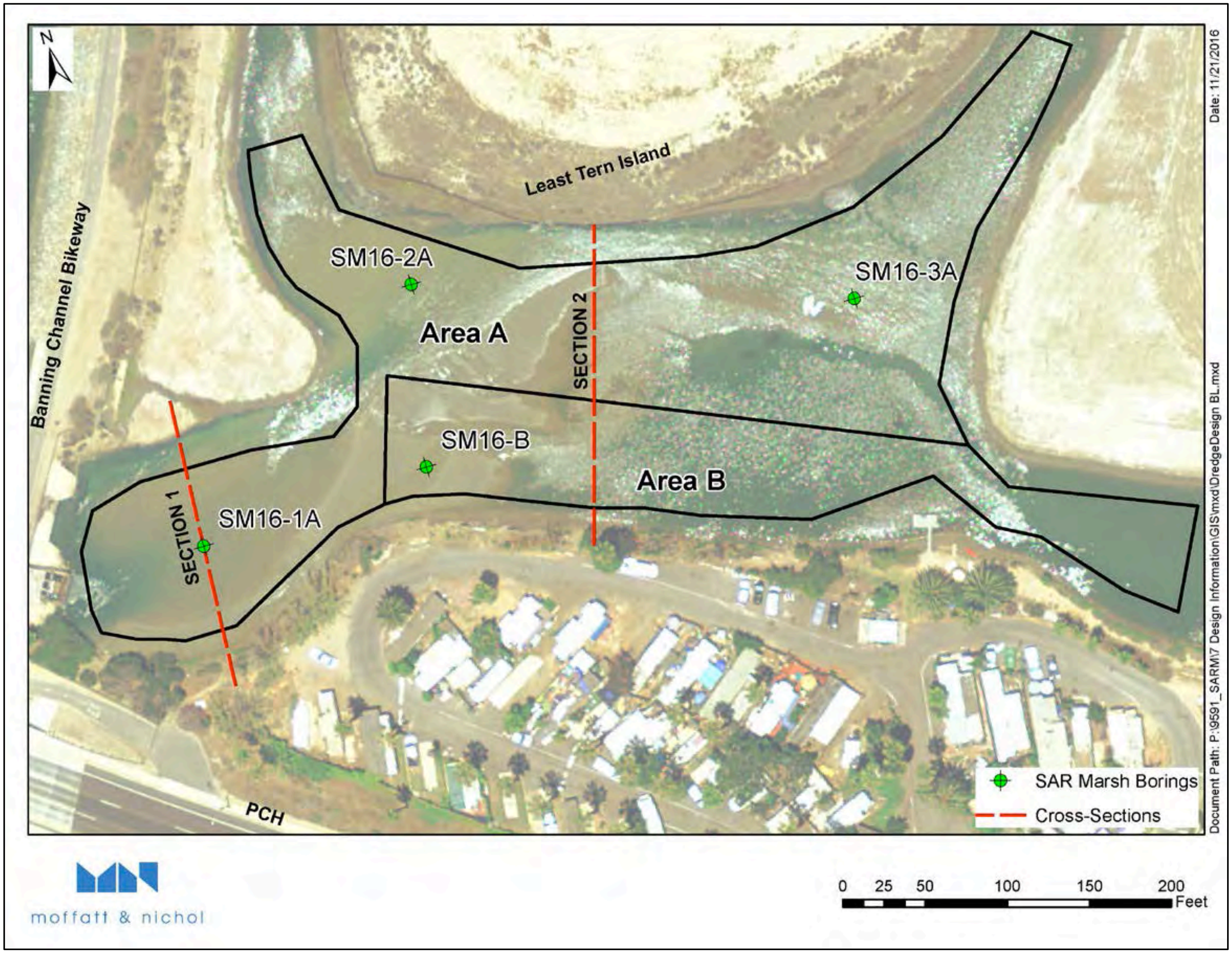

Figure 2. Plan View of the Project Area

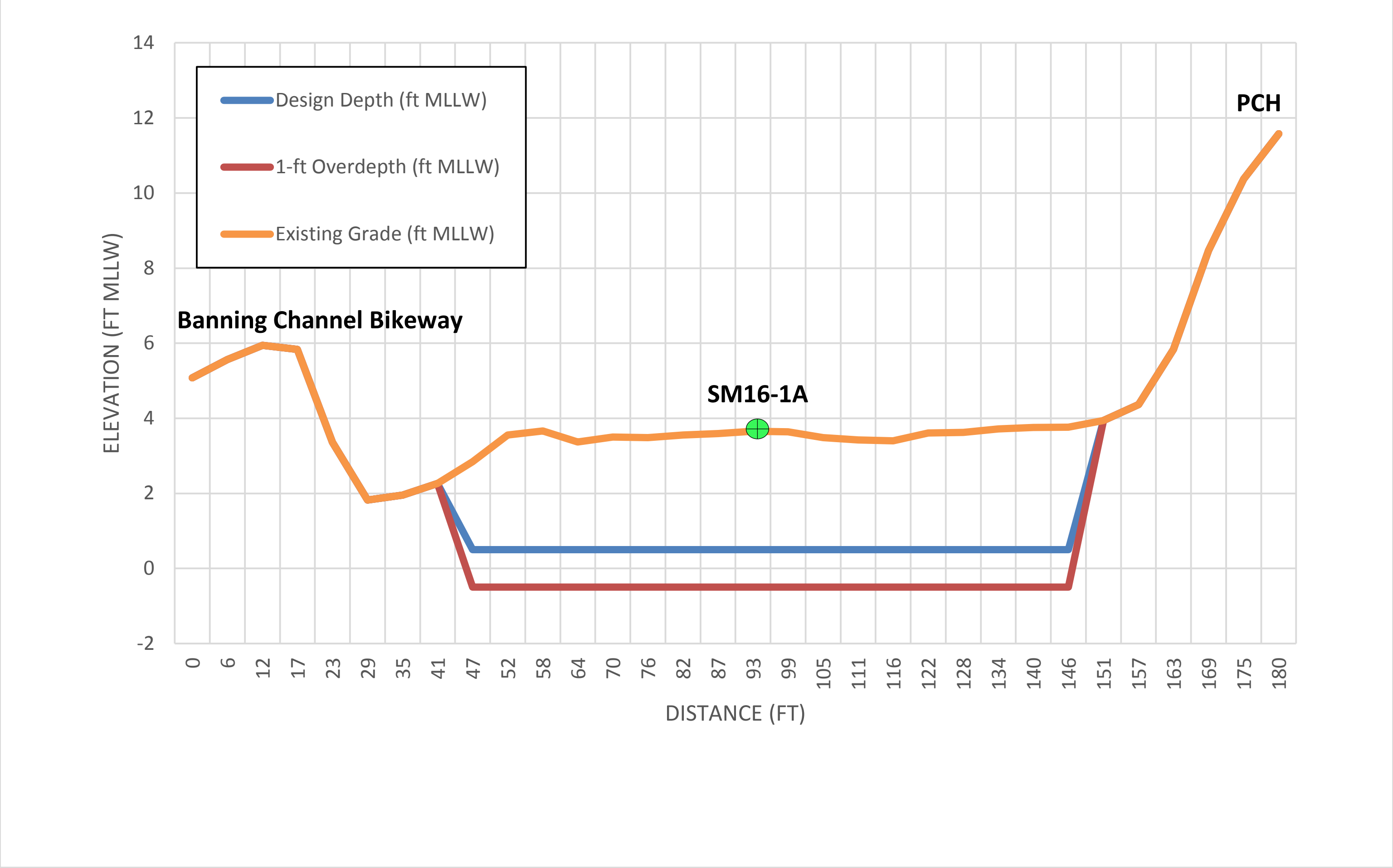

Figure 3. Santa Ana River Marsh Cross Section 1

Figure 4. Santa Ana River Marsh Cross Section 2

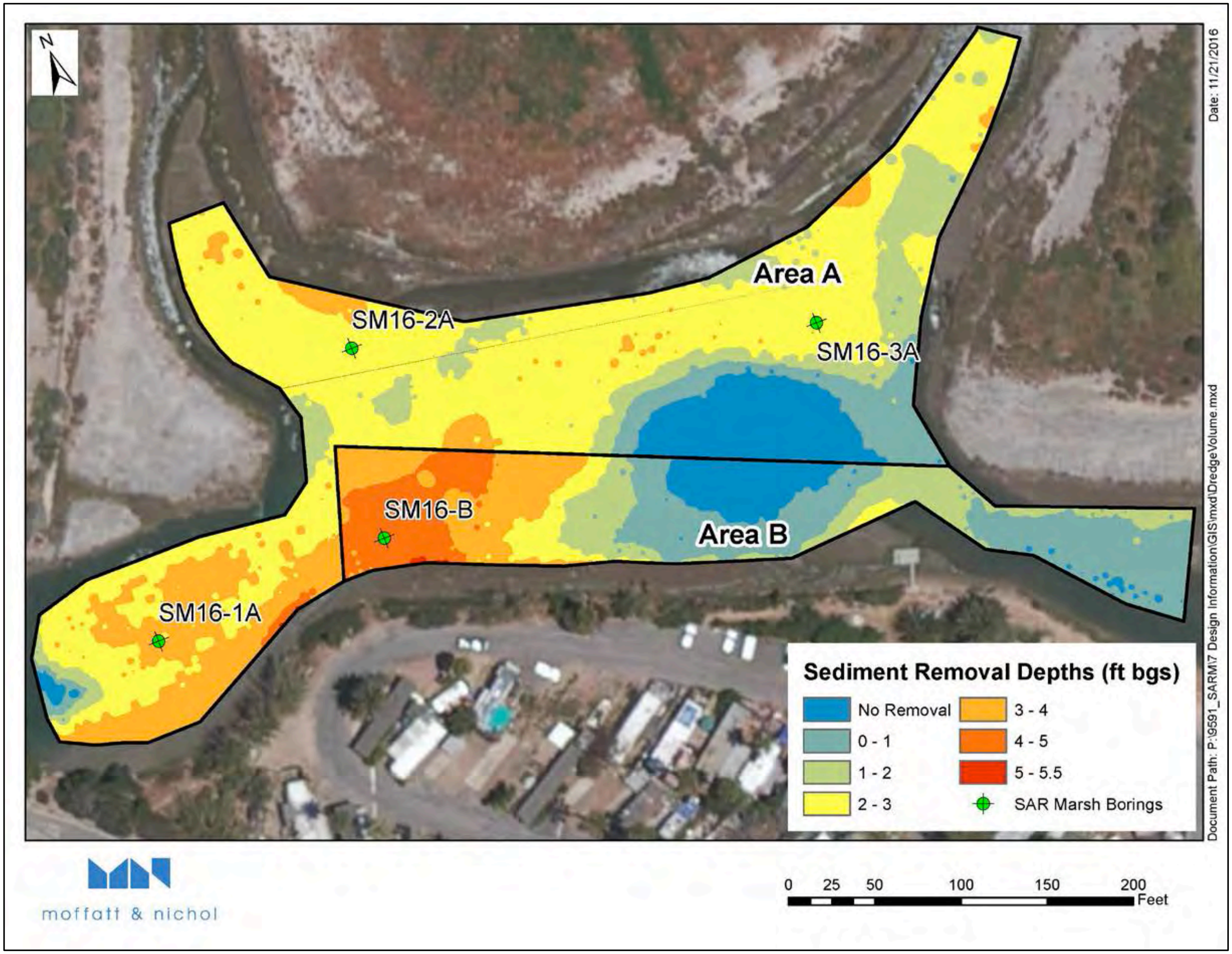

Figure 5. Excavation Depth from Existing Grade to Design Elevation (ft bgs)

Figure 6. Proposed Placement Sites

1.2 *Site Description*

The SAR Marsh is located in the City of Newport Beach, Orange County, CA, which is about 32 miles south of Los Angeles, CA along the Pacific Coast Highway. The 92-acre marsh lies southwest of the Santa Ana River, stretching from 0.25 to one mile upstream of the SAR.

The study area is divided into two areas, the SAR Marsh sediment removal area and Least Tern Island. The SAR Marsh sediment removal area occupies about 2 acres and is behind the first tide gate upstream from the mouth of the SAR. Elevations of the Project area range from approximately -1 to 4 feet MLLW, based on a 2014 Lidar survey (Figure 7).

Least Tern Island occupies a 7-acre footprint within the SAR Marsh and is adjacent to the northeast boundary of the SAR Marsh sediment removal area. The site is relatively flat with a maximum elevation of +16 ft MLLW. The island gradually slopes down to the inter-tidal zone on all sides.

The approximate geographic center of the investigation areas is defined below.

- <u>SAR Marsh Project Area</u> – 33°37'51.84"N, 117°57'20.04"W
- <u>Least Tern Island Investigation Area</u> - 33°37'56.30"N, 117°57'16.60"W

1.3 *Roles and Responsibilities*

The Project team members and specific roles for conducting the work outlined in this SAIR are provided in Table 2. Key project contacts are provided in Table 3.

Table 2. Project Team and Responsibilities

Task/Responsibility	USACE, Los Angeles District	RECON Environmental	Moffatt & Nichol	GForce Inc.	Eurofins
Overall Project Management	X	X	X		
Project Implementation		X	X		
Sampling Plan Development	X		X		
Agency Coordination	X	X	X		
Sampling Site Plan/ Positioning			X		
Sediment Sampling			X		
Compositing/ Sub-sampling					X
Grain Size Analysis & QA/QC				X	
Chemical Analysis & QA/QC					X
Final Report			X		

Table 3. Key Project Contacts

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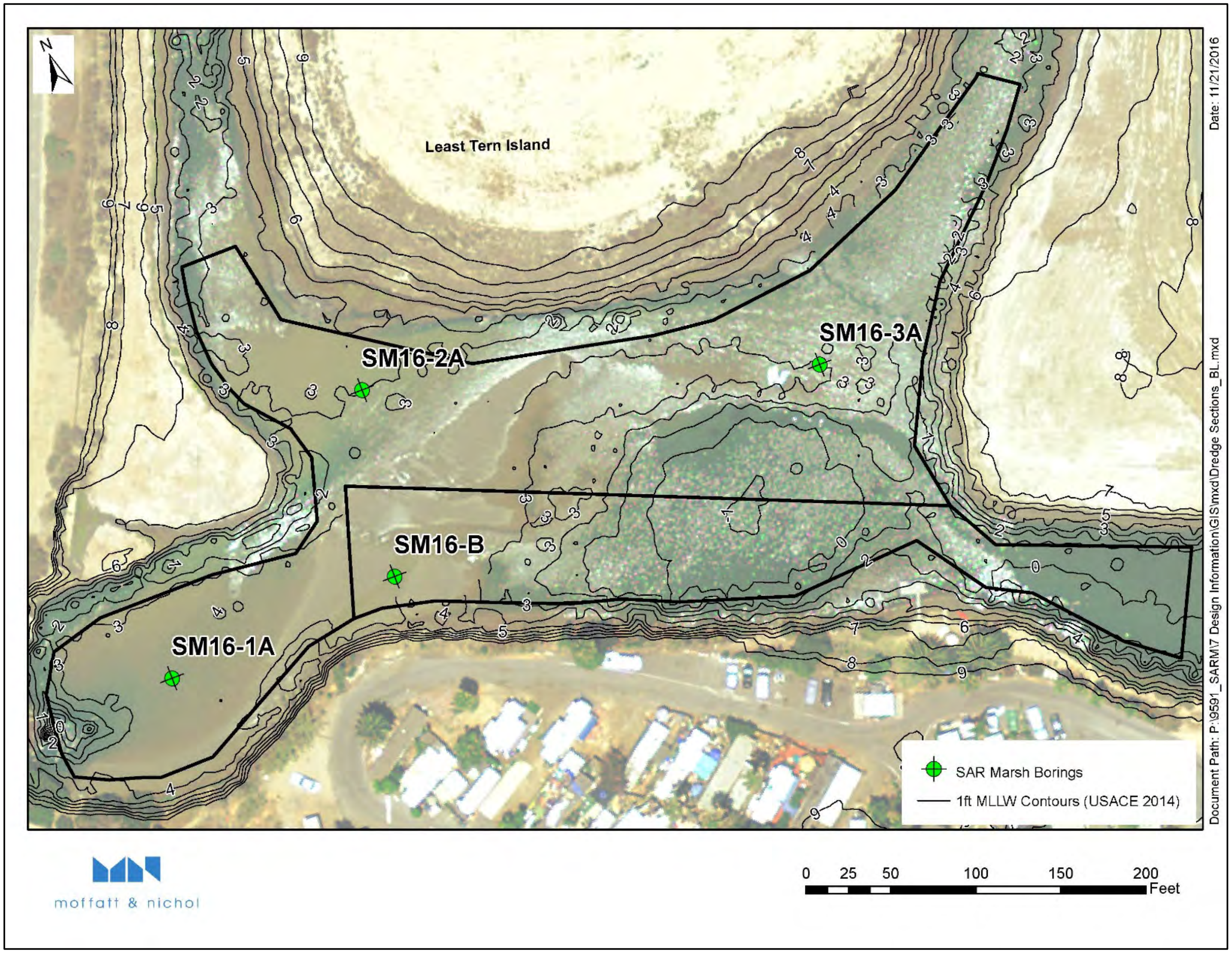

Figure 7. Existing Bathymetry and Boreholes within the Project Area

2 Site History

In the late 1980s, the 92-acre SAR Marsh was acquired with the goal of providing and preserving coastal salt marsh and endangered species habitat. The 92-acre marsh construction began in the fall of 1990 and was mostly completed by 1992, although minor excavation and monitoring have continued through 1999. Since its construction, sedimentation has occurred within the SAR Marsh, particularly behind its entrance at the SAR tide gate. As a result, a sand plug formed, impeding flow through the tide gate, reducing tidal prism, and threatening water quality and wildlife. In 2013, a dredging effort took place to improve the SAR Marsh circulation. The project was not completed within its allowable dredging window, thus, leaving sediment still needing removal.

2.1 *Santa Ana River Marsh Sediment Data*

In March 2012, the USACE conducted an evaluation of the Lower SAR Marsh sediments with the intention of dredging the marsh. These efforts consisted of collecting 22 sediment cores from the SAR Marsh in seven distinct sites (A through G). Grain size, chemical, and Tier III analyses were performed on the sampled material.

Sites A, B, and G encompass seven borings that are within the proposed Project boundary (Figure 8). Site A and the southern portion of Site G correspond to Area A in the proposed Project. Site B in 2012 corresponds with Area B in the proposed Project. Table 4 summarizes the percent fines and Atterberg Limits of borings investigated in 2012 that were within or in the vicinity of the proposed Project. The USACE and SC-DMMT determined that composite Sites B and G were compatible for nearshore placement at Newport Beach. Site A was deemed suitable for placement at offshore site LA-3.

Table 4. USACE 2012 Sampling Results Summary

2012 Composite Area	Boring ID	Sample Elevation Interval (ft MLLW)	Avg. Percent Fines*	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
Site A	SARM10-01	3.0 to -2.4	34.4	48	29	19
	SARM10-02	3.4 to -3.6	33.6	48	24	24
Site B	SARM10-03	3.0 to -3.0	82.3	39	22	17
	SARM10-03-SO	4.0 to 2.2	6.7	NP[1]	NP	NP
	SARM10-04	2.1 to -4.6	1.8	NP	NP	NP
	SARM10-04-SO	3.6 to 2.1	19.0	-	-	-
Site G	SARM10-22	3.2 to 1.2	25.6	-	-	-
		Average	**29.1**	**27**	**15**	**12**

** Percentage of material passing the No. 200 or 0.074mm sieve*

[1] NP = non-plastic

Sediment chemistry analysis was performed on the seven composite areas. No Effects Range Median (ERM) exceedances were detected during chemical analysis. One (1) Effects Range Low (ERL) exceedance was detected during chemical analysis. Dieldrin was found in Area A at a level of 0.50 µg/kg dry weight, which is slightly above the ERL for this analyte at 0.02 µg/kg.

Figure 8. USACE 2012, SAR Marsh Relevant Borings

2.2 *Santa Ana River Marsh Biological Data*

As a component of the Environmental Assessment of the SAR Marsh, biological data has been documented for the project site. The sub- and inter-tidal marsh were found to support little to no vegetation (USACE 2012). The salt marsh supports California cordgrass (*Spartina foliosa*), Pickleweed (*Salicornia virginica* and *S. subterminalis*), saltwort (*Batis maritime*), and seablite (*Suaeda taxifolia*). Pickleweed is most prevalent, including on the slopes of Least Tern Island. Riparian habitat is dominated by Mulefat Scrub (*Baccharis salicifolia*) and the upland habitat is dominated by Quailbush scrub (*Atriplex lentiformis*). Disturbed areas, including access roads, developed land and Least Tern Island, are classified as ruderal habitats supporting weedy species, if any. The faunal species distribution is very wide, including typical Southern California marsh invertebrates (snails, mussels, annelids, etc.), fish (killifish, sculpin, halibut, goby, etc.), and birds (62 species observed within SAR Marsh vicinity). Threatened and endangered species that are known to occur in the vicinity of the SAR Marsh include the light-footed clapper rail (*Rallus longirostris levipes*), California least tern (*Sternaantillarum browni*), western snowy plover (*Charadrius alexandrines nivosus*), coastal California gnatcatcher (*Polioptila californica californica*), and the Belding’s savanna sparrow (*Passerculus sandwichensis beldingi*).

A baseline eelgrass (*Zostera marina*) survey of the SAR Marsh was conducted in 2016 (Merkel & Associates 2016). Eelgrass distribution in the project area is shown in Figure 9. A small area of eelgrass (< 0.1 acres) is present within the Project dredge footprint.

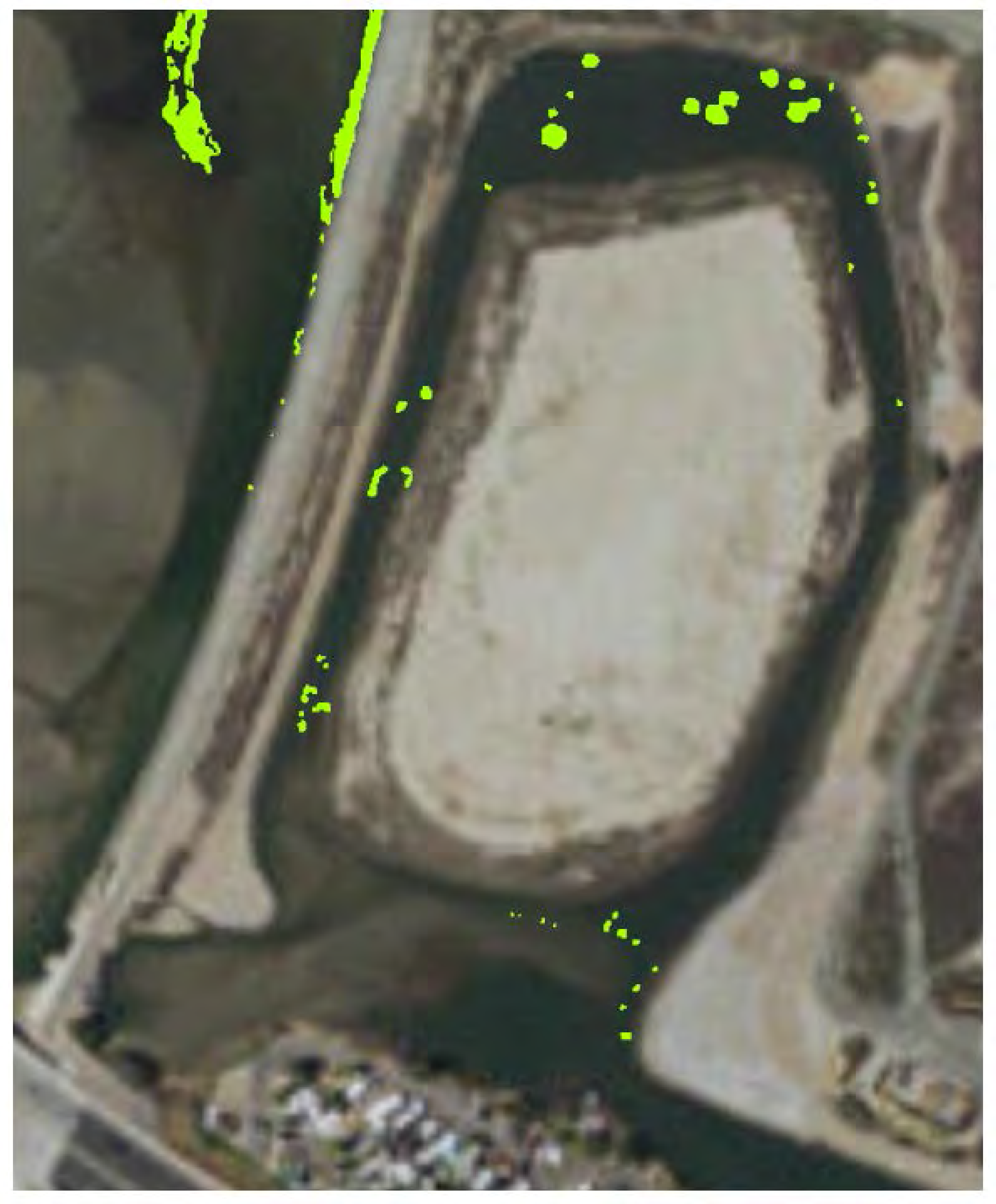

Figure 9. Eelgrass Distribution in the Project Area (Merkel & Associates 2016)

2.3 *Receiver Site Sediment Testing History*

The Project proposes to place dredged sediment in the nearshore off of Newport Beach or Least Tern Island located within the SAR Marsh. Previous sediment testing has been conducted at the proposed Newport Beach nearshore receiving site as part of the Santa Ana River Maintenance Dredging Project in September 2015 (M&N 2015). Gradation samples were collected along three transects in the City at 34th Street, 42nd Street, and Orange Street in the City (Figure 10). Surface grab samples were collected at the elevations of +12, +6, 0, -6, -12, -18, -24, and -30 feet (MLLW) for each of the three transects.

No recent data from Least Tern Island was available at the time of this study.

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar
CNES/Airbus DS, USDA, USGS, AEX, Getmapping
swisstopo, and the GIS User Community

Figure 10. Sampling Transects at Newport Beach (M&N 2015)

2.4 *Past Chemical Spills*

During the 2013 dredging of the SAR Marsh, a gas line was struck by heavy equipment and ruptured. Oil/contaminant spilled into an upland staging area. Restoration of the affected area ensued. Although restoration is believed to have been successful, volatile organic compound (VOC) testing was conducted during the implementation of the proposed sediment testing to ensure the quality of sediment.

3 METHOD OF SAMPLE COLLECTION AND ANALYSIS

Moffatt & Nichol performed sampling of the Project site on November 22, 2016 under the direction of RECON Environmental. A total of eight borings were collected to a maximum depth of 4.8 feet. A summary of the number of grain size and chemistry samples collected during the investigation are provided in Table 5. A total of three chemistry samples and 11 grain size samples were collected.

Table 5. Sampling Summary

Project Area Name	Chemistry Samples (Quantity)	Grain Size Samples (Quantity)
Santa Ana River Marsh – Coarse Grain Composite	1	4
Santa Ana River Marsh – Fine Grain Composite	1	6
Least Tern Island	1	1
TOTAL	**3**	**11**

Sample locations specified in the Final SAP were located and staked in the field using a Trimble GeoXH 6000 Series handheld global positioning system. The GPS unit has an accuracy of 10 centimeters. No samples were relocated in the field.

Borings within the Santa Ana River Marsh were collected via a hand-driven, direct push core sampler. The core sampler was used to collect continuous cores to the target depths. Cores were collected in a clear, acetate (plastic) sleeves at each of the sample locations. Boring depths were variable and corresponded to the maximum depth of excavation in a specific area. Once a core was retrieved, pictures of the core were taken with depth (Attachment B) and a geologic log of each sample location was recorded at 6-inch increments (Attachment D). The logs contain the location name, northing / easting, method of drilling or sampling, total depth sampled and geologic descriptions of the materials encountered. Field notes are included as Attachment C.

VOC testing was performed on all samples with a photoionization detector (PID) MiniRAE 2000 rented from Pine Environmental Services LLC (Pine). Calibration of the machine was performed by Pine the morning of the field investigation. VOC results were documented to a resolution of 0.1 parts per million (ppm).

This section outlines the field and laboratory methodology used in the collection and analysis of sediment samples.

3.1 *Santa Ana River Marsh Sampling*

A total of four (4) boreholes were extended to a maximum depth of 4.8 feet bgs (Table 6). Boring locations are shown on Figure 11. The four samples are used to characterize two areas, Project Area A with a design depth of 0.5 feet (MLLW) and Project Area B that has a design depth of -0.5 feet (MLLW). Multiple core samples were taken at two sampling locations (i.e., SM16-2A and SM16-3A) to collect a sufficient amount of material for chemical analysis.

Table 6. Santa Ana River Marsh Sampling Summary

Project Area	Sample ID	Excavation Volume (CY)	Easting*	Northing*	Sampling Depth (ft MLLW)	Target Core Length (ft)	Recovered Core Length (ft bgs)	No. of cores per sample location
Area A	SM16-1A	63,414	6042799.11843	2177497.50798	-0.5	3.5-4.5	3.75	1
	SM16-2A		6042520.57292	2177470.67773	-0.5	3.5	3.8	2
	SM16-3A		6042542.17399	2177580.14687	-0.5	3.5	3.5	2
Area B	SM16-B	26,054	6042376.89621	2177461.74409	-1.5	3.5-4.5	4.8	1

* Horizontal Coordinate System – NAD83 State Plane VI, feet.

Sediment encountered throughout the site can be generally described as top vertical layers of light brown, poorly graded sand (SP) overlying bottom vertical layers of grey colored silty-sand (SM). Since significant horizontal and vertical stratification was identified in the field, two chemical composite samples were created to separately test these distinct layers of sediment.; consistent with the approach outlined in the Final SAP. The chemistry compositing technique maintained one (1) coarse grained composite and one (1) fine-grained composite sample.

The depths at which the observed sediment layers occurred at each of the four boring locations is shown in Table 7. As shown in this table, significant horizontal and vertical compositing occurred between the four borings to generate the coarse and fine grained composite samples. Sample SM16-SP COMP represents a sediment layer located in the vicinity of the tide gate, specifically the upper 2 feet of SM16-1A and SM16-B sample locations. Sample SM16-SM COMP comprises the lower portion of the excavation prism at these sample locations. This sediment layer was also found to make up the entire length of the boring at locations SM16-2A and SM16-3A.

Table 7. Sample Compositing for Chemical Analysis

Project Area	Boring ID	Sample No.	Sample Depths (feet bgs)	Chemistry Composite ID	Grain Size Analysis
Area A	SM16-1A	1	0-0.5	SM16-SP COMP	✓
	SM16-1A	2	0.5-2		✓
Area B	SM16-B	1	0-0.5		✓
	SM16-B	2	0.5-2.5		✓
Area A	SM16-1A	3	2-3.75	SM16-SM COMP	✓
	SM16-2A	1	0-0.5		✓
	SM16-2A	2	0.5-3.8		✓
	SM16-3A	1	0-0.5		✓
	SM16-3A	2	0.5-3.5		✓
Area B	SM16-B	3	2.5-4.8		✓
LTI	LTI-1	1	0-0.5	LTI-COMP	✓
	LTI-2	1	0-0.5		
	LTI-3	1	0-0.5		
	LTI-4	1	0-0.5		

The coarse and fine grained composite samples were prepared by combining proportional aliquots of the discrete samples and placing them in one 8-ounce and one 16-ounce sterile glass jar to provide sufficient material for testing. Remaining sediment from ten (10) discrete SAR Marsh samples are currently archived at the analytical laboratory. These samples are available for supplemental sampling for a period of six months, if deemed necessary. Chemistry samples were transferred by courier to the laboratory at the end of the sampling. All applicable holding times were met for the chemical analysis being performed. Each sample container was labeled with the project name, sample/composite identification, type of analysis to be performed, date and time, and initials of person preparing the sample.

Two (2) Hydrometer tests in accordance with ASTM D422 were conducted on the finest-grained samples observed in the field. This test was conducted on SM16-2A (0-0.5’ bgs sample) and SM16-3A (0-0.5’ bgs sample). Atterberg Limit tests in accordance with ASTM D4318 were also conducted on these samples.

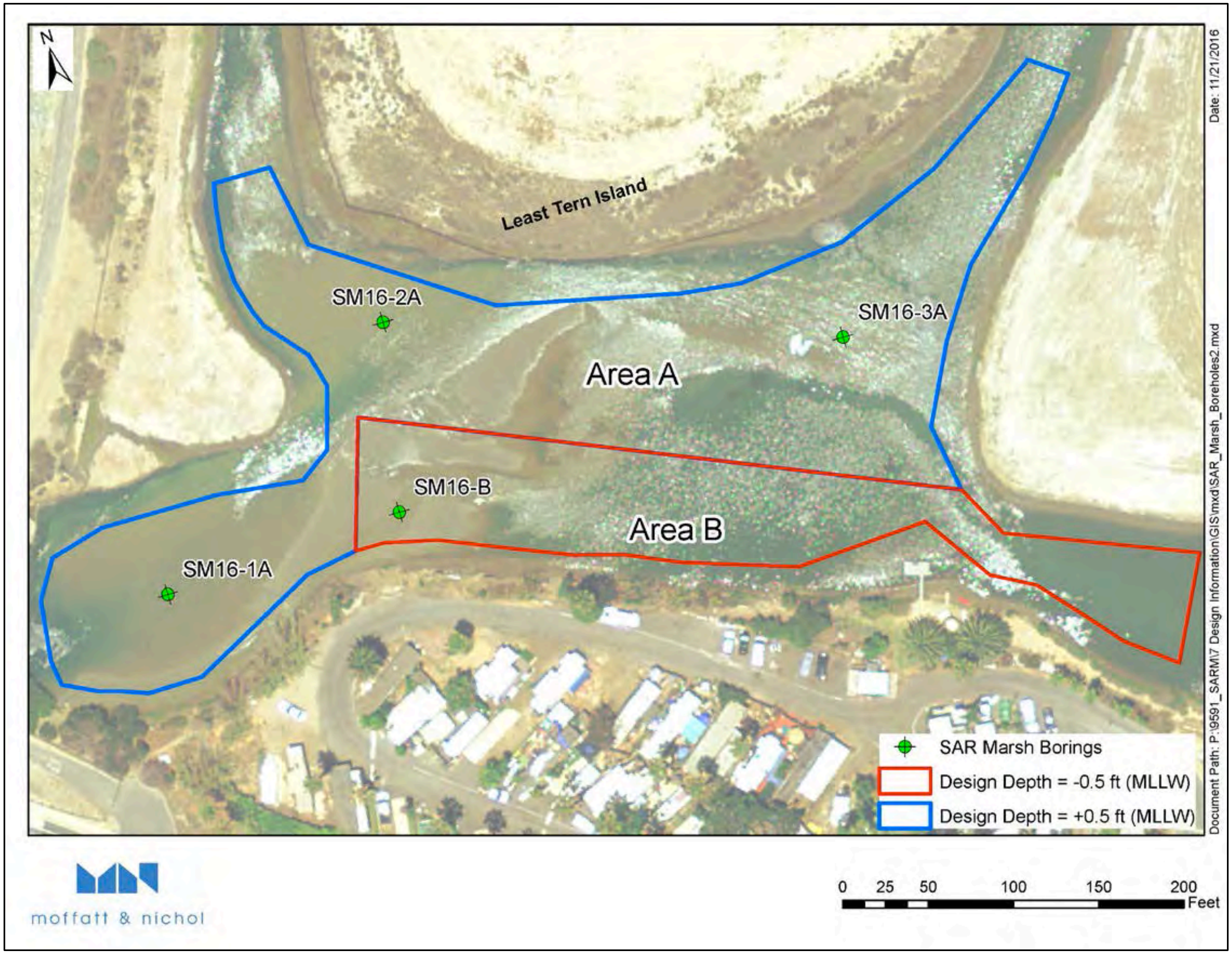

Figure 11. Actual Borehole Locations within the Project Area

3.2 *Least Tern Island Site Sampling*

M&N collected sediment grab samples at four (4) locations within Least Tern Island, as shown in Figure 12. All samples were collected with the use of a small shovel to a depth of 0-0.5 feet bgs. Discrete samples were labeled and stored in 1-gallon freezer bags.

Horizontal composite samples to be tested for grain size and chemistry were prepared by combining proportional aliquots of the four discrete samples. The composite sample for chemistry testing was placed in one 8-ounce and one 16-ounce sterile glass jar and stored on ice. The chemistry sample was transferred by courier to the laboratory at the end of the sampling. All applicable holding times were met for the chemical analysis being performed. The sample container was labeled with the project name, sample/composite identification, type of analysis to be performed, date and time, and initials of person preparing the sample. The composite sample for grain size was created in a similar manner but stored in a plastic bag and transferred to the geotechnical lab for analysis.

Details on the Least Tern Island investigation sampling approach are provided in Table 8.

Table 8. Least Tern Island Sampling Summary

Sample ID	Location		Sample Depth (ft bgs)	Number of Grain Size Samples	Number of Chemistry Samples
	Easting*	Northing*			
LTI-1	6042761.84291	2177688.90156	0-0.5	1 Composite	1 Composite
LTI-2	6042690.41889	2177912.70446	0-0.5		
LTI-3	6042861.37063	2178223.59458	0-0.5		
LTI-4	6043005.01834	2178009.19355	0-0.5		

* Horizontal Coordinate System – NAD83 State Plane VI, feet.

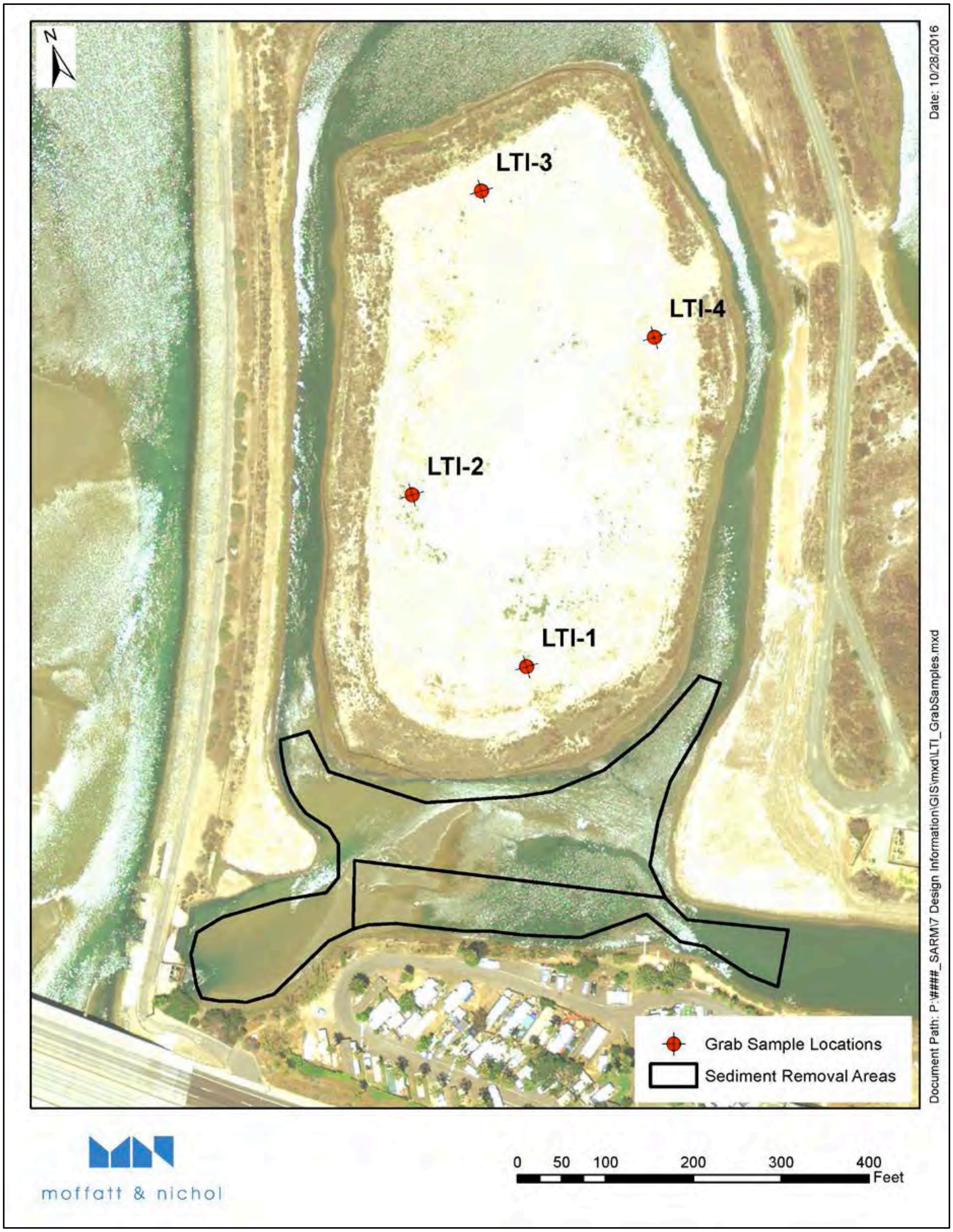

Figure 12. Actual Least Tern Island Grab Sample Locations

4 SEDIMENT ANALYSIS RESULTS

Samples were analyzed per the approved Final SAP (M&N 2016). Physical and chemical results of the sampling are summarized in this section.

4.1 *Physical Testing Results*

Physical testing results from the source site and the proposed placement site are presented in this section. The physical testing results are described in terms of their soil classification (per the Unified Soil Classification System), percentage of fines (defined as percent passing the #200 sieve) and median grain size (d50). The raw data sheets from the geotechnical laboratory are provided as Attachment E.

4.1.1 Santa Ana River Marsh - Source Site

The ten (10) samples from all four (4) boreholes within the SAR Marsh Project area were found to be sandy in composition. The stratigraphy and classification of the sediment was a light brown poorly graded sand (SP) overlying a dark grey silty sand (SM) per the USCS Soil Classification. The SP was mostly medium grain (0.1 to 0.6 mm diameter) size sand, whereas the SM was a fine grained (0.05 to 0.6 mm) sand. The sandy portion of the sediment contains sizes that are similar and shapes that range from rounded to well rounded. Individual sample grain size results are summarized in Table 9.

Table 9. Grain Size Sampling Results Summary – Santa Ana River Marsh

Project Area	Boring ID	Sample No.	Sample Depths (ft bgs)	Approximate Fines Content (% passing #200 Sieve)	Median Grain Size (d50, mm)	USCS Soil Classification	VOC (ppm)
Area A	SM16-1A	1	0-0.5	0.3	0.31	SP	0.4
		2	0.5-2	0.1	0.27	SP	1.2
		3	2-3.75	4.9	0.37	SP	0.8
	SM16-2A	1	0-0.5	6.0	0.18	SM	0.0
		2	0.5-3.8	0.8	0.22	SP	0.1
	SM16-3A	1	0-0.5	9.0	0.13	SM	0.0
		2	0.5-3.5	2.5	0.17	SP	0.2
Area B	SM16-B	1	0-0.5	0.7	0.20	SP	12.0
		2	0.5-2.5	2.2	0.20	SP	1.3
		3	2.5-5	6.3	0.16	SM	0.4
Average				3.7	0.22	SP/SM	1.6

The light-brown colored SM16-SP COMP material contained an average median grain size (d_{50}) of 0.25 mm and 0.8% fines. The dark grey colored SM16-SM COMP material contained an average median grain size of 0.21 mm and 4.9% fines. Collectively, all SAR Marsh material contained an average d50 of approximately 0.22 mm. In terms of percentage of fines, the samples ranged from 0.1 to 9.0 percent fines with an average of 3.7 percent fines. Atterberg Limits tests were performed on two samples, SM16-2A, 0-0.5 feet and SM16-3A, 0-0.5 feet, both of which were reported as follows:

- Liquid Limit: N/A
- Plastic Limit: NP (non-plastic)

- Plasticity Index: NP (non-plastic)

Gradation results from each of the ten (10) samples of the four borings are represented as gradation curves in Figure 13.

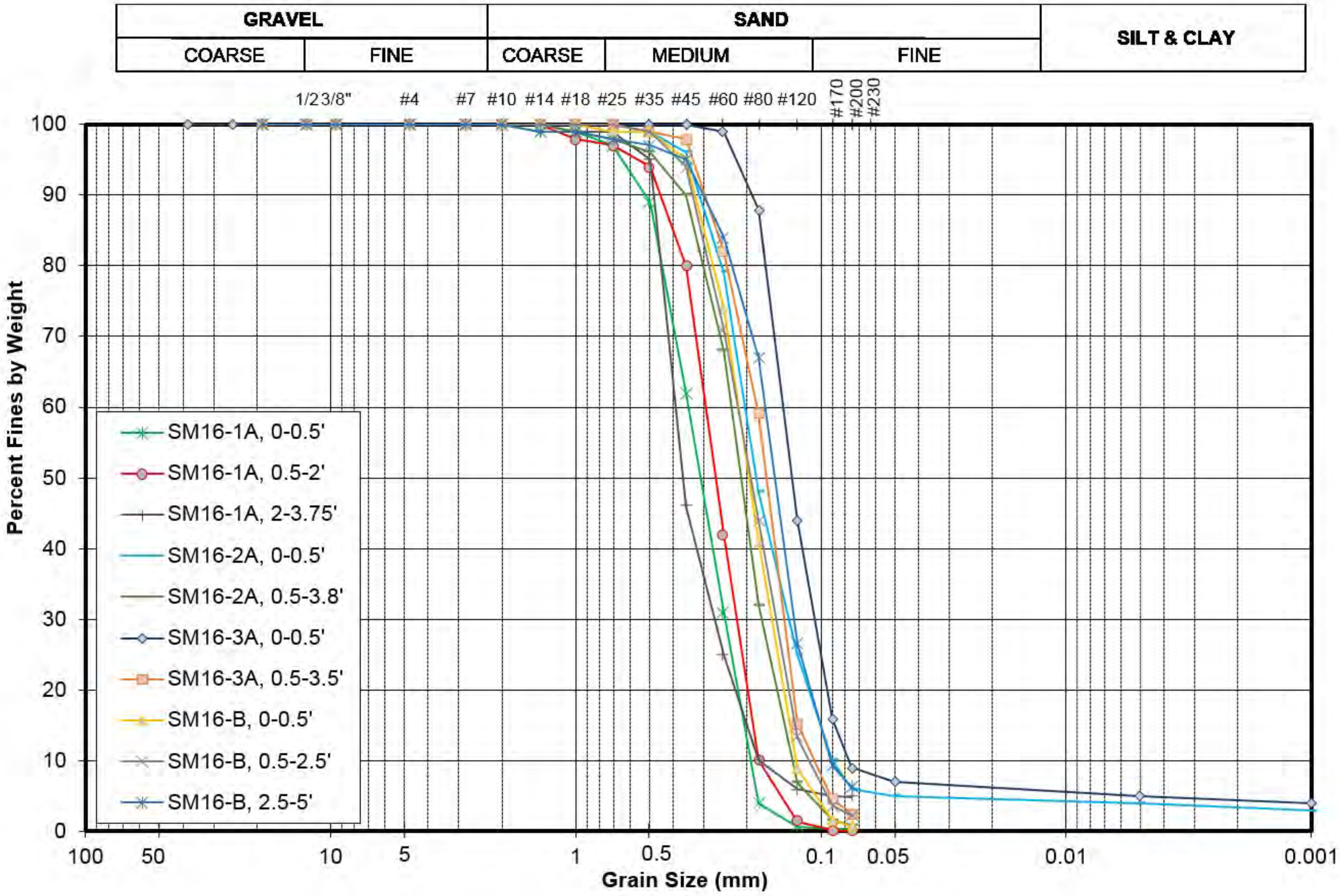

Figure 13. Santa Ana River Marsh Gradation Results

4.1.2 Least Tern Island Receiver Site

Least Tern Island sediment is described as light-brown, poorly graded sand (SP). Shell fragments were noted on the surficial layer. The gradation of the Least Tern Island contains approximately 7.3 percent fines, as shown in Table 10. The d50 values averaged 0.25 mm. Gradation results from Least Tern Island are presented in Figure 14. SAR Marsh material contains approximately 3% fewer fines and has a d50 which is approximately 0.03 mm finer than that of Least Tern Island. The average SAR Marsh sediment is of nearly equivalent grain size when compared to Least Tern Island sediment and is physically compatible for placement at the Least Tern Island receiver site.

Table 10. Grain Size Sampling Results Summary – Least Tern Island

Composite ID	Boring ID	Sample Depths (ft bgs)	Approximate Fines Content (% passing the #200 Sieve)	Median Grain Size (d50, mm)	USCS Soil Classification	VOCs (ppm)
LTI-Comp	LTI-1	0-0.5	7.3	0.25	SP	0.0
	LTI-2	0-0.5			SP	0.0
	LTI-3	0-0.5			SP	0.0
	LTI-4	0-0.5			SP	0.0

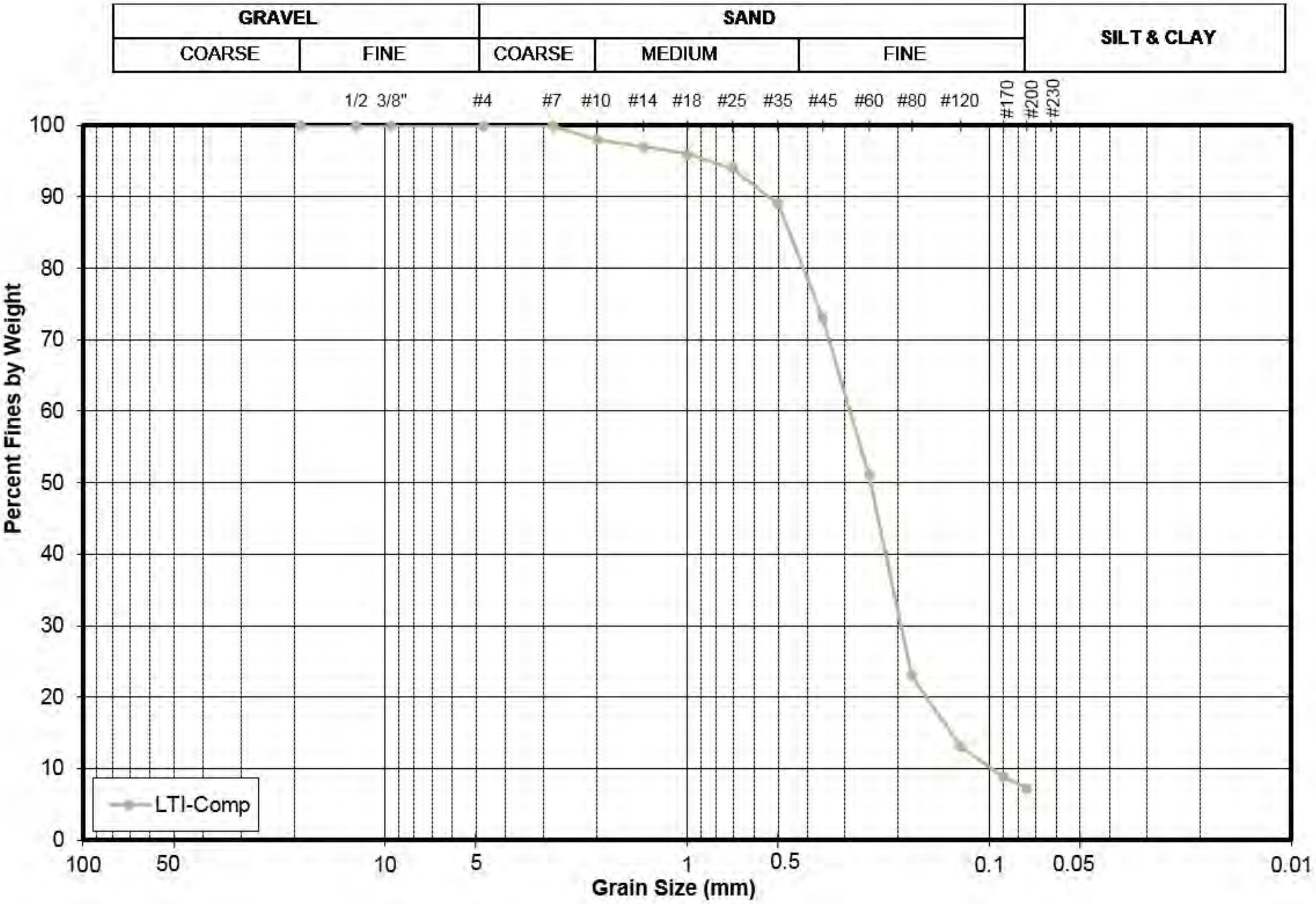

Figure 14. Least Tern Island Gradation Results

4.1.3 Newport Beach Nearshore Receiver Site

The proposed Newport Beach nearshore receiving site was previously analyzed for grain size as part of the Los Angeles Department of Public Works Santa Ana River Maintenance Dredging Project in September 2015 (M&N 2015). The grain size envelope depicting the coarsest, finest, and average gradation of Newport Beach nearshore sediment is provided in Figure 15. The envelope is based only on sediment samples collected along the two beach profiles of 34th and 42nd Streets. As shown on this figure, the coarse limit curve contains 0% fines, while the fines limit curve contains no more than 20% fines. The approximate middle of the curves "median grain size" or (d50 = diameter 50%)of the nearshore placement site is 0.22 mm.

To assess SAR Marsh sediment grain size compatibility for placement at Newport Beach nearshore, SAR Marsh gradation curves were plotted against the Newport Beach nearshore composite grain size envelope. Gradation curves were derived based on the weighted average grain size for each individual borehole and all of the boreholes taken together as one composite of individual weighted average curves. The weighted average for each borehole is shown in Figure 16 and composite weighted average curve is shown on Figure 17. Individual weighted average analysis was performed by averaging the raw grain size results of each sample length range within the entire length of each borehole, while the composite was based on the weighted average of the total summed sample length of all boreholes.

The weighted average calculated for percent passing the U.S. No. 200 sieve for all individual boreholes is as follows: SM16-1A = 3%; SM16-2A = 2%; SM16-3A = 2% and SM16-B = 4%. The No. 200 sieve calculation for all of the individual samples were no greater than 4%, the maximum percent passing for borehole SM16-B. This result (4%) is well below the 20% fines limit curve, which represents the finest sediment at the nearshore placement site. According to USACE Los Angeles District Geotechnical Branch requirements, up to 10% fines beyond this limit is allowable to be placed in the nearshore. This means that a maximum of no more than 30% fines (i.e., 20% + 10%) can be place in the nearshore. The 4% maximum amount of fines calculated from amongst all individual boreholes is well below this threshold. A fines limit of 3% was calculated for all of the boreholes as a composite. This is also well below the threshold. The SAR Marsh sediment is therefore compatible for placement at the Newport Beach nearshore placement site.

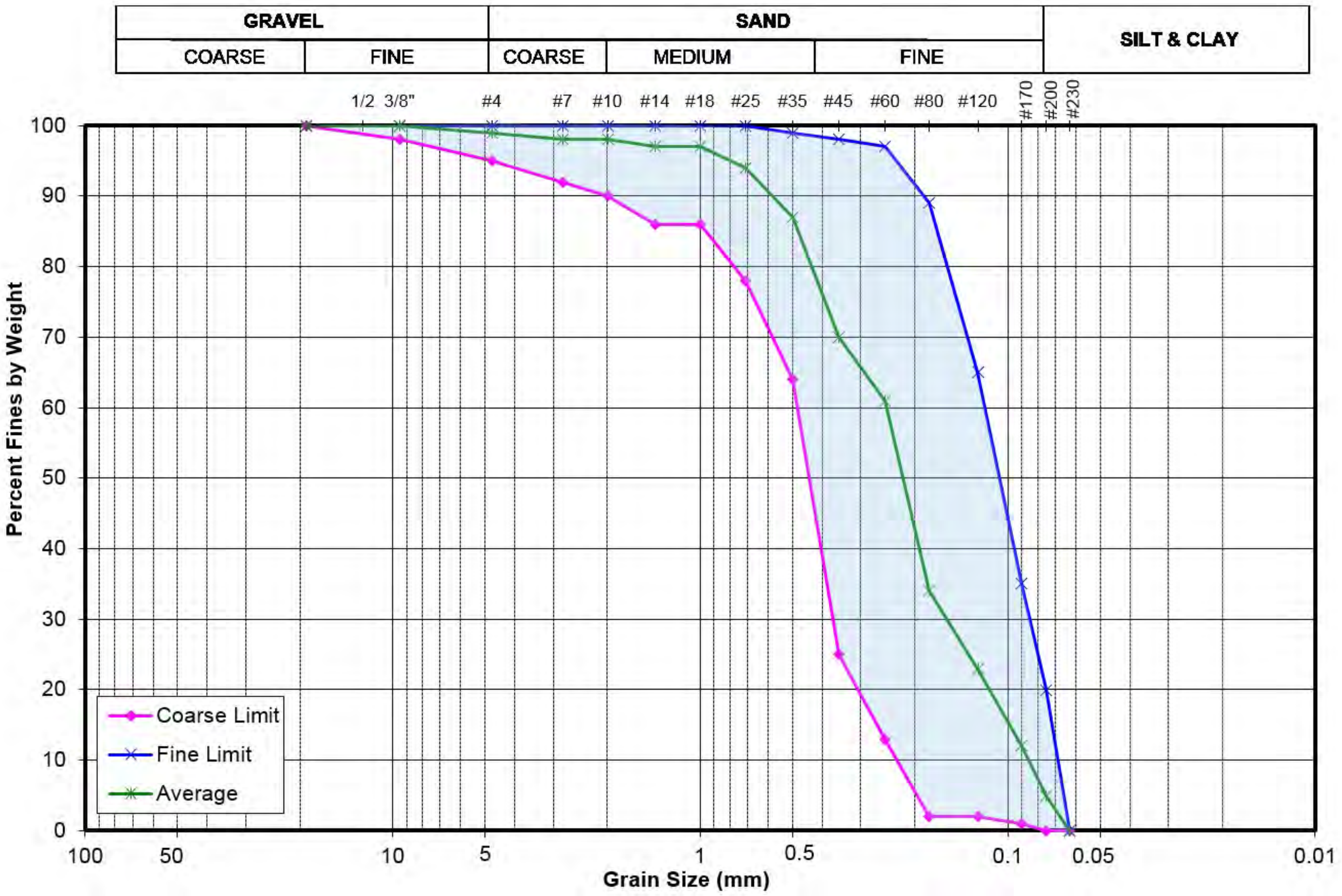

Figure 15. Composite Grain Size Envelope for Newport Beach Nearshore (M&N 2015)

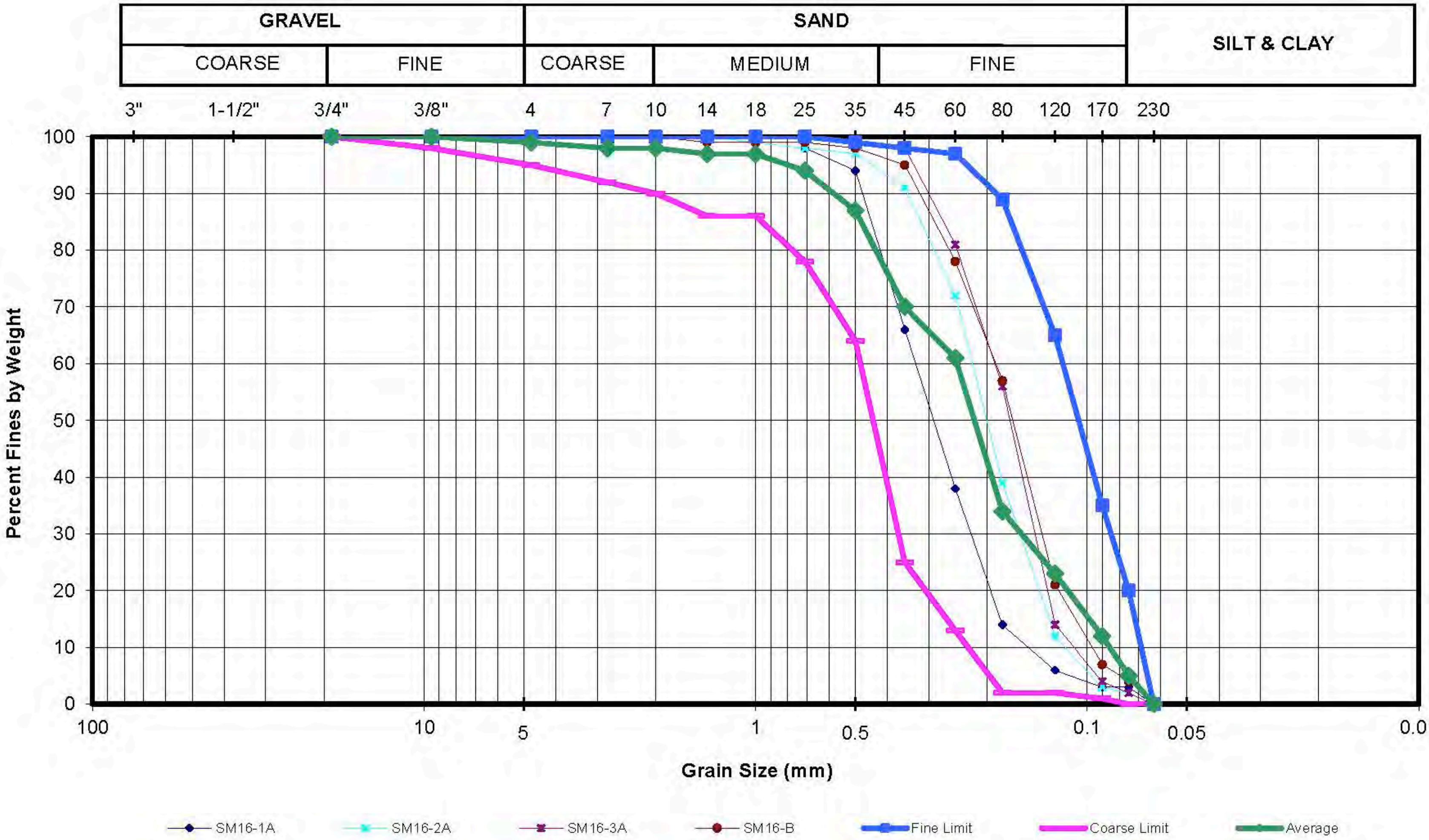

Figure 16. Individual SAR Marsh Boring Gradation Data versus Newport Beach Nearshore Grain Size Envelope

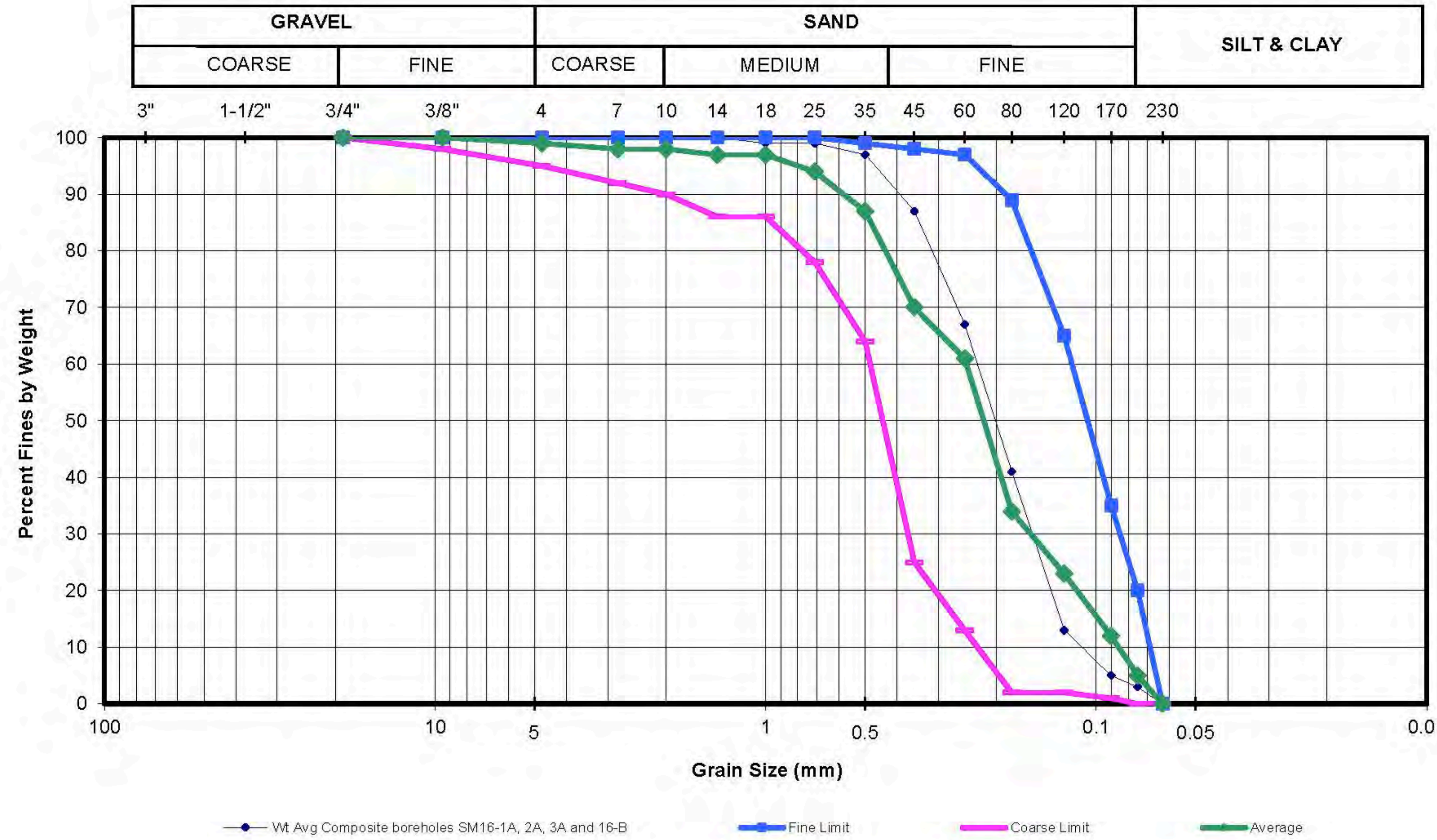

Figure 17. Composite SAR Marsh Gradation Data versus Newport Beach Nearshore Grain Size Envelope

4.2 *Chemical Testing Results*

The chemical results for the source site and the proposed receiving site are presented in this section. Raw chemistry results from the testing lab are presented as Attachment F.

Sediment chemistry results were compared to National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Table (SQUIRT) Guidelines (Buchman 2008). These guidelines are used to screen sediments for contaminant concentrations that might cause biological effects and to identify sediments for further toxicity testing. The guidelines are based on a NOAA database correlating biological effects with concentrations of 9 trace metals, 13 individual Polycyclic aromatic hydrocarbons (PAHs), 3 classes of PAHs, and 3 classes of chlorinated organic hydrocarbons. The guidelines are based on a database assembled by Long et al. (1995). This study developed ERL and ERM values that provide a statistical relationship between adverse biological effects and sediment compound concentration levels.

For any given contaminant, the ERL guideline represents the 10th percentile concentration value in the NOAA database that might be expected to cause adverse biological effects. Therefore, results found to be below established ERL values represent concentrations at which biological effects would rarely be observed. The incidence of adverse biological effects increases to 20% to 30% for most trace metals and 40% to 60% for most organics when concentrations exceeded ERL values but were lower than the ERM values. When concentrations exceed ERM values, the incidence of adverse effects increased to 60% to 90% for most trace metals and 80% to 100% for most organics.

To assess the source sediment’s suitability for human contact, the chemical contamination concentration results were compared with “Regional Screening Levels for Chemical Contaminants at Superfund Sites” (USEPA Region 9, updated 2015). Regional Screening Levels (RSLs) are broken into two categories: residential and industrial. RSLs were developed with USEPA toxicity data, standard exposure assumptions, and standardized equations and are an umbrella term for USEPA Region 9 Preliminary Remediation Goals (PRGs), USEPA Region 3 Risked-Based Concentrations (RBCs) and EPA Region 6 Human Health Medium – Specific Screening Levels (HHMSSLs). USEPA deemed RSLs to be protective for humans over a lifetime. RSLs do not represent ecological impact contaminant levels. Although RSLs were developed for superfund sites, their consideration in non-superfund sites can be beneficial to the project, helping to assess areas and materials that demand greater attention and/or avoidance.

California Human Health Screening Levels (CHHSLs) were also referenced to assess the source sediment’s suitability for human contact and potential human health risks. CHHSLs apply to 54 hazardous chemicals that are protective of human health (Cal/EPA, updated 2010). CHHSL values are broken into two categories: residential and industrial/commercial. CHHSLs were developed by the Office of Environmental Health Hazard Assessment (OEHHA) with USEPA and California Environmental Protection Agency (Cal/EPA) toxicity data, and standard exposure assumptions.

4.2.1 Santa Ana River Marsh Chemistry Results

No exceedance of ERL or ERM screening levels were detected for those analytes for which such screening levels have been established for the two composite chemistry samples analyzed in the SAR Marsh. No organotins, pesticides, nor pyrethoids were detected in SAR Marsh sediment. Trace levels of metals, PCBs, PAHs, phthalates, and phenols were detected, none of which exceeded NOAA, Cal/EPA, or USEPA screening levels. The results of the chemical testing are summarized in Table 11.

4.2.2 Least Tern Island Chemistry Results

Analysis of the chemistry composite sample for Least Tern Island found no exceedances of the ERL or ERM screening levels where such screening levels have been established. Additionally, no organotins, pesticides, phenols, nor pyrethoids were detected. Trace levels of metals, PCBs, PAHs, and phthalates were detected, none of which exceeded NOAA, Cal/EPA, or USEPA screening levels. The results of the chemical testing are summarized in Figure 11.

Table 11. Chemical Analysis Results for SAR Marsh and Least Tern Island

			NOAA Screening[1]		Human RSLs[2]		Human CHHSLs[3]		SM16-SP COMP	SM16-SM COMP	LTI COMP	
GROUPINGS	Analyte	Analytical Method	ERL	ERM	Residential	Industrial	Residential	Commercial/ Industrial				Units
Conventionals	Grain Size	Plumb (1981)							NA	NA	NA	%
	Ammonia	350.1M							3.1	1.5	1.8	mg/kg
	TOC	USEPA 9060A							ND	ND	ND	%
	Moisture	160.3							NA	NA	NA	%
	TSS	SM 2540 D							ND	ND	ND	mg/L
	TVS	SM 2540E							ND	ND	ND	%
	TPH	SW-846							3.1	9.3	2.9	mg/kg
	TRPH	1664M							ND	ND	ND	mg/kg
Metals	Arsenic	USEPA 6020	8.2	70	0.68	3.0	0.07	0.24	1.39	1.21	0.979	mg/kg
	Cadmium	USEPA 6020	1.2	9.6	71	980	1.7	7.5	ND	ND	0.101	mg/kg
	Chromium	USEPA 6020	81	370					3.51	5.64	4.42	mg/kg
	Copper	USEPA 6020	34	270	3100	4700	3000	38000	1.42	2.69	2.98	mg/kg
	Lead	USEPA 6020	46.7	218	400	800	18	180	1.81	2.21	2.67	mg/kg
	Mercury	USEPA 7471A	0.15	0.71	9.4	40	1600	16000	ND	ND	ND	mg/kg
	Nickel	USEPA 6020	20.9	51.6	1500	22000	150	3500	2.09	3.49	3.40	mg/kg
	Selenium	USEPA 6020			390	5800	380	4800	0.159	0.129	0.224	mg/kg
	Silver	USEPA 6020	1	3.7	390	5800	380	4800	ND	ND	ND	mg/kg
	Zinc	USEPA 6020	150	410	23000	350000	23000	100000	13.2	24.7	25.0	mg/kg
Organotins	Dibutyltin	Krone 1989							ND	ND	ND	µg/kg
	Monobutyltin	Krone 1989							ND	ND	ND	µg/kg
	Tetrabutyltin	Krone 1989							ND	ND	ND	µg/kg
	Tributyltin	Krone 1989	<2.0	<2.7	19000	250000			ND	ND	ND	µg/kg

GROUPINGS	Analyte	Analytical Method	NOAA Screening[1]		Human RSLs[2]		Human CHHSLs[3]		SM16-SP COMP	SM16-SM COMP	LTI COMP	Units
			ERL	ERM	Residential	Industrial	Residential	Commercial/ Industrial				
PAHs	1-Methylnapthalene	EPA 8270C SIM			18000	73000			ND	ND	ND	µg/kg
	2-Methylnapthalene	EPA 8270C SIM	70	670	240000	3000000			ND	ND	ND	µg/kg
	2,4,5-Trichlorophenol	EPA 8270C SIM							ND	ND	ND	µg/kg
	2,4,6-Trichlorophenol	EPA 8270C SIM			44000	160000			ND	ND	ND	µg/kg
	2,4-Dichlorophenol	EPA 8270C SIM			180000	1800000			ND	ND	ND	µg/kg
	2,4-Dimethylphenol	EPA 8270C SIM			1200000	12000000			ND	ND	ND	µg/kg
	2,4-Dinitrophenol	EPA 8270C SIM			120000	1200000			ND	ND	ND	µg/kg
	2-Chlorphenol	EPA 8270C SIM			390000	5100000			ND	ND	ND	µg/kg
	Acenaphthene	EPA 8270C SIM	16	500	3400000	33000000			ND	ND	ND	µg/kg
	Acenaphthylene	EPA 8270C SIM	44	640					ND	ND	ND	µg/kg
	Anthracene	EPA 8270C SIM	85.3	1100	18000000	23000000			ND	ND	ND	µg/kg
	Benzo(a)anthracene	EPA 8270C SIM	261	1600	160	2900			ND	ND	ND	µg/kg
	Benzo(a)pyrene	EPA 8270C SIM	430	1600	16	290	38	130	ND	ND	ND	µg/kg
	Benzo (b) Fluoranthene	EPA 8270C SIM			160	2900			ND	ND	ND	µg/kg
	Benzo (g,h,i) Perylene	EPA 8270C SIM							ND	ND	ND	µg/kg
	Benzo (k) Fluoranthene	EPA 8270C SIM			1600	29000			ND	ND	ND	µg/kg
	Chrysene	EPA 8270C SIM	384	2800	16000	290000			ND	ND	ND	µg/kg
	Dibenz (a,h) Anthracene	EPA 8270C SIM	63.4	260	16	290			ND	ND	ND	µg/kg
	Fluoranthene	EPA 8270C SIM	600	5100	2400000	30000000			ND	5.7	2.9	µg/kg
	Fluorene	EPA 8270C SIM	19	540	2400000	30000000			ND	ND	ND	µg/kg
	Indeno (1,2,3-c,d) Pyrene	EPA 8270C SIM			160	2900			ND	ND	ND	µg/kg
	Naphthalene	EPA 8270C SIM	160	2100	3800	17000			ND	ND	ND	µg/kg
	Pentachlorophenol	EPA 8270C SIM							ND	ND	ND	µg/kg
	Phenanthrene	EPA 8270C SIM	240	1500					ND	3.1	2.7	µg/kg
	Pyrene	EPA 8270C SIM	665	2600	1800000	23000000			ND	6.1	3.5	µg/kg
	Total PAHs	EPA 8270C SIM	4022	44792					ND	14.9	9.1	µg/kg

			NOAA Screening[1]		Human RSLs[2]		Human CHHSLs[3]		SM16-SP COMP	SM16-SM COMP	LTI COMP	
GROUPINGS	Analyte	Analytical Method	ERL	ERM	Residential	Industrial	Residential	Commercial/ Industrial				Units
PCBs	PCB 018	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 028	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 029	USEPA 8082A ECD							0.51	ND	ND	µg/kg
	PCB 037	USEPA 8082A ECD							0.39	ND	0.77	µg/kg
	PCB 044	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 049	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 052	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 066	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 070	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 074	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 077	USEPA 8082A ECD			38	160			ND	ND	ND	µg/kg
	PCB 081	USEPA 8082A ECD			12	49			ND	ND	ND	µg/kg
	PCB 087	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 099	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 101	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 105	USEPA 8082A ECD			120	500			ND	ND	ND	µg/kg
	PCB 110	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 114	USEPA 8082A ECD			120	510			ND	ND	ND	µg/kg
	PCB 118	USEPA 8082A ECD			120	500			ND	ND	ND	µg/kg
	PCB 119	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 123	USEPA 8082A ECD			120	500			ND	ND	ND	µg/kg
	PCB 126	USEPA 8082A ECD			0.037	0.15			ND	ND	ND	µg/kg
	PCB 128	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 138	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 149	USEPA 8082A ECD							0.29	ND	ND	µg/kg
	PCB 151	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 153	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 156	USEPA 8082A ECD			120	510			ND	ND	ND	µg/kg
	PCB 157	USEPA 8082A ECD			120	510			ND	ND	ND	µg/kg
	PCB 158	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 167	USEPA 8082A ECD			120	510			ND	ND	ND	µg/kg
	PCB 168	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 169	USEPA 8082A ECD			0.12	0.52			ND	ND	ND	µg/kg
	PCB 170	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 177	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 180	USEPA 8082A ECD							0.27	ND	ND	µg/kg
	PCB 183	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 187	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 189	USEPA 8082A ECD			130	520			ND	ND	ND	µg/kg
	PCB 194	USEPA 8082A ECD							ND	ND	ND	µg/kg

			NOAA Screening[1]		Human RSLs[2]		Human CHHSLs[3]		SM16-SP COMP	SM16-SM COMP	LTI COMP	
GROUPINGS	Analyte	Analytical Method	ERL	ERM	Residential	Industrial	Residential	Commercial/ Industrial				Units
	PCB 201	USEPA 8082A ECD							ND	ND	ND	µg/kg
	PCB 206	USEPA 8082A ECD							ND	ND	ND	µg/kg
	Total PCBs	USEPA 8082A ECD	22.7	180	230	970	89	300	1.46	ND	0.77	µg/kg
Pesticides	2,4'-DDD	US EPA 8081A							ND	ND	ND	µg/kg
	2,4'-DDE	US EPA 8081A							ND	ND	ND	µg/kg
	2,4'-DDT	US EPA 8081A							ND	ND	ND	µg/kg
	4,4'-DDD	US EPA 8081A	2	20	2300	9600	2300	9000	ND	ND	ND	µg/kg
	4,4'-DDE	US EPA 8081A	2.2	27	2000	9300	1600	6300	ND	ND	ND	µg/kg
	4,4-DDT	US EPA 8081A	1	7	1900	8500	1600	6300	ND	ND	ND	µg/kg
	Total DDTs	US EPA 8081A	1.58	46.1					ND	ND	ND	µg/kg
	Aldrin	US EPA 8081A			39	180	33	130	ND	ND	ND	µg/kg
	Alpha-BHC	US EPA 8081A							ND	ND	ND	µg/kg
	Beta-BHC	US EPA 8081A							ND	ND	ND	µg/kg
	Chlordane	US EPA 8081A			1700	7500	430	1700	ND	ND	ND	µg/kg
	Cis-nonachlor	US EPA 8081A							ND	ND	ND	µg/kg
	DCPA (Dacthal)	US EPA 8081A	0.02	8	610000	6200000			ND	ND	ND	µg/kg
	Delta-BHC	US EPA 8081A							ND	ND	ND	µg/kg
	Dieldrin	US EPA 8081A			34	140	35	130	ND	ND	ND	µg/kg
	Endosulfan I	US EPA 8081A			470000	7000000			ND	ND	ND	µg/kg
	Endosulfan II	US EPA 8081A							ND	ND	ND	µg/kg
	Endosulfan Sulfate	US EPA 8081A							ND	ND	ND	µg/kg
	Endrin	US EPA 8081A			19000	250000	19000	250000	ND	ND	ND	µg/kg
	Endrin Aldehyde	US EPA 8081A							ND	ND	ND	µg/kg
	Endrin Ketone	US EPA 8081A							ND	ND	ND	µg/kg
	Gamma-BHC	US EPA 8081A			570	2500			ND	ND	ND	µg/kg
	Heptachlor	US EPA 8081A			130	630	130	520	ND	ND	ND	µg/kg
	Heptachlor Epoxide	US EPA 8081A			70	330			ND	ND	ND	µg/kg
	Methoxychlor	US EPA 8081A			320000	4100000	340000	3800000	ND	ND	ND	µg/kg
	Toxaphene	US EPA 8081A			490	2100	460	1800	ND	ND	ND	µg/kg
Phthalates	Bis(2-Ethylhexyl) Phthalate	EPA 8270C SIM			35000	120000			24	34	26	µg/kg
	Butylbenzyl Phthalate	EPA 8270C SIM			260000	910000			5.6	5.7	11	µg/kg
	Diethyl Phthalate	EPA 8270C SIM			49000000	490000000			12	15	16	µg/kg
	Dimethyl Phthalate	EPA 8270C SIM							ND	2.8	ND	µg/kg
	Di-n-butyl Phthalate	EPA 8270C SIM			6100000	62000000			55	66	120	µg/kg
	Di-n-octyl Phthalate	EPA 8270C SIM							ND	ND	ND	µg/kg

GROUPINGS	Analyte	Analytical Method	NOAA Screening[1]		Human RSLs[2]		Human CHHSLs[3]		SM16-SP COMP	SM16-SM COMP	LTI COMP	Units
			ERL	ERM	Residential	Industrial	Residential	Commercial/ Industrial				
Phenols	2-Methylphenol	EPA 8270C SIM							ND	ND	ND	µg/kg
	2-Nitrophenol	EPA 8270C SIM							ND	ND	ND	µg/kg
	3,4-Methylphenol	EPA 8270C SIM							ND	ND	ND	µg/kg
	4,6-Dinitro-2-Methylphenol	EPA 8270C SIM							ND	ND	ND	µg/kg
	4-Chloro-3-Methylphenol	EPA 8270C SIM							ND	ND	ND	µg/kg
	Bisphenol A	EPA 8270C SIM			3100000	31000000			ND	2.9	ND	µg/kg
	2,4,6-Trichlorophenol	EPA 8270C SIM			44000	160000			ND	ND	ND	µg/kg
	2,4-Dichlorophenol	EPA 8270C SIM			180000	1800000			ND	ND	ND	µg/kg
	2,4-Dimethylphenol	EPA 8270C SIM			1200000	12000000			ND	ND	ND	µg/kg
	2,4-Dinitrophenol	EPA 8270C SIM			120000	1200000			ND	ND	ND	µg/kg
	2-Chlorophenol	EPA 8270C SIM			390000	5100000			ND	ND	ND	µg/kg
	Pentachlorophenol	EPA 8270C SIM			890	2700	4400	13000	ND	ND	ND	µg/kg
	Total phenols	EPA 8270C SIM			18000000	180000000			ND	19	ND	µg/kg
Pyrethroids	Allethrin (Bioallethrin)	GC/MS/MS							ND	ND	ND	µg/kg
	Bifenthrin	GC/MS/MS							ND	ND	ND	µg/kg
	Cyfluthrin-beta (Baythroid)	GC/MS/MS							ND	ND	ND	µg/kg
	Cyhalothrin-Lamba	GC/MS/MS							ND	ND	ND	µg/kg
	Cypermethrin	GC/MS/MS							ND	ND	ND	µg/kg
	Deltamethrin (Decamethrin)	GC/MS/MS							ND	ND	ND	µg/kg
	Esfenvalerate	GC/MS/MS							ND	ND	ND	µg/kg
	Fenpropathrin (Danitol)	GC/MS/MS							ND	ND	ND	µg/kg
	Fenvalerate (sanmarton)	GC/MS/MS							ND	ND	ND	µg/kg
	Fluvalinate	GC/MS/MS							ND	ND	ND	µg/kg
	Permethrin (cis and trans)	GC/MS/MS							ND	ND	ND	µg/kg
	Resmethrin (Bioresmethrin)	GC/MS/MS							ND	ND	ND	µg/kg
	Resmethrin	GC/MS/MS							ND	ND	ND	µg/kg
	Sumithrin (Phenothrin)	GC/MS/MS							ND	ND	ND	µg/kg
	Tetramethrin	GC/MS/MS							ND	ND	ND	µg/kg
	Tralomethrin	GC/MS/MS							ND	ND	ND	µg/kg

[1] *Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Long et al. (1995).*

[2] *Regional Screening Levels for Chemical Contaminants at Superfund Sites (USEPA Region 9, updated 2015).*

[3] *California Human Health Screening Levels for Soil (Cal/EPA, 2005-updated 2010).*

5 CONCLUSIONS

The Santa Ana River Marsh sediment contained two distinct layers, a light-brown colored layer and a dark grey colored layer, generally describable as a poorly graded sand and a silty-sand, respectively. On a composited weighted average basis, the sediment contains 3% fines and a median grain size of 0.20 mm. Chemistry results from two composite samples collected in the Santa Ana River Marsh were found to be below established screening levels from NOAA, Cal/EPA, and the USEPA.

Sediments collected on the potential Least Tern Island receiver site are described as a light-brown, poorly graded sand with a median grain size of 0.25 mm and percent fines of 7.3%. Chemistry results from the one composite sample collected on the Least Tern Island were below established screening levels from NOAA, Cal/EPA, and the USEPA. On a physical and chemical basis, all four Santa Ana River Marsh boreholes are individually and collectively compatible for placement at the Least Tern Island receiver site.

The potential Newport Beach nearshore receiver site contains a minimum of 0% fines, a maximum of 20% fines, and an average median grain size of 0.22 mm. Santa Ana River Marsh gradation curves fall well within the Newport Beach nearshore grain size envelope. On a physical and chemical basis, all four Santa Ana River Marsh boreholes are individually and collectively compatible for placement at the Newport Beach nearshore receiver site.

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USACE. 2012. Final Environmental Assessment for the Santa Ana Marsh Dredging Project, Newport Beach, Orange County, Californian. July 2012.

7 ACRONYMS AND ABBREVIATIONS

ASTM American Society for Testing and Materials
BGS Below Ground Surface
BHC Benzene Hexachloride
BLK Method or Procedural Blank
BMP Best Management Practice **PAH** Polyaromatic Hydrocarbon
BS Blank Spike
BSD Blank Spike Duplicate
CAD Confined Aquatic Disposal
Cal/EP California Environmental Protection Agency
ACD Compact Disc
CEQ Council on Environmental Quality
CEQA Council on Environmental Quality Act
CESPD Corps of Engineers South Pacific Division
CHHSL California Human Health screening Level
CV Coefficient of Variation
CY Cubic Yards
CRM Certified Reference Material
DDD Dichlorodiphenyldichloroethane
DDE Dichlorodiphenyldichloroethylene
DDT Dichlorodiphenyltrichloroethane
DGPS Differential Global Positioning Satellite
DUP Laboratory Replicates
ERL NOAA Effects Range Low
ERM NOAA Effects Range Median
ERMQ ERM Quotient
ESA Endangered Species Act
GPS Global Positioning Satellite
HHMSSL Human Health Medium – Specific Screening Levels
HDPE High-density Polyethylene
ITM Inland Testing Manual
LCL Lower Control Limit
LCS Laboratory Control Spike
LDPE Low-density Polyethylene
LPC Limiting Permissible Concentration
LSD Least Significant Difference
MDL Method Detection Limit
MLLW Mean Lower Low Water
MS Matrix Spike
MSD Matrix Spike Duplicate
MSD Minimum Significant Difference
ND Not Detected
NEPA National Environmental Policy Act
NOAA National Oceanic and Atmospheric Administration
ODMDS Ocean Dredge Material Disposal Site
OEAAA Office of Environmental Health Hazard Assessment
PCB Polychlorinated Biphenyl
PDS Post Digestion Spike
PDSD Post Digestion Spike Duplicate
PID Photoionization Detector
PPB Parts Per Billion
PPM Parts Per Million
PRGs Preliminary Remediation Goals
PVC Polyvinyl Chloride
RBC Risk-Based Concentration
RL Reporting Limit
RPD Relative Percent Difference
RSLs Regional Screening Levels for Cleanup of Superfund
SAIR Sampling and Analysis Investigation Report
SAP Sampling and Analysis Plan
SAPR Sampling and Analysis Results Report
SAR Santa Ana River
SCDMMT Southern California Dredge Material Management Team
SCOUP Sand Compatibility Opportunistic Use Program
SLRR San Luis Rey River
SM Dark Silty Sand
SOPs Standard Operating Procedures
SP Poorly Graded Sand
SPP Suspended Particulate Phase
SQUIRT Screening Quick Reference Table
SRM Standard Reference Material
STLC Title 22 Soluble Threshold Limit Concentration
SURR Surrogate Analysis
SWQCB State Water Resources Control Board
TOC Total Organic Carbon
TRPH Total Recoverable Hydrocarbons
TTLC Title 22 Total Threshold Limit Concentration
UCL Upper Control Limit
USACE U.S. Army Corps of Engineers
USEPA U.S. Environmental Protection Agency
QA Quality Assurance
QC Quality Control
QUAL Qualifier
USCS Unified Soil Classification System
VOC Volatile Organic Compound
WQC Water Quality Criteria

Attachment A.
Final Sampling and Analysis Plan (M&N 2016)

Final Sampling and Analysis Plan

Santa Ana River Marsh Restorative Sediment Removal Project

Source: Google Inc. 2016

Prepared For:

U.S. Army Corps of Engineers

Los Angeles District

W912PL-14-D-0054, Task Order 0013 (RECON Number 8044)

Prepared By:

MOFFATT & NICHOL

1660 Hotel Circle North, Suite 500

San Diego, CA 92108

November 2016

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Tables

1 INTRODUCTION

This report outlines a Final Sampling and Analysis Plan (SAP) that aims to characterize the sediment within the Santa Ana River (SAR) Marsh, located in the City of Newport Beach, Orange County, California (City) (Figure 1). The Santa Ana River Marsh Restorative Sediment Removal Project (Project) proposes to dredge no more than 10,000 cubic yards (CY) of sediment from the marsh to restore tidal flow, which would improve water quality and habitat functions. This SAP aims to evaluate sediment characteristics within the proposed Project area and determine its compatibility with the disposal areas being considered. Sediment is proposed to be placed at either the Least Tern Island within the SAR Marsh or in the nearshore off of Newport Beach. Placement in the nearshore would be performed by Orange County Public Works (County) through their current Lower Santa Ana River Maintenance Dredging project, and would require close coordination with the County. The County's project proposes to place up to 1.1 million CY of export sand within the Newport Beach nearshore as part of restoring channel invert elevations. Their project is currently under construction.

The U.S. Army Corps of Engineers (USACE) is the Federal lead agency for the project. This Final SAP will be submitted to the Southern California - Dredged Materials Management Team (SC-DMMT) for review and concurrence on sampling approach and methods prior to commencing sampling.

1.1 *Project Summary*

The USACE proposes to remove sediment in an approximately 90,000 square foot area of the SAR Marsh to a maximum design depth of -0.5 feet Mean Lower Low Water (MLLW) to remove an existing sand plug that impedes flow through the tide gate. Maintenance work is anticipated to be carried out by hydraulic dredge or excavator; thus, the maximum cut depth includes a sediment characterization overdepth allowance of 1.0 ft. The project footprint was separated into two areas, Areas A and B, with two design depths, as shown in Figure 2. Two representative cross-sections showing the extents of sediment removal within the SAR Marsh are provided in Figure 3 and Figure 4. The depth of sediment removal from ground surface to design depth is depicted in Figure 5. Maintenance work details within the SAR Marsh are provided in Table 1 below.

Table 1. Proposed Santa Ana River Marsh Excavation Volumes

Project Area Name	Project Area (sq. ft.)	Design Depth (ft, MLLW)	Depth with 1-foot Overdepth (ft, MLLW)	Approx. Volume (CY)
Area A	63,414	+0.5	-0.5	7,300
Area B	26,054	-0.5	-1.5	2,700
TOTAL	89,468			10,000

Final construction methods will be determined by the construction contractor and dictated by site-specific constraints such as the tidal gate, site access, cut depths, and timing. The Project is tentatively scheduled to begin March 2017.

The Project proposes beneficial reuse of export material generated for the purposes of habitat expansion of the Least Tern Island within the SAR Marsh, or beneficial reuse of export material in the nearshore area of Newport Beach. The proposed receiver sites are shown in Figure 6. Least Tern Island sediment placement would entail the building up of the island's elevation.

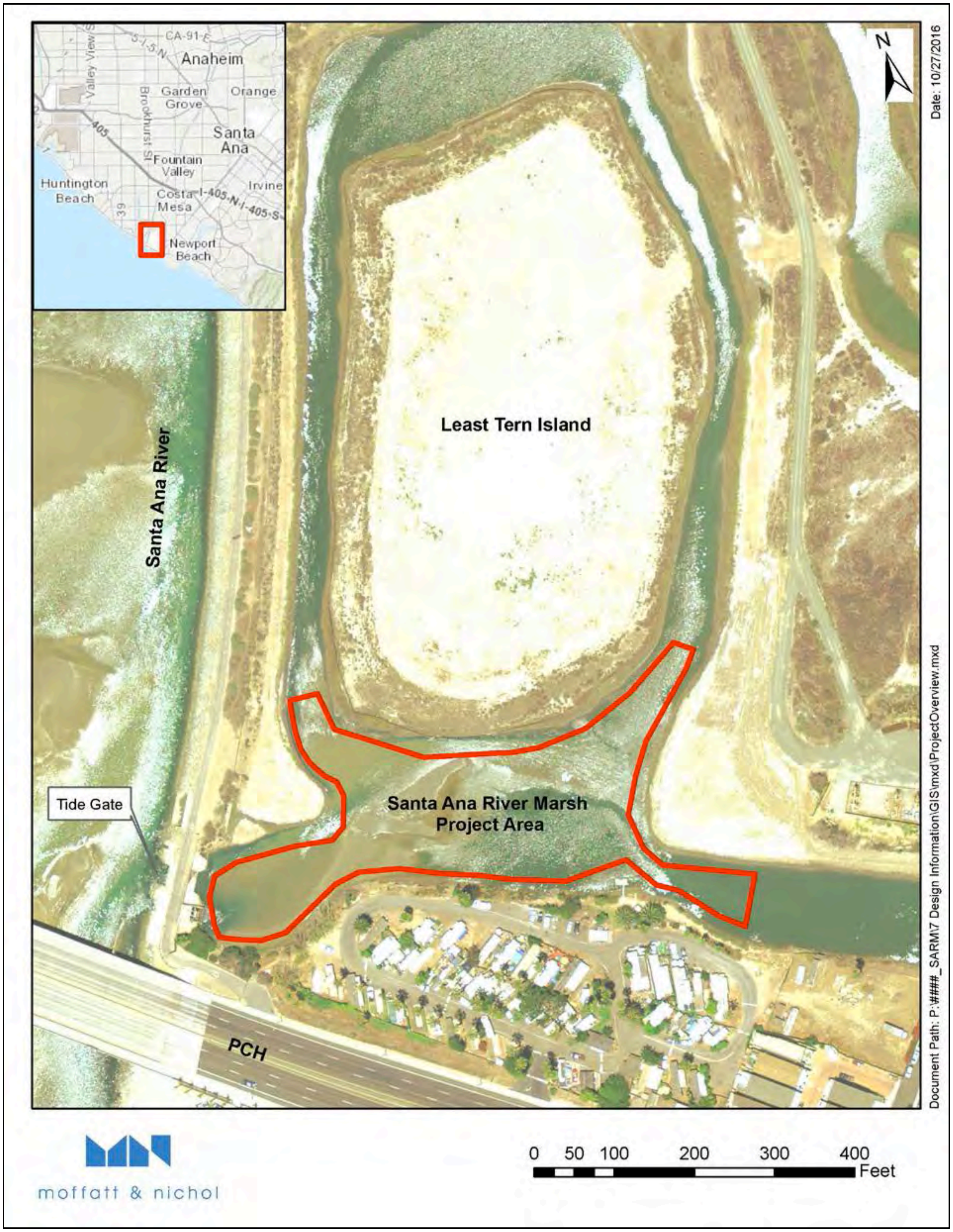

Figure 1. Vicinity Map - Santa Ana River Marsh, Orange County, CA

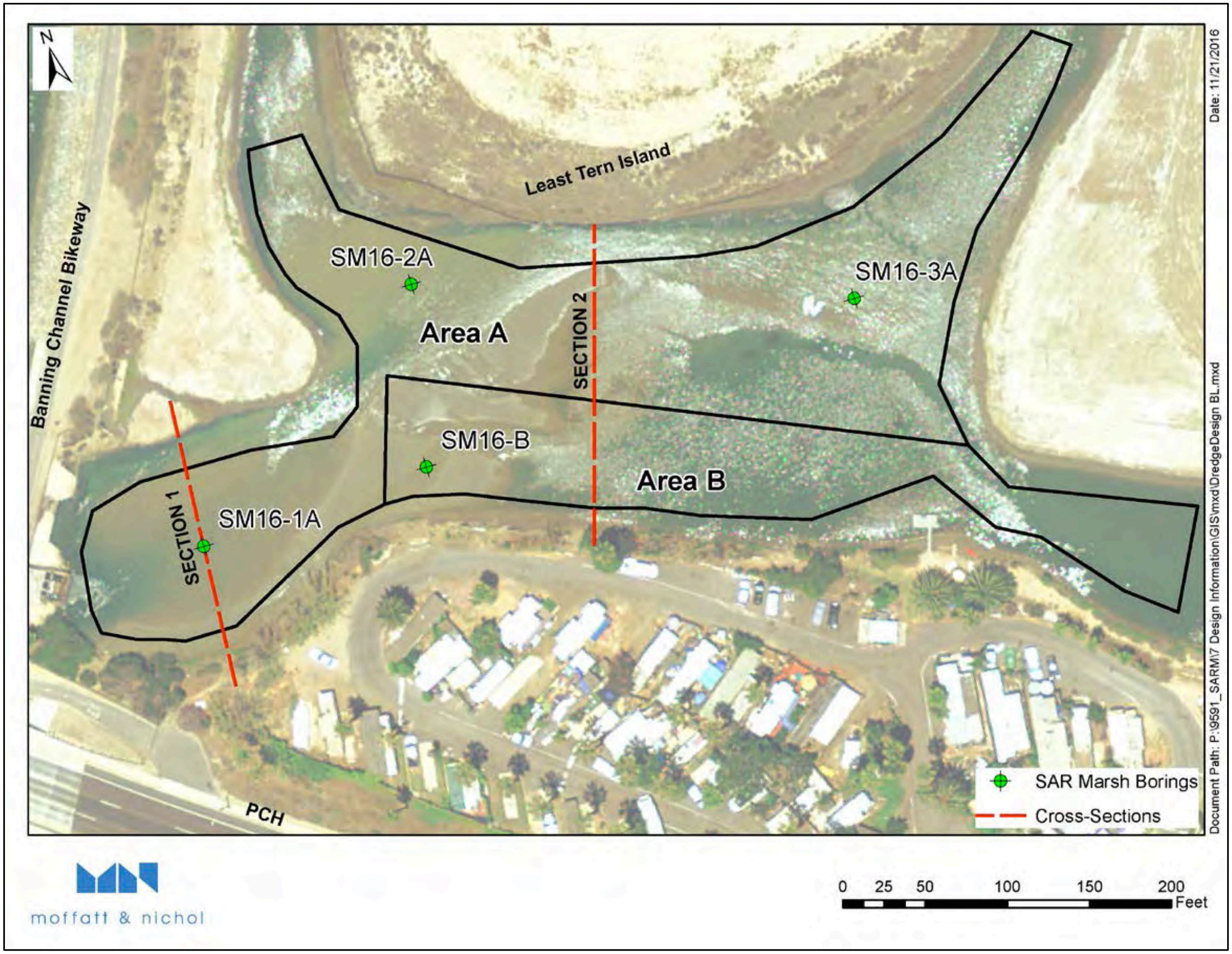

Figure 2. Plan View of the Proposed Project Area

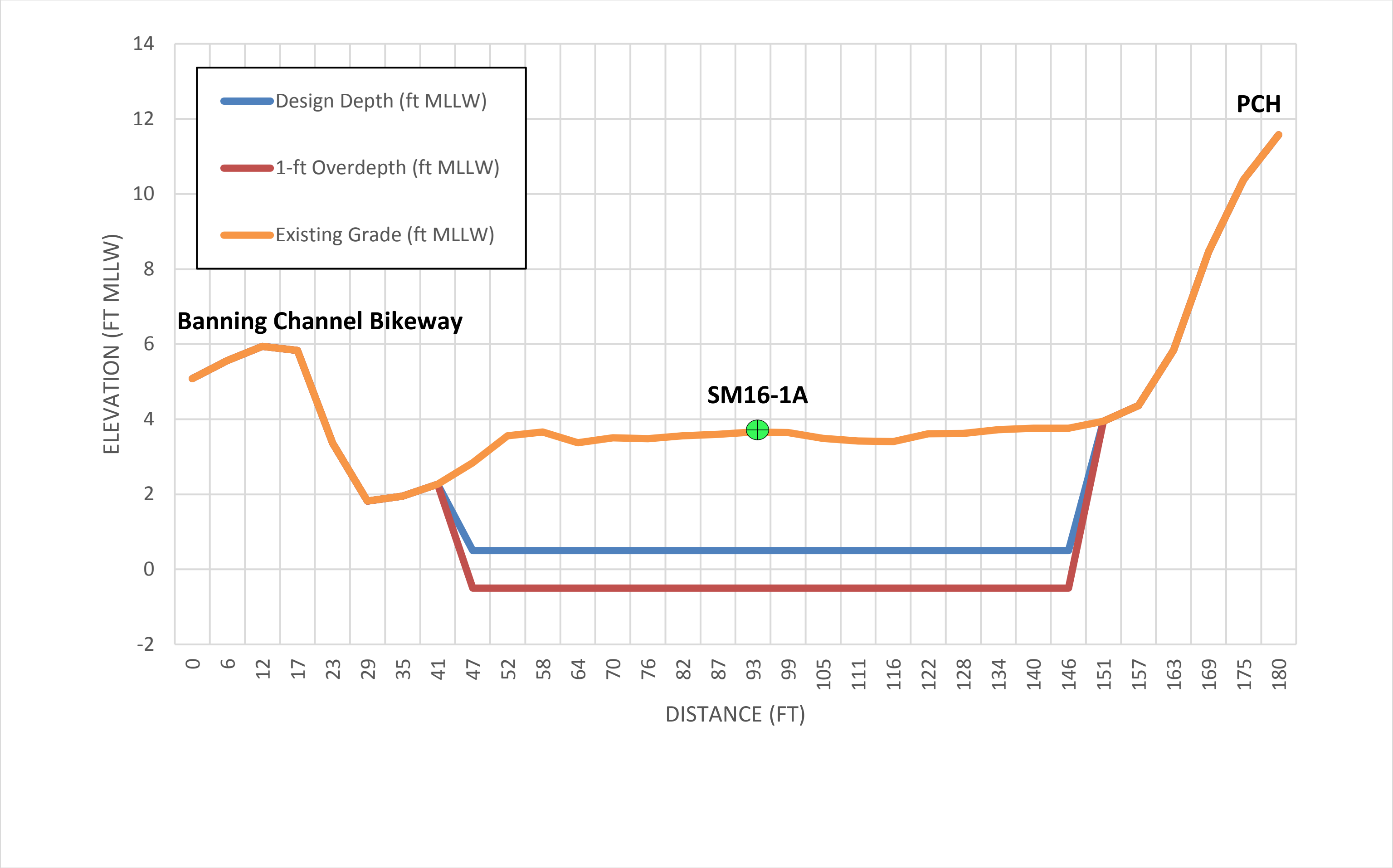

Figure 3. Santa Ana River Marsh Cross Section 1

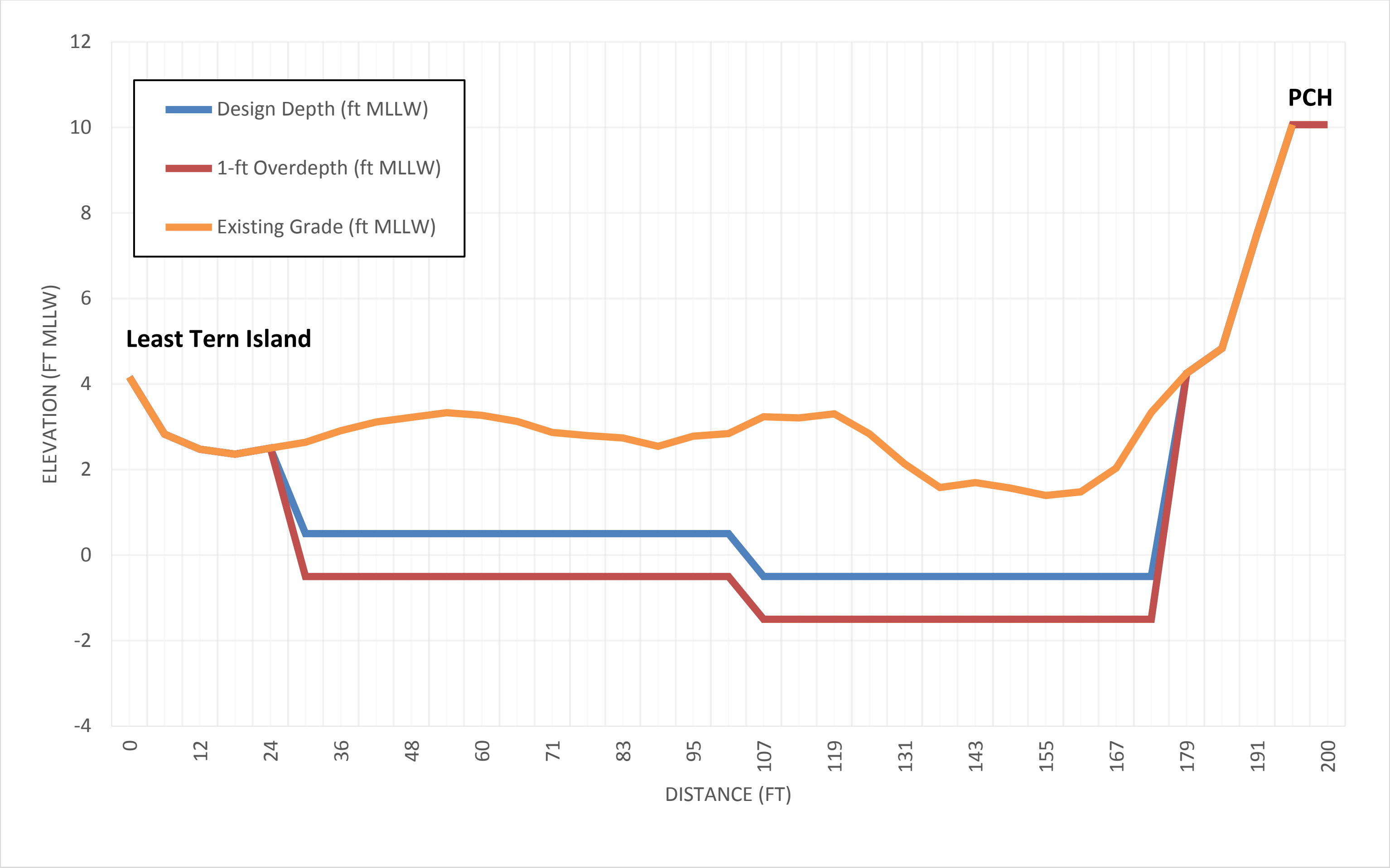

Figure 4. Santa Ana River Marsh Cross Section 2

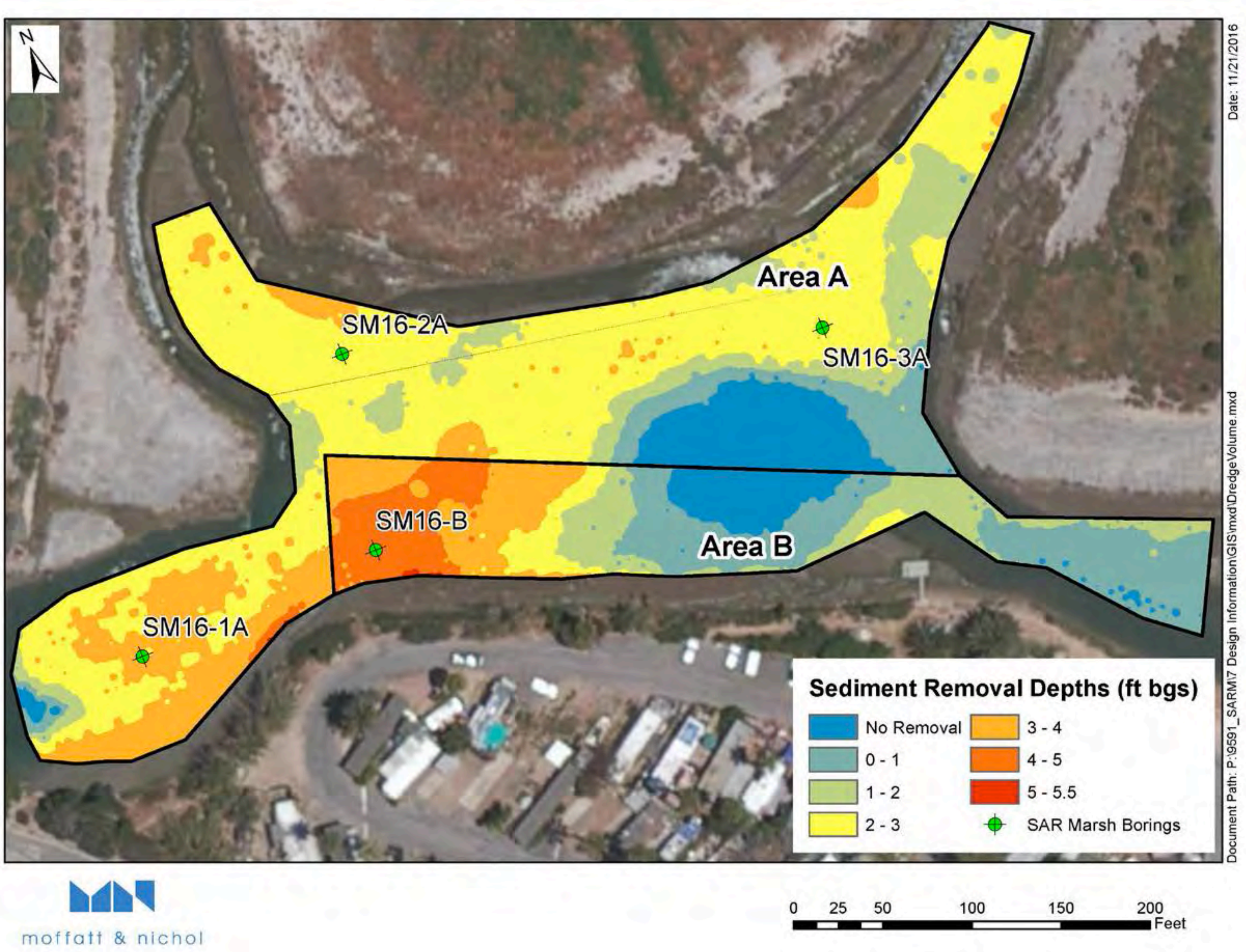

Figure 5. Excavation Depth from Existing Grade to Design Elevation (ft bgs)

Figure 6. Proposed Placement Sites

1.2 *Site Description*

The SAR Marsh is located in the City of Newport Beach, Orange County, CA, which is about 32 miles south of Los Angeles, CA along the Pacific Coast Highway. The 92-acre marsh lies southwest of the Santa Ana River, stretching from 0.25 to one mile upstream of the SAR.

The study area is divided into two areas, the SAR Marsh sediment removal area and Least Tern Island. The SAR Marsh sediment removal area occupies about 2 acres and is behind the first tide gate upstream from the mouth of the Santa Ana River. Elevations of the Project area range from approximately -1 to 4 feet MLLW, based on a 2014 Lidar survey (Figure 7).

Least Tern Island occupies a 7-acre footprint within the SAR Marsh and is adjacent to the northeast boundary of the SAR Marsh sediment removal area. The site is relatively flat with a maximum elevation of +16 ft MLLW. The island gradually slopes down to the inter-tidal zone on all sides.

The approximate geographic center of the investigation areas are defined below.

- SAR Marsh Project Area – 33°37'51.84"N, 117°57'20.04"W
- Least Tern Island Investigation Area - 33°37'56.30"N, 117°57'16.60"W

1.3 *Roles and Responsibilities*

The Project team members and specific roles for conducting the work outlined in this SAP are provided in Table 2. Key project contacts are provided in Table 3.

Table 2. Project Team and Responsibilities

Task/Responsibility	USACE, Los Angeles District	RECON Environmental	Moffatt & Nichol	GForce Inc.	Eurofins
Overall Project Management	X	X	X		
Project Implementation		X	X		
Sampling Plan Development	X		X		
Agency Coordination	X	X	X		
Sampling Site Plan/ Positioning			X		
Sediment Sampling			X		
Compositing/ Sub-sampling					X
Grain Size Analysis & QA/QC				X	
Chemical Analysis & QA/QC					X
Final Report			X		

Table 3. Key Project Contacts

Erin Jones Biologist USACE, Los Angeles District P.O. Box 532711 Los Angeles, CA 90053–2325 Tel.: 951-898-6191 erin.l.jones@usace.army.mil	Karyl Palmer Environmental Analyst RECON Environmental, Inc. 1927 Fifth Avenue San Diego, CA 92101 Tel.: 619.308.9333 kpalmer@reconenvironmental.com
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Carla Lee Hollowell Environmental Project Manager Eurofins Calscience, Inc. 7440 Lincoln Way Garden Grove, CA 92841-1427 Tel.: 714-895-5494 CarlaHollowell@eurofinsUS.com	

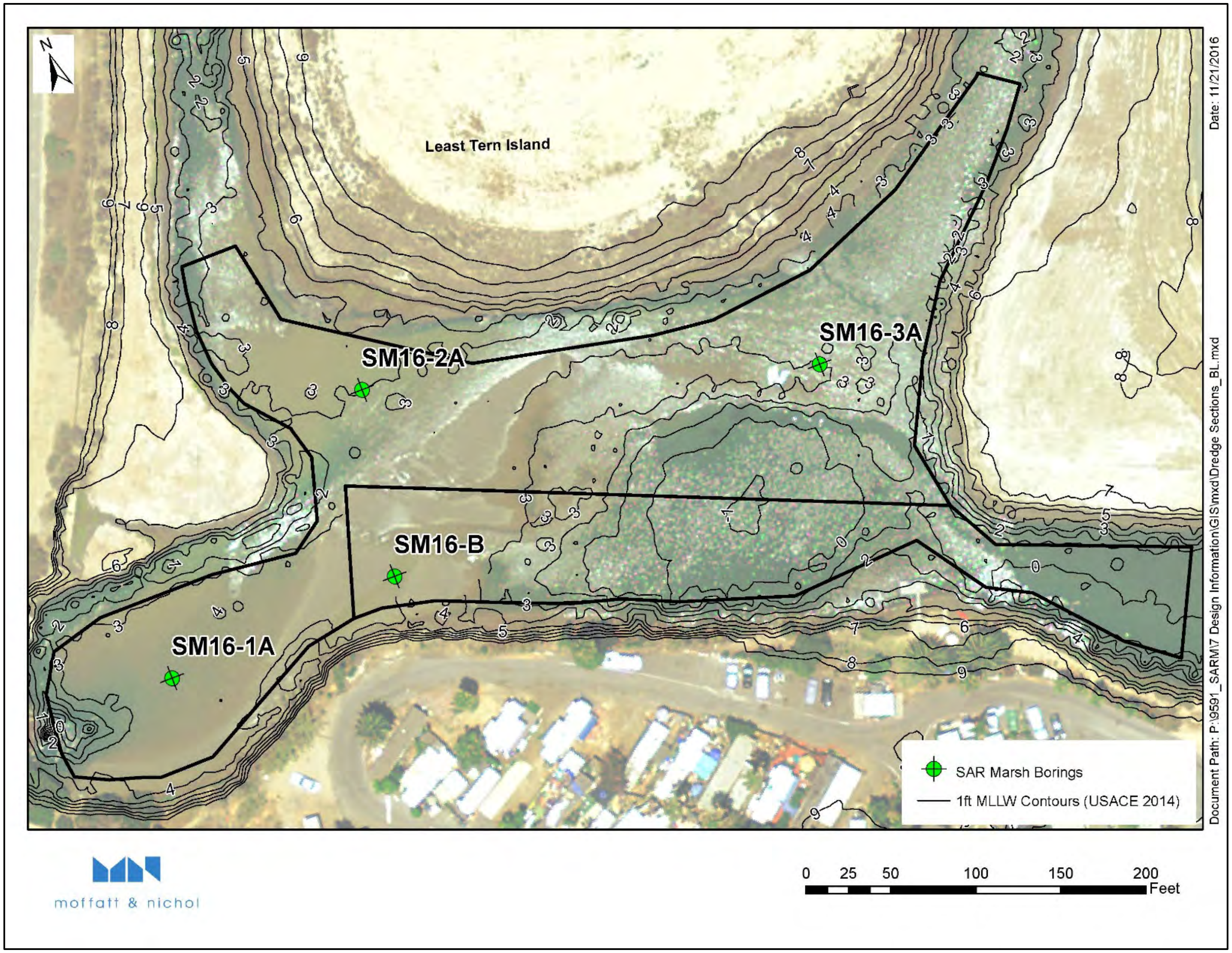

Figure 7. Existing Bathymetry and Proposed Boreholes within the Project Area

2 Site History

In the late 1980s, the 92-acre SAR Marsh was acquired with the goal of providing and preserving coastal salt marsh and endangered species habitat. The 92-acre marsh construction began in the fall of 1990 and was mostly completed by 1992, although minor excavation and monitoring have continued through 1999 (USACE 1999). Since its construction, sedimentation has occurred within the SAR Marsh, particularly behind its entrance at the SAR tide gate. As a result, a sand plug formed, impeding flow through the tide gate, reducing tidal prism, and threatening water quality and wildlife. In 2013, a dredging effort took place to improve the SAR Marsh circulation. The project was not completed within its allowable dredging window, thus, leaving sediment still needing removal.

2.1 *Santa Ana River Marsh Sediment Data*

In March 2012, the USACE conducted an evaluation of the Lower Santa Ana River Marsh sediments with the intention of dredging the marsh. These efforts consisted of collecting 22 sediment cores from the SAR Marsh in seven distinct sites (A through G). Grain size, chemical, and Tier III analyses were performed on the sampled material. The sediment investigation report is included in its entirety as Attachment A.

Sites A, B, and G encompass 7 borings that are within the proposed Project boundary (Figure 8). Site A and the southern portion of Site G correspond to Area A in the proposed Project. Site B in 2012 corresponds with Area B in the proposed Project. Table 4 summarizes the percent fines and Atterberg Limits of borings investigated in 2012 that were within or in the vicinity of the proposed Project. The USACE and SC-DMMT determined that composite Sites B and G were compatible for nearshore placement at West Newport Beach. Site A was deemed suitable for placement at offshore site LA-3.

Table 4. USACE 2012 Sampling Results Summary

2012 Composite Area	Boring ID	Sample Elevation Interval (ft MLLW)	Avg. Percent Fines*	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
Site A	SARM10-01	3.0 to -2.4	34.4	48	29	19
	SARM10-02	3.4 to -3.6	33.6	48	24	24
Site B	SARM10-03	3.0 to -3.0	82.3	39	22	17
	SARM10-03-SO	4.0 to 2.2	6.7	NP[1]	NP	NP
	SARM10-04	2.1 to -4.6	1.8	NP	NP	NP
	SARM10-04-SO	3.6 to 2.1	19.0	-	-	-
Site G	SARM10-22	3.2 to 1.2	25.6	-	-	-
		Average	**29.1**	**27**	**15**	**12**

** Percentage of material passing the No. 200 or 0.074mm sieve*

[1] NP = non-plastic

Sediment chemistry analysis was performed on the seven composite areas. No Effects Range Median (ERM) exceedances were detected during chemical analysis. One (1) Effects Range Low (ERL) exceedance was detected during chemical analysis. Dieldrin was found in Area A at a level of 0.50 µg/kg dry weight, which is slightly above the ERL for this analyte at 0.02 µg/kg.

Figure 8. USACE 2012, SAR Marsh Relevant Borings

2.2 *Santa Ana River Marsh Biological Data*

As a component of the Environmental Assessment of the SAR Marsh, biological data has been documented for the project site. The sub- and inter-tidal marsh were found to support little to no vegetation (USACE 2012). The salt marsh supports California cordgrass (*Spartina foliosa*), Pickleweed (*Salicornia virginica* and *S. subterminalis*), saltwort (*Batis maritime*), and seablite (*Suaeda taxifolia*). Pickleweed is most prevalent, including on the slopes of Least Tern Island. Riparian habitat is dominated by Mulefat Scrub (*Baccharis salicifolia*) and the upland habitat is dominated by Quailbush scrub (*Atriplex lentiformis*). Disturbed areas, including access roads, developed land and Least Tern Island, are classified as ruderal habitats supporting weedy species, if any. The faunal species distribution is very wide, including typical Southern California marsh invertebrates (snails, mussels, annelids, etc.), fish (killifish, sculpin, halibut, goby, etc.), and birds (62 species observed within SAR Marsh vicinity). Threatened and endangered species that are known to occur in the vicinity of the SAR Marsh include the light-footed clapper rail (*Rallus longirostris levipes*), California least tern (*Sternaantillarum browni*), western snowy plover (*Charadrius alexandrines nivosus*), coastal California gnatcatcher (*Polioptila californica californica*), and the Belding's savanna sparrow (*Passerculus sandwichensis beldingi*).

A baseline eelgrass (*Zostera marina*) survey of the SAR Marsh was conducted in 2016 (Merkel & Associates 2016). Eelgrass distribution in the project area is shown in Figure 9. A small area of eelgrass (< 0.1 acres) is present within the Project dredge footprint.

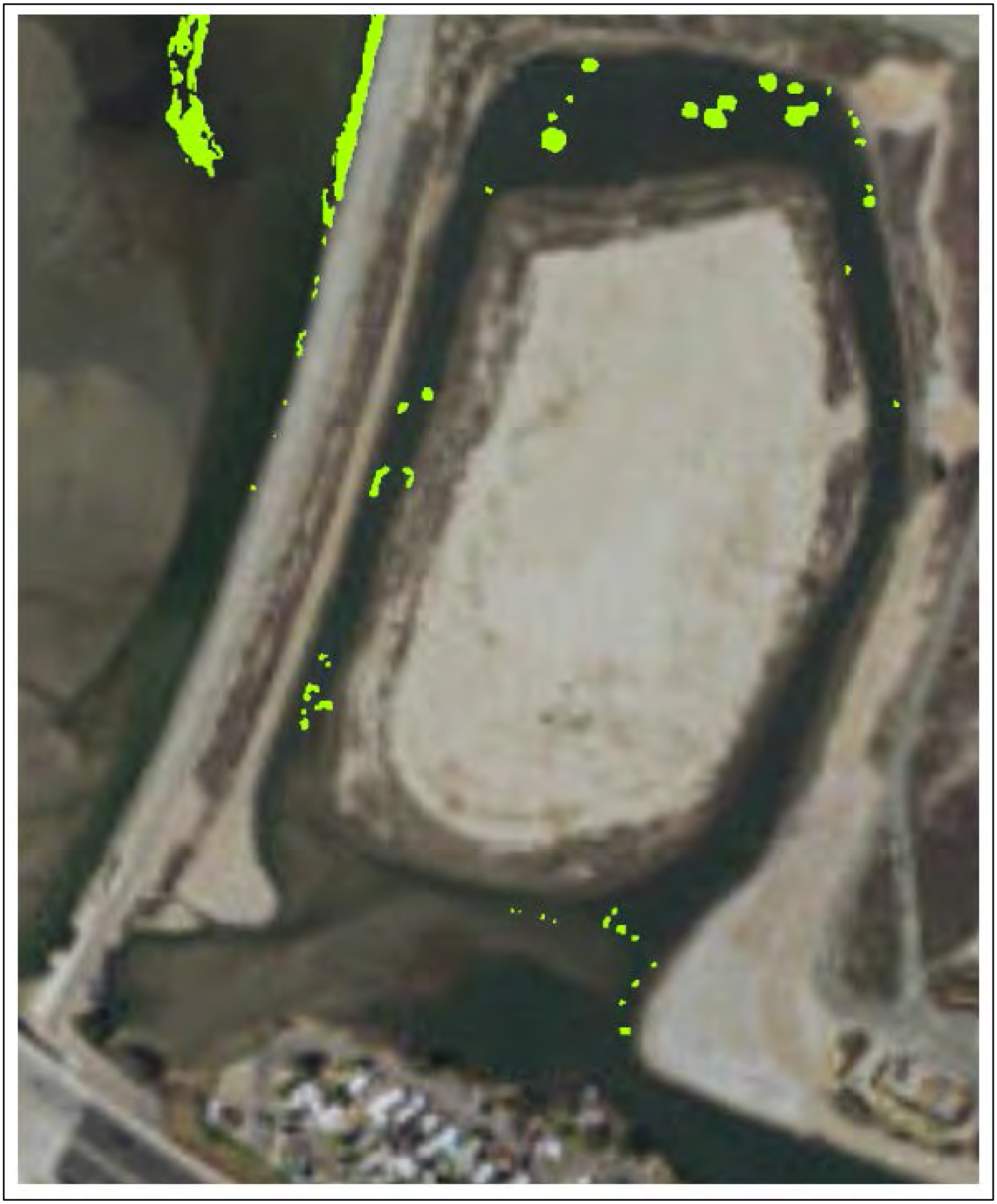

Figure 9. Eelgrass Distribution in the Project Area (Merkel & Associates 2016)

2.3 *Receiver Site Sediment Testing History*

The Project proposes to place dredged sediment in the nearshore off of Newport Beach or Least Tern Island located within the SAR Marsh. Previous sediment testing has been conducted at the proposed Newport Beach receiving site as part of the Santa Ana River Maintenance Dredging Project in September 2015 (M&N 2015). These data are presented in this section. No recent data from Least Tern Island was available at the time of this study.

Gradation samples were collected along three transects in the City at 34th Street, 42nd Street, and Orange Street in the City (Figure 10). Surface grab samples were collected at the elevations of +12, +6, 0, -6, -12, -18, -24, and -30 feet (MLLW) for each of the three transects. The percent fines of the coarsest and finest limits are shown in Figure 11. The coarsest material contains 0.4% fines, and the finest material contains 37.2% fines. The grain size envelope for Newport Nearshore is shown in Figure 11.

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar
CNES/Airbus DS, USDA, USGS, AEX, Getmappi
swisstopo, and the GIS User Community

Figure 10. Sampling Transects at Newport Beach (M&N 2015)

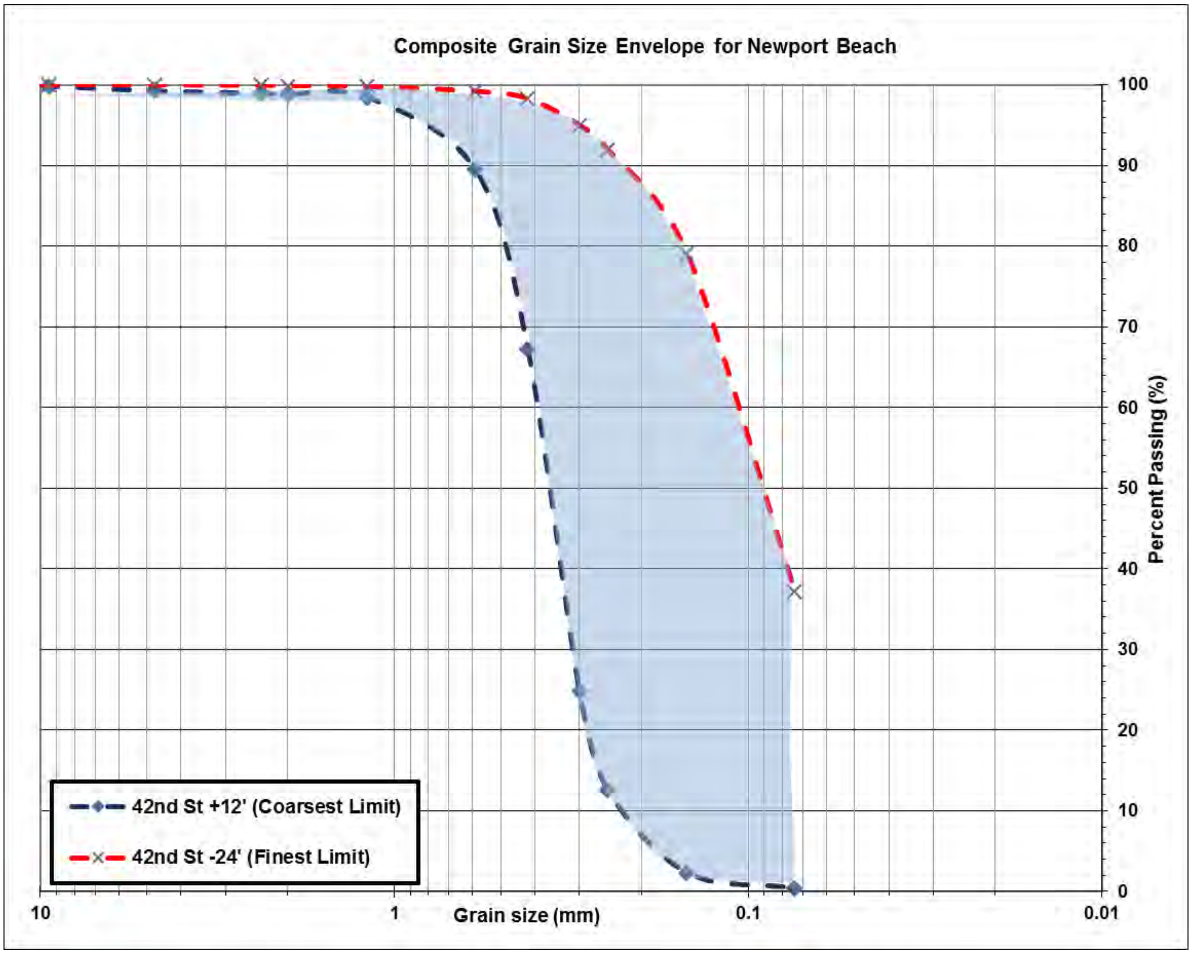

Figure 11. Composite Grain Size Envelope for Newport Beach (M&N 2015)

2.4 *Past Chemical Spills*

During the 2013 dredging of the SAR Marsh, a gas line was struck by heavy equipment and ruptured. Oil/contaminant spilled into an upland staging area. Restoration of the affected area ensued. Although restoration is believed to have been successful, volatile organic compound (VOC) testing will take place during the implementation of the proposed Project to ensure the quality of sediment.

3 METHOD OF SAMPLE COLLECTION AND ANALYSIS

Samples will be collected and analyzed consistent with USACE and U.S. Environmental Protection Agency (USEPA) established protocols for the disposal of dredged material as outlined in the Inland Testing Manual (USEPA and USACE 1998). Work shall also be prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality Act (CEQ), the Endangered Species Act (ESA), and the California Environmental Quality Act (CEQA) regulations.

This section outlines the field and laboratory methodology used in the collection and analysis of sediment samples.

3.1 *Santa Ana River Marsh Sampling*

Four (4) boreholes are proposed to be collected within the dredge footprint (Figure 12). The four samples will be used to characterize two areas, Project Area A with a design depth of 0.5 ft (MLLW) and Project Area B that has a design depth of -0.5 ft (MLLW) (Table 5). Continuous sediment samples will be collected through use of a hand-driven core sampler. Boreholes depths will reach a maximum depth of -1.5 feet MLLW, which includes a 1-foot overdepth allowance. The proposed sampling summary per Project Area is provided in Table 5.

Table 5. Proposed Sampling Summary

Project Area	Sample ID	Easting*	Northing*	Target Sampling Depth (ft MLLW)	Target Core Length (ft)	No. of cores per location	Number of Grain Size Samples	Number of Chemistry Samples
Area A	SM16-1A	6042799.11843	2177497.50798	-0.5	3.5-4.5	1	2-3	1-2 Composites
	SM16-2A	6042520.57292	2177470.67773	-0.5	3.5	1	2-3	
	SM16-3A	6042542.17399	2177580.14687	-0.5	3.5	1	2-3	
Area B	SM16-B	6042376.89621	2177461.74409	-1.5	3.5-4.5	1	2-3	

* Horizontal Coordinate System – NAD83 State Plane VI.

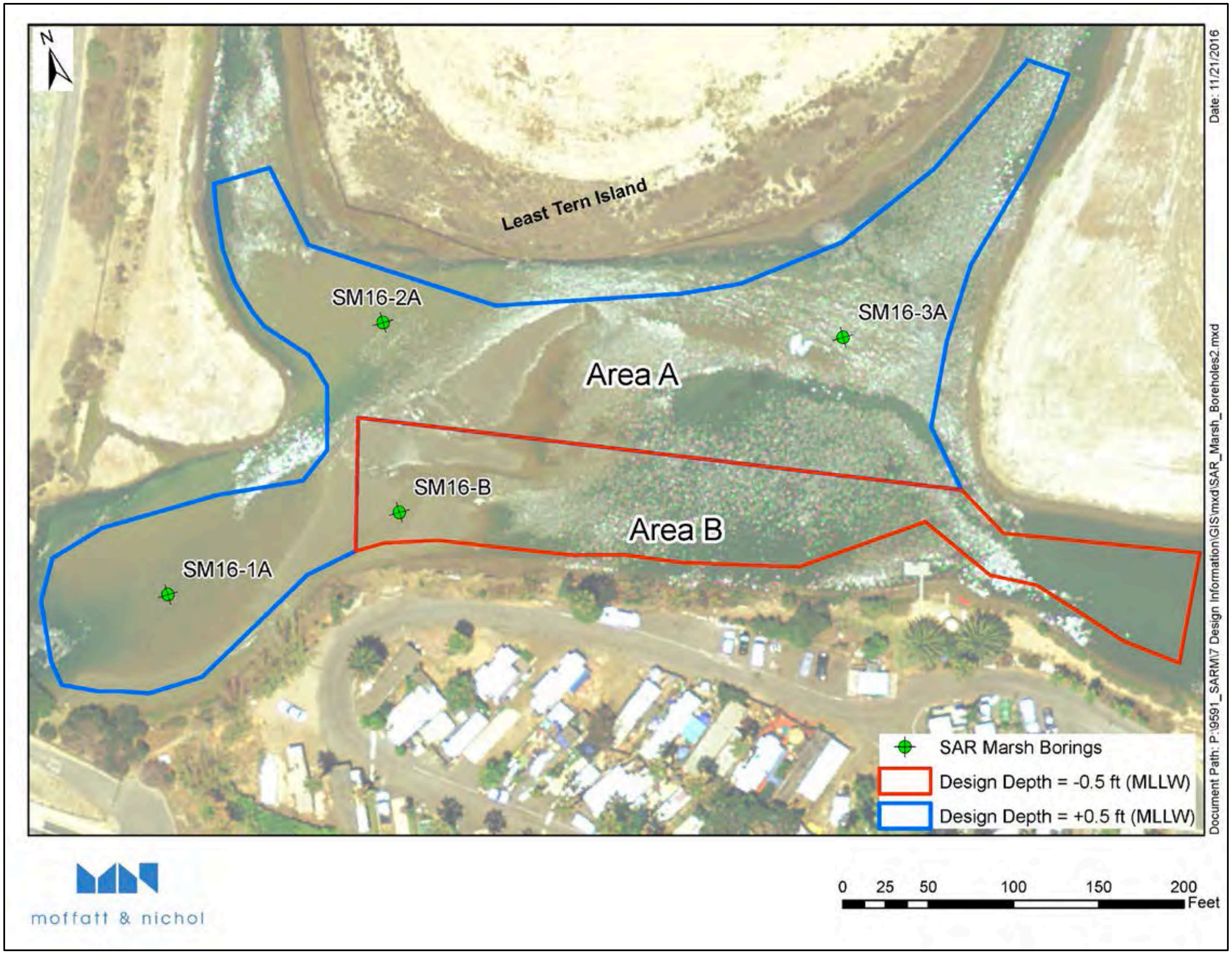

Figure 12. Proposed Borehole Locations within the Project Area

At each borehole, a minimum of two (2) and maximum of three (3) grain size samples will be taken with depth for a total of eight to twelve (8-12) gradation samples. One sample will represent the ground surface to 6 inches depth. A second sample will represent 6 inches depth to overdepth. A third, optional sample, will be taken to characterize any anomalous sediment layers encountered that are greater than 6 inches in thickness. This determination will be made in the field at the discretion of the Contractor. Anomalous layers with thickness less than 6 inches will not be sampled separately but noted in the borehole log.

On-site VOC screening will be performed for all samples of SAR Marsh boreholes. VOC screening will be performed with a photoionization detector (PID).

All samples will be labeled and stored in 1-gallon freezer bags. Pictures of each borehole will be taken. Borehole log details will be noted, as discussed in Section 3.4.

3.2 *Least Tern Island Site Sampling*

M&N will collect grab samples at four (4) locations within Least Tern Island, as shown in Figure 13. All samples will be collected on foot with the use of a small shovel to a depth of less than 1-foot below ground surface (bgs). Samples will be labeled and stored in 1-gallon freezer bags. Pictures of each sample will be taken and grab sample details will be noted in the borehole log, as discussed in Section 3.4. Details on the Least Tern Island investigation sampling plan are provided in Table 6.

Table 6. Least Tern Island Investigation Area Sampling Plan

Sample ID	Location		Sample Depth (ft bgs)	Number of Grain Size Samples	Number of Chemistry Samples
	Easting*	Northing*			
LTI-1	6042761.84291	2177688.90156	< 1	1 Composite	1 Composite
LTI-2	6042690.41889	2177912.70446	< 1		
LTI-3	6042861.37063	2178223.59458	< 1		
LTI-4	6043005.01834	2178009.19355	< 1		

* Horizontal Coordinate System – NAD83 State Plane VI.

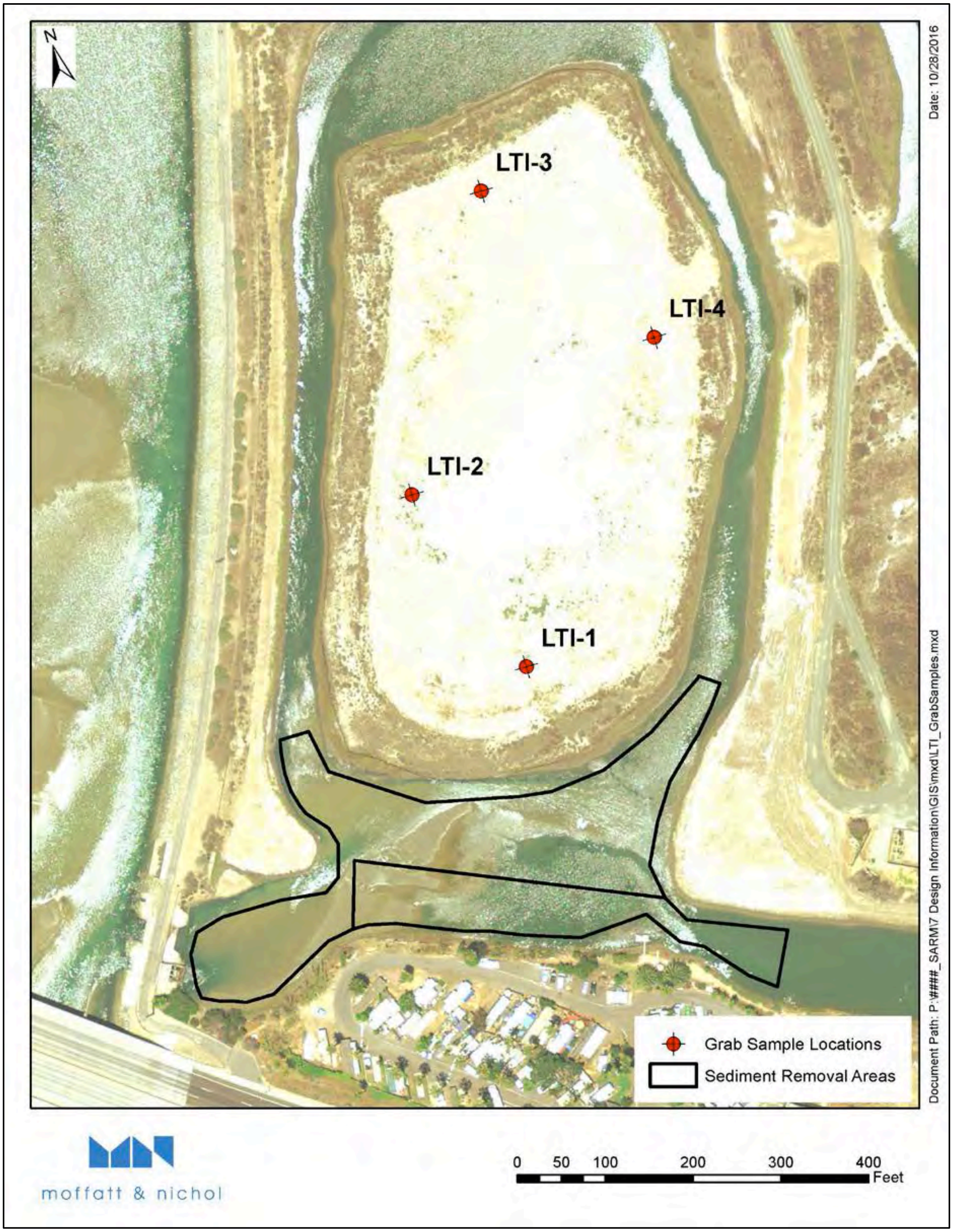

Figure 13. Proposed Least Tern Island Grab Samples

3.3 *Laboratory Analysis*

3.3.1 Sediment Grain Size Analysis

Laboratory analysis will be performed by G-Force, located at 4035 Pacific Highway, San Diego, CA 92110. Sediment grain size analysis of the SAR Marsh shall be conducted for all eight to twelve (8-12) borehole samples in accordance with ASTM D422. Samples will undergo a mechanical sieve analysis with No. ¾, 4, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230 sieves. If sediment is deemed to have a significant portion of fine material (e.g. > 10%), two (2) Hydrometer tests shall be conducted in accordance with ASTM D422, and two (2) Atterberg Limits tests shall be conducted in accordance with ASTM D4318.

Sediment grain size analysis of Least Tern Island shall be conducted for one (1) composite bulk sample made up of the four (4) grab samples taken on the island.

All gradation tests will determine the percent sand, silt and clay (to a precision of 0.1%). Grain size will be reported in both millimeter and phi units. Results will be reported as a cumulative grain size distribution diagram and as a table in Excel format.

3.3.2 Sediment Chemical Analysis

Sediment chemical analysis will be performed on one (1) composite sediment sample representing the surface to overdepth layer of the four (4) SAR Marsh boreholes. Additionally, one (1) composite sample from Least Tern Island, made up of the four (4) grab samples, will be tested. Chemical analysis will be performed on a total of two (2) composite samples. Discrete samples for each coring location will be archived at the analytical laboratory. A total of four (4) sediment samples will be archived. Archive samples will be kept frozen such that they can be analyzed for chemistry later at the discretion of the USACE's Project Technical Manager.

SAR Marsh sediment is expected to be generally uniform; however, if significant and distinct horizontal and/or vertical stratification is encountered, additional chemistry sampling will take place to test these layers separately. Horizontal and/or vertical compositing techniques would be applied if this stratification is encountered with the goal of maintaining one (1) course grain composite and one (1) fine grain composite sample. This determination will be made in the field at the discretion of the qualified field team. If significant stratification exists, chemical analysis will then be performed on a total of three (3) composite samples, including Least Tern Island. Four (4) additional discrete samples, which makeup this added chemistry composite sample, would be archived at the laboratory for a total of eight (8) archived samples.

Chemistry composite samples will be analyzed for Tier II constituents, as listed in Attachment B. Laboratory methods and method detection limits specified will be met by Eurofins Analytical Laboratory.

Chemical concentration results found during sediment analysis will be compared to the sediment quality guidelines developed by NOAA and presented in Long et al. (1995). These guidelines are used to screen sediments for contaminant concentrations that might cause biological effects and to identify sediments for further toxicity testing. The biological effects guidelines are based on a NOAA database correlating biological effects with concentrations of 9 trace metals, 13 individual PAHs, 3 classes of PAHs, and 3 classes of chlorinated organic hydrocarbons. This study developed Effects Range Low (ERL) and Effects Range Median (ERM) values that provide a statistical relationship between adverse biological effects and sediment compound concentration levels. ERL and ERM values will be used as a guideline and not be used to determine sediment compatibility.

For any given contaminant, the ERL guideline represents the 10th percentile concentration value in the NOAA database that might be expected to cause adverse biological effects. A lack of contaminants exceeding ERL values indicates a less than 10% probability of a highly toxic response by marine amphipods. The incidence of adverse biological effects increases to 20% to 30% for most trace metals and 40% to 60% for most organics when concentrations exceed ERL values but are lower than the ERM values. When concentrations exceed ERM values, the incidence of adverse effects increased to 60% to 90% for most trace metals and 80% to 100% for most organics.

The potential toxicity of each composite will be further characterized through the mean ERM quotient (ERMq). Calculations will follow Long et al. (1998a) and Hyland et al. (1999) as shown in the following equation:

$$ERMq = \frac{1}{24} * \sum \frac{SampleConcentration}{ERM}$$

where, sample *Sample Concentration* is the contaminant concentration of each individual chemical and *ERM* corresponds to the ERM value associated with that contaminant. When contaminant concentrations are below the method detection limit (MDL), ½ of the MDL will replace the *Sample Concentration* in the above equation. ERMq values below 0.1 indicate a less than 12% probability of a highly toxic response by marine amphipods. ERMq values above 1.0 indicate a 71% probability of a highly toxic response by marine amphipods (Long and MacDonald, 1998b).

To assess the source sediment's suitability for human contact, the chemical contamination concentration results will be compared with "Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2015). Regional Screening Levels (RSLs) are broken into two categories: residential, and industrial. RSLs were developed with USEPA toxicity data, standard exposure assumptions, and standardized equations and are an umbrella term for USEPA Region 9 Preliminary Remediation Goals (PRGs), USEPA Region 3 Risked-Based Concentrations (RBCs) and EPA Region 6 Human Health Medium – Specific Screening Levels (HHMSSLs). USEPA deemed RSLs to be protective for humans over a lifetime. RSLs do not represent ecological impact contaminant levels. Although RSLs were developed for superfund sites, their consideration in non-superfund sites can be beneficial to the project, helping to assess areas and materials that demand greater attention and/or avoidance.

California Human Health Screening Levels (CHHSLs) will also be referenced to assess the source sediment's suitability for human contact and potential human health risks. CHHSLs apply to 54 hazardous chemicals that are protective of human health (Cal/EPA, updated 2010). CHHSL values are broken into two categories: residential, and industrial/commercial. CHHSLs were developed by the Office of Environmental Health Hazard Assessment (OEHHA) with USEPA and California Environmental Protection Agency (Cal/EPA) toxicity data, and standard exposure assumptions.

The various screening levels to be analyzed are provided in Appendix B.

3.4 *Field Notes*

Field notes will be maintained in a detailed Soils Log during sampling and compositing operations. Included in the field notes will be the following:

- Name of person(s) collecting and logging the samples;
- General weather conditions and other general observations;
- Sampling technique;
- Date and time of collection;
- Sample station number and sample description;
    - Sample elevation (ft MLLW),
    - Ground surface elevation (ft MLLW),
    - Position in CA State Plane VI coordinate system,
    - Sample description in accordance with ASTM D2488:
        - Grain size,
        - Color,
        - Maximum particle size,
        - Estimation of density (sand) or consistency (silts and clays),
        - Odor,
        - VOCs, and
        - Organics and trash;
- Estimated tide & water depth;
- Any deviation from the approved sampling plan.

Color photographs will be taken of all samples, including details of core number, date, sample depth, and a taped measured scale. A one to two page Quality Assurance Form will be prepared for and signed by the USACE Project Technical Manager for each day of field work. A copy of the Detailed Soils Log and Quality Assurance Form will be included in the Sampling and Analysis Investigation Report (SAIR).

3.5 *Sample Transport and Chain-of-Custody Procedures*

A chain-of-custody record for each sample will be maintained throughout all sampling activities and will accompany samples and shipment to the laboratory. Information tracked by the chain-of-custody records in the laboratory include sample identification number, date and time of sample receipt, analytical parameters required, location and conditions of storage, date and time of removal from and return to storage, signature of person removing and returning the sample, reason for removing from storage, and final disposition of the sample.

3.6 *Holding Times*

All samples will be transported to the laboratories within the holding times required for the analytes to be tested. Furthermore, all samples for physical and chemical analysis will be maintained at the testing laboratory at the appropriate temperature for the analytes. Archive sediment samples reserved for potential supplementary testing will be stored under chain-of-custody by the analytical laboratory.

3.7 *Quality Assurance and Quality Control*

Quality assurance procedures to be used for sediment testing are consistent with methods described in the Inland Testing Manual (ITM) (USEPA and USACE 1991). For trace analysis, the procedures include documentation of the following criteria for each sample matrix type: analytical reproducibility, analytical detection limits, recovery of in situ metals and organics, and sample chain-of-custody documentation.

The quality assurance objectives for testing are detailed in individual Laboratory QA Manuals, USEPA/USACE 1991, and USEPA SW-846. Objectives for accuracy and precision involve all aspects of the testing process, including:

- Methods and Standard Operating Procedures (SOPs);
- Calibration Methods and Frequency;
- Data Analysis, Validation and Reporting;
- Internal Quality Control;
- Preventive Maintenance; and
- Procedures to Assure Data Accuracy and Completeness.

3.7.1 Sample Storage and Tracking

Sample chain-of-custody sheets, sample receipt logs, sample holding, and sample labeling procedures are detailed in individual laboratory SOPs and are audited periodically by Control staff. Sample storage conditions and holding times are adhered to strictly. Samples are archived throughout the testing period until the final report is accepted.

3.7.2 Chemistry QC Samples

Environmental sample matrix spike and matrix spike duplicate analysis will be performed at a rate of 5%. In the absence of adequate sample quantity to perform matrix spiking for all matrix types, either the imaginary matrix as described in USEPA SW-846 or a laboratory solid (e.g., sodium sulfite) will be used for preparing matrix spikes. Matrix spikes are from an environmental sample that is split into three separate aliquots. One aliquot is analyzed free from matrix spike introduction. A known concentration of the analyte of interest is added to the other two aliquots prior to sample preparation and analysis. Both percent recovery and relative percent difference are reported for matrix spikes/matrix spike duplicates.

Spike data can provide an indication of matrix bias or interference on analyte recovery. Duplicate data can provide an indication of laboratory precision. Method or reagent blanks will be analyzed at a frequency of 5% or for every analytical batch, whichever is greater. Analytical batches will consist of 20 or fewer samples; therefore, one batch will be created for this Project. Results of all laboratory QC analyses will be reported with the final data. Any QC samples that fail to meet the QC criteria specified in the methodology or in this SAP will be identified and the corresponding data appropriately qualified in the final report. All Quality Assurance/Quality Control records for the various testing programs will be kept on file for review by regulatory agency personnel. It is also anticipated that USACE, RWQCB, and/or USEPA personnel may be present during sampling and may visit the laboratory during testing.

3.7.3 Data Analysis, Validation and Reporting

Physical and chemical tests are to be performed consistent with protocols and conditions listed in laboratory SOPs. Raw data and study records are checked to ensure that required test conditions are within specifications cited in the SOPs. Major deviations (e.g., those that could potentially affect test results) from protocol must be approved by both the client and the Quality Control Manager. Unforeseen circumstances that may affect the integrity of the study are reported with the test results. The data, analysis and report are also reviewed for accuracy by the Quality Control Manager.

3.7.4 Report

The field sampling and laboratory analytical report will consist of logs of individual borings, a brief discussion of field and laboratory methods, and a summary of the results of the testing program. For this Project, results from statistical analyses may also be reported. These analyses would consist of appropriate F- or t-statistics to compare chemical contamination at the test site sediment and reference site. Statistical significance will be reported at the 95% confidence level (e.g., a=0.05). Any chemical concentrations reported for the source site that are significantly different from the reference site will be compared with recognized guidelines for sediment quality (e.g., Buchman 2008). Appendices of the laboratory analyses, including final results and quality control and assurance data will be provided. The report will be in a form appropriate for submittal to the USACE.

3.8 ***Supplementary Chemical Testing***

The outlined chemistry testing will be completed as a screening mechanism of the material. Supplemental testing may be conducted if testing results reveal a constituent to be above established screening levels. Further testing may include confirmation tests or analysis of the individual samples that made up a chemistry composite sample. Supplemental testing would be conducted on samples archived and stored frozen at the laboratory. Samples will be archived for a period of for six months.

4 REPORTING

Findings from the SAP will be summarized in a Sampling and Analysis Investigation Report (SAIR) that will detail sampling and testing methods and present results in a summarized form using figures and tables, where appropriate. The final report documentation shall contain the following information:

- Introduction – Project Description and History.
- Site Maps – Vicinity Map and Plan View.
- Methods and Materials - Inventory of all Methodology and Materials used to implement the proposed SAP.
- Results – Includes results from all grain-size and chemical analysis completed as part of the proposed SAP.
- QA/QC Information – Includes all raw data sheets.
- Field Sheets, Soils Log, Quality Assurance Form.
- Photographic Documentation.
- References.

The final document will be completed once all sampling results are obtained and data analysis has been conducted. The completed document will be submitted to the below address.

U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Blvd.
Los Angeles, CA 90017
Attn: Jessica Vargas

5 REFERENCES

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______. 1998. *Inland Testing Manual (ITM), Evaluation of Dredged Material Proposed for Discharge in Waters of the U. S. - Testing Manual.* EPA reference 823-B-98-004, USACE Office of Water, February 1998.

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6 ACRONYMS AND ABBREVIATIONS

ASTM American Society for Testing and Materials
BHC Benzene Hexachloride
BLK Method or Procedural Blank
BMP Best Management Practice **PAH** Polyaromatic Hydrocarbon
BS Blank Spike
BSD Blank Spike Duplicate
CAD Confined Aquatic Disposal
CD Compact Disc
CESPD Corps of Engineers South Pacific Division
CHHSL California Human Health screening Level
CV Coefficient of Variation
CY Cubic Yards
CRM Certified Reference Material
DDD Dichlorodiphenyldichloroethane
DDE Dichlorodiphenyldichloroethylene
DDT Dichlorodiphenyltrichloroethane
DGPS Differential Global Positioning Satellite
DUP Laboratory Replicates
ERL NOAA Effects Range Low
ERM NOAA Effects Range Medium
GPS Global Positioning Satellite
HHMSSL Human Health Medium – Specific Screening Levels
HDPE High-density Polyethylene
ITM Inland Testing Manual
LCL Lower Control Limit
LCS Laboratory Control Spike
LDPE Low-density Polyethylene
LPC Limiting Permissible Concentration
LSD Least Significant Difference
MDL Method Detection Limit
MLLW Mean Lower Low Water
MS Matrix Spike
MSD Matrix Spike Duplicate
MSD Minimum Significant Difference
ND Not Detected
NOAA National Oceanic and Atmospheric Administration
ODMDS Ocean Dredge Material Disposal Site
PCB Polychlorinated Biphenyl
PDS Post Digestion Spike
PDSD Post Digestion Spike Duplicate
PPB Parts Per Billion
PPM Parts Per Million
PVC Polyvinyl Chloride
RBC Risk-Based Concentration
RL Reporting Limit
RPD Relative Percent Difference
RSLs Regional Screening Levels for Cleanup of Superfund
SAIR Sampling and Analysis Investigation Report
SAP Sampling and Analysis Plan
SAPR Sampling and Analysis Results Report
SCDMMT Southern California Dredge Material Management Team
SCOUP Sand Compatibility Opportunistic Use Program
SLRR San Luis Rey River
SOPs Standard Operating Procedures
SP Solid Phase
SPP Suspended Particulate Phase
SRM Standard Reference Material
STLC Title 22 Soluble Threshold Limit Concentration
SURR Surrogate Analysis
SWQCB State Water Resources Control Board
TOC Total Organic Carbon
TRPH Total Recoverable Hydrocarbons
TTLC Title 22 Total Threshold Limit Concentration
UCL Upper Control Limit
USACE U.S. Army Corps of Engineers
USEPA U.S. Environmental Protection Agency
QA Quality Assurance
QC Quality Control
QUAL Qualifier
USCS Unified Soil Classification System
VOC Volatile Organic Compound
WQC Water Quality Criteria

7 UNITS OF MEASURE

All measurements and calculations will follow U.S. customary units. Horizontal coordinate measurements will reference the California State Plane Zone VI. Vertical units are relative to the MLLW tidal datum.

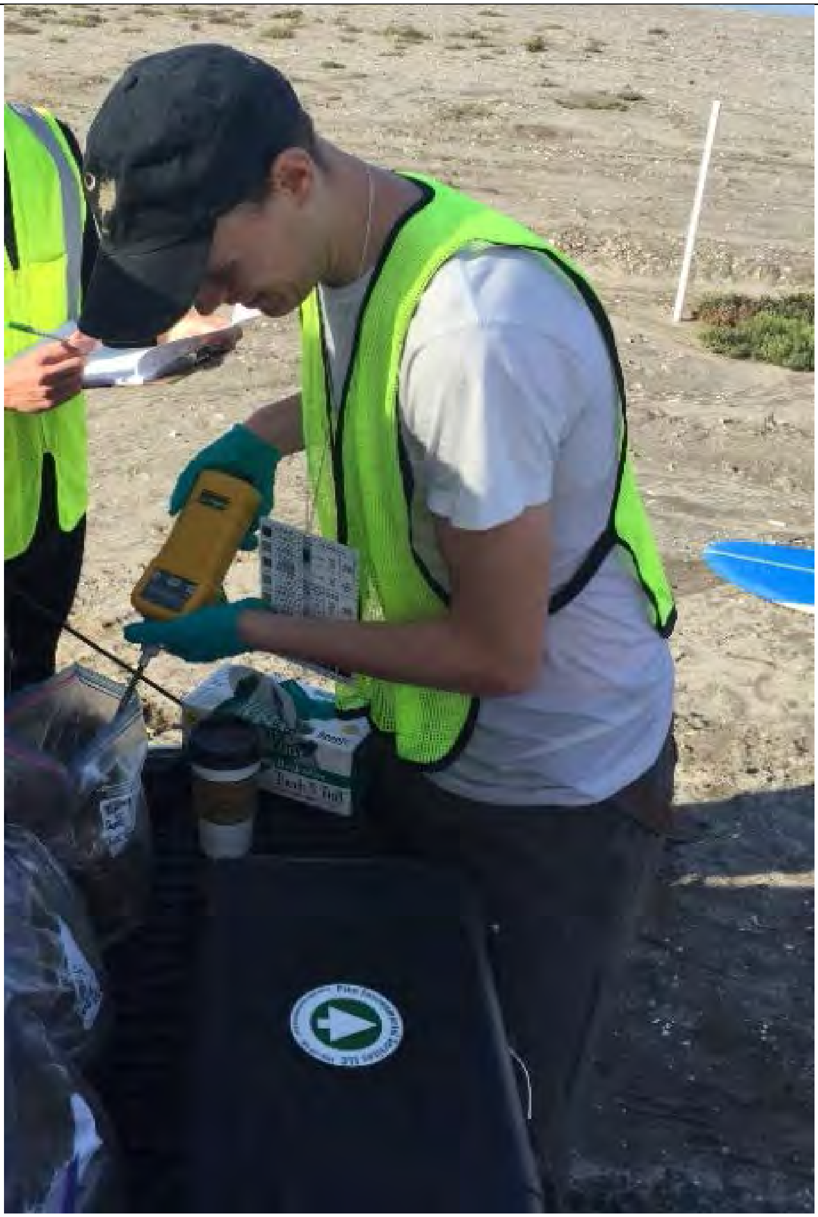
Attachment B.
Field Photographs

Field Photos- November 22, 2016

Least Tern Island

Santa Ana River Marsh

Santa Ana River Tide Gate



PID MiniRae Volatile Organic Compound Testing

SM16-1A, Site Location

SM16-1A, 0-1’ bgs

SM16-1A, 1-3’ bgs

SM16-1A, 3-3.5’ bgs

SM16-2A, Site Location

SM16-2A, 0-1’ bgs

SM16-2A, 1-2.5’ bgs


SM16-2A, 2.5-3’ bgs


SM16-2A, 3-3.8’ bgs

SM16-3A, Site Location

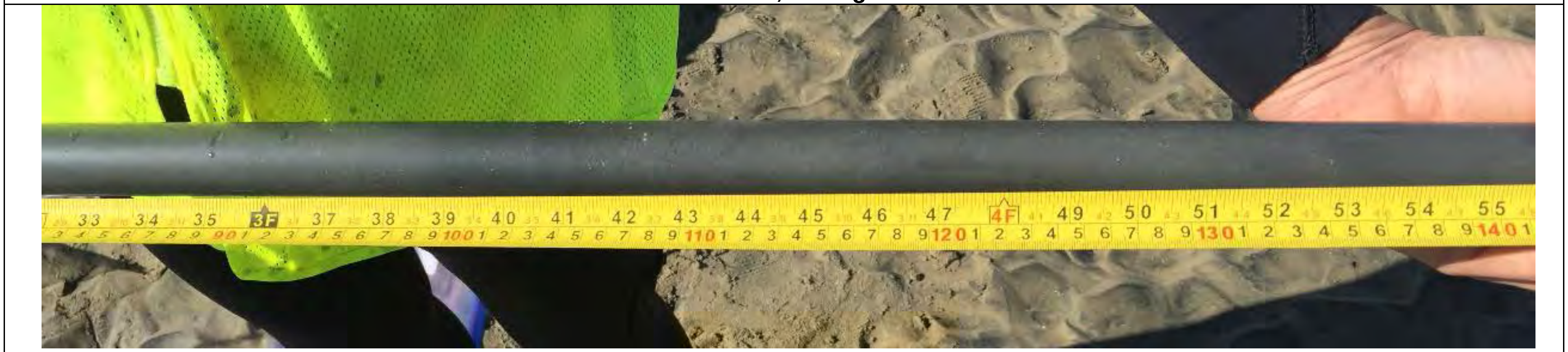
SM16-3A, 0-3.5' bgs

SM16-3A, 0-0.5’ bgs (left) & 0.5-3.5’ bgs (right)

SM16-B, Site Location

SM16-B, 0-1' bgs

SM16-B, 1-3’ bgs



SM16-B, 3-4.8’ bgs

SM16-B, 0-4.8’ bgs

Least Tern Island Boring Locations and Samples- November 22, 2016

LTI-1, 0-0.5' bgs

LTI-2, 0-0.5' bgs

LTI-3, 0-0.5' bgs

LTI-4, 0-0.5' bgs

Attachment C.
Field Notes

Project Name: SARM Restorative Sediment Removal Project

SITE ID: SM-16-1A

Project Location: Newport Beach, CA

Date: 11/22/16 **Time:** 12:30 pm **Weather:** Sun 70° F

Sheet: 1 **Of:** 1

Name of Field Technician(s): B Leslie, C Ofelthun, A Holloway

Site ID: SM16 - 1A

Sample #: 1, 2 + 3

Latitude: 2177497.50798

Depth of Penetration (ft bgs): 3.75

Longitude: 6042799.11843

Depth of Penetration (ft MLLW): -0.5

Sampling Method: Hand Driven Core

Length of Recovery (ft): 3.75

Water Depth (ft): 0.25

Estimated Tide (ft MLLW): 1.9

Ground Surface Elevation (ft MLLW): 3'

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	ppm VOCs	Notes
0	∴	SP	Medium	Brown Light	Medium	Slightly	Well	Rounded	Oil/ Dirty	None	0.4	Distinct
				Brown Gray		loose			Earth		1.2	Layer
1												Light &
												Coarse
2	||||	SM	Medium Fine	Black	Medium	Slightly	Well	Round		Dark	0.8	Distinct Layer
						dense				Organics		Dark & Fine
3												
4												
5												
6												
7												
8												
9												

Project Name: SARM Restorative Sediment Removal Project
SITE ID: SM16-2A

Project Location: Newport Beach, CA

Date: 11/22/16 **Time:** 11:15 AM **Weather:** Sunny 70°F
Sheet: 1 **Of:** 1

Name of Field Technician(s): B Leslie C Ofsthun A Holloway

Site ID: SM-16-2A **Sample #:** 1 + 2

Latitude: 2177470.67773 **Depth of Penetration (ft bgs):** 3.8

Longitude: 6042520.57292 **Depth of Penetration (ft MLLW):** -0.5

Sampling Method: Hand Driven Core **Length of Recovery (ft):** 3.8 ft

Water Depth (ft): N/A

Estimated Tide (ft MLLW): 2.0 ft

Ground Surface Elevation (ft MLLW): 3.3

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	ppm VOCs	Notes
0		SM	Medium Fine	Black	Medium	Slightly dense	well	Round	oyster smell	Yes	0.0	Distinct dark + fine layer
									Earthy	less than surface	0.1	
1									None			
		Grading	Grading									
2												
3		SP	Medium									
4												
5												
6												
7												
8												
9												

Project Name: SARM Restorative Sediment Removal Project

Project Location: Newport Beach, CA

Date: 11/22/16 **Time:** 10:45 AM **Weather:** Sun 65°F

SITE ID: SM16-3A

Sheet: 1 **Of:** 1

Name of Field Technician(s): B Leslie C Ofsthun A Holloway

Site ID: SM16-3A

Sample #: 1 + 2

Latitude: 2177580.14687

Depth of Penetration (ft bgs): 3.5'

Longitude: 6042542.17399

Depth of Penetration (ft MLLW): ~~3~~ -0.5

Sampling Method: Hand driven core

Length of Recovery (ft): 3.5'

Water Depth (ft): 0.5

Estimated Tide (ft MLLW): 2.0

Ground Surface Elevation (ft MLLW): 3.0

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	ppm VOCs	Notes
0		SM	medium mostly fine	black	medium	slightly dense	well	round	Sulfur	Dark	0.0	Distinct Dark + Fine Layer
		SM								Fine organics	0.2	
1										+		
										No Trash		
2												
3			medium	Gray								
4												
5												
6												
7												
8												
9												

Project Name: SARM Restorative Sediment Removal Project

SITE ID: SM-16B

Project Location: Newport Beach, CA

Date: 11/22/16 **Time:** 12:00 pm **Weather:** Sun 70° F

Sheet: 1 **Of:** 1

Name of Field Technician(s): B Leslie, C Offthun, A Holloway

Site ID: SM-16B **Sample #:** 1, 2 & 3

Latitude: 2177461.74409 **Depth of Penetration (ft bgs):** 5'

Longitude: 6042376.89621 **Depth of Penetration (ft MLLW):** -1.5'

Sampling Method: Hand Driven Core **Length of Recovery (ft):** 5'

Water Depth (ft): 0.5'

Estimated Tide (ft MLLW): 1.9 ft'

Ground Surface Elevation (ft MLLW): 3.5'

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	ppm VOCs	Notes
0	░	SP	Medium	Brown Light Brown Gray	Medium	slightly loose	Medium	Well	slightly sulfuric		12.0	
									Earthy		1.3	Distinct Lighter color
1										None		+ Coarser layer
2												Chem Composite separately
	▥	SM	medium fine	Black	medium	slightly dense	well	round	Earthy	Dark		Distinct
3										organics	0.4	Darker or
										no trash		Finer
4												Layer
												Chem Composite separately
5												
6												
7												
8												
9												

Project Name: Santa Ana River Marsh Restorative Sediment Removal Project

Project Location: SARM, Newport Beach CA

Date: 11/22/2016 **Time:** 9:15 Am **Weather:** Sunny 65°F

SITE ID: LTI - 1

Sheet: 1 **Of:** 1

Name of Field Technician(s): Brian Leslie, Conor Ofsthun, Aaron Holloway

Site ID: LTI - 1 **Sample #:** 1

Latitude: 2177688.90156 **Depth of Penetration (ft bgs):** 0.5

Longitude: 6042761.84291 **Depth of Penetration (ft MLLW):** ~~0.5~~ 9.5

Sampling Method: Shovel **Length of Recovery (ft):** 0.5

Water Depth (ft): N/A

Estimated Tide (ft MLLW): 3.1 ft

Ground Surface Elevation (ft MLLW): 10'

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	VOCs (ppm)	Notes
0		SP	Med-Fine	Grey brown	Med	Loose	well	Rounded	None	none	0.0	
1												
2												
3												
4												
5												
6												
7												
8												
9												

Project Name: SARM Restorative Sediment Removal Project
SITE ID: LTI-2
Project Location: Newport Beach, CA
Sheet: 1 **Of:** 1
Date: 11/22/16 **Time:** 9:20 AM **Weather:** Sunny, 65°F
Name of Field Technician(s): Brian Leslie, Cory Ostlun, Aaron Holloway
Site ID: LTI-2 **Sample #:** 1
Latitude: 2177912.70476 **Depth of Penetration (ft bgs):** 0.5
Longitude: 6042690.41889 **Depth of Penetration (ft MLLW):** 9.5
Sampling Method: Shovel **Length of Recovery (ft):** 0.5
Water Depth (ft): N/A
Estimated Tide (ft MLLW): 3.0 ft
Ground Surface Elevation (ft MLLW): 10'

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	ppm VOCs	Notes
0	∴	SP	Medium	Yellow Brown gray	Medium	Loose	Well	Round	No	Stick	0.0	
1												
2												
3												
4												
5												
6												
7												
8												
9												

Project Name: SARM Restorative Sediment Removal Project			**SITE ID:** LTI3
Project Location: Newport Beach, CA			
Date: 11/22/16	**Time:** 9:25	**Weather:** Sunny 65°F	**Sheet:** 1 **Of:** 1

Name of Field Technician(s): Brian Leslie, C Ofsthun, A Holloway

Site ID: LTI-3	**Sample #:** 1
Latitude: 2178223.59458	**Depth of Penetration (ft bgs):** 0.5
Longitude: 6042861.37063	**Depth of Penetration (ft MLLW):** 9.5
Sampling Method: Shovel	**Length of Recovery (ft):** 0.5

Water Depth (ft): N/A

Estimated Tide (ft MLLW): 2.9 ft

Ground Surface Elevation (ft MLLW): 10

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	VOCs	Notes
0	∴	SP	Medium	brown gray	medium	Loose	well	rounded	No	No	0.0	
1												
2												
3												
4												
5												
6												
7												
8												
9												

Project Name: SARM Restoration Sediment Removal Project
SITE ID: LTI-4
Project Location: Newport Beach, CA
Date: 11/22/16 **Time:** 9:35 **Weather:** Sunny 65°F
Sheet: 1 **Of:** 1
Name of Field Technician(s): B Leslie, C Ostlund, A Holloway
Site ID: LTI-4 **Sample #:** 1
Latitude: 2178009.19355 **Depth of Penetration (ft bgs):** 0.5
Longitude: 6043005.01834 **Depth of Penetration (ft MLLW):** 9.5
Sampling Method: Shovel **Length of Recovery (ft):** 0.5
Water Depth (ft): N/A
Estimated Tide (ft MLLW): 2.8'
Ground Surface Elevation (ft MLLW): 10'

Depth (ft bgs)	Graphic Symbol	Letter Symbol	Grain Size	Color	Maximum Particle Size	Density	Sorting	Roundness	Odor	Organics & Trash	VOCs	Notes
0	∴	SP	medium	gray brown	medium	loose	well	round	No	No	0.0	
1												
2												
3												
4												
5												
6												
7												
8												
9												

Attachment D.
Boring Logs

FIELD BORING LOG

Boring No. SM16-1A

Sheet 1
Of: 1

Project Name: SAR Marsh Restorative Sediment Removal Pr Project No.: 9591
Project Location: Santa Ana River Marsh, Newport Beach, CA Phase:
Logged By: CO Date Started: 11/22/16
Reviewed By: BL Date Reviewed: 11/22/16
Drilling Contractor: None Drill Rig: NA Driller: None
Drilling Methods: Direct Push Hammer Type: Slide Helper: BL, AH
Boring Diameter: 1.5" Total Depth 3.75' Backfill Materia None
Ground Elevation 3' Datum Source: ft MLLW Groundwater: Saturated Marsh

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers			Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
1			VOC=0.4ppm	▨				
2	SP	Medium sand, light-brown color, well sorted, rounded	VOC=1.2ppm	▨				
3				▥				Two samples collected to retrieve sufficient volumes for chemical sampling
4	SM	Medium-fine silty-sand, dark gray color, well sorted, well rounded	VOC=0.8ppm	▥				
	Boring Terminated at 3.75 feet							
5								
6								
7								
8								
9								
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								

FIELD BORING LOG

Boring No. SM16-2A

Sheet 1
Of: 1

Project Name: SAR Marsh Restorative Sediment Removal Pr Project No.: 9591
Project Location: Santa Ana River Marsh, Newport Beach, CA Phase:
Logged By: CO Date Started: 11/22/16
Reviewed By: BL Date Reviewed: 11/22/16
Drilling Contractor: None Drill Rig: NA Driller: None
Drilling Methods: Direct Push Hammer Type: Slide Helper: BL, AH
Boring Diameter: 1.5" Total Depth 3.8' Backfill Materia None
Ground Elevation 3.3' Datum Source: ft MLLW Groundwater: Saturated Marsh

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers			Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
1 2 3 4	SM	Medium-fine silty-sand, dark gray color, well sorted, well rounded, oyster/earthy odor, dark organics	VOC=0.0ppm VOC=0.1ppm	▥				
	Boring terminated at 3.8 feet							
5 6 7 8 9 0 1 2 3 4 5 6 7 8 9								

FIELD BORING LOG

Boring No. SM16-3A

Sheet 1
Of: 1

Project Name:	SAR Marsh Restorative Sediment Removal Pr	Project No.:	9591
Project Location:	Santa Ana River Marsh, Newport Beach, CA	Phase:	
Logged By: CO	Date Started: 11/22/16		
Reviewed By: BL	Date Reviewed: 11/22/16		
Drilling Contractor: None	Drill Rig: NA	Driller: None	
Drilling Methods: Direct Push	Hammer Type: Slide	Helper:	BL, AH
Boring Diameter: 1.5"	Total Depth 3.5'	Backfill Materia	None
Ground Elevation 3'	Datum Source: ft MLLW	Groundwater:	Saturated Marsh

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers			Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
			VOC=0.0ppm	▨				
1				▨				
2		Medium-fine silty-sand, dark gray color, well sorted, rounded, sulfur odor, dark organics		▨				
3	SM		VOC=0.2ppm	▨				
	Boring terminated at 3.5 feet							
4								
5								
6								
7								
8								
9								
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								

FIELD BORING LOG

Boring No. SM16-B

Sheet 1
Of: 1

Project Name: SAR Marsh Restorative Sediment Removal Pı Project No.: 9591
Project Location: Santa Ana River Marsh, Newport Beach, CA Phase:
Logged By: CO Date Started: 11/22/16
Reviewed By: BL Date Reviewed: 11/22/16
Drilling Contractor: None Drill Rig: NA Driller: None
Drilling Methods: Direct Push Hammer Type: Slide Helper: BL, AH
Boring Diameter: 1.5" Total Depth 4'8" Backfill Materia None
Ground Elevation 3.5' Datum Source: ft MLLW Groundwater: Saturated Marsh

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers				Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
1 2	SP	Medium sand, light-brown color, well sorted, well rounded, sulfur odor	VOC=12.0ppm VOC=1.3ppm	1 2	▨				
3 4 5	SM	Medium-fine silty-sand, dark gray color, well sorted, rounded, earthy odor, dark organics	VOC=0.4ppm	3 4 5	▥				Two samples collected to retrieve sufficient volumes for chemical sampling
	Boring terminated at 4.8 feet								
6				6					
7				7					
8				8					
9				9					
0				0					
1				1					
2				2					
3				3					
4				4					
5				5					
6				6					
7				7					
8				8					
9				9					

FIELD BORING LOG

Boring No. LTI-1

Sheet 1
Of: 1

Project Name: SAR Marsh Restorative Sediment Removal Pı Project No.: 9591
Project Location: Santa Ana River Marsh, Newport Beach, CA Phase:
Logged By: BL Date Started: 11/22/16
Reviewed By: BL Date Reviewed: 11/22/16
Drilling Contractor: None Drill Rig: NA Driller: None
Drilling Methods: Grab Sample Hammer Type: Slide Helper: BL, AH
Boring Diameter: NA Total Depth 0.5' Backfill Materia None
Ground Elevation: 10' Datum Source: ft MLLW Groundwater: None

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers			Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
0.5	SP	Medium sand, Light-brown color, well sorted, rounded, shell fragments	VOC=0.0ppm	▨				Hand Grab
	Boring terminated at 0.5 feet							
1			1					
2			2					
3			3					
4			4					

FIELD BORING LOG

Boring No. LTI-2

Sheet 1
Of: 1

Project Name: SAR Marsh Restorative Sediment Removal Pı Project No.: 9591
Project Location: Santa Ana River Marsh, Newport Beach, CA Phase:
Logged By: BL Date Started: 11/22/16
Reviewed By: BL Date Reviewed: 11/22/16
Drilling Contractor: None Drill Rig: NA Driller: None
Drilling Methods: Grab Sample Hammer Type: Slide Helper: BL, AH
Boring Diameter: NA Total Depth 0.5' Backfill Materia None
Ground Elevation: 10' Datum Source: ft MLLW Groundwater: None

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers			Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
0.5	SP	Medium sand, Light-brown color, well sorted, rounded, shell fragments	VOC=0.0ppm	▨				Hand Grab
	Boring terminated at 0.5 feet							
1			1					
2			2					
3			3					
4			4					

FIELD BORING LOG

Boring No. LTI-3

Sheet 1
Of: 1

Project Name: SAR Marsh Restorative Sediment Removal Pı Project No.: 9591
Project Location: Santa Ana River Marsh, Newport Beach, CA Phase:
Logged By: BL Date Started: 11/22/16
Reviewed By: BL Date Reviewed: 11/22/16
Drilling Contractor: None Drill Rig: NA Driller: None
Drilling Methods: Grab Sample Hammer Type: Slide Helper: BL, AH
Boring Diameter: NA Total Depth 0.5' Backfill Materia None
Ground Elevation: 10' Datum Source: ft MLLW Groundwater: None

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers			Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
0.5	SP	Medium sand, Light-brown color, well sorted, rounded, shell fragments	VOC=0.0ppm	▨				Hand Grab
	Boring terminated at 0.5 feet							
1			1					
2			2					
3			3					
4			4					

FIELD BORING LOG

Boring No. LTI-4

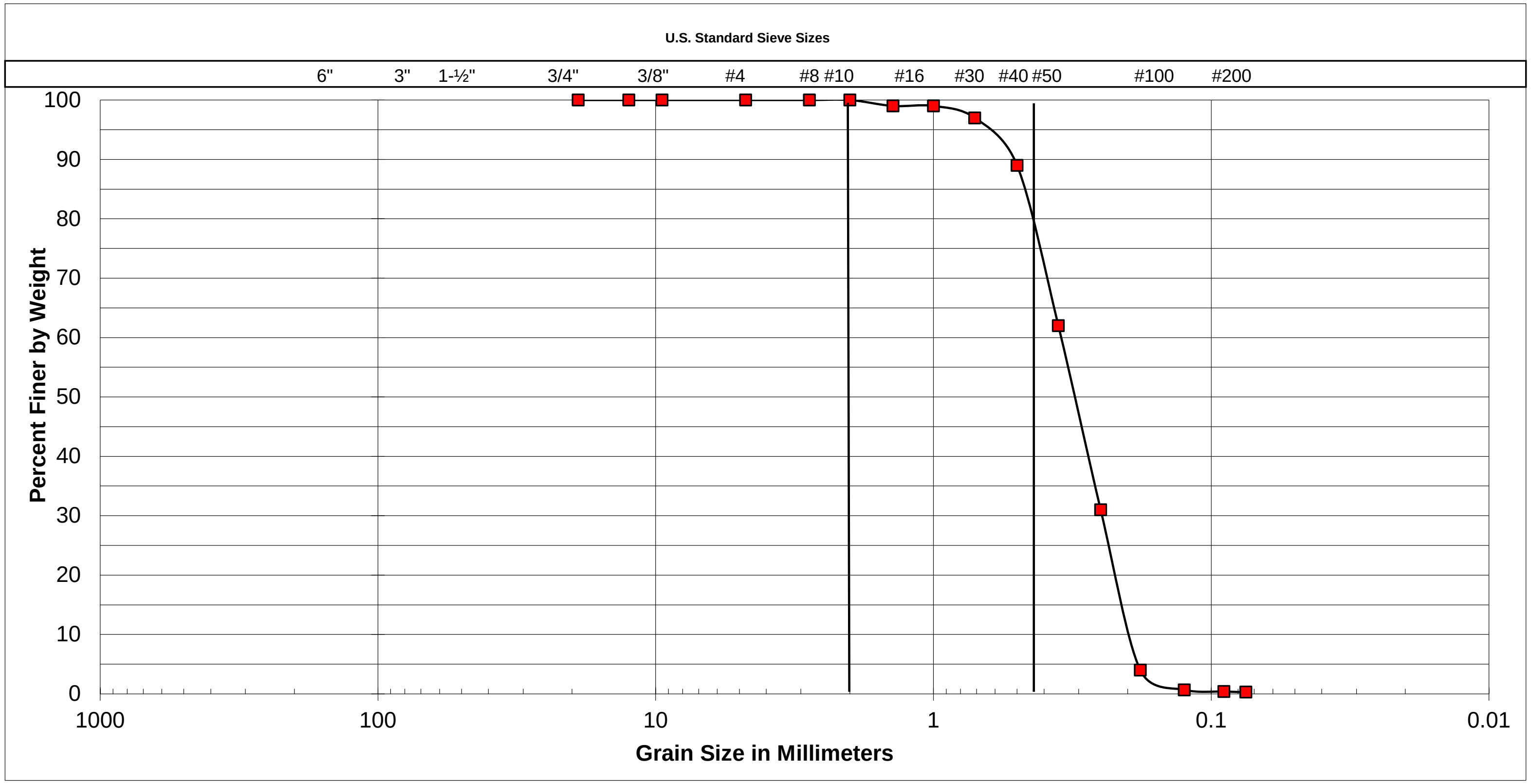
Sheet 1
Of: 1

Project Name: SAR Marsh Restorative Sediment Removal Pı Project No.: 9591
Project Location: Santa Ana River Marsh, Newport Beach, CA Phase:
Logged By: BL Date Started: 11/22/16
Reviewed By: BL Date Reviewed: 11/22/16
Drilling Contractor: None Drill Rig: NA Driller: None
Drilling Methods: Grab Sample Hammer Type: Slide Helper: BL, AH
Boring Diameter: NA Total Depth 0.5' Backfill Materia None
Ground Elevation: 10' Datum Source: ft MLLW Groundwater: None

Site Sketch

Depth (Ft)	**Soil Type** (USCS), Color; Density/Consistency, Moisture, Primary Characteristics, Minor Constituents, Other Modifiers **Rock Type,** Color; Strength, Weathering, Texture and Structure, Bedding, Discontinuities, Orientation, Modifiers			Sampler Graphic	Sample Collection Depth	Samper Type	Blows per 6 in.	Remarks (PP or TV, Well Details, etc.)
0.5	SP	Medium sand, Light-brown color, well sorted, rounded, shell fragments	VOC=0.0ppm	▨				Hand Grab
	Boring terminated at 0.5 feet							
1								
2								
3								
4								

Attachment E.
Geotechnical Laboratory Results



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-1A, 0-0.5'

SCST, Inc.

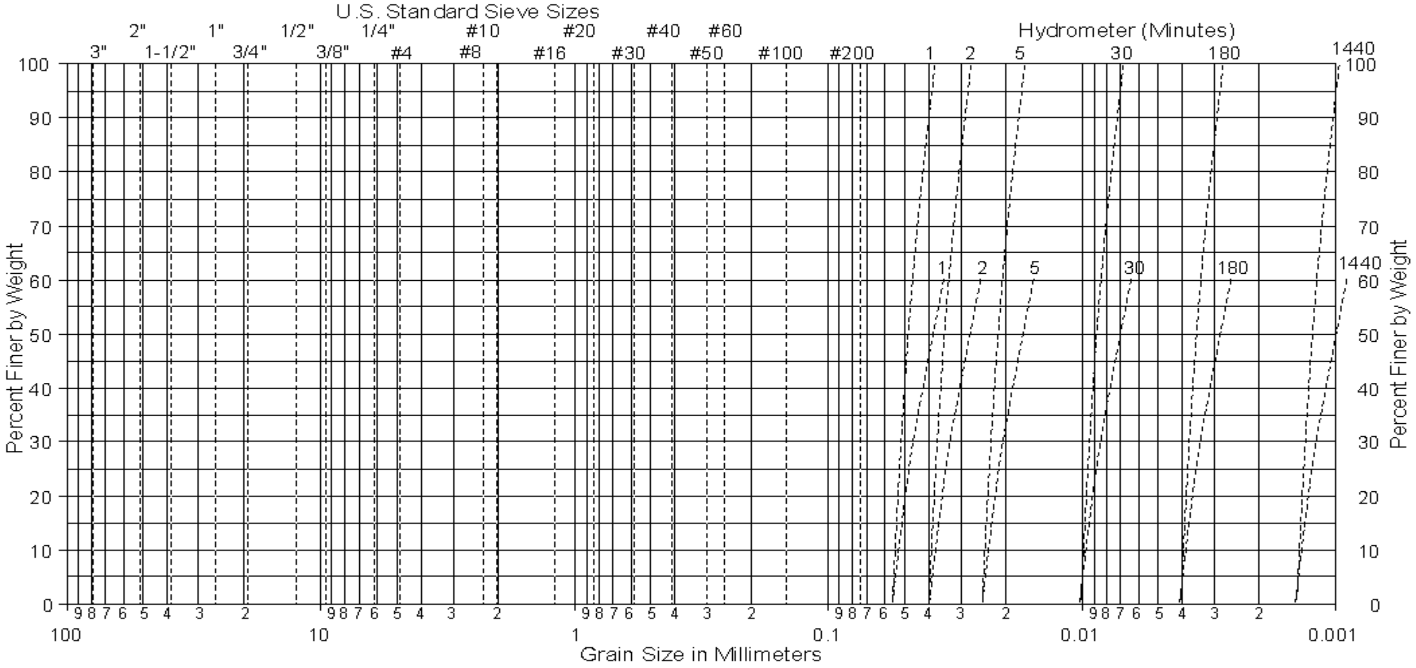
Moffatt & Nichol			
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name: Moffatt & Nichol
Job Number: GF160289L
Location: SM16-1A, 0-0.5'
Sample: 15311
By/Date: PE 12/6/2016

GRAIN SIZE DISTRIBUTION



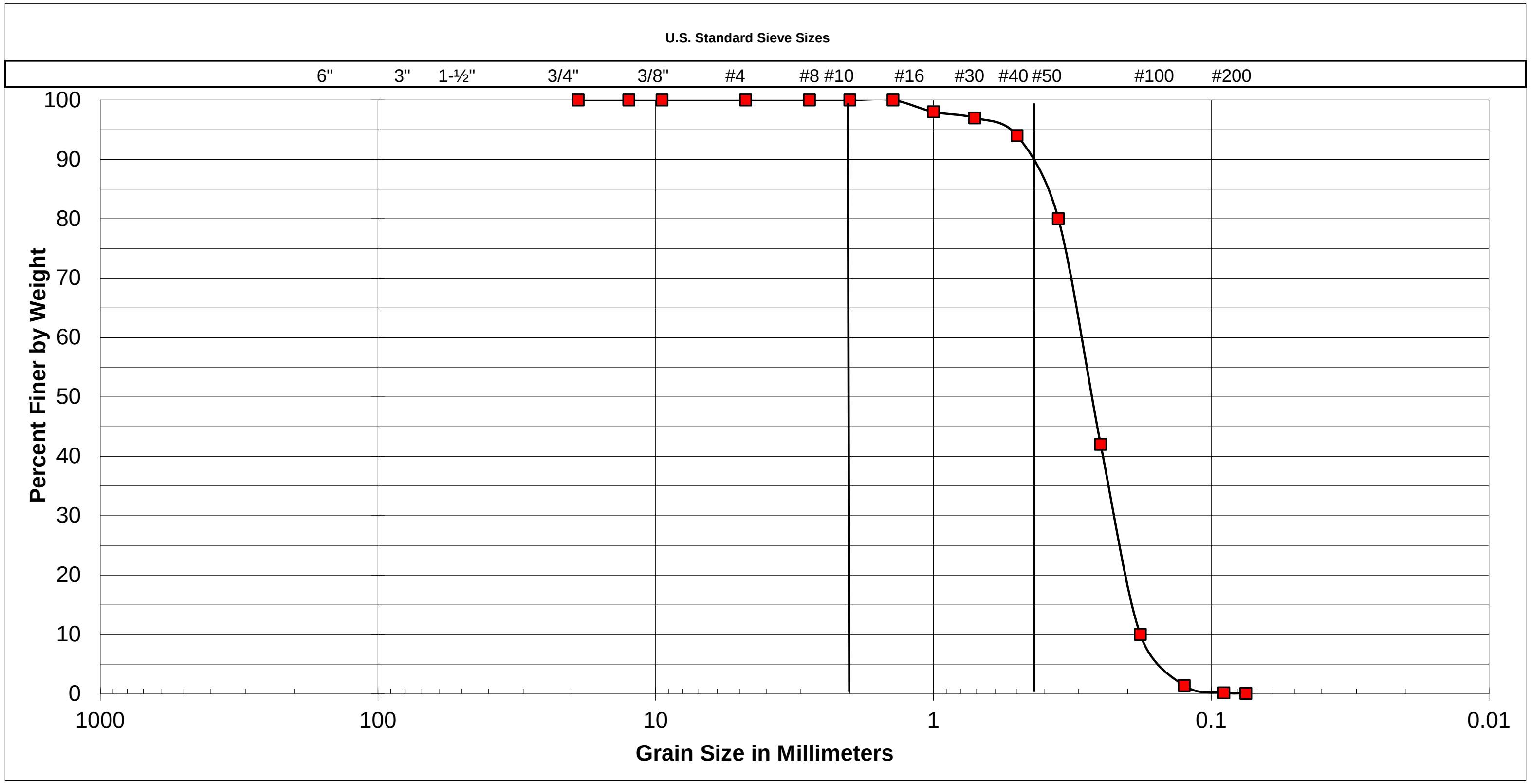
Total + #4	0.0	Total - #4 Dry	260.6	Wet Weight	316.4	-#4 Wet	316.4
Total - #4 Wet	316.4	Total Dry Wt.	260.6	Dry Weight	260.7	-#4 Dry	260.6
				% Moisture	21.4%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
19mm	3/4"	0.0	0%	100%				
12.5mm	1/2"	0.0	0%	100%				
9.5mm	3/8"	0.0	0%	100%				
4.75mm	#4	0.0	0%	100%				
2.8mm	#7	0.0	0%	100%				
2.0mm	#10	0.0	0%	100%				
1.4um	#14	2.3	1%	99%				
1.0um	#18	3.6	1%	99%				
0.71mm	#25	8.4	3%	97%				
0.50mm	#35	28.9	11%	89%				
0.355mm	#45	98.0	38%	62%				
0.250mm	#60	180.0	69%	31%				
0.180mm	#80	250.1	96%	4%				
0.125mm	#120	258.9	99.3%	0.7%				
0.090mm	#170	259.5	99.6%	0.4%				
75um	#200	259.7	99.7%	0.3%				
.05mm	.05mm							
.005mm	.005mm							
.001mm	.001mm							

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-1A, 0.5-2'

SCST, Inc.

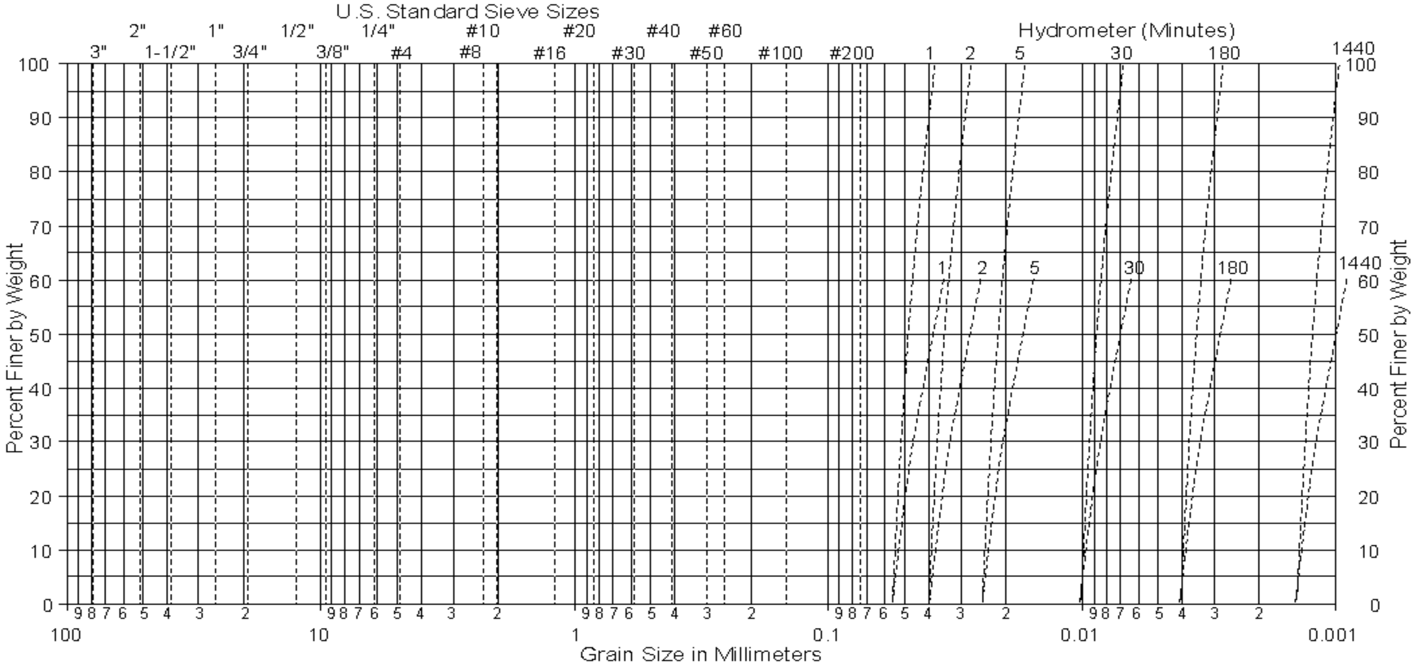
Moffatt & Nichol			
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name:	Moffatt & Nichol
Job Number:	GF160289L
Location:	SM16-1A, 0.5-2'
Sample:	15312
By/Date:	PE 12/6/2016

GRAIN SIZE DISTRIBUTION



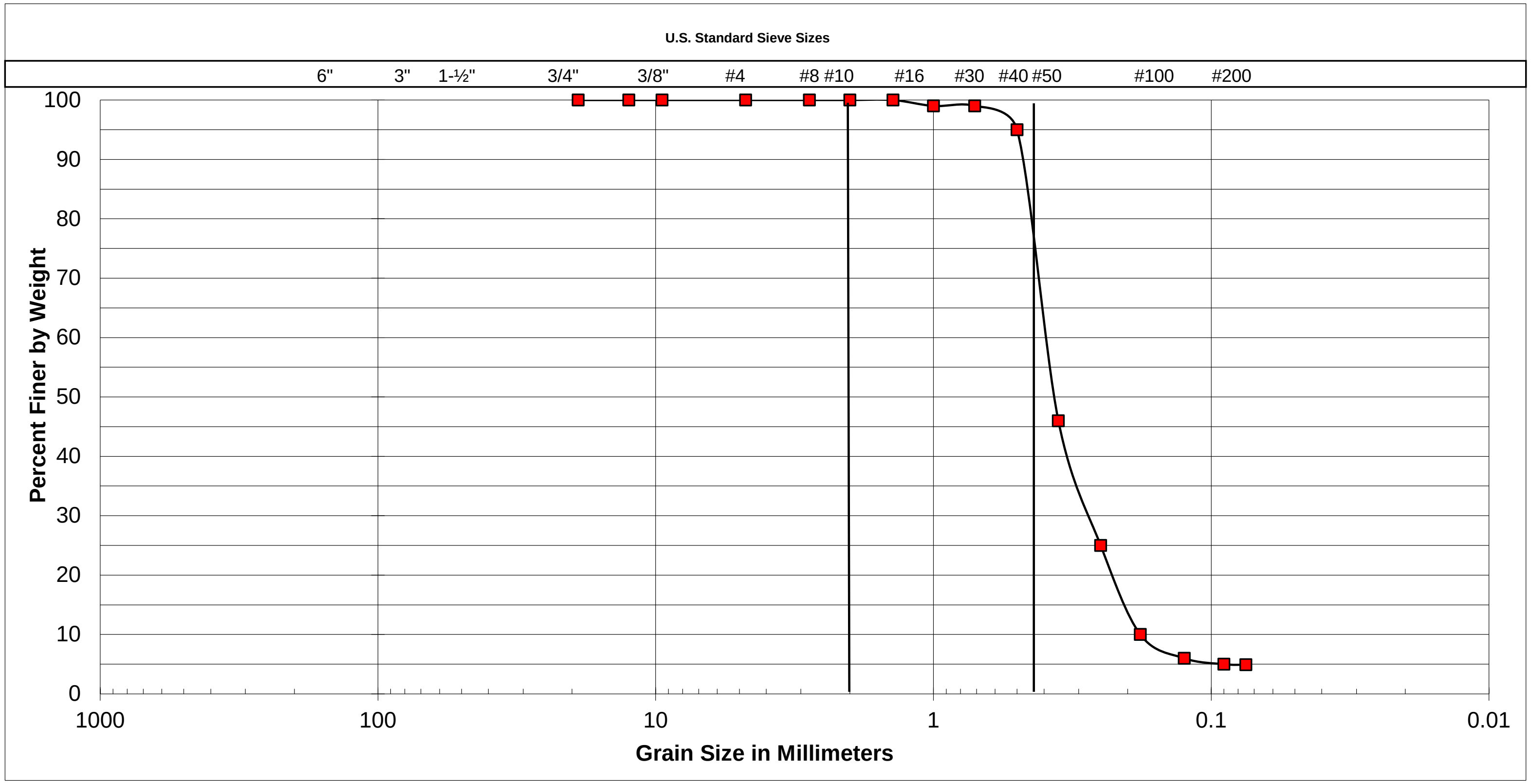
Total + #4	0.0	Total - #4 Dry	385.2	Wet Weight	474.9	-#4 Wet	474.9
Total - #4 Wet	474.9	Total Dry Wt.	385.2	Dry Weight	385.3	-#4 Dry	385.2
				% Moisture	23.3%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
19_{mm}	3/4"	0.0	0%	100%				
12.5_{mm}	$^1/_2$"	0.0	0%	100%				
9.5_{mm}	$^3/_8$"	0.0	0%	100%				
4.75_{mm}	#4	0.0	0%	100%				
2.8_{mm}	#7	0.0	0%	100%				
2.0_{mm}	#10	0.0	0%	100%				
1.4_{um}	#14	0.0	0%	100%				
1.0_{um}	#18	7.1	2%	98%				
0.71_{mm}	#25	13.2	3%	97%				
0.50_{mm}	#35	23.3	6%	94%				
0.355_{mm}	#45	76.7	20%	80%				
0.250_{mm}	#60	225.5	59%	42%				
0.180_{mm}	#80	348.7	91%	10%				
0.125_{mm}	#120	379.9	98.6%	1.4%				
0.090_{mm}	#170	384.5	99.8%	0.2%				
75_{um}	#200	384.9	99.9%	0.1%				
.05mm	.05mm							
.005mm	.005mm							
.001mm	.001mm							

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-1A, 2-3.75'

SCST, Inc.

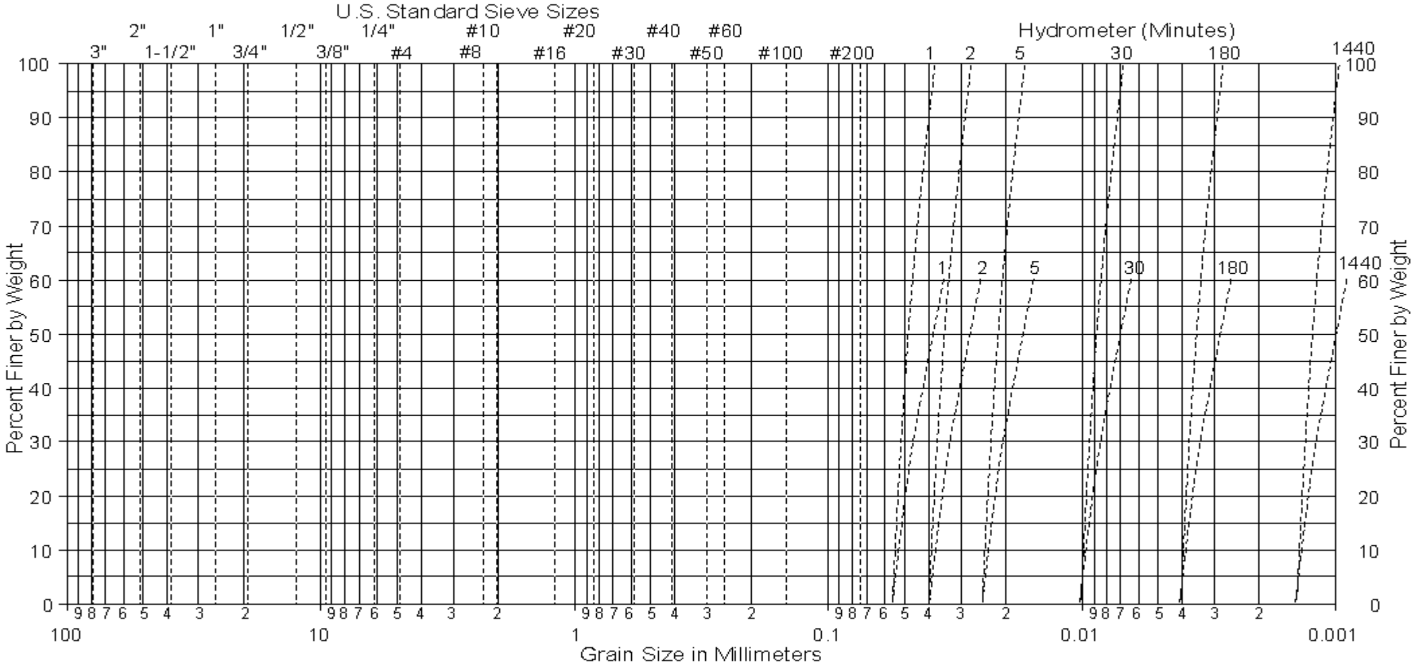
Moffatt & Nichol			
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name: Moffatt & Nichol
Job Number: GF160289L
Location: SM16-1A, 2-3.75'
Sample: 15313
By/Date: PE 12/6/2016

GRAIN SIZE DISTRIBUTION



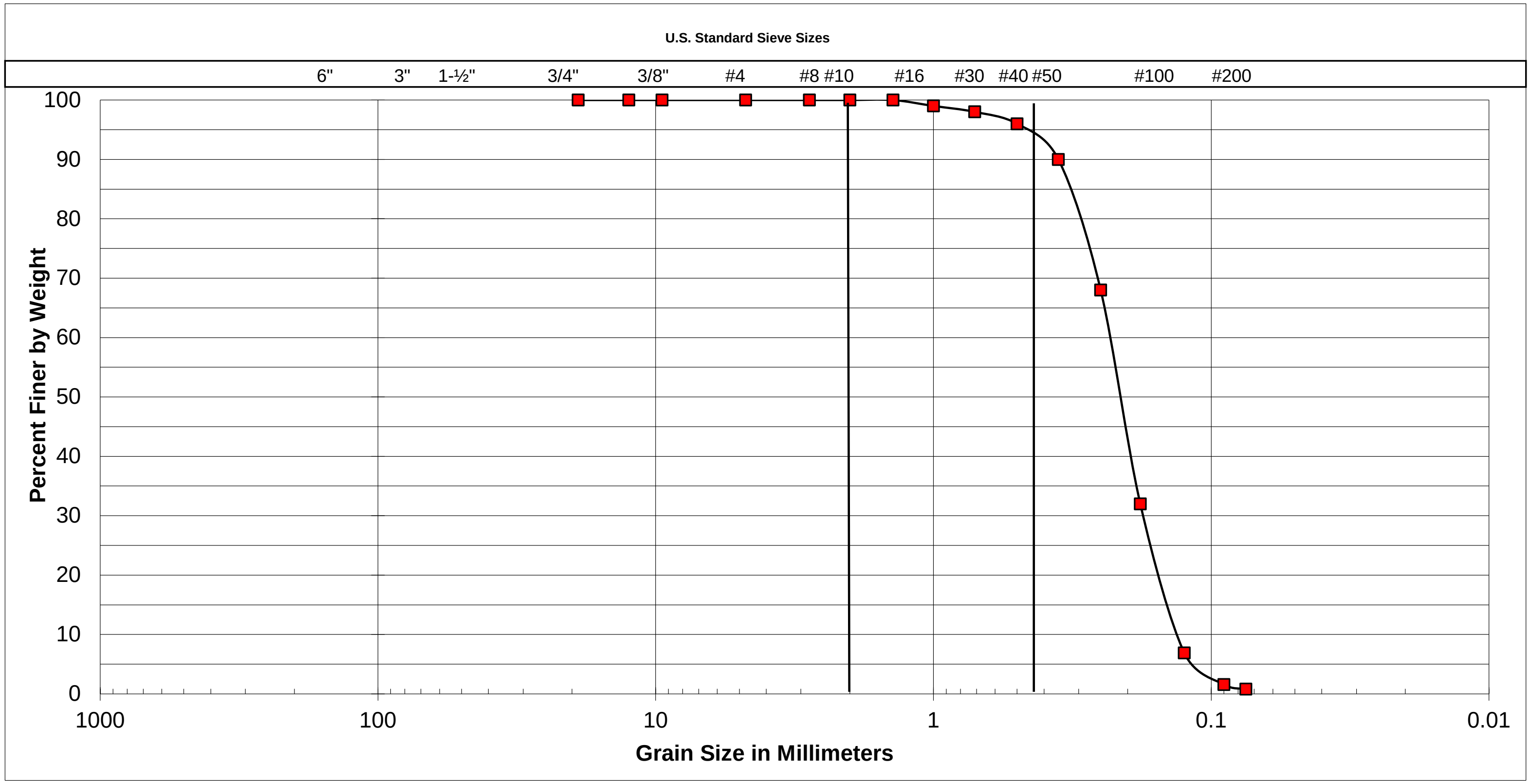
Total + #4	0.0	Total - #4 Dry	384.5	Wet Weight	474.8	-#4 Wet	474.8
Total - #4 Wet	474.8	Total Dry Wt.	384.5	Dry Weight	384.3	-#4 Dry	384.5
				% Moisture	23.5%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
19mm	3/4"	0.0	0%	100%				
12.5mm	$^{1}/_{2}$"	0.0	0%	100%				
9.5mm	$^{3}/_{8}$"	0.0	0%	100%				
4.75mm	#4	0.0	0%	100%				
2.8mm	#7	0.0	0%	100%				
2.0mm	#10	0.0	0%	100%				
1.4um	#14	1.8	0%	100%				
1.0um	#18	2.5	1%	99%				
0.71mm	#25	4.6	1%	99%				
0.50mm	#35	18.4	5%	95%				
0.355mm	#45	206.8	54%	46%				
0.250mm	#60	290.0	75%	25%				
0.180mm	#80	346.6	90%	10%				
0.125mm	#120	360.3	94%	6%				
0.090mm	#170	364.5	95%	5%				
75um	#200	365.5	95.1%	4.9%				
.05mm	.05mm							
.005mm	.005mm							
.001mm	.001mm							

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-2A, 0.5-3.8'

SCST, Inc.

Moffatt & Nichol

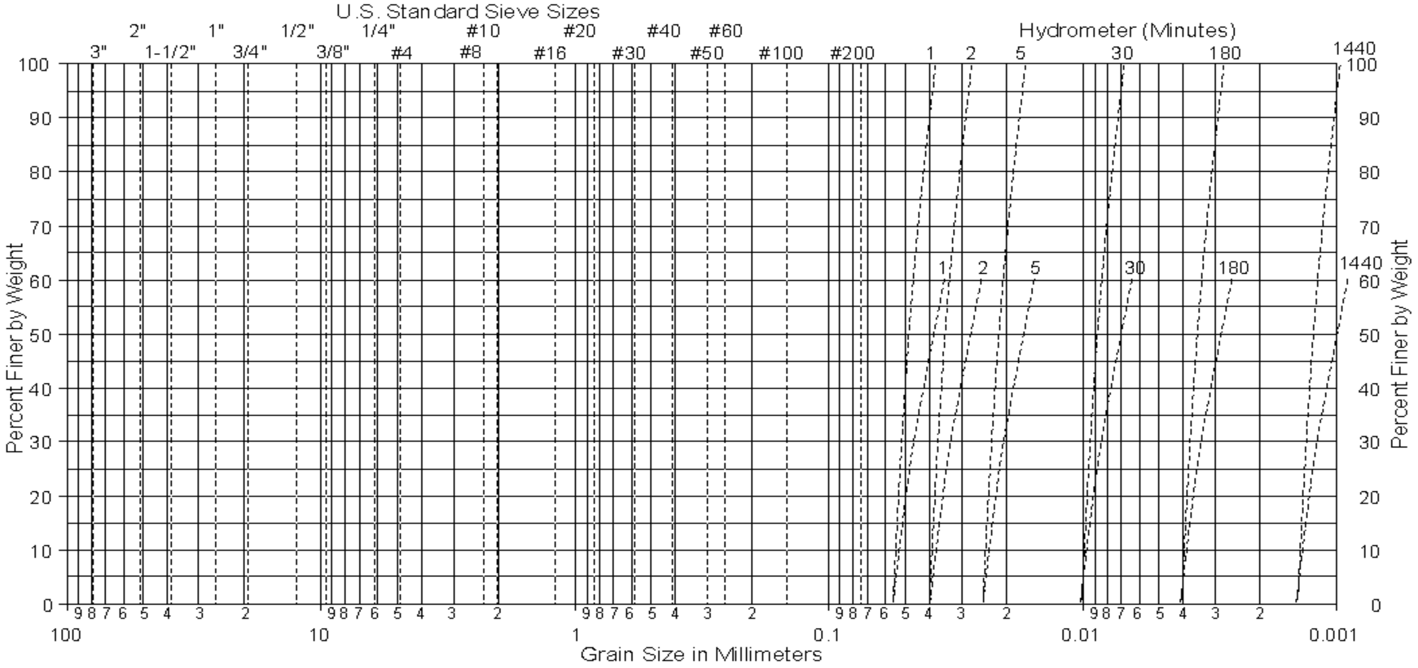
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name: Moffatt & Nichol
Job Number: GF160289L
Location: SM16-2A, 0.5-3.8'
Sample: 15315
By/Date: PE 12/6/2016

GRAIN SIZE DISTRIBUTION



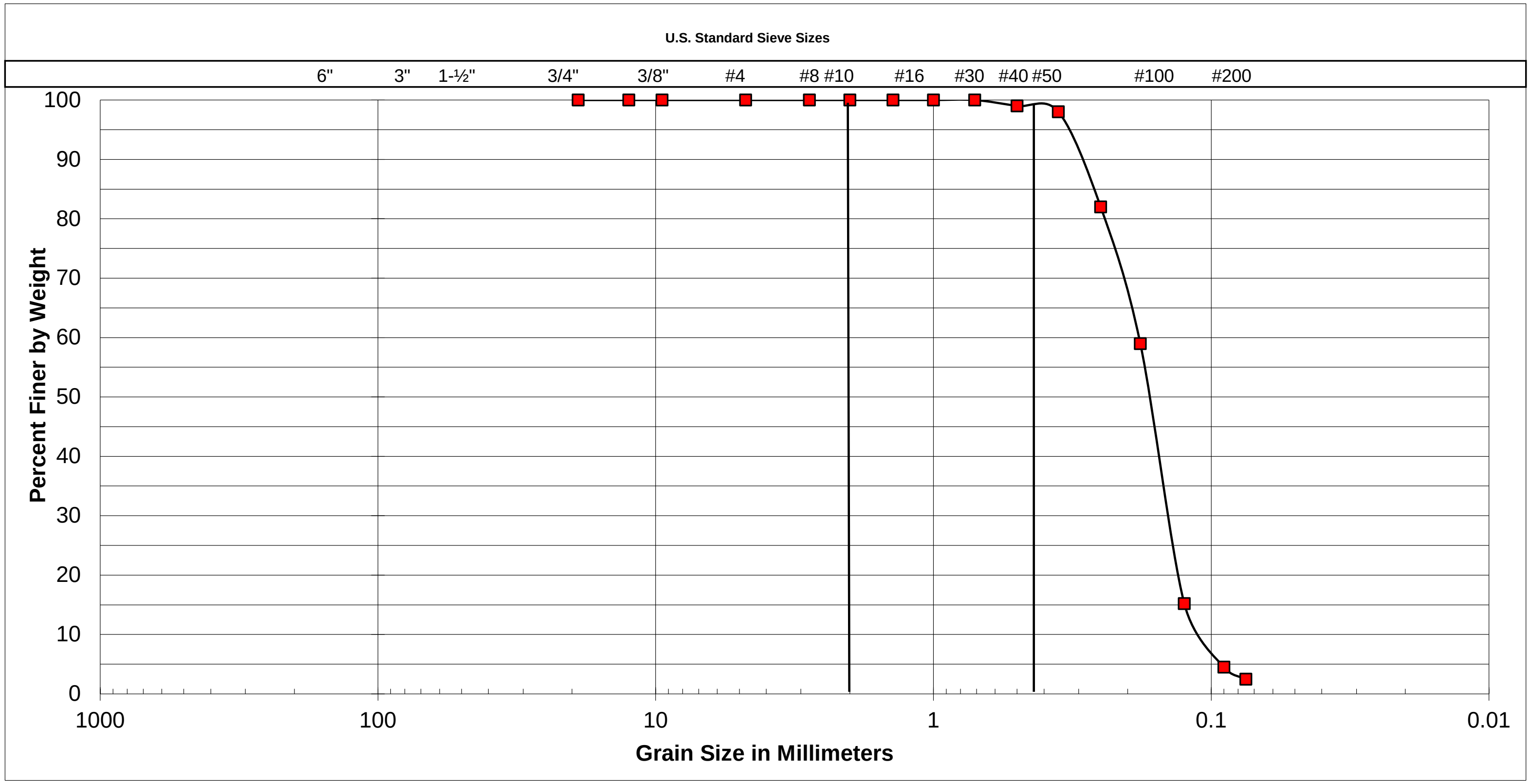
Total + #4	0.0	Total - #4 Dry	330.0	Wet Weight	411.2	-#4 Wet	411.2
Total - #4 Wet	411.2	Total Dry Wt.	330.0	Dry Weight	329.9	-#4 Dry	330.0
				% Moisture	24.6%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
19_{mm}	3/4"	0.0	0%	100%				
12.5_{mm}	$^{1}/_{2}$"	0.0	0%	100%				
9.5_{mm}	$^{3}/_{8}$"	0.0	0%	100%				
4.75_{mm}	#4	0.0	0%	100%				
2.8_{mm}	#7	0.0	0%	100%				
2.0_{mm}	#10	0.0	0%	100%				
1.4_{um}	#14	1.3	0%	100%				
1.0_{um}	#18	2.3	1%	99%				
0.71_{mm}	#25	5.9	2%	98%				
0.50_{mm}	#35	11.6	4%	96%				
0.355_{mm}	#45	32.8	10%	90%				
0.250_{mm}	#60	105.5	32%	68%				
0.180_{mm}	#80	223.3	68%	32%				
0.125_{mm}	#120	307.1	93%	7%				
0.090_{mm}	#170	324.8	98%	2%				
75_{um}	#200	327.2	99.2%	0.8%				
.05mm	.05mm							
.005mm	.005mm							
.001mm	.001mm							

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-3A, 0.5-3.5'

SCST, Inc.

Moffatt & Nichol

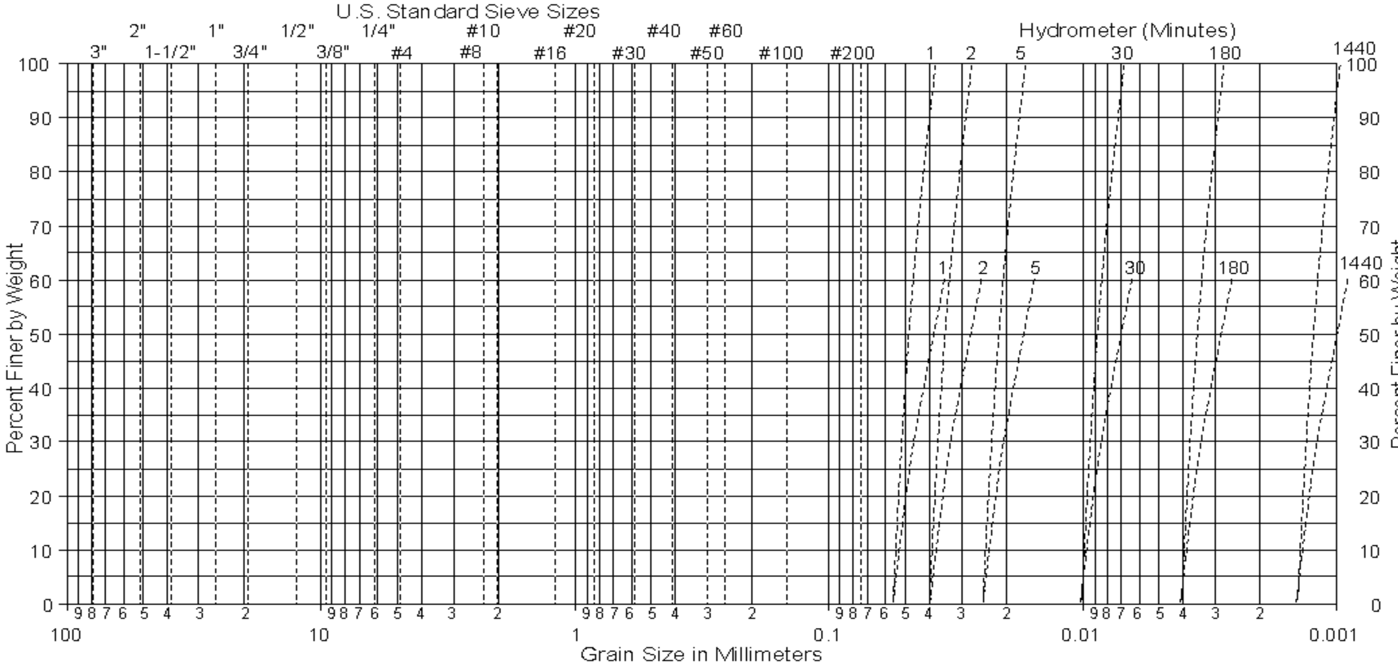
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name: Moffatt & Nichol
Job Number: GF160289L
Location: SM16-3A, 0.5-3.5'
Sample: 15317
By/Date: PE 12/6/2016

GRAIN SIZE DISTRIBUTION



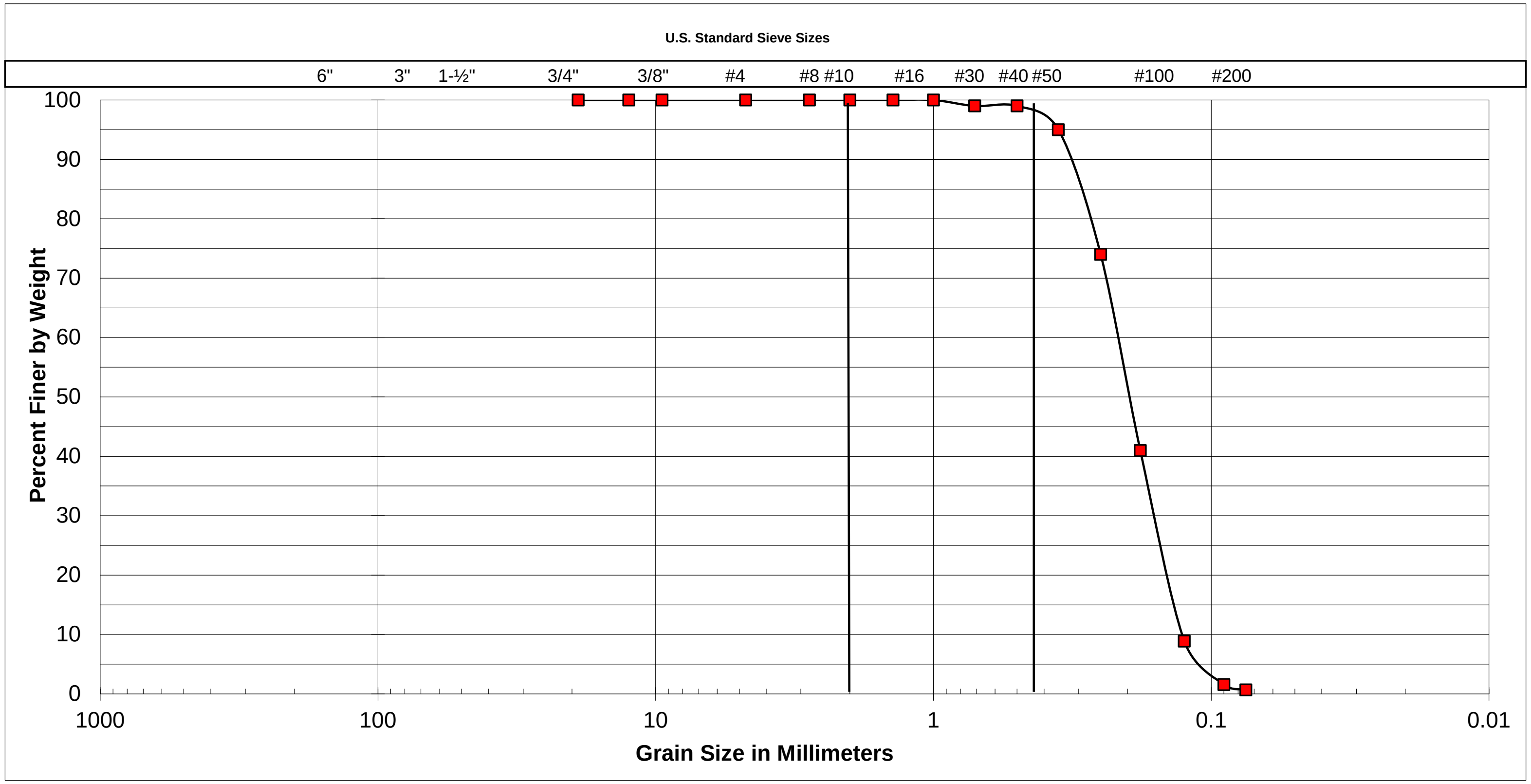
Total + #4	0.0	Total - #4 Dry	352.6	Wet Weight	452	-#4 Wet	452
Total - #4 Wet	452.0	Total Dry Wt.	352.6	Dry Weight	352.6	-#4 Dry	352.6
				% Moisture	28.2%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
19mm	3/4"	0.0	0%	100%				
12.5mm	1/2"	0.0	0%	100%				
9.5mm	3/8"	0.0	0%	100%				
4.75mm	#4	0.0	0%	100%				
2.8mm	#7	0.0	0%	100%				
2.0mm	#10	0.0	0%	100%				
1.4um	#14	0.0	0%	100%				
1.0um	#18	0.0	0%	100%				
0.71mm	#25	1.4	0%	100%				
0.50mm	#35	4.1	1%	99%				
0.355mm	#45	7.5	2%	98%				
0.250mm	#60	62.2	18%	82%				
0.180mm	#80	146.4	42%	59%				
0.125mm	#120	298.9	85%	15%				
0.090mm	#170	336.9	96%	5%				
75um	#200	343.7	97.5%	2.5%				
.05mm	.05mm							
.005mm	.005mm							
.001mm	.001mm							

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-B, 0-0.5'

SCST, Inc.

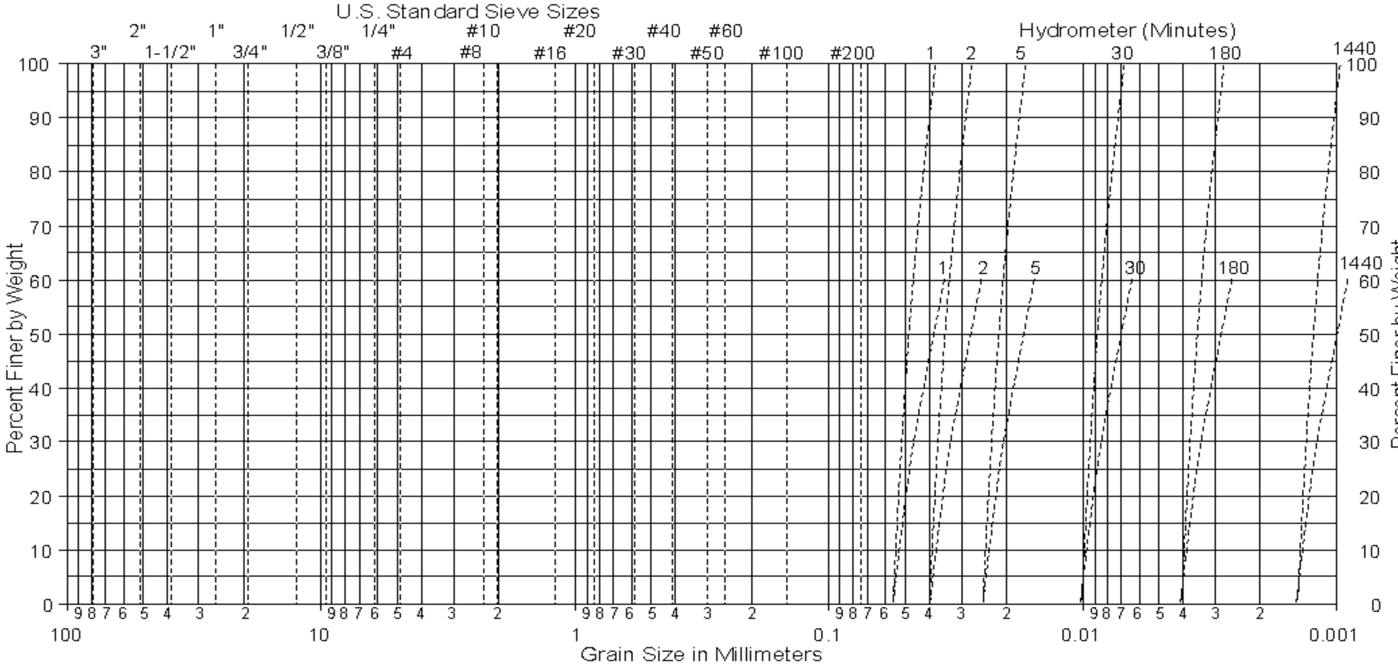
Moffatt & Nichol			
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name:	Moffatt & Nichol
Job Number:	GF160289L
Location:	SM16-B, 0-0.5'
Sample:	15318
By/Date:	PE 12/6/2016

GRAIN SIZE DISTRIBUTION



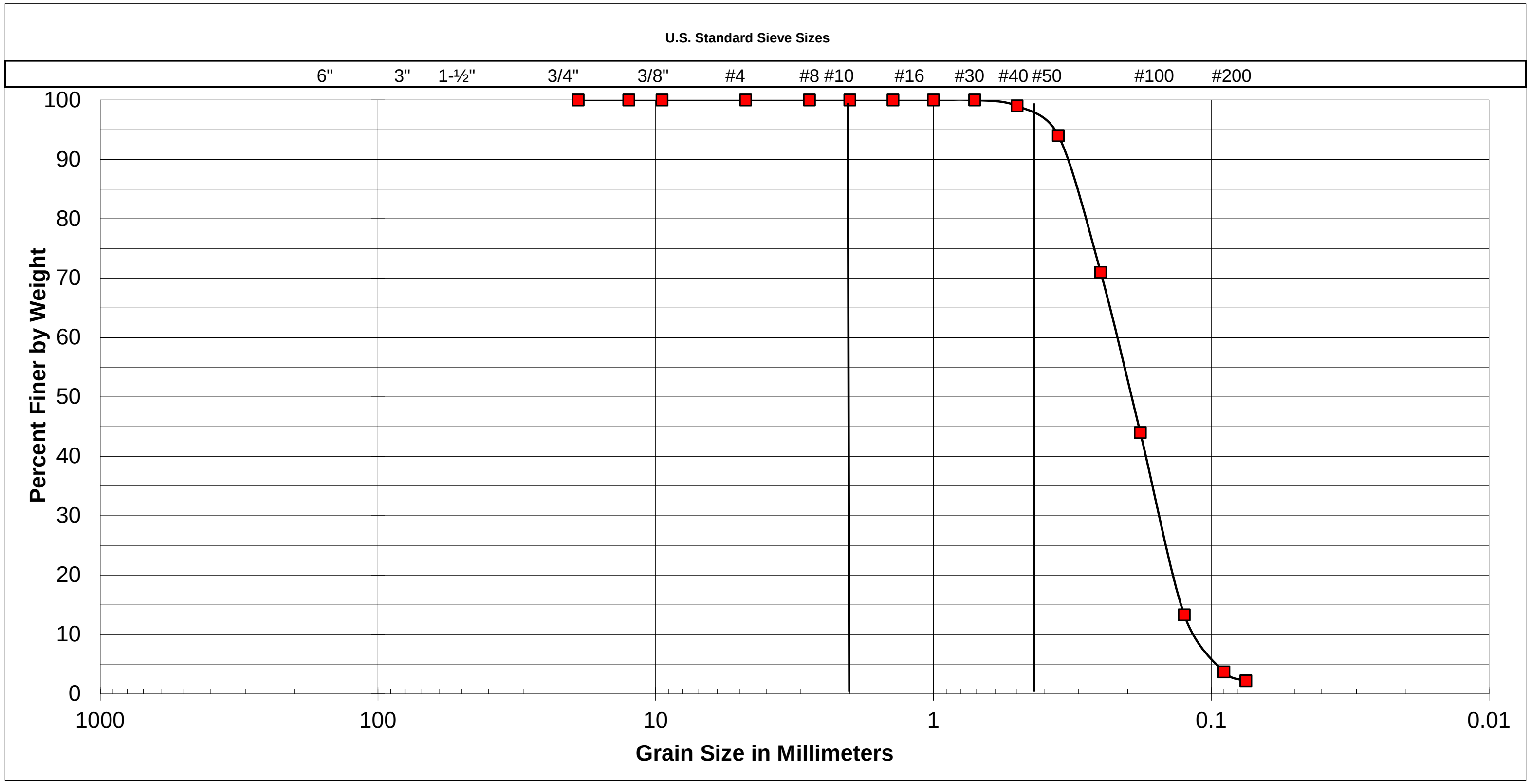
Total + #4	0.0	Total - #4 Dry	388.1	Wet Weight	490.6	-#4 Wet	490.6
Total - #4 Wet	490.6	Total Dry Wt.	388.1	Dry Weight	388.1	-#4 Dry	388.1
				% Moisture	26.4%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	**% Ret.**	**% Pass**	**Wt. Ret.**	**% Ret**	**% Pass**	**Specs**
19_{mm}	**3/4"**	0.0	0%	100%				
12.5_{mm}	**$^{1}/_{2}$"**	0.0	0%	100%				
9.5_{mm}	**$^{3}/_{8}$"**	0.0	0%	100%				
4.75_{mm}	**#4**	0.0	0%	100%				
2.8_{mm}	**#7**	0.0	0%	100%				
2.0_{mm}	**#10**	0.0	0%	100%				
1.4_{um}	**#14**	0.0	0%	100%				
1.0_{um}	**#18**	0.9	0%	100%				
0.71_{mm}	**#25**	2.4	1%	99%				
0.50_{mm}	**#35**	5.6	1%	99%				
0.355_{mm}	**#45**	18.3	5%	95%				
0.250_{mm}	**#60**	100.1	26%	74%				
0.180_{mm}	**#80**	228.1	59%	41%				
0.125_{mm}	**#120**	353.6	91%	9%				
0.090_{mm}	**#170**	381.7	98%	2%				
75_{um}	**#200**	385.5	99.3%	0.7%				
.05mm	**.05mm**							
.005mm	**.005mm**							
.001mm	**.001mm**							

Hydrometer Number

Date	**Lapse**	**Time**	**Read**	**Correction**	**x2 (Y or N)**	**Actual**
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-B, 0.5-2.5'

SCST, Inc.

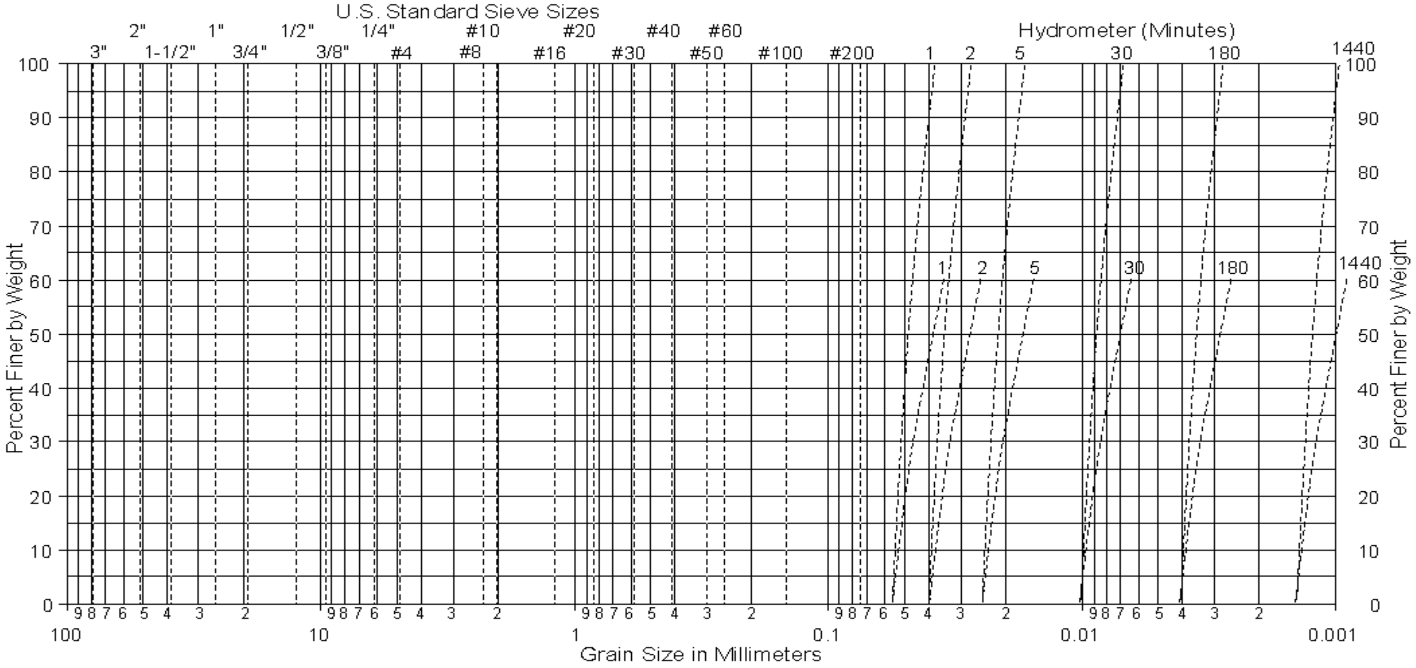
Moffatt & Nichol			
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name:	Moffatt & Nichol
Job Number:	GF160289L
Location:	SM16-B, 0.5-2.5'
Sample:	15319
By/Date:	PE 12/6/2016

GRAIN SIZE DISTRIBUTION



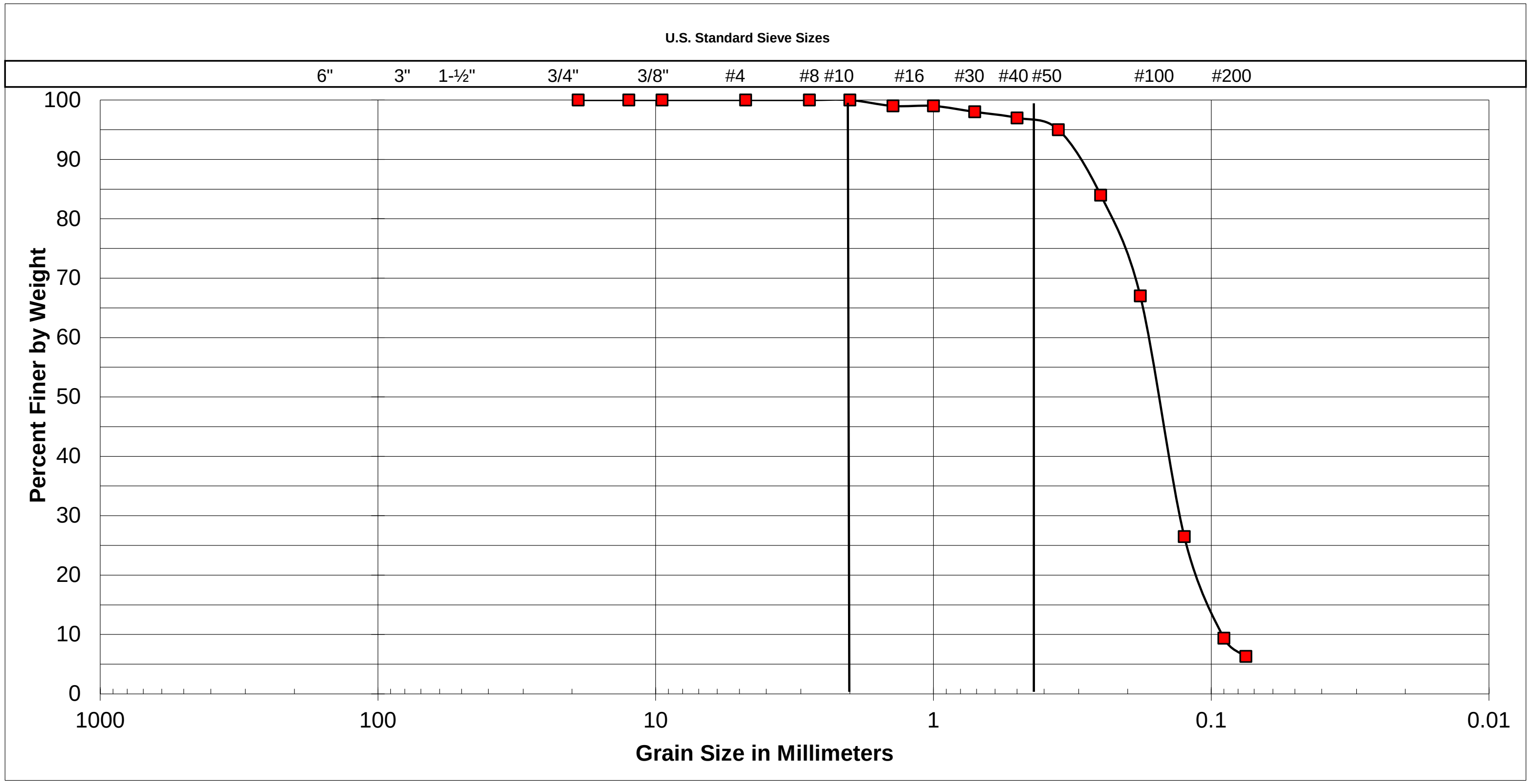
Total + #4	0.0	Total - #4 Dry	353.2	Wet Weight	445	-#4 Wet	445
Total - #4 Wet	445.0	Total Dry Wt.	353.2	Dry Weight	353.3	-#4 Dry	353.2
				% Moisture	26.0%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
19$_{mm}$	3/4"	0.0	0%	100%				
12.5$_{mm}$	$^{1}/_{2}$"	0.0	0%	100%				
9.5$_{mm}$	$^{3}/_{8}$"	0.0	0%	100%				
4.75$_{mm}$	#4	0.0	0%	100%				
2.8$_{mm}$	#7	0.0	0%	100%				
2.0$_{mm}$	#10	0.0	0%	100%				
1.4$_{um}$	#14	0.0	0%	100%				
1.0$_{um}$	#18	0.0	0%	100%				
0.71$_{mm}$	#25	0.0	0%	100%				
0.50$_{mm}$	#35	3.3	1%	99%				
0.355$_{mm}$	#45	20.0	6%	94%				
0.250$_{mm}$	#60	102.5	29%	71%				
0.180$_{mm}$	#80	196.8	56%	44%				
0.125$_{mm}$	#120	306.1	87%	13%				
0.090$_{mm}$	#170	340.0	96%	4%				
75$_{um}$	#200	345.6	97.8%	2.2%				
.05mm	.05mm							
.005mm	.005mm							
.001mm	.001mm							

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-B, 2.5-5'

SCST, Inc.

Moffatt & Nichol

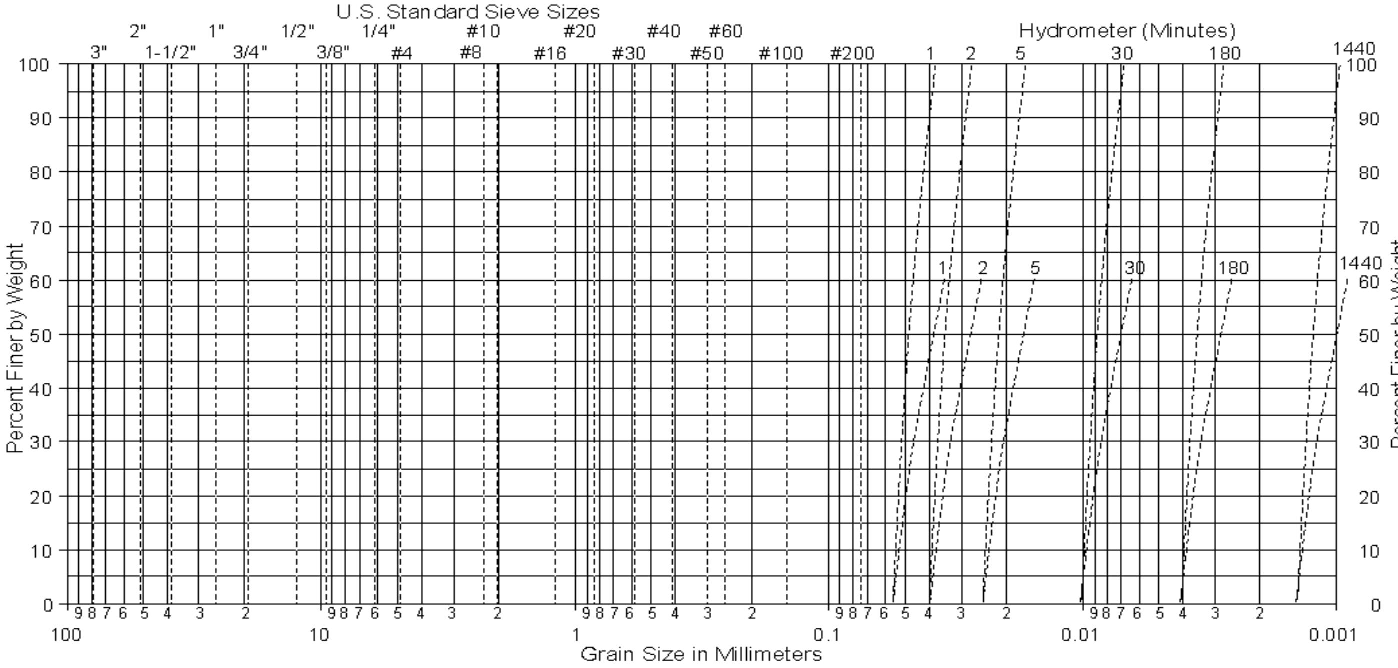
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name: Moffatt & Nichol
Job Number: GF160289L
Location: SM16-B, 2.5-5'
Sample: 15320
By/Date: PE 12/6/2016

GRAIN SIZE DISTRIBUTION



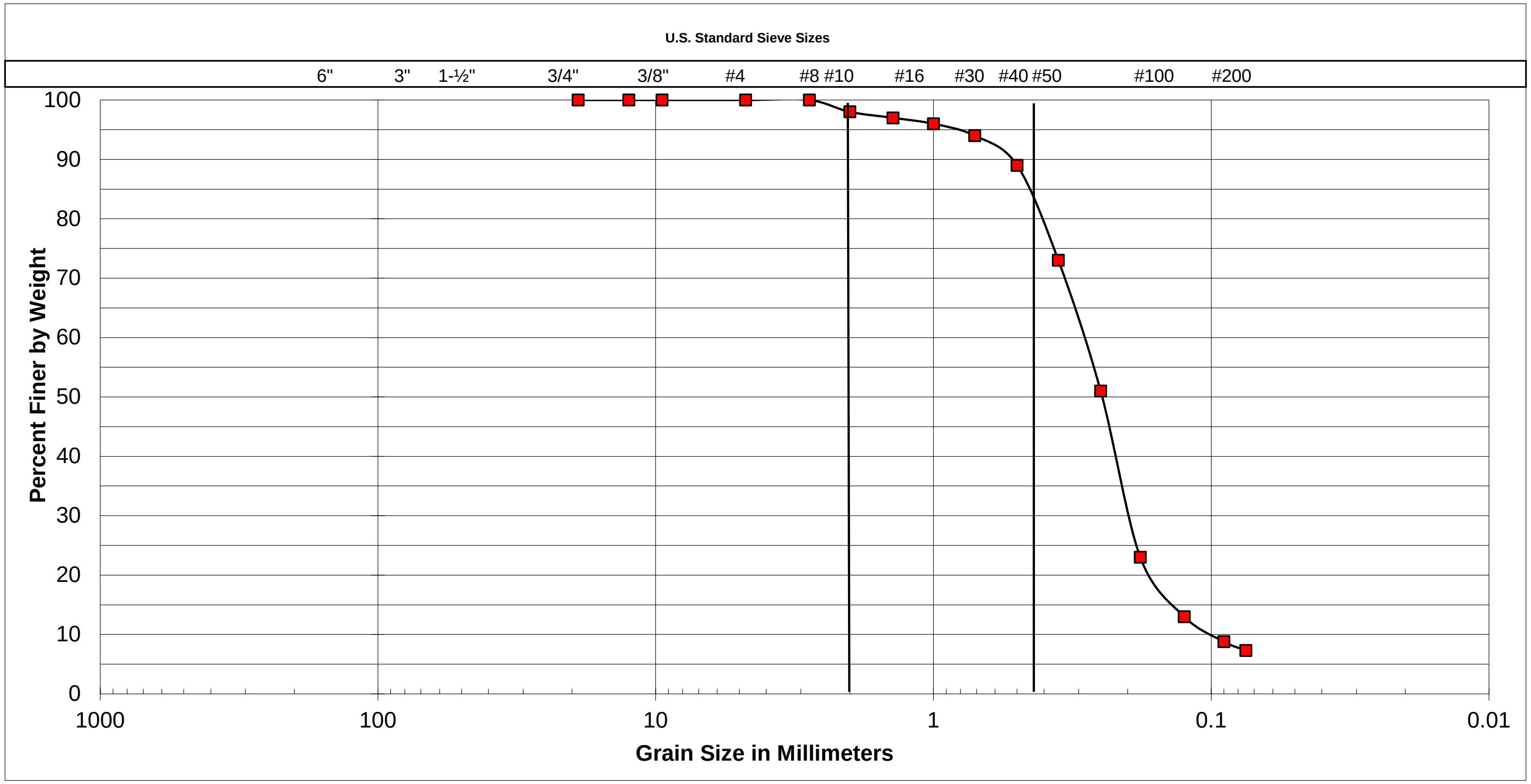
Total + #4	0.0	Total - #4 Dry	354.9	Wet Weight	447.9	-#4 Wet	447.9
Total - #4 Wet	447.9	Total Dry Wt.	354.9	Dry Weight	355	-#4 Dry	354.9
				% Moisture	26.2%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
19$_{mm}$	3/4"	0.0	0%	100%				
12.5$_{mm}$	$^{1}/_{2}$"	0.0	0%	100%				
9.5$_{mm}$	$^{3}/_{8}$"	0.0	0%	100%				
4.75$_{mm}$	#4	0.0	0%	100%				
2.8$_{mm}$	#7	0.0	0%	100%				
2.0$_{mm}$	#10	0.0	0%	100%				
1.4$_{um}$	#14	4.7	1%	99%				
1.0$_{um}$	#18	5.2	1%	99%				
0.71$_{mm}$	#25	6.6	2%	98%				
0.50$_{mm}$	#35	9.8	3%	97%				
0.355$_{mm}$	#45	18.3	5%	95%				
0.250$_{mm}$	#60	55.8	16%	84%				
0.180$_{mm}$	#80	118.3	33%	67%				
0.125$_{mm}$	#120	260.9	74%	27%				
0.090$_{mm}$	#170	321.5	91%	9%				
75$_{um}$	#200	332.6	93.7%	6.3%				
.05mm	.05mm							
.005mm	.005mm							
.001mm	.001mm							

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
LTI-Comp

SCST, Inc.

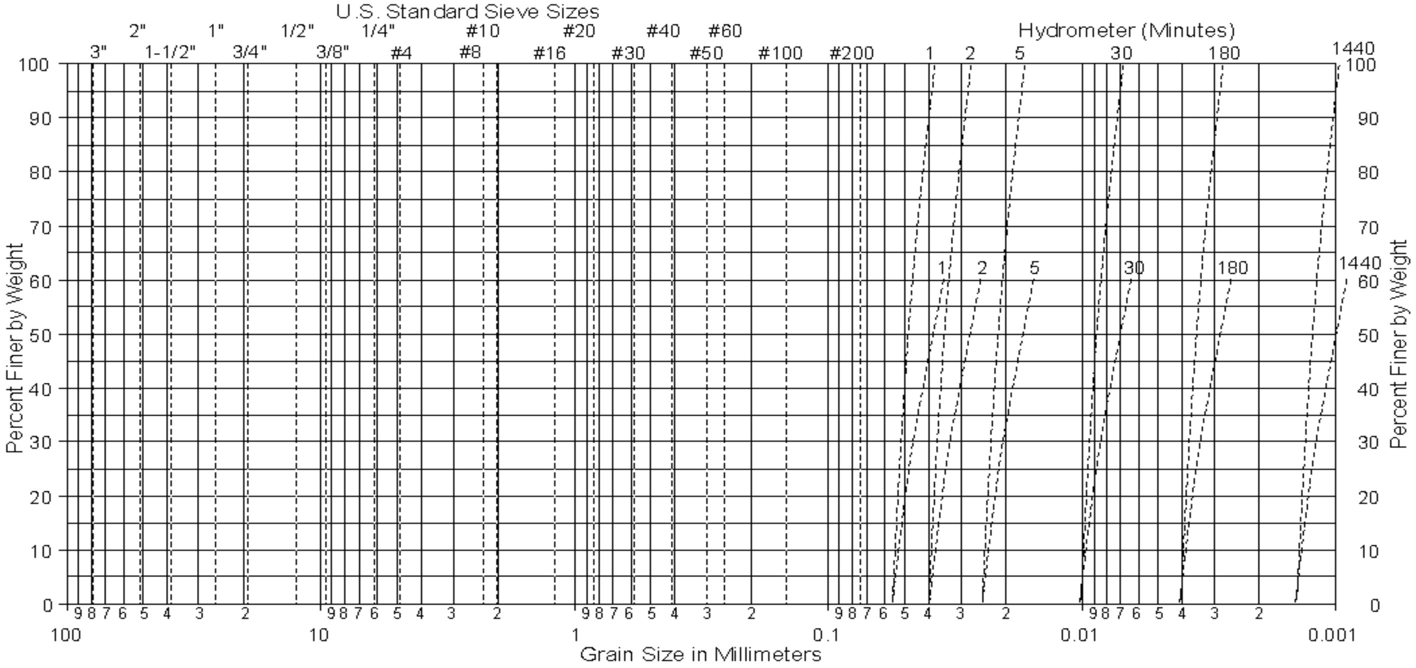
Moffatt & Nichol			
By:	DH	Date:	December, 2016
Job Number:	GF160289L	Figure:	

SCST, Inc.

6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name:	Moffatt & Nichol
Job Number:	GF160289L
Location:	LTI-Comp
Sample:	15321
By/Date:	PE 12/6/2016

GRAIN SIZE DISTRIBUTION



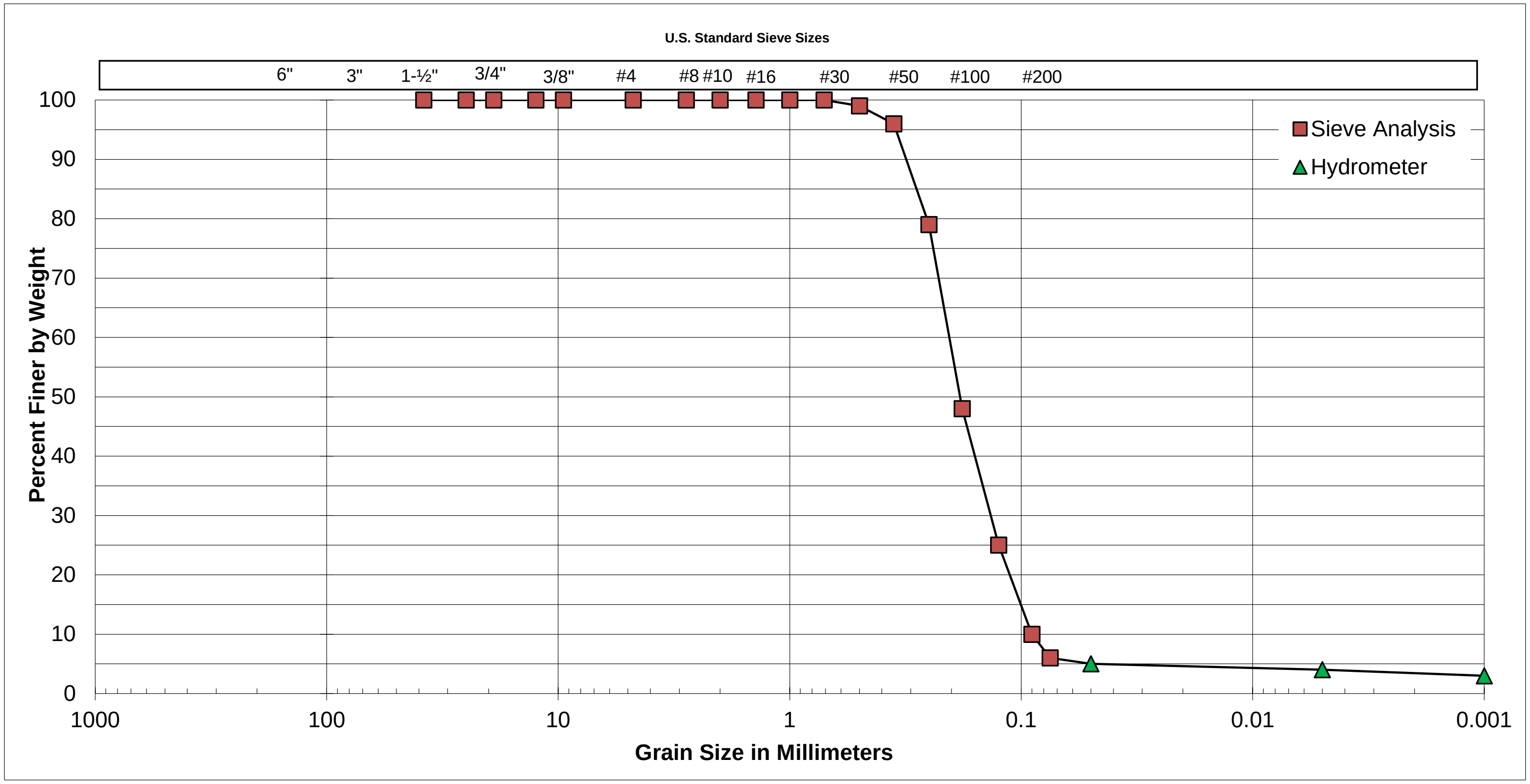
Total + #4	0.0	Total - #4 Dry	482.2	Wet Weight	518.4	-#4 Wet	518.4
Total - #4 Wet	518.4	Total Dry Wt.	482.2	Dry Weight	482.3	-#4 Dry	482.2
				% Moisture	7.5%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	**% Ret.**	**% Pass**	**Wt. Ret.**	**% Ret**	**% Pass**	**Specs**
19mm	**3/4"**	0.0	0%	100%				
12.5mm	**1/2"**	0.0	0%	100%				
9.5mm	**3/8"**	0.0	0%	100%				
4.75mm	**#4**	0.0	0%	100%				
2.8mm	**#7**	0.0	0%	100%				
2.0mm	**#10**	8.1	2%	98%				
1.4um	**#14**	15.6	3%	97%				
1.0um	**#18**	19.4	4%	96%				
0.71mm	**#25**	28.6	6%	94%				
0.50mm	**#35**	54.5	11%	89%				
0.355mm	**#45**	132.3	27%	73%				
0.250mm	**#60**	235.9	49%	51%				
0.180mm	**#80**	373.0	77%	23%				
0.125mm	**#120**	419.6	87%	13%				
0.090mm	**#170**	440.0	91%	9%				
75um	**#200**	447.0	92.7%	7.3%				
.05mm	**.05mm**							
.005mm	**.005mm**							
.001mm	**.001mm**							

Hydrometer Number

Date	**Lapse**	**Time**	**Read**	**Correction**	**x2 (Y or N)**	**Actual**
		1 Minute				0
		2 Minute				0
		30 Minute				0
		24 Hours				0



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-2A, 0-0.5'

UNIFIED SOIL CLASSIFICATION:	
DESCRIPTION	Light Gray Sand

ATTERBERG LIMITS	
LIQUID LIMIT	NA
PLASTIC LIMIT	NP
PLASTICITY INDEX	NP

SCST, Inc.

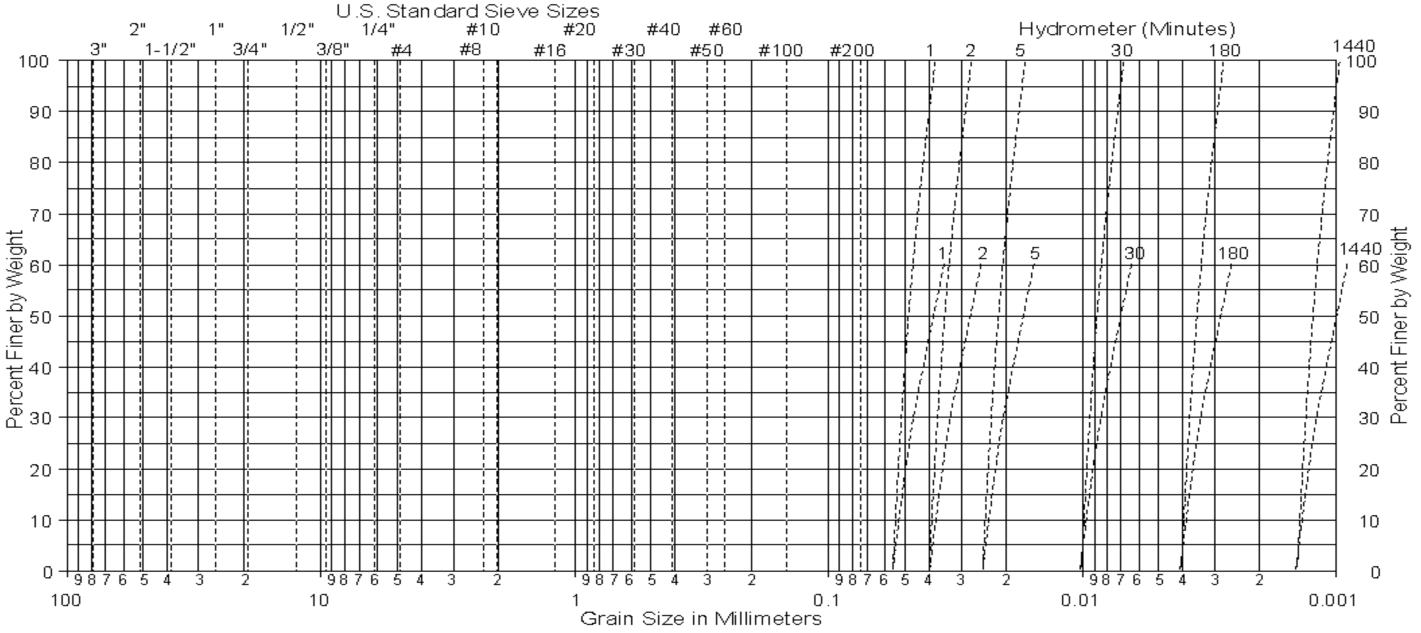
Moffatt & Nichol

By:	DRB	Date:	12/7/16
Job Number:	GF160289L		

SCST, Inc.
6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name: Moffatt & Nichol
Job Number: GF160289L
Location: SM16-2A, 0-0.5'
Sample: 15314
By/Date: DRB 12-7-16

GRAIN SIZE DISTRIBUTION



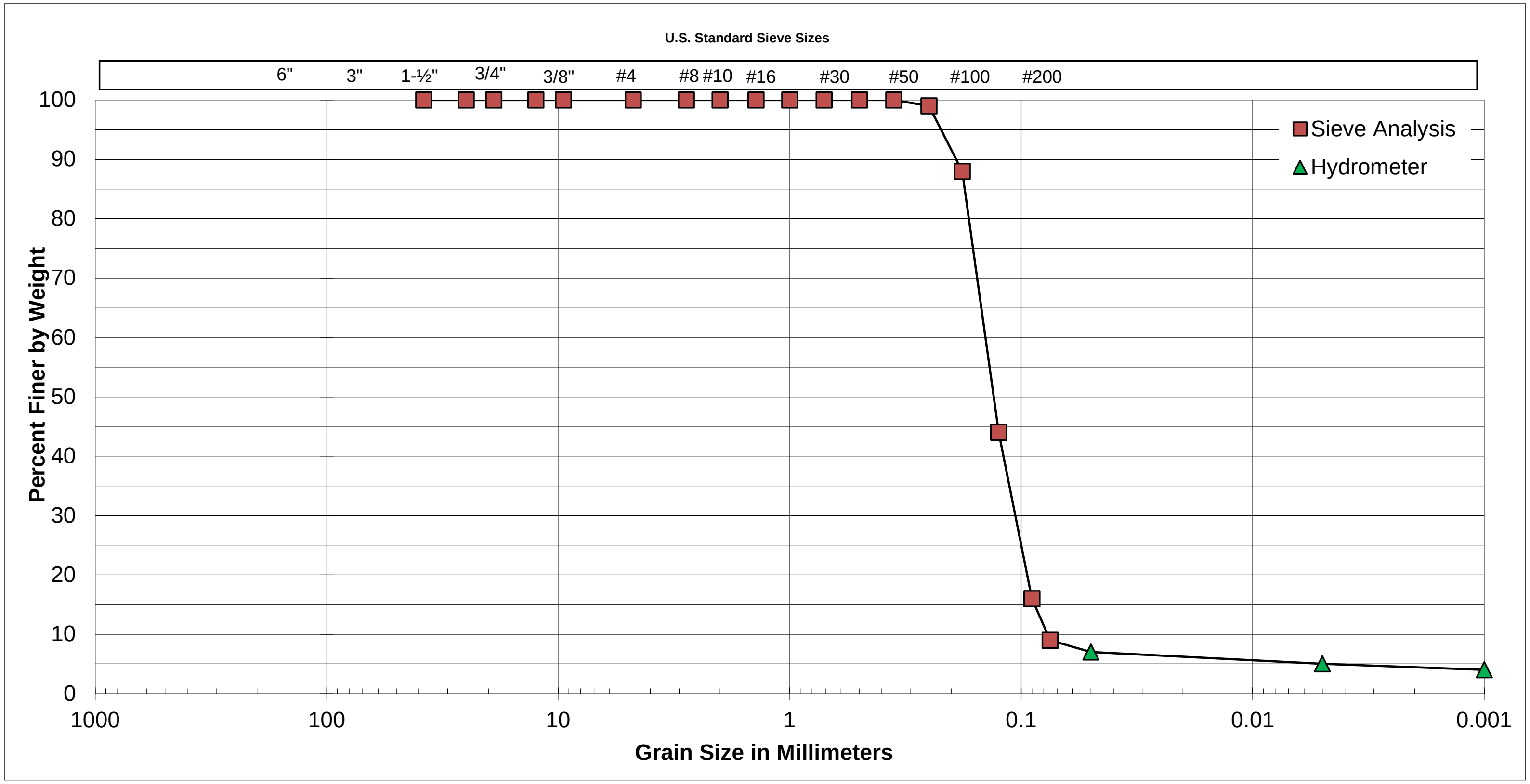
Total + #10	0.0	Total - #10 Dry	100.0	Wet Weight	100	-#10 Wet	100
Total - #10 Wet	100.0	Total Dry Wt.	100.0	Dry Weight	100	-#10 Dry	100.0
				% Moisture	0.0%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
38$_{mm}$	1½"	0.0	0%	100%				
25$_{mm}$	1"	0.0	0%	100%				
19$_{mm}$	3/4"	0.0	0%	100%				
12.5$_{mm}$	$^1/_2$"	0.0	0%	100%				
9.5$_{mm}$	$^3/_8$"	0.0	0%	100%				
4.75$_{mm}$	#4	0.0	0%	100%				
2.8$_{mm}$	#7	0.0	0%	100%				
2.0$_{mm}$	#10	0.0	0%	100%				
1.4$_{um}$	#14	0.0	0%	100%				
1.0$_{um}$	#18	0.0	0%	100%				
0.71$_{mm}$	#25	0.0	0%	100%				
0.50$_{mm}$	#35	0.5	1%	99%				
0.355$_{mm}$	#45	3.9	4%	96%				
0.250$_{mm}$	#60	20.8	21%	79%				
0.180$_{mm}$	#80	51.8	52%	48%				
0.125$_{mm}$	#120	75.3	75%	25%				
0.090$_{mm}$	#170	90.2	90%	10%				
75$_{um}$	#200	94.1	94%	6%				
.05mm	.05mm			5%				
.005mm	.005mm			4%				
.001mm	.001mm			3%				

Hydrometer Number

Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute	24	18	N	6
		2 Minute	23	18	N	5
		30 Minute	22	18	N	4
		24 Hours	22	18	N	4



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
SM16-3A, 0-0.5'

UNIFIED SOIL CLASSIFICATION:	
DESCRIPTION	Light Gray Sand

ATTERBERG LIMITS	
LIQUID LIMIT	NA
PLASTIC LIMIT	NP
PLASTICITY INDEX	NP

SCST, Inc.

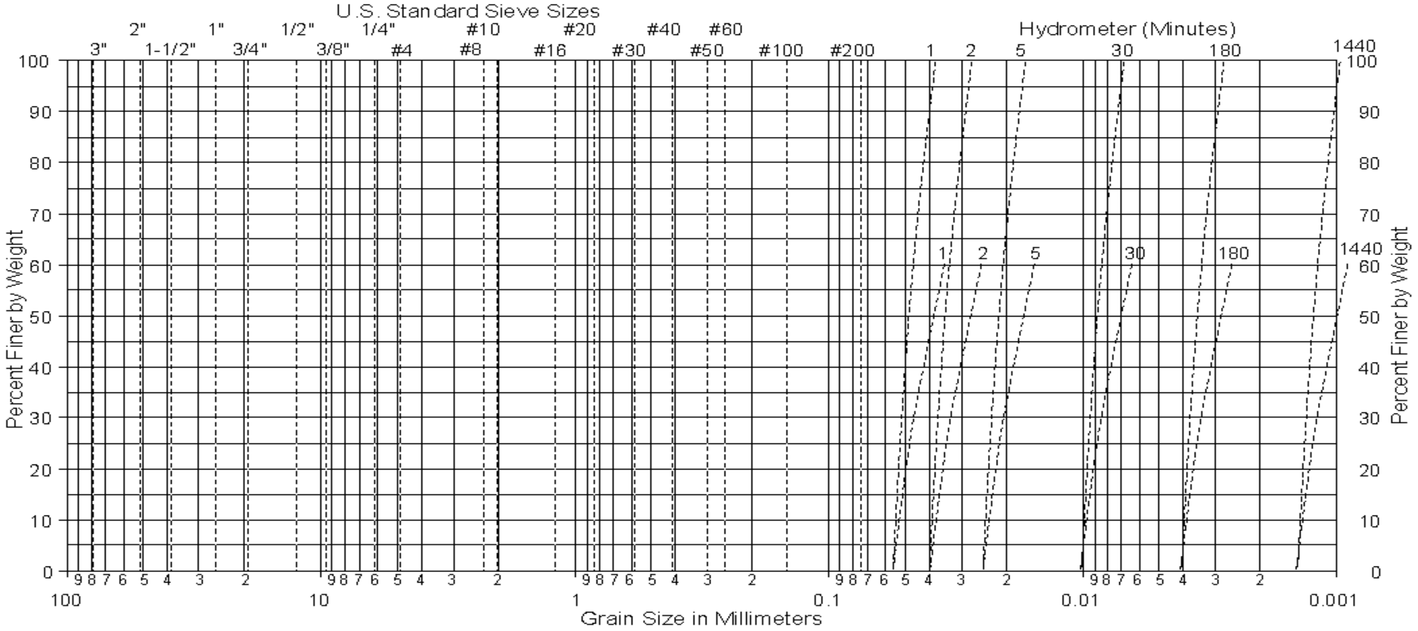
Moffatt & Nichol

By:	DRB	Date:	12/7/16
Job Number:	GF160289L		

SCST, Inc.
6280 RIVERDALE STREET, SAN DIEGO, CA 92120
Phone:(619) 280-4321 Fax: (619) 280-4717

Job Name:	Moffatt & Nichol
Job Number:	GF160289L
Location:	SM16-3A, 0-0.5'
Sample:	15316
By/Date:	DRB 12-7-16

GRAIN SIZE DISTRIBUTION



Total + #10	0.0	Total - #10 Dry	100.0	Wet Weight	100	-#10 Wet	100
Total - #10 Wet	100.0	Total Dry Wt.	100.0	Dry Weight	100	-#10 Dry	100.0
				% Moisture	0.0%		

U.S. Standard Sieve

		Plus #4 Sample			Minus #4 Sample			
		Wt. Ret.	% Ret.	% Pass	Wt. Ret.	% Ret	% Pass	Specs
38mm	1½"	0.0	0%	100%				
25mm	1"	0.0	0%	100%				
19mm	3/4"	0.0	0%	100%				
12.5mm	1/2"	0.0	0%	100%				
9.5mm	3/8"	0.0	0%	100%				
4.75mm	#4	0.0	0%	100%				
2.8mm	#7	0.0	0%	100%				
2.0mm	#10	0.0	0%	100%				
1.4um	#14	0.0	0%	100%				
1.0um	#18	0.0	0%	100%				
0.71mm	#25	0.0	0%	100%				
0.50mm	#35	0.0	0%	100%				
0.355mm	#45	0.0	0%	100%				
0.250mm	#60	1.2	1%	99%				
0.180mm	#80	11.9	12%	88%				
0.125mm	#120	55.8	56%	44%				
0.090mm	#170	84.0	84%	16%				
75um	#200	90.6	91%	9%				
.05mm	.05mm			7%				
.005mm	.005mm			5%				
.001mm	.001mm			4%				

Hydrometer Number

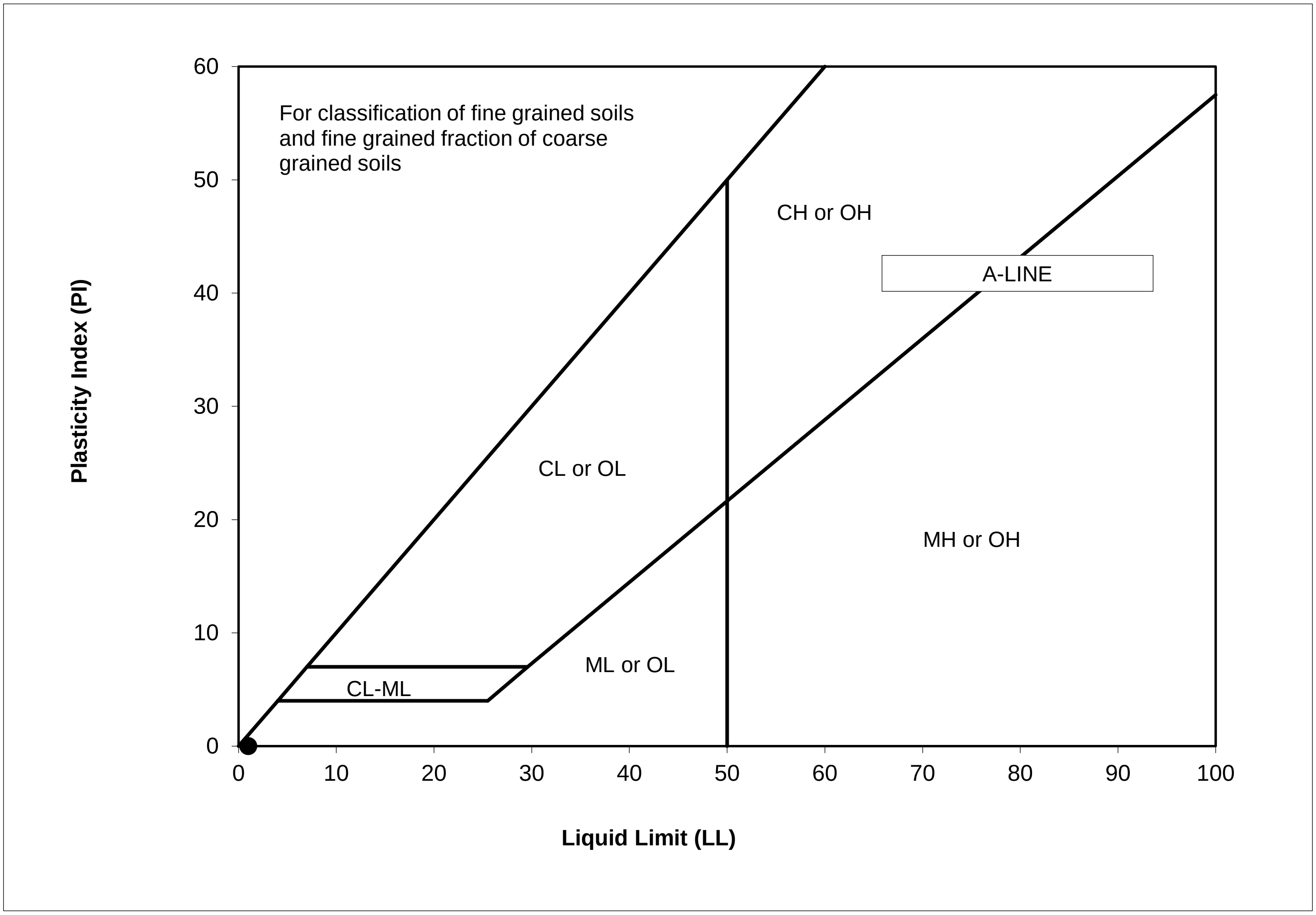
Date	Lapse	Time	Read	Correction	x2 (Y or N)	Actual
		1 Minute	25	18	N	7
		2 Minute	24	18	N	6
		30 Minute	23	18	N	5
		24 Hours	22	18	N	4

Atterberg Limits
ASTM D4318

Sample Identification: SM16-2A, 0-0.5'
Sample Description: Light Gray Sand
Tested By: DRB
Date Tested: 12/6/2016

Liquid Limit Procedure Used: Method B: One Point
Plastic Limit Procedure Used: Hand Method
Inorganic / Organic : Inorganic

Liquid Limit	N/A
Plastic Limit	NP
Plasticity Index	NP
Classification	



SCST, Inc.

Moffat & Nichol 2016 Lab Testing

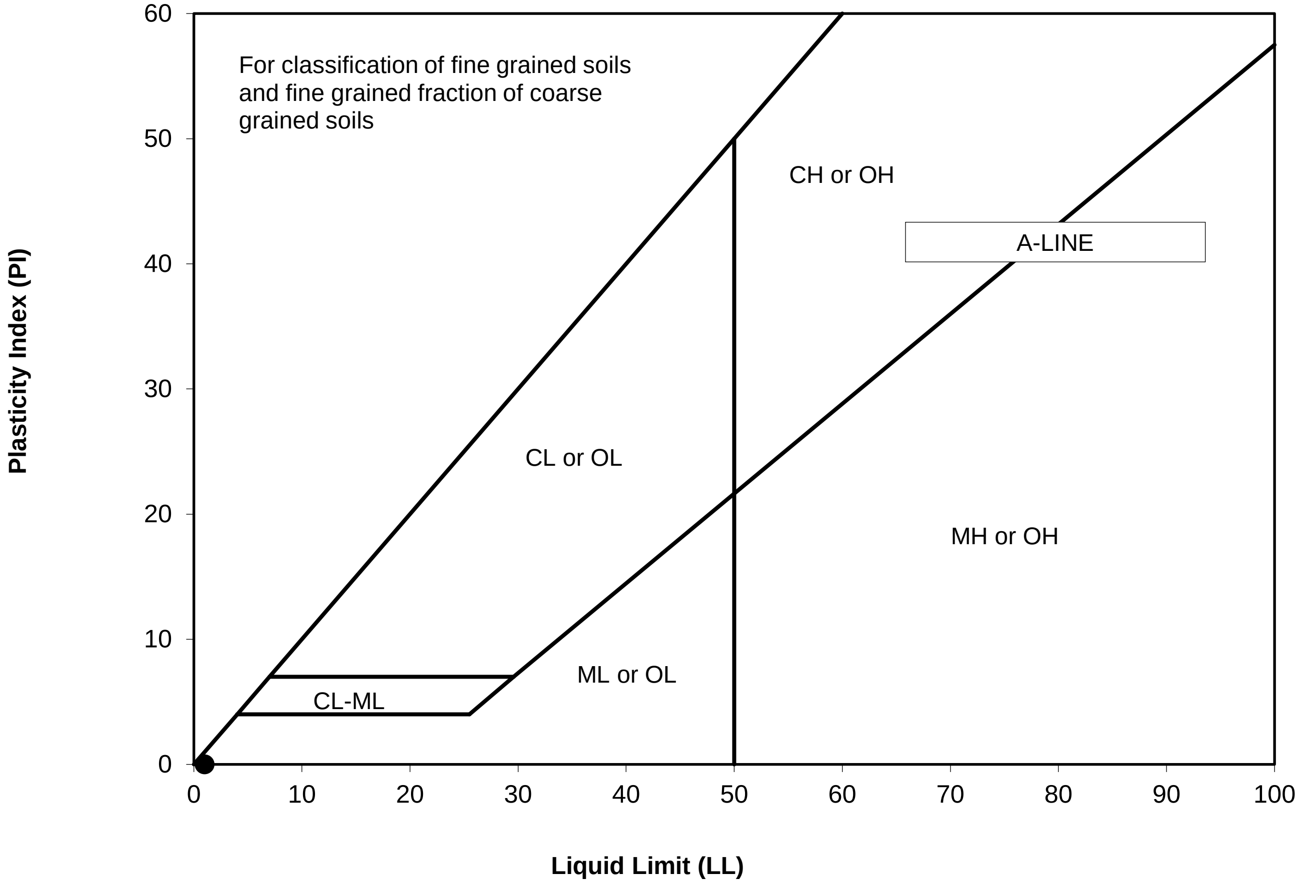
By:	DRB	Date:	December, 2016
Job Number:	GF160289L		

Atterberg Limits
ASTM D4318

Sample Identification: SM16-3A, 0-0.5'
Sample Description: Light Gray Sand
Tested By: DRB
Date Tested: 12/6/2016

Liquid Limit Procedure Used: Method B: One Point
Plastic Limit Procedure Used: Hand Method
Inorganic / Organic : Inorganic

Liquid Limit	N/A
Plastic Limit	NP
Plasticity Index	NP
Classification	



SCST, Inc.

Moffat & Nichol 2016 Lab Testing

By:	DRB	Date:	December, 2016
Job Number:	GF160289L		

Attachment F.
Chemical Laboratory Results

eurofins | Calscience

WORK ORDER NUMBER: 16-11-2212

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Moffatt & Nichol

Client Project Name: Santa Ana River Marsh

Attention: Brian Leslie
1660 Hotel Circle North
Suite 500
San Diego, CA 92108-2805

Approved for release on 12/16/2016 by:
Carla Hollowell
Project Manager

ResultLink ▸

Email your PM ▸

Contents

Client Project Name: Santa Ana River Marsh
Work Order Number: 16-11-2212

eurofins | Calscience

Work Order Narrative

Work Order: 16-11-2212 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 11/23/16. They were assigned to Work Order 16-11-2212.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Moffatt & Nichol 1660 Hotel Circle North, Suite 500 San Diego, CA 92108-2805	Work Order:	16-11-2212
		Project Name:	Santa Ana River Marsh
		PO Number:	
		Date/Time Received:	11/23/16 18:20
		Number of Containers:	13
Attn:	Brian Leslie		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
LTI-COMP	16-11-2212-1	11/22/16 09:40	1	Sediment
SM16-SP COMP	16-11-2212-2	11/22/16 13:45	1	Sediment
SM16-SM COMP	16-11-2212-3	11/22/16 13:47	1	Sediment
SM16-1A 0-0.5'	16-11-2212-4	11/22/16 12:30	1	Sediment
SM16-1A 0.5-2.0'	16-11-2212-5	11/22/16 12:30	1	Sediment
SM16-1A 2.0-3.75'	16-11-2212-6	11/22/16 12:30	1	Sediment
SM16-2A 0.0-0.5'	16-11-2212-7	11/22/16 11:15	1	Sediment
SM16-2A 0.5-3.8'	16-11-2212-8	11/22/16 11:15	1	Sediment
SM16-3A 0-0.5'	16-11-2212-9	11/22/16 10:45	1	Sediment
SM16-3A 0.5-3.5'	16-11-2212-10	11/22/16 10:45	1	Sediment
SM16-B 0-0.5'	16-11-2212-11	11/22/16 12:00	1	Sediment
SM16-B 0.5-2.5'	16-11-2212-12	11/22/16 12:00	1	Sediment
SM16-B 2.5-5.0'	16-11-2212-13	11/22/16 12:00	1	Sediment

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: EPA 160.4 (M)
Units: %

Project: Santa Ana River Marsh

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-A**	**11/22/16 09:40**	**Sediment**	**N/A**	**11/29/16**	**11/29/16 20:00**	**G1129VSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Volatile	0.44	0.10	0.10	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-A**	**11/22/16 13:45**	**Sediment**	**N/A**	**11/29/16**	**11/29/16 20:00**	**G1129VSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Volatile	0.19	0.10	0.10	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-A**	**11/22/16 13:47**	**Sediment**	**N/A**	**11/29/16**	**11/29/16 20:00**	**G1129VSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Volatile	0.33	0.10	0.10	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-05-020-1080**	**N/A**	**Solid**	**N/A**	**11/29/16**	**11/29/16 20:00**	**G1129VSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Volatile	ND	0.10	0.10	1.00	

Return to Contents

RL: Reporting Limit.   DF: Dilution Factor.   MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: EPA 1664A (M)
Units: mg/kg

Project: Santa Ana River Marsh

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEML3**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM: Oil and Grease	34	13	10	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEML3**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM: Oil and Grease	17	13	10	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEML3**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM: Oil and Grease	27	14	11	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-040-632**	**N/A**	**Solid**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEML3**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM: Oil and Grease	ND	10	7.9	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	N/A
Method:	EPA 1664A (M)
Units:	mg/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEML4**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM - SGT: Oil and Grease	17	13	11	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEML4**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM - SGT: Oil and Grease	ND	13	11	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEML4**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM - SGT: Oil and Grease	18	14	11	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-207-147**	**N/A**	**Solid**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEML4**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
HEM - SGT: Oil and Grease	ND	10	8.1	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: EPA 9060A
Units: %

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	ND	0.065	0.023	1.00	

SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	ND	0.065	0.023	1.00	

SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	ND	0.068	0.024	1.00	

Method Blank	**099-06-013-1645**	**N/A**	**Solid**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCL1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	ND	0.050	0.017	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: SM 2540 B (M)
Units: %

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-A**	**11/22/16 09:40**	**Sediment**	**N/A**	**11/29/16**	**11/29/16 17:00**	**G1129TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	76.8	0.100	0.100	1.00	

SM16-SP COMP	**16-11-2212-2-A**	**11/22/16 13:45**	**Sediment**	**N/A**	**11/29/16**	**11/29/16 17:00**	**G1129TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	77.0	0.100	0.100	1.00	

SM16-SM COMP	**16-11-2212-3-A**	**11/22/16 13:47**	**Sediment**	**N/A**	**11/29/16**	**11/29/16 17:00**	**G1129TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	73.9	0.100	0.100	1.00	

Method Blank	**099-05-019-3499**	**N/A**	**Solid**	**N/A**	**11/29/16**	**11/29/16 17:00**	**G1129TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	ND	0.100	0.100	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	N/A
Method:	SM 4500-NH3 B/C (M)
Units:	mg/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-BB**	**11/22/16 09:40**	**Sediment**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3L1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Ammonia (as N)	1.8	0.26	0.14	1.00	

SM16-SP COMP	**16-11-2212-2-BB**	**11/22/16 13:45**	**Sediment**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3L1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Ammonia (as N)	3.1	0.26	0.14	1.00	

SM16-SM COMP	**16-11-2212-3-BB**	**11/22/16 13:47**	**Sediment**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3L1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Ammonia (as N)	1.5	0.27	0.15	1.00	

Method Blank	**099-12-816-151**	**N/A**	**Solid**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3L1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Ammonia (as N)	ND	0.10	0.055	0.500	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3550B
Method:	EPA 8015B (M)
Units:	mg/kg

Project: Santa Ana River Marsh

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**GC 46**	**11/29/16**	**11/29/16 22:53**	**161129B11**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
TPH as Diesel	2.9	6.5	1.6	1.00	J
C6	ND	6.5	1.6	1.00	
C7	ND	6.5	1.6	1.00	
C8	ND	6.5	1.6	1.00	
C9-C10	ND	6.5	1.6	1.00	
C11-C12	ND	6.5	1.6	1.00	
C13-C14	ND	6.5	1.6	1.00	
C15-C16	ND	6.5	1.6	1.00	
C17-C18	ND	6.5	1.6	1.00	
C19-C20	ND	6.5	1.6	1.00	
C21-C22	ND	6.5	1.6	1.00	
C23-C24	ND	6.5	1.6	1.00	
C25-C28	ND	6.5	1.6	1.00	
C29-C32	ND	6.5	1.6	1.00	
C33-C36	ND	6.5	1.6	1.00	
C37-C40	ND	6.5	1.6	1.00	
C41-C44	ND	6.5	1.6	1.00	
C6-C44 Total	2.9	6.5	1.6	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	99	61-145	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)
		Units:	mg/kg
Project: Santa Ana River Marsh			Page 2 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**GC 46**	**11/29/16**	**11/29/16 23:14**	**161129B11**

Comment(s): - Results are reported on a dry weight basis.

- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
TPH as Diesel	3.1	6.5	1.6	1.00	J
C6	ND	6.5	1.6	1.00	
C7	ND	6.5	1.6	1.00	
C8	ND	6.5	1.6	1.00	
C9-C10	ND	6.5	1.6	1.00	
C11-C12	ND	6.5	1.6	1.00	
C13-C14	ND	6.5	1.6	1.00	
C15-C16	ND	6.5	1.6	1.00	
C17-C18	ND	6.5	1.6	1.00	
C19-C20	ND	6.5	1.6	1.00	
C21-C22	ND	6.5	1.6	1.00	
C23-C24	ND	6.5	1.6	1.00	
C25-C28	ND	6.5	1.6	1.00	
C29-C32	ND	6.5	1.6	1.00	
C33-C36	ND	6.5	1.6	1.00	
C37-C40	ND	6.5	1.6	1.00	
C41-C44	ND	6.5	1.6	1.00	
C6-C44 Total	3.1	6.5	1.6	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	97	61-145	

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3550B
Method:	EPA 8015B (M)
Units:	mg/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**GC 46**	**11/29/16**	**11/29/16 23:35**	**161129B11**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
TPH as Diesel	9.3	6.7	1.7	1.00	
C6	ND	6.7	1.7	1.00	
C7	ND	6.7	1.7	1.00	
C8	ND	6.7	1.7	1.00	
C9-C10	ND	6.7	1.7	1.00	
C11-C12	ND	6.7	1.7	1.00	
C13-C14	ND	6.7	1.7	1.00	
C15-C16	ND	6.7	1.7	1.00	
C17-C18	ND	6.7	1.7	1.00	
C19-C20	ND	6.7	1.7	1.00	
C21-C22	ND	6.7	1.7	1.00	
C23-C24	ND	6.7	1.7	1.00	
C25-C28	ND	6.7	1.7	1.00	
C29-C32	ND	6.7	1.7	1.00	
C33-C36	ND	6.7	1.7	1.00	
C37-C40	ND	6.7	1.7	1.00	
C41-C44	ND	6.7	1.7	1.00	
C6-C44 Total	9.3	6.7	1.7	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	98	61-145	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol	Date Received:	11/23/16
1660 Hotel Circle North, Suite 500	Work Order:	16-11-2212
San Diego, CA 92108-2805	Preparation:	EPA 3550B
	Method:	EPA 8015B (M)
	Units:	mg/kg
Project: Santa Ana River Marsh		Page 4 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-490-2383**	**N/A**	**Solid**	**GC 46**	**11/29/16**	**11/29/16 20:28**	**161129B11**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
C6	ND	5.0	1.3	1.00	
C7	ND	5.0	1.3	1.00	
C8	ND	5.0	1.3	1.00	
C9-C10	ND	5.0	1.3	1.00	
C11-C12	ND	5.0	1.3	1.00	
C13-C14	ND	5.0	1.3	1.00	
C15-C16	ND	5.0	1.3	1.00	
C17-C18	ND	5.0	1.3	1.00	
C19-C20	ND	5.0	1.3	1.00	
C21-C22	ND	5.0	1.3	1.00	
C23-C24	ND	5.0	1.3	1.00	
C25-C28	ND	5.0	1.3	1.00	
C29-C32	ND	5.0	1.3	1.00	
C33-C36	ND	5.0	1.3	1.00	
C37-C40	ND	5.0	1.3	1.00	
C41-C44	ND	5.0	1.3	1.00	
C6-C44 Total	ND	5.0	1.3	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	88	61-145	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3541
Method: EPA 8270D (M)/TQ/EI
Units: ug/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**GCTQ 2**	**11/29/16**	**11/30/16 21:26**	**161129L05**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Allethrin	ND	0.65	0.33	1.00	
Bifenthrin	ND	0.65	0.39	1.00	
Cyfluthrin	ND	0.65	0.33	1.00	
Cypermethrin	ND	0.65	0.33	1.00	
Deltamethrin/Tralomethrin	ND	0.65	0.33	1.00	
Fenpropathrin	ND	0.65	0.33	1.00	
Fenvalerate/Esfenvalerate	ND	0.65	0.33	1.00	
Fluvalinate	ND	0.65	0.33	1.00	
Permethrin (cis/trans)	ND	1.3	0.65	1.00	
Phenothrin	ND	0.65	0.33	1.00	
Resmethrin/Bioresmethrin	ND	0.65	0.56	1.00	
Tetramethrin	ND	0.65	0.39	1.00	
lambda-Cyhalothrin	ND	0.65	0.33	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibutylchlorendate	55	40-160	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270D (M)/TQ/EI
Units:	ug/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**GCTQ 2**	**11/29/16**	**11/30/16 22:12**	**161129L05**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Allethrin	ND	0.65	0.32	1.00	
Bifenthrin	ND	0.65	0.39	1.00	
Cyfluthrin	ND	0.65	0.32	1.00	
Cypermethrin	ND	0.65	0.32	1.00	
Deltamethrin/Tralomethrin	ND	0.65	0.32	1.00	
Fenpropathrin	ND	0.65	0.32	1.00	
Fenvalerate/Esfenvalerate	ND	0.65	0.32	1.00	
Fluvalinate	ND	0.65	0.32	1.00	
Permethrin (cis/trans)	ND	1.3	0.65	1.00	
Phenothrin	ND	0.65	0.32	1.00	
Resmethrin/Bioresmethrin	ND	0.65	0.55	1.00	
Tetramethrin	ND	0.65	0.39	1.00	
lambda-Cyhalothrin	ND	0.65	0.32	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibutylchlorendate	63	40-160	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270D (M)/TQ/EI
Units:	ug/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**GCTQ 2**	**11/29/16**	**11/30/16 22:58**	**161129L05**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Allethrin	ND	0.67	0.34	1.00	
Bifenthrin	ND	0.67	0.40	1.00	
Cyfluthrin	ND	0.67	0.34	1.00	
Cypermethrin	ND	0.67	0.34	1.00	
Deltamethrin/Tralomethrin	ND	0.67	0.34	1.00	
Fenpropathrin	ND	0.67	0.34	1.00	
Fenvalerate/Esfenvalerate	ND	0.67	0.34	1.00	
Fluvalinate	ND	0.67	0.34	1.00	
Permethrin (cis/trans)	ND	1.3	0.67	1.00	
Phenothrin	ND	0.67	0.34	1.00	
Resmethrin/Bioresmethrin	ND	0.67	0.57	1.00	
Tetramethrin	ND	0.67	0.40	1.00	
lambda-Cyhalothrin	ND	0.67	0.34	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibutylchlorendate	52	40-160	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270D (M)/TQ/EI
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 4 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-403-116**	**N/A**	**Solid**	**GCTQ 2**	**11/29/16**	**11/30/16 20:40**	**161129L05**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Allethrin	ND	0.050	0.025	0.100	
Bifenthrin	ND	0.050	0.030	0.100	
Cyfluthrin	ND	0.050	0.025	0.100	
Cypermethrin	ND	0.050	0.025	0.100	
Deltamethrin/Tralomethrin	ND	0.050	0.025	0.100	
Fenpropathrin	ND	0.050	0.025	0.100	
Fenvalerate/Esfenvalerate	ND	0.050	0.025	0.100	
Fluvalinate	ND	0.050	0.025	0.100	
Permethrin (cis/trans)	ND	0.10	0.050	0.100	
Phenothrin	ND	0.050	0.025	0.100	
Resmethrin/Bioresmethrin	ND	0.050	0.042	0.100	
Tetramethrin	ND	0.050	0.030	0.100	
lambda-Cyhalothrin	ND	0.050	0.025	0.100	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibutylchlorendate	82	40-160	

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3050B
Method: EPA 6020
Units: mg/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**ICP/MS 03**	**12/05/16**	**12/06/16 13:05**	**161205L04E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	0.979	0.130	0.114	1.00	
Cadmium	0.101	0.130	0.0745	1.00	J
Chromium	4.42	0.130	0.0808	1.00	
Copper	2.98	0.130	0.0546	1.00	
Lead	2.67	0.130	0.0858	1.00	
Nickel	3.40	0.130	0.0659	1.00	
Selenium	0.224	0.130	0.0951	1.00	
Silver	ND	0.130	0.0408	1.00	
Zinc	25.0	1.30	1.03	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**ICP/MS 03**	**12/05/16**	**12/06/16 13:08**	**161205L04E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	1.39	0.130	0.113	1.00	
Cadmium	ND	0.130	0.0743	1.00	
Chromium	3.51	0.130	0.0806	1.00	
Copper	1.42	0.130	0.0544	1.00	
Lead	1.81	0.130	0.0856	1.00	
Nickel	2.09	0.130	0.0657	1.00	
Selenium	0.159	0.130	0.0949	1.00	
Silver	ND	0.130	0.0406	1.00	
Zinc	13.2	1.30	1.03	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3050B
Method: EPA 6020
Units: mg/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**ICP/MS 03**	**12/05/16**	**12/06/16 13:11**	**161205L04E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	1.21	0.135	0.118	1.00	
Cadmium	ND	0.135	0.0774	1.00	
Chromium	5.64	0.135	0.0840	1.00	
Copper	2.69	0.135	0.0567	1.00	
Lead	2.21	0.135	0.0892	1.00	
Nickel	3.49	0.135	0.0685	1.00	
Selenium	0.129	0.135	0.0989	1.00	J
Silver	ND	0.135	0.0424	1.00	
Zinc	24.7	1.35	1.08	1.00	

Method Blank	**099-15-254-477**	**N/A**	**Solid**	**ICP/MS 03**	**12/05/16**	**12/06/16 12:29**	**161205L04E**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	ND	0.100	0.0873	1.00	
Cadmium	ND	0.100	0.0572	1.00	
Chromium	ND	0.100	0.0621	1.00	
Copper	ND	0.100	0.0419	1.00	
Lead	ND	0.100	0.0659	1.00	
Nickel	ND	0.100	0.0506	1.00	
Selenium	ND	0.100	0.0731	1.00	
Silver	ND	0.100	0.0313	1.00	
Zinc	ND	1.00	0.795	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 7471A Total
Method:	EPA 7471A
Units:	mg/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-BB**	**11/22/16 09:40**	**Sediment**	**Mercury 07**	**12/06/16**	**12/06/16 12:29**	**161206L01E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.0269	0.00791	1.00	

SM16-SP COMP	**16-11-2212-2-BB**	**11/22/16 13:45**	**Sediment**	**Mercury 07**	**12/06/16**	**12/06/16 12:31**	**161206L01E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.0244	0.00715	1.00	

SM16-SM COMP	**16-11-2212-3-BB**	**11/22/16 13:47**	**Sediment**	**Mercury 07**	**12/06/16**	**12/06/16 12:34**	**161206L01E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.0280	0.00822	1.00	

Method Blank	**099-16-278-287**	**N/A**	**Solid**	**Mercury 07**	**12/06/16**	**12/06/16 12:15**	**161206L01E**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.0200	0.00587	1.00	

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8081A
Units:	ug/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**GC 41**	**12/01/16**	**12/07/16 07:19**	**161201L06**

Comment(s): - Results are reported on a dry weight basis.

- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	1.3	0.57	1.00	
Alpha-BHC	ND	2.6	0.96	1.00	
Beta-BHC	ND	1.3	0.64	1.00	
Delta-BHC	ND	2.6	1.1	1.00	
Gamma-BHC	ND	1.3	0.58	1.00	
Chlordane	ND	13	6.8	1.00	
Dieldrin	ND	1.3	0.57	1.00	
Trans-nonachlor	ND	1.3	0.35	1.00	
2,4'-DDD	ND	1.3	0.37	1.00	
2,4'-DDE	ND	2.6	1.3	1.00	
2,4'-DDT	ND	1.3	0.41	1.00	
4,4'-DDD	ND	1.3	0.65	1.00	
4,4'-DDE	ND	1.3	0.58	1.00	
4,4'-DDT	ND	1.3	0.57	1.00	
Endosulfan I	ND	1.3	0.51	1.00	
Endosulfan II	ND	1.3	0.61	1.00	
Endosulfan Sulfate	ND	1.3	0.68	1.00	
Endrin	ND	1.3	0.62	1.00	
Endrin Aldehyde	ND	1.3	0.78	1.00	
Endrin Ketone	ND	1.3	0.65	1.00	
Heptachlor	ND	1.3	0.56	1.00	
Heptachlor Epoxide	ND	2.6	0.96	1.00	
Methoxychlor	ND	1.3	0.72	1.00	
Toxaphene	ND	26	12	1.00	
Alpha Chlordane	ND	1.3	0.53	1.00	
Gamma Chlordane	ND	2.6	1.1	1.00	
Cis-nonachlor	ND	1.3	0.34	1.00	
Oxychlordane	ND	1.3	0.35	1.00	
Mirex	ND	1.3	0.43	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	80	25-145	
Decachlorobiphenyl	121	24-168	

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8081A
Units:	ug/kg

Project: Santa Ana River Marsh

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**GC 41**	**12/01/16**	**12/07/16 07:34**	**161201L06**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	1.3	0.56	1.00	
Alpha-BHC	ND	2.6	0.95	1.00	
Beta-BHC	ND	1.3	0.64	1.00	
Delta-BHC	ND	2.6	1.1	1.00	
Gamma-BHC	ND	1.3	0.57	1.00	
Chlordane	ND	13	6.7	1.00	
Dieldrin	ND	1.3	0.56	1.00	
Trans-nonachlor	ND	1.3	0.35	1.00	
2,4'-DDD	ND	1.3	0.37	1.00	
2,4'-DDE	ND	2.6	1.3	1.00	
2,4'-DDT	ND	1.3	0.40	1.00	
4,4'-DDD	ND	1.3	0.64	1.00	
4,4'-DDE	ND	1.3	0.57	1.00	
4,4'-DDT	ND	1.3	0.56	1.00	
Endosulfan I	ND	1.3	0.51	1.00	
Endosulfan II	ND	1.3	0.60	1.00	
Endosulfan Sulfate	ND	1.3	0.67	1.00	
Endrin	ND	1.3	0.62	1.00	
Endrin Aldehyde	ND	1.3	0.77	1.00	
Endrin Ketone	ND	1.3	0.64	1.00	
Heptachlor	ND	1.3	0.55	1.00	
Heptachlor Epoxide	ND	2.6	0.95	1.00	
Methoxychlor	ND	1.3	0.71	1.00	
Toxaphene	ND	26	11	1.00	
Alpha Chlordane	ND	1.3	0.52	1.00	
Gamma Chlordane	ND	2.6	1.1	1.00	
Cis-nonachlor	ND	1.3	0.33	1.00	
Oxychlordane	ND	1.3	0.35	1.00	
Mirex	ND	1.3	0.42	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	88	25-145	
Decachlorobiphenyl	118	24-168	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8081A
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 3 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**GC 41**	**12/01/16**	**12/07/16 07:49**	**161201L06**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	1.3	0.59	1.00	
Alpha-BHC	ND	2.7	0.99	1.00	
Beta-BHC	ND	1.3	0.67	1.00	
Delta-BHC	ND	2.7	1.2	1.00	
Gamma-BHC	ND	1.3	0.60	1.00	
Chlordane	ND	13	7.1	1.00	
Dieldrin	ND	1.3	0.59	1.00	
Trans-nonachlor	ND	1.3	0.36	1.00	
2,4'-DDD	ND	1.3	0.38	1.00	
2,4'-DDE	ND	2.7	1.3	1.00	
2,4'-DDT	ND	1.3	0.42	1.00	
4,4'-DDD	ND	1.3	0.67	1.00	
4,4'-DDE	ND	1.3	0.60	1.00	
4,4'-DDT	ND	1.3	0.59	1.00	
Endosulfan I	ND	1.3	0.53	1.00	
Endosulfan II	ND	1.3	0.63	1.00	
Endosulfan Sulfate	ND	1.3	0.70	1.00	
Endrin	ND	1.3	0.65	1.00	
Endrin Aldehyde	ND	1.3	0.81	1.00	
Endrin Ketone	ND	1.3	0.67	1.00	
Heptachlor	ND	1.3	0.58	1.00	
Heptachlor Epoxide	ND	2.7	0.99	1.00	
Methoxychlor	ND	1.3	0.75	1.00	
Toxaphene	ND	27	12	1.00	
Alpha Chlordane	ND	1.3	0.54	1.00	
Gamma Chlordane	ND	2.7	1.2	1.00	
Cis-nonachlor	ND	1.3	0.35	1.00	
Oxychlordane	ND	1.3	0.36	1.00	
Mirex	ND	1.3	0.44	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	82	25-145	
Decachlorobiphenyl	97	24-168	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8081A
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 4 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-858-447**	**N/A**	**Solid**	**GC 41**	**12/01/16**	**12/05/16 15:05**	**161201L06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	1.0	0.44	1.00	
Alpha-BHC	ND	2.0	0.74	1.00	
Beta-BHC	ND	1.0	0.50	1.00	
Delta-BHC	ND	2.0	0.88	1.00	
Gamma-BHC	ND	1.0	0.45	1.00	
Chlordane	ND	10	5.3	1.00	
Dieldrin	ND	1.0	0.44	1.00	
Trans-nonachlor	ND	1.0	0.27	1.00	
2,4'-DDD	ND	1.0	0.29	1.00	
2,4'-DDE	ND	2.0	0.99	1.00	
2,4'-DDT	ND	1.0	0.31	1.00	
4,4'-DDD	ND	1.0	0.50	1.00	
4,4'-DDE	ND	1.0	0.44	1.00	
4,4'-DDT	ND	1.0	0.44	1.00	
Endosulfan I	ND	1.0	0.40	1.00	
Endosulfan II	ND	1.0	0.47	1.00	
Endosulfan Sulfate	ND	1.0	0.52	1.00	
Endrin	ND	1.0	0.48	1.00	
Endrin Aldehyde	ND	1.0	0.60	1.00	
Endrin Ketone	ND	1.0	0.50	1.00	
Heptachlor	ND	1.0	0.43	1.00	
Heptachlor Epoxide	ND	2.0	0.74	1.00	
Methoxychlor	ND	1.0	0.56	1.00	
Toxaphene	ND	20	9.0	1.00	
Alpha Chlordane	ND	1.0	0.41	1.00	
Gamma Chlordane	ND	2.0	0.89	1.00	
Cis-nonachlor	ND	1.0	0.26	1.00	
Oxychlordane	ND	1.0	0.27	1.00	
Mirex	ND	1.0	0.33	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	87	25-145	
Decachlorobiphenyl	112	24-168	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3545
Method:	EPA 8270C Bisphenol
Units:	ug/kg

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-BB**	**11/22/16 09:40**	**Sediment**	**GC/MS JJJ**	**12/06/16**	**12/08/16 17:23**	**161206L19**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Bisphenol A	ND	13	2.7	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-BB**	**11/22/16 13:45**	**Sediment**	**GC/MS JJJ**	**12/06/16**	**12/08/16 17:41**	**161206L19**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Bisphenol A	ND	13	2.7	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-BB**	**11/22/16 13:47**	**Sediment**	**GC/MS JJJ**	**12/06/16**	**12/08/16 17:58**	**161206L19**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Bisphenol A	2.9	13	2.8	1.00	J

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-401-13**	**N/A**	**Solid**	**GC/MS JJJ**	**12/06/16**	**12/08/16 17:06**	**161206L19**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Bisphenol A	ND	10	2.1	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270C SIM
Units:	ug/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-BB**	**11/22/16 09:40**	**Sediment**	**GC/MS MM**	**11/30/16**	**12/02/16 19:57**	**161130L14**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
1-Methylnaphthalene	ND	13	1.4	1.00	
2,4,5-Trichlorophenol	ND	13	1.6	1.00	
2,4,6-Trichlorophenol	ND	13	1.7	1.00	
2,4-Dichlorophenol	ND	13	2.2	1.00	
2,4-Dimethylphenol	ND	650	3.4	1.00	
2,4-Dinitrophenol	ND	650	78	1.00	
2-Chlorophenol	ND	13	2.4	1.00	
2-Methylnaphthalene	ND	13	2.1	1.00	
2-Methylphenol	ND	13	2.5	1.00	
2-Nitrophenol	ND	650	2.2	1.00	
3/4-Methylphenol	ND	13	4.7	1.00	
4,6-Dinitro-2-Methylphenol	ND	650	86	1.00	
4-Chloro-3-Methylphenol	ND	13	2.7	1.00	
4-Nitrophenol	ND	650	110	1.00	
Acenaphthene	ND	13	2.0	1.00	
Acenaphthylene	ND	13	2.2	1.00	
Anthracene	ND	13	2.5	1.00	
Benzo (a) Anthracene	ND	13	1.8	1.00	
Benzo (a) Pyrene	ND	13	1.8	1.00	
Benzo (b) Fluoranthene	ND	13	1.8	1.00	
Benzo (g,h,i) Perylene	ND	13	2.0	1.00	
Benzo (k) Fluoranthene	ND	13	1.9	1.00	
Bis(2-Ethylhexyl) Phthalate	26	65	2.0	1.00	J
Butyl Benzyl Phthalate	11	65	2.6	1.00	J
Chrysene	ND	13	1.8	1.00	
Di-n-Butyl Phthalate	120	65	2.5	1.00	
Di-n-Octyl Phthalate	ND	65	2.4	1.00	
Dibenz (a,h) Anthracene	ND	13	1.9	1.00	
Diethyl Phthalate	16	65	2.1	1.00	J
Dimethyl Phthalate	ND	65	2.6	1.00	
Fluoranthene	2.9	13	2.3	1.00	J
Fluorene	ND	13	2.1	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	13	1.7	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 2 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
Naphthalene	ND	13	2.0	1.00	
Pentachlorophenol	ND	650	1.7	1.00	
Phenanthrene	2.7	13	2.2	1.00	J
Phenol	ND	13	3.0	1.00	
Pyrene	3.5	13	2.1	1.00	J
1,6,7-Trimethylnaphthalene	ND	13	2.3	1.00	
2,3,4,6-Tetrachlorophenol	ND	13	5.1	1.00	
2,6-Dichlorophenol	ND	13	2.8	1.00	
DCPA	ND	13	3.1	1.00	
Dibenzothiophene	ND	13	1.8	1.00	
Perthane	ND	13	2.6	1.00	
1-Methylphenanthrene	ND	13	2.5	1.00	
Benzo (e) Pyrene	ND	13	2.2	1.00	
Perylene	ND	13	1.5	1.00	
Biphenyl	ND	13	2.5	1.00	
2,6-Dimethylnaphthalene	ND	13	2.7	1.00	
Isophorone	ND	650	2.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,6-Tribromophenol	78	32-143	
2-Fluorobiphenyl	64	14-146	
2-Fluorophenol	64	15-138	
Nitrobenzene-d5	64	18-162	
p-Terphenyl-d14	69	34-148	
Phenol-d6	61	17-141	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270C SIM
Units:	ug/kg

Project: Santa Ana River Marsh

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-BB**	**11/22/16 13:45**	**Sediment**	**GC/MS MM**	**11/30/16**	**12/02/16 20:23**	**161130L14**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
1-Methylnaphthalene	ND	13	1.4	1.00	
2,4,5-Trichlorophenol	ND	13	1.6	1.00	
2,4,6-Trichlorophenol	ND	13	1.7	1.00	
2,4-Dichlorophenol	ND	13	2.2	1.00	
2,4-Dimethylphenol	ND	640	3.3	1.00	
2,4-Dinitrophenol	ND	640	77	1.00	
2-Chlorophenol	ND	13	2.4	1.00	
2-Methylnaphthalene	ND	13	2.1	1.00	
2-Methylphenol	ND	13	2.5	1.00	
2-Nitrophenol	ND	640	2.2	1.00	
3/4-Methylphenol	ND	13	4.7	1.00	
4,6-Dinitro-2-Methylphenol	ND	640	85	1.00	
4-Chloro-3-Methylphenol	ND	13	2.7	1.00	
4-Nitrophenol	ND	640	100	1.00	
Acenaphthene	ND	13	2.0	1.00	
Acenaphthylene	ND	13	2.2	1.00	
Anthracene	ND	13	2.5	1.00	
Benzo (a) Anthracene	ND	13	1.8	1.00	
Benzo (a) Pyrene	ND	13	1.8	1.00	
Benzo (b) Fluoranthene	ND	13	1.8	1.00	
Benzo (g,h,i) Perylene	ND	13	2.0	1.00	
Benzo (k) Fluoranthene	ND	13	1.9	1.00	
Bis(2-Ethylhexyl) Phthalate	24	64	2.0	1.00	J
Butyl Benzyl Phthalate	5.6	64	2.5	1.00	J
Chrysene	ND	13	1.7	1.00	
Di-n-Butyl Phthalate	55	64	2.5	1.00	J
Di-n-Octyl Phthalate	ND	64	2.4	1.00	
Dibenz (a,h) Anthracene	ND	13	1.9	1.00	
Diethyl Phthalate	12	64	2.1	1.00	J
Dimethyl Phthalate	ND	64	2.6	1.00	
Fluoranthene	ND	13	2.3	1.00	
Fluorene	ND	13	2.1	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	13	1.7	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3541
Method: EPA 8270C SIM
Units: ug/kg

Project: Santa Ana River Marsh

Parameter	Result	RL	MDL	DF	Qualifiers
Naphthalene	ND	13	2.0	1.00	
Pentachlorophenol	ND	640	1.7	1.00	
Phenanthrene	ND	13	2.2	1.00	
Phenol	ND	13	3.0	1.00	
Pyrene	ND	13	2.1	1.00	
1,6,7-Trimethylnaphthalene	ND	13	2.3	1.00	
2,3,4,6-Tetrachlorophenol	ND	13	5.0	1.00	
2,6-Dichlorophenol	ND	13	2.7	1.00	
DCPA	ND	13	3.1	1.00	
Dibenzothiophene	ND	13	1.7	1.00	
Perthane	ND	13	2.6	1.00	
1-Methylphenanthrene	ND	13	2.5	1.00	
Benzo (e) Pyrene	ND	13	2.2	1.00	
Perylene	ND	13	1.5	1.00	
Biphenyl	ND	13	2.4	1.00	
2,6-Dimethylnaphthalene	ND	13	2.7	1.00	
Isophorone	ND	640	2.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,6-Tribromophenol	69	32-143	
2-Fluorobiphenyl	62	14-146	
2-Fluorophenol	59	15-138	
Nitrobenzene-d5	62	18-162	
p-Terphenyl-d14	64	34-148	
Phenol-d6	59	17-141	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 5 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-BB**	**11/22/16 13:47**	**Sediment**	**GC/MS MM**	**11/30/16**	**12/02/16 20:49**	**161130L14**

Comment(s): - Results are reported on a dry weight basis.

- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
1-Methylnaphthalene	ND	13	1.4	1.00	
2,4,5-Trichlorophenol	ND	13	1.6	1.00	
2,4,6-Trichlorophenol	ND	13	1.8	1.00	
2,4-Dichlorophenol	ND	13	2.3	1.00	
2,4-Dimethylphenol	ND	670	3.5	1.00	
2,4-Dinitrophenol	ND	670	81	1.00	
2-Chlorophenol	ND	13	2.5	1.00	
2-Methylnaphthalene	ND	13	2.2	1.00	
2-Methylphenol	ND	13	2.6	1.00	
2-Nitrophenol	ND	670	2.3	1.00	
3/4-Methylphenol	ND	13	4.9	1.00	
4,6-Dinitro-2-Methylphenol	ND	670	89	1.00	
4-Chloro-3-Methylphenol	ND	13	2.8	1.00	
4-Nitrophenol	ND	670	110	1.00	
Acenaphthene	ND	13	2.0	1.00	
Acenaphthylene	ND	13	2.3	1.00	
Anthracene	ND	13	2.6	1.00	
Benzo (a) Anthracene	ND	13	1.9	1.00	
Benzo (a) Pyrene	ND	13	1.9	1.00	
Benzo (b) Fluoranthene	ND	13	1.9	1.00	
Benzo (g,h,i) Perylene	ND	13	2.1	1.00	
Benzo (k) Fluoranthene	ND	13	2.0	1.00	
Bis(2-Ethylhexyl) Phthalate	34	67	2.1	1.00	J
Butyl Benzyl Phthalate	5.7	67	2.7	1.00	J
Chrysene	ND	13	1.8	1.00	
Di-n-Butyl Phthalate	66	67	2.6	1.00	J
Di-n-Octyl Phthalate	ND	67	2.5	1.00	
Dibenz (a,h) Anthracene	ND	13	1.9	1.00	
Diethyl Phthalate	15	67	2.2	1.00	J
Dimethyl Phthalate	2.8	67	2.7	1.00	J
Fluoranthene	5.7	13	2.4	1.00	J
Fluorene	ND	13	2.2	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	13	1.8	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol	Date Received:	11/23/16
1660 Hotel Circle North, Suite 500	Work Order:	16-11-2212
San Diego, CA 92108-2805	Preparation:	EPA 3541
	Method:	EPA 8270C SIM
	Units:	ug/kg
Project: Santa Ana River Marsh		Page 6 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
Naphthalene	ND	13	2.1	1.00	
Pentachlorophenol	ND	670	1.8	1.00	
Phenanthrene	3.1	13	2.3	1.00	J
Phenol	19	13	3.1	1.00	
Pyrene	6.1	13	2.2	1.00	J
1,6,7-Trimethylnaphthalene	ND	13	2.4	1.00	
2,3,4,6-Tetrachlorophenol	ND	13	5.2	1.00	
2,6-Dichlorophenol	ND	13	2.9	1.00	
DCPA	ND	13	3.2	1.00	
Dibenzothiophene	ND	13	1.8	1.00	
Perthane	ND	13	2.7	1.00	
1-Methylphenanthrene	ND	13	2.6	1.00	
Benzo (e) Pyrene	ND	13	2.3	1.00	
Perylene	ND	13	1.6	1.00	
Biphenyl	ND	13	2.6	1.00	
2,6-Dimethylnaphthalene	ND	13	2.8	1.00	
Isophorone	ND	670	2.1	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,6-Tribromophenol	71	32-143	
2-Fluorobiphenyl	63	14-146	
2-Fluorophenol	58	15-138	
Nitrobenzene-d5	60	18-162	
p-Terphenyl-d14	68	34-148	
Phenol-d6	57	17-141	

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270C SIM
Units:	ug/kg

Project: Santa Ana River Marsh

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-256-167**	**N/A**	**Solid**	**GC/MS MM**	**11/30/16**	**12/02/16 18:14**	**161130L14**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
1-Methylnaphthalene	ND	10	1.1	1.00	
2,4,5-Trichlorophenol	ND	10	1.2	1.00	
2,4,6-Trichlorophenol	ND	10	1.3	1.00	
2,4-Dichlorophenol	ND	10	1.7	1.00	
2,4-Dimethylphenol	ND	500	2.6	1.00	
2,4-Dinitrophenol	ND	500	60	1.00	
2-Chlorophenol	ND	10	1.9	1.00	
2-Methylnaphthalene	ND	10	1.6	1.00	
2-Methylphenol	ND	10	2.0	1.00	
2-Nitrophenol	ND	500	1.7	1.00	
3/4-Methylphenol	ND	10	3.6	1.00	
4,6-Dinitro-2-Methylphenol	ND	500	66	1.00	
4-Chloro-3-Methylphenol	ND	10	2.1	1.00	
4-Nitrophenol	ND	500	81	1.00	
Acenaphthene	ND	10	1.5	1.00	
Acenaphthylene	ND	10	1.7	1.00	
Anthracene	ND	10	1.9	1.00	
Benzo (a) Anthracene	ND	10	1.4	1.00	
Benzo (a) Pyrene	ND	10	1.4	1.00	
Benzo (b) Fluoranthene	ND	10	1.4	1.00	
Benzo (g,h,i) Perylene	ND	10	1.5	1.00	
Benzo (k) Fluoranthene	ND	10	1.5	1.00	
Bis(2-Ethylhexyl) Phthalate	ND	50	1.5	1.00	
Butyl Benzyl Phthalate	ND	50	2.0	1.00	
Chrysene	ND	10	1.4	1.00	
Di-n-Butyl Phthalate	ND	50	1.9	1.00	
Di-n-Octyl Phthalate	ND	50	1.9	1.00	
Dibenz (a,h) Anthracene	ND	10	1.4	1.00	
Diethyl Phthalate	ND	50	1.6	1.00	
Dimethyl Phthalate	ND	50	2.0	1.00	
Fluoranthene	ND	10	1.8	1.00	
Fluorene	ND	10	1.6	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	10	1.3	1.00	
Naphthalene	ND	10	1.5	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 8 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
Pentachlorophenol	ND	500	1.3	1.00	
Phenanthrene	ND	10	1.7	1.00	
Phenol	ND	10	2.3	1.00	
Pyrene	ND	10	1.6	1.00	
1,6,7-Trimethylnaphthalene	ND	10	1.8	1.00	
2,3,4,6-Tetrachlorophenol	ND	10	3.9	1.00	
2,6-Dichlorophenol	ND	10	2.1	1.00	
DCPA	ND	10	2.4	1.00	
Dibenzothiophene	ND	10	1.4	1.00	
Perthane	ND	10	2.0	1.00	
1-Methylphenanthrene	ND	10	2.0	1.00	
Benzo (e) Pyrene	ND	10	1.7	1.00	
Perylene	ND	10	1.2	1.00	
Biphenyl	ND	10	1.9	1.00	
2,6-Dimethylnaphthalene	ND	10	2.1	1.00	
Isophorone	ND	500	1.5	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,6-Tribromophenol	54	32-143	
2-Fluorobiphenyl	59	14-146	
2-Fluorophenol	70	15-138	
Nitrobenzene-d5	67	18-162	
p-Terphenyl-d14	61	34-148	
Phenol-d6	65	17-141	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270C SIM PCB Congeners
Units:	ug/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-BB**	**11/22/16 09:40**	**Sediment**	**GC/MS HHH**	**11/30/16**	**12/05/16 17:49**	**161130L15**

Comment(s): - Results are reported on a dry weight basis.

- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB003	ND	0.26	0.11	1.00	
PCB005/008	ND	0.51	0.19	1.00	
PCB015	ND	0.26	0.086	1.00	
PCB018	ND	0.26	0.091	1.00	
PCB027	ND	0.26	0.097	1.00	
PCB028	ND	0.26	0.043	1.00	
PCB029	ND	0.26	0.10	1.00	
PCB031	ND	0.26	0.064	1.00	
PCB033	ND	0.26	0.16	1.00	
PCB037	0.77	0.26	0.077	1.00	
PCB044	ND	0.26	0.11	1.00	
PCB049	ND	0.26	0.14	1.00	
PCB052	ND	0.26	0.080	1.00	
PCB056	ND	0.26	0.16	1.00	
PCB060	ND	0.26	0.18	1.00	
PCB066	ND	0.26	0.13	1.00	
PCB070	ND	0.26	0.076	1.00	
PCB074	ND	0.26	0.11	1.00	
PCB077	ND	0.26	0.10	1.00	
PCB081	ND	0.26	0.15	1.00	
PCB087	ND	0.26	0.14	1.00	
PCB095	ND	0.26	0.19	1.00	
PCB097	ND	0.26	0.17	1.00	
PCB099	ND	0.26	0.078	1.00	
PCB101	ND	0.26	0.13	1.00	
PCB105	ND	0.26	0.070	1.00	
PCB110	ND	0.26	0.059	1.00	
PCB114	ND	0.26	0.11	1.00	
PCB118	ND	0.26	0.11	1.00	
PCB119	ND	0.26	0.12	1.00	
PCB123	ND	0.26	0.13	1.00	
PCB126	ND	0.26	0.10	1.00	
PCB128	ND	0.26	0.13	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3541
Method: EPA 8270C SIM PCB Congeners
Units: ug/kg

Project: Santa Ana River Marsh

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Parameter	Result	RL	MDL	DF	Qualifiers
PCB132/153	ND	0.51	0.22	1.00	
PCB137	ND	0.26	0.17	1.00	
PCB138/158	ND	0.51	0.12	1.00	
PCB141	ND	0.26	0.15	1.00	
PCB149	ND	0.26	0.13	1.00	
PCB151	ND	0.26	0.086	1.00	
PCB156	ND	0.26	0.074	1.00	
PCB157	ND	0.26	0.067	1.00	
PCB167	ND	0.26	0.079	1.00	
PCB168	ND	0.26	0.062	1.00	
PCB169	ND	0.26	0.078	1.00	
PCB170	ND	0.26	0.081	1.00	
PCB174	ND	0.26	0.19	1.00	
PCB177	ND	0.26	0.11	1.00	
PCB180	ND	0.26	0.054	1.00	
PCB183	ND	0.26	0.14	1.00	
PCB184	ND	0.26	0.13	1.00	
PCB187	ND	0.26	0.11	1.00	
PCB189	ND	0.26	0.078	1.00	
PCB194	ND	0.26	0.14	1.00	
PCB195	ND	0.26	0.15	1.00	
PCB200	ND	0.26	0.18	1.00	
PCB201	ND	0.26	0.12	1.00	
PCB203	ND	0.26	0.15	1.00	
PCB206	ND	0.26	0.25	1.00	
PCB209	ND	0.26	0.19	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	89	50-150	
p-Terphenyl-d14	100	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol	Date Received: 11/23/16
1660 Hotel Circle North, Suite 500	Work Order: 16-11-2212
San Diego, CA 92108-2805	Preparation: EPA 3541
	Method: EPA 8270C SIM PCB Congeners
	Units: ug/kg
Project: Santa Ana River Marsh	Page 3 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-B**	**11/22/16 13:45**	**Sediment**	**GC/MS HHH**	**11/30/16**	**12/05/16 18:11**	**161130L15**

Comment(s): - Results are reported on a dry weight basis.

- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB003	ND	0.26	0.11	1.00	
PCB005/008	ND	0.52	0.19	1.00	
PCB015	ND	0.26	0.086	1.00	
PCB018	ND	0.26	0.092	1.00	
PCB027	ND	0.26	0.098	1.00	
PCB028	ND	0.26	0.043	1.00	
PCB029	0.51	0.26	0.10	1.00	
PCB031	ND	0.26	0.064	1.00	
PCB033	ND	0.26	0.16	1.00	
PCB037	0.39	0.26	0.078	1.00	
PCB044	ND	0.26	0.11	1.00	
PCB049	ND	0.26	0.15	1.00	
PCB052	ND	0.26	0.081	1.00	
PCB056	ND	0.26	0.16	1.00	
PCB060	ND	0.26	0.19	1.00	
PCB066	ND	0.26	0.13	1.00	
PCB070	ND	0.26	0.077	1.00	
PCB074	ND	0.26	0.11	1.00	
PCB077	ND	0.26	0.10	1.00	
PCB081	ND	0.26	0.15	1.00	
PCB087	ND	0.26	0.14	1.00	
PCB095	ND	0.26	0.19	1.00	
PCB097	ND	0.26	0.18	1.00	
PCB099	ND	0.26	0.078	1.00	
PCB101	ND	0.26	0.13	1.00	
PCB105	ND	0.26	0.071	1.00	
PCB110	ND	0.26	0.059	1.00	
PCB114	ND	0.26	0.11	1.00	
PCB118	ND	0.26	0.11	1.00	
PCB119	ND	0.26	0.12	1.00	
PCB123	ND	0.26	0.13	1.00	
PCB126	ND	0.26	0.10	1.00	
PCB128	ND	0.26	0.13	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 4 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
PCB132/153	ND	0.52	0.22	1.00	
PCB137	ND	0.26	0.17	1.00	
PCB138/158	ND	0.52	0.12	1.00	
PCB141	ND	0.26	0.15	1.00	
PCB149	0.29	0.26	0.13	1.00	
PCB151	ND	0.26	0.087	1.00	
PCB156	ND	0.26	0.074	1.00	
PCB157	ND	0.26	0.068	1.00	
PCB167	ND	0.26	0.080	1.00	
PCB168	ND	0.26	0.063	1.00	
PCB169	ND	0.26	0.079	1.00	
PCB170	ND	0.26	0.082	1.00	
PCB174	ND	0.26	0.19	1.00	
PCB177	ND	0.26	0.11	1.00	
PCB180	0.27	0.26	0.054	1.00	
PCB183	ND	0.26	0.14	1.00	
PCB184	ND	0.26	0.13	1.00	
PCB187	ND	0.26	0.11	1.00	
PCB189	ND	0.26	0.079	1.00	
PCB194	ND	0.26	0.15	1.00	
PCB195	ND	0.26	0.15	1.00	
PCB200	ND	0.26	0.18	1.00	
PCB201	ND	0.26	0.12	1.00	
PCB203	ND	0.26	0.15	1.00	
PCB206	ND	0.26	0.25	1.00	
PCB209	ND	0.26	0.19	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	88	50-150	
p-Terphenyl-d14	97	50-150	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270C SIM PCB Congeners
Units:	ug/kg

Project: Santa Ana River Marsh

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-BB**	**11/22/16 13:47**	**Sediment**	**GC/MS HHH**	**11/30/16**	**12/05/16 18:34**	**161130L15**

Comment(s): - Results are reported on a dry weight basis.

- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB003	ND	0.27	0.12	1.00	
PCB005/008	ND	0.54	0.19	1.00	
PCB015	ND	0.27	0.090	1.00	
PCB018	ND	0.27	0.095	1.00	
PCB027	ND	0.27	0.10	1.00	
PCB028	ND	0.27	0.045	1.00	
PCB029	ND	0.27	0.11	1.00	
PCB031	ND	0.27	0.067	1.00	
PCB033	ND	0.27	0.17	1.00	
PCB037	ND	0.27	0.081	1.00	
PCB044	ND	0.27	0.12	1.00	
PCB049	ND	0.27	0.15	1.00	
PCB052	ND	0.27	0.084	1.00	
PCB056	ND	0.27	0.17	1.00	
PCB060	ND	0.27	0.19	1.00	
PCB066	ND	0.27	0.14	1.00	
PCB070	ND	0.27	0.080	1.00	
PCB074	ND	0.27	0.12	1.00	
PCB077	ND	0.27	0.10	1.00	
PCB081	ND	0.27	0.16	1.00	
PCB087	ND	0.27	0.14	1.00	
PCB095	ND	0.27	0.20	1.00	
PCB097	ND	0.27	0.18	1.00	
PCB099	ND	0.27	0.081	1.00	
PCB101	ND	0.27	0.13	1.00	
PCB105	ND	0.27	0.073	1.00	
PCB110	ND	0.27	0.062	1.00	
PCB114	ND	0.27	0.11	1.00	
PCB118	ND	0.27	0.11	1.00	
PCB119	ND	0.27	0.13	1.00	
PCB123	ND	0.27	0.14	1.00	
PCB126	ND	0.27	0.11	1.00	
PCB128	ND	0.27	0.14	1.00	

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RL: Reporting Limit.   DF: Dilution Factor.   MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 6 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
PCB132/153	ND	0.54	0.23	1.00	
PCB137	ND	0.27	0.18	1.00	
PCB138/158	ND	0.54	0.13	1.00	
PCB141	ND	0.27	0.15	1.00	
PCB149	ND	0.27	0.13	1.00	
PCB151	ND	0.27	0.090	1.00	
PCB156	ND	0.27	0.077	1.00	
PCB157	ND	0.27	0.070	1.00	
PCB167	ND	0.27	0.083	1.00	
PCB168	ND	0.27	0.065	1.00	
PCB169	ND	0.27	0.082	1.00	
PCB170	ND	0.27	0.085	1.00	
PCB174	ND	0.27	0.19	1.00	
PCB177	ND	0.27	0.12	1.00	
PCB180	ND	0.27	0.056	1.00	
PCB183	ND	0.27	0.15	1.00	
PCB184	ND	0.27	0.14	1.00	
PCB187	ND	0.27	0.11	1.00	
PCB189	ND	0.27	0.082	1.00	
PCB194	ND	0.27	0.15	1.00	
PCB195	ND	0.27	0.16	1.00	
PCB200	ND	0.27	0.18	1.00	
PCB201	ND	0.27	0.13	1.00	
PCB203	ND	0.27	0.16	1.00	
PCB206	ND	0.27	0.26	1.00	
PCB209	ND	0.27	0.19	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	91	50-150	
p-Terphenyl-d14	100	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 7 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-418-233**	**N/A**	**Solid**	**GC/MS HHH**	**11/30/16**	**12/05/16 11:07**	**161130L15**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB003	ND	0.20	0.086	1.00	
PCB005/008	ND	0.40	0.14	1.00	
PCB015	ND	0.20	0.067	1.00	
PCB018	ND	0.20	0.071	1.00	
PCB027	ND	0.20	0.076	1.00	
PCB028	ND	0.20	0.034	1.00	
PCB029	ND	0.20	0.080	1.00	
PCB031	ND	0.20	0.050	1.00	
PCB033	ND	0.20	0.12	1.00	
PCB037	ND	0.20	0.060	1.00	
PCB044	ND	0.20	0.087	1.00	
PCB049	ND	0.20	0.11	1.00	
PCB052	ND	0.20	0.063	1.00	
PCB056	ND	0.20	0.13	1.00	
PCB060	ND	0.20	0.14	1.00	
PCB066	ND	0.20	0.10	1.00	
PCB070	ND	0.20	0.060	1.00	
PCB074	ND	0.20	0.087	1.00	
PCB077	ND	0.20	0.078	1.00	
PCB081	ND	0.20	0.12	1.00	
PCB087	ND	0.20	0.11	1.00	
PCB095	ND	0.20	0.15	1.00	
PCB097	ND	0.20	0.14	1.00	
PCB099	ND	0.20	0.061	1.00	
PCB101	ND	0.20	0.098	1.00	
PCB105	ND	0.20	0.055	1.00	
PCB110	ND	0.20	0.046	1.00	
PCB114	ND	0.20	0.082	1.00	
PCB118	ND	0.20	0.084	1.00	
PCB119	ND	0.20	0.094	1.00	
PCB123	ND	0.20	0.10	1.00	
PCB126	ND	0.20	0.080	1.00	
PCB128	ND	0.20	0.10	1.00	
PCB132/153	ND	0.40	0.17	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 8 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
PCB137	ND	0.20	0.13	1.00	
PCB138/158	ND	0.40	0.094	1.00	
PCB141	ND	0.20	0.11	1.00	
PCB149	ND	0.20	0.098	1.00	
PCB151	ND	0.20	0.067	1.00	
PCB156	ND	0.20	0.058	1.00	
PCB157	ND	0.20	0.052	1.00	
PCB167	ND	0.20	0.062	1.00	
PCB168	ND	0.20	0.049	1.00	
PCB169	ND	0.20	0.061	1.00	
PCB170	ND	0.20	0.063	1.00	
PCB174	ND	0.20	0.15	1.00	
PCB177	ND	0.20	0.087	1.00	
PCB180	ND	0.20	0.042	1.00	
PCB183	ND	0.20	0.11	1.00	
PCB184	ND	0.20	0.10	1.00	
PCB187	ND	0.20	0.084	1.00	
PCB189	ND	0.20	0.061	1.00	
PCB194	ND	0.20	0.11	1.00	
PCB195	ND	0.20	0.12	1.00	
PCB200	ND	0.20	0.14	1.00	
PCB201	ND	0.20	0.097	1.00	
PCB203	ND	0.20	0.12	1.00	
PCB206	ND	0.20	0.19	1.00	
PCB209	ND	0.20	0.15	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	66	50-150	
p-Terphenyl-d14	83	50-150	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3550B (M)
Method:	Organotins by Krone et al.
Units:	ug/kg

Project: Santa Ana River Marsh

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Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
LTI-COMP	**16-11-2212-1-AA**	**11/22/16 09:40**	**Sediment**	**GC/MS Y**	**12/05/16**	**12/07/16 11:35**	**161205L06**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	ND	3.9	0.94	1.00	
Monobutyltin	ND	3.9	1.8	1.00	
Tetrabutyltin	ND	3.9	0.96	1.00	
Tributyltin	ND	3.9	1.9	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	113	27-135	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SP COMP	**16-11-2212-2-AA**	**11/22/16 13:45**	**Sediment**	**GC/MS Y**	**12/05/16**	**12/07/16 11:51**	**161205L06**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	ND	3.9	0.95	1.00	
Monobutyltin	ND	3.9	1.8	1.00	
Tetrabutyltin	ND	3.9	0.97	1.00	
Tributyltin	ND	3.9	1.9	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	118	27-135	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SM16-SM COMP	**16-11-2212-3-AA**	**11/22/16 13:47**	**Sediment**	**GC/MS Y**	**12/05/16**	**12/07/16 12:06**	**161205L06**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	ND	4.1	0.99	1.00	
Monobutyltin	ND	4.1	1.9	1.00	
Tetrabutyltin	ND	4.1	1.0	1.00	
Tributyltin	ND	4.1	2.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	115	27-135	

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Analytical Report

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3550B (M)
		Method:	Organotins by Krone et al.
		Units:	ug/kg
Project: Santa Ana River Marsh			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-07-016-1464**	**N/A**	**Solid**	**GC/MS Y**	**12/05/16**	**12/07/16 10:32**	**161205L06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	ND	3.0	0.73	1.00	
Monobutyltin	ND	3.0	1.4	1.00	
Tetrabutyltin	ND	3.0	0.74	1.00	
Tributyltin	ND	3.0	1.5	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	90	27-135	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol	Date Received: 11/23/16
1660 Hotel Circle North, Suite 500	Work Order: 16-11-2212
San Diego, CA 92108-2805	Preparation: N/A
	Method: EPA 1664A (M)
Project: Santa Ana River Marsh	Page 1 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-11-1596-1	**Sample**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEMS3**
16-11-1596-1	**Matrix Spike**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEMS3**
16-11-1596-1	**Matrix Spike Duplicate**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEMS3**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
HEM: Oil and Grease	197.6	40.00	231.2	4X	233.8	4X	78-114	4X	0-18	Q

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: EPA 1664A (M)

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-11-1596-1	**Sample**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEMS4**
16-11-1596-1	**Matrix Spike**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEMS4**
16-11-1596-1	**Matrix Spike Duplicate**	**Sediment**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEMS4**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
HEM - SGT: Oil and Grease	131.7	20.00	148.6	4X	148.2	4X	64-132	4X	0-18	Q

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: EPA 9060A

Project: Santa Ana River Marsh

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-11-1814-1	**Sample**	**Sediment**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCS1**
16-11-1814-1	**Matrix Spike**	**Sediment**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCS1**
16-11-1814-1	**Matrix Spike Duplicate**	**Sediment**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCS1**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	0.3100	3.000	3.447	105	3.542	108	75-125	3	0-25	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: SM 4500-NH3 B/C (M)

Project: Santa Ana River Marsh

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
LTI-COMP	**Sample**	**Sediment**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3S1**
LTI-COMP	**Matrix Spike**	**Sediment**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3S1**
LTI-COMP	**Matrix Spike Duplicate**	**Sediment**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3S1**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Ammonia (as N)	1.400	5.000	5.215	76	5.180	76	70-130	1	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3550B
Method: EPA 8015B (M)

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-11-2401-1	**Sample**	**Solid**	**GC 46**	**11/29/16**	**11/29/16 21:51**	**161129S11**
16-11-2401-1	**Matrix Spike**	**Solid**	**GC 46**	**11/29/16**	**11/29/16 21:09**	**161129S11**
16-11-2401-1	**Matrix Spike Duplicate**	**Solid**	**GC 46**	**11/29/16**	**11/29/16 21:30**	**161129S11**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	127.0	400.0	468.0	85	537.4	103	64-130	14	0-15	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270D (M)/TQ/EI
Project: Santa Ana River Marsh			Page 6 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
SM16-SP COMP	**Sample**	**Sediment**	**GCTQ 2**	**11/29/16**	**11/30/16 22:12**	**161129S05**
SM16-SP COMP	**Matrix Spike**	**Sediment**	**GCTQ 2**	**11/29/16**	**11/30/16 23:44**	**161129S05**
SM16-SP COMP	**Matrix Spike Duplicate**	**Sediment**	**GCTQ 2**	**11/29/16**	**12/01/16 00:30**	**161129S05**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Allethrin	ND	10.00	9.718	97	8.393	84	10-148	15	0-30	
Bifenthrin	ND	10.00	8.960	90	8.410	84	26-128	6	0-30	
Cyfluthrin	ND	10.00	9.498	95	5.642	56	10-131	51	0-30	4
Cypermethrin	ND	10.00	8.161	82	5.984	60	10-136	31	0-30	4
Deltamethrin/Tralomethrin	ND	10.00	11.41	114	8.260	83	13-190	32	0-30	4
Fenpropathrin	ND	10.00	8.733	87	6.159	62	10-148	35	0-30	4
Fenvalerate/Esfenvalerate	ND	10.00	10.11	101	6.411	64	10-149	45	0-30	4
Fluvalinate	ND	10.00	7.725	77	4.538	45	10-121	52	0-30	4
Permethrin (cis/trans)	ND	10.00	11.57	116	9.088	91	45-123	24	0-30	
Phenothrin	ND	10.00	9.281	93	8.848	88	45-165	5	0-30	
Resmethrin/Bioresmethrin	ND	10.00	13.59	136	12.53	125	38-164	8	0-30	
Tetramethrin	ND	10.00	12.56	126	10.58	106	15-153	17	0-30	
lambda-Cyhalothrin	ND	10.00	6.902	69	5.346	53	10-123	25	0-30	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3050B
Method: EPA 6020

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-11-1814-1	**Sample**	**Sediment**	**ICP/MS 03**	**12/05/16**	**12/06/16 12:47**	**161205S04**
16-11-1814-1	**Matrix Spike**	**Sediment**	**ICP/MS 03**	**12/05/16**	**12/06/16 12:35**	**161205S04**
16-11-1814-1	**Matrix Spike Duplicate**	**Sediment**	**ICP/MS 03**	**12/05/16**	**12/06/16 12:38**	**161205S04**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Arsenic	5.420	25.00	31.44	104	31.71	105	80-120	1	0-20	
Cadmium	0.2656	25.00	27.17	108	27.05	107	80-120	0	0-20	
Chromium	40.05	25.00	68.19	113	69.89	119	80-120	2	0-20	
Copper	31.00	25.00	55.89	100	55.60	98	80-120	1	0-20	
Lead	15.61	25.00	41.88	105	41.91	105	80-120	0	0-20	
Nickel	51.99	25.00	76.35	97	77.41	102	80-120	1	0-20	
Selenium	0.2349	25.00	28.70	114	29.06	115	80-120	1	0-20	
Silver	0.1796	12.50	13.58	107	13.50	107	80-120	1	0-20	
Zinc	75.93	25.00	101.0	100	100.6	99	80-120	0	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 7471A Total
Method: EPA 7471A
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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-11-2456-1	**Sample**	**Solid**	**Mercury 07**	**12/06/16**	**12/06/16 12:22**	**161206S01**
16-11-2456-1	**Matrix Spike**	**Solid**	**Mercury 07**	**12/06/16**	**12/06/16 12:20**	**161206S01**
16-11-2456-1	**Matrix Spike Duplicate**	**Solid**	**Mercury 07**	**12/06/16**	**12/06/16 12:24**	**161206S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	ND	0.8350	0.8477	102	0.7602	91	71-137	11	0-14	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol	Date Received: 11/23/16
1660 Hotel Circle North, Suite 500	Work Order: 16-11-2212
San Diego, CA 92108-2805	Preparation: EPA 3541
	Method: EPA 8081A
Project: Santa Ana River Marsh	Page 9 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
LTI-COMP	**Sample**	**Sediment**	**GC 41**	**12/01/16**	**12/07/16 07:19**	**161201S06**
LTI-COMP	**Matrix Spike**	**Sediment**	**GC 41**	**12/01/16**	**12/05/16 15:20**	**161201S06**
LTI-COMP	**Matrix Spike Duplicate**	**Sediment**	**GC 41**	**12/01/16**	**12/05/16 15:35**	**161201S06**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Aldrin	ND	5.000	4.108	82	4.014	80	50-135	2	0-25	
Alpha-BHC	ND	5.000	3.873	77	4.051	81	50-135	4	0-25	
Beta-BHC	ND	5.000	4.328	87	4.165	83	50-135	4	0-25	
Delta-BHC	ND	5.000	4.310	86	4.235	85	50-135	2	0-25	
Gamma-BHC	ND	5.000	4.133	83	4.177	84	50-135	1	0-25	
Dieldrin	ND	5.000	4.950	99	4.577	92	50-135	8	0-25	
4,4'-DDD	ND	5.000	5.093	102	4.879	98	50-135	4	0-25	
4,4'-DDE	ND	5.000	4.800	96	4.430	89	50-135	8	0-25	
4,4'-DDT	ND	5.000	5.105	102	4.526	91	50-135	12	0-25	
Endosulfan I	ND	5.000	4.412	88	4.139	83	50-135	6	0-25	
Endosulfan II	ND	5.000	4.784	96	4.390	88	50-135	9	0-25	
Endosulfan Sulfate	ND	5.000	5.039	101	5.468	109	50-135	8	0-25	
Endrin	ND	5.000	4.858	97	4.545	91	50-135	7	0-25	
Endrin Aldehyde	ND	5.000	4.168	83	3.740	75	50-135	11	0-25	
Endrin Ketone	ND	5.000	5.941	119	5.733	115	50-135	4	0-25	
Heptachlor	ND	5.000	4.088	82	4.087	82	50-135	0	0-25	
Heptachlor Epoxide	ND	5.000	4.326	87	4.128	83	50-135	5	0-25	
Methoxychlor	ND	5.000	5.247	105	4.807	96	50-135	9	0-25	
Alpha Chlordane	ND	5.000	4.416	88	4.112	82	50-135	7	0-25	
Gamma Chlordane	ND	5.000	4.356	87	4.074	81	50-135	7	0-25	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3545
		Method:	EPA 8270C Bisphenol
Project: Santa Ana River Marsh			Page 10 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
SM16-SP COMP	**Sample**	**Sediment**	**GC/MS JJJ**	**12/06/16**	**12/08/16 17:41**	**161206S19**
SM16-SP COMP	**Matrix Spike**	**Sediment**	**GC/MS JJJ**	**12/06/16**	**12/08/16 18:16**	**161206S19**
SM16-SP COMP	**Matrix Spike Duplicate**	**Sediment**	**GC/MS JJJ**	**12/06/16**	**12/08/16 18:34**	**161206S19**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Bisphenol A	ND	100.0	81.62	82	73.45	73	50-150	11	0-20	

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RPD: Relative Percent Difference.   CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3541
Method: EPA 8270C SIM

Project: Santa Ana River Marsh

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
LTI-COMP	**Sample**	**Sediment**	**GC/MS MM**	**11/30/16**	**12/02/16 19:57**	**161130S14**
LTI-COMP	**Matrix Spike**	**Sediment**	**GC/MS MM**	**11/30/16**	**12/07/16 14:41**	**161130S14**
LTI-COMP	**Matrix Spike Duplicate**	**Sediment**	**GC/MS MM**	**11/30/16**	**12/07/16 16:23**	**161130S14**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
2,4,6-Trichlorophenol	ND	1000	992.2	99	975.5	98	40-160	2	0-20	
2,4-Dichlorophenol	ND	1000	945.0	95	923.5	92	40-160	2	0-20	
2-Methylphenol	ND	1000	915.2	92	919.8	92	40-160	1	0-20	
2-Nitrophenol	ND	1000	931.8	93	895.0	90	40-160	4	0-20	
4-Chloro-3-Methylphenol	ND	1000	1116	112	1035	104	40-160	8	0-20	
Acenaphthene	ND	1000	952.8	95	915.4	92	40-160	4	0-20	
Benzo (a) Pyrene	ND	1000	1030	103	995.4	100	17-163	3	0-20	
Chrysene	ND	1000	930.2	93	902.9	90	17-168	3	0-20	
Di-n-Butyl Phthalate	94.65	1000	1140	105	1078	98	40-160	6	0-20	
Dimethyl Phthalate	ND	1000	888.1	89	831.1	83	40-160	7	0-20	
Fluoranthene	ND	1000	1056	106	1017	102	26-137	4	0-20	
Fluorene	ND	1000	964.2	96	933.8	93	59-121	3	0-20	
Naphthalene	ND	1000	853.6	85	831.6	83	21-133	3	0-20	
Phenanthrene	ND	1000	1016	102	1060	106	54-120	4	0-20	
Phenol	ND	1000	943.2	94	871.0	87	40-160	8	0-20	
Pyrene	ND	1000	935.5	94	912.6	91	6-156	2	0-46	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
Project: Santa Ana River Marsh			Page 12 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-11-1814-2	**Sample**	**Sediment**	**GC/MS HHH**	**11/30/16**	**12/05/16 17:04**	**161130S15**
16-11-1814-2	**Matrix Spike**	**Sediment**	**GC/MS HHH**	**11/30/16**	**12/05/16 11:52**	**161130S15**
16-11-1814-2	**Matrix Spike Duplicate**	**Sediment**	**GC/MS HHH**	**11/30/16**	**12/05/16 12:14**	**161130S15**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
PCB018	ND	50.00	43.73	87	43.83	88	50-150	0	0-25	
PCB028	ND	50.00	49.02	98	49.30	99	50-150	1	0-25	
PCB044	ND	50.00	45.12	90	45.32	91	50-150	0	0-25	
PCB052	ND	50.00	45.70	91	46.07	92	50-150	1	0-25	
PCB066	ND	50.00	51.11	102	51.63	103	50-150	1	0-25	
PCB077	ND	50.00	46.55	93	46.82	94	50-150	1	0-25	
PCB101	ND	50.00	46.00	92	45.05	90	50-150	2	0-25	
PCB105	0.4637	50.00	51.63	102	51.05	101	50-150	1	0-25	
PCB118	ND	50.00	48.40	97	48.41	97	50-150	0	0-25	
PCB126	ND	50.00	45.37	91	45.55	91	50-150	0	0-25	
PCB128	ND	50.00	47.79	96	47.69	95	50-150	0	0-25	
PCB170	ND	50.00	46.78	94	47.59	95	50-150	2	0-25	
PCB180	ND	50.00	52.51	105	52.69	105	50-150	0	0-25	
PCB187	ND	50.00	47.59	95	47.58	95	50-150	0	0-25	
PCB195	ND	50.00	53.64	107	54.39	109	50-150	1	0-25	
PCB206	ND	50.00	46.86	94	47.70	95	50-150	2	0-25	
PCB209	ND	50.00	47.83	96	50.87	102	50-150	6	0-25	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Spike/Spike Duplicate

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3550B (M)
Method: Organotins by Krone et al.

Project: Santa Ana River Marsh

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
SM16-SP COMP	**Sample**	**Sediment**	**GC/MS Y**	**12/05/16**	**12/07/16 11:51**	**161205S06**
SM16-SP COMP	**Matrix Spike**	**Sediment**	**GC/MS Y**	**12/05/16**	**12/07/16 11:03**	**161205S06**
SM16-SP COMP	**Matrix Spike Duplicate**	**Sediment**	**GC/MS Y**	**12/05/16**	**12/07/16 11:19**	**161205S06**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Tetrabutyltin	ND	100.0	126.1	126	132.9	133	33-129	5	0-36	3
Tributyltin	ND	100.0	104.6	105	106.3	106	34-142	2	0-50	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - PDS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3050B
Method: EPA 6020

Project: Santa Ana River Marsh

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
16-11-1814-1	**Sample**	**Sediment**	**ICP/MS 03**	**12/05/16 00:00**	**12/06/16 12:47**	**161205S04**
16-11-1814-1	**PDS**	**Sediment**	**ICP/MS 03**	**12/05/16 00:00**	**12/06/16 12:41**	**161205S04**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Arsenic	5.420	25.00	30.86	102	75-125	
Cadmium	0.2656	25.00	25.15	100	75-125	
Chromium	40.05	25.00	63.59	94	75-125	
Copper	31.00	25.00	54.03	92	75-125	
Lead	15.61	25.00	40.21	98	75-125	
Nickel	51.99	25.00	75.81	95	75-125	
Selenium	0.2349	25.00	27.00	107	75-125	
Silver	0.1796	12.50	12.34	97	75-125	
Zinc	75.93	25.00	102.6	107	75-125	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - Sample Duplicate

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	N/A
		Method:	EPA 160.4 (M)
Project: Santa Ana River Marsh			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
LTI-COMP	**Sample**	**Sediment**	**N/A**	**11/29/16 00:00**	**11/29/16 20:00**	**G1129VSD1**
LTI-COMP	**Sample Duplicate**	**Sediment**	**N/A**	**11/29/16 00:00**	**11/29/16 20:00**	**G1129VSD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Volatile	0.4400	0.4700	7	0-25	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Moffatt & Nichol	Date Received: 11/23/16
1660 Hotel Circle North, Suite 500	Work Order: 16-11-2212
San Diego, CA 92108-2805	Preparation: N/A
	Method: SM 2540 B (M)
Project: Santa Ana River Marsh	Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
16-11-2024-1	**Sample**	**Solid**	**N/A**	**11/29/16 00:00**	**11/29/16 17:00**	**G1129TSD1**
16-11-2024-1	**Sample Duplicate**	**Solid**	**N/A**	**11/29/16 00:00**	**11/29/16 17:00**	**G1129TSD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total	34.30	34.00	1	0-10	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - LCS/LCSD

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	N/A
Method:	EPA 1664A (M)

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-040-632	**LCS**	**Solid**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEML3**
099-12-040-632	**LCSD**	**Solid**	**N/A**	**11/30/16**	**11/30/16 16:00**	**G1130HEML3**

Parameter	LCS Spike	LCS Conc.	LCS %Rec.	LCSD Spike	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
HEM: Oil and Grease	40.00	36.57	91	40.00	33.29	83	78-114	9	0-18	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS/LCSD

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: N/A
Method: EPA 1664A (M)

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-207-147	**LCS**	**Solid**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEML4**
099-12-207-147	**LCSD**	**Solid**	**N/A**	**11/30/16**	**11/30/16 18:30**	**G1130HEML4**

Parameter	LCS Spike	LCS Conc.	LCS %Rec.	LCSD Spike	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
HEM - SGT: Oil and Grease	20.00	19.95	100	20.00	16.64	83	64-132	18	0-34	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	N/A
		Method:	EPA 9060A
Project: Santa Ana River Marsh			Page 3 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-06-013-1645	**LCS**	**Solid**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCL1**
099-06-013-1645	**LCSD**	**Solid**	**TOC 9**	**12/05/16**	**12/05/16 18:51**	**G1205TOCL1**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	0.6000	0.5457	91	0.5594	93	80-120	2	0-20	

Return to Contents

RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - LCS/LCSD

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	N/A
		Method:	SM 4500-NH3 B/C (M)
Project: Santa Ana River Marsh			Page 4 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-816-151	**LCS**	**Solid**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3L1**
099-12-816-151	**LCSD**	**Solid**	**BUR05**	**12/15/16**	**12/15/16 19:22**	**G1215NH3L1**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Ammonia (as N)	5.000	4.410	88	4.550	91	80-120	3	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3550B
Method: EPA 8015B (M)

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-490-2383	**LCS**	**Solid**	**GC 46**	**11/29/16**	**11/29/16 20:48**	**161129B11**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
TPH as Diesel	400.0	413.6	103	75-123	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS/LCSD

Moffatt & Nichol		Date Received:	11/23/16
1660 Hotel Circle North, Suite 500		Work Order:	16-11-2212
San Diego, CA 92108-2805		Preparation:	EPA 3541
		Method:	EPA 8270D (M)/TQ/EI
Project: Santa Ana River Marsh			Page 6 of 13

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-403-116	**LCS**	**Solid**	**GCTQ 2**	**11/29/16**	**11/30/16 19:08**	**161129L05**
099-14-403-116	**LCSD**	**Solid**	**GCTQ 2**	**11/29/16**	**11/30/16 19:54**	**161129L05**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
Allethrin	10.00	8.317	83	9.061	91	10-148	0-171	9	0-25	
Bifenthrin	10.00	6.577	66	7.686	77	26-128	9-145	16	0-25	
Cyfluthrin	10.00	6.727	67	7.244	72	10-131	0-151	7	0-25	
Cypermethrin	10.00	6.785	68	7.268	73	10-136	0-157	7	0-25	
Deltamethrin/Tralomethrin	10.00	6.815	68	7.453	75	13-190	0-220	9	0-25	
Fenpropathrin	10.00	6.267	63	6.900	69	10-148	0-171	10	0-25	
Fenvalerate/Esfenvalerate	10.00	7.253	73	8.446	84	10-149	0-172	15	0-25	
Fluvalinate	10.00	5.867	59	5.907	59	10-121	0-140	1	0-25	
Permethrin (cis/trans)	10.00	7.115	71	7.972	80	45-123	32-136	11	0-25	
Phenothrin	10.00	6.165	62	7.055	71	45-165	25-185	13	0-25	
Resmethrin/Bioresmethrin	10.00	6.774	68	7.751	78	38-164	17-185	13	0-25	
Tetramethrin	10.00	8.012	80	9.175	92	15-153	0-176	14	0-25	
lambda-Cyhalothrin	10.00	7.531	75	8.163	82	10-123	0-142	8	0-25	

Total number of LCS compounds: 13
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Moffatt & Nichol	Date Received: 11/23/16
1660 Hotel Circle North, Suite 500	Work Order: 16-11-2212
San Diego, CA 92108-2805	Preparation: EPA 3050B
	Method: EPA 6020

Project: Santa Ana River Marsh

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-254-477	**LCS**	**Solid**	**ICP/MS 03**	**12/05/16**	**12/06/16 12:32**	**161205L04E**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Arsenic	25.00	23.98	96	80-120	
Cadmium	25.00	24.45	98	80-120	
Chromium	25.00	25.09	100	80-120	
Copper	25.00	25.76	103	80-120	
Lead	25.00	24.91	100	80-120	
Nickel	25.00	25.62	102	80-120	
Selenium	25.00	24.54	98	80-120	
Silver	12.50	12.16	97	80-120	
Zinc	25.00	25.30	101	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 7471A Total
Method: EPA 7471A

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-278-287	**LCS**	**Solid**	**Mercury 07**	**12/06/16**	**12/06/16 12:18**	**161206L01E**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Mercury	0.8350	0.7572	91	82-124	

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3541
Method: EPA 8081A

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-12-858-447	**LCS**	**Solid**	**GC 41**	**12/01/16**	**12/05/16 16:04**	**161201L06**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Aldrin	5.000	4.453	89	50-135	36-149	
Alpha-BHC	5.000	4.317	86	50-135	36-149	
Beta-BHC	5.000	4.473	89	50-135	36-149	
Delta-BHC	5.000	4.824	96	50-135	36-149	
Gamma-BHC	5.000	4.430	89	50-135	36-149	
Dieldrin	5.000	4.806	96	50-135	36-149	
4,4'-DDD	5.000	4.552	91	50-135	36-149	
4,4'-DDE	5.000	4.676	94	50-135	36-149	
4,4'-DDT	5.000	4.664	93	50-135	36-149	
Endosulfan I	5.000	4.455	89	50-135	36-149	
Endosulfan II	5.000	4.656	93	50-135	36-149	
Endosulfan Sulfate	5.000	4.844	97	50-135	36-149	
Endrin	5.000	4.516	90	50-135	36-149	
Endrin Aldehyde	5.000	4.185	84	50-135	36-149	
Endrin Ketone	5.000	5.069	101	50-135	36-149	
Heptachlor	5.000	4.454	89	50-135	36-149	
Heptachlor Epoxide	5.000	4.594	92	50-135	36-149	
Methoxychlor	5.000	4.675	93	50-135	36-149	
Alpha Chlordane	5.000	4.411	88	50-135	36-149	
Gamma Chlordane	5.000	4.450	89	50-135	36-149	

Total number of LCS compounds: 20
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3545
Method: EPA 8270C Bisphenol

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-401-13	**LCS**	**Solid**	**GC/MS JJJ**	**12/06/16**	**12/08/16 16:31**	**161206L19**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Bisphenol A	100.0	94.07	94	50-150	

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RPD: Relative Percent Difference.   CL: Control Limits

Quality Control - LCS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received:	11/23/16
Work Order:	16-11-2212
Preparation:	EPA 3541
Method:	EPA 8270C SIM

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-256-167	**LCS**	**Solid**	**GC/MS MM**	**11/30/16**	**12/02/16 18:39**	**161130L14**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
2,4,6-Trichlorophenol	1000	717.2	72	40-160	20-180	
2,4-Dichlorophenol	1000	694.5	69	40-160	20-180	
2-Methylphenol	1000	676.9	68	40-160	20-180	
2-Nitrophenol	1000	628.4	63	40-160	20-180	
4-Chloro-3-Methylphenol	1000	776.1	78	40-160	20-180	
Acenaphthene	1000	693.6	69	48-108	38-118	
Benzo (a) Pyrene	1000	787.4	79	17-163	0-187	
Chrysene	1000	683.6	68	17-168	0-193	
Di-n-Butyl Phthalate	1000	1039	104	40-160	20-180	
Dimethyl Phthalate	1000	703.0	70	40-160	20-180	
Fluoranthene	1000	710.8	71	26-137	8-156	
Fluorene	1000	700.2	70	59-121	49-131	
Naphthalene	1000	638.9	64	21-133	2-152	
Phenanthrene	1000	734.0	73	54-120	43-131	
Phenol	1000	688.7	69	40-160	20-180	
Pyrene	1000	719.6	72	28-106	15-119	

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Total number of LCS compounds: 16
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Project: Santa Ana River Marsh

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3541
Method: EPA 8270C SIM PCB Congeners

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-418-233	**LCS**	**Solid**	**GC/MS HHH**	**11/30/16**	**12/05/16 11:29**	**161130L15**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
PCB018	50.00	39.01	78	24-132	6-150	
PCB028	50.00	42.08	84	31-133	14-150	
PCB044	50.00	38.63	77	36-120	22-134	
PCB052	50.00	39.92	80	31-121	16-136	
PCB066	50.00	45.22	90	43-139	27-155	
PCB077	50.00	40.13	80	41-131	26-146	
PCB101	50.00	39.53	79	37-121	23-135	
PCB105	50.00	44.03	88	48-132	34-146	
PCB118	50.00	41.72	83	46-136	31-151	
PCB126	50.00	40.49	81	38-134	22-150	
PCB128	50.00	41.16	82	40-130	25-145	
PCB170	50.00	41.69	83	40-124	26-138	
PCB180	50.00	46.18	92	41-143	24-160	
PCB187	50.00	40.56	81	39-129	24-144	
PCB195	50.00	48.41	97	44-128	30-142	
PCB206	50.00	43.25	87	33-135	16-152	
PCB209	50.00	42.78	86	29-137	11-155	

Total number of LCS compounds: 17
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

Quality Control - LCS

Moffatt & Nichol
1660 Hotel Circle North, Suite 500
San Diego, CA 92108-2805

Date Received: 11/23/16
Work Order: 16-11-2212
Preparation: EPA 3550B (M)
Method: Organotins by Krone et al.

Project: Santa Ana River Marsh

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-07-016-1464	**LCS**	**Solid**	**GC/MS Y**	**12/05/16**	**12/07/16 10:48**	**161205L06**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Tetrabutyltin	100.0	132.7	133	40-142	
Tributyltin	100.0	112.1	112	33-147	

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 16-11-2212 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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WO NO. / LAB USE ONLY
16-11-2212

CHAIN-OF-CUSTODY RECORD

Date 11/23/16
Page 1 of 2

LABORATORY CLIENT: Moffatt + Nichol
ADDRESS: 1660 Hotel Circle North, Suite 500
CITY: San Diego STATE: CA ZIP: 92108
TEL: 619.220.6050 E-MAIL: bleslie@moffattnichol.com

CLIENT PROJECT NAME / NO.: Santa Ana River Marsh
P.O. NO.:
PROJECT CONTACT: Brian Leslie
LAB CONTACT OR QUOTE NO: 962552
GLOBAL ID:
LOG CODE:
SAMPLER(S): (PRINT) Brian Leslie, Conor Ofstun

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☑ STANDARD

EDD
☐ COELT EDF ☐ OTHER

SPECIAL INSTRUCTIONS:
Process the the composite samples (i.e. LTI-COMP, SM16-SP COMP, SM16-SM COMP) per revised Quote number 962552.
Archive all other samples for potential future testing. Thanks!

REQUESTED ANALYSES
Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	☐ TPH(g) ☐ GRO	☐ TPH(d) ☐ DRO	TPH ☐ C6-C36 ☐ C6-C44	TPH ___	BTEX / MTBE ☐ 8260 ☐ ___	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☐ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	See Quote No. 962552 attached		Archive only	
1	LTI-COMP	11/22/16	0940	SED	~~3~~2	X																	X			
2	SM16-SP COMP	↓	1345	↓	2	↓																	↓			
3	SM16-SM COMP	↓	1347	↓	2	↓																	↓			
4	SM16-1A 0-0.5'	↓	1230	↓	1	↓																			X	
5	SM16-1A 0.5-2.0'	↓	1230	↓	1	↓																			↓	
6	SM16-1A 2.0-3.75'	↓	1230	↓	1	↓																			↓	
7	SM16-2A 0.0-0.5'	↓	1115	↓	1	↓																			↓	
8	SM16-2A 0.5-3.8'	↓	1115	↓	1	↓																			↓	
9	SM16-3A 0-0.5'	↓	1045	↓	1	↓																			↓	
10	SM16-3A 0.5-3.5'		1045		1																				↓	

Relinquished by: (Signature)	Received by: (Signature/Affiliation) ECI	Date: 11/23/16	Time: 1405
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 11/23/16	Time: 1820
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

2016-04-01-Revision

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WO NO. / LAB USE ONLY 2212

CHAIN-OF-CUSTODY RECORD

Date 11/23/16
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LABORATORY CLIENT: Moffatt + Nichol
ADDRESS: 1660 Hotel Circle North, Ste. 500
CITY: San Diego STATE: CA ZIP: 92108
TEL: 619.220.6050 E-MAIL: bleslie@moffattnichol.com

CLIENT PROJECT NAME / NO.: Santa Ana River Marsh
P.O. NO.:
PROJECT CONTACT: Brian Leslie
LAB CONTACT OR QUOTE NO: 962552
GLOBAL ID:
LOG CODE:
SAMPLER(S): (PRINT) Brian Leslie
Conor Olston

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☑ STANDARD

EDD
☐ COELT EDF ☐ OTHER

SPECIAL INSTRUCTIONS:
Archive these samples for potential future testing.

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	☐ TPH(g) ☐ GRO	☐ TPH(d) ☐ DRO	TPH ☐ C6-C36 ☐ C6-C44	TPH ____	BTEX / MTBE ☐ 8260 ☐ ____	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☐ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Archive Only			
11	SM16-B 0-0.5'	11/22/16	1200	SED	1																		X			
12	SM16-B 0.5-2.5'	11/22/16	1200	SED	1																		↓			
13	SM16-B 2.5-5.0'	11/22/16	1200	SED	1																					

Relinquished by: (Signature)	Received by: (Signature/Affiliation) ECI	Date: 11/23/16	Time: 1405
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 11/23/16	Time: 1820
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

2016-04-01-Revision

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WORK ORDER NUMBER: 16-11- 2212

SAMPLE RECEIPT CHECKLIST

COOLER 1 **OF** 1

DATE: 11 / 23 **/ 2016**

CLIENT: MOFFATT & NICHOL

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC3A (CF: 0.0°C); Temperature (w/o CF): 3.2 °C (w/ CF): 3.2 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: ________)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter

Checked by: 671

CUSTODY SEAL:

Cooler	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 671
Sample(s)	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 1069

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers ☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time ☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses ☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500) ☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: **(Trip Blank Lot Number: ____________)**

Aqueous: ☐ VOA ☐ VOAh ☐ VOAna$_2$ ☐ 100PJ ☐ 100PJna$_2$ ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBznna ☐ 250AGB ☐ 250CGB ☐ 250CGBs ☐ 250PB ☐ 250PBn ☐ 500AGB ☐ 500AGJ ☐ 500AGJs ☐ 500PB ☐ 1AGB ☐ 1AGBna$_2$ ☐ 1AGBs ☐ 1PB ☐ 1PBna ☐ ________ ☐ ________ ☐ ________ ☐ ________

Solid: (Sed) ☐ 4ozCGJ ☑ 8ozCGJ ☑ 16ozCGJ ☐ Sleeve (____) ☐ EnCores® (____) ☐ TerraCores® (____) ☐ ________

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ ________ **Other Matrix** (__________): ☐ ________ ☐ ________

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **x** = Na_2SO_3+$NaHSO_4.H_2O$, **znna** = Zn $(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 1069

Reviewed by: 778

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APPENDIX B

404(b)(1) Analysis

THE EVALUATION OF THE EFFECTS
OF THE DISCHARGE OF DREDGED OR FILL MATERIAL
INTO THE WATERS OF THE UNITED STATES

Santa Ana River Marsh Sediment Removal
Newport Beach, Orange County, California

I. INTRODUCTION. The following evaluation is provided in accordance with Section 404 (b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). Its intent is to succinctly state and evaluate information regarding the effects of discharge of dredged or fill material into the waters of the U. S, including incidental discharge during dredging. As such, it is not meant to stand alone and relies heavily upon information provided in the Draft Supplemental Environmental Assessment (EA) to which it is attached.

II. PROJECT DESCRIPTION. (Referenced in the SEA and described briefly as follows:)

A. Location: The project location is described in Section 2.1 of the attached draft SEA.

Brief Summary: The project site is the Santa Ana River Marsh, located in Newport Beach, Orange County, California The proposed project footprint is approximately 2.8 acres within the 54-acre southern portion of the Marsh property. The proposed placement site for the sandy material is the least tern island, located within the Marsh, adjacent to the project area.

B. General Description: The project description is described in Section 2.3 of the attached draft SEA.

Brief Summary: The following are the specific proposed actions for Marsh sediment removal and other project activities: (1) excavation and removal of sediment in the 2.8 acre project area (approximately 10,000 cubic yards); (2) placement and grooming of material on the least tern island; and (3) environmental monitoring.

C. Purpose and Need: The purpose and need is described in Section 1.2 of the attached draft SEA.

Brief Summary: The proposed project would serve the following purposes: (1) remove sediment blocking the downstream tide gate; (2) beneficially reuse the sediment to improve CA least tern nesting habitat on the tern island; and (3) prevent water quality problems and stagnation. Removal of the blockage will increase tidal range and improve circulation of the tidal flow throughout the marsh, which will result in improved water quality and overall habitat quality for wildlife.

D. Authority and Purpose:

The Santa Ana Mainstem Project was federally authorized by the 74th Congress, on June 22, 1936. The Phase I GDM and Supplemental EIS were completed in 1980 by the Corps, and a supplement to Phase I was issued in 1985. The full authorization language is included in the 1980 Phase I GDM. Additional study was authorized by Congress under the Water Resources Development Act (WRDA) of 1986, Public Law 99-662. The Phase II GDM/SEIS was completed in 1988. Subsequent authorizations were included in the Energy and Water Appropriation Act of 1988 (which included the San Timoteo feature), WRDA 1990 (Santa Ana Trails), WRDA 1996 (Prado Dam, SR 71), and WRDA 2007 (Santa Ana River Interceptor Line protection/relocation).

E. General Description of Dredged or Fill Material: A description of dredge material is documented in Section 3.1 and Appendix A of the attached draft SEA.

Brief Summary: Marsh sediment contained two distinct layers generally describable as poorly graded sand and a silty-sand. On a composited weighted average basis, the sediment contained 3 percent fines and a median grain size of 0.20 millimeter (mm). Chemistry results from two composite samples collected in the Marsh were found to be below established screening levels from National Oceanic and Atmospheric Administration, California Environmental Protection Agency (Cal/EPA), and the U.S. Environmental Protection Agency (U.S. EPA) (Moffat and Nichol 2017).

F. Description of the Proposed Placement Site: A description of the placement site is documented in Section 2.3, 3.1, and Appendix A of the attached draft SEA.

Brief Summary: Sediments collected on the tern island receiver site are described as poorly graded sand with a median grain size of 0.25 mm and percent fines of 7.3 percent. Chemistry results from the one composite sample collected on the tern island were below established screening levels from National Oceanic and Atmospheric Administration, Cal/EPA, and the U.S. EPA. On a physical and chemical basis, all four Marsh boreholes were individually and collectively compatible for placement at the tern island receiver site (Moffat and Nichol 2017).

G. Description of Disposal Method: The disposal method is described in Section 2.3 of the attached draft SEA.

Brief Summary: Approximately 10,000 cubic yards of material would be removed. The sandy material would be beneficially reused to cap the adjacent tern island to improve nesting habitat for the California least tern. Removal of sediment would be performed using two excavators and a small dozer. Excavators would place sediment directly on to tern island as much as possible; however, one to two dump trucks may be needed to place sediment in areas the excavator cannot reach.

III. FACTUAL DETERMINATIONS.

A. Disposal Site Physical Substrate Determinations:

1. Substrate Elevation and Slope:

Impact: _____N/A __X__INSIGNIF. _____SIGNIF. __3.1, 4.1__ EA Section

2. Sediment Type:

Impact: _____N/A __X__INSIGNIF. _____SIGNIF. __3.1, 4.1__ EA Section

3. Dredged/Fill Material Movement:

Impact: _____N/A __X__INSIGNIF. _____SIGNIF. __3.1, 4.1__ EA Section

Modifications to the existing bottom topography of the nearshore disposal area would be expected as a result of the proposed project. Local, but minor, changes to the bathymetry would result due to removal of sediments from the Marsh channel. Impacts to the Marsh bathymetry would not be considered significant as sediment would be removed to design depths and removal of sediments would improve the functioning of the Marsh environment.

4. Physical Effects on Benthos (burial, changes in sediment type, composition, etc.):

Impact: _____N/A __X__INSIGNIF. _____SIGNIF. __3.2, 4.2__ EA Section

5. Actions taken to Minimize Impacts

Needed?: _____YES __X__NO

If Needed, Taken:

_X__N/A __ __YES _____NO

Sediment removal activities would cause disturbance and redistribution of bottom sediments which would persist for the duration of the sediment removal activities, which would last approximately 2 weeks. Some invertebrates, especially small crustaceans and mollusks of the infauna, may be relocated with the sediment material and deposited on the tern island. Some may be smothered, become food for opportunistic birds, or may survive at a new location. Sediment removal operations may cause some clogging to gills and suspension feeding apparatuses, resulting in smothering to invertebrates in the immediate vicinity.

Overall, the impacts to invertebrates are expected to be minimal, localized, and temporary, and would be considered less than significant.

B. Effect on Water Circulation, Fluctuation, and Salinity Determinations:

1. Effect on Water. The following potential impacts were considered:

a. Salinity __X__N/A_____INSIGNIF._____SIGNIF.
b. Water Chemistry (pH, etc.) _____N/A__X__INSIGNIF._____SIGNIF.
c. Clarity _____N/A__X__INSIGNIF._____SIGNIF.
d. Color _____N/A__X__INSIGNIF._____SIGNIF.
e. Odor _____N/A__X__INSIGNIF._____SIGNIF.
f. Taste __X__N/A_____INSIGNIF._____SIGNIF.
g. Dissolved gas levels _____N/A__X__INSIGNIF._____SIGNIF.
h. Nutrients _____N/A__X__INSIGNIF._____SIGNIF.
i. Eutrophication_X__N/A____INSIGNIF._____SIGNIF.
j. Others __X__N/A_____INSIGNIF._____SIGNIF.

Temporary physical and chemical changes in water quality characteristics would result due to re-suspension of bottom sediments during sediment removal activities. However, since contaminant levels for all dredge areas were within acceptable limits, impacts to water quality due to contaminants during dredging activities are expected to be minimal and not significant.

Increases in turbidity during sediment removal would be localized and short term. Connections to the Marsh channels (via the tide gate and culverts) would be blocked during sediment removal to keep consistent water levels and prevent turbidity from entering the Santa Ana River and northern portion of the Marsh. Considering the existing tidal flows and turbidity, as well as mitigation measures to be implemented, impacts from turbidity due to sediment removal activities are expected to be localized, short term, and not significant.

Sediment removal activities would adhere to the requirements and controls set forth by the California Regional Water Quality Control Board and the 401 Water Quality Certification. Water quality monitoring would be performed during dredging, placement, and construction operations to minimize impacts due to the implementation of the proposed project. These activities shall include monitoring of turbidity, dissolved oxygen, and pH. Section 6.0 in the draft SEA discusses environmental commitments related to water quality monitoring.

2. Effect on Current Patterns and Circulation. The potential of discharge or fill on the following conditions were evaluated:

a. Current Pattern and Flow
_____N/A__X___INSIGNIF._____SIGNIF.
b. Velocity
_____N/A__X___INSIGNIF._____SIGNIF.
c. Stratification
_____N/A__X___INSIGNIF._____SIGNIF.

d. Hydrology Regime
_____N/A__X___INSIGNIF._____SIGNIF.

Removal of the accumulated sediments will increase tidal range and improve circulation of the tidal flow throughout the marsh, which will result in improved water quality and overall habitat quality for wildlife.

3. Effect on Normal Water Level Fluctuations. The potential of discharge of fill on the following were evaluated:

a. Tide __X__N/A _____INSIGNIF. _____SIGNIF.
b. River Stage __X__N/A _____INSIGNIF. _____SIGNIF.

4. Action Taken to Minimize Effects:
Mitigation measures minimize impacts. See Section 6.0 for Environmental Commitments.

C. Suspended Particulate/Turbidity Determinations at the Disposal Site:

1. Expected Change in Suspended Particulate and Turbidity levels in Vicinity of Disposal Site:
Impact: __X___N/A ____INSIGNIF. _____SIGNIF. __ EA Section

2. Effects (degree and duration) on Chemical and Physical Properties of the Water Column:

a. Light Penetration
__X___N/A ____INSIGNIF._____SIGNIF. __ EA Section

b. Dissolved Oxygen
___X__N/A ____INSIGNIF._____SIGNIF. __ EA Section

c. Toxic Metals & Organics
__X__N/A _____INSIGNIF._____SIGNIF.

d. Pathogen
__X__N/A _____INSIGNIF._____SIGNIF.

e. Esthetics
__X__N/A ____INSIGNIF._____SIGNIF. ___ EA Section

3. Effects of Turbidity on Biota: The following effects of turbidity on biota were evaluated:

a. Primary Productivity
__X__N/A ____INSIGNIF.___SIGNIF. __ EA Section

b. Suspension/Filter Feeders
__X__N/A ____INSIGNIF.___SIGNIF. __ EA Section

c. Sight feeders
__X_N/A ____INSIGNIF.___SIGNIF._____EA Section

4. Action Taken to Minimize Effects:
Disposal would occur at an upland site, the least tern island.

D. Contaminant Determination:

The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material.

1. Physical characteristics of the sediment.

2. Chemical Analysis of sediment samples collected November 2016

3. Results from previous testing of the material or similar material in the vicinity of the project.

An evaluation of the appropriate information above indicates that the proposed dredge or fill material is not expected to be a carrier of contaminants.

The material meets the testing exclusion criteria.

YES__X__NO_____

Impact: _____N/A__X__INSIGNIF._____SIGNIF.

E. Effect on Aquatic Ecosystem and Organism Determinations: The Following ecosystem effects were evaluated:

1. On Plankton
__X___N/A__ __INSIGNIF._____SIGNIF. __3.2, 4.2__ EA Section

2. On Benthos
_____N/A__X__INSIGNIF._____SIGNIF. __3.2, 4.2_ EA Section

3. On Nekton
__X___N/A__ __INSIGNIF._____SIGNIF. __3.2, 4.2_ EA Section

4. Food Web
_____N/A__X__INSIGNIF._____SIGNIF. __3.2, 4.2_ EA Section

5. Sensitive Habitats:
    a. Sanctuaries, refuges
        __X__N/A_____INSIGNIF._____SIGNIF.
    b. Wetlands
        _____N/A__X___INSIGNIF._____SIGNIF.
    c. Mudflats
        _____N/A__X___INSIGNIF._____SIGNIF.
    d. Eelgrass beds
        _____N/A__X___INSIGNIF._____SIGNIF.
    e. Riffle and Pool Complexes
        __X__N/A_____INSIGNIF._____SIGNIF.

6. Threatened & Endangered Species
    _____N/A__X__INSIGNIF._____SIGNIF. __ 3.3, 4.3 __ EA Section

7. Other Wildlife (grunion)
    _____N/A__X__INSIGNIF._____SIGNIF. __ 3.2, 4.2 __ EA Section

F. Proposed Disposal Site Determinations: Is the mixing zone for each disposal site confined to the smallest practicable zone?

____YES _____NO __X__ N/A

Placement site is located upland on the adjacent least tern island.

G. Determination of Cumulative Effects of Disposal or Fill on the Aquatic Ecosystem:

Impacts: _____N/A__X__INSIGNIF._____SIGNIF.

No significant cumulative adverse effects on the aquatic ecosystem are expected.

H. Determination of Indirect Effects of Disposal or Fill on the Aquatic Ecosystem:

Impacts: _____N/A___X__INSIGNIF._____SIGNIF.

IV. FINDING OF COMPLIANCE.

A. A review of the proposed project indicates that:

1. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose.

__X__YES _____NO

2. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and 3) violate requirements of any Federally designated marine sanctuary.

__X__YES _____NO

3. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values.

__X__YES _____NO

4. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

__X__YES _____NO

B. On the Basis of the Guidelines, the Proposed Disposal Sites for the Discharge of Dredged or Fill Material is (select one):

___X___ (1) Specified as complying with the requirements of these guidelines; or,

_______ (2) Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem;or,

_______ (3) Specified as failing to comply with the requirements of these guidelines.

Prepared by: Erin Jones
Name

Environmental Coordinator/Biologist
Position

Date: February 14, 2017

APPENDIX C

Correspondence

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

February 16, 2017

Environmental Resources Branch

Mr. John Ainsworth
Executive Director
California Coastal Commission
45 Fremont, Suite 2000
Attention: Mr. Larry Simon
San Francisco, California 94105

Dear Mr. Ainsworth:

The U.S. Army Corps of Engineers is requesting your concurrence on the enclosed Negative Determination (ND) for the Santa Ana River Marsh Sediment Removal Project. The project would consist of removing approximately 10,000 cubic yards of uncontaminated sandy material that has shoaled within a 2.8 acre area near one of the tide gates within the marsh, and beneficially reusing the excavated material to improve California least tern nesting habitat. The enclosed Draft Supplemental Environmental Assessment (SEA) provides additional information. The Corps received concurrence with Negative Determination ND-023-12 dated May 25, 2012 (enclosed) for a similar but larger scale dredging/excavation project that was completed in 2013. A Final Environmental Assessment (EA) for that larger project was sent to your office in July 2012.

After completion of the previous project in March 2013, additional material has deposited on the marsh side of the downstream tide gate. This shoaled sediment has blocked the opening of the tide gate, resulting in muted tides in the Marsh and diminished access for aquatic wildlife to and from the Marsh. The dampened tidal cycle also prevents proper tidal flushing, which may eventually impact water quality.

The proposed sediment removal project would serve the following purposes: (1) remove sediment blocking the downstream tide gate; (2) beneficially reuse the sediment to improve California least tern nesting habitat on the tern island; and (3) increase tidal range and improve circulation of the tidal flow throughout the marsh, which will result in improved water quality and overall habitat quality for wildlife.

This project and the previous dredging project have been coordinated with Mr. Larry Simon of your staff. If you have any questions, please contact Ms. Erin Jones, Project Environmental Coordinator and Biologist, at 213-300-9723 or erin.l.jones@usace.army.mil.

Thank you for your consideration in this matter.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

February 16, 2017

Environmental Resources Branch

Mr. Rod McInnis
National Oceanic Atmospheric Administration
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Attention: Mr. Bryant Chesney
Long Beach, California 90802

Dear Mr. McInnis:

The U.S. Army Corps of Engineers (Corps) is submitting this Plan of Action to mitigate for direct impacts to eelgrass due to implementation of the supplemental Santa Ana River Marsh Dredging Project, City of Newport Beach, Orange County, California. The Corps hereby requests your concurrence with this plan, so that we may proceed with implementation. The Corps also requests your concurrence with the EFH determination provided in Section 4.2 of the Draft Supplemental Environmental Assessment (SEA). The Corps' staff has been coordinating with Mr. Bryant Chesney of your staff since December 2016, and has also coordinated the current proposed project through the Dredge Materials Management Team (DMMT) since October 2016. A link to the public review Draft SEA is also enclosed for your review. The Corps requests your concurrence on this Plan of Action by February 27, 2017. The Corps requests your concurrence with the EFH determination and comments on the SEA by March 3, 2017.

Subsequent to completion of Marsh dredging in March 2013, additional material has shoaled on the marsh side of the downstream tide gate. This shoaled sediment, totaling approximately 10,000 cubic yards across approximately 2.8 acres, has blocked the opening of the tide gate, which had led to muted tides in the Marsh and diminished access for aquatic wildlife to and from the Marsh. The dampened tidal cycle also prevents proper tidal flushing, which may eventually impact water quality.

The proposed sediment removal project, supplemental to the 2013 dredging, would serve the following purposes: (1) remove sediment blocking the downstream tide gate; (2) beneficially reuse the sediment to improve CA least tern nesting habitat on the adjacent upland tern island; and (3) increase tidal range and improve circulation of the tidal flow throughout the marsh, which will result in improved water quality and overall habitat quality for wildlife.

Construction is scheduled to occur prior to April 15, 2017, outside the nesting season for sensitive birds, to avoid impacts to California least tern.

A detailed project description is provided in Section 2.0 of the Draft SEA, and impacts to biological resources, including eelgrass and essential fish habitat (EFH), and mitigation measures are provided in sections 4.2 and 6.0 respectively. Coordination with other resource agencies including California Coastal Commission (CCC), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and the Regional Water Quality Control Board (RWQCB) is on-going.

Regional eelgrass surveys completed in 2015 and 2016 identified eelgrass within the Marsh, estimated at less than 0.1 acre.[1] Based on these surveys, a small amount of eelgrass has established within the project area since the 2013 dredging, and would be directly impacted by the sediment removal activities. As part of the proposed project, pre-construction eelgrass surveys would be performed in the project area to identify the acreage of eelgrass that would be impacted. Per the Southern California Eelgrass Mitigation Policy (SCEMP), the less than 0.1 acre of anticipated impact would be mitigated at a ratio of 1.2 to 1.

Project construction could result in temporary local increases in turbidity, however, impacts would be short-term and are not expected to indirectly affect other eelgrass patches in the Marsh. Mitigation measures would minimize impacts and include water quality monitoring during sediment removal.

Due to the necessity of the project to restore tidal circulation and preserve sensitive coastal salt marsh habitats and species within the Marsh, including eelgrass, preliminary coordination with Mr. Chesney of your staff suggested that flexibility with the SCEMP was warranted. Flexibility on survey and transplant timing, as well as monitoring period, are requested. The following documents the Corps' Plan of Action to mitigate for losses to eelgrass due to implementation of the sediment removal project.

Plan of Action

To mitigate for impacts to eelgrass from the Marsh Sediment Removal Project, the Corps proposes to transplant plugs of eelgrass from within the project area to other existing patches of eelgrass that have established in the Marsh. The goal would be to expand those existing patches outside the project area by 1.2 times the impacted acreage by the end of the monitoring period, per the SCEMP. Pre-construction surveys for eelgrass in the project area would be performed in February 2017, with transplant occurring in late February/early March 2017. A Mitigation Plan, including success criteria, would be submitted for review by your office after completion of the pre-construction surveys.

The Corps proposes to monitor the eelgrass transplants for two years to ensure that the final mitigation acreage is met, and that deficiencies can be detected and addressed early. The Corps would perform monitoring and submit monitoring reports at 0 months, 6 months, 12 months, and 24 months after transplant. If success criteria are not met after 24 months, the Corps would investigate remedial actions and perform additional monitoring in coordination with your staff.

---

[1] Merkel & Associates, Inc. *2015 Southern California Bight Regional Eelgrass Surveys*. December 2015.

The Corps would coordinate with NMFS throughout the mitigation monitoring period to evaluate the status of the plantings.

Based on preliminary coordination with your staff, the Corps suggests that the proposed transplanting would be suitable mitigation for the impacts to eelgrass due to implementation of the Santa Ana River Marsh Sediment Removal Project, which is being implemented to restore tidal flows and preserve sensitive coastal salt marsh habitats.

Comments and correspondence may be sent to Ms. Erin Jones, Corps' Project Environmental Coordinator, at (213) 300-9723 or at erin.l.jones@usace.army.mil.

Thank you for your consideration.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

February 16, 2017

Environmental Resources Branch

Mr. David Gibson
Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Attention: Marc Brown
Riverside, California 92501

Dear Mr. Gibson:

The U.S. Army Corps of Engineers (Corps) requests an amended Section 401 Water Quality Certification (WQC) for the proposed supplemental Santa Ana River Marsh Dredging Project, City of Newport Beach, Orange County, California (SARWQCB Project No. 302012-19). The Corps staff has been coordinating with Mr. Marc Brown of your staff since November 2016, and has provided proposed revisions to the previous 401 WQC to suit the current proposed project description (enclosed). A link to the public review Draft Supplemental Environmental Assessment (SEA) is also enclosed for your review.

http://www.spl.usace.army.mil/Media/Public-Notices/Article/1086432/spl-2017-00001-elj-santa-ana-river-marsh/

Subsequent to completion of Marsh dredging in March 2013, additional material has shoaled on the marsh side of the downstream tide gate. This shoaled sediment, totaling approximately 10,000 cubic yards across approximately 2.8 acres, has blocked the opening of the tide gate, which had led to muted tides in the Marsh and diminished access for aquatic wildlife to and from the Marsh. The dampened tidal cycle also prevents proper tidal flushing, which may eventually impact water quality.

The proposed sediment removal project, supplemental to the 2013 dredging, would serve the following purposes: (1) remove sediment blocking the downstream tide gate; (2) beneficially reuse the sediment to improve CA least tern nesting habitat on the adjacent upland tern island; and (3) increase tidal range and improve circulation of the tidal flow throughout the marsh, which will result in improved water quality and overall habitat quality for wildlife.

Construction is scheduled to occur prior to April 15, 2017, outside the nesting season for sensitive birds, to avoid impacts to California least tern.

A detailed project description is provided in Section 2.0 of the Draft SEA, and impacts to biological resources, water quality, and mitigation measures are provided in sections 4.2, 4.4, and 6.0 respectively.

Project construction could result in temporary increases in turbidity, however impacts would be short-term. Mitigation measures would minimize impacts and include water quality monitoring during dredging.

Section 404(t) of the CWA requires the Corps to comply with the State or Regional Boards' substantive and procedural requirements pertaining to the discharge of dredged or fill material including structural discharges. However, this Section does not authorize the payment of fees as a condition of compliance with these requirements. Fundamentally, as an agency of the Federal government, legal determinations preclude the Corps from paying fees, except where Congress has clearly and unambiguously waived Federal sovereignty.

This letter, and the enclosed proposed 401 WQC amendments, satisfies the requirements of the Clean Water Act to request Section 401 WQC, or a waiver of certification, pursuant to 33 CFR 336.1(a)(1). Based on coordination that has occurred with your staff since November 2016, we would appreciate issuance of the Section 401 WQC within 30 days of the date of this letter to meet the construction timeframe ending April 15, 2017 and to avoid impacts to federally listed species.

Comments and correspondence may be sent to Ms. Erin Jones, Corps' Project Environmental Coordinator, at (213) 300-9723 or at erin.l.jones@usace.army.mil.

Thank you for your attention to this document.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

Jones, Erin L CIV CESPL CESPD (US)

From: Jones, Erin L CIV CESPL CESPD (US)
Sent: Thursday, February 16, 2017 4:06 PM
To: Christine L. Medak (Christine_Medak@fws.gov)
Subject: SAR Marsh - Request for Informal Consultation and Draft SEA
Attachments: IP letter SAR Marsh signed 2-16-17.pdf; SantaAnaRiverMarsh_Draft_SEA_2-16-17.pdf

Hello Chris,

The Corps requests to initiate informal Section 7 Consultation for the light-footed Ridgway's rail, western snowy plover, and California least tern for the Santa Ana River Marsh sediment removal project. A Draft Supplemental Environmental Assessment (SEA) is attached for your review and comment during the public review period, which ends Friday, March 2, 2017. The Draft SEA includes an assessment of impacts to biological resources and threatened and endangered species (Sections 4.2 and 4.3), and environmental commitments (Section 6.0) to minimize and avoid impacts.

1) The proposed project may affect, but is not likely to adversely affect the light-footed Ridgway's rail. An estimated 0.1 acre of cordgrass would be removed in the project area, however all work would avoid occupied cordgrass habitat. The closest occupied cordgrass habitat is approximately 700 feet from the proposed project boundary. To further minimize impacts the Corps agrees to direct the Contractor to pull back 3 feet from vegetated banks, based on observations in the field and coordination with FWS. The proposed project would last approximately 2 weeks. Post-dredge cordgrass monitoring implemented after the 2013 dredge effort in the Marsh indicated that cordgrass habitat expanded after completion of dredging. Cordgrass would be monitored after sediment removal at 6 months and 12 months post-construction. If monitoring indicates loss of cordgrass habitat, the Corps would perform planting.

2) The proposed project may affect, but is not likely to adversely affect the California least tern. The proposed project would beneficially affect the tern via the capping of the 7-acre least tern island with coarse grain beach quality sand, which would improve nesting habitat. The Corps would weed and manage the least tern island for 6 months post-project to maintain a level of vegetative cover suitable for tern nesting (no more than 5% to 15% native cover). As part of the proposed project, the fencing surrounding the least tern island would be replaced. Fencing would be moved further upslope, above the high tide line, to avoid future corrosion from salt water. All work would be completed prior to April 15, 2017, prior to nesting season.

3) The proposed project may affect, but is not likely to adversely affect the western snowy plover. Sediment removal would remove some mudflats within the Marsh where snowy plover, if present, may forage and roost. Plover are expected to avoid the project area for the duration of construction, which is expected to last approximately 2 weeks, and use alternate foraging and roosting sites at the beach and adjacent wetland areas. To minimize impacts the Corps agrees to direct the Contractor to pull back 3 feet from vegetated banks, based on observations in the field and coordination with FWS.

The Final SEA would be updated based on coordination with the USFWS, and environmental commitments would be included per this informal consultation. USFWS would be provided a copy of the Final SEA, including the signed FONSI.

Please contact me with any additional questions or concerns. Thank you for your continued participation on this project.

Sincerely,

Erin L. Jones
Biologist
Ecosystem Planning Section, Planning Division

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Santa Ana Regional Water Quality Control Board

March 27, 2017

Ms. Erin Jones
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053

Erin.l.jones@usace.army.mil

AMENDED CLEAN WATER ACT SECTION 401 WATER QUALITY STANDARDS CERTIFICATION FOR SANTA ANA RIVER MARSH SEDIMENT REMOVAL PROJECT, COUNTY OF ORANGE, CALIFORNIA (SARWQCB PROJECT NO. 302012-19)

Dear Ms. Jones:

On December 13, 2016, we received your request to amend the Clean Water Act (CWA) Section 401 Water Quality Standards Certification ("Certification") issued to the U.S. Army Corps of Engineers (USACE) on July 17, 2012, for the subject Santa Ana River Marsh Dredging Project (Project).

The purpose of the Project is to remove accumulated sediment from a 2.8-acre area near the downstream tide gate within the Santa Ana River Marsh (SAR Marsh). The SAR Marsh is a 92-acre coastal salt marsh located adjacent to the mouth of the Santa Ana River in the City of Newport Beach. The SAR Marsh was restored in 1992 as mitigation for impacts resulting from the USACE's Santa Ana River Mainstem Project (a flood control project). While dredging occurred in 2013, sediment has again accumulated at the tide gate that impacts hydraulics and proper tidal flushing, leading to reduced water quality, and impacts to movement of marine wildlife into and out of the SAR Marsh.

This letter responds to your request for an amendment of the July 17, 2012 Certification that the proposed Project, described in your application and summarized below, will comply with State water quality standards outlined in the Water Quality Control Plan for the Santa Ana River Basin (1995) (Basin Plan) and subsequent Basin Plan amendments:

Project Description:	The Project consists of the removal of up to, but not to exceed 10,000 cubic yards of accumulated sediment from a 2.8-acre area at the downstream tide gate in the SAR Marsh. An excavator and small dozer will be used to remove the sediment. The USACE will coordinate with US Fish and Wildlife Service (USFWS) to place the sediment on the California Least Tern Island, which is an adjacent upland area in the SAR Marsh.
Receiving water:	SAR Marsh
Fill area:	2.8 acres of temporary impacts to wetland habitat (sediment removal area)
Dredge/Fill volume:	10,000 cubic yards
Federal permit:	Not applicable (USACE project)

You have proposed to mitigate water quality impacts as described in your Certification application. The proposed mitigation is summarized below:

Onsite Water Quality Standards Mitigation Proposed:

- The USACE will implement measures in coordination with the USFWS to mitigate adverse impacts to the light-footed clapper rail (*Rallus longirostris levipes*) and the California least tern (*Sterna antillarum browni*).
- Vegetation, habitat, & staging areas that are temporarily affected as a result of the Project will be monitored to ensure complete recovery per Conditions 4.h. and 4.j. below.
- Standard water quality related best management practices (BMPs) will be employed during construction activities.

Offsite Water Quality Standards Mitigation Proposed:

- Benefits produced by the Project (wetland restoration) will mitigate temporary impacts. As such, compensatory mitigation is not required.

Threatened and/or Endangered Species: Five threatened or endangered species (federal or State listed) occur in the vicinity of the Project site. The USACE is coordinating with the USFWS and California Department of Fish and Wildlife (CDFW) to implement measures to address potential negative impacts to these species. In addition, the Southern California Dredged Material Management Team, which consists of the USACE; the Santa Ana, San Diego, and Los Angeles Regional Water Quality Control Boards; the US Environmental Protection Agency; and other State and federal regulatory agencies, reviewed the Project and approved disposal on the California Least Tern Island.

The Project work shall be conducted outside all identified listed threatened and/or endangered bird species breeding season, which is before April 15, 2017 or after September 1, 2017, in order to avoid impacts to nesting birds.

<u>Other Potentially Applicable Permits</u>:

- No clearing for staging or sediment drying is expected; however, the placement area on Least Tern Island encompasses 4.6 acres. The Project construction activities may result in land disturbance equal to or greater than one (1) acre. Therefore, if land clearance exceeds one (1) acre, the USACE shall substantially comply with the terms of the State Water Resources Control Board Construction General Permit, Order No. 2009-0009-DWQ. For more information please review Order No. 2009-0009-DWQ at http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

  A CWA Section 404 permit is not required, as the USACE issues the CWA Section 404 permit, and does not issue 404 permits for their own projects.

Pursuant to the California Environmental Quality Act (CEQA) Guidelines, 14 CCR § 15304(g) specifies the categorical exemption that consists of maintenance dredging where the dredged material is deposited in an area authorized by all applicable State and federal regulatory agencies. The Santa Ana Regional Water Quality Control Board (Regional Board) has independently considered the Section 15304(g) exemption in the issuance of this Certification, and finds that no changes or alterations to the proposed Project would be necessary to avoid or mitigate impacts to water quality to a less than significant level, if the Project is implemented with the Conditions specified below.

This 401 Certification is contingent upon the execution of the following Conditions:

1) <u>BMPs</u>: The USACE shall utilize BMPs to minimize the controllable discharges of sediment and other wastes to waters of the State and of the United States. These BMPS shall include:

   a. Isolate areas being dredged from adjacent waters, using temporary diversion structures or gates and silt curtains, if warranted.
   b. Separate from dredged sediment and remove floating material or material that becomes floatable.

2) <u>Receiving Water Limitations and Specifications</u>: The USACE shall comply with the following applicable narrative and/or numeric objectives:

a. Bacteria, SAR Marsh – The SAR Marsh is listed in the Basin Plan as having the water contact recreation beneficial use (REC-1). The USACE shall ensure that the Project does not cause an exceedance of the Basin Plan objectives specified in Table 1 for this beneficial use.

Table 1: Bacteria Receiving Water Limitations for the Santa Ana River Marsh

Parameter	**30-day Logarithmic Mean (5 or more samples)**	**10% of samples in any 30-day period**
Fecal coliform	< 200 per 100 ml	< 400 per 100 ml

b. Chemical Constituents – The USACE shall comply with the receiving water limitations specified in Table 2. The turbidity and transmittance limitations are based on recent data collected in Lower Newport Bay. The USACE may substitute site-specific data relating these parameters to total suspended solids (TSS), if available. The USACE must obtain prior approval from the Regional Board for proposed changes to the limitations specified in Table 2.

Table 2: Physical/Chemical Numeric Receiving Water Limitations

Parameter	**Santa Ana River Marsh**
Turbidity	45 NTU
Transmittance	15%
TSS	100 mg/L
pH	7 < pH < 8.6; < 0.2 unit change from ambient
Dissolved Oxygen	> 5 mg/L

3) Monitoring: The USACE shall implement a monitoring program to ensure compliance with the receiving water limitations specified above in Conditions 2a and 2b. The USACE may satisfy some of the monitoring requirements in **Error! Reference source not found.**1 and Table 2 by coordinating its monitoring with the Orange County Health Care Agency (OCHCA) and the Orange County Sanitation District (OCSD).

a. General Monitoring Provisions:

i. All sampling, sample preservation, and analytical procedures shall be in accordance with the current approved edition of "*Standard Methods for the Examination of Water and Wastewater*" (American Public Health Association) and/or 40 CFR Part 136 approved methods unless otherwise specified by the Executive Officer of the Regional Board.

ii. In accordance with the provision of California Water Code section 13176, chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health or at laboratories approved by the Regional Board's Executive Officer.

iii. The USACE shall have and implement an acceptable written quality assurance (QA) plan for laboratory analyses. Duplicate chemical analyses must be conducted on a minimum of ten percent (10%) of the samples, or at least one sample per month, whichever is greater. A similar frequency shall be maintained for analyzing spiked samples.

iv. All monitoring instruments and devices used by the USACE to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. In the event that continuous monitoring equipment is out of service for greater than a 24-hour period, the USACE shall obtain a representative grab sample each day the equipment is out of service. The USACE shall correct the cause(s) of failure of the continuous monitoring equipment as soon as practicable. In its monitoring report, the USACE shall specify the period(s) during which the equipment was out of service and if the problem has not been corrected, shall identify the steps which the USACE is taking or proposes to take to bring the equipment back into service and the schedule for these actions.

v. Monitoring and reporting shall be in accordance with the following:
    i. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
    ii. Monitoring and reporting shall be done more frequently as necessary to maintain compliance with this Certification and or as specified in this Certification.
    iii. Whenever the USACE monitors any pollutant more frequently than is required by this Certification, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the discharge monitoring report specified by the Regional Board Executive Officer.
    iv. Daily samples shall be collected on each day of the week.
    v. Weekly samples shall be collected on any representative day of each week.
    vi. Monthly samples shall be collected on any representative day of each month.

b. Samples shall be collected down-current of the Project activity being monitored. The USACE should obtain current directions in the nearshore zone from the OCSD and the Southern California Coastal Ocean Observing System: http://www.sccoos.org/projects/ocsd-diversion/.

4) Reporting:

a. All analytical data shall be reported with method detection limit[1] (MDLs) and with identification of either reporting level or limits of quantitation (LOQs). To the maximum extent practicable, all MDLs shall be sufficiently low enough to compare analytical results for water and sediment samples to the values listed above under Condition #2: "Receiving Water Limitations and Specifications."

b. Laboratory data must quantify each constituent down to the approved reporting levels for specific constituents. Any internal quality control data associated with the sample must be reported when requested by the Executive Officer. The Regional Board will reject the quantified laboratory data, if quality control data are unavailable or unacceptable.

c. Monitoring data shall be submitted in a format acceptable by the Regional Board. Specific reporting format may include preprinted forms and/or electronic media. The results of all monitoring required by this Certification shall be reported to the Regional Board, and shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this Certification.

d. The USACE shall tabulate the monitoring data to clearly illustrate compliance and/or noncompliance with the requirements of the Project Certification.

e. For every item of monitoring data where the requirements are not met, the monitoring report shall include a statement discussing the reasons for noncompliance, the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and an estimate of the date when the USACE will be in compliance. The USACE shall notify the Regional Board by letter when compliance with the time schedule has been achieved.

f. The USACE shall assure that records of all monitoring information are maintained and accessible for a period of at least five (5) years from the date of the sample, report, or application. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or by the request of the Regional Board at any time.

g. All reports and/or information submitted to the Regional Board shall be signed by a responsible officer or duly authorized representative of the USACE, and shall be submitted under penalty of perjury.

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[1] The standardized test procedure to be used to determine the method detection limit (MDL) is given at Appendix B, "Definition and Procedure for the Determination of the Method Detection Limit" of 40 CFR 136.

h. The USACE shall submit monthly reports via e-mail to the assigned Regional Board staff identified in this Certification by the 7th day of each month. The monthly reports shall include a copy of the laboratory reports for samples collected during the previous month, as well as a brief description of Project activities conducted during the previous month. Monthly reports are not required for recovery monitoring conducted after completion of dredging and disposal activities.

i. A final water quality monitoring report summarizing the Project data and correcting any errors and/or omissions in the monthly reports shall be submitted to the Regional Board no later than six (6) months after completion of the dredging and disposal activities.

j. A final report summarizing the post-dredging recovery monitoring, if required, shall be submitted to the Regional Board no later than six (6) months after completion of the recovery monitoring.

k. All reporting information and data shall be submitted to the Regional Board in an electronic format.

5) Caulerpa: The USACE shall conduct at least one visual survey for the invasive algae *Caulerpa taxifolia* at low tide prior to initiating dredging. If *Caulerpa taxifolia* is discovered, the USACE must cease dredging at that location and notify Regional Board staff, the California Department of Fish and Wildlife (CDFW) (William Paznokas: 858-467-4218,(wpaznokas@dfg.ca.gov) and/or the National Marine Fisheries Service (NMFS) (Eric Chavez: 562-980-4064, Eric.Chavez@noaa.gov) within 24 hours of discovery. The USACE may resume dredging after implementing management measures specified by the CDFW and/or NMFS.

6) Eelgrass: The USACE shall reach agreement with the NMFS, in advance of conducting the Project, regarding impacts to eelgrass in the SAR Marsh and the appropriate mitigation.

7) Threatened and Endangered Species: The USACE shall reach agreement, in advance of conducting the Project, with the USFWS regarding implementation of recommendations provided to the USACE by the USFWS for avoidance of adverse effects to the light-footed clapper rail and the California least tern.

8) Construction Wastes: Substances resulting from Project-related activities that could be harmful to aquatic life, including, but not limited to, petroleum lubricants and fuels, cured and uncured cements, epoxies, paints and other protective coating materials, portland cement concrete or asphalt concrete, and washings and cuttings thereof, shall not be discharged to soils or waters of the State. All waste concrete shall be removed from the Project site.

9) Construction Equipment: Motorized equipment shall not be maintained or parked within or near any body of water in such a manner that petroleum products or other pollutants from the equipment may enter these areas under any flow conditions. Vehicles shall not be driven or equipment operated in waters of the State onsite, except as necessary to complete the proposed Project. No equipment (other than machinery directly related to the sediment removal operation and associated monitoring) shall be operated in areas of flowing water.

10) The USACE shall ensure that all facilities (outlet structures, grade control structures, eroded soil-cement access ramps, etc.) will be restored to their original design and grade, and that vegetation within the Project area will be maintained in perpetuity.

11) This 401 Water Quality Certification is subject to the acquisition of all local, regional, State, and federal permits and approvals, as required by law. Failure to meet any Conditions contained herein or any Conditions contained in any other permit or approval issued by the State of California, or any subdivision thereof, may result in appropriate enforcement action, including the revocation of this Certification and imposition of administrative civil or criminal liability.

12) A copy of this Certification and any subsequent amendments must be maintained onsite for the duration of the Project.

13) The Applicant shall ensure that all fees associated with this Project shall be paid to each respective agency prior to conducting any onsite construction activities.

14) The Applicant shall ensure written notification to this agency shall be made prior to conducting any onsite construction activities. Such notifications shall be made to Marc Brown at marc.brown@waterboards.ca.gov.

15) When work conducted in accordance with this 401 Certification has been completed, the Applicant shall notify Regional Board staff Marc Brown at marc.brown@waterboards.ca.gov within 10 working days. Please cite the SARWQCB Project number listed in the Subject Line above as the Project identifier.

Under California Water Code, Section 1058, and pursuant to California Code of Regulations, Title 23, Chapter 28, §3860, the following shall be included as Conditions of all 401 Water Quality Certification actions:

(a) Every certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Section 13330 of the Water Code and Article 6 (commencing with Section 3867) of this Chapter.

(b) Certification is not intended and shall not be construed to apply to any activity involving a hydroelectric facility and requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to Subsection 3855(b) of this Chapter and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

(c) Certification is conditioned upon total payment of any fee required under this Chapter and owed by the Applicant.

If the above-stated Conditions are changed, any of the criteria or Conditions as previously described are not met, or new information becomes available that indicates a water quality problem, the Regional Board may require that the Applicant to submit a Report of Waste Discharge and obtain Waste Discharge Requirements.

In the event of any violation or threatened violation of the Conditions of this Certification, the holder of any permit or license subject to this Certification shall be subject to any remedies, penalties, process or sanctions as provided for under State law. For purposes of Section 401(d) of the Clean Water Act, the applicability of any State law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this Certification. Violations of the Conditions of this Certification may subject the Applicant to civil liability pursuant to Water Code section 13350 and/or 13385.

This letter constitutes a Water Quality Standards Certification issued pursuant to Clean Water Act Section 401. I hereby certify that any discharge from the referenced Project will comply with the applicable provisions of Sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act, and with other applicable requirements of State law.

This discharge is also regulated under State Water Resources Control Board Order No. 2003-0017-DWQ (Order No. 2003-0017-DWQ), "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received Water Quality Certification" which requires compliance with all conditions of this Water Quality Standards Certification. Order No. 2003-0017-DWQ is available at: www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0017.pdf

Should there be any questions, please contact Marc Brown at (951) 321-4584, or Wanda Cross at (951) 782-4468.

Sincerely,

Kurt V. Berchtold
Executive Officer

cc (via electronic mail):

U.S. Army Corps of Engineers, Los Angeles Office – Josephine Axt – splregorcs@usace.army.mil
State Water Resources Control Board, OCC - David Rice
U.S. Fish and Wildlife Service – Jonathan Snyder
CA Department of Fish and Game – Loni Adams – Loni.Adams@wildlife.ca.gov
State Water Resources Control Board, Office of Chief Counsel - David Rice
State Water Resources Control Board, DWQ-Water Quality Certification Unit - Bill Orme
U.S. Environmental Protection Agency, Region 9 - Wetlands Section – Melissa Scianni
U.S. Environmental Protection Agency, Region 9 - Wetlands Section – Elizabeth Goldmann

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., GOVERNOR

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE (415) 904-5200
FAX (415) 904-5400
TDD (415) 597-5885

March 8, 2017

Eduardo T. De Mesa
Chief, Planning Division
Los Angeles District
U.S. Army Corps of Engineers
ATTN: Erin Jones
915 Wilshire Blvd., Suite 930
Los Angeles, CA 90017

Subject: Negative Determination ND-0006-17 (Santa Ana River Marsh Sediment Removal Project, Newport Beach, Orange County)

Dear Mr. De Mesa:

The Coastal Commission staff has reviewed the above-referenced negative determination. The Corps of Engineers proposes to excavate approximately 10,000 cubic yards of clean sandy sediment that has shoaled within a 2.8 acre area near one of the Santa Ana River Marsh tide gates, and beneficially reuse the sediments by placing them on the adjacent California least tern nesting island. The Commission's Executive Director concurred with a similar but larger scale project in May 2012 to restore the marsh to its original habitat design and function (ND-023-12). Since completion of the previous project in March 2013, additional sediment has built up on the marsh side of the downstream tide gate, leading to muted tidal flow and diminished access for aquatic species to and from the marsh. The proposed project would: (1) remove shoaled sediment blocking the tide gate; (2) beneficially reuse the clean sandy sediment to improve California least tern nesting habitat on the adjacent tern island; and (3) increase tidal range and improve circulation of tidal flow throughout the marsh, with associated improvements in water quality and wildlife habitat.

The Southern California Dredge Materials Management Team (which includes Commission staff) reviewed the proposed project, sediment sampling plan, and sediment test results. In January 2017 the SCDMMT approved the placement of project dredged sediments on the adjacent tern nesting island. The Corps has coordinated with the other resource agencies to ensure that project implementation will avoid and minimize adverse effects on aquatic habitat, and that coordination will continue throughout the duration of the project. Should eelgrass be affected the Corps will implement a mitigation plan consistent with the California Eelgrass Mitigation Policy. Project implementation will be completed prior to April 15, 2017, to avoid impacts to sensitive species, including California least tern, western snowy plover, and Ridgway's rail. The project includes environmental commitments and best management practices to protect biological resources, water quality, public access and recreation, and cultural resources.

Under the federal consistency regulations (15 CFR Section 930.35(a)), a negative determination can be submitted for an activity "which is the same or similar to activities for which consistency determinations have been prepared in the past." The proposed project would improve habitat within the Santa Ana River Marsh and is similar to Corps of Engineers projects previously approved by the Commission and the Executive Director for marsh and river restoration along the lower Santa Ana River (CD-029-88, ND-111-00, ND-026-02, and ND-023-12). We therefore **concur** with your negative determination made pursuant to 15 CFR Section 930.35 of the NOAA implementing regulations. Please contact Larry Simon at (415) 904-5288 should you have any questions regarding this matter.

Sincerely,

(for) John Ainsworth
Executive Director

cc: CCC – South Coast District

From: Simon, Larry@Coastal
To: Jones, Erin L CIV CESPL CESPD (US)
Subject: [Non-DoD Source] RE: SAR Marsh Schedule Update
Date: Monday, April 03, 2017 11:35:46 AM

Hi Erin,

Thank you for the project update. As long as the project remains as described in your ND-0006-17, our concurrence letter remains valid for project implementation between September 15, 2017, and April 15, 2018. Thank you for coordinating with this office. Best regards,

Larry

Larry Simon
Federal Consistency Coordinator
Energy, Ocean Resources and
Federal Consistency Division
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219
(415) 904-5288
larry.simon@coastal.ca.gov
Blockedwww.coastal.ca.gov

-----Original Message-----
From: Jones, Erin L CIV CESPL CESPD (US) [mailto:Erin.L.Jones@usace.army.mil]
Sent: Thursday, March 30, 2017 11:10 AM
To: Simon, Larry@Coastal
Subject: SAR Marsh Schedule Update

Hi Larry,

I wanted to inform you that the Corps won't be able to initiate the SAR Marsh dredge project before April 15. Pre-construction surveys and eelgrass transplant would not be completed in time, so the project will be postponed until after September 15, 2017.

In the project description in the SEA, and in the concurrence letter from your office dated March 8, 2017, it describes completion of the project prior to April 15, 2017. I wanted to confirm that the project performed after September 15 will be the same as described in the SEA, and confirm with you that the Corps would still have your concurrence on the Negative Determination for the project occurring between September 15, 2017 and April 15, 2018.

Please let me know if you have any questions.

Thank you.

Sincerely,

Erin L. Jones
Biologist
Ecosystem Planning Section, Planning Division Prado Dam Field Office Los Angeles District, U.S. Army Corps of Engineers erin.l.jones@usace.army.mil

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

In Reply Refer To:
FWS-OR-12B0198-17I0622

March 23, 2017
Sent by Email

Mr. Eduardo T. De Mesa
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017

Attention: Ms. Erin Jones (CESPL-PDR-N)

Subject: Informal Section 7 Consultation for the Santa Ana River Marsh Sediment Removal Project in the City of Newport Beach, Orange County, California

Dear Mr. De Mesa:

This letter is in response to your February 16, 2017, request for informal consultation pursuant to section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*) for the proposed Santa Ana River Marsh Sediment Removal Project, located in the City of Newport Beach, Orange County, California. You have determined that the proposed project is not likely to adversely affect the federally endangered light-footed Ridgway's (=clapper) rail [*Rallus obsoletus* (=*longirostris*) *levipes*; Ridgway's rail] and California least tern [*Sternula antillarum browni* (*Sterna a. b.*); least tern] and the federally threatened western snowy plover (Pacific Coast population DPS) [*Charadrius nivosus nivosus* (*C. alexandrinus n.*); snowy plover]. This consultation is based on the draft Supplemental Environmental Assessment (Draft SEA) for the project, dated February 2017, and information provided during the consultation period.

DESCRIPTION OF THE PROPOSED ACTION

The U.S. Army Corps of Engineers (Corps) proposes to dredge about 10,000 cubic yards of sediment from a 2.8-acre area, located near the southwest corner of the Santa Ana River Marsh (Figure 1). Sediment removal is anticipated to restore function to the tide gate in this location, increasing tidal range and improving circulation of tidal flow throughout the marsh. Sediment will be deposited with an excavator onto the adjacent least tern island and spread to a thickness of about 6 inches over the surface of the island with a small dozer. In addition, the Corps will replace about 2,200 linear feet of fencing surrounding the least tern nest site. Project activities will be completed in about 1 to 2 weeks, prior to April 15, 2017.

The Corps will implement measures identified in the Draft SEA and in emails from the Corps to the U.S. Fish and Wildlife Service on March 20, 2017, to avoid and minimize the potential for impacts to federally listed species. These measures include, but are not limited to:

1. Construction activities will occur between September 15 and April 15, outside the majority of the least tern and Ridgway's rail breeding seasons.

2. Construction activities will be monitored daily by a qualified biologist to ensure there are no unanticipated impacts to federally listed species. No construction will occur within 300 feet of an active Ridgway's rail nest site.

3. Sediment removal will only occur in areas with sediments compatible for placement on the tern island, as determined by sediment sampling completed in 2016 and approved by the Southern California Dredge Materials Management Team.

4. A 3-foot buffer will be provided between vegetated banks in the project area and the sediment removal footprint to preserve mudflat habitat for foraging Ridgway's rails.

5. Pre- and post-construction vegetation surveys will be performed to document the acreage of habitat impacted by construction activities. The project area will be monitored for 6 months after construction to evaluate the re-establishment of vegetation in areas disturbed by the project. If vegetation does not adequately re-establish, native planting will be performed in appropriate areas.

6. Prior to the 2018 least tern breeding season (i.e., before April 15, 2018) the Corps will prepare the least tern island for nesting by removing weeds and limiting native vegetation cover to less than 15 percent.

EFFECTS OF THE ACTION

Least tern

The least tern island was constructed in 1992 as part of a 92-acre restoration project, completed by the Corps in conjunction with the Santa Ana River Project; however, the site has not supported least tern nesting. The proposed project will have a beneficial effect on least tern habitat by restoring tidal flows in the Santa Ana River Marsh, providing a new sand cap on the least tern island,[1] and replacing fencing surrounding the nest site. These actions are anticipated to improve fish populations in the marsh, improve the attractiveness of the nesting site for least terns, and minimize the potential for predation. Construction will be conducted outside the least tern nesting season, so no disturbance of least tern breeding activities is anticipated.

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[1] The grain size and chemistry of the sediment in the dredge area was determined to be compatible with placement on the least tern island (Draft SEA, page 5)

Ridgway's rail

Ten pairs of Ridgway's rails were observed in the Santa Ana River Marsh during the 2016 breeding season, including 9 pairs to the north of the least tern island (over 350 feet from proposed activities) and 1 pair east of the tern island (over 450 feet from proposed activities).[2] The proposed project will help restore tidal flow within the marsh that is necessary to support cordgrass, the preferred habitat for Ridgway's rails, but it will result in short-term minor impacts to individuals and their habitat. Because construction will occur during a portion of the breeding season (i.e., up until April 15), project-related activities could disturb breeding Ridgway's rails. However, the Corps will maintain a 300-foot buffer around active Ridgway's rail nests. With this measure, project-related disturbance of Ridgway's rails is anticipated to be minor and to have an insignificant effect (i.e., unable to be meaningfully detected, measured, or evaluated) on Ridgway's rail productivity.

In addition to potential disturbance of breeding Ridgway's rail, the proposed project could result in short-term reduction in available habitat. To minimize the potential for impacts to Ridgway's rail habitat during the breeding season, the Corps will maintain a 300-foot buffer around active Ridgway's rail nests and a 3-foot buffer from vegetated banks. A biological monitor will be on-site daily during construction to ensure the buffers are maintained. Dredging will remove a small amount (0.1 acre) of cordgrass that may occasionally be used as foraging or sheltering habitat by Ridgway's rails. However, the primary use areas for Ridgway's rails are over 300 feet from cordgrass that will be removed. In addition, the 3-foot buffer between the vegetated banks and the dredge footprint will minimize potential impacts to Ridgway's rail habitat along the banks. With incorporation of the proposed measures, we anticipate that sufficient resources will remain for essential breeding, feeding, and sheltering behaviors and potential effects to Ridgway's rail survival and productivity will be insignificant.

Snowy plovers

According to the Draft SEA (page 7), snowy plovers were not observed within the Santa Ana River Marsh during surveys conducted in 2012 or 2013. While mudflats within the marsh could be used for foraging and roosting, disturbance associated with local residents and their dogs recreating in areas that are suitable for snowy plover nesting in the marsh channels likely precludes nesting activity. The biological monitor will minimize the potential for individual snowy plovers to be killed or injured by alerting equipment operators to avoid any snowy plovers observed within the project footprint. Foraging or roosting snowy plovers are anticipated to shift their use area to avoid construction activity, but this is not anticipated to impact essential feeding and sheltering behaviors because ample loafing and foraging habitat is available at the mouth of the Santa Ana River and across the river, within the Huntington Beach Wetlands. Therefore, we anticipate that the likelihood of snowy plovers being killed or injured is discountable (i.e., highly unlikely to occur), and potential effects to snowy plover survival will be insignificant.

---

[2] Information received from R. Zembal, Orange County Water District, on January 19, 2017.

Based on the above analysis, we concur with your determination that the proposed action is not likely to adversely affect Ridgway's rails, least terns, or snowy plovers. With our concurrence, the interagency consultation requirements of section 7 of the Act have been satisfied. Although this ends informal consultation, obligations under section 7 of the Act shall be reconsidered if (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (2) this action is subsequently modified in a manner that was not considered in this assessment, or (3) a new species is listed or critical habitat designated that may be affected by the action.

We appreciate your coordination on this project and your efforts to avoid and minimize potential effects to federally listed species. If you have any questions regarding this project, please contact Christine Medak at 760-431-9440, extension 398.

Sincerely,

JONATHAN SNYDER

Digitally signed by JONATHAN SNYDER
Date: 2017.03.23 10:13:49 -07'00'

for Karen A. Goebel
Assistant Field Supervisor

cc:
Jennifer Turner, California Department of Fish and Wildlife

Figure 1. Project Location

From: Medak, Christine
To: Jones, Erin L CIV CESPL CESPD (US)
Subject: [Non-DoD Source] SAR Marsh
Date: Tuesday, March 28, 2017 5:25:27 PM

Erin,

We do not object to the change in schedule as currently proposed.

Christine L. Medak
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008
Phone: (760) 431-9440 ext. 298
Fax: (760) 431-9624
Blockedhttp://www.fws.gov/carlsbad/

Follow us on Facebook at Blockedhttp://facebook.com/USFWSPacificSouthwest
Follow us on Twitter at Blockedhttp://twitter.com/USFWSPacSWest

"I'd like to offer a plug for actually having the natural processes instead of having to simulate them."
— Nadav Nur, PRBO Conservation Science

From: Bryant Chesney - NOAA Federal
To: Jones, Erin L CIV CESPL CESPD (US)
Subject: [EXTERNAL] RE: SAR Marsh Eelgrass Plan of Action & SEA
Date: Friday, March 03, 2017 1:50:31 PM

Erin,
NOAA's National Marine Fisheries Service (NMFS) has reviewed your proposed approach for addressing eelgrass impacts at the Santa Ana River Marsh (Marsh) and the Supplemental Environmental Assessment for maintenance activities within the Marsh. The proposed project occurs within essential fish habitat (EFH) for Pacific Coast Groundfish and Coastal Pelagic Species Fishery Management Plans (FMP). In addition, the project occurs within seagrass and estuarine habitat, which are both designated as habitat areas of particular concern (HAPC) for various fish within the Pacific Coast Groundfish FMP. NMFS believes the maintenance activities would adversely affect EFH via removal of seagrass and salt marsh habitat, benthic disturbance, and increased turbidity. However, the maintenance activities are essential to maintain the ecological integrity of the Marsh and its associated habitats. Moreover, NMFS believes the proposed approach for addressing eelgrass impacts provides adequate conservation for this important resource. Therefore, NMFS concurs with your determination that adverse impacts would be minimal and short term and has no additional EFH conservation recommendations to provide. Thank you for consulting with NMFS.
Regards,
Bryant

-----Original Message-----
From: Jones, Erin L CIV CESPL CESPD (US)
[mailto:Erin.L.Jones@usace.army.mil]
Sent: Thursday, February 16, 2017 2:29 PM
To: Bryant Chesney (Bryant.Chesney@noaa.gov) <Bryant.Chesney@noaa.gov>
Subject: SAR Marsh Eelgrass Plan of Action & SEA

Hi Bryant,

Please see attached for the Corps' Plan of Action for eelgrass at SAR Marsh and a copy of the Draft SEA.

A hard copy of the letter is forthcoming.

Please let me know if you have any questions.

Thanks!

Erin L. Jones
Biologist
Ecosystem Planning Section, Planning Division Prado Dam Field Office Los Angeles District, U.S. Army Corps of Engineers erin.l.jones@usace.army.mil

Office: 951-898-6191
Government Mobile: 213-300-9723

Part Time Schedule: M, T, Th

APPENDIX D

Mailing List

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Ste 250
Carlsbad, CA 92008
Attn: Christine Medak

Mr. John Ainsworth
Executive Director
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219
Attn: Larry Simon

National Marine Fisheries Service
Attn: Bryant Chesney
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802

California Department of Fish & Wildlife
South Coast Region
Attn: Loni Adams
3883 Ruffin Road
San Diego, CA 92123

Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105
ATTN: Allan Ota

Mr. David Gibson, Executive Officer
California RWQCB, Santa Ana Region
Attn: Marc Brown
3737 Main Street, Suite 500
Riverside, California 92501

U.S. Army Corps of Engineers
South Pacific Division, CESPD-PDC
1455 Market St, 20th Floor
San Francisco, CA 94103
ATTN: Nedenia Kennedy

U.S. Army Corps of Engineers
Regulatory Division
915 Wilshire Blvd., Ste 930
ATTN: Corice Farrar
Los Angeles, California 90017

City of Newport Beach
Attn: Robert Stein, Assistant City Engineer
100 Civic Center Dr.
Newport Beach, CA 92660

South Coast Air Quality
Management District
21865 Copley Dr.
Diamond Bar, CA 91765-4182
Attn: Wayne Nastri, Acting Executive Officer

Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Orange County Water District
Attn: Richard Zembal
18700 Ward Street
Fountain Valley, CA 92708

Orange County Environmental Health
1241 East Dyer Road, Suite 120
Santa Ana, CA 92705

Orange County Public Works
Flood Control Division, Santa Ana River Project
Attn: Ariel Corpuz
P.O. Box 4048
Santa Ana, CA 92702-4048

Santa Ana Watershed Association
P.O. Box 5407
Riverside, CA 92517

Sea & Sage Audubon Society
PO Box 5447
Irvine CA 92616-5447

Patrick Alford
City of Newport Beach
100 Civic Center Dr.
Newport Beach, CA 92660

Tom McCloskey
West Newport Oil Company
P.O. Box 1487
Newport Beach, CA 92659

Orange County Sanitation District
Attn: Ms. Lisa Haney
10844 Ellis Avenue
Fountain Valley, CA 92708

Orange County Sanitation District
Attn: Ms. Carla Dillon
10844 Ellis Avenue
Fountain Valley, CA 92708

George Lesley
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Newport Beach, CA 92663

Surfrider Foundation
Newport Beach Chapter
PO Box 12754
Newport Beach, CA 92658

Huntington Beach Wetlands Conservancy
PO Box 5903
Huntington Beach, CA 92615

Newport Beach Public Library
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Newport Beach, CA 92660

Mike Sinacori
City of Newport Beach
Assistant City Engineer
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Newport Beach, CA 92660

Mike Mohler
Project Manager
Newport Banning Ranch, LLC
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Newport Beach, CA 92660

Sean Pence
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Mr. Michael Daily
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Newport Beach, CA 92663

Ed Guilmette
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Costa Mesa, CA 92627

Mr. Craig Batley
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Newport Beach, CA 92663

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Newport Beach, CA 92663

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Jim Mosher
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Newport Beach, CA 92660

Ms. Suzanne Skov
Allen Matkins Leck Gamble Mallory & Natsis LLP
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William Seitz
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Newport Beach, CA 92663

Paul Leveque
4 Canal Circle
Newport Beach, CA 92663

Terry Welsh
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Costa Mesa, CA 92626

Ken & Jo Barrett
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Gary Belt
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Ryan Long
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Newport Beach, CA 92663

Everette Phillips
206 Walnut St.
Newport Beach, CA 92663

Suzanne Gignoux
316 Lugonia St.
Newport Beach, CA 92663

Janet Ford
419 Canal St.
Newport Beach, CA 92663

Mary Schultz
444 62nd St.
Newport Beach, CA 92663

Steve Schumacher
233 Canal St.
Newport Beach, CA 92663

T. Sanglerat
339 Canal St.
Newport Beach, CA 92663

Kevin Dunlap
305 Lugonia St.
Newport Beach, CA 92663

Sherry Franklin
Via e-mail

Geni Walton
Via E-Mail

Neal Shehab
Via E-Mail

Steve Ray
Via E-Mail

Karl Post
Via E-Mail

APPENDIX E

Response to Comments

Comments from:

Verbal Comments Public Informational Meeting
February 27, 2017

1) The tern island should be scraped (cleared & grubbed) prior to sand placement to prevent re-establishment of weedy species.

   Response: The Corps will coordinate with its Contractor to perform scraping of the tern island as needed prior to placement of sediment.

2) The crossing to tern island should be improved, with a permanent crossing for biologists and trucks to allow for consistent maintenance of the island.

   Response: A permanent crossing to the tern island would be counter to the purpose of the island, which is to prevent 1) access by predators that may prey upon terns and chicks, and 2) human trespass. Crossing may still be made using rafts for personnel with light equipment or using temporary structures (i.e. gang planks) to access for work of a longer duration or for more heavy duty equipment. The absence of a permanent crossing does not affect the Corps' ability to perform maintenance.

Ms. Lisa Haney, Orange County Sanitation District
March 1, 2017

1) We own and operate a treatment facility directly across the river from the site. In this location, on the river bank, we have 2 emergency flap gates. Should there be an emergency, we need to be able to open those gates on a moment's notice. We routinely remove sediment that accumulates in front of the doors to ensure they can open and operate. A few months ago we spent money clearing the sediment from those doors. Our concern is that the dredging activities described may lead to sediment accumulation in front of our flap gates. We would ask that this be monitored and that if necessary, the Army Corps mitigate the flap gate area if it becomes affected by the work. Since the project will be in the river dredging anyway, we believe it would be easy for the Army Corps to remove any accumulated sediment that may have deposited in front of the flap gate area. Or if there is a way to prevent or ensure that there would be no impact from the project, even better. Since this is a potential impact to our operations and potentially public health, we would appreciate the opportunity to discuss and secure the operation of the flap gates during the length of the project.

2) Additionally, OCSD has recently been working in the area immediately adjacent to the project. We completed a pipeline project and have spent two years planting and mitigating the area of disturbance as required by a Fish and Wildlife permit obligation. We will be starting a second phase of this mitigation next month. We need to ensure that our two projects will not conflict or interfere with one another in terms of road and site access. We also need to ensure that this project will not harm or influence

the OCSD mitigation site in any way. It is routinely monitored (quarterly) and an annual report submitted to Fish and Wildlife at the beginning of each year. We would be grateful to sit down and discuss logistics of both projects and timelines to ensure that both can proceed without any hindrance to the other.

Response: Based on the maps provided, the proposed project would not impact the described flap gates (comment 1) or mitigation area (comment 2). The project would not affect any vegetation in the mitigation site, and the main easement road would be used to access the smaller road adjacent to the tern island. All work would be contained within the Marsh, with sediment placed upland on the tern island. The Corps will not be performing any work or activities within the River as part of the proposed project. Current River dredging is being performed by Orange County Flood.

Carla Dillon, Orange County Sanitation District

March 2, 2017

Sanitation District has a pipe that carries flow from our Bitter Point Pump Station to the levee at the Santa Ana River and is aligned with the Access Route for The Project (see Enclosure). The pipe travels under the Santa Ana River to the Sanitation District Plant No. 2. The Sanitation District requests the following to understand if your project will have impacts on our infrastructure:

1) Will there be any storage of equipment, vehicles, or sediment, or other materials on the Access Route of the Project?

   Response: No storage is expected on the Access Route. Storage of equipment would be located near the oil derrick that is owned and operated by the City of Newport Beach, southeast of the tern island. Sediment will be placed on the tern island, which will be accessed directly from the sediment removal area and from the crossing off the road just east of the tern island. See Figure 3 of the SEA.

2) What is the weight of load vehicles that will use the Access Route for the Project?

   Response: The largest/heaviest piece of equipment used would be a dump truck, which would weigh approximately 69,000 lbs. (34.5 tons) unloaded. The truck would weigh approximately 150,500 lbs. (75.25 tons) fully loaded.

3) What is the type of vehicle that will use the Access Route for the Project?

   Response: Heavy equipment expected to use the Access Route includes 2 excavators and a small dozer. One to two dump trucks may also be used. Use of the Access Route will be for ingress and egress of equipment and personnel vehicles only. No work will be done or equipment stored on the main Access Route.

The Sanitation District also has a pipe that runs along the Huntington Beach side of the Santa Ana River (see Attachment). This pipe is large in diameter and carries a significant volume of treated wastewater from the Sanitation District's Treatment plants to the ocean. It is shallow and not designed for vehicular traffic. The pipe would require a protection plan if there were to be a load on this pipe.

> **Response:** The proposed project will not be implemented on the west side of the river, therefore no impacts to this pipe would occur.

G. Victor Leipzig, Sea & Sage Audubon
March 3, 2017

1) The ability of the Least Tern nesting island to support nesting of Least Terns (and possibly other sand-nesting avian species) would be enhanced by a program in which community volunteers participate in hand-removal of excess vegetative growth on the island. Sea and Sage Audubon Society, with its 3,500 members, would be willing to collaborate in the recruitment of volunteers.

   Response: Thank you for your suggestion, which will be considered as part of the future maintenance strategy for the marsh.

2) The functional life of the fencing around the tern island would be enhanced if it could be constructed of some non-corrosive material such as recycled plastic. The saline environment of that site is guaranteed to result is short life-span for steel fence components either below or above ground.
   A major contributor to breeding failures at California Least Tern reserves is depredation of both adult and nestling terns from a host of predators. Design of the fence should include provisions to deter avian predators, such as raptors, from being able to perch on the fence.

   Response: The current design for fencing includes chain link with a vinyl waterproofing material. Plastic fencing tends to degrade in the sun over time, cracking and splintering, with pieces of plastic entering the water course. The fencing design also includes topping with barbed wire to deter perching and human intrusion.

3) The successful nesting of Least Terns at the tern island would be enhanced if the County of Orange would enforce its existing ordinance against dogs on-or-off leash at the mouth of the Santa Ana River, a known Least Tern foraging area. We encourage the Corps of Engineers to communicate to the County of Orange to encourage it to safeguard this tern foraging area by ensuring that dogs are not permitted.

   Response: Your comment will be forwarded to the County of Orange.

Ariel Corpuz, Orange County Public Works
March 3, 2017

1) USACE needs to include as part of this project the repair of the embankment erosion at the tidal gates (2 locations) at the SAR 2 Levee System.

   Response: The Corps is aware of the embankment repairs needed along the levee at the SAR Marsh. The current project focuses on the sediment removal at the downstream tide gate only to restore circulation in the Marsh and its habitats. This project is not scoped or funded to accommodate other work. Repairs to the levee embankment will likely be performed through a separate project, which would be addressed in a separate NEPA document.

From: Haney, Lisa
To: Jones, Erin L CIV CESPL CESPD (US)
Cc: Usher, David; Frigo, Lisa
Subject: [EXTERNAL] Santa Ana River Marsh Project
Date: Wednesday, March 01, 2017 4:55:39 PM
Attachments: image001.jpg
image002.jpg
image004.jpg
image006.jpg
image008.jpg
image010.jpg
image012.jpg
Levy Mitigation Site.pdf
Flap Gate Map.pdf

Good Afternoon Erin,

I am reaching out to you on behalf of the Orange County Sanitation District. I read the draft SEA for the Santa Ana River Marsh Sediment removal project, Newport Beach this afternoon. Our agency had two impact concerns that we wanted to bring to your attention and discuss with you.

1) We own and operate a treatment facility directly across the river from the site. In this location, on the river bank, we have 2 emergency flap gates. Should there be an emergency, we need to be able to open those gates on a moment's notice. We routinely remove sediment that accumulates in front of the doors to ensure they can open and operate. A few months ago we spent money clearing the sediment from those doors. Our concern is that the dredging activities described may lead to sediment accumulation in front of our flap gates. We would ask that this be monitored and that if necessary, the Army Corps mitigate the flap gate area if it becomes affected by the work. Since the project will be in the river dredging anyway, we believe it would be easy for the Army Corps to remove any accumulated sediment that may have deposited in front of the flap gate area. Or if there is a way to prevent or ensure that there would be no impact from the project, even better. Since this is a potential impact to our operations and potentially public health, we would appreciate the opportunity to discuss and secure the operation of the flap gates during the length of the project.
2) Additionally, OCSD has recently been working in the area immediately adjacent to the project. We completed a pipeline project and have spent two years planting and mitigating the area of disturbance as required by a Fish and Wildlife permit obligation. We will be starting a second phase of this mitigation next month. We need to ensure that our two projects will not conflict or interfere with one another in terms of road and site access. We also need to ensure that this project will not harm or influence the OCSD mitigation site in any way. It is routinely monitored (quarterly) and an annual report submitted to Fish and Wildlife at the beginning of each year. We would be grateful to sit down and discuss logistics of both projects and timelines to ensure that both can proceed without any hindrance to the other.

I have attached a map of the mitigation site adjacent to the Army Corps project site and a map showing the location of the flap gates on the other side of the river.

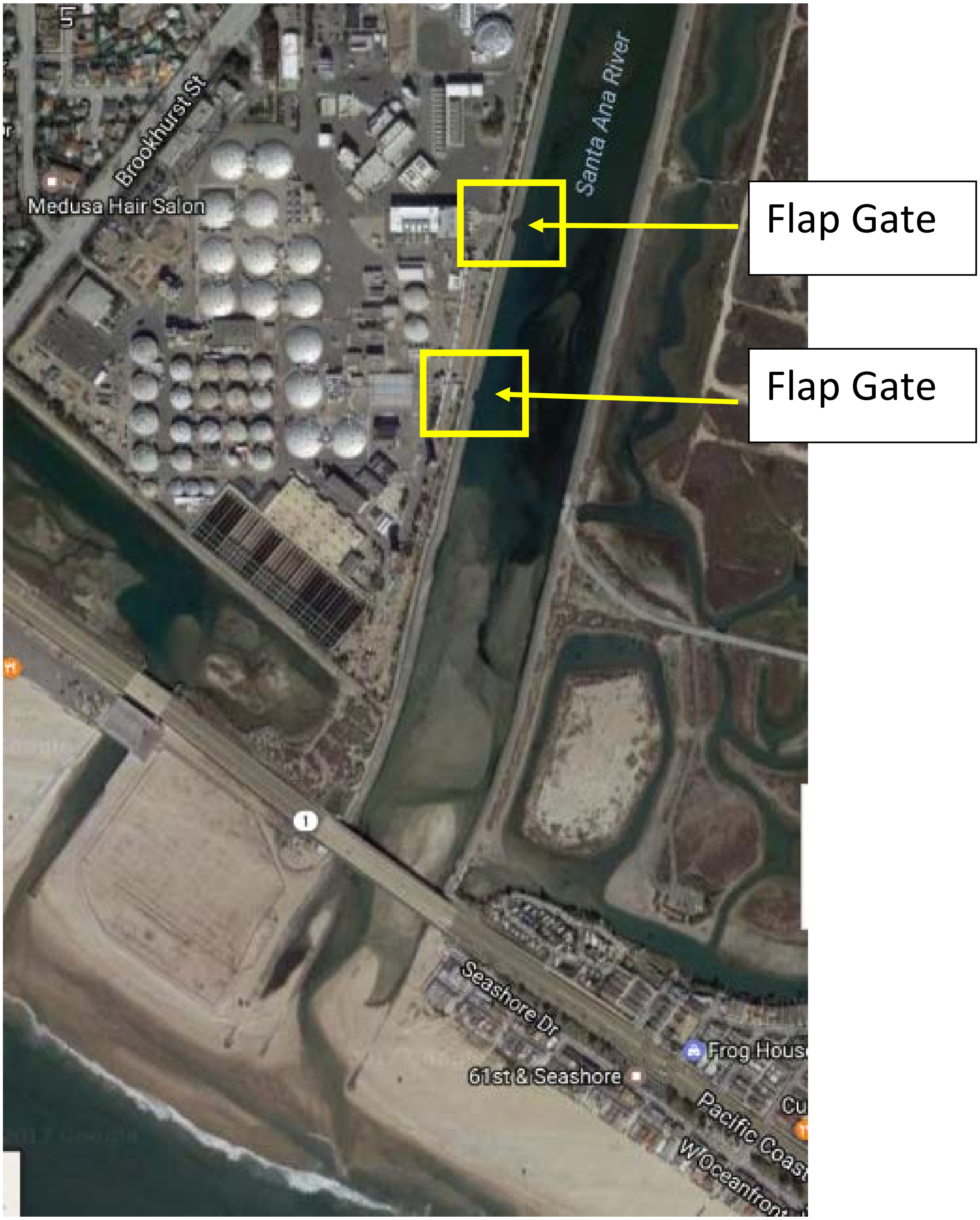
Looking forward to discussing and coordinating with you soon.

Much appreciation,

Lisa Haney

Regulatory Specialist - Water

Orange County Sanitation District
Environmental Compliance
Office: 714.593.7404 | Cell: 714.330-6827 | LHaney@OCSD.com
Blockedwww.ocsewers.com


Flap Gate
Flap Gate
Santa Ana River
Brookhurst St
Medusa Hair Salon
1
Seashore Dr
Frog Hous
61st & Seashore
Pacific Coast
W Oceanfront
Cu

OCSD Levy Mitigation Project Site

Orange County Sanitation District
10844 Ellis Avenue, Fountain Valley, CA 92708
714.962.2411 • www.ocsd.com

Serving:
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Buena Park
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Irvine
La Habra
La Palma
Los Alamitos
Newport Beach
Orange
Placentia
Santa Ana
Seal Beach
Stanton
Tustin
Villa Park
County of Orange
Costa Mesa Sanitary District
Midway City Sanitary District
Irvine Ranch Water District
Yorba Linda Water District

March 2, 2017

Eduardo T. De Mesa, Chief, Planning Division
Erin.l.jones@usace.army.mil
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Blvd., Ste 930
Los Angeles, CA 90017

SUBJECT: Supplemental Environmental Assessment for the Santa Ana River Marsh Sediment Removal Project

---

Thank you for accepting this letter during the comment period for the Supplemental Environmental Assessment for the Santa Ana River Marsh Sediment Removal Project in the City of Newport Beach. The Orange County Sanitation District (Sanitation District) has several large underground pipes in the vicinity of your project.

The Santa Ana River Marsh Sediment Removal Project (The Project) will remove sediment blocking the downstream tide gate, beneficially reuse the sediment to improve California least tern nesting habitat on the tern island, and increase tidal range and improve circulation of the tidal flow throughout the Marsh.

Sanitation District has a pipe that carries flow from our Bitter Point Pump Station to the levee at the Santa Ana River and is aligned with the Access Route for The Project (see Enclosure). The pipe travels under the Santa Ana River to the Sanitation District Plant No. 2. The Sanitation District requests the following to understand if your project will have impacts on our infrastructure:

1. Will there be any storage of equipment, vehicles, or sediment, or other materials on the Access Route of The Project?
2. What is the weight of load vehicles that will use the Access Route of The Project?
3. What is the type of vehicle that will use the Access Route for The Project?

The Sanitation District also has a pipe that runs along the Huntington Beach side of the Santa Ana River (see Attachment). This pipe is large in diameter and carries a significant volume of treated wastewater from the Sanitation District's Treatment plants to the ocean. It is shallow and not designed for vehicular traffic.

The pipe would require a protection plan if there were to be a load on this pipe. If your project requires any activity on the Huntington Beach side of the channel, please contact me for coordination or Rudy Davila at (714) 593-7348.

If you have any questions, please contact me at 714 593-7371.

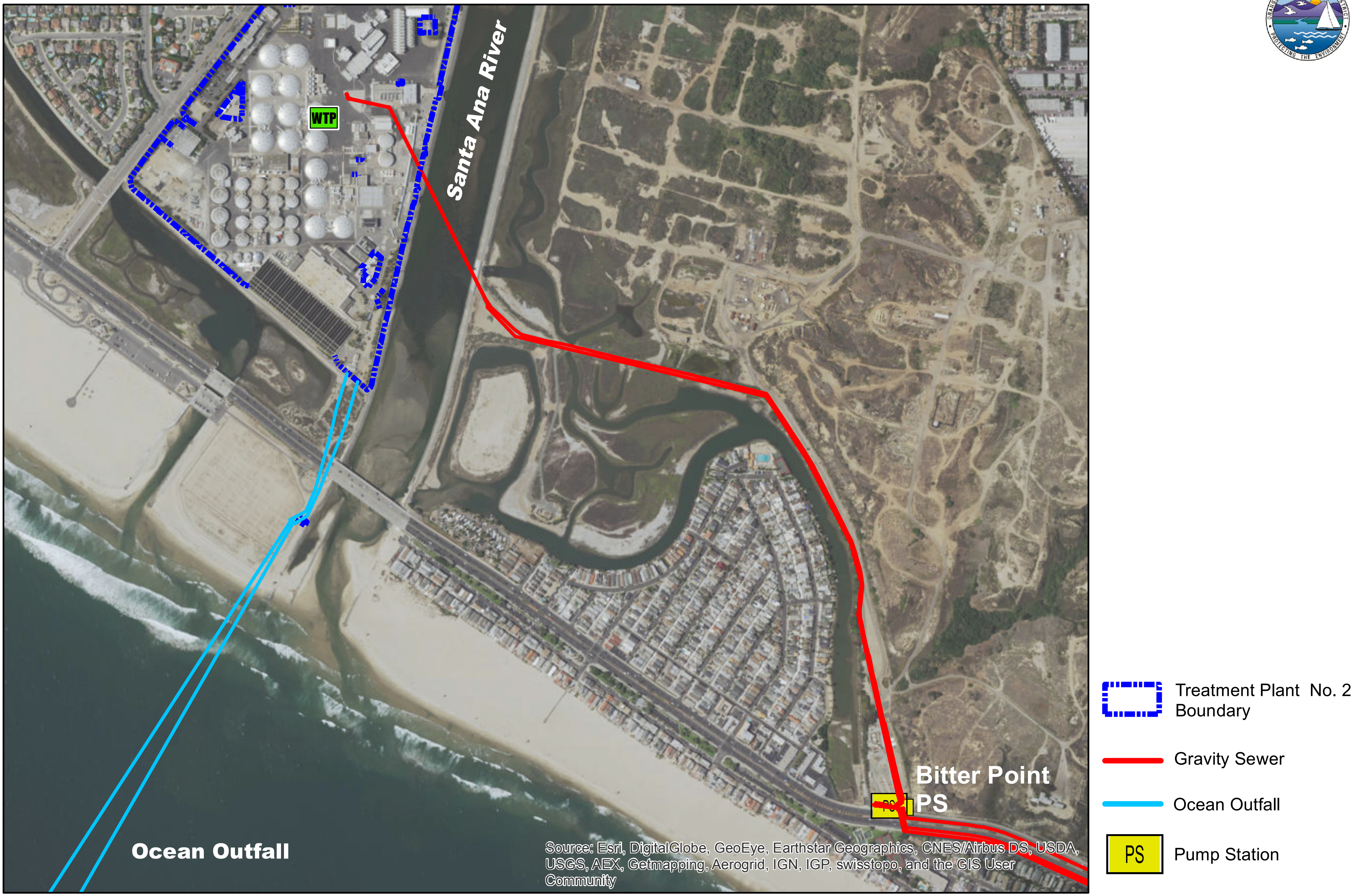
Carla Dillon

Carla Dillon, D.P.A., P.E.
Engineering Supervisor

CD:sa
http://project/sites/Planning/Shared Documents/20170302_ACOE_SA_River_Marsh_Sed_Removal_SEIR.doc

Enclosure

cc: Kathy Millea



ORANGE COUNTY SANITATION DISTRICT

Engineering, Planning - Geographic Information Systems

0 240 480 960 1,440 1,920

Feet

1 inch equals 1,000 feet

N

Source: OCSD GIS Data, Thomas Brothers 2010

Sea & Sage Audubon
P.O. BOX 5447, IRVINE, CA 92616-5447

Eduardo T. De Mesa
Chief, Planning Division
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Blvd., Suite 930
ATTN: Ms. Erin Jones (CESPL-PDR-N)
Los Angeles, CA 90017

By email to: erin.l.jones@usace.army.mil

March 3, 2017

Dear Mr. De Mesa:

Sea and Sage Audubon Society (the major Orange County chapter of the National Audubon Society) wishes to comment on the Supplemental Environmental Assessment (SEA) for the Santa Ana River Marsh Sediment Removal Project.

We feel that the SEA is a comprehensive review of potential impacts of the project. We would add three suggestions for your consideration as to ways to further minimize potential adverse impacts.

1. The ability of the Least Tern nesting island to support nesting of Least Terns (and possibly other sand-nesting avian species) would be enhanced by a program in which community volunteers participate in hand-removal of excess vegetative growth on the island. Sea and Sage Audubon Society, with its 3,500 members, would be willing to collaborate in the recruitment of volunteers.

2. The functional life of the fencing around the tern island would be enhanced if it could be constructed of some non-corrosive material such as recycled plastic. The saline environment of that site is guaranteed to result is short life-span for steel fence components either below or above ground.

A major contributor to breeding failures at California Least Tern reserves is depredation of both adult and nestling terns from a host of predators. Design of the fence should include provisions to deter avian predators, such as raptors, from being able to perch on the fence.

3. The successful nesting of Least Terns at the tern island would be enhanced if the County of Orange would enforce its existing ordinance against dogs on-or-off leash at the mouth of the Santa Ana River, a known Least Tern foraging area. We encourage the Corps of Engineers to communicate to the County of Orange to encourage it to safeguard this tern foraging area by ensuring that dogs are not permitted.

Sincerely yours,

G. Victor Leipzig, Ph.D.
President

Susan Sheakley
Chair, Conservation Committee

Sea and Sage Audubon Society's mission is to protect birds, other wildlife and their habitats through education, citizen science, research and public policy

From: Corpuz, Ariel
To: Jones, Erin L CIV CESPL CESPD (US)
Cc: Tang, Reynold
Subject: [EXTERNAL] Draft SEA for the SAR Marsh Sediment Removal Project
Date: Friday, March 03, 2017 3:34:31 PM

Hi Erin,

Please include the following comment to the subject Draft SEA:

COMMENT: “USACE needs to include as part of this project the repair of the embankment erosion at the tidal gates (2 locations) at the SAR 2 Levee System.”

Thanks.

Ariel Corpuz, P.E.

Senior Civil Engineer

OC Public Works

Flood Control/SARP

(714)647-3966