Appendix B: Southern Los Cerritos Wetlands Restoration Project Basis of Design Components

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MEMORANDUM

To:	Eric Zahn
Cc:	Sally Gee
From:	The M&N Design Team (M&N, CRC, Anchor)
Date:	1/31/23
Subject:	Basis of Design Components
M&N Job No.:	210644

Introduction

This memorandum represents the 65% Draft Basis of Design (BOD) document. It presents the project design and its rationale for the record and for clarification of project design components. The BOD is also intended for stimulating input from the LCWA and the Technical Advisory Committee.

One over-arching goal of the design is to create a project that is self-sustaining and resilient with minimal maintenance over time. Project-specific goals are listed below.

1. Restore tidal wetland processes and functions to the maximum extent possible.

2. Maximize contiguous habitat areas and maximize the buffer between habitat and sources of human disturbance.

3. Create a public access and interpretive program that is practical, protective of sensitive habitat and ongoing oil operations, economically feasible, and will ensure a memorable visitor experience.

4. Incorporate phasing of implementation to accommodate existing and future potential changes in land ownership and usage, and as funding becomes available.

5. Strive for long-term restoration success.

6. Integrate experimental actions and research into the project, where appropriate, to inform restoration and management actions for this project.

The philosophy in the design is to minimize structures and dependence on features (mechanical items) that require active operation, maintenance and/or replacement.

Draft Basis of Design Components

1. Sources of Seawater – The project is proposed to be phased to capitalize on two sources of seawater that are available at different points in time. An existing 42-inch culvert with an invert elevation of -1.0 foot NGVD connects the site to the San Gabriel River and can serve as the seawater source in the near-term timeframe. The second seawater source is the Haynes Cooling Channel (HCC) immediately adjacent to the project site and it is assumed to be available on or after 2029. The project will be connected to the 42-inch culvert in Phase 1 and then be connected to the Haynes Cooling Channel in Phase 2. It is also assumed at this time that the existing culvert will not be relied upon as the primary tidal connection and could be closed but not permanently sealed. It could be left in place to become functional in the future if needed for any reason as a back-up water source. If the HCC cannot be obtained as a water source in the future, then the phase 2 footprint may have to be redesigned and the phasing may need to be revised (Coastal Restoration Consultants, or CRC 2021).

Different tidal conditions will exist in Phases 1 and 2 because the 42-inch culvert does not convey as much seawater as efficiently to and from the site as will the Phase 2 open channel connection. Modeling conducted for prior work (Moffatt & Nichol, or M&N 2015) and for this specific effort (M&N 2022) indicates that the existing tide range is 2.8 feet with a culvert-only connection to the SGR as Phase 1. Tidal elevations range from a high of +2.9 feet and a low of +0.1 feet. The modeling also indicates a potential tide range of nearly 8 feet with a connection to the Haynes Cooling Channel as Phase 2. This suggests that low tides in Phase 1 are limited to an elevation of approximately +0.1 foot NGVD, while it drops to nearly -3.7 feet NGVD in Phase 2.

For Phase 1, the existing culvert connection to the San Gabriel River is assumed to be used. The culvert would likely need to be cleaned out, and the gate is either:

A. Left as is – to simplify permitting and is assumed to be the most likely scenario at this point;

B. Removed entirely – could trigger extra permitting from USACE under section 408 or,

C. Replaced with a new automated device for controlling water levels such as a Self-Regulating Tide gate (SRT) – This action may also require a USACE 408 permit.

For Phase 2, it is assumed that an open channel connection to the Haynes Cooling Channel exists. Full ocean tides will be provided by this connection.

2. Tidal Channels – The current plan is based on ultimate implementation of Phase 2 with a full tide range. With the uncertainty of Phase 2 occurring, if the tide range remains constricted 2.8 feet, then the design of Phase 1 and the bed elevation of the tidal channels could be reconsidered. Low marsh habitat elevations may need to be revised if this is to be the case, but other habitat elevations should function successfully as presently designed. The tidal channel layout and sources of seawater are shown in Figure 1.

Tidal channels provide important habitat and are crucial for distributing tidal flows throughout the marsh. The smallest channels, first-order tidal creeks, are typically found throughout mid-marsh plains and are generally less than a few feet wide and deep and typically drain completely on most low tides. First-order creeks merge to form second-order tidal creeks, which are larger and deeper and may drain only on lower low tides. Second-order creeks merge to form larger third-order creeks and so on. Third-order and higher order creeks typically contain sub-tidal habitat, which is important especially for fish. Natural tidal creeks tend to be meandering due to the generally flat nature of most natural marsh plains.

The 65% engineering drawings show the largest sub-tidal channel proposed through the site to be deepened to an elevation of -4.5 feet NGVD to provide 1 foot of water in the channel at the lowest low tide in the future Phase 2. This same channel will hold nearly 4.5 feet of water in the channel at low tide in Phase 1. The goal is to keep the water in the channel cool and oxygenated in prolonged dry weather conditions. In Phase 1, tidal creeks in the areas that are set aside for minimal to no grading will generally be left to develop on their own around existing small ditches that were dug by vector control to help minimize ponding of tidal waters. These are expected to develop after the full tidal connection allows greater tidal dynamics and thus flows with more potential to cut channels. Except where the new main sub-tidal channel intersects it, the existing tidal channel through the site will remain undisturbed except where culverts will be removed, and also potentially within the experimental area. The lower part of this channel contains a diversity of native invertebrates that if preserved, will help populate the newly restored habitats more quickly than if they had to colonize from neighboring systems such as Steamshovel Slough.

3. Habitat Areas and Elevations – This project is designed to provide a diversity of quality wetland, transitional, and upland habitats on this site, considering opportunities and constraints. The layout of the habitat distribution and size of the areas was prepared to optimize the habitat function on-site. The proposed habitat plan for Phases 1 and 2 is shown in Figure 2. The entire grading plan for the site is designed for fully tidal conditions, which will occur in Phase 2. This is

done so that most areas of Phase 1 will not need to be graded twice, causing additional disturbance to developing habitats.

The result of the ultimate Phase 2 design approach is that lower elevation habitats will experience a relatively high tidal inundation frequency (wetted more often than needed) until Phase 2 is implemented. The cordgrass marsh area for instance will likely be too wet for cordgrass establishment and the entire sub-tidal channel will remain inundated in the near-term. These areas will provide mudflat and sub-tidal habitat in the near-term. At mid-marsh and high-marsh elevations, tidal muting in Phase 1 is less so it is expected that these habitats will function more or less naturally in Phases 1 and 2. The highest high tides will be muted in Phase 1 so the upper limit of the high-marsh and the transition zone will move higher between phases, but both of these habitats will still be in the establishment phase when Phase 2 is implemented. Therefore their elevation ranges will be more a product of revegetation efforts (planting and irrigating) than natural processes. Limited areas at the interface between Phases 1 and 2 will need to be graded in both phases, mainly to connect the Phase 1 sub-tidal channel with both the Haynes Channel and with the upstream extension of the main sub-tidal channel on-site..

Grading shall be done in such a way as to provide for naturalized surfaces with uneven terrain rather than artificially smooth and flat marsh plains. The contractor will be required to create uneven terrain with “micro-topography” or “lumps and bumps” in the areas for mid-marsh, high marsh, transitional habitat, and filled upland habitats. This can be achieved by several methods including ripping graded surfaces, and by “side-casting” earth material when excavating micro-channels to form a low berm parallel to the channels, and then creating gaps in the new berm to result in mounds spaced at random intervals along the channel banks. It can also be achieved by leaving relatively higher existing mounds in place during the grading of the marsh plain to provide more natural unevenness. The Los Cerritos Wetlands Restoration plan by Coastal Restoration Consultants (CRC) dated May 26, 2021 provides examples of the uneven terrain concept.

See details below for each sub-habitat area. The habitat ranges indicated below are all assuming current sea level. The relationship between elevation and inundation frequency will change as sea level rises. The relationship between inundation frequency and habitat type will generally not change.

A. Sub-tidal habitats occur below the lowest tide levels (-3.9 ft NGVD) in fully-tidal systems (Phase 2) or where drainage is limited resulting in permanent ponding in muted-tidal systems (Phase 1). Sub-tidal habitats have an inundation frequency of 100%.

B. Unvegetated low intertidal habitats will occur below the lowest areas of vegetation and have an inundation frequency of 100% to 40%. This inundation range is often referred to as mudflat, but this project is not designed to have any mudflats at current sea level for Phase 2. There will be unvegetated low intertidal habitats in tidal channels, and in Phase 1 mudflat will exist in the future low marsh (cordgrass) area where hydrologic conditions will not yet be suitable for cordgrass until the Phase 2 connection to the HCC. This is described in item C below.

C. Cordgrass marsh areas can occur in along tidal and sub-tidal creeks and on flats that are inundated between about 20% and 40% of the time. The cordgrass marsh area within the project is designed to be inundated 20% of the time once the Phase 2 connection to the Haynes Cooling Channel is made to maximize the time before it converts to mudflat with SLR. This elevation is expected to be +1.9 feet NGVD. During Phase 1, however, when tides are muted the vertical position of the 20%-40% inundation elevation range will be higher compared to Phase 2. Therefore, the low marsh (cordgrass) area is expected to temporarily be mudflat habitat until Phase 2 is implemented.

D. Areas that are graded to mid-marsh elevation are designed to be at +3.3 feet NGVD, which is the upper limit of the 2.0 – 3.3 feet NGVD range for this habitat (and an inundation frequency of 4% to 20%). This will allow mid-marsh habitat to exist at current sea level and with about 1.3 feet of sea level rise. Without beneficial

sediment additions, these habitats will convert to cordgrass marsh with further sea level rise and eventually to unvegetated low intertidal habitat (mudflats) with about 2.6 feet of sea level rise. Much of the areas labeled as "minimal- to no-grading" in Phase 1 fall within the elevation range for mid-marsh and are expected to function as such. It is expected that in Phase 1 the elevation range for mid-marsh will be lower by nearly 0.8 feet than the Phase 2 elevations. The graded mid-marsh areas will include tidal creeks and microtopographic variation that will create mud panne habitat in depressions and small patches of high marsh on small mounds. This topographic heterogeneity increases the overall habitat value of the mid-marsh plain.

E. Areas that are graded to high marsh elevation are designed to be at +4.7 feet NGVD, which is the upper limit of the 3.4 – 4.7 foot NGVD range for this habitat (and an inundation frequency of 0.05 % to 4%). This will allow high-marsh habitat to persist with about 1.3 feet of sea level rise. As with graded mid-marsh habitats, high-marsh will convert with every 1.3 feet of sea level rise to mid-marsh, cordgrass marsh, and unvegetated low intertidal (mudflats). Some of the "minimal- to no-grading areas in Phase 1 will be high marsh and fall into this elevation range. As with mid-marsh, the inundation frequency of high-marsh areas is not expected to change between Phase 1 and 2. High marsh areas will not have tidal creeks but should have topographic heterogeneity like the mid-marsh, mainly in the form of small mounds that can support transition zone shrubs such as California boxthorn (*Lycium californica*). This habitat heterogeneity increases the overall habitat value of the high marsh habitat.

F. Salt panne habitat will be restored in large depressional areas between about +4.1 and +4.7 feet NGVD. Salt pannes flood with a combination of rainfall and/or when extreme high tides overtop the low point surrounding the depression. The ponded water evaporates over time, concentrating salts, often leaving a salt crust on the soil surface when not flooded. The high soil salinity and prolonged flooding exclude most vegetation from salt pannes; however, the upper edges can support the rare annual plant Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*). When not flooded, salt pannes can provide habitat for rare invertebrates such as tiger beetles and nesting for western snowy plovers. The sill elevation for tidal flooding of the salt panne areas should be set at +4.7 feet NGVD.

G. The transition zone habitat areas occur between the high-marsh and upland areas in a zone that is not flooded by the highest typical annual tides but is flooded during anomalous high tides (e.g., in El Nino years) and when high tides coincide with significant rainfall. These rare flooding events leave soils that are too salty for most upland plants and too dry for most salt marsh plants. The width of the transition zone varies between marshes; systems with significant riverine inputs can have more extreme water levels during fluvial flooding events. For this project, which has minimal fluvial connections, the transition zones are designed to be at between +4.8 feet and +5.7 feet NGVD, or about one foot above the highest high tide. This elevation range is expected to be appropriate during both Phases 1 and 2.

H. Non-tidal areas above 5.7 feet NGVD will be restored using native upland species. In areas that have relatively well-drained soils (sandy loams or on 3:1 or steeper slopes), coastal sage scrub can be restored. Heavier soils that are not well drained might support less diverse scrub communities and native grasslands.

I. A non-tidal strip of area between Area 18 and the northern and eastern property lines is expected to support native riparian trees, which are thriving in a bioswale setting immediately east of the project area. Excavation in this area is not required. Non-native vegetation and weeds will be removed and the area will be replanted with native vegetation.

4. Flood Protection – A combination of earthen berms and natural high terrain will protect neighboring properties from potentially increased flooding risk due to improved connection to the SGR culvert in Phase 1 and future connection to the Haynes Cooling Channel in Phase 2. A berm will be installed up to an elevation of +7.5 feet NGVD along the northern boundary of the site with the active Hellman oil field. It will provide a 6-foot width across the crest for pedestrian access. That berm will "tie-into" higher existing elevations at the western end of Area 18. Area 18 and natural high

ground protect neighbors to the east and south of the site except near the eastern end of the existing tidal channel where there is currently regular tidal flooding of a small wetland on City of Seal Beach property. The future hydrology of this area under project conditions is being assessed. The existing First Street roadway through the site will be elevated up to +10.0 feet NGVD and out of the reach of future high water for safe travel by vehicular traffic to the Hellman (oil field) site. Finally, the levee along the Haynes Cooling Channel will remain in place in Phase 1 to keep the water bodies of the wetland and channel separated, but will be partially removed in Phase 2 to allow full connection between water bodies. This is not shown on the 65% design drawings because the levee is not on LCWA property. Flood protection features area shown on Figure 3.

5. Earthwork Balance – A significant amount of excavation is proposed in the project. Each phase results in lowering of areas on the site and generation of surplus soils. Soil disposal offsite is costly. The eastern high ground at Area 18 may be able to be raised significantly to serve as a spoil area for excess earth fill. The grading plan shows it being raised to between +20 and 22 feet NGVD in Phase 1. The other area that may be able to be raised is the former City landfill site at the southwest portion of the site. The raising of that site is shown in the drawings and has been factored into the earthwork quantities. Any fill in the landfill area needs to be kept low enough to not block views from the neighborhood in Seal Beach. In contrast however, blocking views of the nearby oil operations from Heron Point may be desirable. These fill areas would be restored with native upland plant communities.

Additionally, there may be a future need for soil on-site that could be used for beneficial sedimentation in the restored intertidal habitats, which will be needed as sea level rise triggers habitat conversion. Soil for this use could be stockpiled somewhere on site and vegetated to control erosion but not to necessarily create habitat. Generally, the soil volume produced by the project will be a surplus of nearly 274,000 cubic yards (cy). Grading for this project is designed such that the cut and fill quantities balance. Due to the amount of artificial fill and high topographic elevations already present on the site, importing material will not be needed. Advance planning should occur with LCWA members to plan for beneficial soil re-use to reduce future project costs and impacts from material disposal. An example would be providing fill to the Port of Long Beach if it were suitable for project development. The preliminary earthwork quantities are shown in Table 1 below. These quantities may change as the project is further designed. A cut and fill graphic is shown in Figure 4.

Table 1: Table of Material Quantities

Item	Cut Quantity (cy)	Fill Quantity (cy)	Net Quantity (cy)
Phase 1 Grading	97,263	71,371	25,892 Cut
Phase 2 Grading	176,671	199,352	<22,681> Fill
Totals	273,934	270,723	3,211 Cut

6. Soil Preparation – Information in this section is provided by CRC (2021). Topsoil (3-6 inches) should be grubbed from graded and filled areas. This soil and plant material, which will contain a significant amount of weed propagules, should be buried at least 12 inches deep in fill areas or hauled off site in order to limit weed infestations in restored uplands. After intertidal areas are graded to the proper elevation, the soil should be ripped to a depth of 12 inches in order to create small-scale topographic heterogeneity and assure soils are not overly compacted. High marsh and transition zones should also be disked to break up large clods of soil. Low marsh and tidal and sub-tidal channels should not be ripped or disked. Low ground pressure equipment should be used in restored marsh areas to avoid soil compaction.

Upland areas that are graded or receive fill should be ripped to 18 inches and then disked. Selective placing of fill based on soil salinity should assure that at least the top 36 inches of soil has a salinity less than 3 parts per thousand. Saltier soil should be placed as deeply as possible in fill areas or hauled off site. Salty soil can also be stockpiled for future use in beneficial sedimentation of the restored marsh. Regular soil testing will be conducted during grading to assure soils in the fill areas are appropriate for supporting target plant communities. A soil amendment plan will be developed in final engineering design.

7. Preservation of Sensitive Plants On-Site – Information in this section is also provided by CRC (2021). Two rare plants that are known to occur on the project site have the potential to constrain certain restoration actions. Lewis' evening primrose (*Camissoniopsis lewisii*), a small annual plant, is a California Native Plant Society (CNPS) Rank 3 species, which means it may be in need of protection but a lack of sufficient data on its distribution exists to make this determination. This somewhat ambiguous listing makes it difficult to determine how the agencies will view potential impacts to this species. This is a species normally found on very sandy soils in dune systems or on bars along creeks and rivers. It occurs in two areas on imported sand at the project site; in Area 18 and just north of the landfill area on soil that likely has less than 5% silt and clay (i.e., beach sand). Relatively little is known about propagation of this species though it seems to sprout readily from its seedbank with very limited rainfall at the site. Southern tarplant (*Centromadia parryi* ssp. *australis*) is an annual species tolerant of salty clayey soils that is scattered throughout the project site. It is a CNPS Rank 1b, meaning it is rare throughout its range and therefore given a high level of protection, especially in the coastal zone. Propagation of this species is relatively easy where non-native annual species can be controlled. Since both species are annuals, their distribution and population size vary from year to year based on the amount of rainfall. Both species have been mapped in at least two years so there is reasonabe confidence of their distribution at the site. There will inevitably be some impacts to one or both of these species that will trigger the need for some mitigation. There will be many opportunities to establish new areas that support southern tarplant in upland areas with good weed control. Preserving Lewis' evening primrose will require protecting or expanding the area of sand where this species occurs. The mitigation ratio for any impacts to either species is still to be determined with the agencies.

8. Riparian Swale – A riparian area shown in the Conceptual Restoration Plan (CRC 2021) was proposed at the east end of the site. However, due to topographic constraints the project team has decided to simply maintain the existing function along the eastern project boundary rather than create a new swale.-An existing riparian area is being sustained by fresh groundwater shallow enough for trees to reach. The project proposes no changes to the site other than non-native vegetation removal and planting of native species.

9. Contaminated Sump Sites – Certain sites within the project area listed as former oil sumps will need to be removed and backfilled. Contamination left in twelve sumps was commonly placed next to oil wells to collect and circulate drilling muds. The project investigated potential oil contamination in near-surface soils (down to 6 feet below ground surface) and made determinations about their handling. Five sumps that exist on-site will require excavation and removal. The sumps are numbered as 1, 2, 3, 7 and 11. It is assumed they are entirely removed to 6 feet below grade with 2:1 side slopes within their entire outlines and hauled off to a municipal landfill. The volume of material estimated to be hauled away is 26,600 cy. The contractor will stockpile the material on-site, test it for contamination levels, and then haul it off to a landfill. Surplus sediment from grading will be used to backfill the excavation footprints of these sumps. Seven other sumps on-site do not require removal due to the relatively low level of contamination in

each. The sumps to remain are numbers 4, 5, 6, 8, 9, 10 and 12. Figure 5 shows the sumps to be removed and those to remain. This excavation and backfill activity is factored into the earthwork quantities. There are several sumps in the minimal to no grading areas in Phase 1. Sump 11 is within this area and will require clean up, so there will be a short-term disturbance to areas supporting Belding's savanna sparrow breeding habitat during the clean-up. Removing these contaminants will likely be a long-term benefit to this species at the site as the presence of the contaminants may be detrimental to the health of the birds and their reproductive success. Agencies will determine what mitigation will be needed, but the project is expected to greatly expand habitat for this species overall.

10. Contaminated Non-Sump Sites – Sites that are generally labeled as potentially contaminated but are not specifically categorized as sumps will generally be left unaltered. However, there are small areas that may be graded in shallow lifts to create intertidal habitat. Areas that are currently supporting salt marsh habitat will remain unaltered.

11. Construction Staging and Access – Construction staging includes activities such as equipment and material storage, may serve as the contractor field office location, and may provide construction access points. Staging is proposed at the existing State Lands Commission site, along the southern shoulder of First Street outside of the fence line, and at the site of the existing shipping container off of First Street currently used for stewardship programs. Staging at the State Lands parcel is proposed to occur outside of the existing concrete pads and to only occur on existing vacant ground, and will avoid wetlands. Staging along First Street is only to be located along the southern shoulder of the road and outside of the fence line to provide continued passage of vehicles into and out of the site, as needed. Staging at the location of the existing shipping container is on a small site and may only be suitable for the construction trailer or other small-scale storage needs. Southern tarplant has been observed at or near all of these areas, and is especially widespread at the State Lands Commission site. Potential impacts to this species will need to be considered in choosing a preferred footprint for one or more staging areas. An additional construction staging area is proposed at the midpoint of the northern project boundary.

Construction access points are at 1st Street off Pacific Coast Highway, and at Adolfo Lopez Street. Figure 6 shows construction staging and access sites.

12. Road Surface Removal – The existing road surface at the eastern end of the site near Area 18 and paralleling the existing drainage ditch will be removed and the site lowered to be the elevation of mid-marsh; much of that road is currently at or near the elevation of mid-marsh. This shall be done to provide colonization by wetland plant species and to provide for research plots as addressed below. Disposal of the asphalt or concrete will be addressed in the construction documents.

13. Research Plots – Wetland research test plots will be created along the existing eastern relic roadway alignment once the road is removed. The research plots will allow for quantitative evaluation of sea level rise effects and perhaps adaptive management approaches. This area is labeled in the design and details have been developed in the 65% design stage. Discussion of this item is found in CRC 2021.

14. Channel Under First Street – The specifics of the channel connection under First Street have been determined in the 65% design stage. The channel underneath the road will remain relatively large in cross-section using either a large span pre-cast concrete box structure with three sides or a pre-fabricated bridge. The connection is designed to not mute tides and to accommodate 3.3 feet of SLR.

15. Seal Beach Wetland at the Southeast Corner – A portion of the project site located near the far east end straddles a wetland and the property fence line runs through a marsh. Some of that marsh is located on the project site and the rest is located within the City of Seal Beach. There is a desire to not impact it, but in all likelihood the new tidal connection and proposed grading could result in tides inundating that site. This project proposes a small earthen berm between the far eastern end of the Hellman Channel and the property fence line to reduce the amount of tidal inundation entering that small area. The dimensions of this proposed berm may need to be lengthened to protect the wetlands on the Seal Beach side from inundation. However, the design needs to be vetted through the City and the agencies to identify the appropriate action for this specific site.

16. Public Access Pathways – Public access is incorporated into the project design. New earthen trails are proposed and shown schematically in the 65% design along 1st Street and over the southern land fill area with a trail that connects to an existing trail along Gum Grove Park. The final location of the trails may need to be further assessed out in the final engineering stage and after additional meetings with the public, representative Native American nations, and the regulatory agencies.

17. Cultural Resource Considerations – Native American studies and outreach are in process and are informing the project design. At this time the project has intentionally avoided any work in perimeter upland areas (e.g., Gum Grove Park) in consideration of such resources, but pathways and special land use areas may be added to meet the needs of Native Americans in future design iterations. One example is the reburial site proposed within the southern portion of the project area that is shown on the 65% design plans.

18. Soil Texture – Soils in salt marshes, especially in the mid-marsh and lower, tend to have high silt and clay content. The fine texture is important for carbon sequestration, nutrient cycling and other natural processes. The entire project area is located on what was historically tidal marsh and it is expected that those historic marsh soils are intact at some depth. Ideally, those soils will become the surface of the restored marsh in many areas. In any case, the final grading should assure that the top 12-24 inches of soil in the mid-marsh and cordgrass marsh areas is over 40% clay and less than 25% sand. High-marsh areas can have similar soils to lower areas of the marsh or be quite sandy. Salt panne soils should be over 80% silt and clay in at least the top 6-12 inches. Selective grading should be used to assure topsoil (upper 12-24 inches) in fill areas are appropriate for upland restoration. This means they should have very low salinity, a loamy texture, and should not compacted.

19. Easements and Utilities – Easements and utilities exist on-site that need to be protected. Certain utilities (e.g., the Seal Beach main waterline) will be resleeved by the City. A portion of that City waterline will be re-routed to attach to a new structure (box culvert or bridge) over the main tidal channel. A utility easement for SCE also exists along the 1st Street entry road, and another easement for the local homeowner association to the east exists along the eastern property line. Undergrounding of the overhead power line owned by SCE along First Street is assumed to occur and is shown on the plans. The project will coordinate with the City of Seal Beach for waterline relocation and with SCE for undergrounding of the power lines.

20. Tree Removal – Certain existing trees will be removed as part of the project. The trees to be removed will be shown on the plans in the 65% design phase or a later phase. A majority of the trees are palm trees. Surplus organic material from the trees should be considered for use on site to create habitat features (brush piles or downed wood) or chipped to provide a surface for trails or for ground cover in landscaped areas.

21. Planting – Planting and irrigation of installed habitat areas will occur consistent with the Restoration Plan developed by CRC (2021). The Implementation guidance section of the plan calls for planting to occur on man-made transitional habitat areas, and in some intertidal marsh habitat areas. Planting would be done to accelerate the colonization process of target habitats, and would focus on areas that will be disturbed during construction. Irrigation may be needed to help establish the plants along the slopes of berms and control soil salinity in other areas with intertidal salt marsh, transitional, and upland habitat, but it should not be required permanently. Planting is shown on the 65% plans, but irrigation will be deferred to final engineering for construction due to its undefined location(s).

References

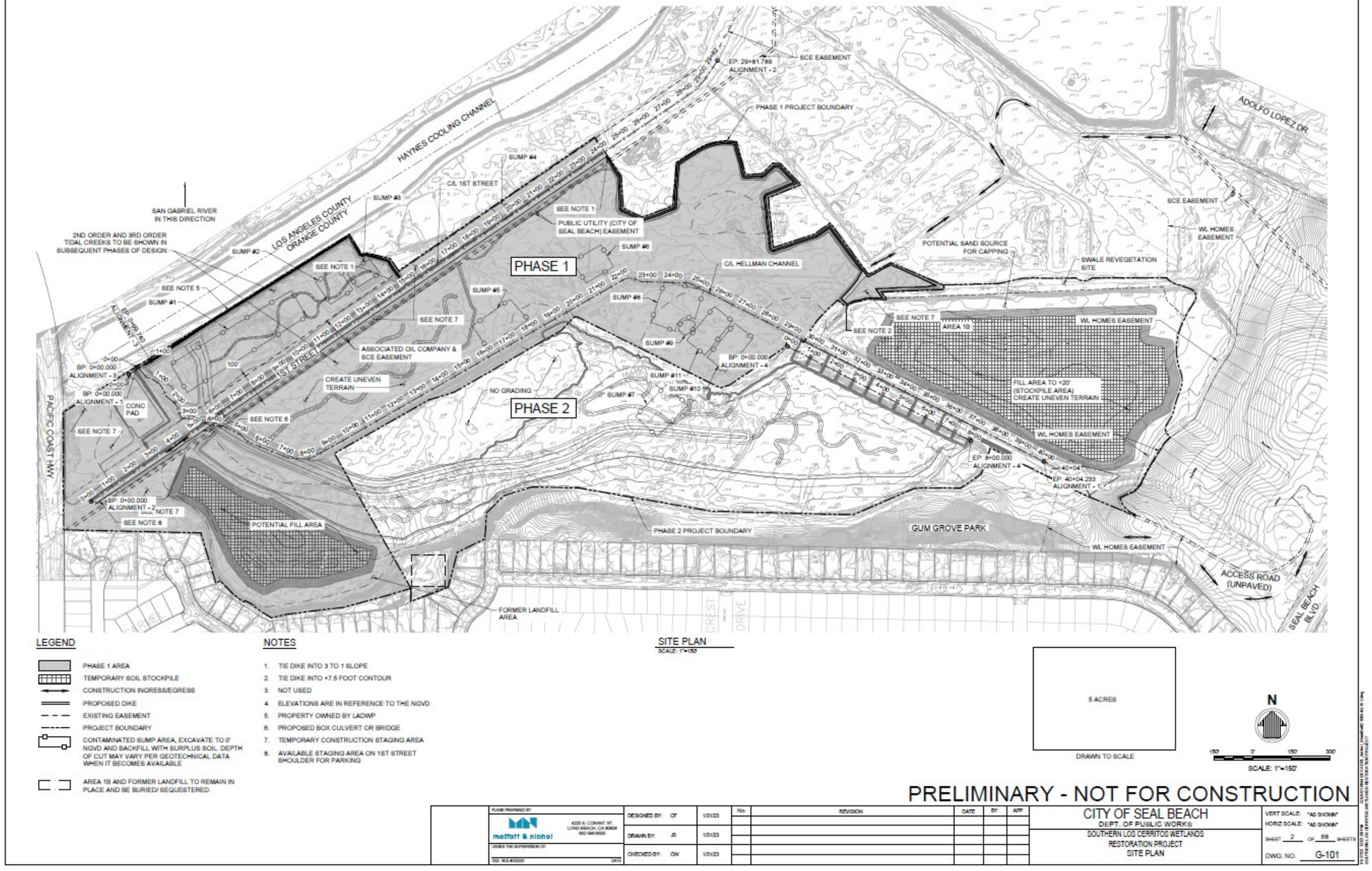
Coastal Restoration Consultants. 2021. Los Cerritos Wetlands Habitat Restoration Plan. May 26, 2021.

Moffatt & Nichol. 2015. Los Cerritos Wetlands Final Conceptual Restoration Plan. August 2015.

Moffatt & Nichol. 2022. Draft Hydrology Memorandum. January 31, 2023.

FIGURES:

1. Project Layout
2. Proposed Habitats
3. Flood Protection Features
4. Cut and Fill Map (“Heat Map”)
5. Sumps to Remain or be Removed
6. Construction Staging and Access Sites



LEGEND

- PHASE 1 AREA
- TEMPORARY SOIL STOCKPILE
- CONSTRUCTION INGRESS/EGRESS
- PROPOSED DIKE
- EXISTING EASEMENT
- PROJECT BOUNDARY
- CONTAMINATED SUMP AREA, EXCAVATE TO 0' NGVD AND BACKFILL WITH SURPLUS SOIL. DEPTH OF CUT MAY VARY PER GEOTECHNICAL DATA WHEN IT BECOMES AVAILABLE
- AREA 1B AND FORMER LANDFILL TO REMAIN IN PLACE AND BE BURIED/ SEQUESTERED.

NOTES

1. TIE DIKE INTO 3 TO 1 SLOPE
2. TIE DIKE INTO +7.5 FOOT CONTOUR
3. NOT USED
4. ELEVATIONS ARE IN REFERENCE TO THE NGVD
5. PROPERTY OWNED BY LADWP
6. PROPOSED BOX CULVERT OR BRIDGE
7. TEMPORARY CONSTRUCTION STAGING AREA
8. AVAILABLE STAGING AREA ON 1ST STREET SHOULDER FOR PARKING

SITE PLAN
SCALE: 1"=150'

5 ACRES
DRAWN TO SCALE

N
150' 0' 150' 300'
SCALE: 1"=150'

PRELIMINARY - NOT FOR CONSTRUCTION

PLANS PREPARED BY: moffatt & nichol, 4225 E. CONANT ST. LONG BEACH, CA 90808, 562-590-6500
UNDER THE SUPERVISION OF: XXX RCE #XXXXX, DATE

DESIGNED BY:	CF	1/31/23
DRAWN BY:	JS	1/31/23
CHECKED BY:	CW	1/31/23

No	REVISION	DATE	BY	APP

CITY OF SEAL BEACH
DEPT. OF PUBLIC WORKS
SOUTHERN LOS CERRITOS WETLANDS RESTORATION PROJECT
SITE PLAN

VERT SCALE: "AS SHOWN"
HORIZ SCALE: "AS SHOWN"
SHEET 2 OF 68 SHEETS
DWG. NO. G-101

FIGURE 1 – PROJECT LAYOUT WITH SOURCES OF SEAWATER AND THE TIDAL CHANNEL NETWORK

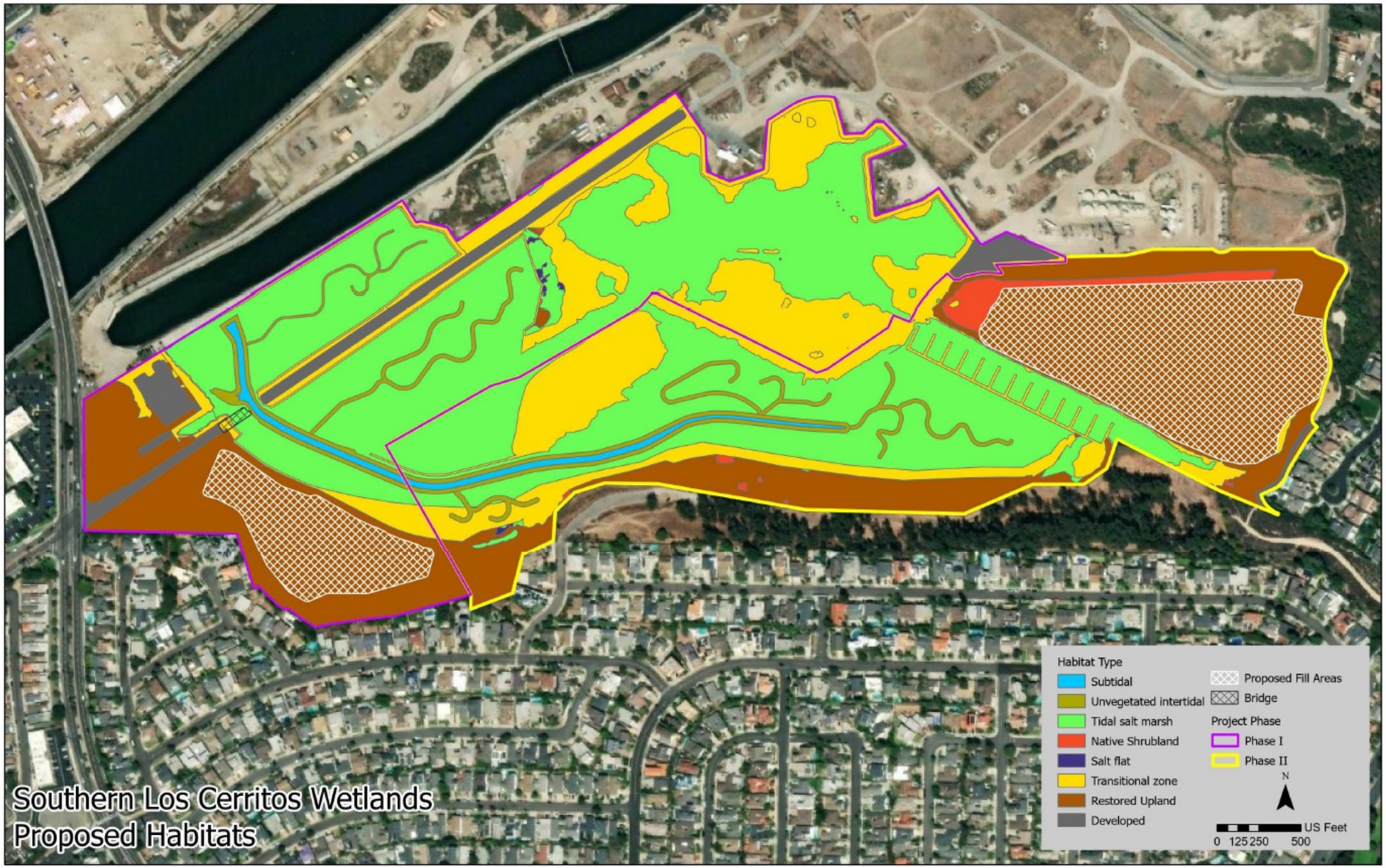
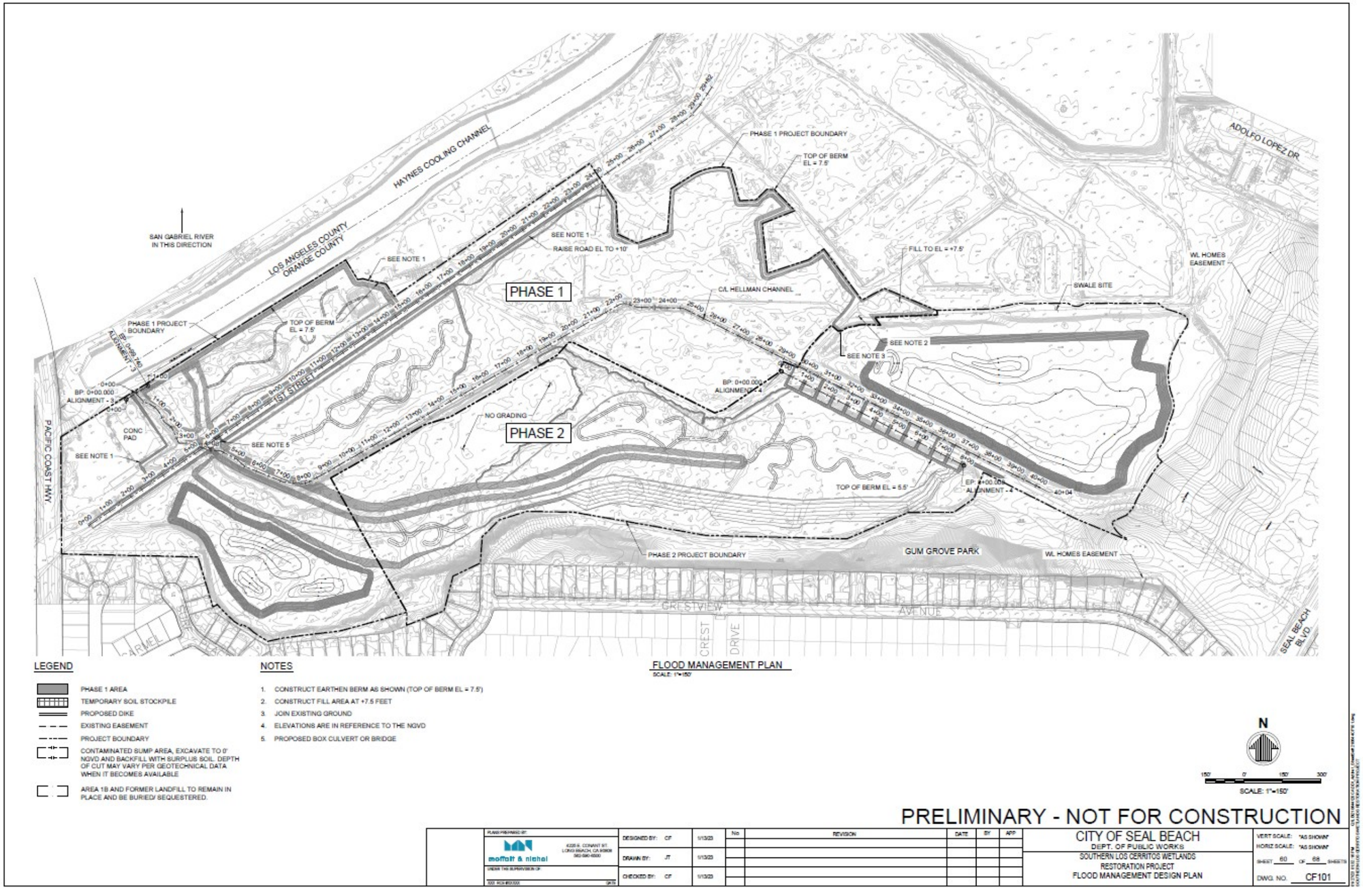


FIGURE 2 – PROPOSED HABITATS



LEGEND

- PHASE 1 AREA
- TEMPORARY SOIL STOCKPILE
- PROPOSED DIKE
- EXISTING EASEMENT
- PROJECT BOUNDARY
- CONTAMINATED SUMP AREA, EXCAVATE TO 0' NGVD AND BACKFILL WITH SURPLUS SOIL. DEPTH OF CUT MAY VARY PER GEOTECHNICAL DATA WHEN IT BECOMES AVAILABLE
- AREA 1B AND FORMER LANDFILL TO REMAIN IN PLACE AND BE BURIED/ SEQUESTERED.

NOTES

1. CONSTRUCT EARTHEN BERM AS SHOWN (TOP OF BERM EL = 7.5')
2. CONSTRUCT FILL AREA AT +7.5 FEET
3. JOIN EXISTING GROUND
4. ELEVATIONS ARE IN REFERENCE TO THE NGVD
5. PROPOSED BOX CULVERT OR BRIDGE

FLOOD MANAGEMENT PLAN
SCALE: 1"=150'

N

150' 0 150' 300'
SCALE: 1"=150'

PRELIMINARY - NOT FOR CONSTRUCTION

PLANS PREPARED BY: moffatt & nichol, 4225 E. CONANT ST. LONG BEACH, CA 90808, 562-590-6500	DESIGNED BY: CF	1/13/23	No.	REVISION	DATE	BY	APP	CITY OF SEAL BEACH DEPT. OF PUBLIC WORKS SOUTHERN LOS CERRITOS WETLANDS RESTORATION PROJECT FLOOD MANAGEMENT DESIGN PLAN	VERT SCALE: "AS SHOWN" HORIZ SCALE: "AS SHOWN" SHEET 60 OF 68 SHEETS DWG. NO. CF101
UNDER THE SUPERVISION OF: ___ RCE# ___ DATE	DRAWN BY: JT	1/13/23							
	CHECKED BY: CF	1/13/23							

FIGURE 3 – PROJECT FLOOD MANAGEMENT DESIGN PLAN WITH FLOOD PROTECTION FEATURES

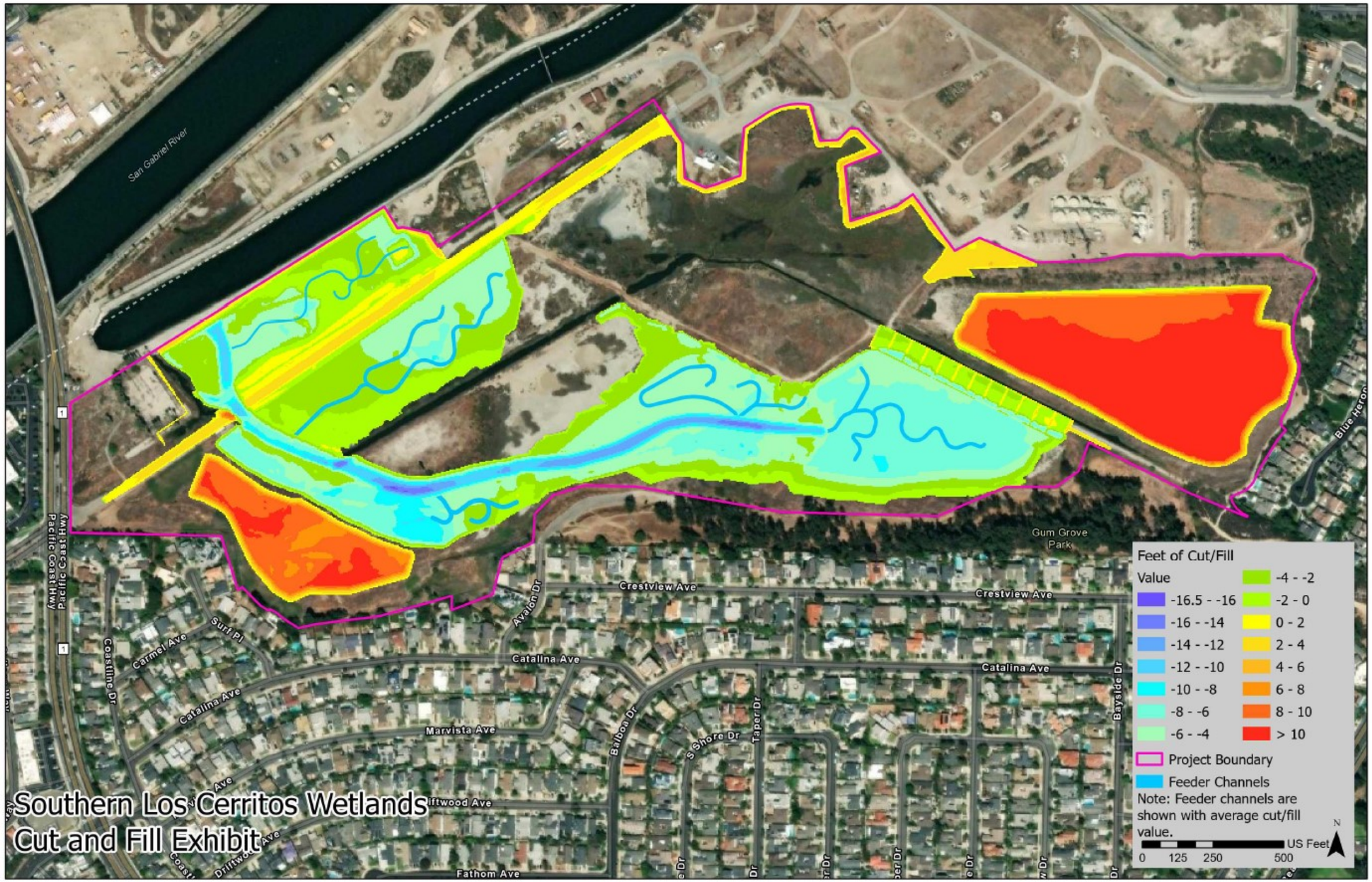


FIGURE 4 – PROJECT CUT AND FILL VALUES

FIGURE 5 – SUMPS TO REMAIN OR BE REMOVED

FIGURE 6 – CONSTRUCTION STAGING AND ACCESS SITES