

2013 WEDA Environmental Excellence Award Application:

Project Name: Port of Long Beach Middle Harbor Redevelopment

Award Category: Environmental Dredging

Project Summary

The management of contaminated sediments has long been a major hurdle in conducting both navigational and remedial dredging activities. With limited treatment options available for large-scale programs and the often economic infeasibility of upland disposal, finding sustainable and cost-effective ways to effectively manage contaminated sediments is critical to maintaining port operations and harbor access. Because the isolation of contaminated sediments in a port fill is environmentally and economically responsible, the Los Angeles Region Contaminated Sediment Task Force (CSTF) has identified this port fill as a preferred beneficial reuse of contaminated sediments. The Middle Harbor Redevelopment Project (MHRP) at the Port of Long Beach (Port) has provided an opportunity to develop a management strategy and methodology for the beneficial reuse of Port contaminated sediments as well as a comprehensive process to eventually select and place up to 2.5 million cubic yards of contaminated sediments from within the Port around the region.

The Port's recently-approved MHRP presents another opportunity for Los Angeles region contaminated sediments to be managed in accordance with the CSTF's guidance. This project includes construction of approximately 65 acres of new land for a marine container terminal, which will require approximately 2.5 million cubic yards of fill material—dredged sediments—in excess of the amounts to be generated by other elements of the project. To show their support for the regional goal for beneficially reusing as much contaminated material as possible, the Port designed their fill in such a way as to make this excess capacity available to outside entities. Through the early establishment of a comprehensive and transparent selection process, the Port was able to successfully identify candidate projects interested in and qualified for contributing dredged material to the Middle Harbor fill site. To that end, the Port developed a Middle Harbor Sediment Management Plan that describes the Port's decision process for acceptance of contaminated sediments into the fill as well as detailing the logistical, technical, and legal requirements for acceptance.

Dredge material from no less than 11 individual projects of varied owners with different material properties, uses, and availability were screened during the evaluation process before the Port made its final selection and recommendation to the CSTF for concurrence. Due to the intricate interaction between dredge and fill contract funding and execution, along with regulatory consensus expectations, priorities had to be clear cut and deadlines set to prevent missing critical project windows. To date, the Port has accepted almost 1 million cy of contaminated material from third parties for beneficial use during Phase I of the Middle Harbor Fill Site.

Through the establishment of a strong internal partnership between Port Engineers and Environmental Planning staff, their consultants, and strong external partnerships with regulatory agencies, the Port was able to implement a comprehensive and transparent solicitation process and coordinated construction process that resulted in the successful placement of the contaminated sediments from outside of the port for beneficial reuse at the MHRP. The Port believes that this approach can serve as a model for other fill sites and is currently planning for a second phase to the MHRP that will likely include third party material capacity. Being able to articulate the local and regional benefits (both financially and environmentally) to the stakeholders with a clear process can lead to encouraging a more efficient long-term management of contaminated sediments.

Project Team

| Team Members | Affiliation | Role on Project | WEDA Member |
|---|---|--|---|
| Thomas Baldwin – Middle Harbor Project Engineer (Project Owner) | Program Management Port of Long Beach | Lead engineer for Middle Harbor Redevelopment Project. Responsible for all aspects of project design | Pacific WEDA |
| Mathew Arms – Manager of Water Quality (Project Owner) | Environmental Planning Port of Long Beach | Lead author of sediment management plan, team lead on environmental considerations of fill and sediment quality for imported sediments. Developed and lead the third party selection process. Responsible for attainment of 404 and 402 permits, permit compliance, and water and sediment quality | National and Pacific WEDA |
| Janna Watanabe | Environmental Planning Port of Long Beach | Contributing author to project sediment management plan, environmental permitting and compliance support | - |
| Shelly Anghera (Nominator) | Anchor QEA | Sediment and water quality consultant to the port, lead co-author to project sediment management plan, lead third party fill management on construction team | National and Pacific WEDA |
| Steve Cappellino (Nominator) | Anchor QEA | Sediment and water quality consultant to the port, support third party fill management on construction team | National and Pacific WEDA (Current President) |
| Tom Johnson | Tom Johnson Consultant | Contributing author to project sediment management plan | - |
| Allan Alcorn | Moffatt & Nichol | Design engineering consultant to the Port | National and Pacific WEDA |
| Devon Beach | Moffatt & Nichol | Design engineering consultant to the Port | National and Pacific WEDA |
| (Arul) K. Arulmoli | Earth Mechanics, Inc. | Geotechnical engineering consulting to the Port | - |
| Douglas Cowan | ARCADIS | Fill Construction Project Manager | - |
| | Manson Dredging | Middle Harbor Dredging Contractor | Various employees are active members |
| | The Dutra Group | Delivered material from Newport Beach, Long Beach, Marina Del Rey | Various employees are active members |

Environmental Benefits

The environmental benefits realized through the POLB Middle Harbor Fill Site were felt throughout the southern California region. By providing a cost effective and environmentally protective location for contaminated sediments, the Middle Harbor Fill Site project provided the catalyst for the removal of almost 1 million cubic yards of contaminated sediment that otherwise would likely still be impacting the water quality within southern California's waterways today and in the future. Contaminants of concern within these sediments included heavy metals like copper, lead, zinc and mercury; pesticides like DDT and chlordane, and other persistent toxicants like PCBs. As an example, for just one of the projects placed into the fill site, the Colorado Lagoon in Long Beach, more than 5,000 pounds of copper, 17,000 pounds of lead, and 23,000 pounds of zinc are estimated to have been removed with the 80,000 cubic yards of sediment dredged from this location and placed into the fill site.

Beneficial use of contaminated sediments as fill in the Middle Harbor Fill Site project benefits the marine environment by removing and sequestering material that may have posed a risk to benthic and aquatic organisms and provides an effective solution for a regional issue. The fill site has been engineered to safely contain chemically impacted materials using a containment berm of monolithic dike design along with a sand filter layer behind the rock. In addition, the material will be covered with up to 24 feet of clean fill from other sources and paved with asphalt.

In addition to the reduction in water quality and benthic organism impacts as a result of removing and sequestering over a million cubic yards of contaminated sediments, the Middle Harbor Fill Site was successful in providing a greater than 90% beneficial reuse rate for all dredge material produced in the Los Angeles and Orange County region for the past 2 years. This is very important to the California State and Federal resource and regulatory agencies as they have developed a long-term goal for achieving 100% beneficial reuse over the next 20 years.

Individual projects placed in the fill include:

- Marina del Rey Federal Channel – 475,000 cy (LA Beaches and Harbors – The Dutra Group)
- Rhine Channel – 85,000 (City of Newport Beach – The Dutra Group)
- Lower Newport Bay Federal Channel – 130,000 (City of Newport Beach – RE Staite)
- Colorado Lagoon – 80,000 cy (City of Long Beach – AIS Construction)
- Alamitos Marina – 42,000 cy (City of Long Beach – The Dutra Group)
- Harborlight Marina – 6,000 cy (City of Long Beach – AIS Construction)
- Los Angeles River Estuary – 100,000 cy (U.S. Army Corps of Engineers – Manson)
- Rainbow Harbor – 75,000 (City of Long Beach – The Dutra Group)

Total Volume of Third Party Material placed in Middle Harbor - 993,000 cy

Innovations

While the development of a port CDF using contaminated sediments may not, by itself, be an innovative management solution for dredge materials, what was innovative was the approach used by the Port to plan and construct this project so that it could provide a “win-win” solution for the Port and the region. From day one, the entire design of the fill site was developed to account for the acceptance of third party fill material. This included design elements that accounted for varying project schedules, disposal methods, and material of varying geotechnical quality.

Given the numerous entities that would be vying for the limited space within the fill, the short window of opportunity for delivery, and the potential for the appearance of undue influence in the selection process, a Middle Harbor Sediment Management Plan was developed to, in part, establish a comprehensive and transparent set of criteria for ranking candidate sources of third-party material according to the geotechnical and chemical nature of the material, the timing of the third-party project relative to the Port’s MRHP, and the location of the source material. This sediment management plan then formed the basis for seeking both regulatory concurrences for fill material selection as well as internal support for Port Board approval of the individual MOUs established with each Third Party entity.

Between March 2012 and July 2012, approximately 1,200,000 cy of material was imported into the Middle Harbor Fill Site for beneficial use. This included almost 800,000 cy of third party material and more than 500,000 cy of material generated from the Middle Harbor project. The logistics and coordination required to ensure a safe working environment, adherence to the engineering fill design, as well as preventing any accidental disposal of contaminated material outside of the fill area was managed through the creation of a third party disposal working group within the construction management team. This group, which included Port staff, construction management team members, third party representatives, Port shipping tenants, and contractors, met weekly to review individual project schedules, progress of the fill site bathymetry, contractor coordination, and to coordinate how to manage changing material quality.

When fill activities were the greatest, twice weekly bathymetric surveys were conducted to ensure material was being placed and behaving as expected. Filling activities were coordinated with ongoing dike construction. Fill management ensured disposed material was not approaching dike or compromising the dike construction activities. Attached graphics illustrates the coordinated fill activities.

Economic Benefits

In southern California, management options for contaminated sediment disposal are limited to upland landfill or reuse within a Port fill development project. Numerous pilot studies have been conducted to test treatment options such as cement stabilization or sediment washing, but all have proven to be either too expensive or too unreliable for most situations. The current cost for dredging, dewatering and upland disposal at a commercial landfill is approximately \$100 to \$150 per cubic yard. The average

cost for dredging and disposal within the Middle Harbor Fill Site was approximately \$25-\$30 per cubic yard. Therefore, the approximate savings for the Third Parties was approximately \$125 million. Likewise, there was a significant cost savings for the Port as receiving this material offset their need to import fill material from other sources or harvest it themselves from the inner harbor area.

Transferability

Through the establishment of a strong internal partnership between Port Engineers and Environmental staff as well as strong external partnerships with regulatory agencies, the Port was able to implement a comprehensive and transparent solicitation process that will result in approximately 2.5 million cy (from the Middle Harbor project and the region) of contaminated sediments being removed from the environment and beneficially reused for the MHRP. The inclusion of these sediments did not impact Port construction schedules or budgets through the development of a clear and open selection process, adherence to memorandums of agreement, and open and frequent communication between all parties during disposal operations. This approach can be used as an example for other coastal development projects. Being able to articulate the local and regional benefits (both financially and environmentally) to the stakeholders with a clear process can lead to encouraging a more efficient long-term management of contaminated sediments. Further, this project demonstrates that the complex process of accepting and managing contaminated sediments from multiple entities is feasible and can be done safely with a well-coordinated construction plan. The lessons learned during the MHRP should be transferable to Port projects elsewhere.

Outreach and Education

Key elements to the success of the MHRP was the extensive planning during the engineering design phase to accommodate the Third Party material as well as the early communication of the project by Port Planning and Program Management staff at local and national conferences and trade meetings to let potential clients and agency representatives know about the project and its needs. Some of these outreach steps were in the form of technical presentations such as:

- Middle Harbor Dredge and Fill Project, PIANC Dredging 2012 in San Diego, October 2012.
- Beneficial Use of Contaminated Sediments in Port Development Projects, Battelle Contaminated Sediments Conferences in New Orleans, February 2011.
- Middle Harbor Redevelopment: Regional Beneficial use of contaminated Sediments, WEDA Pacific Chapter in Monterey Bay, October 2010.
- Planned presentation of Middle Harbor fill update and call for phase 2 fill project, WEDA Pacific Chapter meeting in Long Beach, October 2013.

Additionally, Port staff and their consultants presented project status reports on an almost monthly basis to the southern California Dredge Material Management Team which is comprised of the USACE, State of California Water Resources Control Board, California State Coastal Commission, and various natural resource trustees.

Other

Another key factor that led to the success of the MHRP fill site is that everyone in the region worked collaboratively to make it work. Multiple contractors and consultants worked together non-competitively to meet the objectives of all stakeholders. Agency representatives made themselves available, sometimes with very short notice, to attend meetings and review Port deliverables detailing their proposed fill plans. Port inspectors and construction management consultants worked all hours of the day and night to be available for observing disposal events from various marine contractors. Individually, each party played a key role in the program; collectively, they worked as a unified team to make the project a success by today's standards and an example for future programs.

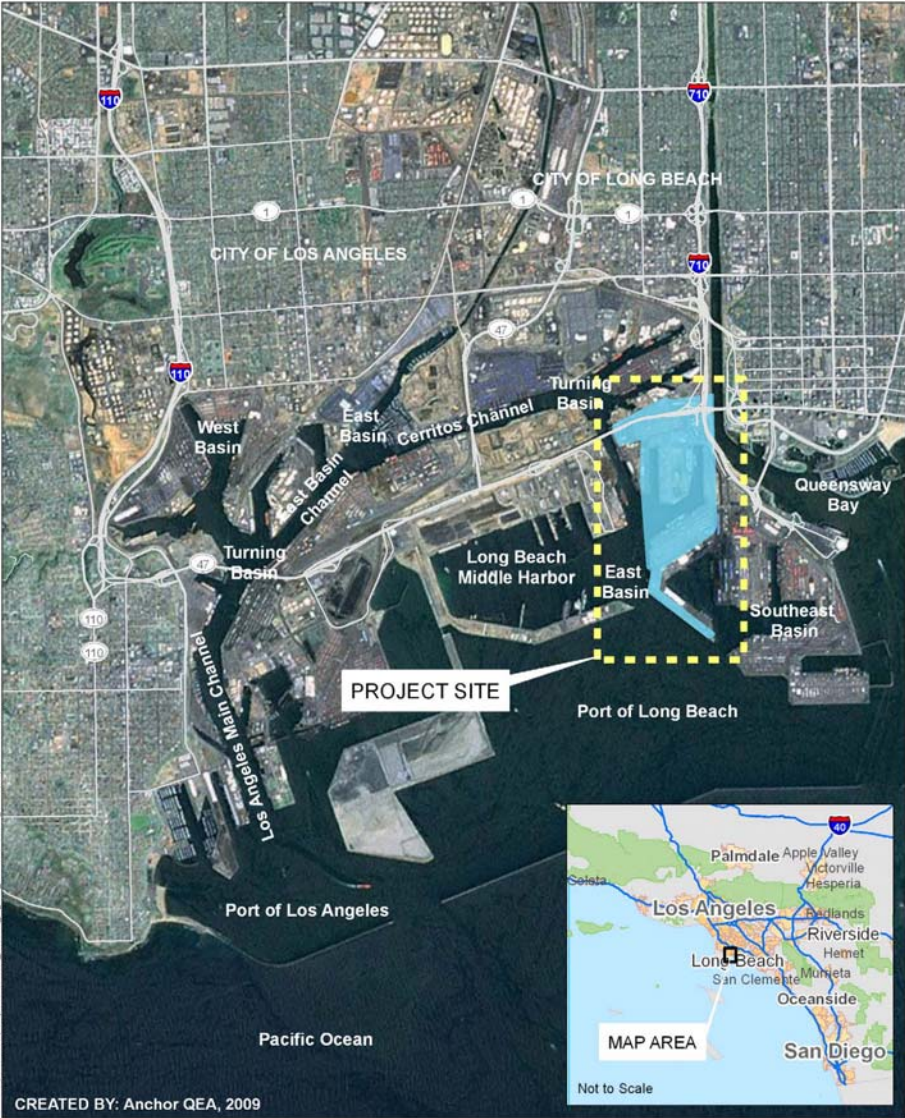


Figure 1. Project site location

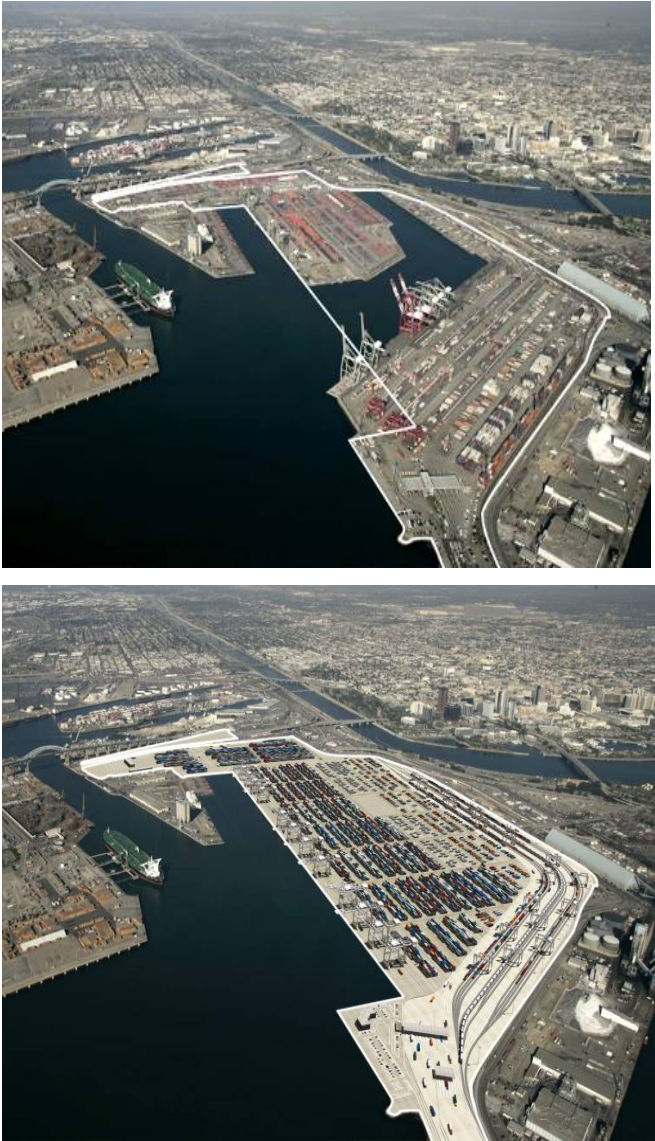


Figure 2. Artist's Rendition of Completed Project

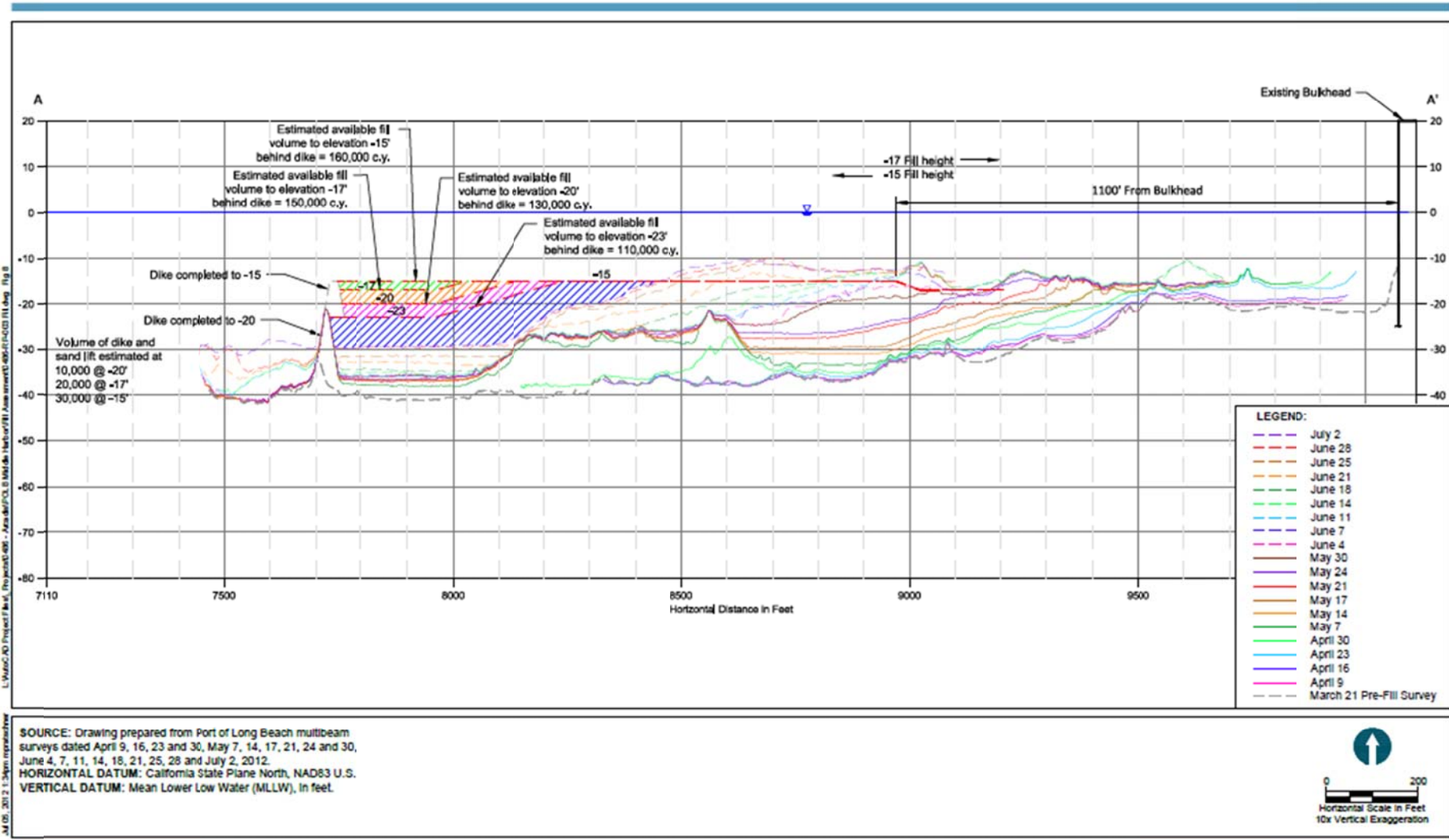


Figure 8
 Summary of Available Fill Volumes After July 2, 2012
 Middle Harbor Slip 1 Fill Site
 Port of Long Beach



Figure 3. Cross-Section of Phase I of the Middle Harbor Fill Site

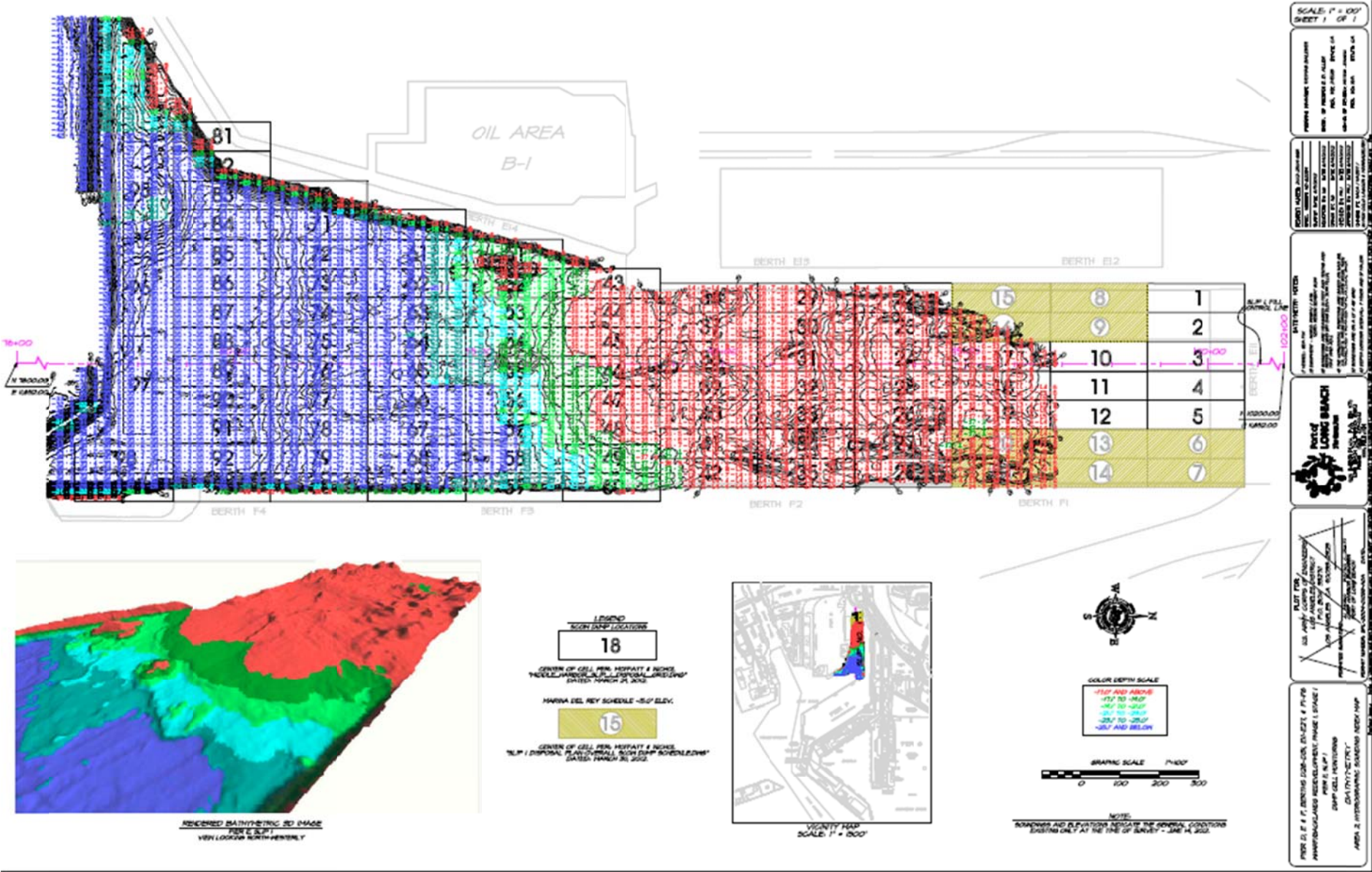


Figure 4. Example Fill Site Bathymetry During Construction