



Port of
LONG BEACH

The Green Port

April 12, 2017

Mr. Craig Vogt
WEDA Environmental Commission Chair
Craig@CraigVogt.com

**Subject: 2017 WEDA Environmental Excellence Award Application
for the Port of Long Beach**

Dear Mr. Vogt:

In response to the Western Dredging Association (WEDA) solicitation for applications for the 2017 WEDA Environmental Excellence Award, the Port of Long Beach respectfully submits our application, West Basin Navigational Dredging, for consideration in the dredging for navigation category.

We appreciate the opportunity to submit our application for consideration.

Sincerely,

A handwritten signature in blue ink, appearing to read "Heather A. Tomley".

Heather A. Tomley
Director of Environmental Planning

JW

Attachment: Award application

2017 WEDA Environmental Excellence Awards Application

West Basin Navigational Dredging

Port of Long Beach



Category: Dredging for Navigation



April 17, 2017

Port of Long Beach West Basin Navigational Dredging

Award Category: Dredging for Navigation

Summary

Project Description

The Port of Long Beach (Port) is the second largest seaport in the United States and a major gateway for trade in and out of the country, with cargo valued at over \$180 billion moving through its facilities on an annual basis. Pier T is currently the largest terminal within the Port, with approximately 385 acres for cargo handling and 5,000 feet of wharf, allowing for 4 berths. Access to Pier T is attained through the West Basin, which has a minimum approach and berth depth of -50 feet mean lower low water (MLLW). While this depth is adequate for most of the largest container vessels currently calling at Pier T, the depth makes it challenging for container vessels with deeper draft depths that reach close to the -50 feet MLLW depth. In order to make navigation safer for these vessels, the West Basin and Pier T berths required additional depth to -55 feet MLLW. To achieve the -55 feet MLLW depth, over 1.6 million cubic yards of material needed to be dredged. Once complete, the increased depth within the Pier T/West Basin will eliminate high spots throughout the dredging footprint, thus further improving navigation safety for the Port pilots and reducing the potential risk of damaging any vessels.

Goals/Objectives

While dredging is essential to maintaining navigation in channels and harbors, disposal of dredged sediments, especially a large volume, in a sustainable and cost-effective manner is a challenge. One sustainable and preferential disposal option is to beneficially reuse dredged sediments in a Port development fill (i.e. confined disposal facility or CDF) to create new land. The Port is currently in the process of filling an existing slip, as part of the Middle Harbor Terminal (MHT) Redevelopment Project to create approximately 55 acres of new land. For the MHT fill site, the Port needed a source of geotechnically suitable material to complete different phases of the fill. The Port could have selected a site within the harbor to mine or borrow this suitable material, however, a forward thinking approach evaluated the Pier T/West Basin navigational dredge footprint as a potential source for the borrow material. Geotechnical and chemical sampling showed that the material was suitable as borrow material for the MHT fill. This strategic approach helped to fulfill the goals/objectives of both projects in terms of completing the much needed navigational dredging of the Pier T/West Basin and completing the MHT fill site.

Accomplishments

As of April 2017, the Pier T/West Basin Navigational dredging project is about 60% complete and is estimated to be finished towards the end of this year. Strategically linking the two projects will provide multiple environmental, safety, and economic benefits. These benefits include providing a nearby source of fill material for the MHT program (the dredge and fill site are less than 2 miles apart), thereby reducing air quality impacts and costs from barge operations. The Pier T/West Basin dredge material will be beneficially reused in a CDF (i.e. MHT fill site) instead of being disposed in an upland landfill or at an approved open ocean disposal site. Additionally, dredging will provide the needed depth at the Pier T/West Basin to provide the required under-keel clearance margin of safety, per the Port pilot's requirements, to safely navigate the largest vessels that call at the Pier T Terminal. The innovative aspect of this project was the close collaboration between different Port divisions, consultants, and regulatory agencies to quickly and efficiently align the two projects and obtain the necessary regulatory permitting within a short time frame. This project is applicable to other ports in regards to strategically thinking ahead to line up future dredging opportunities with fill projects.

Project Owner: Port of Long Beach (Nominating Entity)

Project Team Members:

Role	Affiliation	Team Member
Program Management and Engineering Design	Port of Long Beach	Derek Davis
	KPFF Consulting Engineers	Todd Graham* and Jose Hernandez
Construction Management	Port of Long Beach	Cesar Larios and Francisco Aragon
	Amec Foster Wheeler	Robert Day and Hubert Kang (Simplus Management)
Contractor	Manson Construction	Various employees are WEDA members*
Environmental (Planning, Sediment Sampling, Permitting, and Compliance)	Port of Long Beach	Dylan Porter, James Vernon, and Janna Watanabe*
	Anchor QEA	Shelly Anghera*, Steve Cappellino*, and Chris Osuch*

*WEDA Member

Environmental Benefits

The West Basin and the Pier T Terminal were part of the former Long Beach Naval Complex. Due to the 50 years of naval operations, areas of the West Basin contained contaminated sediments. The Port inherited the responsibility of remediating the West Basin as part of the redevelopment of the Pier T Terminal and has made significant remediation efforts to remove the contamination through several dredging projects within the West Basin (e.g. Pier T Redevelopment and IR Site 7). Even after significant remediation efforts on the part of the Port, additional trace residuals of contaminated sediments remain in select areas. The West Basin navigational dredging presented a great opportunity to further remove contaminated sediment from the West Basin, exposing uncontaminated native material, while at the same time, beneficially reusing the dredged material as fill for the MHT project.

The West Basin was sectioned into multiple dredge units for the purposes of sampling and analysis. Chemical and elutriate testing were performed on the material. Bioassay testing was performed voluntarily to provide flexibility for placement options in the fill site and to ensure the maximum extent of environmental protection was achieved. Sampling results indicated that the dredge footprint contained a mixture of clean and contaminated sediment. Accordingly, the engineering design team designed the dredge and fill plan so that areas not found to be open-ocean suitable were to be dredged first and placed lower in the fill site (below elevation 0 feet MLLW) to mitigate environmental impacts and alleviate the concerns of the regulatory agencies.

In addition to designing the placement of material in the dredge footprint to sequester the contaminated sediment low in the fill, all the material from this navigational dredging project was beneficially reused in the MHT fill site. This provided a cost-effective and environmentally protective solution for disposal of both clean and contaminated sediments from the Pier T/West Basin. Unsuitable sediment from the marine environment was removed and sequestered in a fill site engineered to safely contain chemically impacted materials. This benefits the marine environment by reducing impacts to water quality and benthic organisms. If the material was not reused in the fill site, it would have had to be trucked to an upland landfill, resulting in traffic and air quality impacts from approximately 23,000 truck trips.

A large portion of the West Basin material was chemically suitable for open-ocean placement at approved U.S. EPA LA-2 or LA-3 disposal sites. It is important to note that these ocean disposal sites are for the entire Southern California region and have an annual placement limit of 1 million cubic yards of clean sediment. Instead of taking up precious space in the open-ocean placement sites, the clean material was also beneficially reused in the MHT fill site.

The Port was guided by its Green Port Policy, the premise of which is to mitigate impacts that the Port's operations have on the environment, when lining up the two projects. Selecting the West Basin as the borrow site for the MHT fill had an added benefit of providing a nearby material source (less than 2 miles) to the MHT fill site. This resulted in less air quality impact from barge trips to and from the dredge and disposal site, versus mining at a borrow site further out in the Port's Harbor District.

Also, when mining material it is common practice to dredge a deep hole, possibly 80 feet deep, which can result in anoxic conditions that are detrimental to the benthic community. The Port reduced these impacts by dredging across a larger area to a depth of -55 feet MLLW, where future navigational dredging was necessary. Although the Port needed to dredge deeper in a portion of the footprint to -70 feet MLLW to access better quality geotechnical material, that area was designed not as a deep hole but was a gradual slope from the West Basin into the Port's Main Channel, which is already -76 feet deep.

Additional environmental benefits include performing the dredging using an electric dredge and the use of Tier 2 tugs to mitigate air quality impacts. In the design phase of the project, it was discovered that creosote pile remnants left over from the demolition of old Navy piers were present in the dredge footprint. The removal of these old pile remnants provided additional water quality benefits as the creosote piles were removed from the sediment and water, and disposed of properly in an upland landfill.

Furthermore, the geotechnical and environmental sediment sampling was performed simultaneously using the same vessels. Coordinating the sampling efforts in this fashion minimized vessel mobilization and working time to reduce the environmental and navigational impacts.

Innovation

This project was innovative in that the Pier T/West Basin was not a typical navigational dredging project or borrow site and came with some environmental challenges that needed to be addressed in a strategic and systematic way. One environmental challenge that arose during this project was presenting the sampling results to the regulatory agency members. Per the bioassay testing results, only 3 of the 18 dredge units were not suitable for open-ocean placement and were slated to be placed low in the fill site. However, agency members had concerns over total polychlorinated biphenyl (PCB) levels in four additional areas and requested that those areas also be placed low in the fill site. In total, approximately 400,000 cubic yards of sediment needed to be prioritized and accommodated low in the fill site. In honoring the Port's commitment to its Green Port Policy and the Los Angeles Contaminated Sediments Task Force (CSTF) long-term management strategy for beneficial reuse, the Port made it a priority to accommodate the extra material low in the fill site design.

This provided an interesting puzzle for the Port's Engineering Design team to sequence the dredging to accommodate about 400,000 cubic yards of unsuitable material from the West Basin, in addition to other unsuitable material from other sources in the Port below 0 feet MLLW in the fill site, which had a very small margin for error. Another twist to the puzzle was that in addition to accommodating chemically unsuitable sediments within a certain elevation in the fill site, the sediments also had to meet the right geotechnical characteristics at each elevation to promote constructability.

The removal of the old Navy pier pile remnants within the dredge footprint was an additional challenge. It was difficult to verify the location of all the piles since some were hidden underneath the sediment. In the design phase, the Port took extra effort to use both divers to do visual surveys and state-of-the-art 3D

multi-beam and side scan surveys to help identify remaining piles so that they could be removed prior to dredging.

The project team demonstrated leadership by working in close collaboration with different Port divisions (engineering, environmental, and construction), consultants, and regulatory agencies to quickly and efficiently align the two projects and obtain the necessary regulatory permitting. Advanced planning among multiple groups was extremely important to successfully implement and complete the project and ensure the areas that needed to be dredged for navigation were addressed and the sediment was placed in the appropriate level of the fill site.

Instead of dredging the West Basin, the Port could have elected to locate a borrow area from within the harbor and mine clean sediment to complete the Slip 1 fill. Instead, the Port developed a creative solution that met the Port's needs for both the West Basin and MHT projects and had an added benefit of beneficially reusing the West Basin dredged sediment in a confined disposal facility. If the West Basin were to be dredged at a later date, there may not have been a Port fill site available or the project would have to be put on hold until a fill site was available, delaying navigational improvements in the West Basin.

Economic Benefits

In addition to providing environmental benefits, this project also provided a cost-effective solution for the Port in terms of disposal of contaminated sediment. In Southern California, management options for contaminated sediment disposal are limited to upland landfill or reuse within a Port fill development project. The current cost for dredging, dewatering, and upland disposal at a commercial landfill is approximately \$100 to \$150 per cubic yard, rendering this project economically infeasible if upland disposal was the only available disposal option. The weighted average cost for dredging and disposal within the MHT fill site was approximately \$13 per cubic yard. Therefore, the savings for the Port by placing the West Basin sediments at the MHT fill site instead of disposing in an upland landfill saved the project over \$35 million. Open water disposal of the clean sediments from the West Basin would have cost an additional 20-30% more per cubic yard, saving the Port additional money.

The close proximity of the West Basin site to the MHT fill site as a source of borrow material provided cost savings benefits as it allowed for the use of both mechanical and hydraulic dredging. Hydraulic dredging is more efficient and less expensive than mechanical dredging and is better for air quality since barge trips to the disposal site are eliminated.

The dredging allows for a water depth of -55 feet MLLW for the Pier T Terminal, which provides improved navigation and in turn leads to more efficient shipping. Efficient transportation of goods allows the Port to remain competitive and provide desirable jobs for the community and reduced costs to the public. The Port is a major economic engine in the region. More than \$180 billion of cargo moves through the Port annually, creating jobs (1.4 million nationally), supporting businesses, and generating tax revenues locally, regionally, and nationally. The Pier T Terminal is the largest terminal (approximately 385 acres) at the Port of Long Beach and is one of the three terminals at the Port that can currently accommodate 14,000 and 18,000 TEU ships.

Transferability

This approach could be utilized by other seaports if a similar opportunity presents itself and there is a need to perform navigational dredging along with a disposal site available for clean and contaminated material. This project can serve as a model to think strategically and coordinate between different divisions/departments to determine if any projects can be paired up on the same time schedule and whether work can be performed under existing permits. Also, it may be worth the effort to perform both geotechnical and chemical sampling of a navigational dredge area to determine whether it can provide

structural material for a future fill site. Working together with multiple entities to develop a well-coordinated plan and communicating the plan to everyone will help to ensure that everyone is on the same page and the plan can be implemented successfully. Because of the strong internal partnerships between Port staff and their consultants and strong external partnerships with regulatory agencies, the Port was able to efficiently obtain approvals for the dredging under existing regulatory permits, design the bid specifications in an efficient and timely manner, and properly manage and implement the dredging and material placement during construction. The lessons learned during this process could be transferable to port projects elsewhere.

Outreach and Education

The Port closely coordinated with the regulatory agencies and presented several updates on this project to the Los Angeles Contaminated Sediments Task Force (CSTF). The Los Angeles CSTF focuses on the management of contaminated sediments in the Los Angeles area and is a multi-agency group that includes representatives from the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, California Coastal Commission, Los Angeles Regional Water Quality Control Board, California Department of Fish and Game, Port of Long Beach, Port of Los Angeles, City of Long Beach, Los Angeles County Beaches and Harbors, Heal the Bay, and other interested parties. Utilizing the CSTF helped to involve all the key agencies that regulate dredging and fill activities, environmental groups, and organizations involved in dredging, which helped to keep all parties informed and make the approval process more efficient.

As this dredge footprint was in the middle of an active terminal, coordination with the tenant was very important. The Port and construction contractor worked closely with the terminal operator in order to work around shipping schedules to avoid impacts to the Pier T Terminal and ensure the dredging could be completed as planned to line up with the MHT fill site schedule.

Presentations and abstracts on this project have been presented at the 2015 WEDA Pacific Chapter Conference, and the Coasts, Oceans, Ports, and Rivers Institute (COPRI) and World Association for Waterborne Transport Infrastructure (PIANC) 2016 Ports conference.

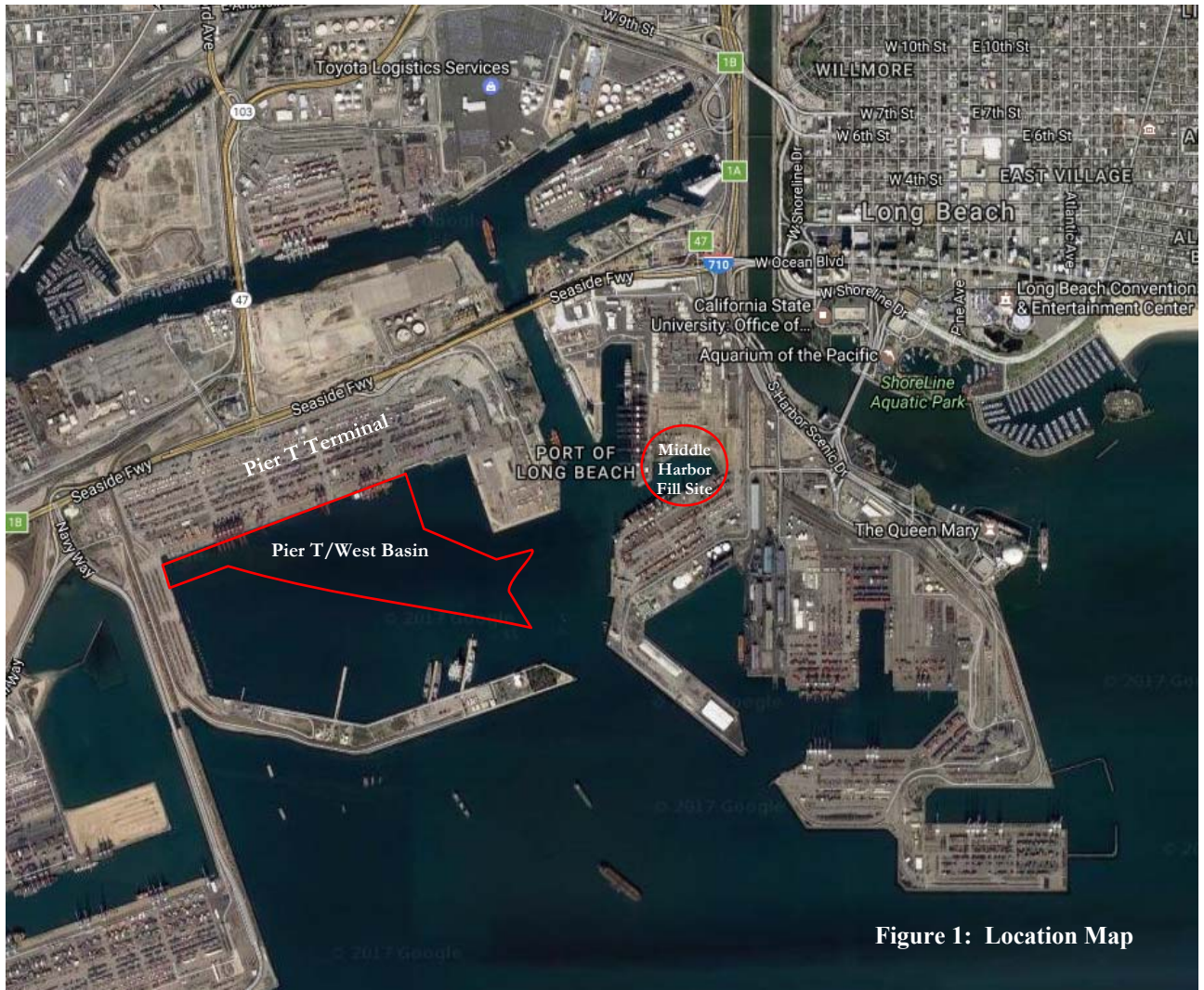


Figure 1: Location Map

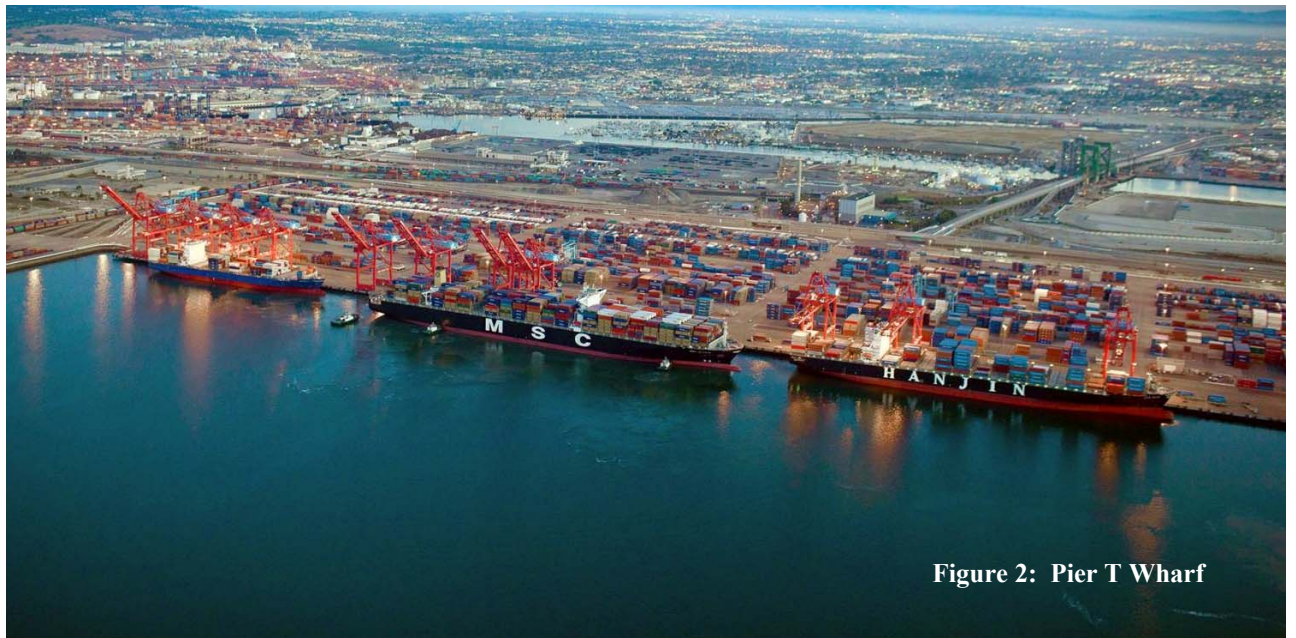


Figure 2: Pier T Wharf

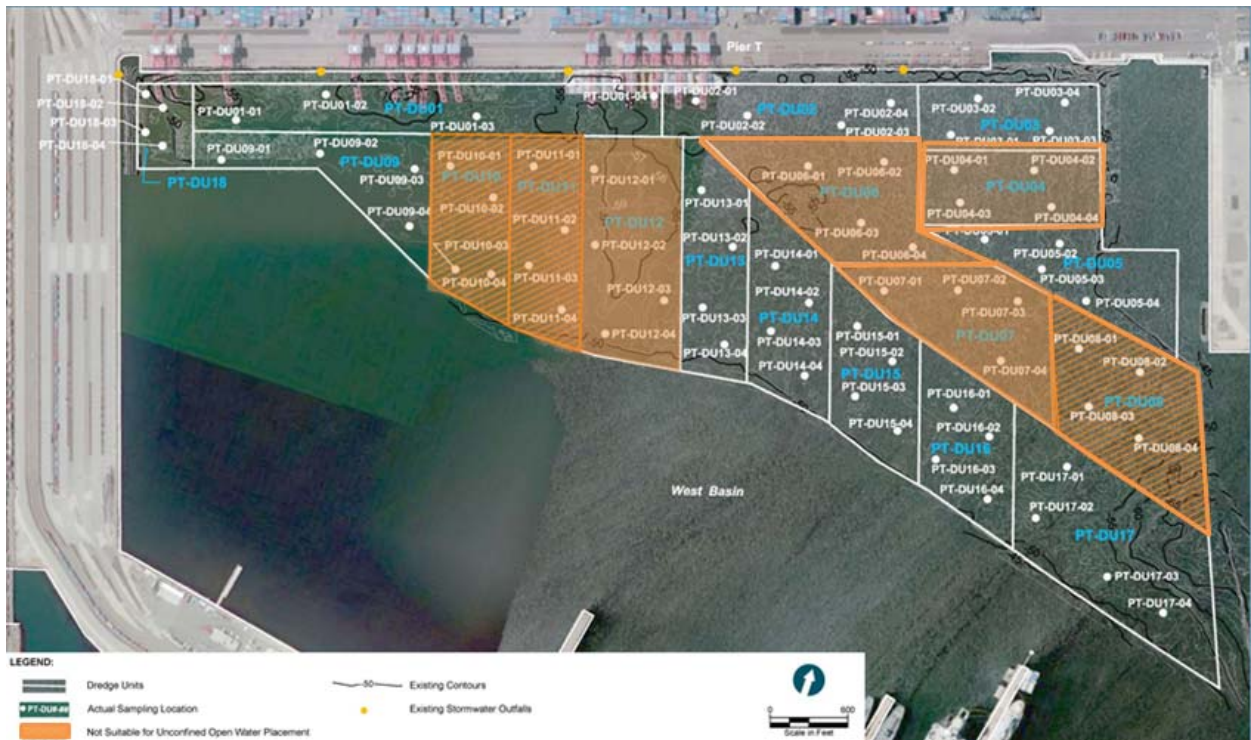


Figure 3: Sediment Sampling and Unsuitable Material (Orange Areas)

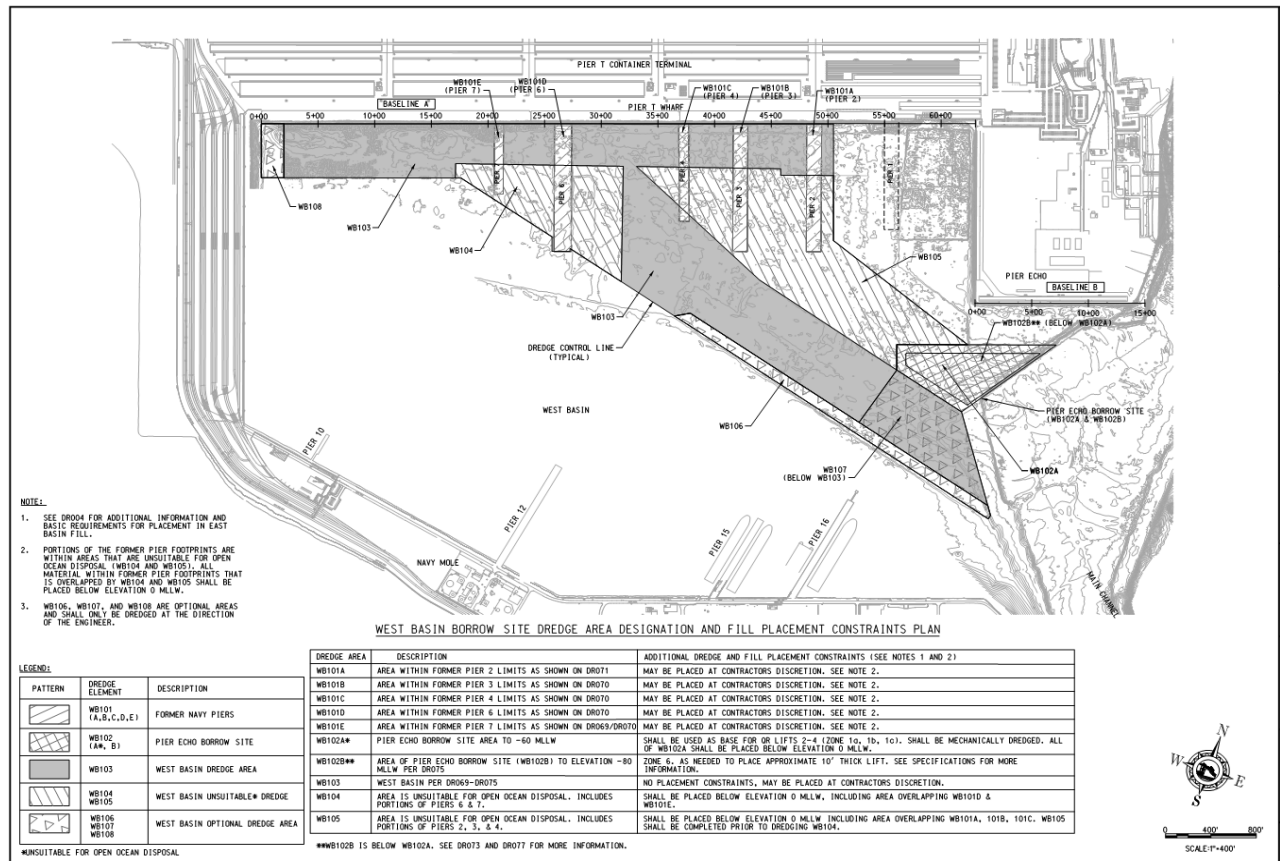


Figure 4: Dredge Design