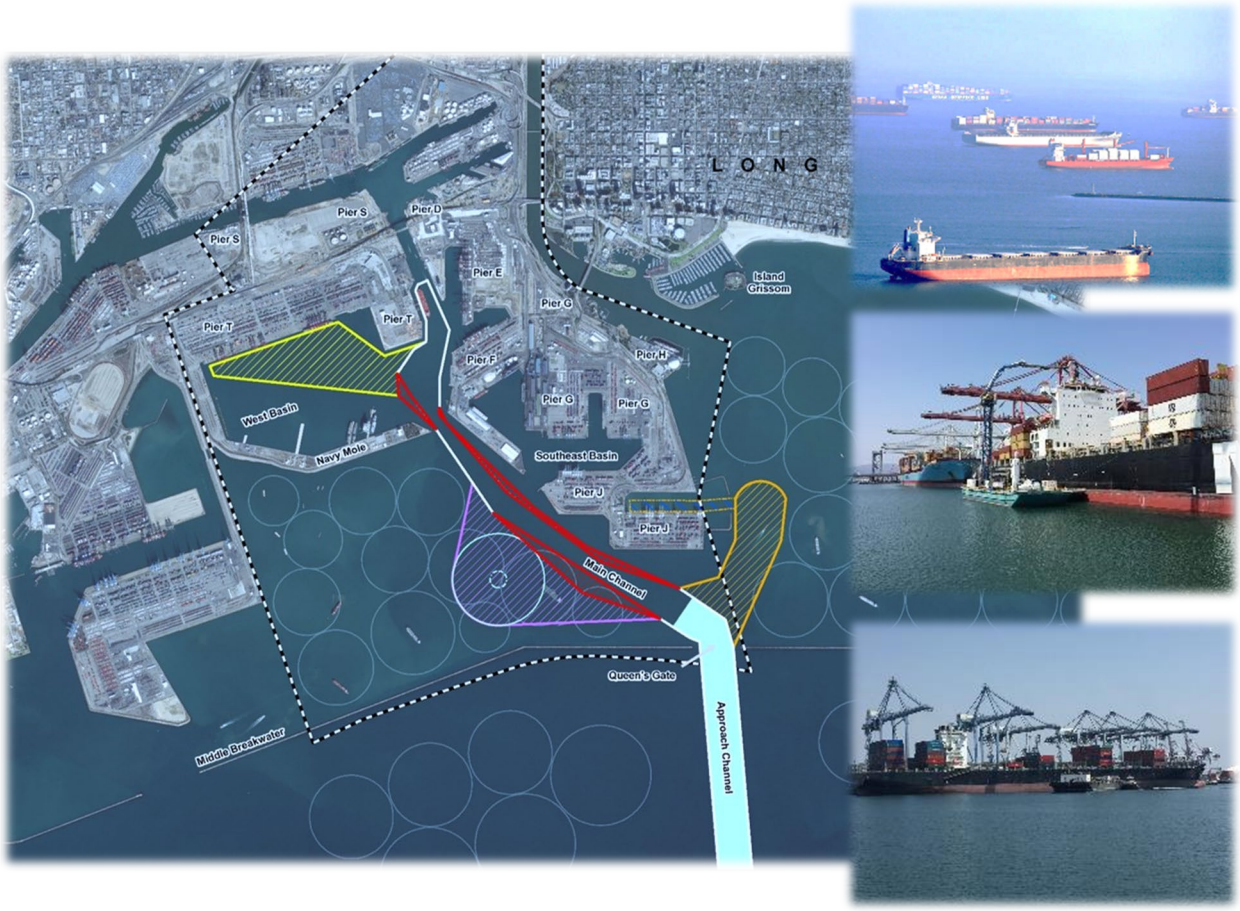
FINAL INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT / ENVIRONMENTAL IMPACT REPORT (EIS/EIR)

APPENDIX F: COST ENGINEERING

PORT OF LONG BEACH
DEEP DRAFT NAVIGATION STUDY
Los Angeles County, California

October 2021



US Army Corps of Engineers ®

Port of LONG BEACH
THE PORT OF CHOICE

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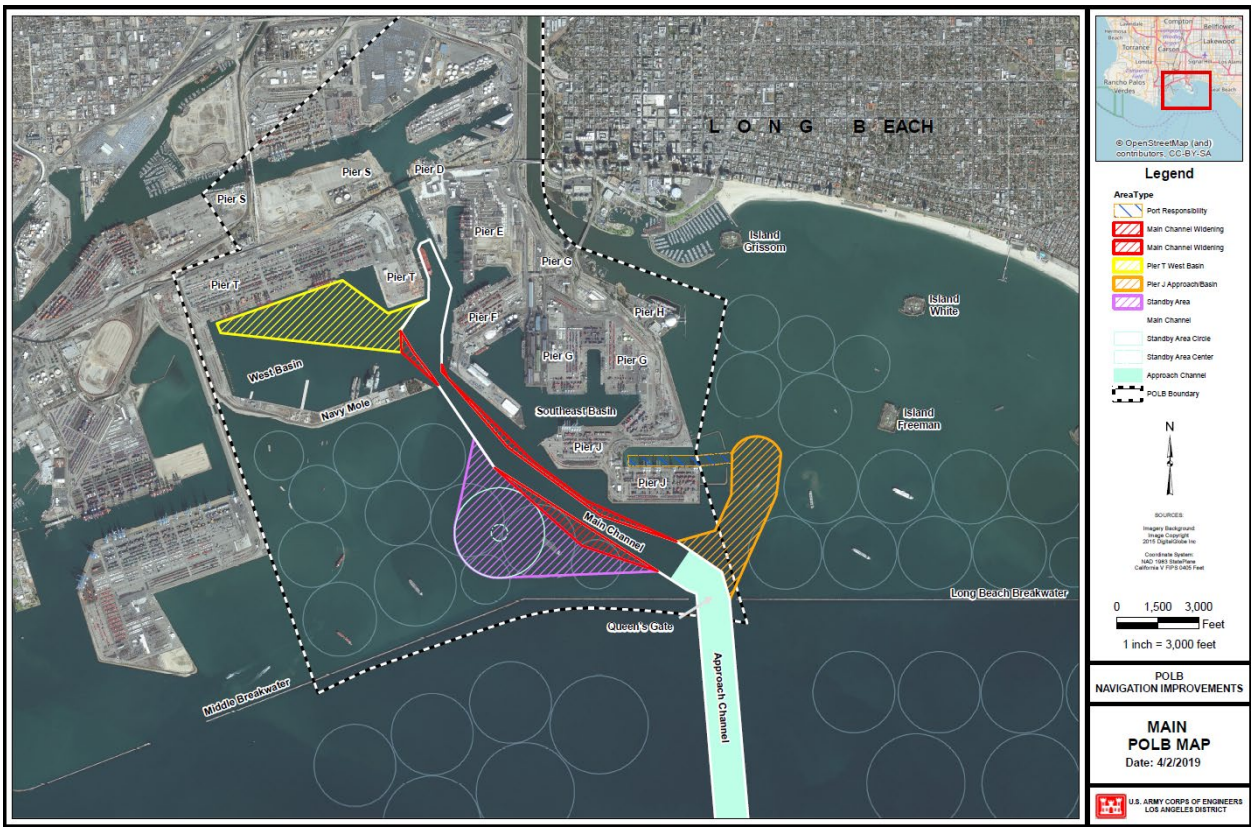
Port of Long Beach Deepening (P2 403268)

Los Angeles, California

Feasibility Study

Appendix F; Cost Engineering



Prepared by: Cost Engineering, Louisville District for

Los Angeles District, South Pacific Division

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Executive Summary

Purpose

The purpose of the study is to identify and evaluate improvements to existing navigation channels within the Port of Long Beach (POLB). The study focuses on improving conditions for current and future container and liquid bulk vessel operations in relation to safety, reliability, and waterborne transportation efficiencies. The purpose of this report is to summarize and document the Total Project Costs for the NED plan (recommended plan), which was Alternative 3 in the alternative array.

The alternative costs provided have undergone District Quality Control Review by the Los Angeles District Coastal Section and the Walla Walla Cost Center of Expertise. These reviews have verified the reasonableness of total project costs, including the construction costs and calculated contingencies using the mandated Abbreviated Risk Analysis techniques.

Project Scope

1) The design vessels considered in the analysis include the Post-Panamax Generation IV (containerized carrier) with a design draft of 52 feet and very large crude carriers (VLCC) for bulk liquid cargoes with a design draft of 70 feet.

2) Dredged material will be disposed of either in a nearshore placement site (i.e. Surfside Borrow Site), an ocean-dredged material disposal site (ODMDS) (LA-2 and/or LA-3), or a combination of the two. The nearshore placement site can accommodate up to 2.5 mcy of dredged material. Each ODMDS has a maximum annual disposal volume; LA-2 is assumed to be 0.9 mcy from all sources, and LA-3 is assumed to be 2.2 mcy from all sources.

3) It is assumed that dredging will be performed using a hopper dredge as well as a clamshell dredge. To minimize transit time, disposal of material from the hopper dredge will maximize use of the nearshore site until all hopper dredging is complete, while a clamshell dredge will be evaluated for disposal at an ODMDS. If there is capacity available at the nearshore site for the clamshell dredging, that will be utilized first.

4) Dredging areas are named as follows:

a) Approach Channel
b) West Basin
c) West Basin Berth (Non-Federal)
d) Pier J Basin Slip and Berth (Non-Federal)
e) Pier J Approach Channel and Transition from Main Channel
f) Main Channel Widening

Cost

The cost estimate for the project has been developed from detail using the Cost Engineering Dredge Estimating Program (CEDEP) estimating software to ensure that cost estimates for dredging areas are prepared accurately and efficiently. This program meets the requirement for preparing estimates in lieu

of using the Micro-Computer Aided Cost Engineering system (MCACES) software program, since none of the cost alternatives include land work.

Estimates include non-federal costs. Costs were provided for Non-federal activities performed by the sponsor, the Port of Long Beach. Non-federal work performed by the sponsor includes:

1) Pier J Wharf improvement/stabilization: underwater bulkhead (sheet pile) to accommodate deepening
2) Pier J Breakwater Stabilization: bulkhead wall
3) Pier T Wharf Improvements
4) Electric Substation near Berth J 260

Non-federal work performed by the COE, but paid by the sponsor includes:

1) Berth Dredging near Pier J and
2) Berth Dredging near West Basin Area

Additionally, costs have been provided to USACE by the United Stats Coast Guard (USCG) for the necessary Aids to Navigation (ATON, as shown in the TPCS sheet). These costs are paid for by USCG but are considered Federal Costs.

Environmental Mitigation costs are not anticipated per Environmental Coordinator.

Real Estate costs are identified in the TPCS under Account 01, Lands and Damages. RE Costs were provided by the Real Estate PDT member for use in the cost estimate. All marine work is performed on State/Federal waters.

The estimate considers all project costs including construction, engineering, design, and contract supervision & administration. Total Project Costs for the recommended plan is identified in Table 1.

Schedule

The Total Project Schedule has been developed using Microsoft Project. It can be found at the end of this appendix.

Risk

A Cost & Schedule Risk Analysis was performed on the final recommended plan in accordance with ER 1110-1-1300 Cost Engineering Policy and General Requirements, with project contingencies calculated accordingly. The 80% Confidence Level (P80) of this CSRA is more likely to ensure the funds received will be adequate for implementation and is the recommended level for USACE cost estimates. The risk analysis results are also intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as provide tools to support decision making and risk management as the project progresses through implementation.

1 Scope of Work

1.1 Federal Construction

1.1.1 12 – Ports

Scope of work includes the following alternatives:

- Recommended (NED) Plan:
  - Deepen West Basin Channel to -55 feet.
  - Deepen Pier J Approach Channel to -55 feet, including the transition from the Main Channel to Pier J Approach Channel.
  - Widening of Main Channel to a design depth of -76'
  - Deepen Approach Channel to a design depth of -80'

1.1.2 12 – Ports

Aids to Navigation (ATON) scope and costs provided by the USCG. Scope of work includes the following alternatives:

1.2 Non-Federal Construction

1.2.1 12 – Ports

- The primary purpose of the Port's project is to deepen the West Basin Berth (Pier T); the Pier J Basin Slip and Berth to facilitate safety and improve navigation for the fleet vessels. Depth analyzed range from -53' to -57'.
- Wharf improvements, breakwater improvements, and electric substation construction work is performed and priced by the sponsor.

1.3 Non-Construction

1.3.1 30 – Planning, Engineering, & Design (PED)

The work covered under this account includes project management, project planning, preparation of plans & specifications, engineering during construction, contract advertisement, opening of bids, and contract award. PED was estimated based on average historical percentages. Additionally, a percentage of cost was allocated for monitoring activities assumed to be required after discussion with the PDT. These costs are captured on the TPCS under "Monitoring and Adaptive Management" and are assumed include sediment sampling, water sampling, and other necessary activities during dredging.

1.3.2 31 – Supervision & Administration (S&A)

The work covered under this account includes contract supervision, contract administration, construction administration, technical management activities, and District office supervision and administration costs. S&A was estimated based on average historical percentages.

2 Major Assumptions

2.1.1 Construction

- All work inside the breakwater (Queen's Gate), within the port, is performed by an electric clamshell in order to meet air quality standards required by the Port of Long Beach.
- All work outside the breakwater (Queen's Gate) is performed by a generic large hopper. Work encompass dredging the Approach Channel. A large hopper is well suited for work on the Approach Channel. Dredging a large volume of sand outside the breakwater justifies the use of the larger vessel. The excavation consists of a thin layer (1-3 feet) along the ocean bottom.
- There is an existing electric substation near Pier T that can serve as a power supply to the electric clamshell dredge when working on the West Basin, Main Channel Widening, and Stand-By areas.
- Marine fuel prices are based on average of current prices due to market fluctuation
- Mob/demob costs are dependent on the placement sites limitations. Once the yearly placement sites volume capacities are met, it is assumed dredging equipment is demobilized. Dredging is resumed the following year with associated mobilization costs.
- Contracts assumed to be low bid/bid opening.
- Real estate costs provided by RE team member and used as provided.
- Environmental mitigation costs are anticipated at no expense
- Additional assumptions are documented within the CEDEP files.

2.1.2 Scheduling

- It is assumed that dredging will be performed using one hopper dredge and one clamshell dredge. To minimize transit time, disposal of material from the hopper dredge will maximize use of the Nearshore Placement Site, while a clamshell dredge will be evaluated for disposal at LA2 or LA3 Placement Sites.
- Dredging of Pier J Slip, berth, and Approach is dependent on construction of the electric substation near Pier J.
- Nearshore placement site (Surfside borrow site) can accommodate 2,500,000 CY of material (Max.)
- Offshore placement sites (LA2 and LA3) max allowable placements are 900,000 CY/year (LA2) and 2,200,000 CY/year (LA3). However, these volumes are also limited by the work that one clamshell can perform per year.
- Assume Approach Channel sediment is transported to the Nearshore placement site first.

3 Cost Estimate

Cost estimates were prepared in CEDEP for all dredging feature accounts and summarized on the Cost Summary Alternative Comparison, as well as input into MII to show a total project cost consistent with the TPCS file. Costs were primarily developed from detail while some were provided by the sponsor, Port of Long Beach, and some by the United States Coast Guard.

3.1 Estimate Methodology

3.1.1 Reasons for selecting the hopper dredge to work on the Approach Channel

In selecting the dredging equipment, engineering considers traffic, disposal site restrictions, hauling distance and cost.

The hopper dredge is the equipment of choice in heavy traffic and it is capable of high productions resulting in a cost effective choice. The hopper dredge maneuverability is excellent and is therefore more mobile in traffic. The hopper dredge does not need scows (barges), thus equipment footprint in the area near Queen's Gate is reduced and vessel traffic impacts are reduced. Reduction of traffic impacts near Queen's Gate is encouraged by the project requirements.

The use of a clamshell (mechanical dredge) in the area is unlikely. When excavating close to a wharf, deck or confined areas the clamshell is the dredge of choice due to its dredging accuracy. However, the clamshell dredging operation is significantly more expensive than the hopper dredge operation because the clamshell low capacity and production is significantly slower than the hopper dredge.

Also, the best choice in disposing material in the open sea is the hopper for hauling distances below 10 miles. With hauling distances over 10 miles, the clamshell-scow operation may be more economical.

Converting the diesel hopper dredge into an electric hopper dredge is not feasible as it is a seagoing ship. A suction pipe hydraulically discharges material into a self-contained hopper, and the material is then transported to a disposal site. The use of an electric line (cord) would prevent the hopper from sailing or transporting the material to the disposal site.

3.1.2 Reasons for selecting the clamshell dredge to work inside the harbor

A conventional clamshell dredge was selected to dredge the areas on the harbor side of Queen's Gate. The hydraulic cutterhead would not be suitable for long delivery distances. Hauling distances to LA1 and LA2 placement sites range mostly from 10 miles and 25 miles out in the ocean. Also, the clamshell dredge seems more economical and suitable for site conditions: selected dredge must run on electric power, a large part of the required deepening of the sea floor runs along the wharf face, and cutting depths are greater than -55 feet.

3.1.3 Non-Federal Estimates

Non-federal work encompass Pier J Basin wharf improvements, Pier J berth dredging, and Pier J Basin slip dredging.

Pier J Basin wharf improvements include breakwater improvements (bulkhead wall) and electric substation construction near Berth J 260 construction. Costs were provided by the Port of Long Beach.

Pier J berth and slip dredging work will be performed through a USACE contract (Contract 1) in conjunction with the bulk of the channel dredging operations.

3.1.4 Detailed CEDEP Cost Estimate

The CEDEP estimating software was used to develop production rates. Equipment selection and production rates were reviewed by the COE Coastal Section and the Port of Long Beach. A construction sequence for area of work was developed based on placement site limitations and equipment production rates. Crews were developed in correspondence with the work being performed. The labor rates were adjusted to the local and current Davis-Bacon wage determinations. CEDEP area factors were updated.

3.2 Direct Costs

Direct costs are based on anticipated equipment, labor, and materials necessary to construct the project. Following formulation of the direct cost, a determination was made that the work is suitable for a marine prime contractor.

3.2.1 Overtime

Overtime is anticipated. Dredging work is assumed to occur 24 hours a day, 6 days per week, Monday through Saturday. Sunday was allowed for equipment maintenance.

3.2.2 Labor - Wage Determination

Los Angeles County, California Davis-Bacon wage rates were obtained from the Department of Labor and used for all craft labor. The base wage rate and taxable fringe were entered into CEDEP and applied accordingly.

3.2.3 Equipment Costs

The clamshell dredge is electric, therefore, the CEDEP program was altered to accommodate the diesel to electric conversion.

The hopper dredge runs on diesel, and the generic large dredge was the best fit to attain required production rates.

3.2.4 Crews

Project specific crews are applied to the detailed costs as appropriate. Number of crew members was modified according to the number of shifts. In considering the crews and productivities, the engineer considered historical project data, input from Coastal Engineering, and the sponsor for checking the overall dredging production rates.

Quantities were developed by the COE Coastal Section. Quantities were confirmed by the estimator and adjusted to account for non-pay dredging volume.

3.3 Indirect Costs

3.3.1 Contractor Acquisition Strategy

Through discussions with the PDT, two contracts are assumed for this project. Contract 1 is assumed to be administered by USACE as a full and open Invitation For Bid (IFB) type contract. Dredging work is assumed to be performed by a marine prime contractor. The scope of work associated with land or marine non-federal is assumed to be coordinated with the Port of Long Beach and for the Port of Long Beach to contract out the work. Acquisition strategy uncertainties have been captured in the CSRA.

3.3.2 Contractor Markups

3.3.2.1 Field Office Overhead (FOOH)

For Field Office Overhead (FOOH), the cost estimate includes a percentage based upon the estimator's judgment, discussion with the PDT, and current estimated construction duration. This value represents the anticipated prime contractor field overhead costs for items such as project supervision, contractor quality control, contractor field office supplies, personal protective equipment, field engineering, and other incidental field overhead costs.

3.3.2.2 Home Office Overhead (HOOH)

For Home Office Overhead (HOOH) expense, the cost estimate includes an allowance applied as a percentage of direct cost plus FOOH. HOOH includes items such as office rental/ownership costs, utilities, office equipment ownership/maintenance, office staff (managers, accountants, clerical, etc.), insurance, and miscellaneous. In reality, the range of home office overhead can be quite broad and depends largely on the contractor's annual volume of work and the type of work that is generally performed by the contractor.

3.3.2.3 Profit

Profit was applied to the prime contractor on the CEDEP estimates since working estimates are built for project authorization.

3.3.2.4 Bond

For the main contract, bond was assumed to be 1% and applied as a running percentage.

3.4 Owner Costs

3.4.1 Contingency

Contingencies for Alternative Project Costs were determined through a Cost & Schedule Risk Analysis (CSRA) workshop with the PDT and Port of Long Beach personnel. The resulting overall project contingency developed was 36%.

3.4.2 Escalation

No escalation was applied to the construction costs except on the TPCS. The civil works breakdown structure (CWBS) feature accounts associated with each contract were escalated to the mid-point of

construction or design period using the Civil Works Construction Cost Index System (CWCCIS) factors as contained in EM 1110-2-1304.

4 Cost MCX Review

Cost MCX cursory review of the final array of alternatives was performed to ensure that all cost engineering products are well developed, consistent, and to a level of quality and detail necessary in order to determine the TSP.

5 NED Plan (Alternative 3)

5.1 Total Project Cost Summary (TPCS)

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: **Port of Long Beach**
PROJECT NO: **403268**

DISTRICT: **Los Angeles District**
PREPARED: **4/15/2021**

LOCATION: **Long Beach, CA**

CHIEF, AE MANAGEMENT, COST AND VALUE
POC: **ENGINEERING, Mark Cooke, P.E.**

This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2021									
						Effective Price Level Date: 1-Oct- 20									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Oct-20 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
12	NAVIGATION PORTS & HARBORS	$81,758	$29,433	36%	$111,190		$81,758	$29,433	$111,190		$111,190	15.8%	$94,636	$34,069	$128,705
12	LOCAL SERVICE FACILITIES	$13,468	$4,848	36%	$18,316		$13,468	$4,848	$18,316			excluded from Fully Funded Costs			
12	ASSOCIATED COSTS (ATON)	$480	$173		$653		$480	$173	$653			excluded from Fully Funded Costs			
	CONSTRUCTION ESTIMATE TOTALS:	$95,705	$34,454		$130,159		$95,705	$34,454	$130,159		$111,190	15.8%	$94,636	$34,069	$128,705
01	LANDS AND DAMAGES	$1,169	$292	25%	$1,462		$1,169	$292	$1,462		$1,462	9.0%	$1,275	$319	$1,593
30	PLANNING, ENGINEERING & DESIGN	$12,264	$4,415	36%	$16,679		$12,264	$4,415	$16,679		$16,679	14.3%	$14,022	$5,048	$19,070
31	CONSTRUCTION MANAGEMENT	$5,478	$1,972	36%	$7,450		$5,478	$1,972	$7,450		$7,450	22.5%	$6,710	$2,416	$9,126
	PROJECT COST TOTALS:	$114,616	$41,133	36%	$155,749		$114,616	$41,133	$155,749		**$136,780**	15.9%	$116,643	$41,851	$158,494

CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

PROJECT MANAGER, Susan M. Ming, P.E.

CHIEF, REAL ESTATE, Cheryl Connett

CHIEF, ENGINEERING, Eric Stevens, P.E.

ESTIMATED FULLY FUNDED TOTAL PROJECT COST: **$158,494**
GENERAL NAVIGATION FEATURES: **$128,705**

PROJECT FIRST COST: **$136,780**
LOCAL SERVICE FACILITIES COST[1]: *$18,316*
ASSOCIATED COSTS[2]: *$653*
LERR: *$1,462*
INCREMENTAL AVERAGE ANNUAL O&M[3]: *$101*

[1]**LOCAL SERVICE FACILITIES ARE 100% NON-FEDERAL COSTS**
[2]**ASSOCIATED COSTS ARE 100% FEDERAL (USCG) COST**
[3]**O&M IS BASED ON 50 YEAR ANALYSIS, COST IS NOT INCLUDED IN Project First Cost or Fully-Funded Cost**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Port of Long Beach
LOCATION: Long Beach, CA
This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

DISTRICT: Los Angeles District
POC: CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

PREPARED: 4/15/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Apr-21 Estimate Price Level: 1-Oct-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1 -Oct-20								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	CONTRACT 1													
12	NAVIGATION PORTS & HARBORS - Year 1	$42,077	$15,148	36.0%	$57,225		$42,077	$15,148	$57,225	2025Q3	13.8%	$47,898	$17,243	$65,141
12	NAVIGATION PORTS & HARBORS - Year 2	$22,405	$8,066	36.0%	$30,471		$22,405	$8,066	$30,471	2026Q3	17.1%	$26,245	$9,448	$35,693
12	NAVIGATION PORTS & HARBORS - Year 3	$7,593	$2,734	36.0%	$10,327		$7,593	$2,734	$10,327	2027Q3	20.5%	$9,152	$3,295	$12,447
12	NAVIGATION PORTS & HARBORS - Electric Substation	$9,682	$3,485	36.0%	$13,167		$9,682	$3,485	$13,167	2026Q3	17.1%	$11,341	$4,083	$15,424
	CONSTRUCTION ESTIMATE TOTALS:	$81,758	$29,433	36.0%	$111,190		$81,758	$29,433	$111,190			$94,636	$34,069	$128,705
01	LANDS AND DAMAGES	$1,169	$292	25.0%	$1,462		$1,169	$292	$1,462	2024Q1	9.0%	$1,275	$319	$1,593
30	PLANNING, ENGINEERING & DESIGN													
1.5%	Project Management	$1,226	$442	36.0%	$1,668		$1,226	$442	$1,668	2024Q1	11.9%	$1,372	$494	$1,866
0.5%	Planning & Environmental Compliance	$409	$147	36.0%	$556		$409	$147	$556	2024Q1	11.9%	$457	$165	$622
8.0%	Engineering & Design	$6,541	$2,355	36.0%	$8,895		$6,541	$2,355	$8,895	2024Q1	11.9%	$7,316	$2,634	$9,950
0.5%	Reviews, ATRs, IEPRs, VE	$409	$147	36.0%	$556		$409	$147	$556	2024Q1	11.9%	$457	$165	$622
1.0%	Life Cycle Updates (cost, schedule, risks)	$818	$294	36.0%	$1,112		$818	$294	$1,112	2024Q1	11.9%	$915	$329	$1,244
0.5%	Contracting & Reprographics	$409	$147	36.0%	$556		$409	$147	$556	2026Q3	22.5%	$501	$180	$681
1.5%	Engineering During Construction	$1,226	$442	36.0%	$1,668		$1,226	$442	$1,668	2026Q3	22.5%	$1,502	$541	$2,043
1.0%	Planning During Construction	$818	$294	36.0%	$1,112		$818	$294	$1,112	2026Q3	22.5%	$1,002	$361	$1,362
0.5%	Adaptive Management & Monitoring	$409	$147	36.0%	$556		$409	$147	$556	2026Q3	22.5%	$501	$180	$681
31	CONSTRUCTION MANAGEMENT													
6.7%	Construction Management	$5,478	$1,972	36.0%	$7,450		$5,478	$1,972	$7,450	2026Q3	22.5%	$6,710	$2,416	$9,126
	CONTRACT COST TOTALS:	$100,668	$36,112		$136,780		$100,668	$36,112	**$136,780**			$116,643	$41,851	**$158,494**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Port of Long Beach
LOCATION: Long Beach, CA
This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

DISTRICT: Los Angeles District
POC: CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.
PREPARED: 4/15/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Apr-21				Program Year (Budget EC): 2021								
		Estimate Price Level: 1-Oct-20				Effective Price Level Date: 1 -Oct-20								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	CONTRACT 2													
12	NAVIGATION PORTS & HARBORS - Mob/Dredging	$5,567	$2,004	36.0%	$7,572		$5,567	$2,004	$7,572	2026Q3	17.1%	$6,521	$2,348	$8,869
12	NAVIGATION PORTS & HARBORS - Pier J Improvements	$4,713	$1,697	36.0%	$6,410		$4,713	$1,697	$6,410	2026Q3	17.1%	$5,521	$1,988	$7,508
	CONSTRUCTION ESTIMATE TOTALS:	$10,281	$3,701	36.0%	$13,982		$10,281	$3,701	$13,982			$12,042	$4,335	$16,378
01	LANDS AND DAMAGES			25.0%										
30	PLANNING, ENGINEERING & DESIGN													
6.0%	POLB Administration Costs	$617	$222	36.0%	$839		$617	$222	$839	2024Q1	11.9%	$690	$248	$939
10.0%	POLB Engineering & Design Costs	$1,028	$370	36.0%	$1,398		$1,028	$370	$1,398	2024Q1	11.9%	$1,150	$414	$1,564
31	CONSTRUCTION MANAGEMENT													
15.0%	POLB Construction Management Costs	$1,542	$555	36.0%	$2,097		$1,542	$555	$2,097	2026Q3	22.5%	$1,889	$680	$2,569
	CONTRACT COST TOTALS:	$13,468	$4,848		$18,316		$13,468	$4,848	**$18,316**			$15,771	$5,678	**$21,449**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Port of Long Beach
LOCATION: Long Beach, CA
This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

DISTRICT: Los Angeles District
POC: CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

PREPARED: 4/15/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Apr-21 Estimate Price Level: 1-Oct-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1 -Oct-20								
				RISK BASED										
WBS	Civil Works	COST	CNTG	CNTG	TOTAL	ESC	COST	CNTG	TOTAL	Mid-Point	ESC	COST	CNTG	FULL
NUMBER	Feature & Sub-Feature Description	($K)	($K)	(%)	($K)	(%)	($K)	($K)	($K)	Date	(%)	($K)	($K)	($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Associated Costs													
12	Aids to Navigtion (ATON)	$480	$173	36.0%	$653		$480	$173	$653	2026Q3	17.1%	$562	$202	$765
	CONSTRUCTION ESTIMATE TOTALS:	$480	$173	36.0%	$653		$480	$173	$653			$562	$202	$765
01	LANDS AND DAMAGES													
30	PLANNING, ENGINEERING & DESIGN													
31	CONSTRUCTION MANAGEMENT													
	CONTRACT COST TOTALS:	$480	$173		$653		$480	$173	**$653**			$562	$202	**$765**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Port of Long Beach
LOCATION: Long Beach, CA
This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

DISTRICT: Los Angeles District
POC: CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

PREPARED: 4/15/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Apr-21				Program Year (Budget EC): 2021								
		Estimate Price Level: 1-Oct-20				Effective Price Level Date: 1 -Oct-20								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	O&M Dredging													
12	O&M Dredging - Cycle 1 (Year 25)	$2,075	$747	36.0%	$2,822		$2,075	$747	$2,822	2053Q1	149.8%	$5,183	$1,866	$7,049
12	O&M Dredging - Cycle 2 (Year 50)	$2,075	$747	36.0%	$2,822		$2,075	$747	$2,822	2078Q1	410.5%	$10,592	$3,813	$14,405
	CONSTRUCTION ESTIMATE TOTALS:	$4,150	$1,494	36.0%	$5,644		$4,150	$1,494	$5,644			$15,775	$5,679	$21,455
01	LANDS AND DAMAGES			25.0%										
30	PLANNING, ENGINEERING & DESIGN													
15.0%	PED - Cycle 1	$311	$112	36.0%	$423		$311	$112	$423	2052Q3	239.3%	$1,056	$380	$1,436
15.0%	PED - Cycle 2	$311	$112	36.0%	$423		$311	$112	$423	2077Q3	826.5%	$2,884	$1,038	$3,922
31	CONSTRUCTION MANAGEMENT													
6.7%	Construction Management - Cycle 1	$139	$50	36.0%	$189		$139	$50	$189	2053Q1	246.2%	$481	$173	$655
6.7%	Construction Management - Cycle 2	$139	$50	36.0%	$189		$139	$50	$189	2078Q1	845.3%	$1,314	$473	$1,787
	CONTRACT COST TOTALS:	$5,051	$1,818		$6,869		$5,051	$1,818	**$6,869**			$21,511	$7,744	**$29,254**
												Annualized Cost (over 50 years):		**$101**

Filename: TPCS_Construction Seq and Qtys_TC_rev-2021-4-15
TPCS

5.2 Cost & Schedule Risk Analysis

Cost and Schedule Risk Analysis **Port of Long Beach Deepening**

Risk Facilitator Taylor Canfield

Risk Register Meeting

Date: 7/14/2020

Attendance	Name	Office	Representing
Full	Taylor Canfield	LRL	Planning
Full	Maricris Lee	SPL	PM
Full	Susan Ming	SPL	PM
Full	Arden Sansom	SWF	Econ
Full	John Goertz	SPL	Engineering
Full	Joe Ryan	SPL	Engineering
Full	Larry Smith	SPL	Engineering
Full	Jeff Khouri	AECOM	Design
Full	Julia Yang	AECOM	Engineering
Full	Lynette Ulloa	SPL	Real Estate
Full	Naser Khan	AECOM	Design
Full	Derek Davis	POA	POLB (Sponsor)
Full	Heather Schlosser	SPL	Planning

Follow-Up Discussions - Individual or group discussions

Date: **through**

Attendance	Name	Office	Representing

Follow-Up Meeting Notes

PDT members supplied additional data based on the questions from the CSRA with regards to the following:

Project Development Stage/Alternative: Design Charrette

Risk Category: Moderate Risk: Typical Project or Possible Life Safety **Meeting Date:** 7/14/2020

Schedule Duration Oct-2024 (From (Month/Year)) May-2027 (From (Month/Year)) **Schedule Duration:** 31.0 Months 20% (Schedule Contingency)

80% Finish Date Nov-2027

WBS		Feature of Work	Contract Cost	% Contingency	$ Contingency	Total
	Risk Not included within CSRA Model					
	01 LANDS AND DAMAGES	Real Estate	$ -	0%	$ -	$ -
	Risk included within CSRA Model					
1	12 NAVIGATION, PORTS AND HARBORS	**Mob/Demob**	$ 8,693,901	28%	$ 2,434,292	$ 11,128,193
2	12 NAVIGATION, PORTS AND HARBORS	**Approach Channel Dredging (Hopper)**	$ 16,420,000	28%	$ 4,597,600	$ 21,017,600
3	12 NAVIGATION, PORTS AND HARBORS	**West Basin Dredging (Clam)**	$ 8,066,250	28%	$ 2,258,550	$ 10,324,800
4	12 NAVIGATION, PORTS AND HARBORS	**Pier J Approach/Transition from Main Channel**	$ 26,395,950	28%	$ 7,390,866	$ 33,786,816
5	12 NAVIGATION, PORTS AND HARBORS	**Main Channel Widening**	$ 10,405,500	28%	$ 2,913,540	$ 13,319,040
6	12 NAVIGATION, PORTS AND HARBORS	**Pier J Basin Slip and Berth**	$ 5,442,928	28%	$ 1,524,020	$ 6,966,948
7	12 NAVIGATION, PORTS AND HARBORS	**Pier J Breakwater Stabilization**	$ 4,713,306	28%	$ 1,319,726	$ 6,033,032
8	12 NAVIGATION, PORTS AND HARBORS	**Electric Substation Near Berth J 260**	$ 9,681,900	28%	$ 2,710,932	$ 12,392,832
23	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 13,671,000	28%	$ 3,827,880	$ 17,498,880
24	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 7,665,000	28%	$ 2,146,200	$ 9,811,200
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				$ -	

Totals					
Real Estate	$ -	0%	$ -	$ -	
Total Construction Estimate	$ 89,819,735	28%	$ 25,149,526	$ 114,969,261	
Total Planning, Engineering & Design	$ 13,671,000	28%	$ 3,827,880	$ 17,498,880	
Total Construction Management	$ 7,665,000	28%	$ 2,146,200	$ 9,811,200	
Fixed Dollar Risk Equally Distributed	$ -	0%	$ -	$ -	
Total	**$ 111,155,735**	**28%**	**$ 31,123,606**	**$ 142,279,341**	

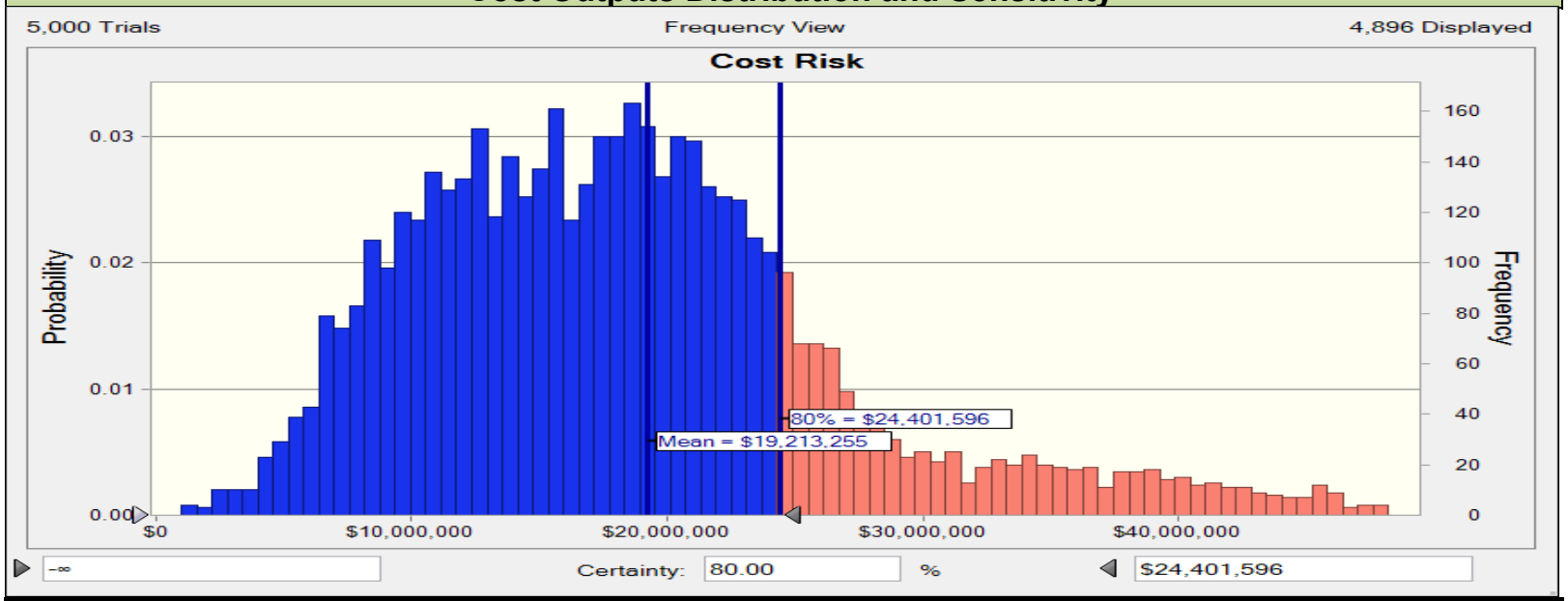
				Project Cost			Project Schedule			Other Information			Cost Model			Schedule Model			Cost due to Schedule Risk			TOTAL Cost		TOTAL Schedule	
													COST			Schedule Model			Cost From Schedule						
CBLE	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Likelihood (C)	Impact (C)	Risk Level (C)	Likelihood (S)	Impact (S)	Risk Level (S)	Cost Variance Distribution	Schedule Variance Distribution	Correlation to Other(s)	Low Variance (Min)	Likely (C)	High Variance (80%-H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%-H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%-H)	Event Prob (PC)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)
Organizational and Project Management Risks (PM)																									
PM1	Funding risks	should be low		Unlikely	Marginal	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled														
Regulatory Environmental Risks (RG)																									
RG1	Endangered species possibly present	Could possibly be sea turtles present	Port doing monitoring for turtles, we won't have to worry about it if there are no turtles. Should the monitoring show any sign of turtles, additional monitoring will have to occur (one add'l employee on the dredge to look out for them). If turtles are sighted then dredging must stop for a period of time. The add'l monitoring cost would likely amount to somewhere between the negligible/marginal range ($1k/day for dredging) would be needed on both dredges if going simultaneously. Assume maybe 2% chance of occurrence. *Upon further discussion with the team, the monitoring cost is less than negligible. This risk can be classified as Low with no input to the model*	Unlikely	Marginal	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled															
RG2	West Basin may be unsuitable for planned disposal sites	Sediment testing might come back with unexpected results	If the sediment testing shows unsuitable soil for the planned disposal sites, new sites will need to located. Nearshore disposal requires chemical/physical compatibility. If not nearshore, could go offshore (as long as not contaminated). Offshore requires it to not be contaminated. Then the sediment would have to be removed from the marine environment or placed into a hole with clean material capping it. Probably some monitoring involved as well. West Basin probably has a higher probability of failing than others. Assume something like 25/75 for liklihood. Probably shorter trip but more precise placement. Then material from another area can be placed on top. For this exercise, assume that the remaining quantity (separate from the above areas) could have an additional qty of 25% added for placement on top, with the tradeoff between the shorter trip and more precise placement coming out to a wash. For threshold purposes, assume a range of 20-30% additional dredged material for cap being required with likely at 25% *add'l monitoring cost would be negligible*	Likely	Significant	High	Likely	Negligible	Low	Triangular	N/A -Not Modeled	RG3, RG4	$1,613,250	$0	$2,419,875	0 Months	0 Months	2 Months				25%	$0	25%	0 Mo
RG3	Approach Channel may be unsuitable for planned disposal sites	Sediment testing might come back with unexpected results	If the sediment testing shows unsuitable soil for the planned disposal sites, new sites will need to located. Nearshore disposal requires chemical/physical compatibility. If not nearshore, could go offshore (as long as not contaminated). Offshore requires it to not be contaminated. Then the sediment would have to be removed from the marine environment or placed into a hole with clean material capping it. Probably some monitoring involved as well. Assume maybe 10% chance of occurrence. Worst-case impact for the approach channel would be take to offshore site. Low threshold assumes LA2; High assumes LA3, with Yes/No model at 10% chance of occurrence.	Possible	Significant	Medium	Possible	Negligible	Low	Triangular	N/A -Not Modeled	RG2, RG4	$2,950,000	$0	$17,700,000							10%	$0	10%	0 Mo
RG4	Remaining Areas may be unsuitable for planned disposal sites	Sediment testing might come back with unexpected results	If the sediment testing shows unsuitable soil for the planned disposal sites, new sites will need to located. Nearshore disposal requires chemical/physical compatibility. If not nearshore, could go offshore (as long as not contaminated). Offshore requires it to not be contaminated. Then the sediment would have to be removed from the marine environment or placed into a hole with clean material capping it. Probably some monitoring involved as well. Assume maybe 10% chance of occurrence. Probably shorter trip but more precise placement.Then material from another area can be placed on top. For this exercise, assume that the remaining quantity (separate from the above areas) could have an additional qty of 25% added for placement on top, with the tradeoff between the shorter trip and more precise placement coming out to a wash. *look into add'l monitoring cost here* **add'l monitoring cost would be negligible**	Unlikely	Significant	Medium	Unlikely	Negligible	Low	Triangular	N/A -Not Modeled	RG2, RG3	$10,110,747	$0	$10,110,747	22 Months	0 Months	22 Months				10%	$0	10%	0 Mo
RG5	POLB will need to go through USACE Regulatory for our permits	Already include in schedule but just noted	Could be some additional requirements from Regulatory but likely minor in impact	Possible	Negligible	Low	Possible	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled														
Contract Acquisition Risks (CA)																									
CA1	Undefined acquisition strategy	Acquisition strategy to be identified during PED	Potentially 4 contracts - hopper, clamshell, substation, and Port contract for Pier J dredging and breakwater work. *look into cost impacts for Corps having to do Pier J work*. For this exercise, assumption is that Port would be able to contract both the Pier J work and the Substation work. Assume 1 contract for the dredging work, and 1 contract for the POLB work. Because of the way that estimates are developed, each one has mobilization and demobilization for each feature. As such, the current estimating methoddoly should be sufficient to cover any increase in contract number, other than the additional contracting requirements and engineering work to put them into separate packages. Assume a range of $500k-$1M additional work	Unlikely	Moderate	Low	Unlikely	Negligible	Low	Triangular	N/A -Not Modeled		$500,000	$0	$1,000,000							10%	$0	25%	0 Mo
General Technical Risks (TR)																									
TR1	Design development stage, incomplete or preliminary	Feasibility level design		Unlikely	Negligible	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled		$0	$0	$1							100%	$0	100%	0 Mo
TR2	Confidence in scope, investigations, design, critical quantities	Distribution in the analysis for sand and gravel can still have implications similar to native materials	Combined with risk TR3 below so as not to double count	Unlikely	Negligible	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled											100%	$0	100%	0 Mo
TR3	Design confidence	Plan form analytical approach used not a 2D model for end losses	Assume a range of quantities for the dredging work may be realized due to the design method/level of confidence. Aside from the basic quantity variation outlined in the risks below for each area, assume an overall range of +5 to +15% based on the basis for qtys	Likely	Marginal	Medium	Likely	Marginal	Medium	Triangular	Triangular		-$4,869,693	$0	-$9,739,386	-1 Months	0 Months	2 Months				100%	$0	100%	0 Mo
Approach Channel Dredging																									
AC1	Potential to undercut adjacent jetty	Risk that hopper dredging may need to switch to clamshell	If clamshell needs to be used in order to more precisely dredge around the breakwater, costs/schedule would be impacted. At this point we don't expect an issue, but it is a possibility that along the breakwater this will be required. This would probably impact somewhere between 10-15,000 CY, so in terms of cost/schedule this likely wouldn't be sumificant at this volume. Keep as a low risk	Possible	Negligible	Low	Possible	Marginal	Low	N/A -Not Modeled	N/A -Not Modeled														
AC2	Stage 13 beach nourishment not occurring in time	Risk that this nourishment doesn't occur, which will take away the nearshore disposal site	Alternative would be that hopper would need to go all the way out to LA3. Assume a worst-case scenario of maybe half the volume (1.25m CY) needing to go to LA3 because of capacity issues. Get with Susie Ming offline to discuss probability of the stage 13 renourishment not occurring. Assume a 40/60 chance that funding will not be received by 1 Oct '24 (POLB start date)	Possible	Moderate	Medium	Possible	Moderate	Medium	Uniform	N/A -Not Modeled		$8,850,000	$0	-$8,850,000	3 Months	0 Months	3 Months				40%	$0	40%	0 Mo
AC3	Qty increase due to sedimentation	Could be some minor qty increase due to sedimentation	Would be small, on the order of 1-2% of qty here.	Possible	Moderate	Medium	Possible	Negligible	Low	Triangular	N/A -Not Modeled		$164,200	$0	$328,400							100%	$0	100%	0 Mo
Main Channel Dredging																									
MC1	Qty variation	Will probably have some slight qty variation	Vary this +/- 2% in either direction for variation.	Possible	Moderate	Medium	Possible	Negligible	Low	Triangular	N/A -Not Modeled		-$208,110	$0	$208,110							100%	$0	100%	0 Mo
West Basin Dredging																									
WB1	Qty variation	Will probably have some slight qty variation	Vary this +/- 2% in either direction for variation.	Possible	Moderate	Medium	Possible	Negligible	Low	Triangular	N/A -Not Modeled		-$161,325	$0	$161,325							100%	$0	100%	0 Mo
Pier J Berth and Basin																									
PJB1	Qty increase	Increase due to most recent survey; total now 337,500 CY	Added to estimate	Certain	Negligible	Relook at Basis of Estimate	Certain	Negligible	Relook at Basis of Estimate	N/A -Not Modeled	N/A -Not Modeled														
Pier J Approach Dredging																									
CV1	Qty variation	Will probably have some slight qty variation	Vary this +/- 5% in either direction for variation.	Very Likely	Marginal	Medium	Very Likely	Negligible	Low	Triangular	N/A -Not Modeled		-$1,501,874	$0	$1,501,874							100%	$0	100%	0 Mo
Pier J Breakwater Stabilization																									
ES1	Increased seismic design	Increased seismic design for this feature would add a lot of cost	The mechanism for failure would be an earthquake or seismic event which, if strong enough to cause the finger piers to collapse, would probably also cause damage to other areas of the Port, the Port of LA, City of Long Beach etc. The seismic paramaters for which this is designed is not insufficient though; it would bea similar risk to Acts of God risk (EX1) so it will be covered there so as not to double-count	Unlikely	Moderate	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled														
ES2	Finger Pier Cost estimate maturity	AECOM estimate based on unit costs/historical costs	Cost estimate provided by AECOM contains unit prices for specific line items in the estimate. Costs seems reasonable on a comparison basis; assume class 2 and allow range of -10% to +30% on distribution.	Possible	Critical	High	Possible	Negligible	Low	Triangular	N/A -Not Modeled		-$471,331	$0	$1,413,992							100%	$0	100%	0 Mo
Electrical Substation																									
ES1	Needs to be in place before any clamshell dredging	Transformer has long lead time (8-12 mo); coordination with SC Edison to tie-in to existing grid	Just things to be coordinated; likely no significant cost or schedule risk.	Unlikely	Negligible	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled														
ES2	Potential increase to substation capacity	Sized for electric clamshell used in other projects	Capacity should be fine; will be worked out in design phase but a slight increase in capacity would still likely have a negligible cost impact per AECOM opinion.	Unlikely	Negligible	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled														
ES3	Electric Substation Estimate maturity	AECOM estimate based on unit costs/historical costs	Cost estimate provided by AECOM contains historical parametric prices for line items in the estimate. Costs seem reasonable on a comparison basis; based on lack of detail and cost engineer's judgement, assume that the estimate for this particular feature class 4 and allow range of -15% to +50% on distribution.	Unlikely	Negligible	Low	Unlikely	Negligible	Low	Triangular	N/A -Not Modeled		-$1,452,285	$0	$4,640,950							100%	$0	100%	0 Mo
Commissioning/Certification (CC)																									
CC1	Coastal Commission Certification	This cert is being put off until the design phase	Could be additional requirements that the coastal commission places on the project; add'l water quality, monitoring, rec impacts, etc. Shouldn't' be additional time added to the critical path for this though, so keep as a low risk	Possible	Negligible	Low	Possible	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled														
CC2	Water Quality Certification	This cert is being put off until the design phase	Ditto, could be add'l requirements placed on the project but likley negligible.	Possible	Negligible	Low	Possible	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled														
Lands and Damages (LD)																									
LD1	Currently looking at RE Plan	May be costs, Lynnette/Sponsor to look into this and respond	Should be no RE Costs at this point, nothing to acquire.	Unlikely	Negligible	Low	Unlikely	Negligible	Low	N/A -Not Modeled	N/A -Not Modeled			$0								100%	$0	100%	0 Mo

Contingency on Base Estimate		
Base Construction Estimate	$89,819,735	
Baseline Estimate Cost Contingency Amount ->	$25,149,526	28%
Baseline Estimate Construction Cost (80% Confidence) ->	$114,969,261	

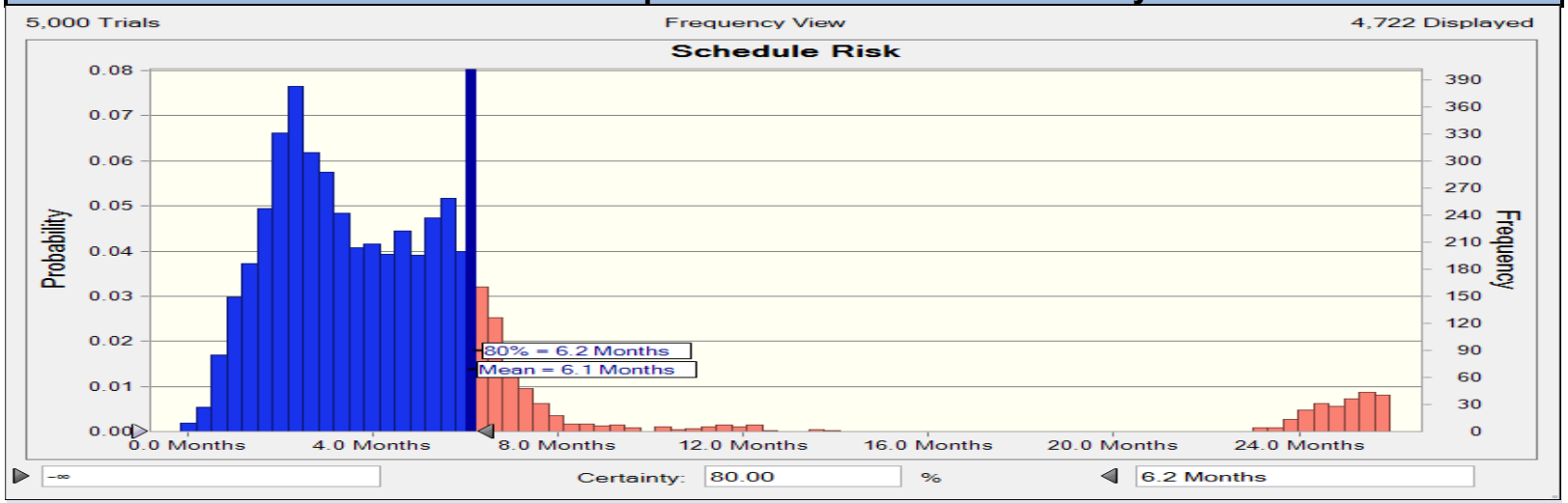
Contingency on Schedule		
Project Base Schedule Duration ->	31.0 Months	
Schedule Contingency Duration ->	6.2 Months	20%
Project Schedule Duration (80% Confidence) ->	37.2 Months	

Port of Long Beach Deepening
14-Jul-20

- Cost Outputs Distribution and Sensitivity -



- Schedule Outputs Distribution and Sensitivity -



Contingency on Base Estimate	80% Confidence Project Cost
Base Construction Estimate	$89,819,735
Baseline Estimate Cost Contingency Amount ->	$25,149,526
Baseline Estimate Construction Cost (80% Confidence) ->	$114,969,261
	28%

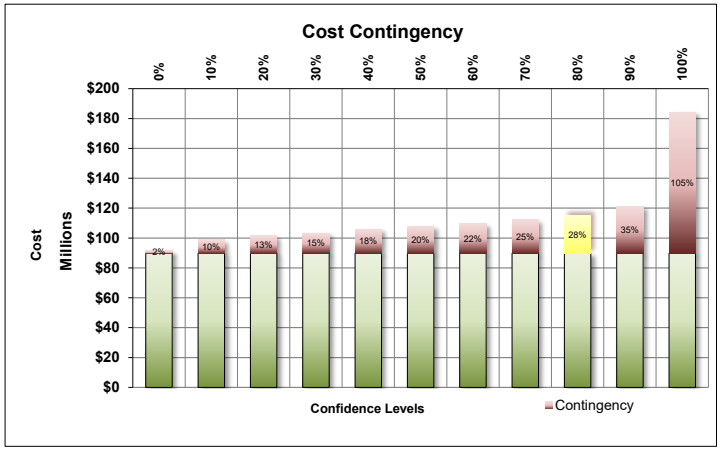
Contingency on Schedule	80% Confidence Project Schedule
Project Base Schedule Duration ->	31.0 Months
Schedule Contingency Duration ->	6.2 Months
Project Schedule Duration (80% Confidence) ->	37.2 Months
	20%

Port of Long Beach Deepening
14-Jul-20

- PROJECT CONTINGENCY DEVELOPMENT -

INITIAL CONSTRUCTION
Contingency Analysis

Base Case Estimate (Excluding 01)	$89,819,735	
Confidence Level	**Contingency Value**	**Contingency**
0%	1,796,395	2%
10%	8,981,974	10%
20%	11,676,566	13%
30%	13,472,960	15%
40%	16,167,552	18%
50%	17,963,947	20%
60%	19,760,342	22%
70%	22,454,934	25%
80%	**25,149,526**	**28%**
90%	31,436,907	35%
100%	94,310,722	105%

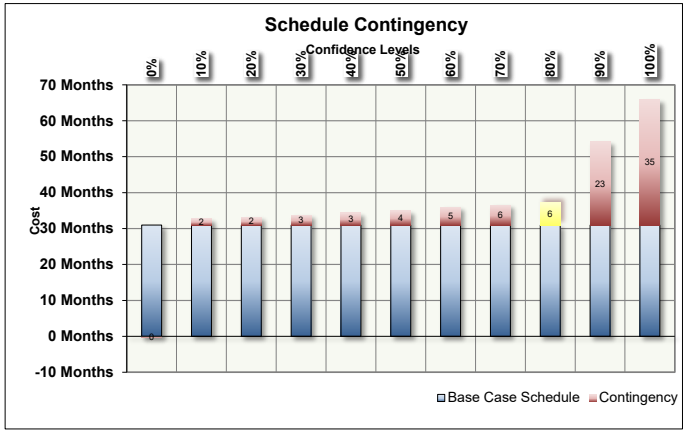


Port of Long Beach Deepening
14-Jul-20

- SCHEDULE CONTINGENCY (DURATION) DEVELOPMENT -

Contingency Analysis

Base Case Schedule	31.0 Months	
Confidence Level	**Contingency Value**	**Contingency**
0%	0 Months	-1%
10%	2 Months	6%
20%	2 Months	7%
30%	3 Months	9%
40%	3 Months	11%
50%	4 Months	13%
60%	5 Months	16%
70%	6 Months	18%
80%	**6 Months**	**20%**
90%	23 Months	75%
100%	35 Months	113%



Pier J New Electrical Substation

SELECTED OPTION: SUBSTATION NEAR BERTH J266 - COST SUMMARY

Item	Descriptions	Item	Quantity	Total		Remarks	USACE Remarks	Rev Cost		
				Unit Cost	Cost					
1	Modifications to existing 66kV system as required for providing service to new 15MVA transformer	LS	1	$400,000.00	$400,000.00	Assume SCE cost		$ 400,000		
2	New 15kVA transformer, 66-12.47kV		1	$3,220,000.00	$4,315,107.96	Eaton Cost plus installation, escalated 7 years (5% per year)		$ 4,315,000		
3	12.47kV Amp Switchgear & Relay (@ Existing 66kV SCE Substation at Pier J		1		$643,245.91	Parametric calcs based on Port of New Orleans project, escalated 7 years (5% per year)		$ 853,000		
4	Underground Cable/Ductbank Concrete Encased		4,300	$342.00	$2,206,974.06	Parametric calcs based on Port of Miami project, escalated 7 years (5% per year)		$ 3,203,500	$ 745.00	$ 3,205,000
5	12.47KV Cable, 3#500KCMIL		25,800	$16.00	$731,300.38	Based on Okonite data escalated 7 years (10% per year)		$ 722,400	$ 28.00	$ 731,000
6	Manholes		6	$12,000.00	$96,486.89	Parametric calcs based on Port of Miami project, escalated 7 years (5% per year)		$ 138,000	$ 23,000.00	$ 140,000
7	SCE Misc Charge (Assume)				$50,000.00	Assume SCE cost, assume no upgrade on existing SCE infrastructure		$ 50,000		
				Total	$ 8,443,115.20		**Total**	**$ 9,681,900**		

Pier J Finger Pier Improvements
Construction Cost Estimate - Based on Concept Design

OPTION 3A - SHEET PILE WALL OPTION

BidItem	Bid Description	Bid Quantity	Units	Total Direct Unit Cost	Direct Total			
3000	**OPTION #3A - SSP TOE WALL >STATIC + OLE 55'**	**680**	**LF**					$ -
3010	MOB/DEMOB PILE OPERATION	1	LS	$ 316,000	$ 316,000			$ 316,000
3020	FURN & INSTALL AZ 42 SHEETPILE	21,760	SF	$ 125	$ 2,720,000			$ 2,720,000
3110	EXCAV PROT TRENCH FRONT OF SSP	1,020	CY	$ 143	$ 145,860			$ 145,860
3120	FURN & INSTALL BEDDING FOR ARMOR ROCK	255	CY	$ 99	$ 25,245			$ 25,245
3130	FURN & INSTALL ARMOR ROCK 500-1500#	1,530	TON	$ 85	$ 130,050			$ 130,050
						TOTAL DIRECT COST		$ 3,337,155
						INDIRECTS (10%)	15%	$ 500,573
						SUBTOTAL		$ 3,837,728
						OH&P (21%)	23%	$ 875,578
							Total	**$ 4,713,306**

COST ESTIMATE CLASSIFICATION MATRIX FOR THE PROCESS INDUSTRIES

The five estimate classes are presented in figure 1 in relationship to the identified characteristics. Only the level of project definition determines the estimate class. The other four characteristics are secondary characteristics that are generally correlated with the level of project definition, as discussed in the generic standard. The characteristics are typical for the process industries but may vary from application to application.

This matrix and guideline provide an estimate classification system that is specific to the process industries. Refer to the generic standard for a general matrix that is non-industry specific, or to other addendums for guidelines that will provide more detailed information for application in other specific industries. These will typically provide additional information, such as input deliverable checklists to allow meaningful categorization in those particular industries.

	Primary Characteristic	*Secondary Characteristic*			
ESTIMATE CLASS	**LEVEL OF PROJECT DEFINITION** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges [a]	**PREPARATION EFFORT** Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/ Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes: [a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

[b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

Assume Electrical Substation Class 4	-15% to +50%
Assume Finger Pier Improvements Class 3	-10% to + 30%

5.3 MII Estimate

Estimated by	Taylor Canfield, PE, CCE, LRL-EDM-C (502) 315-6268
Designed by	Los Angeles District
Prepared by	Taylor Canfield, PE, CCE, LRL-EDM-C (502) 315-6268
Preparation Date	10/30/2020
Effective Date of Pricing	10/1/2020
Estimated Construction Time	1,855 Days
Checked by:	Neal Ralston

Currency in US dollars

Right click here and select "Update Field" to build the Table of Contents for this report.

Designed by
Los Angeles District

Estimated by
Taylor Canfield, PE, CCE, LRL-EDM-C (502) 315-6268

Prepared by
Taylor Canfield, PE, CCE, LRL-EDM-C (502) 315-6268

Design Document	Main Report & Appendices
Document Date	11/12/2020
District	Los Angeles District
Contact	Taylor Canfield, stephen.t.canfield@usace.army.mil
Budget Year	2025
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost
UserCost1

Timeline/Currency

Preparation Date	10/30/2020
Escalation Date	10/1/2020
Eff. Pricing Date	10/1/2020
Estimated Duration	1855 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB16EN: 2016 MII English Cost Book

Labor D-B_2020: CA200022 CA22, Heavy Dredging

Note: http://www.wdol.gov is the website for current Davis Bacon & Service Labor Rates. Fringes paid to the laborers are taxable. In a non-union job the whole fringes are taxable. In a union jo pay fring

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP18R07: 2018_EP1110-1-8_Mii_Library_Region_07_R1

Region 07 - WEST, (2018)	
Sales Tax	8.00
Working Hours per Year	1,560
Labor Adjustment Factor	1.13
Cost of Money	1.13
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel	
Electricity	0.105
Gas	3.080
Diesel Off-Road	2.810
Diesel On-Road	3.380

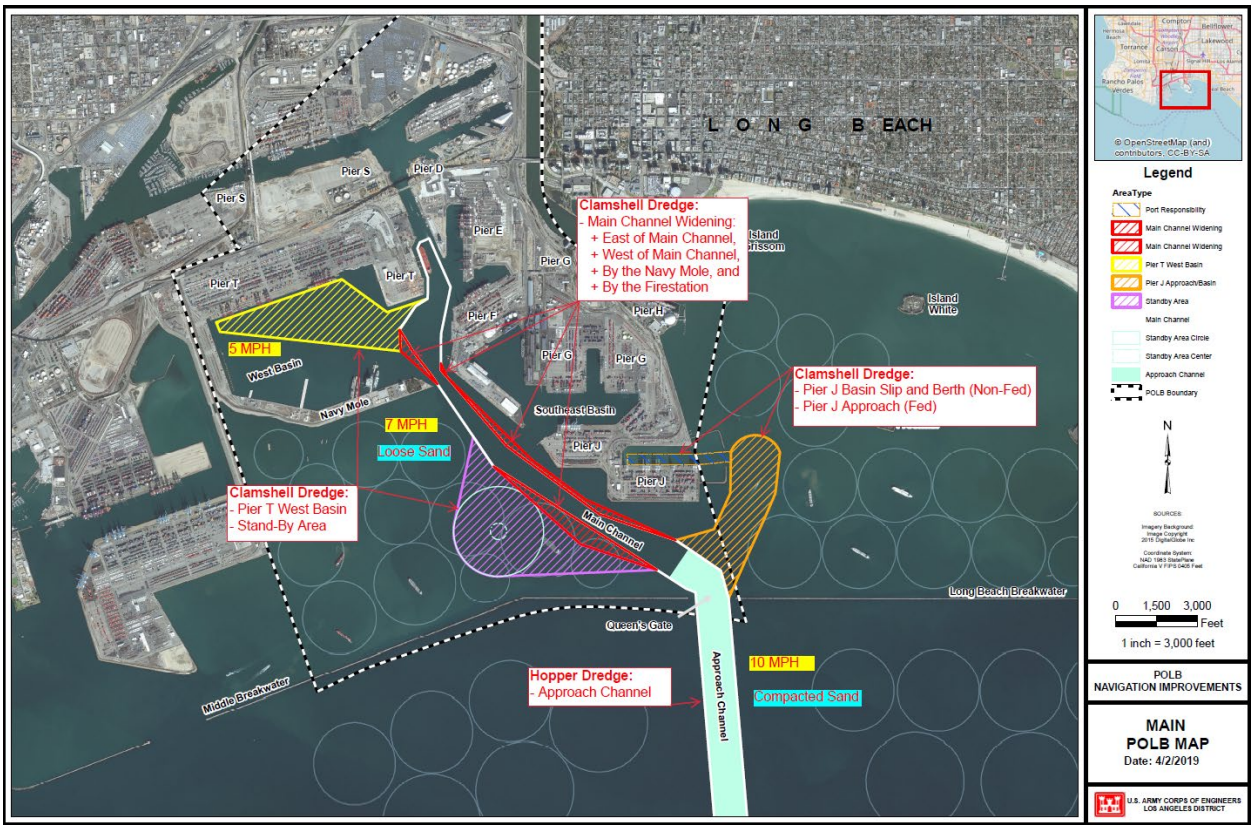
Shipping Rates	
Over 0 CWT	34.16
Over 240 CWT	26.48
Over 300 CWT	22.46
Over 400 CWT	19.79
Over 500 CWT	25.46
Over 700 CWT	21.82
Over 800 CWT	12.23

Currency in US dollars

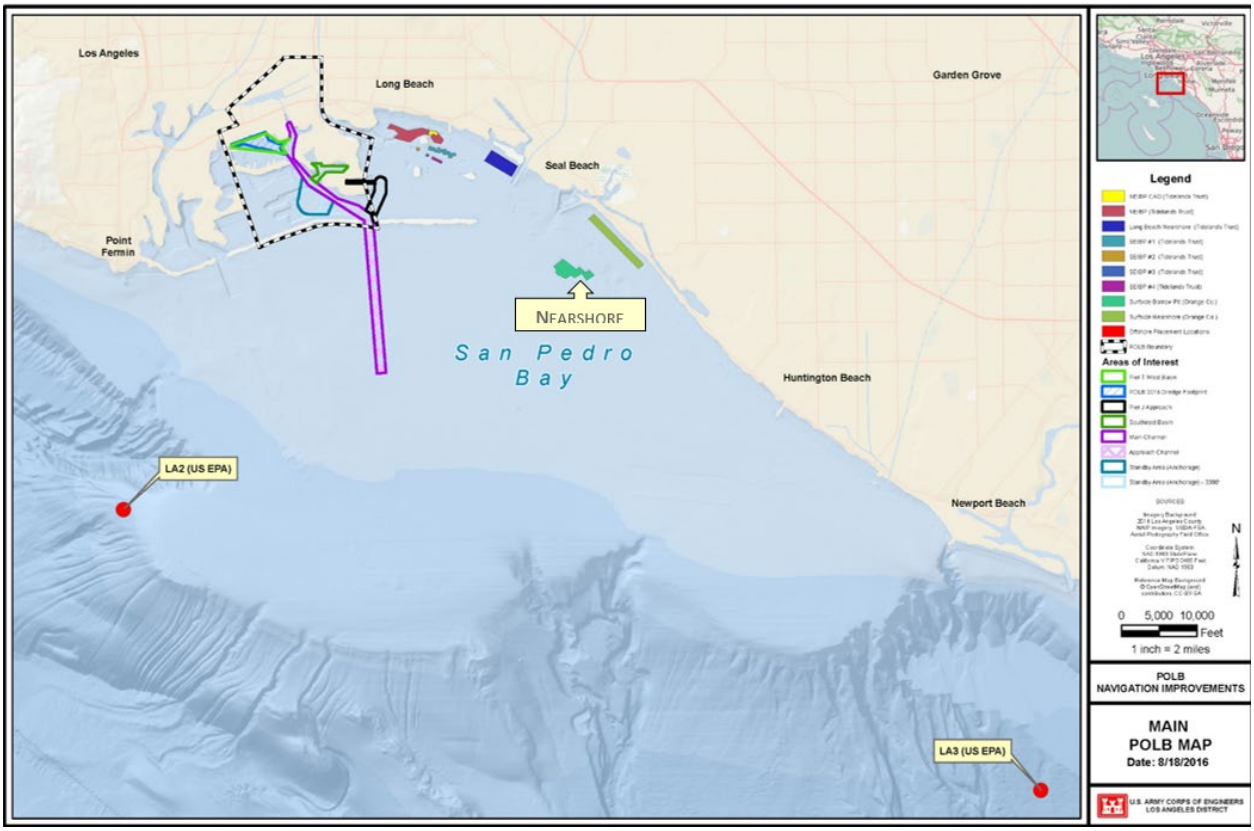
Description	Quantity	UOM	CostToPrime	PrimeCMU	ContractCost
Summary by Contract			**111,155,934.75**	**0.00**	**111,155,934.75**
TSP	**1.00**	**EA**	**111,155,934.75**	**0.00**	**111,155,934.75**
Contract 1 - Corps	**1.00**	**LS**	**85,167,801.00**	**0.00**	**85,167,801.00**
01 Land & Damages	**1.00**	**LS**	**0.00**	**0.00**	**0.00**
12 Navigation Ports & Harbors	**1.00**	**LS**	**69,981,601.00**	**0.00**	**69,981,601.00**
0001 Mobilization and Demobilization	**1.00**	**LS**	**8,693,901.00**	**0.00**	**8,693,901.00**
0002 Approach Channel Dredging to - 80 ft Placement at Surfside Borrow site	**2,600,000.00**	**CY**	**16,420,000.00**	**0.00**	**16,420,000.00**
0003 Main Channel Widening to - 76 ft Placement at LA-2 or LA-3	**1,065,000.00**	**CY**	**10,405,500.00**	**0.00**	**10,405,500.00**
0004 West Basin Dredging to - 55 ft Placement at LA-2 or LA-3	**717,000.00**	**CY**	**8,066,250.00**	**0.00**	**8,066,250.00**
0005 Pier J Approach Dredging to -55 ft (Transition from -80 ft to -55 ft) Placement at LA-2 or LA-3	**2,673,000.00**	**CY**	**26,395,950.00**	**0.00**	**26,395,950.00**
30 Planning, Engineering & Design	**1.00**	**LS**	**10,497,200.00**	**0.00**	**10,497,200.00**
31 Construction Management	**1.00**	**LS**	**4,689,000.00**	**0.00**	**4,689,000.00**
Contract 2 - POLB	**1.00**	**LS**	**25,988,133.75**	**0.00**	**25,988,133.75**
01 Land & Damages	**1.00**	**LS**	**0.00**	**0.00**	**0.00**
12 Navigation Ports & Harbors	**1.00**	**LS**	**19,838,133.75**	**0.00**	**19,838,133.75**
0001 Mobilization and Demobilization	**1.00**	**LS**	**1,801,391.00**	**0.00**	**1,801,391.00**
0002 Electric Substation Near Berth J	**1.00**	**JOB**	**9,681,900.00**	**0.00**	**9,681,900.00**
0003 Pier J Breakwater Stabilization	**1.00**	**JOB**	**4,713,305.95**	**0.00**	**4,713,305.95**
0004 Pier J Slip Dredging to - 55 ft Placement at LA-2 or LA-3	**337,000.00**	**CY**	**3,641,536.80**	**0.00**	**3,641,536.80**
30 Planning, Engineering & Design	**1.00**	**LS**	**3,174,000.00**	**0.00**	**3,174,000.00**
31 Construction Management	**1.00**	**LS**	**2,976,000.00**	**0.00**	**2,976,000.00**

Currency in US dollars

5.4 Port of Long Beach Study Map

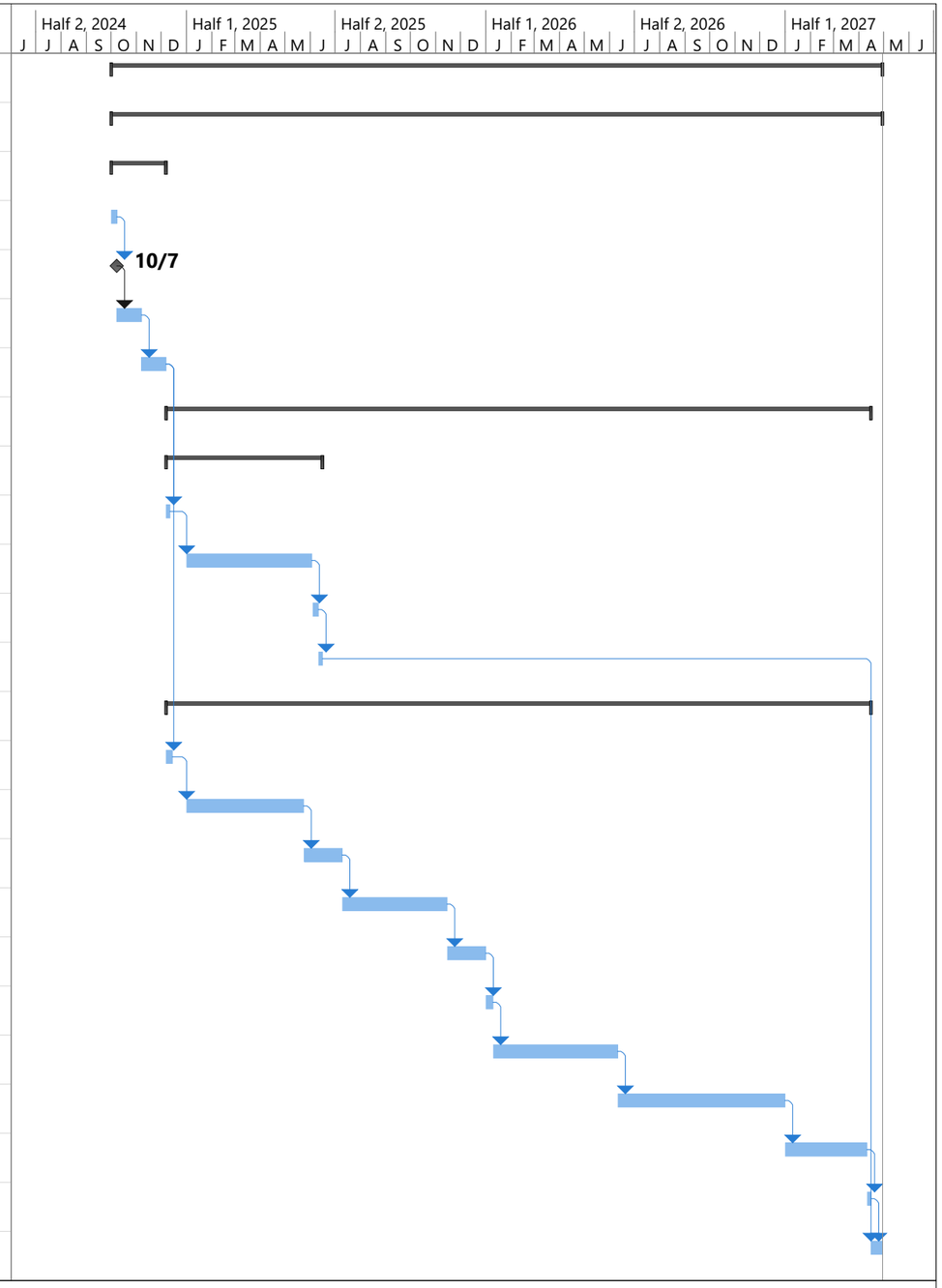


5.5 Potential Material Placement Sites



5.6 Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Construction Schedule**	**941 days**	**Tue 10/1/24**	**Thu 4/29/27**	
2		Alternative 3	941 days	Tue 10/1/24	Thu 4/29/27	
3		**Preconstruction Phase**	**67 days**	**Tue 10/1/24**	**Fri 12/6/24**	
4		Construction Contract Award	5 days	Tue 10/1/24	Mon 10/7/24	
5		Notice to Proceed	0 days	Mon 10/7/24	Mon 10/7/24	4
6		Generate Contractor Submittals	30 edays	Mon 10/7/24	Wed 11/6/24	5
7		Review/Approve Submittals	30 edays	Wed 11/6/24	Fri 12/6/24	6
8		**Construction Phase**	**860 days**	**Sat 12/7/24**	**Thu 4/15/27**	
9		**Hopper Dredging**	**191 days**	**Sat 12/7/24**	**Sun 6/15/25**	
10		Mobilization	5 days	Sat 12/7/24	Wed 12/11/24	7
11		Approach Channel Dredging - Nearshore Disposal	143 days	Wed 1/1/25	Mon 6/2/25	10
12		Approach Channel Dredging - LA2 Disposal	7 days	Wed 6/4/25	Tue 6/10/25	11
13		Demobilization	5 days	Wed 6/11/25	Sun 6/15/25	12
14		**Clamshell Dredging**	**860 days**	**Sat 12/7/24**	**Thu 4/15/27**	
15		Mobilization	8 days	Sat 12/7/24	Sat 12/14/24	7
16		Main Channel Widening - LA2 Disposal	133 days	Wed 1/1/25	Fri 5/23/25	15
17		Main Channel Widening - LA3 Disposal	44 days	Sat 5/24/25	Wed 7/9/25	16
18		West Basin - LA3 Disposal	120 days	Thu 7/10/25	Fri 11/14/25	17
19		Pier J Basin - LA3 Disposal	43 days	Sat 11/15/25	Wed 12/31/25	18
20		Pier J Basin 2nd Year - LA2 Disposal	8 days	Thu 1/1/26	Fri 1/9/26	19
21		Pier J Approach 2nd Year - LA2 Disposal	142 days	Sat 1/10/26	Wed 6/10/26	20
22		Pier J Approach 2nd Year - LA3 Disposal	190 days	Thu 6/11/26	Thu 12/31/26	21
23		Pier J Approach 3rd Year - LA2 Disposal	93 days	Fri 1/1/27	Sat 4/10/27	22
24		Demobilization	5 days	Sun 4/11/27	Thu 4/15/27	23
25		Contract Closeout	14 edays	Thu 4/15/27	Thu 4/29/27	13,24



Project: POLB Deepening_Alt 3-
Date: Thu 7/18/19

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

5.7 Cost Certification

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 403268

SPL – Port of Long Beach Deepening
Navigation Channel Improvements
Feasibility Study

The Port of Long Beach Feasibility Study, as presented by Los Angeles District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of April 16, 2021, the Cost MCX certifies the estimated total project cost:

FY21 Project First Cost: $136,780,000
Fully Funded Amount: $154,089,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through the period of Federal Participation.

JACOBS.MICHAEL.P[redacted]
IERRE.[redacted]
[redacted]ally signed by
[redacted]BS.MICHAEL.PIERRE.[redacted]
Date: 2021.04.19 14:54:17 -07'00'

Michael P. Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: **Port of Long Beach**
PROJECT NO: **403268**

DISTRICT: **Los Angeles District**
PREPARED: **4/15/2021**

LOCATION: **Long Beach, CA**

CHIEF, AE MANAGEMENT, COST AND VALUE
POC: **ENGINEERING, Mark Cooke, P.E.**

This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC):				2021					
						Effective Price Level Date:				1-Oct- 20					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Oct-20 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
12	NAVIGATION PORTS & HARBORS	$81,758	$29,433	36%	$111,190		$81,758	$29,433	$111,190		$111,190	13.1%	$92,492	$33,297	$125,790
12	LOCAL SERVICE FACILITIES	$13,468	$4,848	36%	$18,316		$13,468	$4,848	$18,316				excluded from Fully Funded Costs		
12	ASSOCIATED COSTS (ATON)	$480	$173	36%	$653		$480	$173	$653				excluded from Fully Funded Costs		
	CONSTRUCTION ESTIMATE TOTALS:	$95,705	$34,454		$130,159		$95,705	$34,454	$130,159		$111,190	13.1%	$92,492	$33,297	$125,790
01	LANDS AND DAMAGES	$1,169	$292	25%	$1,462		$1,169	$292	$1,462		$1,462	7.4%	$1,256	$314	$1,570
30	PLANNING, ENGINEERING & DESIGN	$12,264	$4,415	36%	$16,679		$12,264	$4,415	$16,679		$16,679	9.2%	$13,387	$4,819	$18,206
31	CONSTRUCTION MANAGEMENT	$5,478	$1,972	36%	$7,450		$5,478	$1,972	$7,450		$7,450	14.4%	$6,267	$2,256	$8,523
	PROJECT COST TOTALS:	$114,616	$41,133	36%	$155,749		$114,616	$41,133	$155,749		**$136,780**	12.7%	$113,403	$40,687	$154,089

_____ CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

_____ PROJECT MANAGER, Susan M. Ming, P.E.

_____ CHIEF, REAL ESTATE, Cheryl Connett

_____ CHIEF, ENGINEERING, Eric Stevens, P.E.

ESTIMATED FULLY FUNDED TOTAL PROJECT COST: **$154,089**
GENERAL NAVIGATION FEATURES: **$125,790**

PROJECT FIRST COST: **$136,780**
LOCAL SERVICE FACILITIES COST[1]: *$18,316*
ASSOCIATED COSTS[2]: *$653*
LERR: *$1,462*
INCREMENTAL AVERAGE ANNUAL O&M[3]: *$101*

[1]**LOCAL SERVICE FACILITIES ARE 100% NON-FEDERAL COSTS**
[2]**ASSOCIATED COSTS ARE 100% FEDERAL (USCG) COST**
[3]**O&M IS BASED ON 50 YEAR ANALYSIS, COST IS NOT INCLUDED IN Project First Cost or Fully-Funded Cost**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Port of Long Beach
LOCATION: Long Beach, CA
This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

DISTRICT: Los Angeles District
POC: CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

PREPARED: 4/15/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Apr-21 Estimate Price Level: 1-Oct-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1 -Oct-20								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	CONTRACT 1													
12	NAVIGATION PORTS & HARBORS - Year 1	$42,077	$15,148	36.0%	$57,225		$42,077	$15,148	$57,225	2025Q3	11.5%	$46,921	$16,891	$63,812
12	NAVIGATION PORTS & HARBORS - Year 2	$22,405	$8,066	36.0%	$30,471		$22,405	$8,066	$30,471	2026Q3	14.3%	$25,609	$9,219	$34,829
12	NAVIGATION PORTS & HARBORS - Year 3	$7,593	$2,734	36.0%	$10,327		$7,593	$2,734	$10,327	2027Q3	17.2%	$8,896	$3,203	$12,099
12	NAVIGATION PORTS & HARBORS - Electric Substation	$9,682	$3,485	36.0%	$13,167		$9,682	$3,485	$13,167	2026Q3	14.3%	$11,066	$3,984	$15,050
	CONSTRUCTION ESTIMATE TOTALS:	$81,758	$29,433	36.0%	$111,190		$81,758	$29,433	$111,190			$92,492	$33,297	$125,790
01	LANDS AND DAMAGES	$1,169	$292	25.0%	$1,462		$1,169	$292	$1,462	2024Q1	7.4%	$1,256	$314	$1,570
30	PLANNING, ENGINEERING & DESIGN													
1.5%	Project Management	$1,226	$442	36.0%	$1,668		$1,226	$442	$1,668	2024Q1	7.6%	$1,319	$475	$1,794
0.5%	Planning & Environmental Compliance	$409	$147	36.0%	$556		$409	$147	$556	2024Q1	7.6%	$440	$158	$598
8.0%	Engineering & Design	$6,541	$2,355	36.0%	$8,895		$6,541	$2,355	$8,895	2024Q1	7.6%	$7,035	$2,533	$9,568
0.5%	Reviews, ATRs, IEPRs, VE	$409	$147	36.0%	$556		$409	$147	$556	2024Q1	7.6%	$440	$158	$598
1.0%	Life Cycle Updates (cost, schedule, risks)	$818	$294	36.0%	$1,112		$818	$294	$1,112	2024Q1	7.6%	$879	$317	$1,196
0.5%	Contracting & Reprographics	$409	$147	36.0%	$556		$409	$147	$556	2026Q3	14.4%	$468	$168	$636
1.5%	Engineering During Construction	$1,226	$442	36.0%	$1,668		$1,226	$442	$1,668	2026Q3	14.4%	$1,403	$505	$1,908
1.0%	Planning During Construction	$818	$294	36.0%	$1,112		$818	$294	$1,112	2026Q3	14.4%	$935	$337	$1,272
0.5%	Adaptive Management & Monitoring	$409	$147	36.0%	$556		$409	$147	$556	2026Q3	14.4%	$468	$168	$636
31	CONSTRUCTION MANAGEMENT													
6.7%	Construction Management	$5,478	$1,972	36.0%	$7,450		$5,478	$1,972	$7,450	2026Q3	14.4%	$6,267	$2,256	$8,523
	CONTRACT COST TOTALS:	$100,668	$36,112		$136,780		$100,668	$36,112	**$136,780**			$113,403	$40,687	**$154,089**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Port of Long Beach
LOCATION: Long Beach, CA
This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

DISTRICT: Los Angeles District
POC: CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

PREPARED: 4/15/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Apr-21				Program Year (Budget EC): 2021								
		Estimate Price Level: 1-Oct-20				Effective Price Level Date: 1 -Oct-20								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	CONTRACT 2													
12	NAVIGATION PORTS & HARBORS - Mob/Dredging	$5,567	$2,004	36.0%	$7,572		$5,567	$2,004	$7,572	2026Q3	14.3%	$6,364	$2,291	$8,654
12	NAVIGATION PORTS & HARBORS - Pier J Improvements	$4,713	$1,697	36.0%	$6,410		$4,713	$1,697	$6,410	2026Q3	14.3%	$5,387	$1,939	$7,327
	CONSTRUCTION ESTIMATE TOTALS:	$10,281	$3,701	36.0%	$13,982		$10,281	$3,701	$13,982			$11,751	$4,230	$15,981
01	LANDS AND DAMAGES			25.0%										
30	PLANNING, ENGINEERING & DESIGN													
6.0%	POLB Administration Costs	$617	$222	36.0%	$839		$617	$222	$839	2024Q1	7.6%	$664	$239	$903
10.0%	POLB Engineering & Design Costs	$1,028	$370	36.0%	$1,398		$1,028	$370	$1,398	2024Q1	7.6%	$1,106	$398	$1,504
31	CONSTRUCTION MANAGEMENT													
15.0%	POLB Construction Management Costs	$1,542	$555	36.0%	$2,097		$1,542	$555	$2,097	2026Q3	14.4%	$1,764	$635	$2,399
	CONTRACT COST TOTALS:	$13,468	$4,848		$18,316		$13,468	$4,848	**$18,316**			$15,284	$5,502	**$20,787**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Port of Long Beach
LOCATION: Long Beach, CA
This Estimate reflects the scope and schedule in report; POLB Navigation Improvements

DISTRICT: Los Angeles District
POC: CHIEF, AE MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

PREPARED: 4/15/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Apr-21 Estimate Price Level: 1-Oct-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1 -Oct-20								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Associated Costs													
12	Aids to Navigtion (ATON)	$480	$173	36.0%	$653		$480	$173	$653	2026Q3	14.3%	$549	$198	$746
	CONSTRUCTION ESTIMATE TOTALS:	$480	$173	36.0%	$653		$480	$173	$653			$549	$198	$746
01	LANDS AND DAMAGES													
30	PLANNING, ENGINEERING & DESIGN													
31	CONSTRUCTION MANAGEMENT													
	CONTRACT COST TOTALS:	$480	$173		$653		$480	$173	**$653**			$549	$198	**$746**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

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WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	O&M Dredging													
12	O&M Dredging - Cycle 1 (Year 25)	$2,075	$747	36.0%	$2,822		$2,075	$747	$2,822	2053Q1	136.6%	$4,910	$1,768	$6,677
12	O&M Dredging - Cycle 2 (Year 50)	$2,075	$747	36.0%	$2,822		$2,075	$747	$2,822	2078Q1	383.5%	$10,034	$3,612	$13,646
	CONSTRUCTION ESTIMATE TOTALS:	$4,150	$1,494	36.0%	$5,644		$4,150	$1,494	$5,644			$14,944	$5,380	$20,323
01	LANDS AND DAMAGES			25.0%										
30	PLANNING, ENGINEERING & DESIGN													
15.0%	PED - Cycle 1	$311	$112	36.0%	$423		$311	$112	$423	2052Q3	133.7%	$727	$262	$989
15.0%	PED - Cycle 2	$311	$112	36.0%	$423		$311	$112	$423	2077Q3	377.5%	$1,486	$535	$2,021
31	CONSTRUCTION MANAGEMENT													
6.7%	Construction Management - Cycle 1	$139	$50	36.0%	$189		$139	$50	$189	2053Q1	137.0%	$330	$119	$448
6.7%	Construction Management - Cycle 2	$139	$50	36.0%	$189		$139	$50	$189	2078Q1	384.4%	$673	$242	$916
	CONTRACT COST TOTALS:	$5,051	$1,818		$6,869		$5,051	$1,818	**$6,869**			$18,160	$6,538	**$24,698**
													Annualized Cost (over 50 years):	**$101**