LONG-TERM MANAGEMENT STRATEGY FOR THE PLACEMENT OF DREDGED MATERIAL IN THE SAN FRANCISCO BAY REGION

12-YEAR REVIEW PROCESS

BACKGROUND INFORMATION FOR SEPTEMBER 11, 2012, MEETING

FOCUS: COSTS AND CONTRACTING

Prepared by

San Francisco Bay Conservation and Development Commission

San Francisco Bay Regional Water Quality Control Board

U.S. Army Corps of Engineers

U.S. Environmental Protection Agency

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1 INTRODUCTION

The Management Plan for the Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) program called for periodic review and/or modification to ensure that the program remains achievable and current in light of changing conditions over time (USACE et al. 2001). Specifically, the LTMS agencies were directed to complete basic reviews of the program every 3 years with input from interested parties. More comprehensive reviews occur every 6 years. A Six Year Review Report was issued in May 2006.

Because the beginning of 2013 will mark the end of the twelfth year and the end of the LTMS transition period, the LTMS agencies began the review process by initially reviewing existing data, developing the first background report, and organizing discussions held at a meeting on March 29, 2012. The process involves the LTMS agencies collecting, analyzing, and disseminating data about the program's performance to date and holding a series of meetings with stakeholders (each meeting focused on a different key topic suggested by stakeholders) culminating with a summary report. This process, the summary report, analysis, and recommendations will form a basis for discussing potential changes to program implementation.

During the March 29th meeting, the LTMS agencies and interested parties reviewed the policies and implementation of the LTMS program throughout the past 12 years. The program was reviewed in relation to evaluation criteria established in Chapter 8 of the Management Plan as well as in relation to the LTMS goals, which include:

- Maintain, in an economically and environmentally sound manner, those channels necessary for navigation in San Francisco Bay and Estuary and eliminate unnecessary dredging activities in the Bay and Estuary
- Conduct dredged material disposal in the most environmentally sound manner
- Maximize the use of dredged material as a resource
- Establish a cooperative permitting framework for dredging and dredged material disposal applications

At the March 29th meeting, stakeholders identified the following three topics for future meetings:

1. Beneficial reuse (meeting held on June 19, 2012)
2. Costs and contracting (September 11, 2012)
3. Policy and strategy development (date is to be determined)

This document presents information specific to the third LTMS stakeholder meeting and focuses on costs and contracting of dredging projects. Additional information requests from the March 29th meeting will be forthcoming in either topic-related, pre-meeting background documents; as presentation material; or as part of the summary report. The information provided herein is intended to address specific questions on cost and contracting, provide background information for the upcoming meeting, and stimulate thoughtful and productive discussions.

2 CONTRACTING ISSUES

At the March 29th meeting, LTMS stakeholders provided input on potential alternative contracting concepts, including:

- Consider contract acquisition strategies recommended in the U.S. Army Corps of Engineers' (USACE's) Value Engineering (VE) study (2011)
- Make better use of the dredging contracting community (e.g., Dredging Contractors of America and American Association of Port Authorities) to improve understanding of contracting techniques
- Foster coordination among groups of dredgers or dredging proponents regarding equipment and contracting
- Optimize federal funds across the year, not just by projects
- Strive to improve timing certainties; uncertainty leads to higher bids
- Reenergize the Confounding Factors Work Group

Contracting and costs associated with dredging and dredged material placement options have often been a topic of discussion at LTMS meetings. The LTMS agencies recognize that contracting dredging projects is a complicated process and dredging and dredged material placement is an expensive endeavor. The LTMS agencies also recognize that out-of-Bay disposal at either the San Francisco Deep Ocean Disposal Site (SF-DODS) or at beneficial reuse sites, including wetland and beach habitat restoration projects, construction sites, and levees, is more expensive than in-Bay disposal. In fact, the transition period was designed and included in the LTMS program to allow the community to plan and make appropriate budgetary decisions for voluntary compliance with the program.

The LTMS agencies do not have the ability to directly influence contracting practices or dredging costs for permittees; however, through discussions with the dredging and stakeholder community, the LTMS agencies have become aware of potential contracting efficiencies that may be broadly applicable. In 2011, the USACE held a VE study to examine opportunities for improving contracting efficiencies within its program. The executive summary of the VE Study is included as Appendix A to this document.

While the study was specifically conducted on the USACE San Francisco District's Navigation Program, the LTMS agencies found that many of the issues identified by the VE study reflected common issues faced by both public and private dredging proponents. Accordingly, these recommendations could be applied to any dredging project in San Francisco Bay to improve its efficiency and cost-effectiveness. The LTMS agencies encourage dredging proponents to review the VE study for ideas that may be appropriate to their project(s). Measures that may benefit the larger dredging community from the contracting perspective include:

- Use an array of disposal sites in contracts rather than a single-source disposal site (IC-4)
- Dredge more volume, less frequently (EE-1; i.e., dredge the whole project in one episode versus multiple small episodes)
- Develop multi-year contracts (ICP-14)
- Consolidate projects into one large contract (IC-13)
- Use a separate beneficial reuse contract (IC-12)
- Have permits in hand prior to contracting and include them in the solicitation package
- Begin dredging as soon as the environmental work window opens
- Use knockdowns or advanced maintenance dredging where appropriate

While some of these concepts may require modification to be applied to non-USACE dredging projects, the spirit of the VE study recommendations can still be useful. Proponents wishing to apply these recommendations should review their permits and dredging contracts, and direct any questions related to proposed changes in operations or implementation to the relevant permitting agencies.

3 COST ISSUES

This section presents additional dredging and beneficial reuse project cost information, much of which was requested at the March 29th meeting. Information provided includes dredging costs in the San Francisco Bay compared to other regions of the country, additional San Francisco Bay operations and maintenance (O&M) dredging cost information, and case studies for the Hamilton Wetland Restoration Project (HWRP), Middle Harbor Enhancement Area (MHEA), and several non-USACE dredging projects in the San Francisco Bay Area.

3.1 Variability in Regional USACE Dredging Project Costs

Regional dredging cost data were obtained from the USACE Dredging Information System (DIS) located on its Navigation Data Center website (http://www.ndc.iwr.usace.army.mil).

The website is accessible to the public; however, USACE staff have special permissions to run additional data queries enabling it to obtain more specific information.

Figure 1 provides a comparison of the overall annual cost of USACE-contracted dredging projects by region and fiscal year (all projects combined for each region, each year, independent of type of equipment used). Data for San Francisco Bay are for O&M dredging projects only; however, because of how data are presented in the DIS, new work and maintenance dredging data reported by other regions are indistinguishable. While this comparison shows overall San Francisco Bay Area costs per cubic yard (cy) as generally higher than other regions, a number of important variables may influence these costs differently from region to region, including:

- The relative proportion of mechanical versus hydraulic dredging projects conducted
- The relative proportion of dredged material suitable for aquatic disposal versus needing special handling
- The kind of placement or reuse sites used
- The distance to placement or reuse sites used
- The contracting environment (in terms of competition and equipment availability)

Figure 2 provides a similar annual cost comparison for government hopper dredges only. Again, data for the San Francisco Bay Area are for O&M dredging only, while data presented from the rest of the nation are presumed to include all types of dredging work. Nevertheless, costs for government hopper dredging in the San Francisco Bay Area seem to be well within the range for other regions of the country.

3.2 Additional San Francisco Bay Operations and Maintenance Dredging Cost Information

Figures 3 and 4 provide information on San Francisco Bay USACE O&M dredging costs from 2000 to 2011, including and excluding mobilization and demobilization costs, respectively. It should be noted that mobilization and demobilization costs were not readily available for all projects in all years.

Figures 5 and 6 provide the costs for USACE O&M dredging projects to use San Francisco Bay dredged material placement sites from 2000 to 2011, including and excluding mobilization and demobilization costs, respectively.

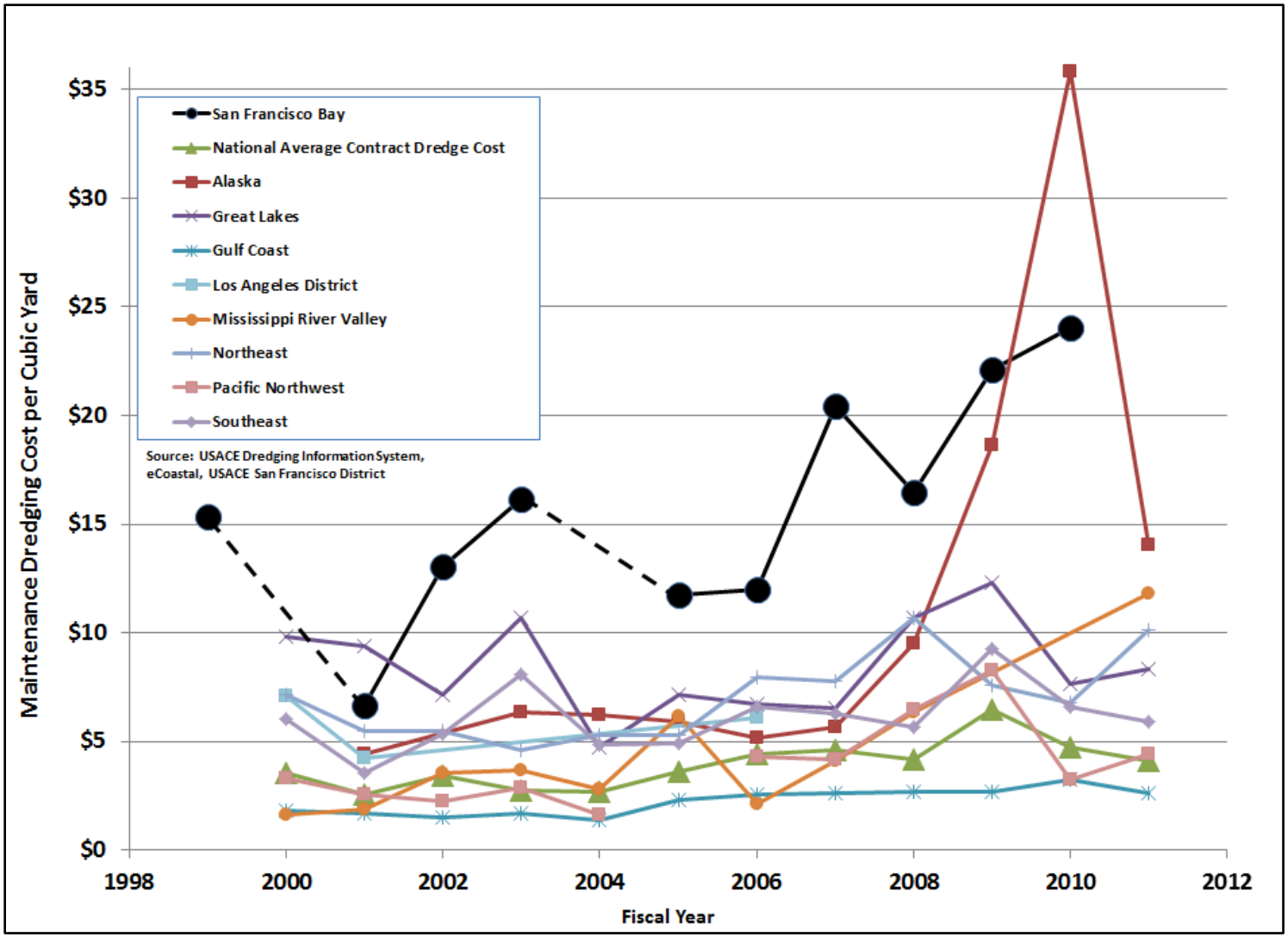

Figure 1. USACE-Contract Dredging Costs: San Francisco Bay* vs. Other Regions

* O&M dredging projects only.

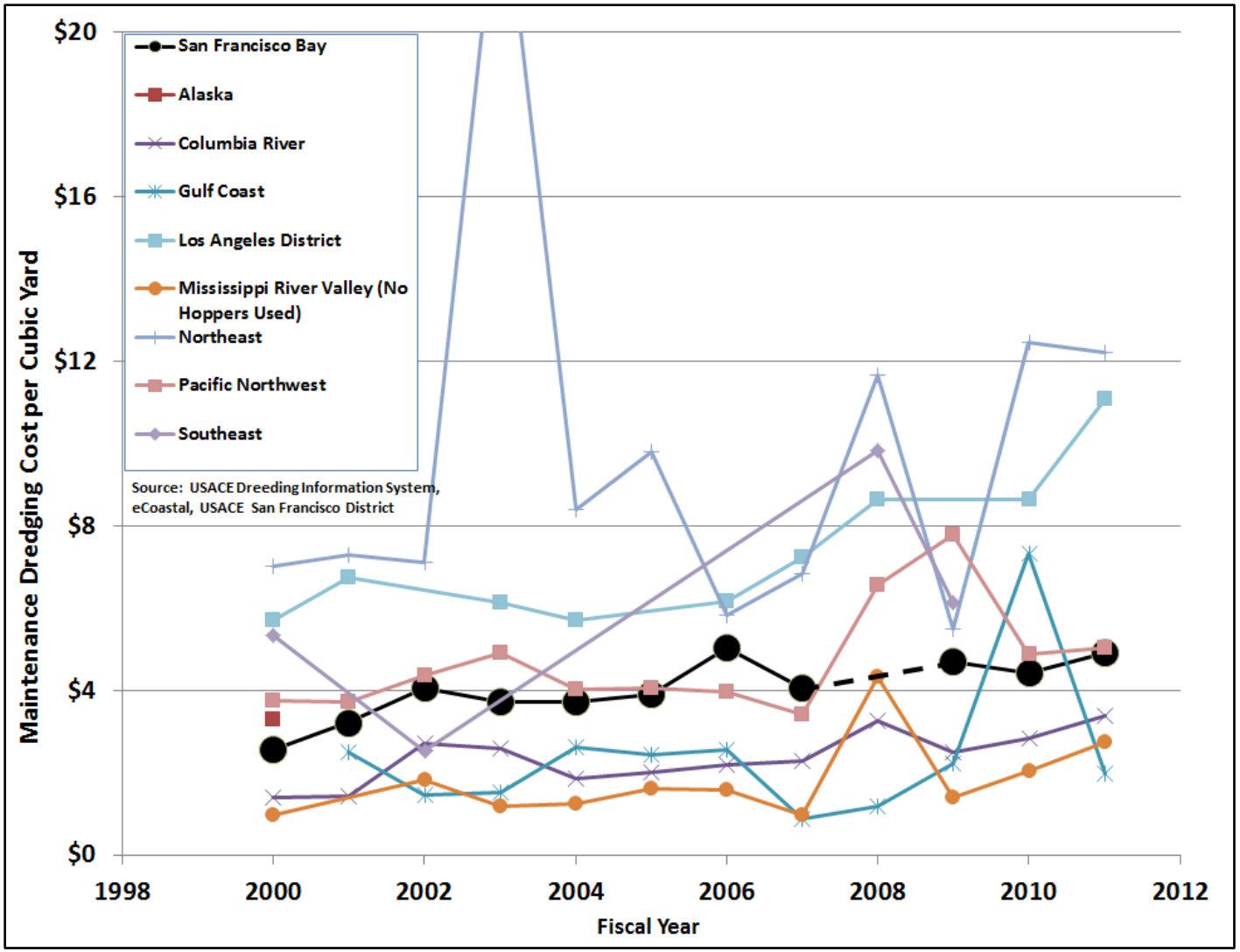

Figure 2. Government Hopper Dredging Costs: San Francisco Bay* vs. Other Regions

* O&M dredging projects only.

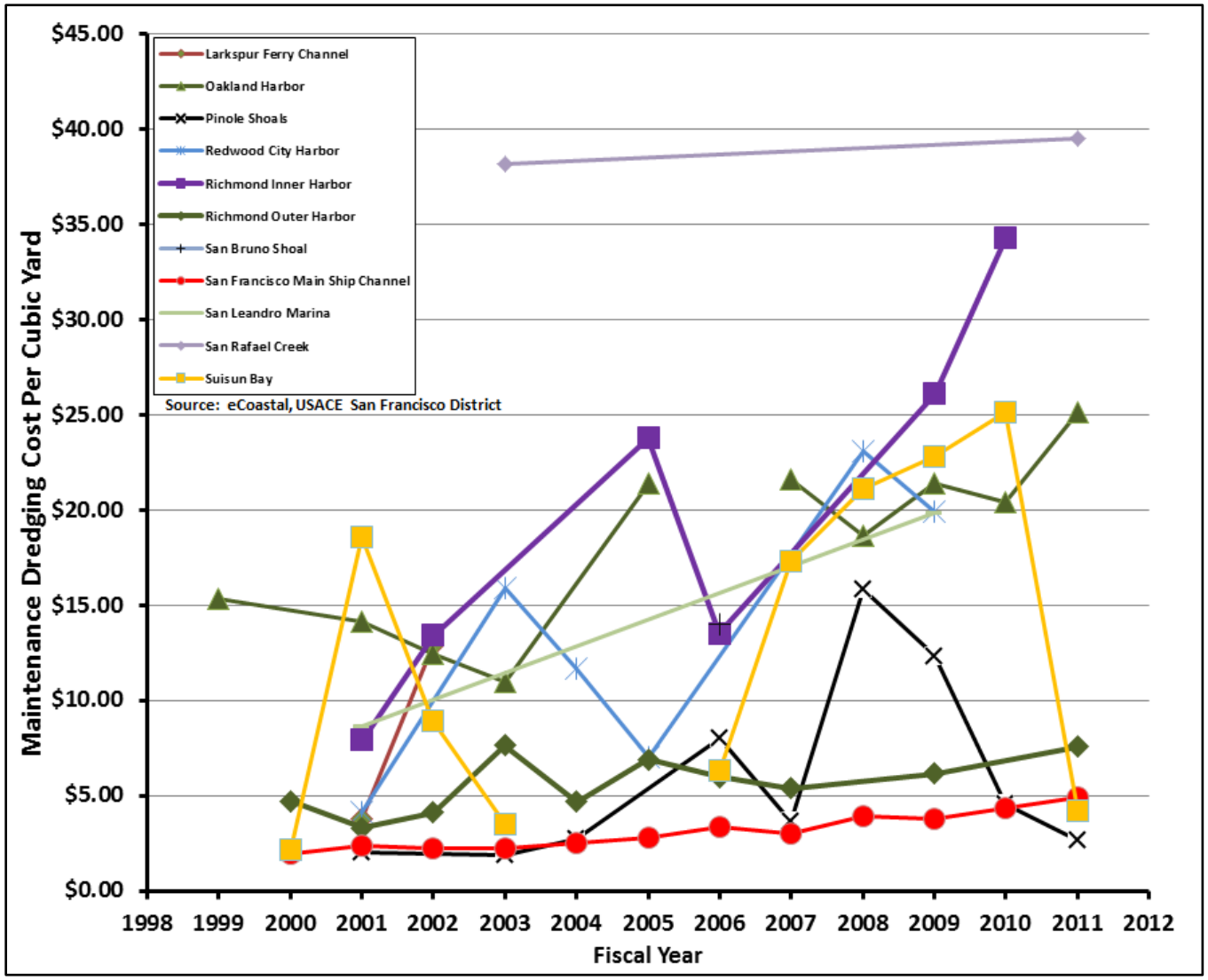

Figure 3. San Francisco Bay USACE Maintenance Dredging Costs from 2000 to 2011 (Including Mobilization and Demobilization)

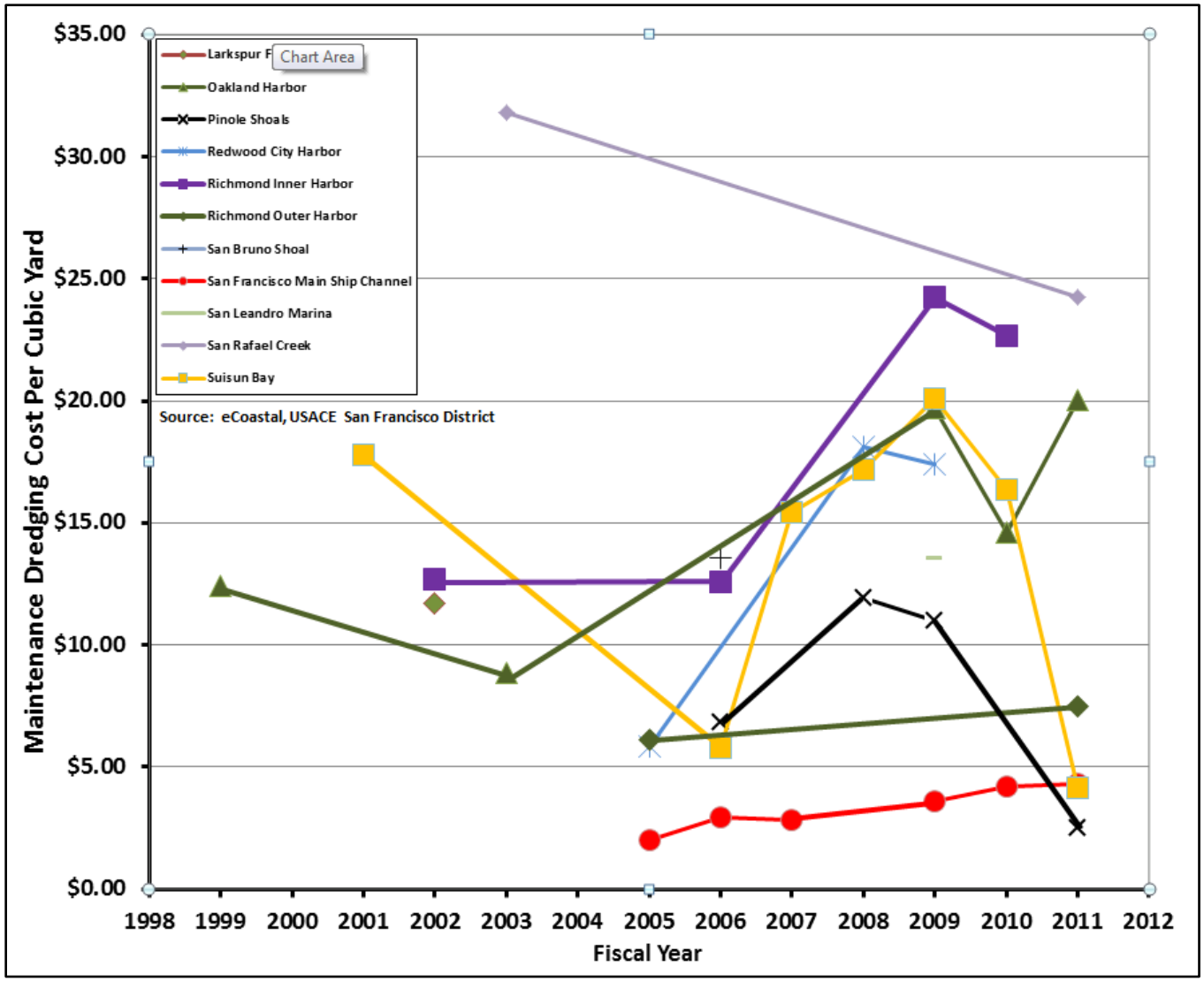

Figure 4. San Francisco Bay USACE Maintenance Dredging Costs from 2000 to 2011 (Excluding Mobilization and Demobilization)

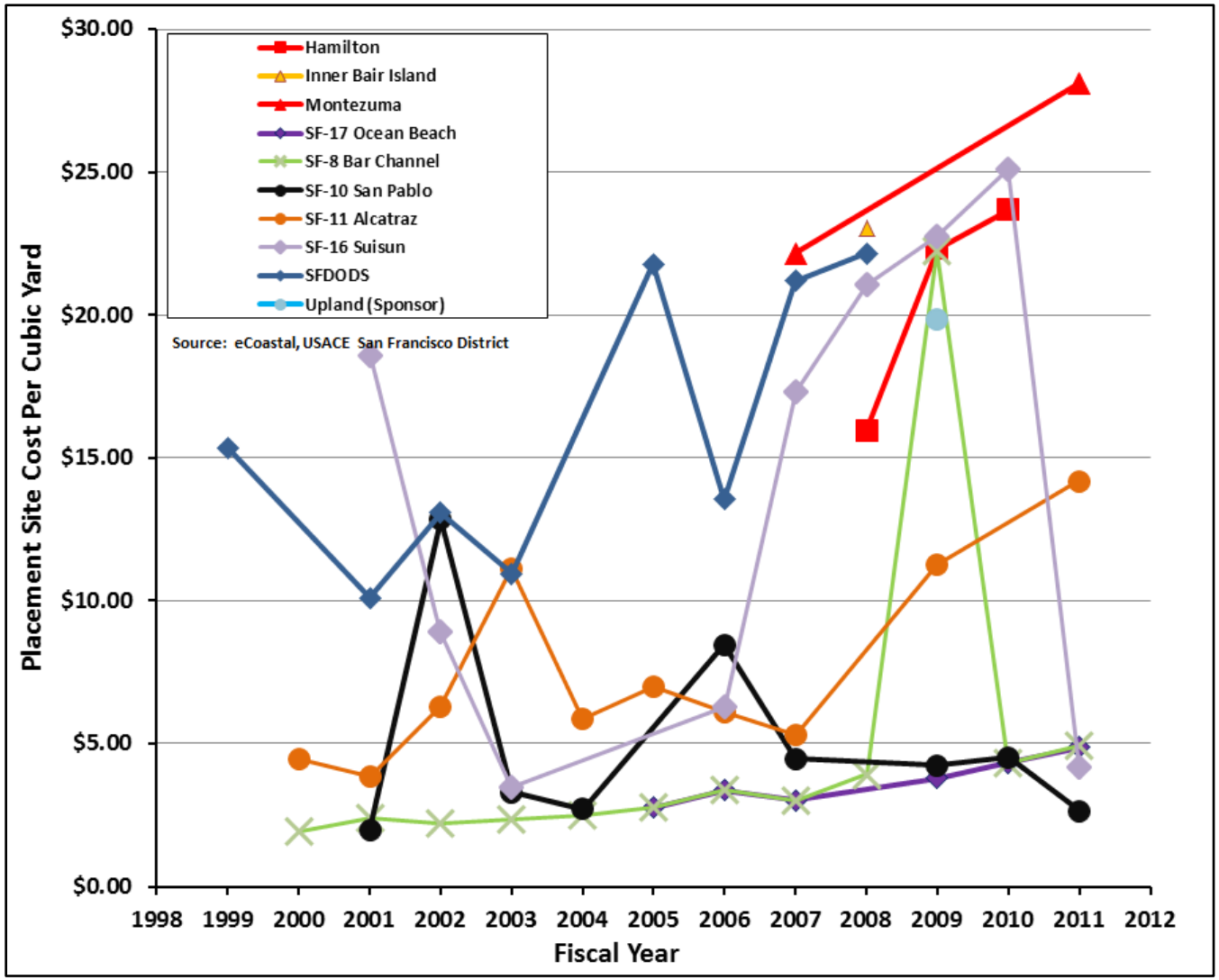

Figure 5. San Francisco Bay Dredged Material Placement Site Costs from 2000 to 2011 (Including Mobilization and Demobilization)

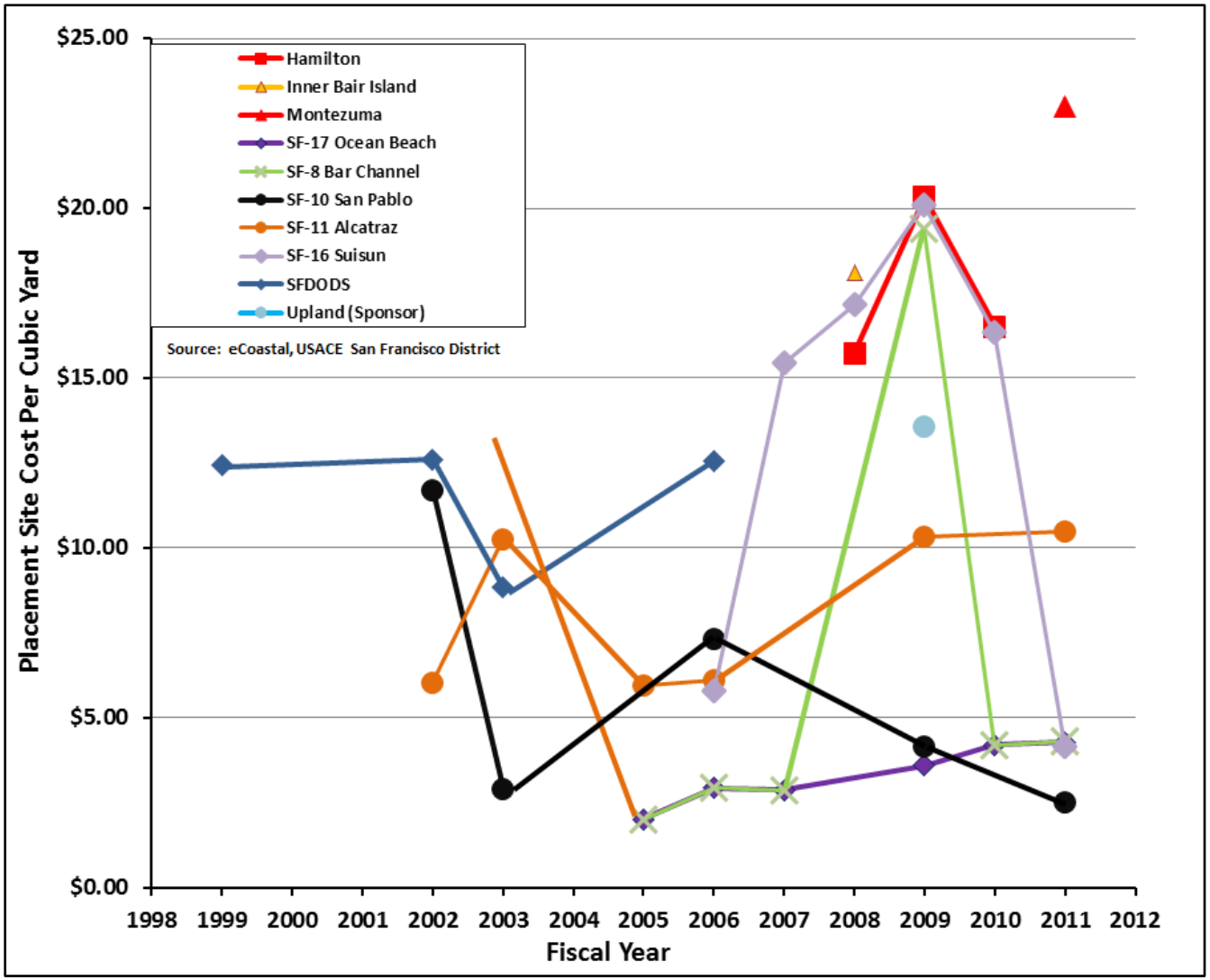

Figure 6. San Francisco Bay Dredged Material Placement Site Costs from 2000 to 2011 (Excluding Mobilization and Demobilization)

3.3 Case Studies

At the March 29th meeting, it was requested that an analysis be provided of the cost to construct the beneficial reuse sites used by the Oakland Harbor 50-Foot Deepening Project (50-Ft Project) for comparison purposes. The 50-Ft Project was authorized by Congress to dredge the Oakland Inner and Outer Harbors and the entrance channel to -50 feet mean lower low water (MLLW). The project delivered approximately 15.9 million cy of dredged material to the MHEA, Montezuma Wetlands Restoration Site (MWRP), and the HWRP to be beneficial reused. The MWRP received material that was both suitable for unconfined aquatic disposal (SUAD) and material that was not suitable for unconfined aquatic disposal (NUAD). Material was also disposed at SF-DODS and the Port of Oakland's Berth 10 (for landfill-bound NUAD material). The case studies provided herein focus mainly on the costs to construct the HWRP and MHEA. The full cost of constructing the MWRP site is not included in this analysis because it is not known to the LTMS agencies; however, the cost to dredge and place material from the 50-Ft Project at the MWRP is reported. Jim McGrath provided additional analysis on the placement of material from the 50-Ft Project, which is included as Appendix B to this document.

The current total project cost (TPC) estimate for the 50-Ft Project now stands at $413,758,000 (dredging and placement costs are $254.1 million; additional project costs are $159.7 million). The final cost of the project has yet to be determined because the MHEA has not been fully constructed.

Table 1 presents the costs of dredging and placement/disposal activities for the 50-Ft Project to date at the sites previously mentioned, as well as the costs of other items of work required in order to achieve a complete project, including Preliminary Engineering & Design (PED) costs; Engineering & Design (E&D); construction Supervision & Administration (S&A); demolition and construction work at the Inner Harbor Turning Basin; provision of electrical power for the dredge plants; port infrastructure improvements; and Lands, Easements, Rights of Way, Relocations (LERRs) costs.

Table 1

Total 50-Ft Project Costs

Site/Item	Cost
Dredging and Placement/Disposal Costs	
HWRP	$99.3 million
MHEA	$66.8 million
MWRP	$66.3 million
SF-DODS	$15.4 million

Site/Item	Cost
Berth 10	$6.3 million
Subtotal	*$254.1 million*
Additional Costs	
PED	$4.4 million
S&A and E&D	$27.5 million
Other Construction Costs	$41.5 million
Project Coordination Team	$6.3 million
Local Service Facilities	$53.9 million
Berth Facilities	$6.7 million
LERRs	$19.1 million
USCG Navigation Aids	$0.3 million
Subtotal	*$159.7 million*
Total 50-Ft Project Cost	**$413.8 million**

Note: The costs in Table 1 are only those paid by the 50-Ft Project to dredge and deliver material to the specified sites and do not include the cost to construct the placement/disposal sites with the exception of the MHEA. For this site, the figure represents the total cost for construction, because the 50-Ft Project was the sole source of the sediment placed at that site.

3.3.1 Hamilton Wetland Restoration Project

The HWRP, located in Novato, California, on San Pablo Bay, allows for the beneficial reuse of up to 24 million cy of dredged material, including 3.5 million cy from the 50-Ft Project. The 2,600 acre restoration project includes a 1,000-acre former military airfield and adjacent California State Lands Commission parcel, and the 1,600-acre Bel Marin Keys Unit V (BMKV) parcel. The HWRP will provide valuable habitat for various waterfowl, fish and other wetland dependent species of plants and animals, including the California clapper rail and the salt marsh harvest mouse.

To date, 5.8 million cy of dredged material have been placed primarily at the airfield portion of the HWRP from the 50-Ft Project, other USACE O&M dredging projects, and some non-USACE dredging projects around the Bay. Final seasonal wetland contouring and shaping, construction of a portion of the Bay Trail, and site preparation and outboard levee breach is expected to be completed in 2013.

The HWRP was initially authorized under the Water Resources Development Act (WRDA) 1999 for $55.2 million and was modified for increased costs and to add the BMKV parcel for $228.1 million under WRDA 2007. The estimated TPC for the original Hamilton Airfield section only, including adaptive management and monitoring, is approximately $117.2

million. A majority of the costs reflected below were funded by HWRP federal appropriations and non-federal sponsor (California State Coastal Conservancy [SCC]) funds. Dredging and transport costs were paid for by the 50-Ft Project and other O&M dredging projects—primarily Oakland Harbor and Richmond Harbor. The majority of sediment placed at the HWRP was from the 50-Ft Project. Once contracting mechanisms and cost sharing were established other O&M dredging projects and non-USACE dredging projects also placed material at the site. Total expenditures allocable to the HWRP project through July 2012 are shown in Table 2. Dividing the total cost to construct the airfield portion of the HWRP by the total volume of dredged material placed at the site to date reveals that the cost per cy was $39.76.

Table 2

Total HWRP Costs

Component	Cost
Site Construction	
Design and PED	$34.9 million
Construction Management	$3.3 million
LERRDs and Relocation	$2.6 million
Site Shaping, Culverts, and Nursery	$26.7 million
Planting, Surveys, and Monitoring	$2.0 million
Other	$1.3 million
Subtotal	*$70.8 million*
Offloading and Placement	
Offloading and Placement	$24.9 million
Subtotal	*$24.9 million*
Dredging/Offloading (Paid by 50-Ft Project and O&M Projects)	
50-Ft Project	$99.3 million
Oakland Harbor O&M	$23.2 million
Richmond Harbor O&M	$12.4 million
Subtotal	*$134.9 million*
Total Cost to Construct HWRP	**$230.6 million**

3.3.2 Middle Harbor Enhancement Area

The MHEA is an integral part of the 50-Ft Project and was designed to provide a combination of habitats including deep-water channels, shallow-water channels and flats, covered water (e.g., pile-supported structures), eelgrass beds (42 acres), hard substrate, sandy

beach, salt marsh, high tide island refugia for birds, non-beach shoreline, and piles. The total MHEA habitat enhancement is approximately 181 acres.

Between 2002 and 2007, approximately 5.8 million cy of deepening material was placed in the MHEA from the 50-Ft Project. Since 2007, sediment has been consolidating, which is required to provide a stable substrate for restoration activities. In March 2011, the USACE completed a geotechnical report that concluded approximately 600,000 cy of sediment should be relocated to provide proper substrate for the targeted planting of eelgrass beds. The USACE contracted with a dredging company to relocate dredged material in appropriate locations and elevations as part of the initial shaping of the site. It is anticipated that over the next 6 years, with appropriate funding from Congress, final shaping, habitat construction, and planting of eelgrass will provide the habitat benefits described in the project authorization.

Cost data presented in this section are based on consultant and construction contracts that were specifically awarded for the MHEA. Planning costs, also known as feasibility phase costs, are not included in this analysis. Because the MHEA was designed and is being constructed as part of the 50-Ft Project, certain costs (i.e., USACE S&A and E&D costs specific to the MHEA) cannot be easily separated from other deepening activities. These costs are included as a percentage of the total S&A and E&D costs for the 50-Ft Project. The presented MHEA costs can be broken down into the following broad categories: design costs, site preparation costs, dredging and placement costs, final site work, and monitoring costs. The design, site preparation, dredging and placement, and initial grading are sunk costs, in other words, already expended. An estimated $9.525 million of grading, eelgrass planting, and environmental monitoring work has yet to be accomplished. The total cost to construct the MHEA is estimated to be $66.8 million as is shown in Table 3. Dividing the total cost by the total volume of dredged material placed at the site reveals that the cost per cy was $11.52. Table 4 provides a detailed breakdown of the MHEA costs.

Table 3

Summary of Total MHEA Construction Costs

Component	Cost	Cost/CY	Percentage
Design	$3.2 million	$0.55	4.8
S&A and E&D	$6.6 million	$1.14	9.9
Site Preparation	$9.6 million	$1.66	14.4
Dredging and Placement	$33.1 million	$5.70	49.5
Initial Grading	$4.8 million	$0.82	7.1
Final Site Work	$9.5 million	$1.64	14.3
Total Cost	**$66.8 million**	**$11.52**	**100**

Table 4

Detailed MHEA Cost Information

Category	Description of Work	Final Quantity	Unit of Measure	Unit Price	Total Cost
Design					
MHEA Design	Design	1	LS	LS	$3,202,524
	Total	1	LS	LS	$3,202,524
Site Preparation					
MHEA Phase 2A	Containment Structure	1	LS	LS	$7,699,316
MHEA Phase 2B	Storm Water Treatment Units	1	LS	LS	$1,939,794
				Total	$9,639,110
Dredging and Placement					
IHTB Phase 1A2	Young Bay Mud	67,020	CY	$5.00	$335,100
	San Antonio Formation, Old Bay Mud	81,590	CY	$7.60	$620,084
	San Antonio Formation, Old Bay Mud	16,906	CY	$2.00	$33,812
	Total	*165,516*	*CY*	*$5.98*	*$988,996*
IHTB Phase 1B	Wet Basin/Inner Bulkhead SAF	63,175	CY	$13.30	$840,228
	Total	*63,175*	*CY*	*$13.30*	*$840,228*
Phase 3B/3C	Reaches 1 to 9	2,270,509	CY	$6.43	$14,599,373
	Reaches 10, 11, & 12	648,124	CY	$6.76	$4,381,318
	Inner Harbor Cells 5961N & 6164N	386,890	CY	$8.19	$3,168,629
	Total	*3,305,523*	*CY*	*$5.64*	*$22,149,320*

Category	Description of Work	Final Quantity	Unit of Measure	Unit Price	Total Cost
Phase 3D	Dredging	206,739	CY	$7.00	$1,447,173
	Dredging	8,000	CY	$17.61	$140,880
	Total	*214,739*	*CY*	*$7.40*	*$1,588,053*
Phase 3E	Dredging	474,872	CY	$9.00	$4,273,848
	Dredging	151,794	CY	$8.00	$1,214,352
	Total	*626,666*	*CY*	*$8.76*	*$5,488,200*
Port of Oakland	Berth Dredging	338,048	CY	$6.00	*$2,028,288*
Unpaid Overdepth	All Areas	1,086,352	CY	-	-
	Total	5,800,019	CY	$5.70	$33,083,085
Final Site Work					
Initial Grading	Sand Placement	1	LS	LS	$4,775,171
Remaining Work	Final Grading/Eelgrass Planting	1	LS	LS	$9,525,000
				Total	$14,300,171
S&A and E&D					
S&A	All Contracts	1	LS	LS	$3,849,585
E&D	All Contracts	1	LS	LS	$2,749,704
				Total	$6,599,289
	Total Cost to Construct and Fill MHEA	**5,800, 019**	**CY**	**$11.42**	**$66,824,178**

Note: LS = lump sum

3.3.3 Non-USACE Dredging Projects

To better understand costs included in non-USACE dredging projects, several project proponents were contacted to collect details regarding their dredging expenses. In general, dredging project proponents stated that the overall costs of dredging have increased incrementally each year by approximately 5 percent. Because their dredging bids were all written as lump sums, the origins of these increases are not readily apparent. For example, price of fuel, labor rates, and insurance costs are not separated out in bids. It is worth noting that the price of fuel has increased by more than 50 percent since 2000.

Disposal rates in bids, however, have stayed fairly consistent at $9-$11/cy for in-Bay disposal and $22-$25/cy for upland or disposal at SF-DODS. Few dredging contractors are located in the area and there is a sense among project proponents that volume-based dredging costs do

not reflect the true cost of dredging, but, instead, that this is the amount the dredging companies feel the market will bear.

Project proponents also agreed that out-of-Bay and upland disposal requirements have greatly increased dredging costs and noted the following specific concerns:

- SF-DODS is their last choice among out-of-Bay disposal sites. The distance to the site (approximately 50 miles west of the Golden Gate Bridge) as well as limiting factors, such as weather and equipment availability, can add a lot of time to a project, increasing costs and delaying normal use of the dredge area.
- Availability of upland sites
- Availability of off-loading equipment at upland sites
- Double handling costs when using upland sites
- Excessive study and testing requirements
- Excessive time for review and approval of permit applications and plans

To further understand project costs, staff interviewed several small to medium dredging projects to develop case studies based on regularity and frequency of dredging, size of projects, disposal locations, and sediment characteristics. Information specific to each project is presented in Tables 5 to 9.

Table 5

Golden Gate Ferry Larkspur Terminal Berths and Channel Maintenance Dredging Costs

General Information	
Permittee	Golden Gate Bridge Highway & Transportation District
Typical Dredging Frequency	Every 3 to 4 years
Typical Dredging Method	Clamshell
Typical Volume Dredged	500,000 cy per episode; 50,000 cy for berths-only dredging
Disposal/Placement Site(s)	• SF-11 • SF-10 • MWRP • HWRP • SF-DODS
Project Costs for 2010 Episode	
Pre-Construction/Internal Costs	$1,363,327
Mobilization/ Demobilization	$ 834,995 (included in dredging price figure)
Dredging	$5,231,020
Placement	• SF-10/SF-11: $12/cy (2010 actual cost) • HWRP: $15-$20/cy • SF-DODS: $23.90/cy (2010 actual cost) • MWRP: $24/cy (All placement costs are included in dredging price figure)
Overall Costs	$6,594,347
Lessons Learned/Recommendations	
Reported Cost "Driver(s)"	Distance to SF-DODS and double-handling costs for upland disposal sites
What would you change?	• Need wider work window to accommodate associated work including repairs of piers, navigational markers, dolphins, and camels that may be damaged during construction. • Need quicker response to in-project supplemental permit applications for associated work within the dredging window. Or, the Dredged Material Management Office (DMMO) could allow permittees to incorporate potential associated repair works as a rider into the various agency dredging permits. • Need more clarity from the DMMO regarding the timing and availability of upland placement sites and expected off-loader tipping fees, and any foreseeable changes to their availability.
Other comments?	Few dredging contractors with equipment that can handle our yardage results in less competition and potentially higher costs. There is pressure from smaller contractors to break up projects into smaller bits to allow for increased competition.

Table 6

Valero Refining Company Dredging Costs

General Information	
Permittee	Valero Refining Company
Typical Dredging Frequency	4 to 5 times per year
Typical Dredging Method	Clamshell and knock-down
Typical Volume Dredged	10,000-20,000 cy per event
Disposal/Placement Site(s)	• MWRP • HWRP • Winter Island • SF-9 • SF-11 • SF-DODS
Project Costs	
Pre-Construction	Approximately $80,000 for Tier III sediment testing every three years
Mobilization/Demobilization	Included in dredging price
Dredging (Includes dredging, transport, tipping fees, and mobilization/demobilization)	$13/cy - $27/cy plus stand-by/demurrage ($0-$100,000 per event)
Placement	Included in dredging price
Internal costs	Report preparation (including surveys, volume calculations, pre- and post-dredge event reports to DMMO, dredge operation plan): $10,000 per event
Overall Costs	• One 15,000 cy event: $200,000-$500,000 • Annually (4 events/60,000 cy): $820,000-$1,600,000
Lessons Learned/Recommendations	
Reported Cost "Driver(s)"	• Distance to SF-DODS and double-handling costs for upland sites • Out-of-Bay disposal increases duration of dredge event
What would you change?	• No turbidity study requirement for knockdowns • Need more out-of-Bay options • Consider in-Bay placement of clean sediment at dispersive locations as "beneficial reuse" relative to sediment deficit issues
Other comments?	• DMMO permit process has improved significantly • High cost of out-of-Bay placement is not justified in situations where in-Bay placement indicates no measurable negative environmental effects

Table 7

City of Martinez Marina Maintenance Dredging Costs

General Information	
Permittee	City of Martinez
Typical Dredging Frequency	3 to 4 years
Typical Dredging Method	Hydraulic suction dredge
Typical Volume Dredged	22,000-25,000 cy
Disposal/Placement Site(s)	City-owned upland disposal pond
Project Costs	
Pre-Construction	Permitting and design: $235,000; pre- and post-dredge surveys: $15,000
Mobilization/ Demobilization	$75,000
Dredging and Placement	$175,000 (contract cost: $8/cy; total project cost: $22/cy)
Overall Costs	Total project budget: $500,000
Lessons Learned/Recommendations	
Reported Cost "Driver(s)"	Permitting, testing and mitigation fees have become prohibitively expensive and permits take a long time to process
What would you change?	Since the work falls under a Nationwide permit from USACE and it seems the agencies want to promote upland disposal, the City would like to see the permits issued "over-the counter" without extensive studies each episode.
Other comments?	• The City has performed regular maintenance dredging utilizing our upland disposal ponds since the marina was constructed in the early 1960s. • Permit conditions have been very similar, with frequently only the date and dredge amounts changing. • A very limited number of dredging contractors bid our projects. • Maintenance of the disposal ponds between dredging episodes has become an issue because of the possibility habitat developing. • Finding a home (disposal site) for the dredged sediment from the settling ponds continues to be an issue.

Table 8

Richmond Long Wharf Maintenance Dredging Costs

General Information	
Permittee	Chevron U.S.A., Inc., in Richmond, CA
Typical Dredging Frequency	Annually
Typical Dredging Method	Clamshell
Typical Volume Dredged	150,000 cy
Disposal/Placement Site(s)	• SF-11 • SF-DODS • HWRP
Project Costs for 2011 Episode	
Pre-Construction	Pre-dredge survey included in overall costs
Mobilization	Included in overall costs
Dredging	$13/cy overall costs
Placement	SF-11 disposal included in overall costs
Demobilization	Included in overall costs
Overall Costs	$1,900,000
Lessons Learned/Recommendations	
Reported Cost "Driver(s)"	Limits to in-Bay disposal
Addressable by the LTMS?	Cost issues can be addressed through policy changes
What would you change?	Even a small increase in the in-Bay disposal limits would be helpful to dredgers.
Other comments?	• Few contractors in the Bay Area; would like to have more options and increased competition • Would like to combine projects to share costs and increase efficiency

Table 9

Pier 39 Marina Maintenance Dredging Costs (East and West Basins)

General Information	
Permittee	Pier 39 Marina
Typical Dredging Frequency	10 years
Typical Dredging Method	Excavator
Typical Volume Dredged	28,000 cy
Disposal/Placement Site(s)	• Port of Oakland Berth 10 • SF-11 • SF-DODS
Project Costs for 2012 Episode	
Pre-Construction	$50,000
Mobilization/ Demobilization	Included in dredging price
Dredging	• West Basin (Berth 10): $73,000 • East Basin (SF-DODS): $542,000 • East Basin (SF-11): $232,000
Placement	Included in dredging price
Overall Costs	$897,000
Lessons Learned/Recommendations	
Reported Cost "Driver(s)"	PAH levels required SF-DODS and Berth 10 disposal
What would you change?	Access to information on other local dredging projects and test results; ability to combine projects and share costs if dredging at same time as neighboring facility
Other comments?	Changes in requirements during permitting process adds costs to project budget (Essential Fish Habitat-associated)

4 REFERENCES

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APPENDIX A
VALUE ENGINEERING STUDY EXECUTIVE SUMMARY

EXECUTIVE SUMMARY **FINAL**

Value Management Strategies, Inc., in association with Noble Consultants, Inc., conducted a Value Engineering (VE) study, sponsored by the U.S. Army Corps of Engineers (USACE) San Francisco District (SPN) for SPN's Navigation Program. The study was conducted in Sacramento, California, in May 2011. This *Executive Summary* provides an overview of the project, key findings, and the alternatives developed by the VE team.

PROJECT SUMMARY

The VE team was able to identify numerous opportunities to increase competition among the dredging community by restructuring contracts, reevaluating contracting methodologies, exploring advance maintenance possibilities, while simultaneously exploring use of upland and other sites to meet current Long-Term Management Strategy (LTMS) goals for the placement of dredged material; all while assuring the program's goal of timely and continuous maintenance of the federally authorized navigation channels.

PROJECT PURPOSE AND NEED

The focus of the VE study was the evaluation of:

- Current contracting strategies and practices to determine whether they could be revisited and restructured to invite ***greater competition among the dredging contractor community***;
- Evaluate contracts to look for opportunities for advance maintenance in order to extend the utility of the project(s) for a longer maintenance cycle and possibly reduce the projects' budget; and
- Look at maximizing the use of upland sites where appropriate and cost effective, in order to meet current LTMS goals for the placement of dredged material, as well as structuring contracts to incorporate the latest environmental considerations.

VE STUDY OBJECTIVES

The objectives of the VE study as defined in the Scope of Work and further identified by the VE team were to:

- **Increase qualified dredging competition**
- **Reduce cost** and increase efficiency of dredging
- Maximize amount of dredging for available cost/budget
- **Optimize LTMS goals for available cost/budget**
- Increase use of advance maintenance dredging
- Incorporate latest environmental regulation
- Increase communication between parties/stakeholders/internal to agencies

- Streamline contracting methodology
- Meet customer expectations
- Increase PDT membership and assure participation
- Determine and develop process to implement these goals and objectives
- Reduce uncertainties
- Reduce frequency of dredging

KEY PROJECT ISSUES

The items listed below are the key drivers, constraints, or issues being addressed by the project and considered during this VE study to identify possible improvements.

Environmental Parameters:

- Environmental Work Windows
- Endangered Species Act (ESA) / Essential Fish Habitat (EFH)
- In-Bay Placement / Sediment Quality / Characterization Time

Environmental Goals:

- In-Bay <40% of total – 2012 / In-Bay <20% of total –2013
- Maximize Beneficial Use (Upland or In-water)

Budget:

- $30M/year – all O&M projects in SPN's jurisdiction

Other:

- **Reduced Competition**
- Contracting Restrictions
- Dredging Equipment Availability
- Budget Uncertainties (Specific to fiscal years (past 2010), 2011 and possibly 2012)

Constraints:

- Permitting
- Budget Timing
- Contract Award Timing
- USACE "Process"
- Timing of Sediment Testing

VE ALTERNATIVES

The VE team developed a total of 26 alternatives for improvements to the O&M dredging program. Eleven alternatives have been identified by the VE team to be the most critical for deliberation. The remaining 15 alternatives are by no means unimportant, nor to be neglected, and are included for review and disposition. It is noted that most, if not all of the developed alternatives, are intertwined

and although some are truly standalone recommendations, most are not and should be evaluated in that context.

The following Alternatives designations were used throughout the study report: IC – Increase Competition; ICP – Improve Contract/Project; and EE – Enhance Environmental. **Furthermore, please refer to the *Glossary* section at the end of this report for definitions of all of the acronyms used throughout.**

DISCUSSION OF KEY FINDINGS

A. Competition and Communication between Dredging Contractors

Since one of the objectives of the VE study was to "*Increase Competition"* between dredging contractors, ***Alternative No. IC-1*** explored the possibilities of consolidating similar projects under a smaller number of contracts. This consolidation creates the opportunity to potentially:

- Increase the size of the contracts;
- Issuing 2 or 3 (minimal) contracts for all O&M undertakings;
- Using multi-year contracts;
- Using a prime-contractor-type contract vehicle; and
- Consolidating non-federal projects by balancing the work across numerous projects.

The combining of similar projects reduces the number of required contracts, thereby benefitting the overall program costs by reducing SPN's up-front (i.e.; administration) time and generally contract costs due to scale of economy and allowing the contractor more efficient use of their equipment (large or small). This consolidation would allow for added competition among the existing dredging contractors in SPN's area of responsibility, but would also increase the pool of contractors by opening up the opportunity to bid on specific areas of expertise, size, and ability. As an example, the pre-2006 contracting effort for the Oakland and Richmond Harbors' O&M contract attracted four bidders (Weeks Marine, Dutra Dredging, Manson Construction, and Great Lakes Dredge and Dock). Not only did these contracts attract non-local dredging contractors, the lowest bidders were the non-local entries.

This alternative further explored the potential of using multi-year contracts. These types of contracts would increase competition by allowing the competitors the ability to spread the cost of mobilization/demobilization and equipment over the life of the contract or place all of these costs into the first year and not into subsequent years. Additionally, these contracts could reduce the amount of environmental testing (see Alternative ICP-14). This type of contract could be extended up to five years by having the government exercise yearly options if the work is being satisfactorily accomplished and Congress appropriates the funds. This contracting methodology is ideally suited for a prime contractor. In addition to the "regular" dredging process, other examples of the type work to by undertaken by multi-year contracts could be: (a) knockdown shoals (like an on-call contract as noted on Alternative IC-13) for Pinole Shoal and Suisun Bay, (b) pilot/test programs for anti-shoaling systems to prevent the creation of shoals, eliminating the need for disposal by maintaining a fluidized suspension, or (c) for advance maintenance dredging.

In another effort to focus on increasing dredging contractor competition, ***Alternative IC-4*** recommends including an array of approved disposal sites in the contracts rather than a single-source disposal site or allowing contractors to propose reuse sites, with some restrictions. This would permit the bidders to evaluate the choices available for disposal and bid according to their expertise and equipment availability, thereby resulting in lower costs. If tied to a multi-year or with similar project consolidations as noted in Alternative IC-1 above or with separate on-call contracts as indicated on Alternative IC-13, separate beneficial reuse contracts would benefit greatly by potentially maximizing the use of upland sites where appropriate to meet current LTMS goals for the placement of dredged material, as well as structuring the contracts to incorporate the latest environmental considerations.

Another area deemed necessary to explore by the VE team for increased dredging contractor participation is to "*Increase Communication*" with contractors. This effort is basically outlined in ***Alternative IC-15***, which would commence with conducting periodic workshops with the contractor community to evaluate concerns, constraints, etc., as noted in Alternative ICP-37. These workshops could dovetail into pre-solicitation conferences with the dredging community to foment better understanding of the projects/program and relationship with SPN, EPA, BCDC, CMANC, and other stakeholders/sponsors. As an example of known concerns noted by the dredging community is the failure of SPN to maintain a contracting schedule with minimal delays, stoppages, setbacks, and postponements, which has led to lower contractor participation for fear of "losing other contracting opportunities" or having to commit equipment when it could have been better used elsewhere. ***Alternative IC-25*** expands the market research being undertaken to appropriately improving dredging contractor competition. This is a good example of how the recommendations presented in this report are shared for the desired result. When combined with Alternative IC-15, IC-1 and IC-4 to name a few, the desired outcome can only improve.

B. Contracting Program

Another aspect of the VE study was to explore other available avenues to further the rationale of increasing dredging contractor competition was to *Improve Contracting Program*. This is clearly demonstrated in ***Alternative ICP-1***, which researched the possibility of awarding the contracts as scheduled. This is an extension of the concerns noted by contactors in the past as noted above in Alternative IC-15 and creates undue uncertainty within the dredging community as to the "sincerity" of awarding the contracts. This can be overcome by having SPN complete the contracts and advertise earlier pending authorization of funds.

Furthermore, the contracting language should be concentrated on completing work by the end date of the work window rather than focusing on the start date. Additional contracting efforts could concentrate on: (a) providing the NTP 30 days prior to the work window opening, (b) awarding the contracts earlier, and (c) aligning the projects in order of when environmental work windows open. Past experience indicates these improvements to the contracting effort can increase competition by optimizing each contractor's ability to schedule the work within the available work window thereby reducing costs. This is as opposed to late awards that lead to more work shifts, additional equipment rental, and reduced time available to complete the project during the work window. Past experience on marina dredging work, when awarded on time or even early, led to a reduction of about $2/CY on work that costs in the range of $12/CY to $15/CY. On larger dredging operations, savings could

approach ~25% (see attached bid schedule for Oakland Entrance Channel that indicated a reduction from $8.459M to $6.557M in the write-up for Alternative ICP-1).

Another source of concern among the dredging community is the consistent lack of project team continuity. This is noted on ***Alternative ICP-6***, wherein a dedicated effort should be undertaken by SPN to ensure a cradle-to-grave project delivery team, thereby avoiding miscommunications, misinterpretation, repeated mistakes, uninformed follow-on by team members, etc. This effort should concentrate on the PMs' assignments to ensure theses individuals are always the consistent POC for each project. It is acknowledged this may not always be possible as advancements or required reassignments cannot be withheld from personnel; however, the PMs should be the key POC person for each project regardless of the project delivery teams' composition.

A tie-in with Alternative IC-10 to use multi-year contracts could be ***Alternative ICP-14*** that promotes the use of multi-year EA for each dredging project. By using this approach to EAs, it is possible to save nearly 4 weeks of effort per each EA. This reduction optimizes the costs associated with the work for which the EA was performed and may permit plans and specifications to be issued earlier in the year, allowing for greater contractor flexibility in scheduling work.

The current SPN contracting process concept of the design-bid-build effort includes time to assure the BCOE compliance of the project/program being undertaken from design through construction. If the "E" (Environmental) were to be decoupled from the BCOE series process, i.e.; each task following the other, and conducted as a parallel, simultaneous effort as noted on ***Alternative ICP-18***, a four- to six-week time savings may be possible for each contract in a manner similar to Alternative ICP-4 above. This effort may entail redistribution of risk wherein SPN assumes more of the risk as some design work may need to be redone based on the environmental process; especially if the decoupling is separated from the design process in and of itself. This undertaking could be accomplished by maximizing the use of Tier I approval of dredge material testing protocol (including Tier III pre-dredge of prior year[s]).

As noted on ***Alternative ICP-30***, the overall time to accomplish BCOE, and to the same extent the ITR, should be analyzed to reduce the current effort consisting of redundant reviews, sign-offs, and the like. They also should be reviewed to determine if value is added to the process by completing these internal processes. This reduced effort can translate into more available time to advertise, conduct contractor workshops, undertake pre-solicitation conferences, and allow the contractors additional time for better equipment scheduling and pricing. As noted above, generalized consensus was that an approximately four-week reduction could be expected.

C. Environmental Concerns

The final area delved into by the VE team addressed some of the *Environmental Concerns* and ways to optimize the intended LTMS goals regarding placement of dredged material. ***Alternative EE-1*** basically explores how to dredge deeper and less frequently. Recommendations within this alternative include: (a) redefine and consider more use of advanced maintenance dredging, (b) expand the use of knockdowns and other non-extractive dredging methods, (c) reduce the use of or eliminate annual dredging, (d) reduce the disturbance created by dredging, (e) consider the use of anti-shoaling technologies to reduce dredging, (f) realignment of projects to take advantage of deep waters, and (g) consider dredging bi-annually as a minimum. All of these aspects have merit for

consideration and as noted in previous paragraphs, some are intertwined with means of improving contractor participation and optimizing costs.

Taking advantage of some of the items listed above, ***Alternative EE-6*** would work to identify new in-Bay beneficial reuse opportunities. This can be accomplished by redefining and reevaluating environmental impacts, redefining LTMS goals, and developing and conducting beneficial reuse pilot projects.

A listing of the proposed VE alternatives is provided below. As noted above with short narratives, the first 11 are those alternatives deemed critical for deliberation; the last 15 alternatives are also proposed for review and disposition.

SUMMARY OF ALTERNATIVES

Summary of Priority Alternatives

Alternative No. and Description	Cost / Quality Impact
IC-1 Consolidate contracts - Increase competition by increasing the size of the advertised dredging contract in order to entice more contractors to pursue the project.	Savings between 2 and 16 percent is possible for two to four bids, respectively.
IC-4 Include an array of disposal sites in contracts rather than single-source disposal site - Implement dredging contracts that either identify multiple sites for disposal or allow the contractor to identify disposal site(s) with options for disposal within the contract bid.	Improved scheduling, equipment usage, potential lower bid results, and potentially increasing beneficial reuse.
IC-15 Increase communication with contractors - Invite contractors early on in the acquisition process by holding pre-solicitation conferences and workshops.	Quality improvement for better specifications/contract documents, lower potential for bid protests. Contracting community would have a clearer understanding of the work to be undertaken, resulting in more favorable bids as better planning and scheduling can be undertaken.
IC-25 Focus market research appropriately to improve competition - Identifying more specialized and more capable SBA/8(a) contractors and/or identifying contractors who might be customers or users of the products generated by the initial contractors that were surveyed – such as customers of landfill cap material, construction fill, or levee rehabilitation material.	Increases pool of qualified dredging contractors. Could lead to savings between 2 and 16 percent, as noted in IC-1.
ICP-1 Get individual contracts out on time - Increase effort to ensure the published schedule at the beginning of each fiscal year is maintained.	Improves work schedule resulting in lower costs and potentially shortened work durations.

Alternative No. and Description	Cost / Quality Impact
ICP-6 Maintain PDT continuity - Provide for the continuity of PDT membership during the life cycle of the project to the maximum extent possible.	Consistency within PDT provides for better management, reduced bidding time, and decreased potential for change orders.
ICP-14 Use multi-year EAs - Consider greater use of "categorical exclusion" clause within 33 CFR 230 referring to the information provided to the District Commander for proposed action, or alternatively, use a three-year EA tied to the IAA and CD, and only update more frequently for changes at the dredge or disposal site.	The removal of a critical path task will result in a higher likelihood of maintaining the work schedule, reducing end-of-work scrambling, reducing the time to award, and producing more favorable bids.
ICP-18 Decouple "Environmental Review" from engineering/contract process - Decouple the environmental review process from other engineering tasks, allowing these tracks to proceed in parallel and reduce project delays.	As much as two weeks could be reduced in specification preparation and final engineering, resulting in overall earlier contract awards.
ICP-30 Reduce internal design/specification review period - Reduce the time period for each review and thus have a better chance to be ready to dredge when the work windows open.	In a manner similar to Alternative ICP-18, as much as two weeks could be reduced in specification preparation and final engineering, resulting in overall earlier contract awards.
EE-1 Dredge deeper less frequently - The concept is the hydrodynamic consideration of channel shoaling at specific locations in the waterway. This concept is very similar to advance maintenance dredging to create a sediment sump or catch basin.	A "sweet spot" of around 2 feet over advanced maintenance dredging achieves 75% of the cost savings; i.e., from approximately $20.60/CY to about $15.00/CY.
EE-6 Identify new In-Bay beneficial reuse opportunities - Identify approaches and situations in which discrete placement of O&M dredged material into San Francisco Bay and Estuary produces net environmental or societal benefits that help meet the LTMS goals in a more affordable manner.	By using in-Bay reuse approach, energy savings associated with ocean disposal alone would warrant further investigation; e.g., an ocean-going scow would have to travel approximately 120 miles roundtrip from the shoreline plus the distance from the dredge site to the Golden Gate Bridge, and consume nearly 3,000 gal of diesel fuel at $4.80/gal or $14,400 per scow. If the average in-Bay distance were 10 miles, the scow would only burn $2,400 of fuel (500 gal at $4.80/gal). In addition, the staff time of the contractor would be greatly reduced, perhaps by as much as 50%.

Summary Remaining Alternatives

Alternative **No.** and **Description**	**Cost / Quality Impact**
IC-3 Alternative contracting methods - Select the best contracting methodology to maximize the overall O&M dredging program and improve the O&M of individual projects.	Improves the quality of the end product and how it is to be contracted.
IC-7 Reduce size of dredging contracts - Use more smaller dredging contracts (in terms of size, dollars, and length/depth) to encourage participation of additional dredging contractors.	The quality of smaller contracts can be better achieved due to their tendency to be simpler and readily adaptable to different contracting vehicle.
IC-12 Use separate beneficial reuse contracts – Decouple meeting LTMS reuse goals from individual O&M contracts by having separate contracts to take specified material to reuse; perhaps from multiple locations.	The quality of the contracts can be improved when they are focused on a given task, such as beneficial reuse, rather than a broader dredging contract. Single task contracts can be adjusted to the specifics, resulting in better quality control, improved scheduling, and potentially lower overall costs.
IC-13 Use separate on-call contracts – Examples would be for "clean-up" dredging, knockdowns, discrete shoals that impact an entire channel, or "emergency" dredging.	The quality of the contracts can be improved when they are focused on a given task such as in an on-call contract as the specifics can be focused, resulting in better quality control, improved scheduling, quicker response time including unanticipated needs, and lower overall costs.
ICP-8 Review of contract language - Establish a procedure for the SPN staff to periodically review contract language and provisions for assessment as to relevancy.	Improved quality of the product: the dredging, on-call, beneficial reuse, maintenance, etc., contract itself.
ICP-9 Have all permitting as part of solicitation package - Attach permit requirements to the specification as an appendix to eliminate any duplication throughout the specification, and make sure all permits are part of the bidding process.	Improves quality of the contract(s) by elimination of ambiguous and unclear language, resulting in better bid values. This should lead to reduced concerns by contractors regarding compliance risks.

Alternative **No.** and **Description**	**Cost / Quality Impact**
ICP-11 First quarter Project Team meeting - Have each PM conduct a first-quarter PDT meeting to review project, budget, schedule, AAR results from the previous year, IAA, and the latest environmental restrictions and changes for the program in order to begin all up-front work and baseline/template work as soon as possible.	Improves the quality of the work product – design, management, and execution of the dredging program – which could result in lower bids and increased contactor participation.
ICP-15 Expand Consistency Determinations to 10 Years - Produce multi-year CDs.	Improves quality by preparing CDs less frequently, which could reduce or eliminate some project delays and timing complications.
ICP-22 Periodic audit workshop related to regulatory (permit) requirements - LTMS/DMMO agencies should review the full range of permit conditions they jointly apply to O&M dredging projects. This process should include input from both USACE SPN and permit applicants, as well as dredging contractors.	From a quality view point, the LTMS/DMMO agencies should also review the full range of permit conditions jointly applied to O&M dredging projects.
ICP-24 Move O&M dredging to one branch - Consider moving the maintenance dredging function to the Operation and Readiness Division, which has responsibility for navigation debris removal and O&M of USACE SPN lakes.	By placing the appropriate "team" in-house to manage and control the O&M dredging program, the end result will be a better product and an efficiently operated, well executed program. This alternative precludes the "borrowing" of expertise from one division/branch to another and places the burden of proper execution within a single division. Clear lines of communications and responsibility with authority are established.
ICP-29 Minimum dig face - Use advance maintenance dredging and/or sediment redistribution methods, i.e., knockdown, etc., to remove minor localized shoaling in between cost-effective, thicker dig cut, maintenance dredging events.	Although the VE team only analyzed one set of dredging contract bid results, it demonstrated with a fair share of certainty that by restricting dredging to areas with a specified minimum dig face, greater equipment utilization will occur leading to cost savings. For a depiction of savings, see the graph in the Alternative's write-up.

Alternative **No.** and **Description**	**Cost / Quality Impact**
ICP-32 Expand participants of annual program AAR - Prepare an AAR for the entire program, in addition to selected projects and invite all interested stakeholders to include non-federal sponsors, harbor pilots, resource/regulatory agency staff, and members of the Harbor Safety Committee to participate in the AAR process.	This is a quality issue. Since AARs are currently prepared on selected projects, the value is not readily apparent to non-federal sponsors and stakeholders who experience frustrations with respect to federal channel maintenance year after year . The AAR process could be the vehicle to help reduce these frustrations through process improvement and total quality management. Moreover, non-federal sponsors may be in a position to favorably influence funding and legislative "fixes" in support of the O&M program.
ICP-33 Have Construction assume responsibility of AARs - The responsibility of the AARs should be transferred to the Construction Branch and prepared for each and every project upon completion of the construction.	This alternative again addresses quality issues associated with using the AAR process for betterment. Participation in the AAR meeting should be mandatory for the PMs, PDT members, and all chiefs and should include invitations to the local sponsors and appropriate resource agencies (LTMS PMs), Ports, bar pilots, etc., as appropriate.
ICP-35 Improve coordination between contract package creation and Construction - Provide a construction representative as a full-time member of the PDT.	As with other alternatives suggesting quality improvements, this too addresses the issue of involving construction as a permanent member of the PDT as in other District sections.
ICP-39 Fund O&M program rather than individual projects - Project sponsors should lobby Congress to fund USACE SPN's O&M program and create a regional dredging program, or allow greater flexibility to manage the overall budget to move the most mud.	This alternative proposes a change in the funding process to reduce the number of, if not eliminate, all current annual dredging projects as line items. More funds would be available for each project in the year the project was scheduled to be dredged. In addition, the suggestion to maximize the use of advance maintenance will make for a more efficient dredging project for the contractor, which could lead to lower unit costs to dredge, including reducing mobilization/ demobilization expenses from a yearly expense to a two- or three-year expense.

VE TEAM

VE Study Team

Name	Organization	Title
Luis M. Venegas	VMS	VE Study Team Leader
April Hiller	VMS	VE Study Assistant
James E. Garror	USACE SPN, Subject Matter Expert (SME)	Contracting
David V. Doak	USACE SPN, SME	Engineering, Dredging, Management
Brian D. Ross	U.S. EPA, Region 9, SME	Dredging and Sediment Management Team (WTR-8)
Brenda Göeden	BCDC, SME	Dredging and Sediment Management Team Manager
Charles F. Fano	USACE Walla Walla District, SME	Cost Engineer
Richard M. Rhoads	Moffatt & Nichol, SME	Dredging
James M. Haussener	CMANC, SME	Executive Director
Greg Hartman	Hartman Associates, SME	Dredging
Scott M. Noble	Noble Consultants, Inc., SME	Civil Engineering
Leonard E. Cardoza	Weston Solutions, Inc., SME	Senior Technical Advisor
Syed I. Burney	USACE SPN	Value Engineering Officer

Key Project Contacts

Name	Organization	Title
Syed I. Burney	USACE SPN	Value Engineering Officer

APPENDIX B
ADDITIONAL ANALYSIS ON THE 50-FT PROJECT

MEMO

To: Brenda Goeden

From: Jim McGrath

Date: June 2012

Subject: Analysis of Port of Oakland Fifty Foot Deepening Project Placement Volumes

Brenda,

I was interested in seeing if patterns emerged from the data--how much was Port of Oakland/Corps work on the 50 foot project, what other material went into Hamilton, what reuse sites were one-off and which might be sustainable for a longer period. So I took the spread sheet data for 2000-2011 and made annual totals for all projects as Port of Oakland/50 foot, Hamilton, and miscellaneous. I then went back over the miscellaneous data to see what emerged. I essentially ignored the small projects except to round the numbers and place them in the miscellaneous category. Here's the results:

1. The Port of Oakland 50 foot project, which includes I believe the maintenance work during the construction period, was the primary driver. Total re-use was 17,446,000 cubic yards. (this does not include the other re-use projects I worked on, Sonoma Baylands and Galbraith, which was about 700,000 cy. I think Sonoma Baylands was about 2.5 million cy.)

2. The total for Miscellaneous was 1,894,000 cy. Of the larger reuse projects that made up that total, San Leandro (180,000 cy in 2001) is no longer available, and the subtotals were:

Winter Island at 520,000 cy

Port Sonoma at 430,000 cy

Bair Island at 286,000 cy

3. Port of Oakland 50 foot material went to Montezuma, at 3,000,000 cy, Hamilton at 6,000,000, and 5,000,000 to Middle Harbor. I know that doesn't add up to the full

17,446,000 and I don't remember the source, or if I knew it, of the discrepancy.

4. The totals I got for material destined to Hamilton were 6 mcy from Oakland and 1.1 mcy from all others, mostly Richmond Federal channel.

For the information needed to discuss cost the next time, it would be useful to divide the reuse volumes into three categories, by volume: a) New work with authorization in either the Oakland or Hamilton WRDA's; b) maintenance during construction at Oakland; and c) maintenance, both of Federal channels and non-Federal channels. The reason for category b is that a lot of material gets dropped in a construction project as large as the 50 foot project, and the maintenance material is not just normal maintenance, but maintenance plus dropped new work. It was, I believe, cost-shared on much the same basis, and used the same contractor, so it is a special category that might not be seen again.