



**US Army Corps  
of Engineers®**  
Seattle District



**Port of Grays Harbor**  
*On Washington's Pacific Coast*

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# **Grays Harbor, Washington Navigation Improvement Project General Investigation Feasibility Study**

## **DRAFT Limited Reevaluation Report**

### **Appendix E: Cost Engineering**

**Prepared by:**

**U.S. Army Corps of Engineers  
Seattle District**

**January 2014**



## APPENDX E – COST ENGINEERING

### Grays Harbor Navigation Improvement Project Grays Harbor, WA

#### INTRODUCTION

The purpose of this appendix is to document and present the detailed cost estimate prepared in support of the Grays Harbor Navigation Improvement Project. The Grays Harbor Navigation Channel is 27.5 miles long and includes the following reaches from west to east: Bar, Entrance, Point Chehalis, South Reach, Outer Crossover, Inner Crossover, North Channel, Hoquiam Reach, Cow Point, Aberdeen, and South Aberdeen. The navigation channel is of great importance to the Port of Grays Harbor and the local economy. The Port of Grays Harbor is the local sponsor partnering with the U.S. Army Corps of Engineers for this project. The federal government will cost share 75% of the total initial construction and 100% of the operations and maintenance costs.

#### SCOPE

There are two alternatives beside the no action alternative. Alternatives 2 and 3 deepen the channel, with Alternative 3 being the recommended plan. This project is still in development and a decision on the final plan will be made by the end of the current fiscal year.

The cost estimate includes the initial construction to deepen the channel and the incremental annual O&M dredging. The following is a brief overview of the project Alternatives and the assumptions made.

##### *Alternative #1*

This is the no action alternative and no cost estimate was required.

##### *Alternative #2*

This alternative is to deepen the current channel from -36 MLLW down to -37 MLLW plus 2 ft of overdepth. The dredge volumes provided are what is necessary to incrementally dredge down 1 additional foot. All work is assumed to be done by clamshell dredge except for the material at South Reach. A hopper dredge is required at South Reach due to the exposed open water conditions of the Pacific Ocean. Additionally, 11,200 CY of unsuitable material will need to be removed via clamshell from the Cow Point turning basin and placed at an upland site. All other dredge material is assumed to be placed at the Point Chehalis and South Jetty open water placement sites and Half Moon Bay and South Beach beneficial use sites.

##### *Alternative #3*

This alternative is the recommended plan and it is to deepen the current channel from -36 MLLW down to -38 MLLW plus 2 ft of overdepth. The dredge volumes provided are what is necessary to incrementally dredge down 1 additional foot. All work is assumed to be done by clamshell dredge

expect for the material at South Reach. A hopper dredge is required at South Reach due to the exposed open water conditions of the Pacific Ocean. Additionally, 22,400 CY of unsuitable material will need to be removed via clamshell from the Cow Point turning basin and placed at an upland site. All other dredge material is assumed to be placed at the Point Chehalis and South Jetty open water placement sites and Half Moon Bay and South Beach beneficial use sites.

### **Cost and Schedule Risks**

An informal cost and schedule risk analysis was performed for alternatives 2 and 3 separately, even though the risks are identical for these alternatives. A formal cost and schedule risk analysis is required for all estimates over \$40 million. However, since on the initial construction is included in the Total Project Cost Summary (TPCS) and not the O&M dredging, the cost estimate is under the \$40 million threshold.

In each cost risk analysis, similar features of work were grouped together and contingencies were derived independently from all other features of work. These individual contingencies were weighted based on the percentage of each feature of work from the total cost. The contingencies were compiled to develop each Alternative's total contingency.

There were numerous risks identified for each feature of work. The full risk analysis register for the TSP is included as an attachment to this appendix. The following is a brief discussion of some of the major cost risk drivers for each Alternative.

#### *Alternative #1*

There was no risk analysis performed for the no action alternative.

#### *Alternative #2 & Alternative 3*

The largest potential risk for both alternatives is the chance that a government hopper dredge is not available. This would require a hopper dredge to be mobilized from the east coast since no other hopper dredges are available on the west coast. The cost impact in the mobilization of such a vessel could increase the project cost by an additional \$1.5 million. Another large risk is that the estimate assumes the prime contractor will be doing the clamshell dredging. If this work was to be subcontracted out it could add an additional 25% in markups. Lastly, the upland disposal method assumed that the unsuitable material can be disposed of at the Hoquiam Lagoon made available by the Port of Grays Harbor. If this material cannot be disposed at this location, additional costs will be needed to haul this material further than what was assumed in the cost estimate.

### **PRICE LEVEL**

Guidance for preparation was obtained from ER 1110-2-1150 Engineering and Design (E&D) for Civil Works Projects, ER 1110-1-1300 E&D Cost Engineering Policy and General Requirements, ER 1110-2-1302 Civil Works Cost Engineering, and ETL 1110-2-573 E&D Construction Cost Estimating Guide for Civil

Works. The cost estimates were prepared using Micro-Computer Aided Cost Estimating System MII version 4, build 4. Unit pricing for dredging was developed in the Cost Engineering Dredge Estimating Programs (CEDEP). Supporting cost libraries or databases were MII 2012-b English Cost Book, 2011 Region VIII Equipment library (EP 1110-1-8) and the 2013 Davis-Bacon Wage Rates for heavy construction in Grays Harbor County, Washington.

The three categories of cost contained in the TPCS are “Estimated Cost,” “Project First Cost,” and “Total Project Cost.” The estimated cost, which is the cost calculated in MCACES (MII), is based on a price level of January 2014. The Project First Cost, or in other words the value the project is actually authorized at, is set at October 2016. Lastly, the date point of the Total Project Cost which is the cost the government will pay at the midpoint of construction for each alternative.

Escalation is based on the September 2013 Civil Works Construction Cost Index System (CWCCIS), EM 1110-2-1304.

The cost of the selected plan is considered fair and reasonable, provided the construction is done by a prudent and well equipped contractor.

#### **COST ESTIMATE STRUCTURE**

The cost estimate for the preferred plan was prepared by the Cost Engineering Section within the Seattle District. The overall structure of the TPCS is dictated by the Civil Works – Work Breakdown Structure. Project features are broken out separately, then contingencies are applied, and finally the cost is escalated to the correct point date in the project schedule.

The civil works features found in the TPCS report are as follows: Navigation Ports and Harbors, Lands and Damages, Planning, Engineering and Design, and Construction Management. The MII cost estimate and corresponding contingency is entered in the navigation ports and harbor feature. The lands and damages cost and contingency was provided by the NWS Real Estate Section. The planning, engineering, and design costs as well as the construction management costs were provided by the project manager based on the size and scope of the project.

The basis of the cost estimate is the conceptual design drawings prepared by the Project Delivery Team (PDT). Dredging quantities were provided by the Costal Engineering Section. Additional information has been developed by the PDT via emails, phone calls, and in-person discussions. The MII cost estimate carefully documents the basis of information used in development of costs, down to the lowest reasonable level.

The major features of work include two types of dredging: clamshell dredging and hopper dredging. All clamshell dredging costs were developed using the most current version of the Corps of Engineers Dredge Estimating Program (CEDEP). All hopper dredging costs were developed using the FY14 daily rate and production rates of the Government Hopper Dredge Yaquina. The PDT assumed that the

hopper dredging would be done via government vessel and the Yaquina is the most conservative of the options available.

Risk and uncertainties are captured in the Cost and Schedule Risk Analysis (CSRA). PDT input was used to capture the likelihood and impact for each risk element. The CSRA assigns a contingency to all features of work in the cost estimate. The cost estimate and its corresponding contingency were then placed into the Total Project Cost Summary and the proper escalation factors were applied. See Appendix E for the Total Project Cost Summary.

Escalation factors to the Effective Price Level Date and the Fully Funded Project Estimate Amount through the end of construction have also been included as part of the TPCS. The inflation was based on an assumed authorization date of October 2016. The mid-point of construction varies between the Alternative packages from September 2017 to December 2017.

## **CONTRACTOR AND INDIRECT COST CONSIDERATIONS**

The cost estimator assumed the majority of the work is done by the prime contractor which performs the clamshell dredging. The government is anticipated to perform the hopper dredging. The prime is expected to subcontract out the upland disposal of the hazardous material. This arrangement makes for two levels of applied markup costs (job office overhead, home office overhead, profit, bond, insurance, and B&O tax) for the upland disposal features only.

Common markup costs are the job office overhead, home office overhead, profit, bond, and Washington State business and occupation tax. The job office overhead markup consists of all the necessary utilities, equipment, and personnel required on site to support construction and provide oversight. These costs were itemized in the cost estimate and applied for the entire construction duration.

Home office overhead markup rates are a percentage applied to the project based on the size of the company. These markups rates cover the cost to operate the contractor's home office.

Profit is calculated on the prime contractor using the profit weighted guidelines. The profit is dependent on the size of the project, difficulty, risk, duration, investment by the contractor, assistance by the government, and the amount of work to be subcontracted out. The profit for the subcontractor was an applied percentage based on common projects of this size and scope.

Bond, insurance and B&O are applied at a separate percentage points, that rarely vary. Each is a case by case determination but for the most part these markup rates are fairly standard.

The total prime contractor markup rate sums to 30.5% and the total subcontractor markup rate sums to 32.5%. The detailed summary for the prime and sub contractor are included as an attachment to this appendix.

## **PLANNING, ENGINEERING, AND DESIGN**

The Planning, Engineering and Design (PED) costs are costs to develop the project from the point the project is approved, to when solicitation is completed. This work includes detailed surveys, soil investigations and preparation of the plans and specifications to guide the contractor to construct the project. These costs for each Alternative were developed in coordination with the PDT as lump sum costs based on administration and design costs typically seen for projects of similar dollar value; these lump sum costs are included in the TPCS reports for each Alternative. A contingency of 7% was assigned to these items to account for cost overruns.

## **CONSTRUCTION MANAGEMENT**

The Construction Management (CM) costs are determined as a percent of the estimated construction costs. As with the PED costs this percentage was determined through discussions with the PDT and are included in the TPCS reports for each Alternative. . A contingency of 7% was assigned to these items to account for cost overruns.

## **CONTINGENCY**

Current regulations require formal analyses of schedule and costs risks for projects over \$40 million. Since this project is less than \$40 million (not including the O&M dredging) and for the purposes of SMART planning an informal cost risk analysis (CRA) method was selected. This method is an abbreviated form of the formal Cost and Schedule Risk Analysis (C&SRA). This method is typically less intensive, resulting in time and labor savings. See the CRA Attachment for the results of the informal Cost Risk Analysis Study that was performed. Contingency for 01 Real Estate costs was determined by Real Estate personnel and contingency for PED and CM costs was determined in consultation with the Project Manager.

The purpose of contingencies is an added cost included in the cost estimate to cover unknowns.

Unknowns could include:

- Contractor efficiency
- The exact nature of the work environment
- Uncertainty with design quantities.
- Disposal locations.
- Construction methodology changes at Feasibility.

## **PROJECT SCHEDULE**

The project schedule for each base and each increment was developed by the cost engineer based on CEDEP and MII calculated durations. Sequencing for the project was based on discussions with the PDT. The initial construction project schedule for each base and increment is included as an attachment to this appendix.

Per discussions with the team biologist there is a presumed construction window of mid March to the end of May for the hopper dredge and July to mid February for clamshell dredging. This scheduling consideration was applied to the construction schedules for each Alternative to provide the most accurate project duration prediction possible at this level of design.

Alternative 3 has the longest duration for clamshell dredging at 5 ½ months. This leaves a 2 month window of float for the construction to occur during one season. The duration for hopper dredging is 1 month for both alternatives. This leaves a 1 ½ month window of float for the construction to occur during one season. While dredging is always impacted by poor weather conditions the weather would have to be worse than normal to impact either dredging operation and prevent the work from being completed in one season.

## **OPERATIONS & MAINTENANCE**

The O&M dredging costs were calculated based on quantities provided by the PDT. These quantities are the incremental volumes to be dredge above what is already performed in an annual O&M basis. The O&M dredging methods are identical to that of the initial construction with the exception that no further hazardous material is expected to be encountered. Therefore, no upland disposal will be needed. The O&M dredging will require both hopper and clamshell dredges.

It is assumed that the project life will be 50 years. Since the initial construction will be completed in one year, the O&M dredging will be required for 49 years. The MII cost estimate reflects one year's worth of O&M dredging in FY 2014 dollars. This was not included in the TPCS report but was made available to the PDT for further analysis.

## **RECOMMENDED PLAN ESTIMATE**

Alternative 2 is to deepen the channel down to -37 MLLW. The FY 2014 initial construction price level is \$8,605,000. The fully funded amount is \$12,719,000. Alternative 3 is to deepen the channel down to -38 MLLW and is the recommended plan. The FY 2014 initial construction price level is \$14,128,000. The fully funded amount is \$19,703,000.

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

PROJECT: **Grays Harbor NIP CWE -37 MLLW**  
PROJECT NO: **P2 XXXXXXX**  
LOCATION: **Grays Harbor, WA**

DISTRICT: **NWS Seattle**

PREPARED: **1/6/2014**

POC: **CHIEF, COST ENGINEERING, John Dudgeon**

This Estimate reflects the scope and schedule in report; Limited Reevaluation Report

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER <u>A</u>	Civil Works Feature & Sub-Feature Description <u>B</u>	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Spent Thru: 1/6/2014 (\$K) <u>K</u>	<u>L</u>	COST (\$K)	CNTG (\$K)	FULL (\$K)
		<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>	<u>J</u>			<u>M</u>	<u>N</u>	<u>O</u>
12	NAVIGATION PORTS & HARBORS	\$8,605	\$2,183	25%	\$10,788.09	5.9%	\$9,110	\$2,311	\$11,421			\$9,239	\$2,344	\$11,583
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$8,605	\$2,183		\$10,788.09	5.9%	\$9,110	\$2,311	\$11,421			\$9,239	\$2,344	\$11,583
01	LANDS AND DAMAGES	\$98	\$15	15%	\$112.24	5.9%	\$103	\$15	\$119			\$105	\$16	\$121
22	FEASIBILITY STUDY (CAP studies)													
30	PLANNING, ENGINEERING & DESIGN	\$700	\$49	7%	\$749.00	13.2%	\$793	\$55	\$848			\$714	\$50	\$763
31	CONSTRUCTION MANAGEMENT	\$220	\$15	7%	\$235.40	5.8%	\$233	\$16	\$249			\$236	\$17	\$253
<b>PROJECT COST TOTALS:</b>		\$9,623	\$2,262	24%	\$11,884.73		\$10,239	\$2,399	\$12,637			\$10,293	\$2,426	\$12,719

- Mandatory by Regulation CHIEF, COST ENGINEERING, John Dudgeon
- Mandatory by Regulation PROJECT MANAGER, Josh Jackson
- Mandatory by Regulation CHIEF, REAL ESTATE, Chris Borton
- CHIEF, PLANNING, Valorie Ringold
- CHIEF, ENGINEERING, JoAnn Walls
- CHIEF, OPERATIONS, Beth Coffey
- CHIEF, CONSTRUCTION, Aril Berg
- CHIEF, CONTRACTING, Patricia Blackwood
- CHIEF, PM-PB, xxxx
- CHIEF, DPM, Olton Swanson

ESTIMATED FEDERAL COST: 75% **\$9,540**  
ESTIMATED NON-FEDERAL COST: 25% **\$3,180**  
**ESTIMATED TOTAL PROJECT COST: \$12,719**

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

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

PROJECT: Grays Harbor NIP CWE -37 MLLW  
 LOCATION: Grays Harbor, WA  
 This Estimate reflects the scope and schedule in report; Limited Reevaluation Report

DISTRICT: NWS Seattle  
 POC: CHIEF, COST ENGINEERING, John Dudgeon  
 PREPARED: 1/6/2014

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1/6/2014		Effective Price Level: 1/6/2014		Program Year (Budget EC): 2017		Effective Price Level Date: 1 OCT 16						
		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
<b>12</b>	<b>PHASE 1 or CONTRACT 1</b> NAVIGATION PORTS & HARBORS	\$8,605	\$2,183	25.4%	\$10,788	5.9%	\$9,110	\$2,311	\$11,421	2018Q1	1.4%	\$9,239	\$2,344	\$11,583
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$8,605	\$2,183	25.4%	\$10,788		\$9,110	\$2,311	\$11,421			\$9,239	\$2,344	\$11,583
<b>01</b>	LANDS AND DAMAGES	\$98	\$15	15.0%	\$112	5.9%	\$103	\$15	\$119	2018Q1	1.4%	\$105	\$16	\$121
<b>30</b>	PLANNING, ENGINEERING & DESIGN													
1.90%	Project Management	\$250	\$18	7.0%	\$268	13.2%	\$283	\$20	\$303	2014Q2	-11.7%	\$250	\$18	\$268
1.60%	Planning & Environmental Compliance	\$120	\$8	7.0%	\$128	13.2%	\$136	\$10	\$145	2014Q2	-11.7%	\$120	\$8	\$128
1.90%	Engineering & Design	\$100	\$7	7.0%	\$107	13.2%	\$113	\$8	\$121	2014Q2	-11.7%	\$100	\$7	\$107
0.80%	Engineering Tech Review ITR & VE	\$50	\$4	7.0%	\$54	13.2%	\$57	\$4	\$61	2014Q2	-11.7%	\$50	\$4	\$54
0.80%	Contracting & Reprographics	\$80	\$6	7.0%	\$86	13.2%	\$91	\$6	\$97	2014Q2	-11.7%	\$80	\$6	\$86
1.30%	Engineering During Construction	\$40	\$3	7.0%	\$43	13.2%	\$45	\$3	\$48	2018Q1	3.2%	\$47	\$3	\$50
1.30%	Planning During Construction	\$40	\$3	7.0%	\$43	13.2%	\$45	\$3	\$48	2018Q1	3.2%	\$47	\$3	\$50
0.60%	Project Operations	\$20	\$1	7.0%	\$21	13.2%	\$23	\$2	\$24	2014Q2	-11.7%	\$20	\$1	\$21
<b>31</b>	CONSTRUCTION MANAGEMENT													
2.60%	Construction Management	\$100	\$7	7.0%	\$107	5.8%	\$106	\$7	\$113	2018Q1	1.4%	\$107	\$8	\$115
1.00%	Project Operation:	\$20	\$1	7.0%	\$21	5.8%	\$21	\$1	\$23	2018Q1	1.4%	\$21	\$2	\$23
1.30%	Project Management	\$100	\$7	7.0%	\$107	5.8%	\$106	\$7	\$113	2018Q1	1.4%	\$107	\$8	\$115
<b>CONTRACT COST TOTALS:</b>		\$9,623	\$2,262		\$11,885		\$10,239	\$2,399	\$12,637			\$10,293	\$2,426	\$12,719

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

PROJECT: **Grays Harbor NIP CWE -38 MLLW**  
PROJECT NO: **P2 XXXXXXX**  
LOCATION: **Grays Harbor, WA**

DISTRICT: **NWS Seattle**

PREPARED: **1/6/2014**

POC: **CHIEF, COST ENGINEERING, John Dudgeon**

This Estimate reflects the scope and schedule in report; Limited Reevaluation Report

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER <u>A</u>	Civil Works Feature & Sub-Feature Description <u>B</u>	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Spent Thru: 1/6/2014 (\$K) <u>K</u>	<u>L</u>	COST (\$K)	CNTG (\$K)	FULL (\$K)
		<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>	<u>J</u>			<u>M</u>	<u>N</u>	<u>O</u>
12	NAVIGATION PORTS & HARBORS	\$14,128	\$3,165	22%	\$17,292.67	5.9%	\$14,957	\$3,350	\$18,308			\$15,169	\$3,398	\$18,566
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$14,128	\$3,165		\$17,292.67	5.9%	\$14,957	\$3,350	\$18,308			\$15,169	\$3,398	\$18,566
01	LANDS AND DAMAGES	\$98	\$15	15%	\$112.24	5.9%	\$103	\$15	\$119			\$105	\$16	\$121
22	FEASIBILITY STUDY (CAP studies)													
30	PLANNING, ENGINEERING & DESIGN	\$700	\$49	7%	\$749.00	13.2%	\$793	\$55	\$848			\$714	\$50	\$763
31	CONSTRUCTION MANAGEMENT	\$220	\$15	7%	\$235.40	5.8%	\$233	\$16	\$249			\$236	\$17	\$253
<b>PROJECT COST TOTALS:</b>		\$15,146	\$3,244	21%	\$18,389.31		\$16,086	\$3,438	\$19,524			\$16,223	\$3,480	\$19,703

- Mandatory by Regulation CHIEF, COST ENGINEERING, John Dudgeon
- Mandatory by Regulation PROJECT MANAGER, Josh Jackson
- Mandatory by Regulation CHIEF, REAL ESTATE, Chris Borton
- CHIEF, PLANNING, Valorie Ringold
- CHIEF, ENGINEERING, JoAnn Walls
- CHIEF, OPERATIONS, Beth Coffey
- CHIEF, CONSTRUCTION, Aril Berg
- CHIEF, CONTRACTING, Patricia Blackwood
- CHIEF, PM-PB, xxxx
- CHIEF, DPM, Olton Swanson

ESTIMATED FEDERAL COST: 75% **\$14,777**  
ESTIMATED NON-FEDERAL COST: 25% **\$4,926**  
**ESTIMATED TOTAL PROJECT COST: \$19,703**

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

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

PROJECT: Grays Harbor NIP CWE -38 MLLW  
 LOCATION: Grays Harbor, WA  
 This Estimate reflects the scope and schedule in report; Limited Reevaluation Report

DISTRICT: NWS Seattle  
 POC: CHIEF, COST ENGINEERING, John Dudgeon  
 PREPARED: 1/6/2014

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1/6/2014		Effective Price Level: 1/6/2014		Program Year (Budget EC): 2017		Effective Price Level Date: 1 OCT 16						
		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
<b>PHASE 1 or CONTRACT 1</b>														
12	NAVIGATION PORTS & HARBORS	\$14,128	\$3,165	22.4%	\$17,293	5.9%	\$14,957	\$3,350	\$18,308	2018Q1	1.4%	\$15,169	\$3,398	\$18,566
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$14,128	\$3,165	22.4%	\$17,293		\$14,957	\$3,350	\$18,308			\$15,169	\$3,398	\$18,566
01	LANDS AND DAMAGES	\$98	\$15	15.0%	\$112	5.9%	\$103	\$15	\$119	2018Q1	1.4%	\$105	\$16	\$121
30	PLANNING, ENGINEERING & DESIGN													
1.90%	Project Management	\$250	\$18	7.0%	\$268	13.2%	\$283	\$20	\$303	2014Q2	-11.7%	\$250	\$18	\$268
1.60%	Planning & Environmental Compliance	\$120	\$8	7.0%	\$128	13.2%	\$136	\$10	\$145	2014Q2	-11.7%	\$120	\$8	\$128
1.90%	Engineering & Design	\$100	\$7	7.0%	\$107	13.2%	\$113	\$8	\$121	2014Q2	-11.7%	\$100	\$7	\$107
0.80%	Engineering Tech Review ITR & VE	\$50	\$4	7.0%	\$54	13.2%	\$57	\$4	\$61	2014Q2	-11.7%	\$50	\$4	\$54
0.80%	Contracting & Reprographics	\$80	\$6	7.0%	\$86	13.2%	\$91	\$6	\$97	2014Q2	-11.7%	\$80	\$6	\$86
1.30%	Engineering During Construction	\$40	\$3	7.0%	\$43	13.2%	\$45	\$3	\$48	2018Q1	3.2%	\$47	\$3	\$50
1.30%	Planning During Construction	\$40	\$3	7.0%	\$43	13.2%	\$45	\$3	\$48	2018Q1	3.2%	\$47	\$3	\$50
0.60%	Project Operations	\$20	\$1	7.0%	\$21	13.2%	\$23	\$2	\$24	2014Q2	-11.7%	\$20	\$1	\$21
31	CONSTRUCTION MANAGEMENT													
2.60%	Construction Management	\$100	\$7	7.0%	\$107	5.8%	\$106	\$7	\$113	2018Q1	1.4%	\$107	\$8	\$115
1.00%	Project Operation:	\$20	\$1	7.0%	\$21	5.8%	\$21	\$1	\$23	2018Q1	1.4%	\$21	\$2	\$23
1.30%	Project Management	\$100	\$7	7.0%	\$107	5.8%	\$106	\$7	\$113	2018Q1	1.4%	\$107	\$8	\$115
<b>CONTRACT COST TOTALS:</b>		\$15,146	\$3,244		\$18,389		\$16,086	\$3,438	\$19,524			\$16,223	\$3,480	\$19,703

FY13 Grays Harbor NIP CWE  
PROJECT DESCRIPTION

This Navigation Improvement Project is to report the initial construction cost and the additional O&M over the subsequent 50 years of deepening the channel from South Reach to Cow Point Reach for two different alternative depths. Alternative 1 is the no action alternative, with no initial construction costs and the O&M costs are currently captured in the FY13-FY15 Grays Harbor Maintenance Dredging contract. Alternative 2 would deepen the channel from the approved dredge depth of -36 MLLW down to -37 MLLW plus 2 feet of overdepth. Alternative 3 would deepen the channel from the approved dredge depth of -36 MLLW down to -38 MLLW plus 2 feet of overdepth. This is not a decision document since congress has already authorized dredging down to -38 MLLW back in 1989, however there has never been an economic benefit to dredge below -36 MLLW. This Limited Reevaluation Report will explore the economic benefits now that the Port of Grays Harbor is trying to attract larger ships holding more cargo. Starting from west to east there are 6 reaches and they are as follows: South Reach, Outer Crossover, Inner Crossover, North Channel, Hoquiam Reach, and Cow Point. The following assumptions are true for both alternative 2 and 3. All the material from South Reach will be dredged by a government furnished hopper and be disposed of at the South Beach openwater disposal site. It is assumed that 22,000 CY of contaminated material will be dredged via clamshell from Cow Point Reach and disposed of upland at Hoquiam Lagoon. The rest of the dredged material from all the other reaches will be via clamshell and disposed of at Point Chehalis open water disposal site. It is assumed that to complete the initial construction dredging it will take one year.

BASIS OF THIS ESTIMATE

The Limited Reevaluation Report and information provided by the NWS Coastal Engineering Section, the NWS Navigation Section and the NWD Regional Contract Manager.

CONSTRUCTION SCHEDULE

The dredging work window for the hopper dredge is from mid march to the end of may. The dredge work window for the clamshell is from the end of July to Valentines Day. The construction schedule for Alternative 3 has the hopper dredge completing work in 25 days and the clamshell dredge completing work in 153 days plus 15 days for upland disposal. Both of these duration fit within the provided work windows.

OVERTIME

Overtime is assumed at 7 days per week, 24 hrs per day for the in water work and 7 days per week, 12hrs per day for the disposal site operations.

ACQUISITION PLAN

Invitation for Bid, full and open solicitation.

CONTRACTING PLAN

The Prime Contractor is an dredging contractor. A sub contractor is expected to perform all upland disposal of dredge material.

SITE ACCESS

All access to and from the dredge will be via boat. Access to the hoquiam lagoon near terminal 3 is open and ready for construction traffic.

BORROW AND DISPOSAL AREAS

Estimated by NWS-ENR163CE  
Designed by NWS  
Prepared by Anthony Rodriguez

Preparation Date 12/18/2013  
Effective Date of Pricing 12/18/2013  
Estimated Construction Time 365 Days

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Designed by  
NWS  
Estimated by  
NWS-EN-TS-CE  
Prepared by  
Anthony Rodriguez

Design Document DRAFT LRR  
Document Date 12/13/2013  
District Seattle District  
Contact Anthony Rodriguez, 206-764-6953  
Budget Year 2014  
UOM System Original

**Direct Costs**

LaborCost  
EQCost  
MatlCost  
SubBidCost  
UserCost1

**Timeline/Currency**

Preparation Date 12/18/2013  
Escalation Date 12/18/2013  
Eff. Pricing Date 12/18/2013  
Estimated Duration 365 Day(s)  
Currency US dollars  
Exchange Rate 1.000000

Costbook CB12EB-b: MII English Cost Book 2012-b

Labor NLS2012: National Labor Library - Seattle 2012

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 job, the vacation pay fringes is taxable.

Labor Rates  
LaborCost1  
LaborCost2  
LaborCost3  
LaborCost4

Equipment EP11R08: MII Equipment 2011 Region 08

**08 NORTHWEST**

Sales Tax 5.40  
Working Hours per Year 1,540  
Labor Adjustment Factor 1.05  
Cost of Money 2.50  
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 0.072  
Gas 4.000  
Diesel Off-Road 3.900  
Diesel On-Road 4.500

**Shipping Rates**

Over 0 CWT 28.32  
Over 240 CWT 26.60  
Over 300 CWT 24.23  
Over 400 CWT 22.06  
Over 500 CWT 11.26  
Over 700 CWT 9.51  
Over 800 CWT 6.48

DRAFT

<u>Date</u>	<u>Author</u>	<u>Note</u>
6/28/2013	A Rod	All clamshell dredging costs were generated using the CEDEP program and included the following markups: 12% Overhead, 8% Profit and 2% Bond. No additional markups were added in the MII file.
6/28/2013	A Rod	Right now the upland disposal method is to bring the scow to Terminal 3 and off load it there. It will then travel roughly 3,000 LF to the Hoquiam Lagoon for disposal. The latest information presented by Kevin Kane is RE is that there will be no real estate fees since we will provide a betterment to the project site.
6/28/2013	A Rod	No contingency or escalation are included in this MII estimate. These markups are added and shown in the TPCS report.
7/15/2013	A Rod	UPDATE: Escalation in the TPCS will be set for FY17 based on input from Josh Jackson and Scott Long. The index values were taken from the CWCCIS Escalation Calculation TPCS report dated April 2011.
12/18/2013	A Rod	UPDATE: Baseline quantities have been updated and were provided by Josh Jackson on 8 Dec 13. In addition, O&M dredging has been added for 2018.
1/3/2014	A Rod	It is estimated that there are 22,000 CY of contaminated material to be dredged from the cow point turning basin. This has been brought up and confirmed in several meetings with the PDT. This volume is the same for both alternatives. A project note has been added.
1/3/2014	A Rod	UPDATE: As of Dec 20th 2013 the mitigation cost of \$500,000 will no longer be needed. The PM informed me that the impact to crab is anticipated to be minimal and thus any mitigation will no longer be needed.
1/3/2014	A Rod	The following is a list of the CEDEP Reference Files:GH NIP CS ALT 2 CP to PT CH 12-13-13GH NIP CS ALT 2 CP to T3 CH 6-27-13GH NIP CS ALT 2 HC to PT CH 12-13-13GH NIP CS ALT 2 IC to PT CH 12-13-13GH NIP CS ALT 2 NC to PT CH 12-13-13GH NIP CS ALT 2 OC to PT CH 12-13-13GH NIP HP ALT 2 SR to SJ 12-13-13GH NIP CS ALT 3 CP to PT CH 12-13-13GH NIP CS ALT 3 CP to T3 CH 12-13-13GH NIP CS ALT 3 HC to PT CH 12-13-13GH NIP CS ALT 3 IC to PT CH 12-13-13GH NIP CS ALT 3 NC to PT CH 12-13-13GH NIP CS ALT 3 OC to PT CH 12-13-13GH NIP HP ALT 3 SR to SJ 12-13-13
1/3/2014	A Rod	The PDT has assumed that one of two government hopper dredges will dredge the material at South Reach. The Yaquina and the Essayons are both moored in Portland. The daily rate for the Yaquina is \$75,000, the daily production rate is 11,000 CY and the unit cost is \$6.82. The daily rate for the Essayons is \$128,000, the daily production rate is 30,000 Cy and the unit cost is \$4.27. To be conservative the Yaquina unit cost will be used. It is anticipated to take 1 day to mob and 1 day to demob from Portland to Grays Harbor. Once the vessel is on site it can begin dredging immediately. To calculate the mob/demob for the Yaquina you multiply the mob/demob duration by the daily rate.

Description	Quantity	UOM	DirectCost	SubCMU	CostToPrime	JOOH_PRM	HOOH_PRM	Profit_PRM	Bond_PRM	Excise_PRM	ContractCost
Contract Cost Summary			23,082,926	374,257	23,457,183	112,266	181,871	135,797	36,665	8,976	23,932,758
Navigation Ports & Harbors	1.00	EA	23,082,926	374,257	23,457,183	112,266	181,871	135,797	36,665	8,976	23,932,758
Initial Construction Costs	1.00	LS	21,883,621	374,257	22,257,878	112,266	181,871	135,797	36,665	8,976	22,733,452
-37 MLLW Alternative	1.00	LS	8,164,194	194,209	8,358,403	58,257	94,376	70,468	19,026	4,658	8,605,188
Baseline Dredging	811,396.00	CY	8,164,194	194,209	8,358,403	58,257	94,376	70,468	19,026	4,658	8,605,188
Mob Demob	1.00	EA	649,034	0	649,034	0	0	0	0	0	649,034
Dredging	811,396.00	CY	7,515,160	194,209	7,709,369	58,257	94,376	70,468	19,026	4,658	7,956,154
-38 MLLW Alternative	1.00	LS	13,719,427	180,047	13,899,475	54,009	87,494	65,329	17,639	4,318	14,128,264
Baseline Dredging	1,751,705.00	CY	13,719,427	180,047	13,899,475	54,009	87,494	65,329	17,639	4,318	14,128,264
Mob Demob	1.00	EA	649,034	0	649,034	0	0	0	0	0	649,034
Dredging	1,751,705.00	CY	13,070,393	180,047	13,250,441	54,009	87,494	65,329	17,639	4,318	13,479,230
Annual O&M Costs	1.00	YR	1,199,306	0	1,199,306	0	0	0	0	0	1,199,306
-37 MLLW Alternative O&M	1.00	EA	425,380	0	425,380	0	0	0	0	0	425,380
O & M Dredging	49,739.00	CY	425,380	0	425,380	0	0	0	0	0	425,380
Clamshell	44,086.00	CY	386,826	0	386,826	0	0	0	0	0	386,826
Hopper	5,653.00	CY	38,553	0	38,553	0	0	0	0	0	38,553
-38 MLLW Alternative O&M	1.00	EA	773,926	0	773,926	0	0	0	0	0	773,926
O & M Dredging	107,378.00	CY	773,926	0	773,926	0	0	0	0	0	773,926
Clamshell	92,045.00	CY	669,355	0	669,355	0	0	0	0	0	669,355
Hopper	15,333.00	CY	104,571	0	104,571	0	0	0	0	0	104,571

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost
<b>Direct Cost Summary</b>								
<b>Navigation Ports &amp; Harbors</b>								
<b>Initial Construction Costs</b>								
<b>-37 MLLW Alternative</b>								
(Note: This alternative assumes that the new channel limit is -37 FT and the advance maintenance is set at -41 FT.)								
<b>Baseline Dredging</b>								
<b>Mob Demob</b>								
<b>Clamshell Mob/demob</b>								
(Note: It is expected that the clamshell will be mobilized from Tacoma, WA which has a one-way haul distance of 300 miles. The cost to mob/demob the dredge was given from CEDEP and already includes overhead, profit and bonding.)								
Mob/Demob Clamshell, Tacoma, WA to Grays Harbor, WA	1.00	EA	0	0	0	499,034	0	499,034
<b>Hopper Mob/Demob</b>								
(Note: It is expected that the hopper will be mobilized from Portland, OR. The dredge is expected to take 1 day to mob and 1 day to demob. The daily rate is \$75k so the total cost to mob and demob is anticipated to be \$150k for the Yaquina.)								
Mob/Demob Hopper, Long Beach, CA to Grays Harbor, WA	1.00	EA	0	0	0	150,000	0	150,000
<b>Dredging</b>								
<b>Clamshell</b>								
(Note: Unit costs were obtained from CEDEP. Pricing already includes 12% Overhead, 8% Profit and 2% Bond )								
Outter Crossover to Pt Chehalis	121,068.00	CY	0	0	0	0	1,076,295	1,076,295
(Note: One way haul distance is 6 MI.)								
Inner Reach to Pt Chehalis	128,968.00	CY	0	0	0	0	1,189,085	1,189,085
(Note: One way haul distance is 7.5 MI.)								
North Channel Reach to Pt Chehalis	126,354.00	CY	0	0	0	0	1,161,193	1,161,193
(Note: One way haul distance is 9.6 MI.)								
Hoquiam Channel Reach to Pt Chehalis	172,013.00	CY	0	0	0	0	1,534,356	1,534,356
(Note: One way haul distance is 12 MI.)								

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost
Cow Point Reach to Pt Chehalis (Note: One way haul distance is 15.1 MI.)	148,779.00	CY	0	0	0	0	1,361,328	1,361,328
<b>Hopper</b>								
(Note: It is assumed that the Government Hopper Dredge Yaquina will be dredging the South Reach site. The daily rate of \$75,000 and the production rate of 11,000 CY/Day were provided by the Portland District. No markups are assumed to be placed on this contractor since the daily rate is lump sum.)								
South Reach to Pt Chehalis (Note: One way haul distance is 3.4 MI.)	92,214.00	CY	0	0	0	0	628,899	628,899
<b>Upland Disposal</b>								
(Note: Assume the crew will consists of 1 clamshell crane that will load 3 trucks around the clock. These trucks will carry roughly 25 CY to the hoquiam lagoon which is no more than 3000 LF away from the shoreline. Estimate that there will be a loader to pick up the last bit of sludge at the bottom of the scow as well there will be pumps working around the clock to get all of the liquid waste out of the scow. Assume there will be one dozer at the lagoon to level all of the sludge waste. Assume that one 25 CY truck will deliver material every 10 minutes. This equates to 150 CY/HR. Assume 50 productive minutes of every hour and this reduces to 125 CY/HR. Based on 22,000 CY of sludge material this equates to 176 hours of effort.)								
Unload Crew	176.00	HR	92,477	115,523	0	0	0	208,000
Cycle hauling(wait, load,travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 20 min load/wait/unload, 12 C.Y. truck, cycle 1 mile, 20 MPH, excludes loading equipment (Note: One way distance from the loading ramp to hoquiam lagoon is no more than one mile each way. Add 10% for excess water suspended in the dredge mix.)	24,200.00	LCY	41,491	52,258	0	0	0	93,749
Custom Built Access Ramp (Note: This item is a place holder for a ramp to allow equipment to access the scow from the pier next to terminal 3. The basis of this estimate is a 36' steel truck loading yard ramp with 30,000 LB capacity from easyrack.org for a price of \$14,240. It is anticipated that the heaviest equipment to use the ramp will be a 724K front end loader with an operating weight of 45,000 LBS. Scale the cost by a factor of two to be conservative.)	1.00	EA	0	0	0	0	28,480	28,480
Cow Point Reach to Terminal 3/Hoquiam Lagoon (Note: One way haul distance is 3.6 MI. This unit cost came from CEDEP.)	22,000.00	CY	0	0	0	0	185,460	185,460
Traffic control Crew (Note: Two flaggers plus two trucks will be on site for 10 hour shifts.)	176.00	HR	13,911	4,403	0	0	0	18,314
<b>Permit</b>								
Permit to dredge	3.00	EA	0	0	0	30,000	0	30,000

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost
(Note: Assume that there will be 1 permit obtained to clamshell dredge, one for the hopper dredge and one for upland disposal.)								
<b>-38 MLLW Alternative</b>								
(Note: Alternative 2 assumes that the new channel limit is -38 FT and the advance maintenance is set at -42 FT.)								
<b>Baseline Dredging</b>								
<b>Mob Demob</b>								
<b>Clamshell Mob/demob</b>								
(Note: It is expected that the clamshell will be mobilized from Tacoma, WA which has a one-way haul distance of 300 miles. It is assumed that there will be two dredges out on site to dredge all the material in one season. The cost to mob/demob the dredge was given from CEDEP and already includes overhead, profit and bonding.)								
Mob/Demob Clamshell, Tacoma, WA to Grays Harbor, WA	1.00	EA	0	0	0	499,034	0	499,034
<b>Hopper Mob/Demob</b>								
(Note: It is expected that the hopper will be mobilized from Portland, OR. The dredge is expected to take 1 day to mob and 1 day to demob. The daily rate is \$75k so the total cost to mob and demob is anticipated to be \$150k for the Yaquina.)								
Mob/Demob Hopper, Long Beach, CA to Grays Harbor, WA	1.00	EA	0	0	0	150,000	0	150,000
<b>Dredging</b>								
<b>Clamshell</b>								
(Note: Unit costs were obtained from CEDEP. Pricing already includes 12% Overhead, 8% Profit and 2% Bond )								
Outter Crossover to Pt Chehalis	256,936.00	CY	0	0	0	0	1,901,326	1,901,326
(Note: One way haul distance is 6 MI.)								
Inner Reach to Pt Chehalis	263,936.00	CY	0	0	0	0	1,818,519	1,818,519
(Note: One way haul distance is 7.5 MI.)								
North Channel Reach to Pt Chehalis	274,023.00	CY	0	0	0	0	1,948,304	1,948,304
(Note: One way haul distance is 9.6 MI.)								
Hoquiam Channel Reach to Pt Chehalis	358,635.00	CY	0	0	0	0	2,657,485	2,657,485
(Note: One way haul distance is 12 MI.)								
Cow Point Reach to Pt Chehalis	326,047.00	CY	0	0	0	0	2,513,822	2,513,822
(Note: One way haul distance is 15.1 MI.)								

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost
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Hopper

(Note: It is assumed that the Government Hopper Dredge Yaquina will be dredging the South Reach site. The daily rate of \$75,000 and the production rate of 11,000 CY/Day were provided by the Portland District. No markups are assumed to be placed on this contractor since the daily rate is lump sum.)

South Reach to Pt Chehalis	250,128.00	CY	0	0	0	0	1,705,873	1,705,873
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(Note: One way haul distance is 3.4 MI.)

Upland Disposal

(Note: Assume the crew will consists of 1 clamshell crane that will load 3 trucks around the clock. These trucks will carry roughly 25 CY to the hoquiam lagoon which is no more than 3000 LF away from the shoreline. Estimate that there will be a loader to pick up the last bit of sludge at the bottom of the scow as well there will be pumps working around the clock to get all of the liquid waste out of the scow. Assume there will be one dozer at the lagoon to level all of the sludge waste. Assume that one 25 CY truck will deliver material every 10 minutes. This equates to 150 CY/HR. Assume 50 productive minutes of every hour and this reduces to 125 CY/HR. Based on 22,000 CY of sludge material this equates to 176 hours of effort.)

Unload Crew	176.00	HR	92,477	115,523	0	0	0	208,000
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Custom Built Access Ramp	1.00	EA	0	0	0	0	28,480	28,480
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(Note: This item is a place holder for a ramp to allow equipment to access the scow from the pier next to terminal 3. The basis of this estimate is a 36' steel truck loading yard ramp with 30,000 LB capacity from easyrack.org for a price of \$14,240. It is anticipated that the heaviest equipment to use the ramp will be a 724K front end loader with an operating weight of 45,000 LBS. Scale the cost by a factor of two to be conservative.)

Cycle hauling(wait, load,travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 20 min load/wait/unload, 12 C.Y. truck, cycle 1 mile, 20 MPH, excludes loading equipment	24,200.00	LCY	41,491	52,258	0	0	0	93,749
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(Note: One way distance from the loading ramp to hoquiam lagoon is no more than one mile each way. Add 10% for excess water suspended in the dredge mix.)

Cow Point Reach to Terminal 3/Hoquiam Lagoon	22,000.00	CY	0	0	0	0	146,520	146,520
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(Note: One way haul distance is 3.6 MI. This unit cost from CEDEP.)

Traffic control Crew	176.00	HR	13,911	4,403	0	0	0	18,314
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(Note: Two flaggers plus two trucks will be on site for 10 hour shifts.)

Permit

Permit to dredge	3.00	EA	0	0	0	30,000	0	30,000
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(Note: Assume that there will be 1 permit obtained to clamshell dredge, one for the hopper dredge and one for upland disposal.)

Annual O&M Costs

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost
<b>-37 MLLW Alternative O&amp;M</b>								
<b>O &amp; M Dredging</b>								
(Note: O&M dredging will take place for 50 years from 2018 through 2067. The O&M dredge quantities are assumed to be additional annual dredging to what is already required. Thus there will not need to be a mob/demob each year since O&M dredging is already performed annually at this site. )								
<b>Clamshell</b>								
(Note: Unit costs were obtained from CEDEP. Pricing already includes 12% Overhead, 8% Profit and 2% Bond )								
Outer Crossover to Pt Chehalis	7,421.00	CY	0	0	0	0	67,086	67,086
(Note: One way haul distance is 6 MI.)								
Inner Reach to Pt Chehalis	7,906.00	CY	0	0	0	0	69,968	69,968
(Note: One way haul distance is 7.5 MI.)								
North Channel Reach to Pt Chehalis	7,746.00	CY	0	0	0	0	65,609	65,609
(Note: One way haul distance is 9.6 MI.)								
Hoquiam Channel Reach to Pt Chehalis	10,544.00	CY	0	0	0	0	90,257	90,257
(Note: One way haul distance is 12 MI.)								
Cow Point Reach to Pt Chehalis	10,469.00	CY	0	0	0	0	93,907	93,907
(Note: One way haul distance is 15.1 MI.)								
<b>Hopper</b>								
(Note: It is assumed that the Government Hopper Dredge Yaquina will be dredging the South Reach site. The daily rate of \$75,000 and the production rate of 11,000 CY/Day were provided by the Portland District. No markups are assumed to be placed on this contractor since the daily rate is lump sum.)								
South Reach to Pt Chehalis	5,653.00	CY	0	0	0	0	38,553	38,553
(Note: One way haul distance is 3.4 MI.)								
<b>-38 MLLW Alternative O&amp;M</b>								
<b>O &amp; M Dredging</b>								
<b>Clamshell</b>								
(Note: Unit costs were obtained from CEDEP. Pricing already includes 12% Overhead, 8% Profit and 2% Bond )								
Outer Crossover to Pt Chehalis	15,749.00	CY	0	0	0	0	118,905	118,905

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost
<b>(Note: One way haul distance is 6 MI.)</b>								
Inner Reach to Pt Chehalis	16,179.00	CY	0	0	0	0	103,222	103,222
<b>(Note: One way haul distance is 7.5 MI.)</b>								
North Channel Reach to Pt Chehalis	16,798.00	CY	0	0	0	0	114,562	114,562
<b>(Note: One way haul distance is 9.6 MI.)</b>								
Hoquiam Channel Reach to Pt Chehalis	21,984.00	CY	0	0	0	0	182,467	182,467
<b>(Note: One way haul distance is 12 MI.)</b>								
Cow Point Reach to Pt Chehalis	21,335.00	CY	0	0	0	0	150,198	150,198
<b>(Note: One way haul distance is 15.1 MI.)</b>								
<b>Hopper</b>								
<b>(Note: It is assumed that the Government Hopper Dredge Yaquina will be dredging the South Reach site. The daily rate of \$75,000 and the production rate of 11,000 CY/Day were provided by the Portland District. No markups are assumed to be placed on this contractor since the daily rate is lump sum.)</b>								
South Reach to Pt Chehalis	15,333.00	CY	0	0	0	0	104,571	104,571
<b>(Note: One way haul distance is 3.4 MI.)</b>								

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# Contractor Markups Report

□ FY13 Grays Harbor NIP CWE

Q:\ZZ Estimates\1 Working\Civil Works\Gray Harbor GI NIP\2 CWEs\30%  
CWE\MII\FY13 Grays Harbor NIP Without Markups 01-14-14.mlp

## Prime

Markup		Own Work	Sub Work
JOOH [Running %]		8.00%	8.00%
HOOH [Running %]		12.00%	12.00%
Profit [Running %]		8.00%	8.00%
Bond & Insurance [Running %]	Class B 24 mo.	2.00%	2.00%
Excise Tax [Running %]		0.48%	0.48%

## Sub Contractor

Markup		Own Work	Sub Work
JOOH [Running %]		12.00%	12.00%
HOOH [Running %]		10.00%	10.00%
Profit [Running %]		8.00%	8.00%
Bond & Insurance [Running %]	Class B 24 mo.	2.00%	2.00%
Excise Tax [Running %]		0.48%	0.48%

## Prime No Markups

Markup		Own Work	Sub Work
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## Gov S&A

Markup		Own Work	Sub Work
JOOH Calc (Small Tools) [Small Tools]		2.00%	0.00%
JOOH Calc [JOOH]		0.00%	0.00%

**Abbreviated Risk Analysis**

Project (less than \$40M): **Grays Harbor NIP -37 MLLW Alternative**  
 Project Development Stage: **Feasibility (Alternatives)**  
 Risk Category: **Moderate Risk: Typical Project or Possible Life Safety**

Total Construction Contract Cost = \$ **8,605,188**

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ 135,000	10.00%	\$ 13,500	\$ 148,500.00
1	12 NAVIGATION, PORTS AND HARBORS	Clamshell Mob/Demob	\$ 499,034	15.02%	\$ 74,975	\$ 574,008.79
2	12 NAVIGATION, PORTS AND HARBORS	Hopper Mob/Demob	\$ 150,000	16.60%	\$ 24,900	\$ 174,899.69
3	12 NAVIGATION, PORTS AND HARBORS	Clamshell Dredging	\$ 6,322,257	26.89%	\$ 1,699,770	\$ 8,022,026.63
4	12 NAVIGATION, PORTS AND HARBORS	Hopper Dredging	\$ 628,899	15.72%	\$ 98,858	\$ 727,756.97
5	12 NAVIGATION, PORTS AND HARBORS	Upland Disposal	\$ 974,998	29.06%	\$ 283,291	\$ 1,258,289.09
6	12 NAVIGATION, PORTS AND HARBORS	Permit Costs	\$ 30,000	9.09%	\$ 2,727	\$ 32,727.38
7			\$ -	0.00%	\$ -	\$ -
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12		<b>Remaining Construction Items</b>	\$ -	0.0%	\$ -	\$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 876,000	7.00%	\$ 61,320	\$ 937,320.00
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 421,000	7.00%	\$ 29,470	\$ 450,470.00

<b>Totals</b>						
	Real Estate	\$	135,000	10.00%	\$	148,500.00
	Total Construction Estimate	\$	8,605,188	25.39%	\$	10,789,709
	Total Planning, Engineering & Design	\$	876,000	7.00%	\$	937,320
	Total Construction Management	\$	421,000	7.00%	\$	450,470
	<b>Total</b>	\$	<b>10,037,188</b>		\$	<b>12,325,999</b>

Grays Harbor NIP -37 MLLW Alternative

Feasibility (Alternatives)  
Abbreviated Risk Analysis

Meeting Date: 30-Jul-13

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
<b>Project Scope Growth</b>							
						Max Potential Cost Growth	75%
PS-1	Clamshell Mob/Demob	• Potential for scope growth, added features and quantities?	N/a		Unlikely	Negligible	0
PS-2	Hopper Mob/Demob	• Potential for scope growth, added features and quantities?	n/a		Unlikely	Negligible	0
PS-3	Clamshell Dredging	• Design confidence?	• Design confidence? Will the channel alignment change?	It is unlikely that the channel alignment will change from that assumed in this estimate. The PDT believed that if the channel does change it will increase the quantities by less than 10% and will have a significant impact.	Unlikely	Significant	1
PS-4	Hopper Dredging	• Design confidence?	• Design confidence? Will the channel alignment change?	The channel alignment doesn't impact the South Reach where the hopper is anticipated to dredge.	Unlikely	Negligible	0
PS-5	Upland Disposal	• Potential for scope growth, added features and quantities?	n/a		Unlikely	Negligible	0
PS-6	Permit Costs	• Potential for scope growth, added features and quantities?	How many permits will be needed and what is the effort to obtain these permits?	It is assumed that there will be (3) \$10,000 permits for clamshell dredging, hopper dredging and upland disposal. It is possible that (2 or 3) more may be needed however this cost will be less than \$40,000 and negligible.	Possible	Negligible	0
PS-7	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-8	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-9	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-10	0	• Investigations sufficient to support design assumptions?			Unlikely	Negligible	0
PS-11	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-12	Remaining Construction Items	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-14	Construction Management	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0

**Acquisition Strategy**

							Max Potential Cost Growth	30%
AS-1	Clamshell Mob/Demob	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The prime is assumed to do this work feature, it is unlikely but if this work was to be sub contracted out it would add 25% to the mob/demob and this would be significant.	Unlikely	Significant	1	
AS-2	Hopper Mob/Demob	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The government is assumed to do this work feature, it is unlikely (10% or less) but if this work was to be sub contracted out it would cost roughly \$1.0M \$1.5M (provided by Courtney Jones at PDX) and this would be a crisis cost impact.	Unlikely	Crisis	3	
AS-3	Clamshell Dredging	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The prime is assumed to do this work feature, it is unlikely but if this work was to be sub contracted out it would add 25% to the clamshell dredging and this would add over \$1M and be a crisis cost impact.	Unlikely	Crisis	3	
AS-4	Hopper Dredging	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The government is assumed to do this work feature. It is unlikely but if this work was to be sub contracted, the commercial hopper dredge unit price would be \$2-3/CY plus 60% markups. This would be at the same rate or cheaper than the gov hopper dredge and this would be a negligible cost impact.	Unlikely	Negligible	0	
AS-5	Upland Disposal	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	This work is already assumed to be subcontracted out so there are no additional contractor markups expected.	Unlikely	Negligible	0	
AS-6	Permit Costs	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	It would be unlikely for this work to be subcontracted out and if it was it would be a negligible cost.	Unlikely	Negligible	0	
AS-7	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-8	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-9	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-10	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-11	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-12	Remaining Construction Items	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-14	Construction Management	• Contracting plan firmly established?			Unlikely	Negligible	0	

**Construction Elements**

					Max Potential Cost Growth	25%	
CE-1	Clamshell Mob/Demob	• Accelerated schedule or harsh weather schedule?	Affects of weather delays?	It is anticipated that bad weather can delay the arrival of the clamshell by up to 2 days. Since the second closest location a contractor can mob from is Tacoma, 2 days of standby time is not unreasonable. 2 days of standby costs is anticipated to be 0.5% to 1% which is marginal and possible given the number of anticipated bad weather days in the winter.	Possible	Marginal	1
CE-2	Hopper Mob/Demob	• Accelerated schedule or harsh weather schedule?	Affects of weather delays?	The mob time for the hopper dredge is assumed to be 1 day. It is possible that the hopper can be delayed by 2 days and the standby time for this effort is anticipated to be between 0.5 and 1% which would be a marginal cost impact.	Possible	Marginal	1
CE-3	Clamshell Dredging	• Accelerated schedule or harsh weather schedule?	Hard native (sandstone) material to be dredged at cowpoint reach	This material is found at -37 and -38 MLLW and is harder than the typical sandy soil found through the channel length. It is likely that this material will be encountered and slow down the production rate. A heavy duty clamshell bucket with less capacity may be used. This could increase the cost between 0.5 to 1% and would be a marginal cost impact.	Likely	Marginal	2
CE-4	Hopper Dredging	• Accelerated schedule or harsh weather schedule?	Affects of weather delays?	5 Bad weather likely since the South Reach is so exposed to the Pacific Ocean tides. The standby cost for this is anticipated to be roughly \$40,000 per day so the cost impact would be between 1 to 5% and this would be a significant cost impact.	Likely	Significant	3
CE-5	Upland Disposal	• Accelerated schedule or harsh weather schedule?	Unsure of handling requirements to hold upland spoils	Likely that there will be additional costs to handle this material. Not sure what these cost will be but it isn't expected to exceed \$100,000. This would be a significant cost impact.	Likely	Significant	3
CE-6	Permit Costs	• Accelerated schedule or harsh weather schedule?	n/a		Unlikely	Negligible	0
CE-7	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-8	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-9	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-10	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-11	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-12	Remaining Construction Items	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-13	Planning, Engineering, & Design	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-14	Construction Management	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0

**Quantities for Current Scope**

							Max Potential Cost Growth	20%
Q-1	Clamshell Mob/Demob	• Level of confidence based on design and assumptions?	n/a			Unlikely	Negligible	0
Q-2	Hopper Mob/Demob	• Level of confidence based on design and assumptions?	n/a			Unlikely	Negligible	0
Q-3	Clamshell Dredging	• Level of confidence based on design and assumptions?	Increase is the quantities?		The quantities for the current scope are conservative. It is possible that they can change but no more that a 10% increase. This would be a marginal cost increase since it would only increase the bank height and actually increase production rate. The increase is cost would come from the additional scow disposal trips needed.	Possible	Marginal	1
Q-4	Hopper Dredging	• Level of confidence based on design and assumptions?	Increase is the quantities?		The quantities for the current scope are conservative. It is possible that they can change but no more that a 10% increase. This would be a marginal cost increase there is not a large quantity to dredge by hopper.	Possible	Marginal	1
Q-5	Upland Disposal	• Level of confidence based on design and assumptions?	Increase is the quantities?		The quantities for the current scope are conservative. It is possible that they can change but no more that a 10% increase. This would be a marginal cost increase there is not a large quantity to dispose upland.	Possible	Marginal	1
Q-6	Permit Costs	• Level of confidence based on design and assumptions?	n/a			Unlikely	Negligible	0
Q-7	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-8	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-9	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-10	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-11	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-12	Remaining Construction Items	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-13	Planning, Engineering, & Design	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-14	Construction Management	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0

Specialty Fabrication or Equipment

							Max Potential Cost Growth	75%
FE-1	Clamshell Mob/Demob	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-2	Hopper Mob/Demob	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-3	Clamshell Dredging	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-4	Hopper Dredging	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-5	Upland Disposal	• Unusual parts, material or equipment manufactured or installed?	May need pump to shore capabilities such as a hydraulic dredge versus clamshell	It is possible that we cannot use the Hoquiam Lagoon. Worst case is that we need to pump the contaminated dredged material onshore and then haul the material up to 20 miles. Add that we may need an enviro bucket which would slow the production rate and this effort is expected to be close to \$750K (\$400K for hauling, \$200K for pumping, \$150K enviro bucket).		Possible	Critical	3
FE-6	Permit Costs	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-7	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-8	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-9	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-10	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-11	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-12	Remaining Construction Items	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-13	Planning, Engineering, & Design	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-14	Construction Management	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0

**Cost Estimate Assumptions**

							Max Potential Cost Growth	35%
CT-1	Clamshell Mob/Demob	• Reliability and number of key quotes?	How reliable are the CEDEP numbers?	In past projects, specifically for the current O&M dredging at Grays Harbor, the GE has been on the high side. While there is a chance that the GE can be low on this estimate, historical data will show that the GE is almost always on the high side. With that logic it is possible that the CWE is under estimated. Worst case is that the estimate is 5-10% off.	Unlikely	Critical	2	
CT-2	Hopper Mob/Demob	• Reliability and number of key quotes?	N/A	The same risk does not apply to this feature of work since	Unlikely	Negligible	0	
CT-3	Clamshell Dredging	• Reliability and number of key quotes?	How reliable are the CEDEP numbers?	In past projects, specifically for the current O&M dredging at Grays Harbor, the GE has been on the high side. While there is a chance that the GE can be low on this estimate, historical data will show that the GE is almost always on the high side. With that logic it is possible that the CWE is under estimated. Worst case is that the estimate is 5-10% off.	Unlikely	Negligible	0	
CT-4	Hopper Dredging	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-5	Upland Disposal	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-6	Permit Costs	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-7	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-8	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-9	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-10	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-11	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-12	Remaining Construction Items	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-13	Planning, Engineering, & Design	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-14	Construction Management	• Reliability and number of key quotes?			Unlikely	Negligible	0	

External Project Risks

							Max Potential Cost Growth	40%
EX-1	Clamshell Mob/Demob	• Potential for severe adverse weather?	n/a			Unlikely	Marginal	0
EX-2	Hopper Mob/Demob	• Potential for severe adverse weather?	What if the gov hopper is not available		The likelihood is that 1 in every 10 years the gov hopper dredges will not be available. An east coast hopper would need to be brought in and this would be expensive. This risk has already been captured in risk element AS-2.	Unlikely	Negligible	0
EX-3	Clamshell Dredging	• Unanticipated inflations in fuel, key materials?	Mitigation Risk to be reinstated?		It is unlikely that the mitigation cost will be reinstated into the cost estimate however if it was to be placed back in we would need another place holder of \$500K.	Unlikely	Critical	2
EX-4	Hopper Dredging	• Potential for severe adverse weather?	What if the gov hopper is not available		The likelihood is that 1 in every 10 years the gov hopper dredges will not be available. An east coast hopper would need to be brought in and this would be expensive to mob however once here the unit costs is not much higher than the gov hopper. This risk was already caputed in risk element AS-4.	Unlikely	Negligible	0
EX-5	Upland Disposal	• Potential for severe adverse weather?	n/a			Unlikely	Negligible	0
EX-6	Permit Costs	• Potential for severe adverse weather?	Fish and Wildlife mitigation requirements		Getting buyoff from US Fish and Wildlife to approve our mitigation efforts may take more coordination than expected. The cost impact is assumed to be marginal at the greatest extent.	Possible	Marginal	1
EX-7	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-8	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-9	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-10	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-11	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-12	Remaining Construction Items	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-13	Planning, Engineering, & Design	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-14	Construction Management	• Potential for severe adverse weather?				Unlikely	Negligible	0

**Abbreviated Risk Analysis**

Project (less than \$40M): **Grays Harbor NIP -38 MLLW Alternative**  
 Project Development Stage: **Feasibility (Alternatives)**  
 Risk Category: **Moderate Risk: Typical Project or Possible Life Safety**

Total Construction Contract Cost = \$ **14,128,264**

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ 135,000	10.00%	\$ 13,500	\$ 148,500.00
1	12 NAVIGATION, PORTS AND HARBORS	Clamshell Mob/Demob	\$ 499,034	8.90%	\$ 44,432	\$ 543,466.26
2	12 NAVIGATION, PORTS AND HARBORS	Hopper Mob/Demob	\$ 150,000	12.80%	\$ 19,203	\$ 169,202.57
3	12 NAVIGATION, PORTS AND HARBORS	Clamshell Dredging	\$ 10,839,457	24.60%	\$ 2,666,866	\$ 13,506,323.14
4	12 NAVIGATION, PORTS AND HARBORS	Hopper Dredging	\$ 1,705,873	15.72%	\$ 268,150	\$ 1,974,022.80
5	12 NAVIGATION, PORTS AND HARBORS	Upland Disposal	\$ 903,900	18.07%	\$ 163,318	\$ 1,067,218.40
6	12 NAVIGATION, PORTS AND HARBORS	Permit Costs	\$ 30,000	9.09%	\$ 2,727	\$ 32,727.38
7			\$ -	0.00%	\$ -	\$ -
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12		<b>Remaining Construction Items</b>	\$ -	0.0%	\$ -	\$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 876,000	7.00%	\$ 61,320	\$ 937,320.00
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 421,000	7.00%	\$ 29,470	\$ 450,470.00

<b>Totals</b>						
		Real Estate	\$ 135,000	10.00%	\$ 13,500	\$ 148,500.00
		Total Construction Estimate	\$ 14,128,264	22.40%	\$ 3,164,697	\$ 17,292,961
		Total Planning, Engineering & Design	\$ 876,000	7.00%	\$ 61,320	\$ 937,320
		Total Construction Management	\$ 421,000	7.00%	\$ 29,470	\$ 450,470
		<b>Total</b>	<b>\$ 15,560,264</b>		<b>\$ 3,268,987</b>	<b>\$ 18,829,251</b>

**Grays Harbor NIP -38 MLLW Alternative**  
 Feasibility (Alternatives)  
 Abbreviated Risk Analysis

Meeting Date: 30-Jul-13

**Risk Level**

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
<b>Project Scope Growth</b>							
						Max Potential Cost Growth	75%
PS-1	Clamshell Mob/Demob	• Potential for scope growth, added features and quantities?	N/a		Unlikely	Negligible	0
PS-2	Hopper Mob/Demob	• Potential for scope growth, added features and quantities?	n/a		Unlikely	Negligible	0
PS-3	Clamshell Dredging	• Potential for scope growth, added features and quantities?	• Design confidence? Will the channel alignment change?	It is unlikely that the channel alignment will change from that assumed in this estimate. The PDT believed that if the channel does change it will increase the quantities by less than 10% and will have a significant impact.	Unlikely	Significant	1
PS-4	Hopper Dredging	• Potential for scope growth, added features and quantities?	• Design confidence? Will the channel alignment change?	The channel alignment doesn't impact the South Reach where the hopper is anticipated to dredge.	Unlikely	Negligible	0
PS-5	Upland Disposal	• Potential for scope growth, added features and quantities?	n/a		Unlikely	Negligible	0
PS-6	Permit Costs	• Potential for scope growth, added features and quantities?	How many permits will be needed and what is the effort to obtain these permits?	It is assumed that there will be (3) \$10,000 permits for clamshell dredging, hopper dredging and upland disposal. It is possible that (2 or 3) more may be needed however this cost will be less than \$40,000 and negligible.	Possible	Negligible	0
PS-7	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-8	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-9	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-10	0	• Investigations sufficient to support design assumptions?			Unlikely	Negligible	0
PS-11	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-12	Remaining Construction Items	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-14	Construction Management	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0

**Acquisition Strategy**

							Max Potential Cost Growth	30%
AS-1	Clamshell Mob/Demob	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The prime is assumed to do this work feature, it is unlikely but if this work was to be sub contracted out it would add 25% to the mob/demob and this would be significant.	Unlikely	Negligible	0	
AS-2	Hopper Mob/Demob	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The government is assumed to do this work feature, it is unlikely (10% or less) but if this work was to be sub contracted out it would cost roughly \$1.0M \$1.5M (provided by Courtney Jones at PDX) and this would be a crisis cost impact.	Unlikely	Critical	2	
AS-3	Clamshell Dredging	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The prime is assumed to do this work feature, it is unlikely but if this work was to be sub contracted out it would add 25% to the clamshell dredging and this would add over \$2M and be a crisis cost impact.	Unlikely	Crisis	3	
AS-4	Hopper Dredging	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	The government is assumed to do this work feature. It is unlikely but if this work was to be sub contracted, the commercial hopper dredge unit price would be \$2-3/CY plus 60% markups. This would be at the same rate or cheaper than the gov hopper dredge and this would be a negligible cost impact.	Unlikely	Negligible	0	
AS-5	Upland Disposal	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	This work is already assumed to be subcontracted out so there are no additional contractor markups expected.	Unlikely	Negligible	0	
AS-6	Permit Costs	• Contracting plan firmly established?	Are the contractor markup rates appropriate?	It would be unlikely for this work to be subcontracted out and if it was it would be a negligible cost.	Unlikely	Negligible	0	
AS-7	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-8	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-9	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-10	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-11	0	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-12	Remaining Construction Items	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?			Unlikely	Negligible	0	
AS-14	Construction Management	• Contracting plan firmly established?			Unlikely	Negligible	0	

**Construction Elements**

					Max Potential Cost Growth	25%	
CE-1	Clamshell Mob/Demob	• Accelerated schedule or harsh weather schedule?	Affects of weather delays?	It is anticipated that bad weather can delay the arrival of the clamshell by up to 2 days. Since the second closest location a contractor can mob from is Tacoma, 2 days of standby time is not unreasonable. 2 days of standby costs is anticipated to be 0.5% to 1% which is marginal and possible given the number of anticipated bad weather days in the winter.	Possible	Marginal	1
CE-2	Hopper Mob/Demob	• Accelerated schedule or harsh weather schedule?	Affects of weather delays?	The mob time for the hopper dredge is assumed to be 1 day. It is possible that the hopper can be delayed by 2 days and the standby time for this effort is anticipated to be between 0.5 and 1% which would be a marginal cost impact.	Possible	Marginal	1
CE-3	Clamshell Dredging	• Accelerated schedule or harsh weather schedule?	Hard native (sandstone) material to be dredged at cowpoint reach	This material is found at -37 and -38 MLLW and is harder than the typical sandy soil found through the channel length. It is likely that this material will be encountered and slow down the production rate. A heavy duty clamshell bucket with less capacity may be used. This could increase the cost between 0.5 to 1% and would be a marginal cost impact.	Likely	Marginal	2
CE-4	Hopper Dredging	• Accelerated schedule or harsh weather schedule?	Affects of weather delays?	5 Bad weather likely since the South Reach is so exposed to the Pacific Ocean tides. The standby cost for this is anticipated to be roughly \$40,000 per day so the cost impact would be between 1 to 5% and this would be a significant cost impact.	Likely	Significant	3
CE-5	Upland Disposal	• Accelerated schedule or harsh weather schedule?	Unsure of handling requirements to hold upland spoils	Likely that there will be additional costs to handle this material. Not sure what these cost will be but it isn't expected to exceed \$100,000. This would be a significant cost impact.	Likely	Marginal	2
CE-6	Permit Costs	• Accelerated schedule or harsh weather schedule?	n/a		Unlikely	Negligible	0
CE-7	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-8	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-9	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-10	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-11	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-12	Remaining Construction Items	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-13	Planning, Engineering, & Design	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-14	Construction Management	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0

**Quantities for Current Scope**

							Max Potential Cost Growth	20%
Q-1	Clamshell Mob/Demob	• Level of confidence based on design and assumptions?	n/a			Unlikely	Negligible	0
Q-2	Hopper Mob/Demob	• Level of confidence based on design and assumptions?	n/a			Unlikely	Negligible	0
Q-3	Clamshell Dredging	• Level of confidence based on design and assumptions?	Increase is the quantities?		The quantities for the current scope are conservative. It is possible that they can change but no more that a 10% increase. This would be a marginal cost increase since it would only increase the bank height and actually increase production rate. The increase is cost would come from the additional scow disposal trips needed.	Possible	Marginal	1
Q-4	Hopper Dredging	• Level of confidence based on design and assumptions?	Increase is the quantities?		The quantities for the current scope are conservative. It is possible that they can change but no more that a 10% increase. This would be a marginal cost increase there is not a large quantity to dredge by hopper.	Possible	Marginal	1
Q-5	Upland Disposal	• Level of confidence based on design and assumptions?	Increase is the quantities?		The quantities for the current scope are conservative. It is possible that they can change but no more that a 10% increase. This would be a marginal cost increase there is not a large quantity to dispose upland.	Possible	Marginal	1
Q-6	Permit Costs	• Level of confidence based on design and assumptions?	n/a			Unlikely	Negligible	0
Q-7	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-8	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-9	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-10	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-11	0	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-12	Remaining Construction Items	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-13	Planning, Engineering, & Design	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0
Q-14	Construction Management	• Level of confidence based on design and assumptions?				Unlikely	Negligible	0

Specialty Fabrication or Equipment

							Max Potential Cost Growth	75%
FE-1	Clamshell Mob/Demob	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-2	Hopper Mob/Demob	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-3	Clamshell Dredging	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-4	Hopper Dredging	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-5	Upland Disposal	• Unusual parts, material or equipment manufactured or installed?	May need pump to shore capabilities such as a hydraulic dredge versus clamshell	It is possible that we cannot use the Hoquiam Lagoon. Worst case is that we need to pump the contaminated dredged material onshore and then haul the material up to 20 miles. Add that we may need an enviro bucket which would slow the production rate and this effort is expected to be close to \$750K (\$400K for hauling, \$200K for pumping, \$150K enviro bucket).		Possible	Significant	2
FE-6	Permit Costs	• Unusual parts, material or equipment manufactured or installed?	n/a			Unlikely	Negligible	0
FE-7	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-8	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-9	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-10	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-11	0	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-12	Remaining Construction Items	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-13	Planning, Engineering, & Design	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0
FE-14	Construction Management	• Unusual parts, material or equipment manufactured or installed?				Unlikely	Negligible	0

**Cost Estimate Assumptions**

							Max Potential Cost Growth	35%
CT-1	Clamshell Mob/Demob	• Reliability and number of key quotes?	How reliable are the CEDEP numbers?	In past projects, specifically for the current O&M dredging at Grays Harbor, the GE has been on the high side. While there is a chance that the GE can be low on this estimate, historical data will show that the GE is almost always on the high side. With that logic it is possible that the CWE is under estimated. Worst case is that the estimate is 5-10% off.	Unlikely	Negligible	0	
CT-2	Hopper Mob/Demob	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-3	Clamshell Dredging	• Reliability and number of key quotes?	How reliable are the CEDEP numbers?	In past projects, specifically for the current O&M dredging at Grays Harbor, the GE has been on the high side. While there is a chance that the GE can be low on this estimate, historical data will show that the GE is almost always on the high side. With that logic it is possible that the CWE is under estimated. Worst case is that the estimate is 5-10% off.	Unlikely	Negligible	0	
CT-4	Hopper Dredging	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-5	Upland Disposal	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-6	Permit Costs	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-7	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-8	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-9	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-10	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-11	0	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-12	Remaining Construction Items	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-13	Planning, Engineering, & Design	• Reliability and number of key quotes?			Unlikely	Negligible	0	
CT-14	Construction Management	• Reliability and number of key quotes?			Unlikely	Negligible	0	

External Project Risks							Max Potential Cost Growth	40%
EX-1	Clamshell Mob/Demob	• Potential for severe adverse weather?	n/a			Unlikely	Marginal	0
EX-2	Hopper Mob/Demob	• Potential for severe adverse weather?	What if the gov hopper is not available		The likelihood is that 1 in every 10 years the gov hopper dredges will not be available. An east coast hopper would need to be brought in and this would be expensive. This risk has already been captured in risk element AS-2.	Unlikely	Negligible	0
EX-3	Clamshell Dredging	• Unanticipated inflations in fuel, key materials?	Mitigation Risk to be reinstated?		It is unlikely that the mitigation cost will be reinstated into the cost estimate however if it was to be placed back in we would need another place holder of \$500K.	Unlikely	Significant	1
EX-4	Hopper Dredging	• Potential for severe adverse weather?	What if the gov hopper is not available		The likelihood is that 1 in every 10 years the gov hopper dredges will not be available. An east coast hopper would need to be brought in and this would be expensive to mob however once here the unit costs is not much higher than the gov hopper. This risk was already caputed in risk element AS-4.	Unlikely	Negligible	0
EX-5	Upland Disposal	• Potential for severe adverse weather?	n/a			Unlikely	Negligible	0
EX-6	Permit Costs	• Potential for severe adverse weather?	Fish and Wildlife mitigation requirements		Getting buyoff from US Fish and Wildlife to approve our mitigation efforts may take more coordination than expected. The cost impact is assumed to be marginal at the greatest extent.	Possible	Marginal	1
EX-7	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-8	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-9	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-10	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-11	0	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-12	Remaining Construction Items	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-13	Planning, Engineering, & Design	• Potential for severe adverse weather?				Unlikely	Negligible	0
EX-14	Construction Management	• Potential for severe adverse weather?				Unlikely	Negligible	0

ID	Task Name	Duration	Start	Finish	Predecessors	April 2017							May 2017							June 2017							July 2017							August 2017							September 2017							October 2017																																																																																																
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	<b>Hopper Dredging</b>	10 days?	Mon 4/3/17	Thu 4/13/17																																																																																																																																												
2	Mob Hopper Dredge	1 day	Mon 4/3/17	Tue 4/4/17																																																																																																																																												
3	Dredge South Reach	8 days	Tue 4/4/17	Wed 4/12/17	2																																																																																																																																											
4	Demob Hopper Dredge	1 day?	Wed 4/12/17	Thu 4/13/17	3																																																																																																																																											
5	<b>Clamshell Dredging</b>	94 days?	Sun 7/16/17	Wed 10/18/17																																																																																																																																												
6	Mob Clamshell Dredge	5 days	Sun 7/16/17	Fri 7/21/17																																																																																																																																												
7	Dredge Outer Crossover	14 days?	Fri 7/21/17	Fri 8/4/17	6																																																																																																																																											
8	Dredge Inner Crossover	15 days	Fri 8/4/17	Sat 8/19/17	7																																																																																																																																											
9	Dredge North Channel	15 days	Sat 8/19/17	Sun 9/3/17	8																																																																																																																																											
10	Dredge Hoquiam Channel	20 days	Sun 9/3/17	Sat 9/23/17	9																																																																																																																																											
11	Dredge Cow Point Hazardous	3 days	Sat 9/23/17	Tue 9/26/17	10																																																																																																																																											
12	Dredge Cow Point Non Hazardous	17 days	Tue 9/26/17	Fri 10/13/17	11																																																																																																																																											
13	Demob Clamshell Dredge	5 days	Fri 10/13/17	Wed 10/18/17	12																																																																																																																																											
14	<b>Upland Disposal</b>	15 days	Tue 9/26/17	Wed 10/11/17																																																																																																																																												
15	Unload Scow	15 days	Tue 9/26/17	Wed 10/11/17	11																																																																																																																																											
16	Haul Material	15 days	Tue 9/26/17	Wed 10/11/17	11																																																																																																																																											
17	Place Material	15 days	Tue 9/26/17	Wed 10/11/17	11																																																																																																																																											

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Project: Alternative 2 -37 01-06-13.mp  
Date: Mon 1/6/14

Task Split

Progress Milestone

Summary Project Summary

External Tasks External Milestone

Deadline

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