

Cost Estimate Low Production Rate

**Table I-1 DREDGE PRODUCTION ESTIMATE
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

Dredge Production Estimate - Open Access - Derrick Barge	
Prescribed Volume	500000 cy
Cycle Time	3 min
Bucket Capacity	6 cy
Effective Bucket Capacity (70%)	4.2 cy
Operating Day	12 hrs
Efficiency	70%
Daily Production	706 cy/day
No. days	709 days

Deep, open access areas
Debris removal
Offloading

Bulk Removal
More overdredge (1.0 ft plus)
Less accurate/less control of bucket placement
Increased potential for water quality impacts/residuals

Dredge Production Estimate - Open Access Deep - Precision Excavator	
Prescribed Volume	500000 cy
Cycle Time	2.5 min
Bucket Capacity	5 cy
Effective Bucket Capacity (70%)	3.5 cy
Operating Day	12 hrs
Efficiency	70%
Daily Production	706 cy/day
No. days	709 days

Midrange depth (-35 to -40 ft depth)
Limited debris removal
Bulk removal/precision final pass removal
Minimal overdredge (0.5 ft to 1.0 ft overdredge)
More accurate/more control of bucket placement
Potential for decreased water quality impacts/residuals

Dredge Production Estimate - Open Access Shallow - Precision Excavator	
Prescribed Volume	500000 cy
Cycle Time	2.5 min
Bucket Capacity	3 cy
Effective Bucket Capacity (70%)	2.1 cy
Operating Day	12 hrs
Efficiency	65%
Daily Production	393 cy/day
No. days	1272 days

Shallow depth range (-30 ft to -35 ft and shallow)
Limited underdock application
Bulk removal/precision final pass removal
Minimal overdredge (0.5 ft to 1.0 ft overdredge)
More accurate/more control of bucket placement
Potential for decreased water quality impacts/residuals

Dredge Production Estimate - Underdock - Diver- Assist Hydraulic	
Prescribed Volume	25000 cy
Operating Day	12 hrs
Efficiency	65%
Daily Production	240 cy/day
No. days	104 days

Final cleanup around structures (piles, docks and other areas that cannot be accessed by conventional dredge equipment)

Dredge Production Estimate - Debris Sweep - Derrick Barge	
Prescribed Area	100 acres
Cycle Time	10 min
Bucket Capacity	12 cy
Effective Bucket Capacity (70%)	8.4 cy
Operating Day	12 hrs
Efficiency	70%
Debris Picks Per Day	50
Assume Daily Production	0.37 acre/day
Labor and Equipment Costs	\$12,000 per day
Side Scan Survey and Debris Transport/Disposal	\$6,000 per day
Total Cost	\$18,000 per day
Total Cost	\$48,649 per acre
No. days	270 days

Assume 400 ft x 40 ft lane per day
Assume 50 tons of debris per day at \$25/ton for transport and disposal at CDL

**Table I-2 CAPPING PRODUCTION ESTIMATE
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

Capping Production Estimate - Open Access - Derrick Barge	
Prescribed Volume	100000 cy
Cycle Time	2.5 min
Bucket Capacity	8 cy
Effective Bucket Capacity (85%)	6.8 cy
Operating Day	12 hrs
Efficiency	75%
Daily Production	1469 cy/day
No. days	68 days

ENR Production Estimate - Open Access - Derrick Barge	
Prescribed Volume	100000 cy
Cycle Time	2.5 min
Bucket Capacity	8 cy
Effective Bucket Capacity (85%)	6.8 cy
Operating Day	12 hrs
Efficiency	70%
Daily Production	1371 cy/day
No. days	73 days

Capping Production Estimate - Open Access Deep - Precision Excavator	
Prescribed Volume	100000 cy
Cycle Time	2 min
Bucket Capacity	5 cy
Effective Bucket Capacity (85%)	4.25 cy
Operating Day	12 hrs
Efficiency	75%
Daily Production	1148 cy/day
No. days	87 days

ENR Production Estimate - Open Access Deep - Precision Excavator	
Prescribed Volume	100000 cy
Cycle Time	2 min
Bucket Capacity	5 cy
Effective Bucket Capacity (85%)	4.25 cy
Operating Day	12 hrs
Efficiency	70%
Daily Production	1071 cy/day
No. days	93 days

Capping Production Estimate - Open Access Shallow - Precision Excavator	
Prescribed Volume	500000 cy
Cycle Time	2 min
Bucket Capacity	3 cy
Effective Bucket Capacity (85%)	2.55 cy
Operating Day	12 hrs
Efficiency	65%
Daily Production	597 cy/day
No. days	838 days

ENR Production Estimate - Open Access Shallow - Precision Excavator	
Prescribed Volume	500000 cy
Cycle Time	2 min
Bucket Capacity	3 cy
Effective Bucket Capacity (85%)	2.55 cy
Operating Day	12 hrs
Efficiency	60%
Daily Production	551 cy/day
No. days	908 days

Capping Production Estimate - Underdock - Hydraulic, conveyor	
Prescribed Volume	25000 cy
Operating Day	12 hrs
Efficiency	
Daily Production	350 cy/day
No. days	days

ENR Production Estimate - Underdock - Hydraulic, conveyor	
Prescribed Volume	25000 cy
Operating Day	12 hrs
Efficiency	
Daily Production	300 cy/day
No. days	days

Capping Production Estimate - Underdock - Shotcrete	
Prescribed Volume	25000 cy
Operating Day	12 hrs
Efficiency	
Daily Production	cy/day
No. days	days

Capping Production Estimate - Open Access - Derrick Barge for Armor Placement	
Prescribed Volume	100000 cy
Cycle Time	7 min
Bucket Capacity	8 cy
Effective Bucket Capacity (85%)	6.8 cy
Operating Day	12 hrs
Efficiency	75%
Daily Production	525 cy/day
No. days	191 days

**Table I-3 CAPPING MATERIAL UNIT COST
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

Capping Material Assumed SG 1.62

Example Tow / Barge Surcharge Calc (i.e. for Steillacoom or CEWE)

Quoted			
Glacier NW / Lonestar Quarry			
Contact			
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	4 to 8 inch Crushed Spall Rock		
Basis	\$15.75 Ton		
Delivered	\$ 2.30 Ton	\$ 3.73 / cy	
		\$ - / cy	
Total	<u>\$18.05</u> Ton	<u>\$ 29.24</u> / cy	

Est Tow Charge

30 nautical miles RT
5 knots avg
6 hrs sail
400 tons/hr loading
1500 tons capacity
3.75 hrs loading
9.75 total hrs
\$ 300.00 per hr, tug
\$ 50.00 per hr., barge
\$ 350.00 per hr., total
\$ 3,412.50 trip cost
\$ 2.30 add'l per ton

Quoted			
Glacier NW / Lonestar Quarry			
Contact			WA-AggSales@GlacierNW.com
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	Sand (8/30 Sieved)		
Basis	\$13.00 Ton		
Delivered	\$ 2.30 Ton	\$ 3.73 / cy	
		\$ - / cy	
Total	<u>\$15.30</u> Ton	<u>\$ 24.79</u> / cy	

Quoted			
Glacier NW / Lonestar Quarry			
Contact			
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	Pea Gravel		
Basis	\$15.00 Ton		
FOB	Ton	\$ -	
Delivered to Site	\$ 2.30 Ton	\$ 3.73 / cy	
Total	<u>\$17.30</u> Ton	<u>\$ 28.03</u> / cy	

Quoted			
Glacier NW / Lonestar Quarry			
Contact			
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	Fish Mix		
Basis	\$25.00 Ton		
Delivered	\$ 2.30 Ton	\$ 3.73 / cy	
		\$ - / cy	
Total	<u>\$27.30</u> Ton	<u>\$ 44.23</u> / cy	

**Table I-4 TRANS-LOADING UNIT COST
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

Cost Estimating Parameters & Methodology:	
Trans-loading Area Setup	\$1,000,000 LS
Water Management	\$10,000 per day
Transport sediment to offload facility	\$11,760 per day
Offload Sediments to Offload Area	\$5 per ton
Transport Storage Containers to Railcar	\$7.9 per ton
Load into Trucks	\$4.2 per ton
Cost includes daily rate for two 1,600 cy capacity disposal barges and 1,800 hp tug.	

include 2 mat barges and 1800 hp tug

Sediment Offload Calculations

Crane Rental	\$2,000 per day
Operating Cost	\$300 per hour
Average Production Rate	700 cy per day (12-hr)

Truck Transport Calculations

RT Miles	8 miles
Tons/Trip	30 tons
Time per trip	45 min
Total Trucks	33 per day
Trucks Operating	4
Material Transport	1000 tons per day
Trucking Cost	\$165 per hour
Trucking Cost	\$7,920 per day
Trucking Cost	\$7.9 per ton
Hours per day	12 hour

Loading onto Trucks

FEL (2)	\$1,200 per day
Operating Cost	\$250 per hour
Operating Cost	\$3,000 per day
Total Daily Cost	\$4,200 per day
Total Daily Cost	\$4.2 per ton

Available trans-loading and rail transportation capacity for dredged material is the limiting factor at 1,000 tons per day (per Joe Casselini at Allied Waste Services)

**Table I-5 SURVEY COSTS
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

Payment / Progress Surveys

Single Beam / Multibeam Survey Inclusive of acquisition, processing, and data delivery

Quote 1	\$ 4,780 / Day
Quote 2	\$ 5,075 / Day
Avg.	\$ 4,928 / Day
	\$5,000 / Day

**Table I-6 MOBILIZATION, DEMOBILIZATION, SITE RESTORATION AND
CONTRACTOR PROJECT MANAGEMENT COSTS**

**LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

Mobilization

Mobilize Equipment and Facilities (Derrick Crane)	\$750,000 LS
Land Lease for Operations and Staging	\$250,000 per year
Site Office & Operating Expense	\$21,600 per month
Contractor Work Plan Submittals	\$100,000 per year
Barge Protection	\$80,000 LS

Project Management

Labor and Supervision	\$112,800 per month
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Standby Time

Standby for Site Access	5% total project days
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Table I-17 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 2

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	32	3	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 281,600	\$ 29,308	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 120,000	\$ 31,000	\$ -
Total monitoring cost	\$ 656,600	\$ 187,808	\$ 170,000

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	32	3	0	96
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 21,399	\$ 5,506	\$ -	\$ 41,334
No. of sampling days(@ 5 stations/day)	13	1	-	77
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 140,800	\$ 14,654	\$ -	\$ 843,666
Subtotal annual labor, equipment and materials cost	\$ 130,199	\$ 16,829	\$ -	\$ 693,257
Annual data management, analysis and reporting	\$ 120,000	\$ 31,000	\$ -	\$ 232,000
Subtotal annual monitoring costs	\$ 390,999	\$ 62,483	\$ -	\$ 1,768,923

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^{0.6}
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr
B - 2, 3, 5, 7 and 10 yr

Repair Costs for Cap and ENR - 5% of total area

	Cap	ENR
Area	0.17	0.00
Cost/Ac	\$300,000	\$100,000
Total Cost	\$49,957	\$0

Notes:

- Monitoring frequency Year 5 and 10
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-18 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	96 acres
5% of Verification Monitoring Area:	1.4 acres
10% of MNR	9.59 acres
Total	10.99 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 2

Table I-8 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3a

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	28	8	36
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 246,400	\$ 69,256	\$ 314,908
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 111,000	\$ 52,000	\$ 128,000
Total monitoring cost	\$ 612,400	\$ 248,756	\$ 612,908

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	28	8	36	54
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 19,751	\$ 9,223	\$ 22,883	\$ 29,359
No. of sampling days(@ 5 stations/day)	11	3	29	43
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 123,200	\$ 34,628	\$ 314,908	\$ 477,041
Subtotal annual labor, equipment and materials cost	\$ 114,951	\$ 35,981	\$ 266,221	\$ 397,981
Annual data management, analysis and reporting	\$ 111,000	\$ 52,000	\$ 128,000	\$ 165,000
Subtotal annual monitoring costs	\$ 349,151	\$ 122,609	\$ 709,129	\$ 1,040,022

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^{0.6}
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr
B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.39	1.79
Cost/Ac	\$300,000	\$100,000
Total Cost	\$118,050	\$178,925

Notes:

- Monitoring frequency Year 5 and 10
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-19 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	54 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	5.42 acres
Total	6.82 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3a

Table I-9 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3b

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	31	10	41.10456143
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 272,800	\$ 87,120	\$ 361,720
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 118,000	\$ 59,000	\$ 139,000
Total monitoring cost	\$ 645,800	\$ 273,620	\$ 670,720

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	31	10	41	43
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 20,995	\$ 10,585	\$ 24,867	\$ 25,432
No. of sampling days (@ 5 stations/day)	12	4	33	34
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 136,400	\$ 43,560	\$ 361,720	\$ 375,522
Subtotal annual labor, equipment and materials cost	\$ 126,395	\$ 44,245	\$ 304,378	\$ 315,608
Annual data management, analysis and reporting	\$ 118,000	\$ 59,000	\$ 139,000	\$ 143,000
Subtotal annual monitoring costs	\$ 380,795	\$ 146,805	\$ 805,098	\$ 834,130

Notes:

1. Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
2. Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^{0.6}
3. Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr
B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.50	2.055228071
Cost/Ac	\$300,000	\$100,000
Total Cost	\$148,500	\$205,523

Notes:

1. Monitoring frequency Year 5 and 10
5% Assume 5% of total area requires repair
2. These repair costs are carried over to Table I-20 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	43 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	4.27 acres
Total	5.67 acres

Notes:

1. Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
2. The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3b

Table I-10 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3c

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	46	14	46
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 404,800	\$ 122,327	\$ 406,717
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 149,000	\$ 73,000	\$ 150,000
Total monitoring cost	\$ 808,800	\$ 322,827	\$ 726,717

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	46	14	46	26
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 26,604	\$ 12,975	\$ 26,680	\$ 19,040
No. of sampling days(@ 5 stations/day)	18	6	37	21
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 202,400	\$ 61,163	\$ 406,717	\$ 231,797
Subtotal annual labor, equipment and materials cost	\$ 183,004	\$ 60,238	\$ 340,961	\$ 198,156
Annual data management, analysis and reporting	\$ 149,000	\$ 73,000	\$ 150,000	\$ 107,000
Subtotal annual monitoring costs	\$ 534,404	\$ 194,401	\$ 897,679	\$ 536,953

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^0.6
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr
B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.70	2.31
Cost/Ac	\$300,000	\$100,000
Total Cost	\$208,512	\$231,089

Notes:

- Monitoring frequency Year 5 and 10
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-21 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	26 acres
5% of Verification Monitoring A	1.4 acres
10% of MNR	2.63 acres
Total	4.03 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3c

Table I-11 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3d

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	64	31	45
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 563,200	\$ 273,856	\$ 396,000
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 182,000	\$ 118,000	\$ 147,000
Total monitoring cost	\$ 1,000,200	\$ 519,356	\$ 713,000

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	64	31	45	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 32,434	\$ 21,044	\$ 26,256	\$ -
No. of sampling days(@ 5 stations/day)	26	12	36	-
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 281,600	\$ 136,928	\$ 396,000	\$ -
Subtotal annual labor, equipment and materials cost	\$ 250,034	\$ 126,852	\$ 332,256	\$ -
Annual data management, analysis and reporting	\$ 182,000	\$ 118,000	\$ 147,000	\$ -
Subtotal annual monitoring costs	\$ 713,634	\$ 381,780	\$ 875,256	\$ -

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^{0.6}
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr
B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	1.56	2.25
Cost/Ac	\$300,000	\$100,000
Total Cost	\$466,800	\$225,000

Notes:

- Monitoring frequency Year 5 and 10
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-22 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	0 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	0.00 acres
Total	1.40 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3d

Table I-12 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4a

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	70.52415437	7	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 620,613	\$ 58,200	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 193,000	\$ 47,000	\$ -
Total monitoring cost	\$ 1,068,613	\$ 232,700	\$ 170,000

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	70.52415437	7	0	54
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 34,379	\$ 8,309	\$ -	\$ 29,359
No. of sampling days(@ 5 stations/day)	28	3	-	43
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 310,306	\$ 29,100	\$ -	\$ 477,041
Subtotal annual labor, equipment and materials cost	\$ 274,161	\$ 30,796	\$ -	\$ 397,981
Annual data management, analysis and reporting	\$ 193,000	\$ 47,000	\$ -	\$ 165,000
Subtotal annual monitoring costs	\$ 777,468	\$ 106,896	\$ -	\$ 1,040,022

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^0.6
- Assumed monitoring frequencies for remedial action: A - 2, 3 and 5 yr
 B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.33	0.00
Cost/Ac	\$300,000	\$100,000
Total Cost	\$99,205	\$0

Notes:

- Monitoring frequency Year 5 and 10
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-23 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	54 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	5.42 acres
Total	6.82 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4a

Table I-13 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4b

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	90.99653353	7	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 800,769	\$ 58,200	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 225,000	\$ 47,000	\$ -
Total monitoring cost	\$ 1,280,769	\$ 232,700	\$ 170,000

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	91	7	0	43
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 40,060	\$ 8,309	\$ -	\$ 25,432
No. of sampling days(@ 5 stations/day)	36	3	-	34
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 400,385	\$ 29,100	\$ -	\$ 375,522
Subtotal annual labor, equipment and materials cost	\$ 349,448	\$ 30,796	\$ -	\$ 315,608
Annual data management, analysis and reporting	\$ 225,000	\$ 47,000	\$ -	\$ 143,000
Subtotal annual monitoring costs	\$ 974,833	\$ 106,896	\$ -	\$ 834,130

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^{0.6}
- Assumed monitoring frequencies for remedial action A - 2, 3 and 5 yr
 B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.33	0.00
Cost/Ac	\$300,000	\$100,000
Total Cost	\$99,205	\$0

Notes:

- Monitoring frequency Year 5 and 10
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-24 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	43 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	4.27 acres
Total	5.67 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4b

Table I-14 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4c

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	107	7	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 941,600	\$ 64,384	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 248,000	\$ 50,000	\$ -
Total monitoring cost	\$ 1,444,600	\$ 241,884	\$ 170,000

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	107	7	0	26
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 44,149	\$ 8,828	\$ -	\$ 19,040
No. of sampling days(@ 5 stations/day)	43	3	-	21
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 470,800	\$ 32,192	\$ -	\$ 231,797
Subtotal annual labor, equipment and materials cost	\$ 407,949	\$ 33,704	\$ -	\$ 198,156
Annual data management, analysis and reporting	\$ 248,000	\$ 50,000	\$ -	\$ 107,000
Subtotal annual monitoring costs	\$ 1,126,749	\$ 115,896	\$ -	\$ 536,953

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., $\text{cost}(\text{area A}) = \text{Cost}(\text{site-wide}) * (\text{Area A}/418 \text{ acres})^{0.6}$
- Assumed monitoring frequencies for remedial action A - 2, 3 and 5 yr
 B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.37	0.00
Cost/Ac	\$300,000	\$100,000
Total Cost	\$109,746	\$0

Notes:

- Monitoring frequency Year 5 and 10
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-25 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	26 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	2.63 acres
Total	4.03 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4c

Table I-15 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4d

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	131	9	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 1,152,800	\$ 78,194	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 280,000	\$ 56,000	\$ -
Total monitoring cost	\$ 1,687,800	\$ 261,694	\$ 170,000

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	131	9	0	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 49,849	\$ 9,920	\$ -	\$ -
No. of sampling days(@ 5 stations/day)	52	4	-	-
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 576,400	\$ 39,097	\$ -	\$ -
Subtotal annual labor, equipment and materials cost	\$ 495,249	\$ 40,131	\$ -	\$ -
Annual data management, analysis and reporting	\$ 280,000	\$ 56,000	\$ -	\$ -
Subtotal annual monitoring costs	\$ 1,351,649	\$ 135,229	\$ -	\$ -

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^{0.6}
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr
 B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.44	0
Cost/Ac	\$300,000	\$100,000
Total Cost	\$133,286	\$0

Notes:

- Monitoring frequency Year 5 and 10
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-26 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	28 acres
MNR	0 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	0.00 acres
Total	1.40 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4d

Table I-16 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 5

Post-Construction Confirmation - Sediment Only

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	290	9	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 2,552,000	\$ 82,538	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 450,000	\$ 57,000	\$ -
Total monitoring cost	\$ 3,257,000	\$ 267,038	\$ 170,000

Recovery/Recontamination Plus Operations and Maintenance - Sediment and Bathymetry

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	290	9	0	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 80,303	\$ 10,247	\$ -	\$ -
No. of sampling days(@ 5 stations/day)	116	4	-	-
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 1,276,000	\$ 41,269	\$ -	\$ -
Subtotal annual labor, equipment and materials cost	\$ 1,066,303	\$ 42,136	\$ -	\$ -
Annual data management, analysis and reporting	\$ 450,000	\$ 57,000	\$ -	\$ -
Subtotal annual monitoring costs	\$ 2,792,303	\$ 140,405	\$ -	\$ -

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) * (Area A/418 acres)^{0.6}
- Assumed monitoring frequencies for remedial actions A - 2, 3 and 5 yr
 B - 2, 3, 5, 7 and 10 yr

Repair Costs - 5% of total area

	Cap	ENR
Area	0.47	0
Cost/Ac	\$300,000	\$100,000
Total Cost	\$140,689	\$0

Notes:

- Monitoring frequency Year 5 and 10
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-27 for PV analysis as part of OM&M cost development

Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation

Verification Monitoring	0 acres
MNR	0 acres
5% of Verification Monitoring Area	0 acres
10% of MNR	0.00 acres
Total	0.00 acres

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 5

Table I-17 Site-Wide Analytical Package for Baseline and Long-Term RAO Monitoring

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

Sediment			
		Subtotal Sediment	190,500
Tissue			
		Subtotal Tissue	96,200
Water			
		Subtotal Water	21,960
Annual data management, analysis, and rep	na	na	\$ 250,000
		Subtotal All	\$558,660
		QC (15%)	\$83,799
		Grand Total	\$ 640,000

Notes:

1. Baseline monitoring consists of a complete sample group as set forth in the table. The sampling is performed before remediation activities commence. The purpose of baseline sampling is to establish surface sediment, tissue, and water quality conditions.
2. Costs are assumed to apply at year 0 (baseline; capital expense) and years 5, 10, and 15; (4 rounds total).
3. Present value of payments made according to schedule in Note No. 2 and assuming 3% discount rate

Table I-18 PRESENT VALUE CALCULATION - Alt 2
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION
i = 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$390,999	\$62,483	\$0	\$1,768,923	\$0	\$390,999	0.942595909	\$368,554	\$368,554	\$58,897	\$0	\$1,667,380	\$0	\$1,008,554
3	\$390,999	\$62,483	\$0	\$1,768,923	\$0	\$390,999	0.9151141659	\$357,819	\$357,819	\$57,181	\$0	\$1,618,815	\$0	\$1,366,373
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,366,373
5	\$390,999	\$112,441	\$0	\$1,768,923	\$640,000	\$1,030,999	0.862608784	\$889,348	\$337,279	\$96,993	\$0	\$1,525,889	\$552,070	\$2,255,721
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,255,721
7	\$0	\$0	\$0	\$1,768,923	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$1,438,296	\$0	\$2,255,721
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,255,721
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,255,721
10	\$0	\$0	\$0	\$1,768,923	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$1,316,245	\$476,220	\$2,731,941
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,142,733
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
Totals	\$1,172,996				\$2,560,000	\$3,732,996		\$3,142,733	\$1,060,000	\$210,000	\$0	\$7,570,000	\$2,080,000	

PRESENT VALUE CALCULATION

Table I-19 PRESENT VALUE CALCULATION - Alt 3a
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$349,151	\$122,609	\$709,129	\$1,040,022	\$0	\$349,151	0.942595909	\$329,108	\$329,108	\$115,571	\$668,422	\$980,321	\$0	\$969,108
3	\$349,151	\$122,609	\$709,129	\$1,040,022	\$0	\$349,151	0.915141659	\$319,523	\$319,523	\$112,205	\$648,953	\$951,768	\$0	\$1,288,631
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,288,631
5	\$349,151	\$240,659	\$888,054	\$1,040,022	\$640,000	\$989,151	0.862608784	\$853,250	\$301,181	\$207,595	\$766,043	\$897,132	\$552,070	\$2,141,881
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,141,881
7	\$0	\$0	\$709,129	\$1,040,022	\$0	\$0	0.813091511	\$0	\$0	\$0	\$576,587	\$845,633	\$0	\$2,141,881
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,141,881
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,141,881
10	\$0	\$0	\$888,054	\$1,040,022	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$660,795	\$773,874	\$476,220	\$2,618,101
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,028,893
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
Totals	\$1,047,453				\$2,560,000	\$3,607,453		\$3,028,893	\$950,000	\$440,000	\$3,320,000	\$4,450,000	\$2,080,000	

PRESENT VALUE CALCULATION

**Table I-20 PRESENT VALUE CALCULATION - Alt 3b
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$380,795	\$146,805	\$805,098	\$834,130	\$0	\$380,795	0.942595909	\$358,936	\$358,936	\$138,377	\$758,882	\$786,247	\$0	\$998,936
3	\$380,795	\$146,805	\$805,098	\$834,130	\$0	\$380,795	0.915141659	\$348,481	\$348,481	\$134,347	\$736,779	\$763,347	\$0	\$1,347,417
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,347,417
5	\$380,795	\$295,305	\$1,010,621	\$834,130	\$640,000	\$1,020,795	0.862608784	\$880,547	\$328,477	\$254,732	\$871,771	\$719,528	\$552,070	\$2,227,963
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,227,963
7	\$0	\$0	\$805,098	\$834,130	\$0	\$0	0.813091511	\$0	\$0	\$0	\$654,619	\$678,224	\$0	\$2,227,963
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,227,963
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,227,963
10	\$0	\$0	\$1,010,621	\$834,130	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$751,997	\$620,671	\$476,220	\$2,704,183
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,114,975
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
Totals	\$1,142,384				\$2,560,000	\$3,702,384		\$3,114,975	\$1,040,000	\$530,000	\$3,770,000	\$3,570,000	\$2,080,000	

PRESENT VALUE CALCULATION

**Table I-21 PRESENT VALUE CALCULATION - Alt 3c
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$534,404	\$194,401	\$897,679	\$536,953	\$0	\$534,404	0.942595909	\$503,727	\$503,727	\$183,242	\$846,148	\$506,130	\$0	\$1,143,727
3	\$534,404	\$194,401	\$897,679	\$536,953	\$0	\$534,404	0.915141659	\$489,055	\$489,055	\$177,905	\$821,503	\$491,388	\$0	\$1,632,783
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,632,783
5	\$534,404	\$402,913	\$1,128,768	\$536,953	\$640,000	\$1,174,404	0.862608784	\$1,013,051	\$460,982	\$347,556	\$973,685	\$463,180	\$552,070	\$2,645,834
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,645,834
7	\$0	\$0	\$897,679	\$536,953	\$0	\$0	0.813091511	\$0	\$0	\$0	\$729,895	\$436,592	\$0	\$2,645,834
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,645,834
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,645,834
10	\$0	\$0	\$1,128,768	\$536,953	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$839,910	\$399,543	\$476,220	\$3,122,054
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,532,846
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
Totals	\$1,603,212				\$2,560,000	\$4,163,212		\$3,532,846	\$1,450,000	\$710,000	\$4,210,000	\$2,300,000	\$2,080,000	

PRESENT VALUE CALCULATION

Table I-22 PRESENT VALUE CALCULATION - Alt 3d
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$713,634	\$381,780	\$875,256	\$0	\$0	\$713,634	0.942595909	\$672,669	\$672,669	\$359,864	\$825,012	\$0	\$0	\$1,312,669
3	\$713,634	\$381,780	\$875,256	\$0	\$0	\$713,634	0.915141659	\$653,076	\$653,076	\$349,382	\$800,983	\$0	\$0	\$1,965,745
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,965,745
5	\$713,634	\$848,580	\$1,100,256	\$0	\$640,000	\$1,353,634	0.862608784	\$1,167,657	\$615,587	\$731,992	\$949,090	\$0	\$552,070	\$3,133,402
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$3,133,402
7	\$0	\$0	\$875,256	\$0	\$0	\$0	0.813091511	\$0	\$0	\$0	\$711,663	\$0	\$0	\$3,133,402
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$3,133,402
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$3,133,402
10	\$0	\$0	\$1,100,256	\$0	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$818,693	\$0	\$476,220	\$3,609,622
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$4,020,413
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
Totals	\$2,140,902				\$2,560,000	\$4,700,902		\$4,020,413	\$1,940,000	\$1,440,000	\$4,110,000	\$0	\$2,080,000	

PRESENT VALUE CALCULATION

**Table I-23 PRESENT VALUE CALCULATION - Alt 4a
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$777,468	\$106,896	\$0	\$1,040,022	\$0	\$777,468	0.942595909	\$732,838	\$732,838	\$100,760	\$0	\$980,321	\$0	\$1,372,838
3	\$777,468	\$106,896	\$0	\$1,040,022	\$0	\$777,468	0.915141659	\$711,493	\$711,493	\$97,825	\$0	\$951,768	\$0	\$2,084,331
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$2,084,331
5	\$777,468	\$206,101	\$0	\$1,040,022	\$640,000	\$1,417,468	0.862608784	\$1,222,720	\$670,650	\$177,785	\$0	\$897,132	\$552,070	\$3,307,051
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$3,307,051
7	\$0	\$0	\$0	\$1,040,022	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$845,633	\$0	\$3,307,051
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$3,307,051
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$3,307,051
10	\$0	\$0	\$0	\$1,040,022	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$773,874	\$476,220	\$3,783,271
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$4,194,063
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
Totals	\$2,332,403				\$2,560,000	\$4,892,403		\$4,194,063	\$2,110,000	\$380,000	\$0	\$4,450,000	\$2,080,000	

PRESENT VALUE CALCULATION

**Table I-24 PRESENT VALUE CALCULATION - Alt 4b
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$974,833	\$106,896	\$0	\$834,130	\$0	\$974,833	0.942595909	\$918,873	\$918,873	\$100,760	\$0	\$786,247	\$0	\$1,558,873
3	\$974,833	\$106,896	\$0	\$834,130	\$0	\$974,833	0.915141659	\$892,110	\$892,110	\$97,825	\$0	\$763,347	\$0	\$2,450,984
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$2,450,984
5	\$974,833	\$99,205	\$0	\$834,130	\$640,000	\$1,614,833	0.862608784	\$1,392,969	\$840,899	\$85,575	\$0	\$719,528	\$552,070	\$3,843,952
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$3,843,952
7	\$0	\$0	\$0	\$834,130	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$678,224	\$0	\$3,843,952
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$3,843,952
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$3,843,952
10	\$0	\$0	\$0	\$834,130	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$620,671	\$476,220	\$4,320,173
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$4,730,964
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
Totals	\$2,924,498				\$2,560,000	\$5,484,498		\$4,730,964	\$2,650,000	\$280,000	\$0	\$3,570,000	\$2,080,000	

Table I-25 PRESENT VALUE CALCULATION - Alt 4c
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION
i = 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$1,126,749	\$115,896	\$0	\$536,953	\$0	\$1,126,749	0.942595909	\$1,062,069	\$1,062,069	\$109,243	\$0	\$506,130	\$0	\$1,702,069
3	\$1,126,749	\$115,896	\$0	\$536,953	\$0	\$1,126,749	0.915141659	\$1,031,135	\$1,031,135	\$106,061	\$0	\$491,388	\$0	\$2,733,205
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$2,733,205
5	\$1,126,749	\$225,642	\$0	\$536,953	\$640,000	\$1,766,749	0.862608784	\$1,524,014	\$971,944	\$194,641	\$0	\$463,180	\$552,070	\$4,257,218
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$4,257,218
7	\$0	\$0	\$0	\$536,953	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$436,592	\$0	\$4,257,218
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$4,257,218
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$4,257,218
10	\$0	\$0	\$0	\$536,953	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$399,543	\$476,220	\$4,733,438
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$5,144,230
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
Totals	\$3,380,248				\$2,560,000	\$5,940,248		\$5,144,230	\$3,070,000	\$410,000	\$0	\$2,300,000	\$2,080,000	

Table I-26 PRESENT VALUE CALCULATION - Alt 4d
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$1,351,649	\$135,229	\$0	\$0	\$0	\$1,351,649	0.942595909	\$1,274,059	\$1,274,059	\$127,466	\$0	\$0	\$0	\$1,914,059
3	\$1,351,649	\$135,229	\$0	\$0	\$0	\$1,351,649	0.915141659	\$1,236,950	\$1,236,950	\$123,753	\$0	\$0	\$0	\$3,151,009
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$3,151,009
5	\$1,351,649	\$268,514	\$0	\$0	\$640,000	\$1,991,649	0.862608784	\$1,718,014	\$1,165,944	\$231,623	\$0	\$0	\$552,070	\$4,869,023
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
7	\$0	\$0	\$0	\$0	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
10	\$0	\$0	\$0	\$0	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$0	\$476,220	\$5,345,243
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$5,756,035
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
Totals	\$4,054,947				\$2,560,000	\$6,614,947		\$5,756,035	\$3,680,000	\$480,000	\$0	\$0	\$2,080,000	

Table I-27 PRESENT VALUE CALCULATION - Alt 5
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$2,792,303	\$140,405	\$0	\$0	\$0	\$2,792,303	0.942595909	\$2,632,014	\$2,632,014	\$132,345	\$0	\$0	\$0	\$3,272,014
3	\$2,792,303	\$140,405	\$0	\$0	\$0	\$2,792,303	0.915141659	\$2,555,353	\$2,555,353	\$128,491	\$0	\$0	\$0	\$5,827,367
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$5,827,367
5	\$2,792,303	\$281,094	\$0	\$0	\$640,000	\$3,432,303	0.862608784	\$2,960,735	\$2,408,665	\$242,474	\$0	\$0	\$552,070	\$8,788,102
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
7	\$0	\$0	\$0	\$0	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
10	\$0	\$0	\$0	\$0	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$0	\$476,220	\$9,264,322
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$9,675,113
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
Totals	\$8,376,910				\$2,560,000	\$10,936,910		\$9,675,113	\$7,600,000	\$500,000	\$0	\$0	\$2,080,000	

**Table I-28 SEDIMENT VOLUME CALCULATION
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON**

Remedy Type/ Engineering Constraint	Dredge	Days	CAD Cell	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	
Under Pier	0	0	0	0	3	54	0	0	0	0	0	0	0	4	69	0	0	0	0	0	0	0	0	4	72	0	0	0	0	
Above -10 ft	116,793	297	0	0	0	0	15	16	0	0	0	134,906	343	1	3	15	16	0	0	0	162,701	414	1	0	17	18	0	0	0	
Below -10 ft	231,442	328	371,000	526	0	0	17	14	0	0	96	221,004	313	9	33	7	6	36	32	54	233,568	331	11	43	7	6	41	36	43	
MNR and Verification Add-on Vol	97,492	138										60,524	86								50,288	71								
Additional Dioxin/Furan Volume	0											0									0									
Totals	445,728	760	371,000	530	3	50	32	30	0	0	96	416,434	740	13	100	22	20	36	32	54	446,557	820	16	110	24	20	41	36	43	
Residuals Management Area					32	ac								22	ac								25							
Partial Dredge and Cap Area												6	ac								6	ac								
					18,806	cy	38,720	cy	0	cy				75,552	cy	26,620	cy	43,300	cy				91,024	cy	29,040	cy	49,737	cy		
	32	ac										28	ac								31	ac								

Dredge	Production Rate (cy/day)
Dredge Rate (Derrick Barge-6 cy bucket) - Below -10	706
Dredge Rate (Excavator Deep Access-5 cy bucket) - above -10	706
Dredge Rate (Excavator Shallow Access-3 cy bucket) - 25-ft reach	393
Dredge Rate (Hydraulic) - under pier	240

Cap	Production Rate (cy/day)
Cap Placement Rate (Derrick Barge - 8 cy bucket) - below -10	1,469
Cap Placement Rate (Excavator Deep Access-5 cy bucket) - above -10	1,148
Cap Placement Rate (Excavator Deep Access-3 cy bucket) - 25 ft	597
Cap Placement Rate (Underdock Hydraulic Conveyor)	350

ENR	Production Rate (cy/day)
ENR Placement Rate (Derrick Barge - 8 cy bucket) - below -10	1,371
ENR Placement Rate (Excavator Deep Access-5 cy bucket) - above -10	1,071
ENR Placement Rate (Excavator Deep Access-3 cy bucket) - 25 ft	551
ENR Placement Rate (Underdock Hydraulic Conveyor)	300

Notes:

1. Additional volume including 1-ft overdredge allowance, 0.5-ft design allowance and 1-ft allowance for deeper contamination built in the dredge volume shown in the table.
2. For residuals capping within the dredge footprint, capping volume based on total thickness of 9 inches of thin layer sand placement.
3. MNR and verification monitoring add-on volume includes volume resulting from 10% of MNR and 5% of verification monitoring reverting to active remediation.
4. Partial dredge area volume included in the total dredge volume presented in the table
5. Backfill of partial dredge area included in the capping area presented in the table for calculation of backfill material volume.
6. Assume no longterm monitoring required for residuals management areas and backfill areas within dredge and cap footprint.
7. Additional volume resulting from dioxins/furan RAL of 28 ppt or lower is included for Alternatives 3c, 3d, 4c, 4d and 5. The footprint is 9.02 acres and equates to 64,706 cubic yards

3.5 ft	Cap Thickness
0.75 ft	ENR and Residuals Management Thin Layer Sand Placement Thickness
43,560 sq. ft	1 Acre
5.5 ft	Dredge Depth (For MNR and Verification Add-on Volume)

Table I-28 SEDIMENT VOLUME CALCULATION

Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	
0	0	5	82	0	0	0	0	0	0	0	6	96	0	0	0	0	0	0	0	0	7	107	0	0	0	0	
188,196	479	1	6	20	21	0	0	0	224,229	570	2	0	26	27	0	0	0	262,727	668	0	0	33	35	0	0	0	
270,499	383	15	56	19	16	46	41	26	327,933	465	23	89	30	25	45	40	0	512,840	727	0	0	37	31	0	0	54	
35,796	51								12,423	18								60,524	86								
64,706	92								64,706	92								0									
559,196	910	21	140	39	40	46	41	26	629,291	1,050	31	190	56	50	45	40	0	836,091	1480	7	110	71	70	0	0	54	
		39									56																
7	ac								8	ac																	
		118,354	cy	47,190	cy	55,924					175,724	cy	67,760	cy	54,450					37,345	cy	85,334	cy	0			
46	ac								64	ac									71	ac							

Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	Dredge	Days	Cap	Days	Residuals Management	Days	ENR	Days	MNR	
0	0	7	107	0	0	0	0	0	0	0	7	118	0	0	0	0	0	0	0	9	143	0	0	0	0	0	0	0	0	9	149	0	0	0	0	
262,727	668	0	0	33	35	0	0	0	309,425	787	0	0	40	42	0	0	0	378,525	963	0	0	48	51	0	0	0	938,838	2388	0	0	129	136	0	0	0	
666,476	945	0	0	58	48	0	0	43	744,824	1056	0	0	67	55	0	0	26	940,543	1333	0	0	83	68	0	0	0	1,873,292	2655	0	0	161	133	0	0	0	
50,288	71								0	0								0	0								0	0								
0									64,706									64,706									64,706									
979,491	1,680	7	110	91	80	0	0	43	1,118,954	1840	7	120	107	100	0	0	26	1,383,774	2,300	9	140	131	120	0	0	0	2,876,836	5,040	9	150	290	270	0	0	0	
		37,345	cy	110,106	cy	0					41,313	cy	129,444	cy	0				50,175	cy	158,662	cy					52,962	cy	351,139	cy						
91	ac								107	ac								131	ac								290	ac								

Table I-29 BASIS FOR COST ESTIMATES¹

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

Cost Estimating Parameters & Methodology		Notes	Source
Discount Rate	3.0%	21	EPA, July 2000
Project Management and Remedial Design	30.0%	35	EPA, July 2000
Construction Management	10.0%	36	EPA, July 2000
Sales Tax	8.8%		
Contingency	35.0%	37	EPA, July 2000
Agency Review and Oversight	1.0%	3	
Mobilization, Demobilization and Site Restoration (Dredging and Capping)			
Mobilize/Demobilize Equipment and Facilities	\$750,000 LS	3, 26	
Land Lease for Operations and Staging	\$250,000 per year	3	
Contractor Work Plan Submittals	\$100,000 per year	3	
Barge Protection	\$80,000 LS	3	
Project Management (Contractor)			
Labor and Supervision	\$112,800 per month	3,16	
Construction Office and Operating Expense	\$21,600 per month	3,4	
Confined Aquatic Disposal			
Impacted Material/Clean Cap Material Placement Rate	1,469 cy per day (12-hr)	3,10	
Overburden Removal Rate from CAD Cell(Derrick Crane)	706 cy <i>in situ</i> per day (12-hr)	3,6	
Transport and Disposal of Material at Elliott Bay Open Water	\$10 cy	3,40	
Dredging			
Debris Sweep	\$50,000 per acre	2,3,9	Local Contractor Quote
Shift Rate (12 hours)	\$8,000 per day	2,5	Local Contractor Quote
Shift Rate for Bank Areas with Obstructions(12 hours)	\$12,000 per day	2,5,41	
Dredge Rate (Derrick Crane -6 cy bucket)	706 cy <i>in situ</i> per day (12-hr)	3,6,22	
Dredge Rate (Excavator Deep Access-5 cy bucket)	706 cy <i>in situ</i> per day (12-hr)	3,7	
Dredge Rate (Excavator Shallow Access-3 cy bucket)	393 cy <i>in situ</i> per day (12-hr)	3,8	
Dredge Rate (Hydraulic)	240 cy <i>in situ</i> per day (12-hr)	4	
Gravity Dewatering (on the barge)	\$2 per cy	2	Local Contractor Quote
Material Barge (3 barges)	\$1,800 per day	2	Local Contractor Quote
Assist Tug (700 to 1200 HP)	\$8,184 per day	2,13	Local Contractor Quote
Sediment Handling and Disposal Costs			
Railcar transport to and tipping at Subtitle D Landfill	\$60 per ton	2, 20, 34	Local Contractor Quote
Transportation cost by barge to transloading facility (1800 HP)	\$1,200 per day	2,14	Local Contractor Quote
Assist Tug (1800 HP)	\$10,560 per day	2,13	Local Contractor Quote
Transloading Area Setup	\$1,000,000 LS	3	
Water Management	\$10,000 per day	3	
Transloading Costs	\$17 per ton	3,15	
Capping/ENR			
Debris Sweep	\$35,000 per acre	3,9	
Shift Rate (12 hours)	\$8,000 per day	2,5	Local Contractor Quote
Cap Placement Rate (Derrick Crane - 8 cy bucket)	1,469 cy per day (12-hr)	3,10	
Cap Placement Rate (Excavator Deep Access-5 cy bucket)	1,148 cy per day (12-hr)	3,11	
Cap Placement Rate (Excavator Deep Access-3 cy bucket)	597 cy per day (12-hr)	3,12	
Cap Placement Rate (Underdock Hydraulic Conveyor)	350 cy per day (12-hr)	3	
ENR Placement Rate (Derrick Crane - 8 cy bucket)	1,371 cy per day (12-hr)	3,27	
ENR Placement Rate (Excavator Deep Access-5 cy bucket)	1,071 cy per day (12-hr)	3,28	
ENR Placement Rate (Excavator Deep Access-3 cy bucket)	551 cy per day (12-hr)	3,29	
ENR Placement Rate (Underdock Hydraulic Conveyor)	300 cy per day (12-hr)	3	
Cap material procurement and delivery(Sand)	\$25 per cy	2, 23	Local Commercial Source Quote
Cap material procurement and delivery(4 to 8 in crushed stone)	\$29 per cy	2	Local Commercial Source Quote
Cap material procurement and delivery(Pea Gravel)	\$28 per cy	2	Local Commercial Source Quote
Cap material procurement and delivery(Fish Mix)	\$44 per cy	2	Local Commercial Source Quote
Material Barge for Cap Material (2 barges)	\$1,200 per day	2	Local Contractor Quote
Assist Tug (700 to 1200 HP)	\$8,184 per day	2,13	Local Contractor Quote
Treatment by Soil Washing, Mechanical Dewatering & Water Treatment			
Mob/Demob and Site Layout	\$4,000,000 LS	2,17	Contractor Quote
Soil Washing, Mech Dewatering & Water Treatment	\$120 per cy	2,18	Contractor Quote
Treated Sand Disposal	\$0 per cy	39	Contractor Quote
Standby Time			
Standby for Site Access	5% total project days	3, 38	
Construction QA/QC			
Implementation Monitoring	\$5,000 per day	3,19	
Post-remediation Compliance Monitoring (Dredge, Capping)	\$2,200 per acre	3	
Daily Cost	\$8,500 per day	3	
Data Management Analysis and Reporting	\$15,000 per acre	3	Assume \$15,000 for first acre and scale up using power of 0.6
Project Completion Report (incl. As-built drawings)	\$20,000 LS	3	
Operations, Maintenance and Monitoring Costs			
OM&M (Dredging)	\$2,200 per acre	3, 24	Assumed monitoring frequency at 2, 3, and 5 years
OM&M (Capping)	\$2,200 per acre	3, 24	Assumed monitoring frequency at 2, 3, and 5 years
OM&M (ENR)	\$2,200 per acre	3, 25	Assumed monitoring frequency at 2, 3, 5, 7 and 10 years
O&M (MNR)	\$2,200 per acre	3, 25	Assumed monitoring frequency at 2, 3, 5, 7 and 10 years
OM&M Daily Cost	\$8,500 per day	3	Daily labor, equipment and material costs during OM&M implementation
Cap Repair	\$300,000 per acre	3	Assumed for 5% of the cap area implemented at Year 5 and 10
ENR Repair	\$100,000 per acre	3	Assumed for 5% of the ENR area implemented at Year 5 and 10
Long-term Monitoring			
Long-term Monitoring	\$640,000 per year	3	Year 0 (baseline; capital expense) and years 5, 10 and 15(4 rounds total) Includes annual data management, analysis and reporting

Table I-29 BASIS FOR COST ESTIMATES (page 2)

Notes

- 1 2008 dollars
- 2 Vendor quote
- 3 Professional judgment based on previous projects
- 4 Construction office includes rental office trailers, operating expense, vehicle rental, PPE and pollution insurance
- 5 Assume one 12 hour shift per day
- 6 6 cy derrick crane with 0.70 Fill Factor, 3 min cycle time, and 0.70 TE.
- 7 5 cy excavator with 0.70 Fill Factor, 2.5 min cycle time, and 0.70 TE.
- 8 3 cy excavator with 0.70 Fill Factor, 2.5 min cycle time, and 0.65 TE.
- 9 Assume 400 ft by 40 ft lane for debris sweep per day or 0.37 acres/day. Cost includes side scan survey and debris disposal at CDL. Debris sweep costs for capping area assumed to be lower as debris sweep requirements for capping areas are generally lower compared to dredge areas
- 10 8 cy derrick crane with 0.85 Fill Factor, 2.5 min cycle time, and 0.75 TE.
- 11 5 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.75 TE.
- 12 3 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.65 TE.
- 13 Includes fuel surcharge of 10% for fuel rate above \$2
- 14 Cost includes daily rate for two 1,600 cy capacity material barges
- 15 Cost includes material transfer from barge onto offloading area, load dewatered sediment onto truck with containers, truck transport to rail facility. Offloading of sediment from barges at an offloading facility (infrastructure to be built in the future) in the vicinity of site to transloading area. Trucks with 20 ft containers on chassis and fitted with line
- 16 Labor categories include project manager, chief surveyor/QCM, works manager/superintendent, surveyor, accountant, CIH and travel and housing cost
- 17 Includes capital cost from conception to production, total plant footprint of approximately 4 acres to 7 acres with 40 to 45 tph capacity
- 18 Assume 40% sand, cost includes labor, plant operations, maintenance and filter cake disposal and no credit for beneficial reuse of sand
- 19 Implementation monitoring includes survey boat and equipment required for routine bathymetric surveys and pH/turbidity check
- 20 Cost includes liners installed in the 20 ft containers
- 21 Based on current inflation rate of 4.95%, used a lower value of discount rate for this estimate. EPA recommends 7% discount rate
- 22 Available transloading capacity (1,000 tons per day) limits the dredge volume to 700 cy per day
- 23 Cost includes delivery to the Site by barge.
- 24 Analytical costs with a sampling frequency of 2 samples per acre
- 25 Analytical costs with a sampling frequency of 4 samples per acre
- 26 Includes project management and labor during mobilization and demobilization phases
- 27 8 cy derrick crane with 0.85 Fill Factor, 2.5 min cycle time, and 0.70 TE.
- 28 5 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.70 TE.
- 29 3 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.60 TE.
- 30 Sediment dredge volume includes 1ft overdredge allowance, 0.5 ft design allowance and 1ft allowance for deeper contamination
- 31 LS denotes Lump Sum
- 32 CY denotes Cubic Yard
- 33 Excavated sediment volume assumed to be 1.2 times the in-situ sediment volume.
- 34 Wet bulk density of dewatered dredged sediment assumed to be 1.5 tons per cubic yard
- 35 Includes 10% toward project management and 20% toward remedial design. Selected percentages are the high end specified in the EPA cost guidance document due to the complex nature of sediments project. Remedial design includes pre-design sampling and analysis, engineering survey, design plans and specifications, cost estimate and schedule
- 36 The selected percentage (10%) is the mid to high range as specified in the EPA cost guidance document. A higher percentage was selected due to the complex nature of the project
- 37 Total contingency includes 20% toward scope contingency and 15% toward bid contingency. Scope contingency is toward the high end specified in the EPA cost guidance document as project scope for a sediments project of this magnitude will likely change considerably between FS and Final Design. Bid contingency of 15% is mid-range of the values specified in the EPA cost guidance document.
- 38 Standby time is included to cover items such as tribal fishing, analytical data wait time, water quality exceedances and physical access issues etc
- 39 Assume 50% of sediment that is processed through the soil washing unit results in treated sand material. Assume that treated sand material can be disposed at a local source at no cost
- 40 Includes barge transport and disposal at the DMMP Elliott Bay open water disposal site
- 41 Higher daily rate applied to 10% of the total duration for each alternative to account for additional costs resulting from over-water structures, slope stability, outfall protection, habitat enhancement etc.

Table I-30 Alternative 1: No Further Action/Completion of Sponsored EAAs

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	0	PER EVENT	\$750,000	\$0
Land Lease for Operations and Staging	0	PER YEAR	\$250,000	\$0
Contractor Work Plan Submittals	0	PER YEAR	\$100,000	\$0
Barge Protection	0	LS	\$80,000	\$0
Subtotal:				\$0
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	0	MONTH	\$112,800	\$0
Construction Office and Operating Expense	0	MONTH	\$21,600	\$0
Subtotal:				\$0
DREDGING				
Debris Sweep	0	ACRE	\$50,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Gravity Dewatering (on the barge)	0	CY	\$2	\$0
Material Barge	0	DAY	\$1,800	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$10,560	\$0
Transloading Area Setup	0	LS	\$1,000,000	\$0
Water Management	0	DAY	\$10,000	\$0
Transloading Costs	0	TON	\$17	\$0
Railcar Transport to and Tipping at Subtitle D Landfill	0	TON	\$60	\$0
Subtotal:				\$0
SEDIMENT CAPPING				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
ENHANCED NATURAL RECOVERY				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
STANDBY TIME				
Standby for Site Access	0	PER DAY	\$8,000	\$0
Subtotal:				\$0
CONSTRUCTION QA/QC				
Implementation Monitoring	0	PER DAY	\$5,000	\$0
Subtotal:				\$0
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	0	PER EVENT	\$0	\$0
Compliance Testing (Capping)	0	PER EVENT	\$0	\$0
Compliance Testing (ENR)	0	PER EVENT	\$0	\$0
Project Completion Report	0	LS	\$20,000	\$0
Subtotal:				\$0
CAPITAL COST				
Construction Contingency				\$0
Sales Tax				\$0
Project Management and Remedial Design				\$0
Construction Management				\$0
Agency Review and Oversight				\$0
TOTAL CAPITAL COST				\$0
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations, Maintenance and Monitoring(Dredging)	0	LS		\$0
Operations, Maintenance and Monitoring(Capping)	0	LS		\$0
Operations, Maintenance and Monitoring(ENR)	0	LS		\$0
Operations, Maintenance and Monitoring(MNR)	0	LS		\$0
Long-term Monitoring	0	LS		\$0
Subtotal:				\$0
TOTAL COST				\$50,000,000^a

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

^a Cost based a sum of individual EAA costs provided by site managers.

Table I-31 Alternative 2: Focused Removal and Contained Aquatic Disposal

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	6	PER EVENT	\$750,000	\$4,275,000
Land Lease for Operations and Staging	6	PER YEAR	\$250,000	\$1,425,000
Contractor Work Plan Submittals	6	PER YEAR	\$100,000	\$570,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$6,350,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	29	MONTH	\$112,800	\$3,214,800
Construction Office and Operating Expense	29	MONTH	\$21,600	\$615,600
Subtotal:				\$3,830,400
DREDGING				
Debris Sweep	32	ACRE	\$50,000	\$1,600,000
Shift Rate (12 hours)	684	DAY	\$8,000	\$5,472,000
Shift Rate for Bank Areas with Obstructions (12 hours)	76	DAY	\$12,000	\$912,000
Gravity Dewatering (on the barge)	445,728	CY	\$2	\$891,456
Material Barge	760	DAY	\$1,800	\$1,368,000
Assist Tug	760	DAY	\$8,184	\$6,219,840
Subtotal:				\$16,463,296
CONFINED AQUATIC DISPOSAL				
Overburden Removal (Shift Rate - 12 hours)	530	DAY	\$8,000	\$4,240,000
Impacted Material Placement (Shift Rate - 12-hours)	170	DAY	\$8,000	\$1,356,209
Cap Material procurement and delivery(Sand)	74,000	CY	\$25	\$1,834,164
Cap Placement (Shift Rate - 12 hours)	50	DAY	\$8,000	\$403,050
Overburden Transport and Disposal at Elliott Bay Open Water Site	371,000	CY	\$10	\$3,710,000
Subtotal:				\$11,543,423
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	684	DAY	\$1,200	\$820,800
Assist Tug	684	DAY	\$10,560	\$7,223,040
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	684	DAY	\$10,000	\$6,840,000
Transloading Costs	295,092	TON	\$17	\$5,150,334
Railcar Transport to and Tipping at Subtitle D Landfill	295,092	TON	\$60	\$17,705,503
Subtotal:				\$38,739,677
SEDIMENT CAPPING				
Debris Sweep	3.3	ACRE	\$35,000	\$116,567
Shift Rate (12 hours)	80	DAY	\$8,000	\$640,000
Cap material procurement and delivery(Sand)	57,526	CY	\$25	\$1,425,845
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	80	DAY	\$1,200	\$96,000
Assist Tug	80	DAY	\$8,184	\$654,720
Subtotal:				\$2,933,132
ENHANCED NATURAL RECOVERY				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
STANDBY TIME				
Standby for Site Access	38	PER DAY	\$8,000	\$304,000
Subtotal:				\$304,000
CONSTRUCTION QA/QC				
Implementation Monitoring	684	PER DAY	\$5,000	\$3,420,000
Subtotal:				\$3,420,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$656,600	\$656,600
Compliance Testing (Capping)	1	PER EVENT	\$187,808	\$187,808
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$864,408
CAPITAL COST				
Construction Contingency				\$29,556,918
Sales Tax				\$7,431,454
Project Management and Remedial Design				\$25,334,501
Construction Management				\$8,444,834
Agency Review and Oversight				\$844,483
TOTAL CAPITAL COST				\$156,060,526
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$1,060,000	\$1,060,000
Operations and Maintenance(Capping)	1	LS	\$210,000	\$210,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$7,570,000	\$7,570,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$10,920,000
TOTAL COST				\$166,980,500

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

Table I-32 Alternative 3: Increasing Active Cleanup with Emphasis on Containment

3a: RALs - Achieve CSL Compliance and Individual Beach Play Area Goals Immediately After Construction

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	6	PER EVENT	\$750,000	\$4,162,500
Land Lease for Operations and Staging	6	PER YEAR	\$250,000	\$1,387,500
Contractor Work Plan Submittals	6	PER YEAR	\$100,000	\$555,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$6,185,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	28	MONTH	\$112,800	\$3,130,200
Construction Office and Operating Expense	28	MONTH	\$21,600	\$599,400
Subtotal:				\$3,729,600
DREDGING				
Debris Sweep	28	ACRE	\$50,000	\$1,400,000
Shift Rate (12 hours)	666	DAY	\$8,000	\$5,328,000
Shift Rate for Bank Areas with Obstructions (12 hours)	74	DAY	\$12,000	\$888,000
Gravity Dewatering (on the barge)	416,434	CY	\$2	\$832,868
Material Barge	740	DAY	\$1,800	\$1,332,000
Assist Tug	740	DAY	\$8,184	\$6,056,160
Subtotal:				\$15,837,028
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	666	DAY	\$1,200	\$799,200
Assist Tug	666	DAY	\$10,560	\$7,032,960
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	666	DAY	\$10,000	\$6,660,000
Transloading Costs	624,651	TON	\$17.5	\$10,902,242
Railcar Transport to and Tipping at Subtitle D Landfill	624,651	TON	\$60	\$37,479,060
Subtotal:				\$63,873,462
SEDIMENT CAPPING				
Debris Sweep	7.9	ACRE	\$35,000	\$275,450
Shift Rate (12 hours)	120	DAY	\$8,000	\$960,000
Cap material procurement and delivery(Sand)	102,172	CY	\$25	\$2,532,445
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	120	DAY	\$1,200	\$144,000
Assist Tug	120	DAY	\$8,184	\$982,080
Subtotal:				\$4,893,975
ENHANCED NATURAL RECOVERY				
Debris Sweep	36	ACRE	\$35,000	\$1,252,475
Shift Rate (12 hours)	32	DAY	\$8,000	\$252,683
Cap material procurement and delivery(Sand)	43,300	CY	\$25	\$1,073,230
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	32	DAY	\$1,200	\$37,903
Assist Tug	32	DAY	\$8,184	\$258,495
Subtotal:				\$2,874,785
STANDBY TIME				
Standby for Site Access	37	PER DAY	\$8,000	\$296,000
Subtotal:				\$296,000
CONSTRUCTION QA/QC				
Implementation Monitoring	666	PER DAY	\$5,000	\$3,330,000
Subtotal:				\$3,330,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$612,400	\$612,400
Compliance Testing (Capping)	1	PER EVENT	\$248,756	\$248,756
Compliance Testing (ENR)	1	PER EVENT	\$612,908	\$612,908
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$1,494,064
CAPITAL COST				
Construction Contingency				\$35,879,870
Sales Tax				\$9,021,224
Project Management and Remedial Design				\$30,754,174
Construction Management				\$10,251,391
Agency Review and Oversight				\$1,025,139
TOTAL CAPITAL COST				\$189,445,714
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$950,000	\$950,000
Operations and Maintenance(Capping)	1	LS	\$440,000	\$440,000
Operations and Maintenance(ENR)	1	LS	\$3,320,000	\$3,320,000
Operations and Maintenance(MNR)	1	LS	\$4,450,000	\$4,450,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$11,240,000
TOTAL COST				\$200,685,700

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-33 Alternative 3: Emphasis on Containment
3b: RALs - Achieve SQS Compliance within 10 years after Construction**

LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	6	PER EVENT	\$750,000	\$4,612,500
Land Lease for Operations and Staging	6	PER YEAR	\$250,000	\$1,537,500
Contractor Work Plan Submittals	6	PER YEAR	\$100,000	\$615,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$6,845,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	31	MONTH	\$112,800	\$3,468,600
Construction Office and Operating Expense	31	MONTH	\$21,600	\$664,200
Subtotal:				\$4,132,800
DREDGING				
Debris Sweep	31	ACRE	\$50,000	\$1,550,000
Shift Rate (12 hours)	738	DAY	\$8,000	\$5,904,000
Shift Rate for Bank Areas with Obstructions (12 hours)	82	DAY	\$12,000	\$984,000
Gravity Dewatering (on the barge)	446,557	CY	\$2	\$893,113
Material Barge	820	DAY	\$1,800	\$1,476,000
Assist Tug	820	DAY	\$8,184	\$6,710,880
Subtotal:				\$17,517,993
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	738	DAY	\$1,200	\$885,600
Assist Tug	738	DAY	\$10,560	\$7,793,280
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	738	DAY	\$10,000	\$7,380,000
Transloading Costs	669,835	TON	\$17.5	\$11,690,850
Railcar Transport to and Tipping at Subtitle D Landfill	669,835	TON	\$60	\$40,190,088
Subtotal:				\$68,939,818
SEDIMENT CAPPING				
Debris Sweep	9.9	ACRE	\$35,000	\$346,500
Shift Rate (12 hours)	130	DAY	\$8,000	\$1,040,000
Cap material procurement and delivery(Sand)	120,064	CY	\$25	\$2,975,913
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	130	DAY	\$1,200	\$156,000
Assist Tug	130	DAY	\$8,184	\$1,063,920
Subtotal:				\$5,582,333
ENHANCED NATURAL RECOVERY				
Debris Sweep	41	ACRE	\$35,000	\$1,438,660
Shift Rate (12 hours)	36	DAY	\$8,000	\$290,246
Cap material procurement and delivery(Sand)	49,737	CY	\$25	\$1,232,769
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	36	DAY	\$1,200	\$43,537
Assist Tug	36	DAY	\$8,184	\$296,921
Subtotal:				\$3,302,133
STANDBY TIME				
Standby for Site Access	41	PER DAY	\$8,000	\$328,000
Subtotal:				\$328,000
CONSTRUCTION QA/QC				
Implementation Monitoring	738	PER DAY	\$5,000	\$3,690,000
Subtotal:				\$3,690,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$645,800	\$645,800
Compliance Testing (Capping)	1	PER EVENT	\$273,620	\$273,620
Compliance Testing (ENR)	1	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$939,420
CAPITAL COST				
Construction Contingency				\$38,947,124
Sales Tax				\$9,792,420
Project Management and Remedial Design				\$33,383,249
Construction Management				\$11,127,750
Agency Review and Oversight				\$1,112,775
TOTAL CAPITAL COST				\$205,640,814
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$1,040,000	\$1,040,000
Operations and Maintenance(Capping)	1	LS	\$530,000	\$530,000
Operations and Maintenance(ENR)	1	LS	\$3,770,000	\$3,770,000
Operations and Maintenance(MNR)	1	LS	\$3,570,000	\$3,570,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$10,990,000
TOTAL COST				
				\$216,630,800

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

Table I-34 Alternative 3: Emphasis on Containment

3c: RALs - Achieve SQS Compliance and Lower Maximum Values within 10 Years after Construction

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	7	PER EVENT	\$750,000	\$5,118,750
Land Lease for Operations and Staging	7	PER YEAR	\$250,000	\$1,706,250
Contractor Work Plan Submittals	7	PER YEAR	\$100,000	\$682,500
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$7,587,500
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	34	MONTH	\$112,800	\$3,849,300
Construction Office and Operating Expense	34	MONTH	\$21,600	\$737,100
Subtotal:				\$4,586,400
DREDGING				
Debris Sweep	46	ACRE	\$50,000	\$2,300,000
Shift Rate (12 hours)	819	DAY	\$8,000	\$6,552,000
Shift Rate for Bank Areas with Obstructions (12 hours)	91	DAY	\$12,000	\$1,092,000
Gravity Dewatering (on the barge)	559,196	CY	\$2	\$1,118,392
Material Barge	910	DAY	\$1,800	\$1,638,000
Assist Tug	910	DAY	\$8,184	\$7,447,440
Subtotal:				\$20,147,832
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	819	DAY	\$1,200	\$982,800
Assist Tug	819	DAY	\$10,560	\$8,648,640
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	819	DAY	\$10,000	\$8,190,000
Transloading Costs	838,794	TON	\$17.5	\$14,639,755
Railcar Transport to and Tipping at Subtitle D Landfill	838,794	TON	\$60	\$50,327,654
Subtotal:				\$83,788,850
SEDIMENT CAPPING				
Debris Sweep	13.9	ACRE	\$35,000	\$486,527
Shift Rate (12 hours)	180	DAY	\$8,000	\$1,440,000
Cap material procurement and delivery(Sand)	165,544	CY	\$25	\$4,103,177
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	180	DAY	\$1,200	\$216,000
Assist Tug	180	DAY	\$8,184	\$1,473,120
Subtotal:				\$7,718,824
ENHANCED NATURAL RECOVERY				
Debris Sweep	46	ACRE	\$35,000	\$1,617,626
Shift Rate (12 hours)	41	DAY	\$8,000	\$326,352
Cap material procurement and delivery(Sand)	55,924	CY	\$25	\$1,386,123
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	41	DAY	\$1,200	\$48,953
Assist Tug	41	DAY	\$8,184	\$333,858
Subtotal:				\$3,712,912
STANDBY TIME				
Standby for Site Access	46	PER DAY	\$8,000	\$364,000
Subtotal:				\$364,000
CONSTRUCTION QA/QC				
Implementation Monitoring	819	PER DAY	\$5,000	\$4,095,000
Subtotal:				\$4,095,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$808,800	\$808,800
Compliance Testing (Capping)	1	PER EVENT	\$322,827	\$322,827
Compliance Testing (ENR)	1	PER EVENT	\$726,717	\$726,717
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$1,878,344
CAPITAL COST				
Construction Contingency				\$46,857,882
Sales Tax				\$11,781,410
Project Management and Remedial Design				\$40,163,899
Construction Management				\$13,387,966
Agency Review and Oversight				\$1,338,797
TOTAL CAPITAL COST				\$247,409,615
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$1,450,000	\$1,450,000
Operations and Maintenance(Capping)	1	LS	\$710,000	\$710,000
Operations and Maintenance(ENR)	1	LS	\$4,210,000	\$4,210,000
Operations and Maintenance(MNR)	1	LS	\$2,300,000	\$2,300,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$10,750,000
TOTAL COST				\$258,159,600

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-35 Alternative 3: Emphasis on Containment
3d: RALs - Achieve SQS Compliance Immediately After Construction**

LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	8	PER EVENT	\$750,000	\$5,906,250
Land Lease for Operations and Staging	8	PER YEAR	\$250,000	\$1,968,750
Contractor Work Plan Submittals	8	PER YEAR	\$100,000	\$787,500
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$8,742,500
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	39	MONTH	\$112,800	\$4,441,500
Construction Office and Operating Expense	39	MONTH	\$21,600	\$850,500
Subtotal:				\$5,292,000
DREDGING				
Debris Sweep	64	ACRE	\$50,000	\$3,200,000
Shift Rate (12 hours)	945	DAY	\$8,000	\$7,560,000
Shift Rate for Bank Areas with Obstructions (12 hours)	105	DAY	\$12,000	\$1,260,000
Gravity Dewatering (on the barge)	629,291	CY	\$2	\$1,258,581
Material Barge	1,050	DAY	\$1,800	\$1,890,000
Assist Tug	1,050	DAY	\$8,184	\$8,593,200
Subtotal:				\$23,761,781
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	945	DAY	\$1,200	\$1,134,000
Assist Tug	945	DAY	\$10,560	\$9,979,200
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	945	DAY	\$10,000	\$9,450,000
Transloading Costs	943,936	TON	\$17.5	\$16,474,830
Railcar Transport to and Tipping at Subtitle D Landfill	943,936	TON	\$60	\$56,636,160
Subtotal:				\$94,674,190
SEDIMENT CAPPING				
Debris Sweep	23	ACRE	\$35,000	\$809,200
Shift Rate (12 hours)	240	DAY	\$8,000	\$1,920,000
Cap material procurement and delivery(Sand)	243,484	CY	\$25	\$6,035,001
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	240	DAY	\$1,200	\$288,000
Assist Tug	240	DAY	\$8,184	\$1,964,160
Subtotal:				\$11,016,361
ENHANCED NATURAL RECOVERY				
Debris Sweep	45	ACRE	\$35,000	\$1,575,000
Shift Rate (12 hours)	40	DAY	\$8,000	\$317,752
Cap material procurement and delivery(Sand)	54,450	CY	\$25	\$1,349,598
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	40	DAY	\$1,200	\$47,663
Assist Tug	40	DAY	\$8,184	\$325,060
Subtotal:				\$3,615,073
STANDBY TIME				
Standby for Site Access	53	PER DAY	\$8,000	\$420,000
Subtotal:				\$420,000
CONSTRUCTION QA/QC				
Implementation Monitoring	945	PER DAY	\$5,000	\$4,725,000
Subtotal:				\$4,725,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$1,000,200	\$1,000,200
Compliance Testing (Capping)	1	PER EVENT	\$519,356	\$519,356
Compliance Testing (ENR)	1	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$1,539,556
CAPITAL COST				\$153,786,461
Construction Contingency				\$53,825,261
Sales Tax				\$13,533,209
Project Management and Remedial Design				\$46,135,938
Construction Management				\$15,378,646
Agency Review and Oversight				\$1,537,865
TOTAL CAPITAL COST				\$284,197,380
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$1,940,000	\$1,940,000
Operations and Maintenance(Capping)	1	LS	\$1,440,000	\$1,440,000
Operations and Maintenance(ENR)	1	LS	\$4,110,000	\$4,110,000
Operations and Maintenance(MNR)	0	LS	\$0	\$0
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$9,570,000
TOTAL COST				\$293,767,400

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

Table I-36 Alternative 4: Increasing Active Cleanup with Emphasis on Removal and Upland Disposal

4a: RALs - Achieve CSL Compliance and Individual Beach Play Area Goals Immediately After Construction

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	11	PER EVENT	\$750,000	\$8,325,000
Land Lease for Operations and Staging	11	PER YEAR	\$250,000	\$2,775,000
Contractor Work Plan Submittals	11	PER YEAR	\$100,000	\$1,110,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$12,290,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	56	MONTH	\$112,800	\$6,260,400
Construction Office and Operating Expense	56	MONTH	\$21,600	\$1,198,800
Subtotal:				\$7,459,200
DREDGING				
Debris Sweep	71	ACRE	\$50,000	\$3,526,208
Shift Rate (12 hours)	1,332	DAY	\$8,000	\$10,656,000
Shift Rate for Bank Areas with Obstructions (12 hours)	148	DAY	\$12,000	\$1,776,000
Gravity Dewatering (on the barge)	836,091	CY	\$2	\$1,672,183
Material Barge	1,480	DAY	\$1,800	\$2,664,000
Assist Tug	1,480	DAY	\$8,184	\$12,112,320
Subtotal:				\$32,406,710
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	1,332	DAY	\$1,200	\$1,598,400
Assist Tug	1,332	DAY	\$10,560	\$14,065,920
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	1,332	DAY	\$10,000	\$13,320,000
Transloading Costs	1,254,137	TON	\$17.5	\$21,888,870
Railcar Transport to and Tipping at Subtitle D Landfill	1,254,137	TON	\$60	\$75,248,218
Subtotal:				\$127,121,408
SEDIMENT CAPPING				
Debris Sweep	6.6	ACRE	\$35,000	\$231,479
Shift Rate (12 hours)	180	DAY	\$8,000	\$1,440,000
Cap material procurement and delivery(Sand)	122,679	CY	\$25	\$3,040,733
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	180	DAY	\$1,200	\$216,000
Assist Tug	180	DAY	\$8,184	\$1,473,120
Subtotal:				\$6,401,331
ENHANCED NATURAL RECOVERY				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
STANDBY TIME				
Standby for Site Access	74	PER DAY	\$8,000	\$592,000
Subtotal:				\$592,000
CONSTRUCTION QA/QC				
Implementation Monitoring	1,332	PER DAY	\$5,000	\$6,660,000
Subtotal:				\$6,660,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$1,068,613	\$1,068,613
Compliance Testing (Capping)	1	PER EVENT	\$232,700	\$232,700
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$1,321,313
CAPITAL COST				
Construction Contingency				\$67,988,187
Sales Tax				\$17,094,173
Project Management and Remedial Design				\$58,275,589
Construction Management				\$19,425,196
Agency Review and Oversight				\$1,942,520
TOTAL CAPITAL COST				\$358,977,627
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$2,110,000	\$2,110,000
Operations and Maintenance(Capping)	1	LS	\$380,000	\$380,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$4,450,000	\$4,450,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$9,020,000
TOTAL COST				\$367,997,600

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

Table I-37 Alternative 4: Emphasis on Removal

4b: Achieve SQS Compliance within 10 years after Construction

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	13	PER EVENT	\$750,000	\$9,450,000
Land Lease for Operations and Staging	13	PER YEAR	\$250,000	\$3,150,000
Contractor Work Plan Submittals	13	PER YEAR	\$100,000	\$1,260,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$13,940,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	63	MONTH	\$112,800	\$7,106,400
Construction Office and Operating Expense	63	MONTH	\$21,600	\$1,360,800
Subtotal:				\$8,467,200
DREDGING				
Debris Sweep	90.99653353	ACRE	\$50,000	\$4,549,827
Shift Rate (12 hours)	1,512	DAY	\$8,000	\$12,096,000
Shift Rate for Bank Areas with Obstructions (12 hours)	168	DAY	\$12,000	\$2,016,000
Gravity Dewatering (on the barge)	979,491	CY	\$2	\$1,958,982
Material Barge	1,680	DAY	\$1,800	\$3,024,000
Assist Tug	1,680	DAY	\$8,184	\$13,749,120
Subtotal:				\$37,393,928
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	1,512	DAY	\$1,200	\$1,814,400
Assist Tug	1,512	DAY	\$10,560	\$15,966,720
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	1,512	DAY	\$10,000	\$15,120,000
Transloading Costs	1,469,236	TON	\$17.5	\$25,643,071
Railcar Transport to and Tipping at Subtitle D Landfill	1,469,236	TON	\$60	\$88,154,177
Subtotal:				\$147,698,368
SEDIMENT CAPPING				
Debris Sweep	6.6	ACRE	\$35,000	\$231,479
Shift Rate (12 hours)	190	DAY	\$8,000	\$1,520,000
Cap material procurement and delivery(Sand)	147,451	CY	\$25	\$3,654,721
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	190	DAY	\$1,200	\$228,000
Assist Tug	190	DAY	\$8,184	\$1,554,960
Subtotal:				\$7,189,160
ENHANCED NATURAL RECOVERY				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
STANDBY TIME				
Standby for Site Access	84	PER DAY	\$8,000	\$672,000
Subtotal:				\$672,000
CONSTRUCTION QA/QC				
Implementation Monitoring	1,512	PER DAY	\$5,000	\$7,560,000
Subtotal:				\$7,560,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$1,280,769	\$1,280,769
Compliance Testing (Capping)	1	PER EVENT	\$232,700	\$232,700
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$1,533,470
CAPITAL COST				
Construction Contingency				\$78,558,944
Sales Tax				\$19,751,963
Project Management and Remedial Design				\$67,336,238
Construction Management				\$22,445,413
Agency Review and Oversight				\$2,244,541
TOTAL CAPITAL COST				\$414,791,224
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$2,650,000	\$2,650,000
Operations and Maintenance(Capping)	1	LS	\$280,000	\$280,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$3,570,000	\$3,570,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$8,580,000
TOTAL COST				\$423,371,200

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-38 Alternative 4: Emphasis on Removal
4c: RALs - Achieve SQS Compliance and Lower Maximum Values within 10 Years after Construction**

LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	14	PER EVENT	\$750,000	\$10,350,000
Land Lease for Operations and Staging	14	PER YEAR	\$250,000	\$3,450,000
Contractor Work Plan Submittals	14	PER YEAR	\$100,000	\$1,380,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$15,260,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	69	MONTH	\$112,800	\$7,783,200
Construction Office and Operating Expense	69	MONTH	\$21,600	\$1,490,400
Subtotal:				\$9,273,600
DREDGING				
Debris Sweep	107	ACRE	\$50,000	\$5,350,000
Shift Rate (12 hours)	1,656	DAY	\$8,000	\$13,248,000
Shift Rate for Bank Areas with Obstructions (12 hours)	184	DAY	\$12,000	\$2,208,000
Gravity Dewatering (on the barge)	1,118,954	CY	\$2	\$2,237,908
Material Barge	1,840	DAY	\$1,800	\$3,312,000
Assist Tug	1,840	DAY	\$8,184	\$15,058,560
Subtotal:				\$41,414,468
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	1,656	DAY	\$1,200	\$1,987,200
Assist Tug	1,656	DAY	\$10,560	\$17,487,360
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	1,656	DAY	\$10,000	\$16,560,000
Transloading Costs	1,678,431	TON	\$17.5	\$29,294,221
Railcar Transport to and Tipping at Subtitle D Landfill	1,678,431	TON	\$60	\$100,705,877
Subtotal:				\$167,034,658
SEDIMENT CAPPING				
Debris Sweep	7.3	ACRE	\$35,000	\$256,073
Shift Rate (12 hours)	220	DAY	\$8,000	\$1,760,000
Cap material procurement and delivery(Sand)	170,757	CY	\$25	\$4,232,383
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	220	DAY	\$1,200	\$264,000
Assist Tug	220	DAY	\$8,184	\$1,800,480
Subtotal:				\$8,312,937
ENHANCED NATURAL RECOVERY				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
STANDBY TIME				
Standby for Site Access	92	PER DAY	\$8,000	\$736,000
Subtotal:				\$736,000
CONSTRUCTION QA/QC				
Implementation Monitoring	1,656	PER DAY	\$5,000	\$8,280,000
Subtotal:				\$8,280,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$1,444,600	\$1,444,600
Compliance Testing (Capping)	1	PER EVENT	\$241,884	\$241,884
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$1,706,484
CAPITAL COST				
Construction Contingency				\$88,206,351
Sales Tax				\$22,177,597
Project Management and Remedial Design				\$75,605,444
Construction Management				\$25,201,815
Agency Review and Oversight				\$2,520,181
TOTAL CAPITAL COST				\$465,729,536
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$3,070,000	\$3,070,000
Operations and Maintenance(Capping)	1	LS	\$410,000	\$410,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$2,300,000	\$2,300,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$7,860,000
TOTAL COST				
				\$473,589,500

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-39 Alternative 4: Emphasis on Removal
4d: RALs - Achieve SQS Compliance Immediately After Construction**

LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	17	PER EVENT	\$750,000	\$12,937,500
Land Lease for Operations and Staging	17	PER YEAR	\$250,000	\$4,312,500
Contractor Work Plan Submittals	17	PER YEAR	\$100,000	\$1,725,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$19,055,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	86	MONTH	\$112,800	\$9,729,000
Construction Office and Operating Expense	86	MONTH	\$21,600	\$1,863,000
Subtotal:				\$11,592,000
DREDGING				
Debris Sweep	131	ACRE	\$50,000	\$6,550,000
Shift Rate (12 hours)	2,070	DAY	\$8,000	\$16,560,000
Shift Rate for Bank Areas with Obstructions (12 hours)	230	DAY	\$12,000	\$2,760,000
Gravity Dewatering (on the barge)	1,383,774	CY	\$2	\$2,767,547
Material Barge	2,300	DAY	\$1,800	\$4,140,000
Assist Tug	2,300	DAY	\$8,184	\$18,823,200
Subtotal:				\$51,600,747
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	2,070	DAY	\$1,200	\$2,484,000
Assist Tug	2,070	DAY	\$10,560	\$21,859,200
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	2,070	DAY	\$10,000	\$20,700,000
Transloading Costs	1,037,830	TON	\$17.5	\$18,113,598
Railcar Transport to and Tipping at Subtitle D Landfill	1,037,830	TON	\$60	\$62,269,817
Subtotal:				\$126,426,614
SEDIMENT CAPPING				
Debris Sweep	8.9	ACRE	\$35,000	\$311,000
Shift Rate (12 hours)	260	DAY	\$8,000	\$2,080,000
Cap material procurement and delivery(Sand)	208,837	CY	\$25	\$5,176,223
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	260	DAY	\$1,200	\$312,000
Assist Tug	260	DAY	\$8,184	\$2,127,840
Subtotal:				\$10,007,063
ENHANCED NATURAL RECOVERY				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
TREATMENT BY SOIL WASHING				
Mobilization/Demobilization and Site Layout	1	LS	\$4,000,000	\$4,000,000
Soil Washing, Mechanical Dewatering and Water Treatment	691,887	CY	\$120	\$83,026,422
Treated Sand Disposal	345,943	CY	\$0	\$0
Subtotal:				\$87,026,422
STANDBY TIME				
Standby for Site Access	115	PER DAY	\$8,000	\$920,000
Subtotal:				\$920,000
CONSTRUCTION QA/QC				
Implementation Monitoring	2,070	PER DAY	\$5,000	\$10,350,000
Subtotal:				\$10,350,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$1,687,800	\$1,687,800
Compliance Testing (Capping)	1	PER EVENT	\$261,694	\$261,694
Compliance Testing (ENR)	0	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$1,969,494
CAPITAL COST				
Construction Contingency				\$111,631,569
Sales Tax				\$28,067,366
Project Management and Remedial Design				\$95,684,202
Construction Management				\$31,894,734
Agency Review and Oversight				\$3,189,473
TOTAL CAPITAL COST				\$589,414,686
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$3,680,000	\$3,680,000
Operations and Maintenance(Capping)	1	LS	\$480,000	\$480,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	0	LS	\$0	\$0
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$6,240,000
TOTAL COST				\$595,654,700

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

Table I-40 Alternative 5: Maximum Removal and Upland Disposal

LOWER DUWAMISH WATERWAY
 SEDIMENT CLEANUP - FS ESTIMATE
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
PRE-CONSTRUCTION				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	38	PER EVENT	\$750,000	\$28,350,000
Land Lease for Operations and Staging	38	PER YEAR	\$250,000	\$9,450,000
Contractor Work Plan Submittals	38	PER YEAR	\$100,000	\$3,780,000
Barge Protection	1	LS	\$80,000	\$80,000
Subtotal:				\$41,660,000
PROJECT MANAGEMENT (CONTRACTOR)				
Labor and Supervision	189	MONTH	\$112,800	\$21,319,200
Construction Office and Operating Expense	189	MONTH	\$21,600	\$4,082,400
Subtotal:				\$25,401,600
DREDGING				
Debris Sweep	290	ACRE	\$50,000	\$14,500,000
Shift Rate (12 hours)	4,536	DAY	\$8,000	\$36,288,000
Shift Rate for Bank Areas with Obstructions (12 hours)	504	DAY	\$8,000	\$4,032,000
Gravity Dewatering (on the barge)	2,876,836	CY	\$2	\$5,753,672
Material Barge	5,040	DAY	\$1,800	\$9,072,000
Assist Tug	5,040	DAY	\$8,184	\$41,247,360
Subtotal:				\$110,893,032
SEDIMENT HANDLING AND DISPOSAL				
Transportation cost by barge to transloading facility	4,536	DAY	\$1,200	\$5,443,200
Assist Tug	4,536	DAY	\$10,560	\$47,900,160
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	4,536	DAY	\$10,000	\$45,360,000
Transloading Costs	4,315,254	TON	\$17.5	\$75,315,566
Railcar Transport to and Tipping at Subtitle D Landfill	4,315,254	TON	\$60	\$258,915,240
Subtotal:				\$433,934,166
SEDIMENT CAPPING				
Debris Sweep	9.4	ACRE	\$35,000	\$328,274
Shift Rate (12 hours)	420	DAY	\$8,000	\$3,360,000
Cap material procurement and delivery(Sand)	404,100	CY	\$25	\$10,016,033
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	420	DAY	\$1,200	\$504,000
Assist Tug	420	DAY	\$8,184	\$3,437,280
Subtotal:				\$17,645,588
ENHANCED NATURAL RECOVERY				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$8,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$8,184	\$0
Subtotal:				\$0
STANDBY TIME				
Standby for Site Access	252	PER DAY	\$8,000	\$2,016,000
Subtotal:				\$2,016,000
CONSTRUCTION QA/QC				
Implementation Monitoring	4,536	PER DAY	\$5,000	\$22,680,000
Subtotal:				\$22,680,000
Post-Remediation Compliance Monitoring				
Compliance Testing (Dredging)	1	PER EVENT	\$3,257,000	\$3,257,000
Compliance Testing (Capping)	1	PER EVENT	\$267,038	\$267,038
Compliance Testing (ENR)	0	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
Subtotal:				\$3,544,038
CAPITAL COST				
Construction Contingency				\$230,221,048
Sales Tax				\$57,884,149
Project Management and Remedial Design				\$197,332,327
Construction Management				\$65,777,442
Agency Review and Oversight				\$6,577,744
TOTAL CAPITAL COST				\$1,215,567,135
OPERATIONS AND MAINTENANCE/MONITORING COSTS				
Operations and Maintenance(Dredging)	1	LS	\$7,600,000	\$7,600,000
Operations and Maintenance(Capping)	1	LS	\$500,000	\$500,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	0	LS	\$0	\$0
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
Subtotal:				\$10,180,000
TOTAL COST				\$1,225,747,100

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

Table I-41 Summary of Costs
LOWER DUWAMISH WATERWAY
SEDIMENT CLEANUP - FS ESTIMATE
SEATTLE, WASHINGTON

Alternative Number ^a	1	2	3a	3b	3c	3d	4a	4b	4c	4d	5
Capital Cost	\$0	\$156,060,526	\$189,445,714	\$205,640,814	\$247,409,615	\$284,197,380	\$358,977,627	\$414,791,224	\$465,729,536	\$589,414,686	\$1,215,567,135
Indirect Construction Cost	\$0	\$10,920,000	\$11,240,000	\$10,990,000	\$10,750,000	\$9,570,000	\$9,020,000	\$8,580,000	\$7,860,000	\$6,240,000	\$10,180,000
Total Cost	\$50,000,000a	\$166,980,500	\$200,685,700	\$216,630,800	\$258,159,600	\$293,767,400	\$367,997,600	\$423,371,200	\$473,589,500	\$595,654,700	\$1,225,747,100

Notes:

1. Capital cost includes construction contingency, sales tax, engineering, procurement, and construction management.
 2. Indirect construction cost includes operations and maintenance (dredging, capping, ENR, and MNR) and long-term monitoring.
- ^aTotal costs for Alternatives 2 through 5 do not include EAA costs.