Yakima River Basin Study

Costs of the Integrated Water Resource Management Plan Technical Memorandum

U.S. Bureau of Reclamation
Contract No. 08CA10677A ID/IQ, Task 5.3

Prepared by

HDR Engineering, Inc.
Anchor QEA

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia-Cascades Area Office

State of Washington
Department of Ecology
Office of Columbia River

March 2011

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The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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1.0 Introduction

This technical memorandum summarizes costs estimated for the proposed Yakima River Basin Integrated Water Resource Management Plan (Integrated Plan) and the methods used to estimate those costs. It includes Opinions of Probable Construction Cost (OPCC) for major capital projects included in the Integrated Plan. The OPCCs were developed at the appraisal level under Bureau of Reclamation cost-estimating guidelines.

This technical memorandum also includes costs of two additional categories of actions in the Integrated Plan: 1) proposed programmatic actions such as funding programs designed to support a range of projects; and 2) capital projects that have been recommended for further study. Costs in these two categories should be considered as conceptual rather than appraisal level. Conceptual costs are more preliminary in nature than appraisal-level costs.

A team led by HDR Engineering developed the estimates. They are intended to aid in selecting the most economical plan and help determine whether more detailed investigations of potential projects are justified.

Descriptions of the individual projects and programs discussed in this memorandum can be found in the Task 4 technical memoranda included in Volume 2 of the Yakima River Basin Study.

2.0 Summary of Results

Table 1 summarizes costs developed for the Integrated Plan. These estimates and how they were determined are described in more detail in the remainder of this technical memorandum.

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Table 1. Costs of Proposed Integrated Plan in $ Million

Project	Construction Cost ($M)			Construction Plus Noncontract Costs[2] ($M)			Annual O&M ($ Million)
		Range[1]			Range[1]		
	Base Cost	Lower	Upper	Base Cost	Lower	Upper	
Projects for Which OPCCs Were Developed (See Section 3)							
Fish Passage at Cle Elum Lake Dam[3]	$71.9	$57.5	$100.7	$87.6	$70.0	$122.6	$0.30
Fish Passage at Bumping Lake Dam[4]	$20.5	$16.4	$28.7	$26.6	$21.3	$37.3	$0.30
Fish Passage at Clear Lake Dam	$2.3	$1.8	$3.2	$3.0	$2.4	$4.2	$0.07
Wymer Reservoir with Thorp Intake and Roza Delivery	$1,260.6	$1,008.5	$1,764.9	$1,638.8	$1,311.1	$2,294.4	$4.05
Pipeline from Lake Keechelus to Lake Kachess	$146.7	$117.3	$205.3	$190.7	$152.5	$266.9	$0.09
Lake Kachess Inactive Storage Alternative 1 – Tunnel	$195.2	$156.2	$273.3	$253.8	$203.1	$355.3	$0.28
Fish Passage at Box Canyon Creek	$0.9	$0.7	$1.3	$1.2	$0.9	$1.6	$0.03
Bumping Lake Enlargement [4]	$309.6	$247.7	$433.5	$402.5	$322.0	$563.5	$0.21
Pool Level Increase at Cle Elum Dam[5]	$13.0	$10.4	$18.1	$16.8	$13.5	$23.6	$0.00
KRD Main Canal and South Branch Modifications	$27.6	$22.1	$38.7	$35.9	$28.7	$50.3	$0.15
Wapatox Canal Conveyance – Alternative 2	$63.2	$50.5	$88.5	$82.1	$65.7	$115.0	$0.21
Projects for Which Other Methods Were Used for Estimating Costs (See Section 4)							
Mainstem Floodplain Restoration Program	N/A	N/A	N/A	$270.0	$216.0	$378.0	$0.50
Tributary Habitat Enhancement Program	N/A	N/A	N/A	$180.0	$144.0	$252.0	$0.00
Fish Passage (Tieton, Kachess, Keechelus Dams)	$225.0	$180.0	$315.0	$292.5	$234.0	$409.5	$0.90
Enhanced Agricultural Conservation[6]	N/A	N/A	N/A	$400.0	$320.0	$560.0	$0.00
Municipal Conservation	N/A	N/A	N/A	N/A	N/A	N/A	$1.00
Market Reallocation	N/A	N/A	N/A	$2.0	$1.6	$2.8	$0.20
Groundwater Infiltration (Pilot study)	N/A	N/A	N/A	$4.7	$3.7	$6.5	$0.00
Groundwater Infiltration[7] (Full Scale)	$56.1	$31.0	$93.5	$98.2	$54.3	$163.6	$2.15
Columbia River Pump Exchange Study	N/A	N/A	N/A	$4.1	$3.3	$5.7	$0.00
Totals (rounded) [8]	***$2,393***	***$1,900***	***$3,365***	***$3,990***	***$3,168***	***$5,613***	***$10***

N/A = Not applicable. Either there is no construction involved in the project, or a separate construction cost was not developed independently of permitting and design costs.

[1] The low end of the cost range is 20 percent less than the base cost; the high end is 40 percent greater than the base cost, except where noted.

[2] Non-contract costs are 30 percent of construction cost. This covers design, permitting, environmental compliance and land or easement acquisition. However see note 3 below.

[3] Cost for fish passage at Cle Elum Lake Dam are from Reclamation 2011a. Non-contract costs were developed by Reclamation specifically for this project.

[4] Cost of fish passage at Bumping Lake Dam is based on an estimate prepared for the existing dam. It is assumed installation of passage at the proposed new dam will be similar. Cost of the Bumping Lake Enlargement (below) was based on a prior estimate and does not include fish passage costs. However, fish passage will be required at the proposed new dam.

[5] Costs of acquiring land and easements are included only in the construction cost column for Cle Elum pool raise because they represent more than 10 percent of total cost of this project. For other projects they are relatively small and are assumed to be covered by the multiplier for non-contract costs.

[6] Cost estimates obtained for agricultural conservation projects included design and permitting based on differing assumptions from a variety of project sponsors.

[7] For the groundwater infiltration project, multipliers are different. See Table 21.

[8] Costs of the "Targeted Watershed Enhancement and Protection" actions described in the *Proposed Integrated Water Resource Management Plan* would be subject to land availability and purchase negotiations. These costs are not included in this table or discussed in this technical memorandum to avoid affecting potential negotiations.

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3.0 Costs of Major Capital Projects

This section describes costs for major capital projects included in the proposed Integrated Plan. Costs for other projects are described in Section 4.

3.1 Opinions of Probable Construction Cost

OPCC Methodology

The objective of developing OPCCs was to provide appraisal-level opinions of probable construction cost for the major capital projects included in the Integrated Plan, complying with the following sections of the Reclamation Manual:

- FAC P09, Policy
- FAC 09-01, Cost Estimating
- FAC 09-02, FAC 0-02, Construction Cost Estimates and Project Cost Estimates

(The Reclamation Manual provides policies, directives and standards for Reclamation activities. The "FAC" series is used in project planning activities.)

Costs were estimated in 2010 dollars (third quarter 2010 for all OPCCs except Box Canyon Creek Fish Passage, which was estimated later using fourth quarter 2010 dollars).

In the case of the fish passage for Cle Elum Dam, Bumping Lake Dam and the Wymer Reservoir, prior cost estimates provided by Reclamation substantially conformed to these standards. Those costs were estimated by indexing using the Bureau of Reclamation Construction Cost Trends (CCT) indices (Reclamation 2011b). Indexing accounts for changes in the cost of construction over time, similar to inflation in the cost of consumer goods. The specific index used and the factors developed for these project elements are listed in the totals page notes in the OPCC estimate reports included in the appendices.

The remaining projects were estimated using a combination of stochastic and deterministic methodology, whichever was the most appropriate for each aspect of the project. Stochastic methodology involves estimation-based variables, such as total cost per unit of storage or flow, based on similar projects constructed elsewhere with appropriate adjustments for location and time. Deterministic methodology involves calculations from definable project information that is typically available when a project element has been described to at least an appraisal level of design. This information is usually developed to the point where specific quantities may be estimated (e.g., reinforced concrete walls) and costs determined by using forecast unit prices (e.g., price per cubic yard) for those estimated quantities.

HDR's approach is to quantify the work to the greatest extent possible from either existing design documents, standard designs for similar work, and/or supplemental drawings provided by the HDR design staff to provide a mix of deterministic and stochastic methodologies. Notes were included within the individual estimate Pay Item descriptions to document the assumptions and/or clarifications necessary to estimate the project. General notes in the totals page notes in each appendix further describe the basis for each estimate. HDR used the following procedures, tools, and database to develop these OPCC estimates:

1. The HDR estimating staff reviewed the existing design documents, drawings, photos, and design reports in sufficient depth to have an understanding of the feature characteristics of the proposed projects and developed questions for the design team.
2. The HDR design team and estimating staff discussed the project features and available field information provided by Reclamation or acquired during site visits by HDR and Anchor QEA staff. The pay items for each project were also developed to comply with the Reclamation Uniform Classification Accounts Pay Items.
3. The estimating staff then quantified and estimated the work in Timberline Extended Estimating software using the latest RS Means Construction Cost database (a widely used database of construction costs), supplemented by work items developed by HDR for items not included in the RS Means database.
4. Upon completion of the estimating process, draft Pay Item and Detail reports, along with the Basis of Estimate, were distributed for quality control to design staff and an HDR peer reviewer. The draft OPCC estimate was then revised based on quality control comments.

Table 2 summarizes the methodology used for each of the major capital projects. As noted in Table 2, the only facility estimated by HDR using a purely stochastic methodology was the hydropower unit that is part of the Wymer Reservoir to Roza Dam alternative conveyance listed separately in the summary OPCC table below.

Table 3 summarizes markup percentages used in each OPCC estimate. The HDR study team examined Reclamation documents and previous estimates for project-by-project features and combined them with the estimating team's experience for this type of work to select appropriate markup percentages for each of the following components:

- Contractor's field overhead
- Mobilization of contractor personnel and equipment to the project site.
- Design contingencies (includes minor unlisted items, minor design and scope changes and minor refinements to the cost estimates)
- Contractor's fee for office overhead and profit
- Contractor's bonds and insurance
- Construction contingencies (includes overruns on quantities, changed site conditions, and change orders)

Based on the nature and size of the work, HDR did not include any markup percentage for procurement strategy, but rather elected to base each estimate on an open competition, sealed bid procurement strategy. A Washington State Sales tax of 8.2 percent for the project area was added, except where sales tax was already embedded in prior cost estimates that were indexed to current cost levels. Construction cost indexing to the midpoint of construction was not included since a construction timeframe had not been established at the time these OPCCs were prepared.

Table 2. Estimate Methodologies for OPCCs

Facility	Methodology	Variances
Fish Passage at Cle Elum Lake Dam	Indexing of previous field estimates using CCT indices	None
Fish Passage at Bumping Lake Dam	Indexing of previous field Estimates using CCT indices	None
Fish Passage at Clear Lake Dam	Deterministic from appraisal design information	None
Wymer Reservoir with Adjacent Yakima River Intake	Indexing of previous field estimates using CCT indices	The powerhouse estimate was based on historical cost for similar facilities (specific reference is noted in the estimate)
Alternate Wymer Supply from Yakima River at Thorp	Deterministic from appraisal design information, vendor budget quotes, and subcontractor budget quotes	None
Wymer Power Recovery and Conveyance to Roza Dam	Conveyance/Penstock option was estimated using deterministic methods based on appraisal design information	For powerhouse, see documentation at end of Appendix F (i.e. Base Capital Cost from Table B2 of CPUC GHG Modeling, Hydro v.4, 2007).
Pipeline from Lake Keechelus to Kachess Reservoir	Deterministic from appraisal design information	None
Lake Kachess Inactive Storage – Alternative 1 Tunnel	Deterministic from appraisal design information	None
Lake Kachess Inactive Storage – Alternative 2 Pump Station	Deterministic from appraisal design information	None
Fish Passage at Box Canyon Creek	Deterministic from appraisal design information	None
Bumping Lake Reservoir Enlargement	Deterministic from appraisal design information and subcontractor quotes	Impacts on park, roadway and similar facilities that were indexed using CCT indices
Pool Level Increase at Cle Elum Dam	Deterministic from appraisal design information	None
KRD Main Canal and South Branch Modifications	Deterministic from appraisal design information	None
Wapatox Canal Conveyance Improvements – Alternative 1	Deterministic from appraisal design information	None
Wapatox Canal Conveyance Improvements – Alternative 2	Deterministic from appraisal design information	None

Table 3. Summary of Mark-up Percentages

Facility	Cost Items and Markup Percentages										
	Field Overhead	Mobilization	Minor Unlisted Items	Minor Design/Scope Changes	Minor Cost Estimate Refinement	Contractor's Fee	Bonds & Builder Risk Insurance	Procurement Strategy – Open	Construction Contingencies	Sales Tax – Washington State	Indexing to Midpoint
Fish Passage at Cle Elum Dam [1]	n/a	5%	n/a	15%	n/a	n/a	n/a	n/a	25%	n/a	2.9%
Fish Passage at Bumping Lake Dam	6%	4%	4%	4%	2%	10%	1.5%	0%	25%	8.2%	0%
Fish Passage at Clear Lake Dam	6%	4%	4%	4%	2%	10%					
Wymer Reservoir with Adjacent Yakima River Intake)	0%	3%	4%	4%	2%	6%					
Alternate Wymer Supply from Yakima River at Thorp	4%	6%	6%	7%	3%	7%					
Wymer Power Recovery and Conveyance to Roza Dam	0%	3%	4%	4%	2%	6%					
Pipeline from Lake Keechelus to Lake Kachess	4%	1%	4%	4%	2%	6%					
Lake Kachess Inactive Storage – Alternative 1 Tunnel	4%	2%	4%	4%	2%	8%					
Lake Kachess Inactive Storage – Alternative 2 Pump Station	4%	2%	4%	4%	2%	6%					
Fish Passage at Box Canyon Creek	6%	6%	4%	4%	4%	10%					
Bumping Lake Enlargement	2%	1%	4%	4%	2%	6%					
Pool Level Increase at Cle Elum Dam	6%	2%	4%	4%	2%	8%					
KRD Main Canal and South Branch Modifications	2%	2.5%	4%	4%	2%	8%					
Wapatox Canal Conveyance Improvements – Alternative 1	4%	2%	4%	4%	2%	8%					
Wapatox Canal Conveyance Improvements – Alternative 2	4%	2%	4%	4%	2%	8%					

[1] The estimate for Fish Passage at Cle Elum Lake Dam is from Reclamation 2011a. Mark-ups were developed by Reclamation specifically for this project, rather than using the standard percentages applied to the other projects listed.

OPCC Estimates

Tables 4 through 19 summarize the OPCC estimates that were prepared for the major capital projects considered in the Yakima River Basin Study. A single summary table is provided for most of the projects, but separate tables are provided for three projects that involve multiple alternatives. These include:

- Wymer Reservoir (Tables 7-10). Table 10 explains which cost was used in Table 1.
- Lake Kachess Inactive Storage (Tables 12 and 13). The cost listed in Table 1 is for the tunnel alternative.
- Wapatox Canal Conveyance Improvements (Tables 18 and 19). The cost listed in Table 1 is for Alternative 2.

More detailed information on the OPCC for each project is provided in Appendices A through M. For more information on all of the projects and alternatives, see the respective technical memoranda in Volume 2 that were prepared for each project as part of the Yakima River Basin Study.

As noted previously, OPCCs were not developed for the programmatic actions in the proposed Integrated Plan or for capital projects that require further study before appraisal-level costs can be developed. Section 4 presents a separate discussion of those costs, based on alternative methods of estimation.

Table 4. Fish Passage at Cle Elum Lake Dam

Component	Amount[1]
1. Materials and Labor	
Fish Passage – Cle Elum Lake Dam	$46,317,000
Materials and Labor	**46,317,000**
2. Mobilization and Design Contingency	11,225,000
Contract Cost	**57,542,000**
3. Contingencies	14,386,000
Field Cost	**71,928,000**
Construction Cost	**$71,928,000**

[1] The estimate for fish passage at Cle Elum Lake Dam was indexed to third quarter 2010 from an estimate prepared by Reclamation in January 2008 (see Appendix A.).

Table 5. Fish Passage at Bumping Lake Dam

Component	Amount
1. Materials and Labor	
Fish Passage – Bumping Lake Dam[1]	$12,252,000
Materials and Labor	**12,252,000**
2. Field Overhead and Mobilization	1,225,000
3. Other Contractor Costs	2,902,000
Contract Cost	**16,378,000**
4. Contingencies	4,095,000
Field Cost	**20,473,000**
Construction Cost	**$20,473,000**

[1] The cost presented in this table was developed for passage at the existing Bumping Lake Dam. If the existing dam is replaced for an enlarged reservoir, fish passage will be needed at the new dam. For purposes of the Integrated Plan, it is assumed the cost to include passage at the new dam will be similar to the cost estimated for passage at the existing dam.

Table 6. Fish Passage at Clear Lake Dam

Component	Amount
1. Materials and Labor	
Fish Passage – Clear Lake Dam	$1,349,000
Materials and Labor	1,349,000
2. Field Overhead and Mobilization	135,000
3. Other Contractor Costs	313,000
Contract Cost	**1,796,000**
4. Contingencies	449,000
Field Cost	**2,246,000**
5. Sales Tax	57,000
Construction Cost	**$2,303,000**

Table 7. Wymer Reservoir with Adjacent Yakima River Intake

Component	Amount
1. Materials and Labor	
Yakima River Intake	$20,844,000
Pumping Station	60,809,000
Switchyard and Transmission Line	6,545,000
Discharge Line	27,724,000
Dam and Dike	399,921,000
Spillway and Outlet Works	63,578,000
Diversion During Construction	4,769,000
Road and Creek Improvements	6,610,000
Materials and Labor	**590,800,000**
2. Field Overhead and Mobilization	17,724,000
3. Other Contractor Costs	56,730,000
Contract Cost	**665,254,000**
4. Contingencies	166,313,000
Field Cost	**831,567,000**
5. Sales Tax	85,000
Construction Cost	**$831,652,000**

Table 8. Alternate Wymer Supply from Yakima River at Thorp

Component Amount	
1. Materials and Labor	
Diversion Control Dam	$1,567,000
Intake	4,343,000
Pump Station To Pipeline	44,336,000
Pipeline – 144" To KRD North Branch Canal	23,514,000
Pump Station Pipeline Flow Discharge Structure KRD Canal	1,172,000
KRD North Branch Improvements – Siphon, Badger Creek	28,072,000
KRD North Branch Improvements – Tunnel, Wymer Fill	59,313,000
Materials and Labor	**239,426,000**
2. Field Overhead and Mobilization	23,943,000
3. Other Contractor Costs	62,672,000
Contract Cost	**326,041,000**
4. Contingencies	81,510,000
Field Cost	**407,551,000**
5. Sales Tax	8,787,000
Construction Cost	**$416,338,000**

Table 9. Wymer Power Recovery and Conveyance to Roza Dam

Component Amount	
1. Materials and Labor	
Tunnels, Siphon and Penstock	$112,382,000
Tailrace Flume	3,067,000
Powerhouse	45,679,000
Materials and Labor	**161,128,000**
2. Field Overhead and Mobilization	17,281,000
3. Other Contractor Cost	16,804,000
Contract Cost	**195,213,000**
4. Contingencies	48,803,000
Field Cost	**244,016,000**
5. Sales Tax	930,000
Construction Cost	**$244,946,000**

Table 10. Summary of Wymer Elements and Alternatives (construction cost)

Component Amount	
Intake and Pump Station Adjacent to Reservoir (with conveyance)	$163,115,000
Intake and Pump Station Near Thorp (with conveyance)	416,338,000
Dam and Reservoir Facilities	668,537,000
Tunnels, Siphon, and Penstock	171,082,000
Tailrace flume	4,687,000
Powerhouse	69,177,000
Total, with Intake Adjacent to Reservoir	**1,076,598,000**
Same, Without Powerhouse	**1,007,421,000**
Total, with Intake at Thorp	**1,329,821,000**
Same, Without Powerhouse[a]	**1,260,644,000**

[a] For Wymer Reservoir elements and alternatives, the cost listed in Table 1 includes the Thorp intake alternative; and does not include the powerhouse. This is consistent with how benefits were analyzed for the proposed Integrated Plan.

Table 11. Pipeline from Lake Keechelus to Lake Kachess

Component	Amount
1. Materials and Labor	
Intake Screens & Connection to Existing Aqua Duct	$1,768,000
Wye Structure & Connections to Existing	4,446,000
Pipeline from Wye Structure to Future Outlet Control Valve Building	86,373,000
Pipeline from Future Outlet Control Valve Building to STA 275+10	958,000
Materials and Labor	**93,546,000**
2. Field Overhead and Mobilization	2,806,000
3. Other Contractor Costs	16,712,000
Contract Cost	**113,064,000**
4. Contingencies	28,266,000
Field Cost	**141,330,000**
5. Sales Tax	5,339,000
Construction Cost	**$146,669,000**

Table 12. Lake Kachess Inactive Storage – Alternative 1 Tunnel

Component	Amount
1. Materials and Labor	
Lake Kachess Outlet to Pump Station	$12,909,000
Pump Station – 20 CFS	15,329,000
Pipeline – 20" from Pump Station to Kachess River Discharge	3,122,000
Tunnel From Pump Station to Yakima River	85,997,000
Yakima River Discharge Structure	4,489,000
Kachess River Discharge Structure	586,000
Materials and Labor	**122,432,000**
2. Field Overhead and Mobilization	7,346,000
3. Other Contractor Costs	25,640,000
Contract Cost	**155,419,000**
4. Contingencies	38,855,000
Field Cost	**194,273,000**
5. Sales Tax	970,000
Construction Cost	**$195,243,000**

Table 13. Lake Kachess Inactive Storage – Alternative 2 Pump Station

Component	Amount
1. Materials and Labor	
Lake Kachess Outlet to Pump Station	$12,909,000
Pump Station – 1,000 CFS	79,251,000
Pipeline – Pump Station to Kachess River Discharge	14,515,000
Kachess River Discharge Structure	1,343,000
Materials and Labor	**10,8018,000**
2. Field Overhead and Mobilization	6,481,000
3. Other Contractor Costs	19,975,000
Contract Cost	**134,474,000**
4. Contingencies	33,618,000
Field Cost	**168,092,000**
5. Sales Tax	5,527,000
Construction Cost	**$173,620,000**

Table 14. Fish Passage at Box Canyon Creek

Component Amount	
1. Materials and Labor	
Fish Passage – Box Canyon Creek To Kachess Lake	$517,000
Materials and Labor	**517,000**
2. Field Overhead and Mobilization	62,000
3. Other Contractor Costs	130,000
Contract Cost	**708,000**
4. Contingencies	177,000
Field Cost	**885,000**
5. Sales Tax	18,000
Construction Cost	**$903,000**

Table 15. Bumping Lake Enlargement

Component Amount	
1. Materials and Labor	
Land Rights	$713,000
Relocation of Property of Others	3,488,000
Clearing Lands	11,266,000
Roads and Road Structures	4,019,000
Dams	180,717,000
Materials and Labor	**200,204,000**
2. Field Overhead and Mobilization	6,006,000
3. Other Contractor Costs	36,465,000
Contract Cost	**24,2675,000**
4. Contingencies	60,669,000
Field Cost	**303,344,000**
5. Sales Tax	6,270,000
Construction Cost [1]	**$309,614,000**

[1] Construction cost at Bumping Lake does not include the cost of fish passage, because that cost was not developed in the original estimate that was indexed for this study. However, the enlargement project will require fish passage. The cost of fish passage is assumed to be similar to the cost listed in Table 5, for fish passage at the *existing* Bumping Lake Dam.

Table 16. Pool Level Increase at Cle Elum Dam

Component	Amount
1. Materials and Labor	
Cle Elum Improvements Project engineering cost estimate	$5,143,000
Cle Elum Improvements Project land related cost estimate	1,128,000
Materials and Labor	**6,272,000**
2. Field Overhead and Mobilization	502,000
3. Other Contractor Costs	1,299,000
Contract Cost	**8,073,000**
4. Contingencies	2,018,000
Field Cost	**10,091,000**
5. Sales Tax	254,000
Construction Cost	**10,345,000**
6. Land/Easements	2,612,000
Total with Land/Easements	**$12,957,000**

Table 17. KRD Main Canal and South Branch Modifications

Component	Amount
1. Materials and Labor	
Main Canal Lateral 4.9	$189,000
Main Canal Lateral 6.1	412,000
Main Canal Lateral 7.7	407,000
Main Canal Lateral 13.6	1,537,000
Main Canal Lateral 16.9	63,000
South Branch Lateral 9.9	854,000
South Branch Lateral 13.8	2,146,000
South Branch Lateral 14.3	2,968,000
South Branch Laterals 16.7 & 17.6	3,329,000
Pumping to Manastash Creek	3,755,000
Reservoir – 15 AF	1,424,000
Materials and Labor	**17,084,000**
2. Field Overhead and Mobilization	769,000
3. Other Contractor Costs	3,480,000
Contract Cost	**21,332,000**
4. Contingencies	5,333,000
Field Cost	**26,665,000**
5. Sales Tax	956,000
Construction Cost	**$27,621,000**

Table 18. Wapatox Canal Conveyance Improvements – Alternative 1

Component	Amount
1. Materials and Labor	
Demo Of Existing Canal Lining – Wapatox Canal	$5,158,000
Install New Ditch Lining – Fish Screen to Wenas Grade PS Locations	4,729,000
Install New Check Structure in Existing Canal Upstream Wenas Grade PS	103,000
Pressurized Pipeline – Wenas Grade PS to End of Wapatox Canal, 60"	6,981,000
Pressurized Pipeline – End of Wapatox Canal to Tailrace, 48"	391,000
Pressurized Pipeline – From Tailrace to City Of Yakima WTP Intake, 42"	593,000
Pressurized Pipeline – From Tailrace to Gleed Ditch, 36"	1,017,000
Wenas Grade Pump Station	1,173,000
Wenas Grade Pump Station Discharge Pipeline To NSID Canal Below WGPS	120,000
Discharge Structure At NSID Canal	114,000
Spill Pipeline From Wenas Grade Pump Station to Naches River	2,012,000
Distribution Pump Stations – NSID Customers Upstream of Wenas Grade Pump Station	420,000
Pressurized Pipeline – NSID Customers Upstream Wenas Grade Pump Station	4,661,000
Connection to Existing Wapatox Ditch Company Turnouts	223,000
Connection to Existing NSID Turnouts	84,000
Demolition of Existing NSID Diversion	232,000
Demolition of Existing Gleed Ditch Diversion	32,000
Materials and Labor	**28,043,000**
2. Field Overhead and Mobilization	1,683,000
3. Other Contractor Costs	5,698,000
Contract Cost	**35,423,000**
4. Contingencies	8,856,000
Field Cost	**44,279,000**
5. Sales Tax	1,360,000
Construction Cost	**$45,639,000**

NSID = Naches-Selah Irrigation District

Table 19. Wapatox Canal Conveyance Improvements – Alternative 2

Component	Amount
1. Materials and Labor	
Demo of Existing Canal Lining – Wapatox Canal	$5,158,000
Pipeline, Gravity for Low Pressure – Fish Screenn to Wenas Grade Pump Station 96"	17,525,000
Pressurized Pipeline – Wenas Grade Pump Station to End Wapatox Canal 60"	6,981,000
Pressurized Pipeline – End of Wapatox Canal to Tailrace, 48"	391,000
Pressurized Pipeline – From Tailrace to City of Yakima WTP Intake, 42"	593,000
Pressurized Pipeline – From Tailrace to Gleed Ditch, 36"	1,017,000
Wenas Grade Pump Station	1,173,000
Wenas Grade Pump Station Discharge Pipeline to NSID Canal Below the Pump Station	120,000
Discharge Structure at NSID Canal	114,000
Distribution Pump Stations – NSID Customers Upstream of Wenas Grade PS	420,000
Pressurized Pipeline – NSID Customers Upstream Wenas Grade Pump Station	4,661,000
Connection to Existing Wapatox Ditch Company Turnouts	223,000
Connection to Existing NSID Turnouts	84,000
Demolition 0f Existing NSID Diversion	232,000
Demolition of Existing Gleed Ditch Diversion	32,000
Materials and Labor	**38,724,000**
2. Field Overhead and Mobilization	2,323,000
3. Other Contractor Costs	7,222,000
Contract Cost	**48,940,000**
4. Contingencies	12,235,000
Field Cost	**61,175,000**
5. Sales Tax	2,004,000
Construction Cost	**$63,179,000**

NSID = Naches-Selah Irrigation District

WTP = Water Treatment Plant

3.2 Noncontract Costs

The OPCCs discussed above represent "field costs" under Reclamation cost-estimating procedures. Additional "non-contract" costs must be considered in order to determine the full project costs. Noncontract costs are funds for engineering designs and specifications, regulatory compliance and permitting activities, environmental mitigation and monitoring, construction contract administration and management, and costs associated with land acquisition and relaocation or rights of way that may be required for consstuction of the project features. A percentage of the field cost is typically used to identify funds for noncontract items. For the capital projects discussed in this technical memorandum, a percentage of 30 percent was used for noncontract costs (except where noted).

3.3 Annual Operation, Maintenance and Power Costs

O&M costs for the major capital projects are summarized in Table 1 and details of those costs are provided in Appendix N. (However, the O&M cost for fish passage at Cle Elum Dam is from Reclamation and Ecology 2010, and the cost for fish passage at Bumping Dam is assumed to be the same as for Cle Elum Dam.) Some O&M costs are consistent from year to year. Other costs vary from year to year, such as a pump station that pumps more water for a drought year than a non-drought year.

Annual costs are different for each type of facility. Pump stations have significant energy costs. Pump stations and valves with remote operational capability need communication systems that typically include an annual cost for phone lines or wireless/telemetry communications systems.

Pipelines require relatively little annual maintenance but appurtenances such as valves, gates, and flow meters do have costs associated with their O&M. Cathodic protection systems have an annual monitoring and maintenance cost if metallic pipes are used. Facilities with buildings and mechanical equipment typically require electrical power (beyond that needed for pumping). Pipelines and canals need to be monitored during operation and all facilities need to be either permanently manned or visited on a regular basis by the operators, mechanics, and electricians. Large pump stations, fish screens, power plants, and reservoirs would likely be staffed on a daily basis, while smaller pump stations, dams, and fish screens may be visited less frequently.

Where a facility is only in operation part of the year, the operational costs reflect this schedule and resources were assigned for startup and shutdown at the beginning and end of the season. For example, the North Branch of the KRD Canal would be operated during an irrigation season that may or may not coincide or overlap with the conveyance of water from the Thorp Pump Station to the Wymer Reservoir.

For the annual operational costs, each facility was assigned the staff resources needed for normal operation. For variable operations, it was assumed the normal annual labor full time equivalents (FTEs) were sufficient to keep the facility in operation. For example, a pump station may run at a higher flow rate because more pumps are running, but the operators would not spend significant additional time operating the system.

The cost of electrical power to run pumps – called "Power Seasonal Demand and Energy Charge" in the cost calculations – would vary from year to year, especially when a pump station is only used seasonally. For example, the Thorp Pump Station would pump 135,000 acre-feet during non-drought years, but 165,000 acre-feet during drought years, which occur about every 5 years. In this case, pumping costs for 135,000 acre-feet a year is an annual cost while pumping costs for the additional 30,000 acre feet every 5 years is a non-annual cost. That cost was converted to an annual cost by adding 20 percent of the additional cost to each year of the 5-year period. Seasonal power rates would apply

since power rates vary throughout the year and most pump stations would only be used during part of the year.

Annual costs are subdivided in the following categories:

- Utilities
- Power consumption
- Standby generators
- Pump and/or gate lubrication
- Staffing and miscellaneous costs for supplies, small equipment, and instrumentation

Power rates directly from the Bonneville Power Administration rate schedule (BPA 2009) were applied to the installed pumping power, and energy usage was calculated using an assumed average delivery rate for each month.

For facilities that have the potential to utilize a hydropower plant to recover energy, revenue from power generation would partially offset pumping costs. However, revenue from hydropower was not calculated at this time due to uncertainties regarding operation of the facilities that would affect power generation.

3.4 Replacement Costs

Costs related to inspection, repair and/or replacement of facilities or equipment for the capital projects were not determined for this appraisal-level study and therefore are not included in Table 1. Repair is defined as major work that occurs only once every 5 to 10 years and differs from preventative maintenance, which is included in O&M cost estimates. Replacement costs for facilities and equipment may be expected on a 25- to 50-year cycle.

3.5 Real Estate Costs

Real estate costs are treated separately from construction costs under Reclamation cost estimating procedures. Real estate costs were estimated for four projects that would require some form of easement and/or property acquisition. This section provides a brief summary of real estate costs. Additional information is provided in Appendix O.

An HDR real estate specialist made preliminary assessments of the areas and numbers of parcels impacted by three of the proposed projects: Alternate Wymer Supply from Yakima River at Thorp, Pipeline from Lake Keechelus to Lake Kachess, and Lake Kachess Inactive Storage. The Kittitas County Assessor's website was accessed to compile property ownership and values. Depending on the project, additional costs were estimated for contingencies and unknown acquisitions that may be required. Results are as follows:

- Alternate Wymer Supply from Yakima River at Thorp: $2.5 million
- Wymer Reservoir: $2 million (based on Reclamation's prior study of Wymer facility)
- Pipeline from Lake Keechelus to Lake Kachess: 1.5 million
- Lake Kachess Inactive Storage: $0.5 to 1 million (for pump station alternative or tunnel alternative, respectively).

The real estate costs for these projects are relatively small in comparison to total project costs for each of these three projects. Therefore in accordance with Reclamation cost estimating procedures, Table 1 includes real estate costs within noncontract costs.

Estimates for the Pool Level Increase at Cle Elum Dam started with information in the Cle Elum Improvements Project Final Cost Estimate study (Reclamation 2000). The estimates were revised based on updated land values and evaluation of non-Federal land acquisition. It was assumed no structures would have to be acquired or removed to accommodate the shoreline protection project and increased inundation described in that study. The total estimated land acquisition cost is $2.6 million. Because this estimate is based on assessed valuation, the estimate may not reflect market costs and may be understating the actual costs. For further information, see Appendix O.

Since real estate cost is significant (more than 5 percent of total cost) in comparison to construction cost for the Pool Level Increase at Cle Elum Dam, it is not included in the design and permitting multiplier like the other three projects discussed above. Real estate cost is added to construction cost (see Table 16) and this total is listed under "Construction Cost" in Table 1.

4.0 Costs of Other Actions in the Integrated Plan

This section describes costs of proposed programmatic actions and capital projects that are conceptual only at this time and have been recommended for further study to define the projects. Various methods were used to estimate these costs, and OPCCs were not developed. Costs in these two categories should be considered as conceptual rather than appraisal level. Conceptual costs are more preliminary in nature than appraisal-level costs.

As with the major capital projects discussed in Section 3, these projects are included in the proposed Integrated Plan. For more information on these projects, see the project-by-project technical memoranda included in Volume 2 of the Yakima River Basin Study.

4.1 Mainstem Floodplain Restoration Program

The proposed Mainstem Floodplain Restoration Program would include restoration actions for 10 mainstem Yakima and Naches River reaches: Gap to Gap, Umptanum Road Bridge to Ringer Road, Lower Naches, Naches, Cle Elum, Kittitas, Wapato, Easton, Selah, and Lower Yakima. The YRBWEP Workgroup established goals, identified actions, and estimated associated costs for each of these reaches. Of the estimated $280 million in total costs, $10 million was identified for annual operation expenses ($500,000 per year for 20 years), including increasing staffing capacity for project management and oversight, initiating design, and administration.

Table 20 lists cost assumptions for the program, which were derived from the *Yakima River Basin Integrated Water Resource Management Alternative Final EIS* (Ecology 2009) and professional judgment by members of the YRBWEP Workgroup Habitat Subcommittee during restoration planning workshops held for the different reaches in 2009.

Table 20. Mainstem Floodplain Restoration Cost Item Assumptions

Item	Units	Unit Cost (December 2010 levels)
Large woody debris pieces placed in structures	Each	$1,000 [1]
Excavation	Cubic Yard	$8 [2]
Riparian restoration	Square Foot	$1 [1]
Levee setbacks [3]	Mile	High – $900,000
		Medium – $750,000
		Low – $600,000
Clearing and grubbing	Acre	$5,000 [4]
Plant removal/control	Acre	$4,000 [5]
Seeding	Acre	$2,500 [5]
Soil preparation	Acre	$1,000 [5]
Protection – easements	Acre	$5,000 [5]
Protection – acquisitions	Acre	$15,000 [5]
Engineered logjams	Each	$50,000 [5]

[1] Value derived from Ecology 2009, Table 5-36, and adjusted per input from they YRBWEP Habitat Subcommittee in 2009.
[2] Value derived from average cost for excavation as reported in Ecology 2009, Table 5-36; assumed 5 feet deep.
[3] Values derived from cost for 1 mile of medium-sized levee with 20-foot base and including clearing and grubbing for new levee alignment, subgrade preparation, excavation, haul, placement and compaction, armoring, and restoration of existing levee alignment. High value was used if levee base was anticipated to be larger than 20 feet. Low value was used if anticipated to be smaller than 20 feet. Anticipated levee size was based on local knowledge provided by participants at Habitat Subcommittee meetings and associated workshops.
[4] Value derived from Ecology 2009, Table 5-36.
[5] Value based on local knowledge provided by participants at Habitat Subcommittee meetings and associated workshops.

4.2 Tributary Habitat Enhancement Program

The Tributary Habitat Enhancement Program identifies restoration actions for the middle and upper Yakima Basin. Tributary actions and associated budgets were developed to estimate the habitat enhancement program funding level and direction in the following categories:

- Passage and screening projects
- Habitat restoration and enhancement – below reservoirs
- Wilson and Naneum creeks fish passage, screening, and habitat enhancement
- Headwaters restoration – above Reclamation reservoirs, primarily focused on improving bull trout habitat conditions
- Yakama Nation Reservation screening, passage, and restoration
- Emergent needs fund for acquisition, conservation, and easement opportunities

Cost estimates for tributary actions were developed at a planning level and are based on professional judgment by members of the Habitat Subcommittee and others who participated in planning workshops in 2009, and project cost estimates provided by the North Yakima and Kittitas County conservation districts. Total cost of the program is estimated to be $180 million.

4.3 Fish Passage at Tieton, Kachess and Keechelus Dams

The proposed Integrated Plan identifies fish passage at Tieton, Kachess and Keechelus Dams for implementation after fish passage has been constructed at Cle Elum, Bumping and Clear Lake Dams. Detailed cost estimation for passage at Tieton, Kachess and Keechelus Dams has not been performed at this time . For purposes of the proposed Integrated Plan, a "placeholder" construction cost of $225 million has been used for all three of these fish passage facilities combined (i.e., average of $75 million per facility). Adding non-contract costs estimated at 30% of construction cost, the total cost would be $292.5 million.

It is assumed that annual O&M costs at Tieton, Kachess and Keechelus Dams will be similar to costs at Bumping and Cle Elum dams, which was estimated to be $300,000 per year at each facility. This results in a total estimated O&M cost of $900,000 per year for fish passage at the three facilities combined.

4.4 Enhanced Water Conservation Program

The enhanced water conservation program addresses two distinct areas: 1) agricultural water conservation and 2) municipal and domestic water conservation.

Total capital cost of the agricultural conservation program is estimated to be $400 million. No costs were included for operation and maintenance because it is assumed that individual irrigation districts would address operation in their normal operating budgets. Costs in the agricultural category were mostly obtained from the previous technical report on the Enhanced Water Conservation Alternative (Ecology 2007) and were updated to 2010 costs. About half of the projects listed in the technical report had detailed and itemized cost estimates available for review. For those projects, the detailed cost estimates were indexed to 2010 costs using the Reclamation Construction Cost Index. A contingency of 25 percent and noncontract costs of 35 percent were added to the detailed cost estimates. Planning-level cost estimates available for the remainder of the projects were indexed to 2010, but no contingencies or noncontract costs were added because they are only at the planning level.

Costs in the municipal and domestic category were developed through discussions with the Out-of-Stream Water Needs Subcommittee of the YRBWEP Workgroup and are loosely based on annual costs of urban water conservation programs for areas with populations comparable to the Yakima River Basin. The cost is estimated to be approximately $1 million per year, but could range from $0.5 million to $1.5 million (50 percent less to 50 percent greater). These costs are highly conceptual and would require additional attention as the program elements are refined in the future. The cost of the municipal and domestic conservation program is treated as an annual operational cost only since this program does not involve construction of infrastructure or other capital facilities.

4.5 Market Reallocation Program

Costs for the market reallocation program were identified through discussion among the HDR consultant team and Ecology. The cost is estimated to be approximately $2 million to put administrative frameworks in place initially. This cost would be spent gradually over a period of approximately 5 years. An estimated range around this cost is $1.6 million to $2.8 million (minus 20 percent to plus 40 percent). Once the system is established, operational costs are estimated to be about $200,000 per year. All of these costs are highly conceptual and would require additional attention as program elements are refined in the future.

4.6 Groundwater Infiltration

Costs of the groundwater storage program are described in the technical memorandum *Groundwater Infiltration Appraisal-Level Study*. This program would involve an initial pilot-phase to test feasibility followed by full-scale implementation. The pilot-phase cost is estimated to be $4.7 million. The capital cost for full-scale implementation was estimated to be $98 million (Table 21). These costs were obtained from engineering analysis presented in Golder 2009.

Once the full-scale system is constructed, Golder estimated operation and maintenance costs to be $2.15 million per year. Costs of the full-scale system and operation and maintenance would need to be refined based on results of the pilot study.

Table 21. Estimated Cost of Full-Scale Groundwater Infiltration

COMPONENT		RANGE IN COSTS		
		LOW	EXPECTED	HIGH
$/acre	Unit Construction Cost	$ 175,000	$ 175,000	$ 175,000
$/acre	Land Acquisition	$ 12,000	$ 12,000	$ 12,000
	Total Acres	166	300	500
	Construction Costs (@ $187,000/Acre)	$ 31,042,000	$56,100,000	$ 93,500,000
15%	Permitting	$ 4,656,300	$ 8,415,000	$ 14,025,000
30%	Engineering Design	$ 9,312,600	$ 16,830,000	$ 28,050,000
30%	Contingency	$ 9,312,600	$ 16,830,000	$ 28,050,000
	Total Construction	$ 54,323,500	$ 98,175,000	$ 163,625,000
$ 65	Fixed O&M (Annual Cost)	$ 2,145,000	$ 2,145,000	$ 2,145,000

4.7 Columbia River Pump Exchange Feasibility Study

Costs for Step 1 and Step 2 of the Feasibility Study were estimated by HDR based on experience with similar studies. The estimated cost is $4.1 million, and is detailed more fully in the technical memorandum *Columbia River Pump Exchange Plan of Study*. This project is a study only, and therefore does not include any capital costs or operating costs (Note: the Columbia River technical memorandum was in draft form at the time this cost technical memorandum was prepared, so the cost listed here may be subject to change).

5.0 References

1. BPA. 2009. *2010 Wholesale Power Rate Schedules and General Rate Schedule Provisions (FY 2010-2011)*. Bonneville Power Administration.
2. Ecology. 2007. *Technical Report on the Enhanced Water Conservation Alternative for the Yakima River Basin Water Storage Feasibility Study*. Ecology Publication #07-11-044. Washington State Department of Ecology.
3. Ecology, 2009. *Yakima River Basin Integrated Water Resource Management Alternative Final EIS*. Washington State Department of Ecology.
4. Golder. 2009. *Technical Report on Groundwater Storage Alternatives for Yakima River Basin Storage Assessment.* Ecology Publication Number 07-11-004. Golder Associates Inc.
5. Reclamation. 2000, *Cle Elum Improvements Project Final Cost Estimate April 2000*. U.S. Department of the Interior, Bureau of Reclamation.
6. Reclamation. 2011a. *Supplement – Cle Elum and Bumping Lake Dams Fish Passage Facilities Designs & Estimates Appendix*. Technical Series No. PN-YDFP-16. Pacific Northwest Region, Boise, Idaho. U.S. Department of the Interior, Bureau of Reclamation. April 2011.
7. Reclamation. 2011b, *Bureau of Reclamation Construction Cost Trends 2008-2011*. Accessed in March 2011 at Reclamation web site: http://www.usbr.gov/pmts/estimate/cost_trend.html. U.S. Department of the Interior, Bureau of Reclamation.
8. Reclamation and Ecology. 2010, *Draft Environmental Impact Statement, Cle Elum Dam Fish Passage Facilities and Fish Reintroduction Project.*. U.S. Department of the Interior, Bureau of Reclamation and Washington State Department of Ecology.
9. RS Means Construction Cost Database 3rd Qtr 2010.

6.0 List of Preparers

Name	Background	Responsibility
HDR Engineering, Inc.		
Richard Glassen	Cost Estimator	Task manager and cost estimation for earthwork, concrete and mechanical systems
Norman Wagoner	Cost Estimation	Tunnel and shaft estimation
Trooper Shaw	Cost Estimation	Electrical and I&C estimation
Keith Goss	Professional Engineer	Task engineer
Joseph Looney	Real Estate	Real estate cost estimation
Jim Peterson	Professional Engineer	Task engineer
Stan Schweissing	Professional Engineer	Task engineer
Keith Underwood	Fisheries Biologist	Fish passage
Andrew Graham	Water Resource Planner	Municipal conservation
Anchor QEA		
Bob Montgomery	Professional Engineer	Task engineer
Ben Floyd	Planner	Habitat Subcommittee coordination

APPENDIX A

OPCC Fish Passage at Cle Elum Lake Dam

Yakima River Basin Water Storage Study
Fish Passage
Cle Elum Dam

US Department of the Interior

Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

10/21/2010
Appraisal
3rd Qtr 2010 Union
Open Competition

Fish Passages for Cle Elum consists of a downstream passage with in-lake Intake structure and concrete fish conduit to the river. Upstream passage consists of a short fish ladder to an adult collection facility for truck transport to the reservoir. Cost Estimates for Cle Elum were developed using unit prices and quantities from previous Feasibility Estimates with a Price Level of Jan 08 adjusted using the appropriate CCT indices as noted on the Totals Page notes. Neither noncontract costs nor escalation are included in these estimates.

989-WA-YAKIMA

AACE Classification Accuracy Range

Lower Range -20%

Upper Range +40%

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001	FISH PASSAGE - CLE ELUM LAKE DAM	1.00	LS			46,316,706			46,316,706

Estimate Totals

Description	Amount	Totals	Rate
Labor			
Material			
Subcontract	46,316,706		
Equipment			
Other			
Subtotal		**46,316,706**	
Mobilization	2,315,835		5.000 %
Escalation MidPoint 5% 7 mon	1,404,021		2.887 %
Design Contingency	7,505,484		15.000 %
Procurement Strategy-Open Comp			
Contract Cost		**57,542,046**	
Construction Contingency	14,385,512		25.000 %
Sales Tax Estimate (IncluSub)			
Forecasted Feature Field Cost		**71,927,558**	

CCT adjustments were made on the Cle Elum and Bumping Fish Passages - Adjustments were made as follows: Earth Dams - Dam Structure - 276/257:001-01.20; 002-01.20 Earth Dams - Outlet Works - 343/334:001-01.30; 001-02.10; 001-02.30; 002-01.30; 002-02.10; 002-02.20 Pumping Plants - 326/305:001-02.40; 002-02.30; 002-02.40 Secondary Roads - 411/394:001-01.10; 001-02.20; 002-01.10 Sales Tax for Cle Elum and Bumping are assumed to be in the previous estimate unit prices since it did not appear on the totals page of the January 2008 Feasibility Estimate.

Yakima River Basin Water Storage Study
Fish Passage
Cle Elum Dam

US Department of the Interior
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Fish Passages for Cle Elum consists of a downstream passage with in-lake Intake structure and concrete fish conduit to the river. Upstream passage consists of a short fish ladder to an adult collection facility for truck transport to the reservoir. Cost Estimates for Cle Elum were developed using unit prices and quantities from previous Feasibility Estimates with a Price Level of Jan 08 adjusted using the appropriate CCT indices as noted on the Totals Page notes. Neither noncontract costs nor escalation are included in these estimates.

989-WA-YAKIMA

AACE Classification Accuracy Range

Lower Range -20%

Upper Range +40%

Description			Quantity	Total Unit Cost	Amount
001		***FISH PASSAGE - CLE ELUM LAKE DAM***			
001-01.10		**Cle Elum Downstream Passage Facility - Roads and Road Structures**			
		Site Clearing	4.00 ac	8,658.15 /ac	34,633
02110.000		Earthwork - Fine grade	11,700.00 sy	0.42 /sy	4,882
02200.050		Embankment Fill, including compaction	8,080.00 cy	5.89 /cy	47,622
02207.005		Gates, Custom Fabricated Steel bar	1.00 ls	50,071.20 /ls	50,071
02444.010		Bases, Ballasts, Pavements & Appurtenances	9,799.00 cy	41.78 /cy	409,402
	Structural Impvts - 4" thick, road - 8" thick				
02700.000	**001-01.10 Cle Elum Downstream Passage Facility - Roads and Road Structures**		**1.00 ls**	**546,609.56 /ls**	**546,610**
001-01.20		**Cle Elum Downstream Passage Facility - Dams**			
		Dewatering	1.00 ls	1,557,198.50 /ls	1,557,199
02140.000		Earthwork, Structural Excavation	210,000.00 cy	4.56 /cy	958,483
02200.500	*Cle Elum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy Cle Elum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy, Bumping Downstream Dams - Intake Structure - 600 cy Bumping Downstream Waterways - Conduit - 19440 cy*				
		Earthwork, Structural Backfill, Borrow includes compaction	1,630.00 cy	30.07 /cy	49,014
02200.550		Earthwork, Structural Backfill, Native Material includes compaction	59,700.00 cy	51.55 /cy	3,077,454
02200.600	*Cle Elum - Upstream Collection Waterworks - Pump Pit and Retaining Wall Bumping - Intake - Dams - Intake*				
		Earthwork, Haul and Spread Excess Structural Excavation, no compaction	155,000.00 cy	4.30 /cy	665,837
02200.700		Embankment Fill, impervious	13,300.00 cy	80.55 /cy	1,071,245
02207.035		Stone Revetment (Rip Rap)	16,600.00 cy	117.54 /cy	1,951,116
02271.000	*Cle Elum Downstream -Dam - Rip Rap Bedding-8900 cy, Rip Rap 16600 cy Cle Elum Upstream -Waterway - Rip Rap Bedding-340 cy, Rip Rap 340 cy Bumping - Removal and stockpile of existing 2200 cy; Rip rap bedding 1100 cy; place rip rap from stockpile, 2700 cy*				
		Concrete_Foundations	3,250.00 cy	289.96 /cy	942,374
03002.100	*Clr Crk - Auxiliary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation Cle Elum - Downstream Waterway - 2700 CY Bumping - Upstream Structures and Impvts - 105 cy*				
		Concrete_Walls Exterior, elev slabs and piers	4,750.00 cy	826.93 /cy	3,927,899
03002.302		Metal Deck	3,375.00 sf	36.51 /sf	123,233
05313.000		Metal Fabrications	1.00 ls	808,637.08 /ls	808,637
05505.000	*Cle Elum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls Cle Elum - Upstream Waterway - Pump plt handrail 100 lf Cle Elum - Upstream Pumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5' Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf; Misc, 920 lb*				

Description			Quantity	Total Unit Cost	Amount
		Hydraulic Gates & Valves	7.00 ea	253,984.44 /ea	1,777,891
11280.000	*Cle Elum - Downstream - Dams - F&I 10'x10' slide gate and hydraulic operator; F&I 8'x16' roller gates with guides and electric winches; F&I 8'x8' roller gates with guides and electric winches; F&I 8'x16' bulkhead gate; F&I roller gate controls Cle Elum Upstream Collection Facility - Aux Water - F&I Isolation Slide gate Bumping - Dams - Intake - F&I folding langemann control gates 10' w x 12' h with automatic controls; F&I slide gate, 7' x 7' Clr Crk - 4' high x 4' wide*				
		Gantry Cranes	1.00 ea	177,198.45 /ea	177,198
14304.000		Trash Rack Clean -Automatic with Trash conveyance	1.00 ea	805,447.50 /ea	805,448
15115.610		Electrical: Permanent Service to site	1.00 ls	289,961.10 /ls	289,961
16020.000		Interior and Exterior Lighting	1.00 ls	28,996.11 /ls	28,996
16500.000	**001-01.20 Cle Elum Downstream Passage Facility - Dams**		**1.00 ls**	**18,211,984.16 /ls**	**18,211,984**
001-01.30		**Cle Elum Downstream Passage Facility - Waterway Structures**	*7' Dia concrete fish passage conduit*		
		Site Clearing	16.00 ac	10,064.11 /ac	161,026
02110.000		Strip and Respread Topsoil	23,500.00 cy	7.19 /cy	168,933
02200.025	*Borrow Area*	Earthwork, Structural Excavation	641,200.00 cy	6.19 /cy	3,967,416
02200.500	*Cle Elum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy Cle Elum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy, Bumping Downstream Dams - Intake Structure - 600 cy Bumping Downstream Waterways - Conduit - 19440 cy*				
		Earthwork, Structural Backfill, Borrow includes compaction	6,950.00 cy	25.67 /cy	178,433
02200.550		Earthwork, Structural Backfill, Native Material includes compaction	49,200.00 cy	32.86 /cy	1,616,830
02200.600	*Cle Elum - Upstream Collection Waterworks - Pump Plt and Retaining Wall Bumping - Intake - Dams - Intake*				
		Embankment Fill, conduit cutoff fill, sand	600.00 cy	74.97 /cy	44,980
02207.031		Embankment Fill, conduit cutoff fill, gravel, borrow	35.00 cy	58.54 /cy	2,049
02207.032		Embankment Fill, conduit cutoff fill, bentonite	1,400.00 ton	801.02 /ton	1,121,429
02207.033		Embankment Fill, conduit cutoff fill, low permeable zone	20,650.00 cy	112.96 /cy	2,332,717
02207.034	*Waterworks - low permeable 2' surface seal - 9800 cy, low permeable zone 200' wide - 10850 cy*				
		Storm Drainage System	1.00 ls	3,378,994.13 /ls	3,378,994
02423.000	*Waterworks - 6" conduit cutoff wall drain 120', 557000 cy of compacted backfill, and 33,400 cy of excess haul off*				
		Concrete - Modifications	1.00 ls	6,675.17 /ls	6,675
03002.005	*Cle Elum Waterworks - Spillway modifications, 4 ea 34" square holes, 7' dia in wall for conduit Bumping Upstream Collection Waterworks - Concrete Demolition and Remove*				
		Concrete_Foundations_Walls-Fish passage	3,700.00 cy	1,026.95 /cy	3,799,715
03002.101	*Clr Crk - Auxiliary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation Cle Elum - Downstream Waterway - 2700 CY*				
		Concrete_Miscellaneous	200.00 cy	205.39 /cy	41,078
03002.900	*Mud Slab for waterworks fish passage*				

Description			Quantity	Total Unit Cost	Amount
		Metal Fabrications	1.00 ls	11,296.45 /ls	11,296
05505.000	*Cle Elum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls Cle Elum - Upstream Waterway - Pump plt handrail 100 lf Cle Elum - Upstream Pumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5' Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf; Misc, 920 lb*				
	001-01.30 Cle Elum Downstream Passage Facility - Waterway Structures		**1.00 ls**	**16,831,571.86 /ls**	**16,831,572**
001-02.10		**Cle Elum Upstream Passage Collection Facility - Structures and Impvts**			
		Site Clearing	10.00 ac	8,318.30 /ac	83,183
02110.000		Dewatering	1.00 ls	123,234.00 /ls	123,234
02140.000		Earthwork, Structural Excavation	1,750.00 cy	12.32 /cy	21,566
02200.500	*Cle Elum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy Cle Elum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy, Bumping Downstream Dams - Intake Structure - 600 cy Bumping Downstream Waterways - Conduit - 19440 cy*				
		Earthwork, Structural Backfill, Native Material includes compaction	1,650.00 cy	28.24 /cy	46,598
02200.600	*Cle Elum - Upstream Collection Waterworks - Pump Plt and Retaining Wall Bumping - Intake - Dams - Intake*				
		Embankment Fill, including compaction	700.00 cy	35.94 /cy	25,160
02207.005		Chain Link Fence and Gates	400.00 lf	39.02 /lf	15,610
02444.000		Aggregate Vehicular Drive, Compacted	285.00 cy	96.53 /cy	27,512
02514.000	*Cle Elum - 4" Gravel drive 285 cy Clear Creek - 300' x 18' wide 12" aggregate base access road to control box*				
		Gravel Pack Wells	1.00 ls	12,323.40 /ls	12,323
02580.000		Seeding, Sodding, and Landscaping	4,277.78 sy	1.53 /sy	6,524
02930.000		Concrete_Foundations	300.00 cy	503.21 /cy	150,962
03002.100	*Clr Crk - Auxiliary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation Cle Elum - Downstream Waterway - 2700 CY Bumping - Upstream Structures and Impvts - 105 cy*				
		Concrete_Walls Exterior	1,170.00 cy	831.83 /cy	973,241
03002.300	*Clr Crk - Auxiliary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade Cle Elum - Downstream Waterway - 1000 CY*				
		Metal Fabrications	1.00 ls	377,732.75 /ls	377,733
05505.000	*Cle Elum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls Cle Elum - Upstream Waterway - Pump plt handrail 100 lf Cle Elum - Upstream Pumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5' Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf; Misc, 920 lb*				
		Rough Carpentry	1.00 ls	9,411.99 /ls	9,412
06100.000	*Upstream collection - Wood ladder weirs - 220 fbm, False weir 12"x12",*				

Description				Quantity	Total Unit Cost	Amount
		Motorized Roll-Up Doors		2.00 ea	7,496.74 /ea	14,993
08331.000		Hydraulic Gates & Valves		1.00 ea	22,592.90 /ea	22,593
11280.000	*Cle Elum - Downstream - Dams - F&I 10'x10' slide gate and hydraulic operator; F&I 8'x16' roller gates with guides and electric winches; F&I 8'x8' roller gates with guides and electric winches; F&I 8'x16' bulkhead gate; F&I roller gate controls Cle Elum Upstream Collection Facility - Aux Water - F&I Isolation Slide gate Bumping - Dams - Intake - F&I folding langemann control gates 10' w x 12' h with automatic controls; F&I slide gate, 7' x 7' Clr Crk - 4' high x 4' wide*					
		Metal Building Systems		2,575.00 sf	118.10 /sf	304,106
13121.000	*Cle Elum - UpstreamStructureImpvts - Building shell 2575 sf @ 115/sf Cle Elum - UpstreamWaterwayStructures - Building Shell 1900 sf @ 100/sf*					
		Pipe: Plastic, Sewer DW35		160.00 lf	40.05 /lf	6,408
15064.300		Pipe: Polyethylene (HDPE), Drainage Pipe		65.00 lf	128.37 /lf	8,344
15067.100	*Cle Elum - CollectionStructuresImpvts - 65 lf 12' Cle Elum - CollectionUpstreamAuxWater -40 lf 12"*					
		Plumbing Fixtures & Equipment		1.00 ls	20,025.53 /ls	20,026
15440.000		Fish Collection Entry Pool - Fish V Trap		170.00 lb	46.21 /lb	7,856
15509.260	*Cle Elum - Upstream Collection - Structures and Impvts - 6' high x 4' wide Bumping - Upstream Collection - Structures and Impvts - 6' high x 4' wide*					
		Fish Collection Entry Pool - Fish Crowder & Bulkhead Gate		9,700.00 lb	15.86 /lb	153,837
15509.262	*Cle Elum - Upstream Collection - 6' high x 8' wide Bumping - Upstream Collection - 6' high x 8' wide*					
		Fish Collection Flume		1,100.00 lb	35.94 /lb	39,538
15509.270	*Cle Elum and Bumping Upstream Collection Flum - 2' wide x 1.25' deep*					
		Fish Collection - Anesthetic Tank		115.00 lb	90.37 /lb	10,393
15509.275	*Cle Elum and Bumping - 5' long x1.5' wide x 2' deep*	Fish Collection - Recovery Tank		300.00 lb	90.37 /lb	27,111
15509.276	*Cle Elum and Bumping - 4' long x 4.8' wide x 2' deep*	Fish Collection - Transport Truck		1,500.00 gal	133.50 /gal	200,255
15509.295		Electrical Subcontractor - Buildings		2,575.00 sf	16.35 /sf	42,105
16000.100	**001-02.10 Cle Elum Upstream Passage Collection Facility - Structures and Impvts**		**1.00 ls**		**2,730,621.54 /ls**	**2,730,622**
001-02.20		**Cle Elum Upstream Passage Collection Facility - Road & Road Structures**				
		Earthwork, Site Cut to Fill		9,930.00 cy	5.95 /cy	59,043
02200.100		Bases, Ballasts, Pavements & Appurtenances		260.00 cy	74.06 /cy	19,257
02700.000	*Structural Impvts - 4" thick, road - 8" thick* **001-02.20 Cle Elum Upstream Passage Collection Facility - Road & Road Structures**		**1.00 ls**		**78,299.88 /ls**	**78,300**
001-02.30		**Cle Elum Upstream Passage Collection Facility - Waterway Structures**				
		Diversion of River During Construction		1.00 ls	410,780.00 /ls	410,780
02139.000		Dewatering		1.00 ls	698,326.00 /ls	698,326
02140.000						

Description			Quantity	Unit Cost	Total Amount
		Earthwork, Structural Excavation	91,760.00 cy	7.48 /cy	686,721
02200.500	*Cle Elum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy Cle Elum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy, Bumping Downstream Dams - Intake Structure - 600 cy Bumping Downstream Waterways - Conduit - 19440 cy*				
		Earthwork, Structural Backfill, Native Material includes compaction	4,610.00 cy	23.11 /cy	106,520
02200.600	*Cle Elum - Upstream Collection Waterworks - Pump Plt and Retaining Wall Bumping - Intake - Dams - Intake*				
		Stone Revetment (Rip Rap)	340.00 cy	153.02 /cy	52,025
02271.000	*CleElumDownstream -Dam - Rip Rap Bedding-8900 cy, Rip Rap 16600 cy CleElumUpstream -Waterway - Rip Rap Bedding-340 cy, Rip Rap 340 cy Bumping - Removal and stockpile of existing 2200 cy; Rip rap bedding 1100 cy; place rip rap from stockpile, 2700 cy*				
		Concrete_Retaining Wall	1,480.00 cy	862.64 /cy	1,276,704
03002.301	*Clr Crk - Auxiliary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade Cle Elum - Downstream Waterway - 1000 CY*				
		Concrete_Pumping Plt	925.00 cy	1,026.95 /cy	949,929
03002.303		Metal Fabrications	100.00 ls	63.67 /ls	6,367
05505.000	*Cle Elum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls Cle Elum - Upstream Waterway - Pump plt handrail 100 lf Cle Elum - Upstream Pumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5' Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf; Misc, 920 lb*				
		Metal Building Systems	1,900.00 sf	102.70 /sf	195,121
13121.000	*Cle Elum - UpstreamStructureImpvts - Building shell 2575 sf @ 115/sf Cle Elum - UpstreamWaterwayStructures - Building Shell 1900 sf @ 100/sf*				
	001-02.30 Cle Elum Upstream Passage Collection Facility - Waterway Structures		**1.00 ls**	**4,382,493.72 /ls**	**4,382,494**
001-02.40		**Cle Elum Upstream Passage Collection Facility - Auxiliary Water Supply**	*Auxiliary Wtr Supply with pumping plt equipment assumed price is F&I., added $2,900,000 as subcontract plus escalation.*		
		Metal Fabrications	1.00 ls	60,507.60 /ls	60,508
05505.000	*Cle Elum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls Cle Elum - Upstream Waterway - Pump plt handrail 100 lf Cle Elum - Upstream Pumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5' Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf; Misc, 920 lb*				
		Pumping Equipment: Non-Clog Centrifugal	2.00 ea	30,462.22 /ea	60,924
11061.000		Pumping Equipment: Pumping Plant Equipment	1.00 ls	3,099,665.00 /ls	3,099,665
11061.002					

Description			Quantity	Total Unit Cost	Amount
		Hydraulic Gates & Valves	1.00 ea	56,649.05 /ea	56,649
11280.000	*Cle Elum - Downstream - Dams - F&I 10'x10' slide gate and hydraulic operator; F&I 8'x16' roller gates with guides and electric winches; F&I 8'x8' roller gates with guides and electric winches; F&I 8'x16' bulkhead gate; F&I roller gate controls Cle Elum Upstream Collection Facility - Aux Water - F&I Isolation Slide gate Bumping - Dams - Intake - F&I folding langemann control gates 10' w x 12' h with automatic controls; F&I slide gate, 7' x 7' Clr Crk - 4' high x 4' wide*				
		Pipe: Polyethylene (HDPE), Drainage Pipe	40.00 lf	197.74 /lf	7,909
15067.100	*Cle Elum - CollectionStructuresImpvts - 65 lf 12' Cle Elum - CollectionUpstreamAuxWater -40 lf 12"*				
		Butterfly Valves	2.00 ea	5,023.60 /ea	10,047
15103.000		Electrical Power - Supply Poles and Conductors	1,000.00 lf	239.42 /lf	239,422
	Four Poles and 1000 lf of conductor				
16200.100	**001-02.40 Cle Elum Upstream Passage Collection Facility - Auxiliary Water Supply**		**1.00 ls**	**3,535,125.18 /ls**	**3,535,125**
	001 FISH PASSAGE - CLE ELUM LAKE DAM		***1.00 LS***	***46,316,705.90 /LS***	***46,316,706***

Estimate Totals

Description	Amount	Totals	Rate
Labor			
Material			
Subcontract	46,316,706		
Equipment			
Other			
Subtotal		**46,316,706**	
Mobilization	2,315,835		5.000 %
Escalation Midpoint 5% 7 mon	1,404,021		2.887 %
Design Contingency	7,505,484		15.000 %
Procurement Strategy-Open Comp			
Contract Cost		**57,542,046**	
Construction Contingency	14,385,512		25.000 %
Sales Tax Estimate (IncluSub)			
Forecasted Feature Field Cost		**71,927,558**	

CCT adjustments were made on the Cle Elum and Bumping Fish Passages - Adjustments were made as follows: Earth Dams - Dam Structure - 276/257:001-01.20; 002-01.20 Earth Dams - Outlet Works - 343/334:001-01.30; 001-02.10; 001-02.30; 002-01.30; 002-02.10; 002-02.20 Pumping Plants - 326/305:001-02.40; 002-02.30; 002-02.40 Secondary Roads - 411/394:001-01.10; 001-02.20; 002-01.10 Sales Tax for Cle Elum and Bumping are assumed to be in the previous estimate unit prices since it did not appear on the totals page of the January 2008 Feasibility Estimate.

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BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

CLE ELUM DAM

DOWNSTREAM FISH PASSAGE FACILITY

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKFP | **ESTIMATE LEVEL:** Feasibility

REGION PN | **PRICE LEVEL:** Jan-08

FILE: J:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[Copy of Cle Elum Downstream passage 20091117.xls]Sheet 1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
140		Road and Road Structures					
		01 Access road on right abutment					
	1	Clear & Grub expanding existing gravel roadways		4	acres	$8,300.00	$33,200.00
	2	Roadway subgrade for base course rdw		11,700	sy	$0.40	$4,680.00
	3	F&I base course roadway		9,760	cy	$40.00	$390,400.00
	4	F & I 2 ft wideroadway embankment to intake tower		8,080	cy	$5.65	$45,652.00
	5	Roadway geavel surfacing		39	cy	$53.00	$2,067.00
	6	F & I new steel bar entrance gate		1	ls	$48,000.00	$48,000.00
		02 Access bridge from dam crest to intake structure					
		Mobilization & Preparation		Delete			
		F&I Embankment Fill for Access Ramp		Delete			
		Roadway gravel surfacing		Delete			
		F&I Reinforced Concrete Bridge Supports (2 piers and 1 abutmen		Delete			
		F&I Steel Truss Bridge 16 ft wide H20 w handrails		Delete			
		F&I Steel bar entrance gate		Delete			
		Allowance for unlisted items		Delete			
		Subtotal plant account 140					$523,999.00

QUANTITIES		PRICES	
DESIGN BY: MR CAMPBELL	CHECKED BY: MB SCHUETZ	BY: jbabcock	Math Check Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW BY: E COHEN	DATE PREPARED: 12/15/2009	DCC 12/17/09

ESTIMATE WORKSHEET

FEATURE:
CLE ELUM DAM
DOWNSTREAM FISH PASSAGE FACILITY

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKFP | **ESTIMATE LEVEL:** Feasibility

REGION PN | **PRICE LEVEL:** Jan-08

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
151		Dams					
	2	Care of water (dewatering & unwatering)		1	ls	$1,450,000.00	$1,450,000.00
		F&I Cellular Steel sheetpile cofferdam 25 psf 30wx34h		Delete			
		F&I & remove Cofferdam fill material		Delete			
		Removal of existing riprap slope protection & stockpile		Delete			
	6	Structural excavation for outlet tower and approach channel		210,000	cy	$4.25	$892,500.00
	7	F& I Compacted Select Material for tower base		1,630	cy	$28.00	$45,640.00
	8	F& I Reinforced concrete footing slab for tower		3,250	cy	$270.00	$877,500.00
	9	F&I Reinforced concrete walls and floors& piers in tower		4,750	cy	$770.00	$3,657,500.00
	10	F&I Trash Racks for tower (Intake) Structure		174,400	lb	$3.80	$662,720.00
	11	F&I 10'x10' Slide Gate & Hydraulic Operator		1	ls	$155,000.00	$155,000.00
	12	F&I 8'x16' Roller Gates w guides & electric winches		4	ea	$290,000.00	$1,160,000.00
	13	F&I 8'x8' Roller Gate w/guide & electric winches		1	ea	$130,000.00	$130,000.00
	14	F&I top Profile Bar Decking and supports		3,375	sf	$34.00	$114,750.00
	15	F&I Bulkhead Gate 8'x16'		1	ls	$70,500.00	$70,500.00
	16	F&I 15 ton overhead gantry crane		1	ls	$165,000.00	$165,000.00
	17	F&I Trash HydroRake & Conveyor system		1	ls	$750,000.00	$750,000.00
	18	F&I Electrical Service to Site		1	ls	$270,000.00	$270,000.00
	19	F&I Interior Stairway and Landings		300	sf	$105.00	$31,500.00
	20	F&I Vertical Rung Ladders		65	lf	$190.00	$12,350.00
		Subtotal this sheet					$10,444,960.00

QUANTITIES		PRICES	
DESIGN BY: MR CAMPBELL	CHECKED BY: MB SCHUETZ	BY: jbabcock	Math check Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW BY: E COHEN	DATE PREPARED: 12/15/2009	DCB 12/17/09

ESTIMATE WORKSHEET

FEATURE:
CLE ELUM DAM
DOWNSTREAM FISH PASSAGE FACILITY

PROJECT:
Cle Elum Dam - Yakima Project, WA

WOID:	YAKFP	**ESTIMATE LEVEL:**	Feasibility
REGION	PN	**PRICE LEVEL:**	Jan-08

FILE: J:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[Copy of Cle Elum Downstream passage 20091117.xls]Sheet 1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
151		Dams (cont)					
	21	F&I Interior Electrical Lighting		1	ls	$27,000.00	$27,000.00
	22	F&I Handrailing on top of tower (Intake) structure		320	lf	$145.00	$46,400.00
	23	F&I Automated Roller Gate Controls		1	lf	$140,000.00	$140,000.00
	24	F&I Compacted Structural Backfill for tower structure		59,700	cy	$48.00	$2,865,600.00
		F&I Impervious fill for tower structure and approach channel		13,300	cy	$75.00	$997,500.00
	25	F&I Riprap Bedding for tower structure and approach channel		8,900	cy	$40.00	$356,000.00
	26	F&I Riprap Slope Protection 30" for tower structure and approach		16,600	cy	$88.00	$1,460,800.00
	27	deleted					
	28	Excess excavation material to waste		155,000	cy	$4.00	$620,000.00
		Subtotal this sheet					$6,513,300.00
		Subtotal from sheet 2					$10,444,960.00
		Subtotal plant account 151					$16,958,260.00

QUANTITIES		PRICES	
DESIGN BY: MR CAMPBELL	CHECKED BY: MB SCHUETZ	BY: jbabcock	Math check Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW BY: E COHEN	DATE PREPARED: 12/15/2009	DCA 12/17/09

ESTIMATE WORKSHEET

FEATURE:
CLE ELUM DAM
DOWNSTREAM FISH PASSAGE FACILITY

PROJECT:
Cle Elum Dam - Yakima Project, WA

WOID: YAKFP | **ESTIMATE LEVEL:** Feasibility

REGION PN | **PRICE LEVEL:** Jan-08

FILE: J:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[Copy of Cle Elum Downstream passage 20091117.xls]Sheet 1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
153		Waterway Structures					
		7' diameter concrete fish passage conduit					
	2	Clear and Grub		16	acre	$9,800.00	$156,800.00
	3	Topsoil strip & stockpile & replace		23,500	cy	$7.00	$164,500.00
	4	Common excavation for conduit 3:1 sideslopes		625,000	cy	$5.30	$3,312,500.00
	5	F&I Reinforced concrete for fish passage conduit		3,700	cy	$1,000.00	$3,700,000.00
	6	F&I Compacted Select Material for fish passage conduit bedding		6,950	cy	$25.00	$173,750.00
	7	F&I Mud Slab for foundations of fish passage conduit		200	cy	$200.00	$40,000.00
	8	F&I Compacted Structural Backfill to 2 ft over fish passage condu		49,200	cy	$32.00	$1,574,400.00
	9	F&I Access Hatch and Air Inlet to Conduit		1	ls	$11,000.00	$11,000.00
		F&I Reinforced Concrete Flume Outlet		deleted			
		Spillway wall modifications		1	ls	$6,500.00	$6,500.00
		Cut 4 holes 34-inch square for pipe &fill in					
		Cut 7-ft diameter hole in spillway wall for conduit					
		delete		delete			
	11	F&I Sand Filter Diaphram		600	cy	$73.00	$43,800.00
	12	delete		delete			
		Subtotal this sheet					$9,183,250.00

QUANTITIES		PRICES	
DESIGN BY: MR CAMPBELL	CHECKED BY: MB SCHUETZ	BY: jbabcock	Math check Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW BY: E COHEN	DATE PREPARED: 12/15/2009	DCD 12/17/09

ESTIMATE WORKSHEET

FEATURE: *CLE ELUM DAM* — *DOWNSTREAM FISH PASSAGE FACILITY*

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKFP **ESTIMATE LEVEL:** Feasibility

REGION PN **PRICE LEVEL:** Jan-08

FILE: J:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[Copy of Cle Elum Downstream passage 20091117.xls]Sheet 1

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
153		Waterway Structures (cont)					
		F&I Gravel filter zone material		35	cy	$57.00	$1,995.00
	14	F&I 6" Drain Pipe to spillway		120	ft	$15.50	$1,860.00
	15	F&I Compacted Backfill in Outlet Trench Excavation		557,200	cy	$5.65	$3,148,180.00
	16	Excess excavated material to waste		33,400	cy	$4.20	$140,280.00
		F&I Steel Sheetpiling Protection at Spillway Wall Ex.	included in other work				
	17	F & I low permeable 2ft surface seal		9,800	cy	$110.00	$1,078,000.00
	18	F & I low permeable zone (200 ft wide)		10,850	cy	$110.00	$1,193,500.00
	19	F&S Bentonite		1,400	tons	$780.00	$1,092,000.00
	20	F&I Filter Zone d/s of Low Permeabile Zone & upstream excavati		16,200	cy	$34.00	$550,800.00
		Subtotal this sheet					$7,206,615.00
		Subtotal from sheet 4					$9,183,250.00
		Total plant account 153					$16,389,865.00

QUANTITIES		PRICES	
DESIGN BY: MR CAMPBELL	CHECKED BY: MB SCHUETZ	BY: Jbabcock	Math Check Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW BY: E COHEN	DATE PREPARED: 12/15/2009	DCN 12/17/09

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:	
CLE ELUM DAM *DOWNSTREAM FISH PASSAGE FACILITY*	Cle Elum Dam - Yakima Project, WA	
	WOID: YAKFP	ESTIMATE LEVEL: Feasibility
	REGION: PN	PRICE LEVEL: Jan-08
	FILE: J:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[Copy of Cle Elum Downstream passage 20091117.xls]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT
		Subtoital account 140					$523,999.00
		Subtotal account 151					$16,958,260.00
		Subtotal account 153					$16,389,865.00
		Subtotal					$33,872,124.00
		Mobilization @	5.00%				$1,693,606.20
		Subtotal w/ mobilization					$35,565,730.20
		Escalation from NTP to midpoint of construction @	5.0%	for	7.0	months	$ 1,026,776.00
		Subtotal					$36,592,506.20
		Subtotal					$36,592,506.20
		Design Contingency	15.00%				$5,488,876.00
		Subtotal #1					$42,081,382.00
		Allowance for procurement strategy	0.00%				$0.00
		Subtotal #2					$0.00
		Subtotal (Unrounded)					$42,081,382.00
		CONTRACT COST					**$42,000,000.00**
		Construction contingency	25.00%				$11,000,000.00
		FIELD COST (See Note A below)					**$53,000,000.00**
		Note A: This estimate does not include non-contract costs and should not be used for solicitation of funding.					
		Reference documents RM D&S Cost Estimate (FAC 09-01) and RN D&S CCE and PCE (FAC 09-02)					

QUANTITIES		PRICES	
DESIGN BY: MR CAMPBELL	CHECKED BY: MB SCHUETZ	BY: jbabcock	CHECKED BY: Amy Latham 12/16/09
DATE PREPARED	PEER REVIEW BY: E COHEN	DATE PREPARED: 12/16/2009	PEER REVIEW / DATE: ACO 12/17/09

ESTIMATE WORKSHEET

FEATURE: Cle Elum Dam Adult Upstream Fish Passage Facility - Collection Facility on Right Bank

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKPF | **ESTIMATE LEVEL:** Feasibility

REGION: PN | **PRICE LEVEL:** Jan-08

FILE: U:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[cle Elum Upstream 12-2009.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
130		Structures and improvements					
	1	Mobilization & Preparation		1	ls		
	2	Dewatering		1	ls	$120,000.00	$120,000.00
	3	Clear and Grub		1	ls	$81,000.00	$81,000.00
	4	Embankment		700	cy	$35.00	$24,500.00
	5	Structure Excavation		1,750	cy	$12.00	$21,000.00
	6	F&I Structure Concrete [Flat Work]		300	cy	$490.00	$147,000.00
	7	F&I Structure Concrete [Vertical Work]		1,170	cy	$810.00	$947,700.00
	8	F&I Backfill for Structures		1,650	cy	$15.50	$25,575.00
	9	Compact Backfill for Structures		1,650	cy	$12.00	$19,800.00
	10	F&I Aux. Trashrack 26 ft wide x 7 ft high		Delete			
	11	F&I Aux. Wood Weir 10 ft long x 6 ft high		Delete			
	12	F&I Aux. Control Gates 6 ft x 6 ft		Delete			
	13	F&I Aux. Steel Wall Diffuser 18 ft wide x 10 ft high		Delete			
	14	F&I Wood Ladder Weirs [12 each]		220	Fbm	$41.00	$9,020.00
	15	F&I False Weir 12 inch x 12 inch		1	ea	$145.00	$145.00
	16	F&I Control Gate 4 ft high x 2 ft wide		1	ea	$22,000.00	$22,000.00
	17	F&I 12 inch HDPE Gravity Delivery Pipe		65	lf	$125.00	$8,125.00
	18	F&I Entry Pool V-Trap 6 ft high x 4 ft wide		170	lbs	$45.00	$7,650.00
	19	F&I Entry Pool Crowder 6 ft high x 8 ft wide		300	lbs	$45.00	$13,500.00
	20	F&I Entry Pool Bulkhead Gate 6 ft high x 8 ft wide		9,400	lbs	$14.50	$136,300.00
		Subtotal sheet 1					**$1,583,315.00**

QUANTITIES		PRICES	
BY: MR Campbell	CHECKED: MB Schuetz	BY:	CHECKED: Amy Latham 12/15/09
DATE PREPARED: November 17, 2009	PEER REVIEW: E Cohen	DATE PREPARED: December 15, 2009	PEER REVIEW/DATE: DCS 12/16/09

ESTIMATE WORKSHEET

FEATURE: Cle Elum Dam Adult Upstream Fish Passage Facility - Collection Facility on Right Bank

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKPF **ESTIMATE LEVEL:** Feasibility

REGION: PN **PRICE LEVEL:** Jan-08

FILE: U:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[cle Elum Upstream 12-2009.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
130		Structures and improvements					
	21	F&I Fish Lock Lifting Braile w/Hoist 8 ft x 8 ft		400	lbs	$370.00	$148,000.00
	22	F&I Fish Flume 2 ft W x 1.25 ft D		1,100	lbs	$35.00	$38,500.00
	23	F&I Anesthetic Tank 5 ft L x 1.5 ft W x 2 ft D		115	lbs	$88.00	$10,120.00
	24	F&I Recovery Tank 4 ft L x 4.8 ft W x 2 ft D		300	lbs	$88.00	$26,400.00
	25	F&I Bathroom Facilities w/ Piped Septic Tank		1	ls	$19,500.00	$19,500.00
	26	F&I Drain Pipe 6-inch Dia.		160	lft	$39.00	$6,240.00
	27	F&I Potable Water Supply w/ Well		1	ls	$12,000.00	$12,000.00
	28	F&I Walkway Support Structure		3,300	lbs	$14.50	$47,850.00
	29	Walkway Grating		2,870	sf	$46.00	$132,020.00
	30	F&I Steel Stairway		500	lbs	$14.50	$7,250.00
	31	F&I 7-ft Security Fence		400	lft	$38.00	$15,200.00
	32	F&I Handrail		280	lft	$65.00	$18,200.00
	33	Miscellaneous Metalwork		1	ls	$14,500.00	$14,500.00
	34	Building Shell 33 ft x 78 ft x 16 ft high		2,575	sf	$115.00	$296,125.00
	35	F&I Interior Electric		1	ls	$41,000.00	$41,000.00
	36	Gravel Surfacing 4 inch thick		285	cy	$94.00	$26,790.00
	37	Re-seeding		38.5	msf	$165.00	$6,352.50
	38	Furnish Fish Transport Truck [1500 gal]		1	ea	$195,000.00	$195,000.00
	39	Furnish and Install Roll up Doors		2	ea	$7,300.00	$14,600.00
		Subtotal Account 130 sheet 1					$1,583,315.00
		Subtotal Account 130					$2,658,962.50

QUANTITIES		PRICES	
BY: MR Campbell	CHECKED: MB Schuetz	BY:	CHECKED: Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW: E Cohen	DATE PREPARED: December 15, 2009	PEER REVIEW/DATE: DCD 12/16/09

ESTIMATE WORKSHEET

FEATURE: Cle Elum Dam Adult Upstream Fish Passage Facility - Collection Facility on Right Bank

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKPF **ESTIMATE LEVEL:** Feasibility

REGION: PN **PRICE LEVEL:** Jan-08

FILE: U:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[cle Elum Upstream 12-2009.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
140		Roads and Road Structures					
		0.01 Access road from left abutment to collection site-					
		0.7 mi long, 24 ft wide, gravel surfaced					
		Mobilization & Preparation		DELETE			
		Clearing and Grubbing		DELETE			
		Common Excavation		DELETE			
		Compact Embankment		DELETE			
		Gravel Surfacing 8 inch Thick		DELETE			
		F&I 24" dia x 40 ft long CMP Cross Drainage Culverts		DELETE			
		Allowance for unlisted items		DELETE			
		0.01 350 ft. Long Access Road on Rt Abutment					
	2	Clearing and Grubbing		0.7	ac	in item 130-1	
	3	Common Excavation		9,930	cy	$5.70	$56,601.00
	4	Gravel Surfacing 8 inch Thick		260	cy	$71.00	$18,460.00
		Subtotal account 140					$75,061.00

QUANTITIES		PRICES	
BY: MR Campbell	CHECKED: MB Schuetz	BY:	CHECKED: Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW: E Cohen	DATE PREPARED: December 15, 2009	REER REVIEW/DATE: ACA 12/16/09

ESTIMATE WORKSHEET

FEATURE: Cle Elum Dam Adult Upstream Fish Passage Facility - Collection Facility on Right Bank

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKPF **ESTIMATE LEVEL:** Feasibility

REGION: PN **PRICE LEVEL:** Jan-08

FILE: U:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[cle Elum Upstream 12-2009.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
153		Waterway Structures					
		0.01 Retaining Wall and Pumping Plant on Right Bank					
	2	Control of River During Construction		1	ls	$400,000.00	$400,000.00
		396 Sandbags for cofferdam (350 ft long by 9 bags (8 ft long))					
	3	Dewatering		1	ls	$680,000.00	$680,000.00
	4			delete			
	5	Retaining Wall Excavation		30,850	cy	$7.50	$231,375.00
		Excavation for Pad (Elevation 2136 to OGS)		19,500	cy	$6.50	$126,750.00
		Excavation for Pumping Plant (El. 2136 to 2100)		41,410	cy	$7.50	$310,575.00
	6	F&I Structural Concrete for Retaining Wall		1,480	cy	$840.00	$1,243,200.00
	7	F&I Structure Concrete in Pumping Plant		925	cy	$1,000.00	$925,000.00
	8	F&I Backfill for Structures (both retaining wall & Pumping plant)		4,610	cy	$11.00	$50,710.00
	9	Compact Backfill for Structures (both retaining wall & pp)		4,610	cy	$11.50	$53,015.00
	10	F&I Rip Rap Scour Protection [18-inch MSA]		340	cy	$130.00	$44,200.00
	11	Select Bedding for Rip Rap [9-inch MSA]		340	cy	$19.00	$6,460.00
	12	F&I Handrail at Pumping Plant		100	lf	$62.00	$6,200.00
		Pumping Plan Metal Builing 28' x 68' x 16'		1,900	sf	$100.00	$190,000.00
		deleted 13, 14, 15					
		Subtotal acount 153					$4,267,485.00

QUANTITIES		PRICES	
BY: MR Campbell	CHECKED: MB Schuetz	BY:	CHECKED: Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW: E Cohen	DATE PREPARED: December 15, 2009	PEER REVIEW/DATE: DCD 12/16/09

ESTIMATE WORKSHEET

FEATURE: Cle Elum Dam Adult Upstream Fish Passage Facility - Collection Facility on Right Bank

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKPF **ESTIMATE LEVEL:** Feasibility

REGION: PN **PRICE LEVEL:** Jan-08

FILE: U:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[cle Elum Upstream 12-2009.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
160		Pumps and Prime Movers					
		.01 Auxiliary Water supply for fish collection facilities					
	2	F&I Weir Wall (steel 10 x 18))		3,600	lb	$15.00	$54,000.00
	3	F&I Shut off Gate 4 ft x 4 ft (isolation gate)		1	ea	$53,000.00	$53,000.00
	4	delete					
	5	F&I Centrifugal Pump 17 Hp		1	ea	$30,000.00	$30,000.00
	6	F&I Secondary Sump		1	ea	$27,000.00	$27,000.00
	7	F&I 12 inch HDPE Pressure Delivery Pipe		40	lf	$185.00	$7,400.00
	8	F&I 6 inch Butterfly Valves		2	ea	$4,700.00	$9,400.00
	9	F&I Wall Diffuser 10 ft x 5 ft		180	lb	$14.50	$2,610.00
		Grating included on sheet 2					
		.01 Pumping Plant equipment		1	ls	$2,900,000.00	$2,900,000.00
	2	Screens & Operators		4	ea		
	3	Isolation Butterfly valves		4	ea		
	4	Pumps and Motors		4	ea		
	5	Pipng (48 inch ID pipe 115 ft long, schedule 40, 260 #/lf))		30,000	lbs		
		Pipng (36 inch ID pipe 51 ft long, schedule 40, 195 #/lf))		10,000	lbs		
	6	Grating across areas (66' x 26')		1,720	sq ft		
		Subtotal account 160					$3,083,410.00

QUANTITIES		PRICES	
BY: MR Campbell	CHECKED: MB Schuetz	BY:	CHECKED: Amy Latham 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW: E Cohen	DATE PREPARED: December 15, 2009	PEER REVIEW/DATE: DCD 12/16/09

ESTIMATE WORKSHEET

FEATURE: Cle Elum Dam Adult Upstream Fish Passage Facility - Collection Facility on Right Bank

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKPF | **ESTIMATE LEVEL:** Feasibility

REGION: PN | **PRICE LEVEL:** Jan-08

FILE: U:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[cle Elum Upstream 12-2009.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
170		Accessory Electrical Equipment					
		.01 Water supply for fish collection facilities					
	2	Power line poles [4 each @ 250 ft spacing]		4	ea	$11,000.00	$44,000.00
	3	Power line conductors		1,000	lf	$180.00	$180,000.00
		Subtotal account 170					$224,000.00

QUANTITIES		PRICES	
BY: MR Campbell	CHECKED: MB Schuetz	BY:	CHECKED: Amy Latham
DATE PREPARED: November 17, 2009	PEER REVIEW: E Cohen	DATE PREPARED: December 15, 2009	PEER REVIEW/DATE: DCA 12/16/09

ESTIMATE WORKSHEET

FEATURE: Cle Elum Dam Adult Upstream Fish Passage Facility - Collection Facility on Right Bank

PROJECT: Cle Elum Dam - Yakima Project, WA

WOID: YAKPF | **ESTIMATE LEVEL:** Feasibility

REGION: PN | **PRICE LEVEL:** Jan-08

FILE: U:\Work\Estimates\Yakima Projects\Cle elum 2009 rev\[cle Elum Upstream 12-2009.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT
		Subtotal Account 130					$2,658,962.50
		Subtotal account 140					$75,061.00
		Subtotal acount 153					$4,267,485.00
		Subtotal account 160					$3,083,410.00
		Subtotal account 170					$224,000.00
		Subtotal					$10,308,918.50
		Mobilization @	5.00%				$515,446.00
		Subtotal w/ mobilization					$10,824,364.50
		Escalation from NTP to mid point of construction @	5.0%	for	7.0	months	$ 312,497.00
		Subtotal					$11,136,861.50
		Design Contingency	15.00%				$1,670,529.00
		Subtotal #1					$12,807,390.50
		Allowance for procurement strategy					
		Subtotal #2					
		Subtotal (Unrounded)					$12,807,391.00
		CONTRACT COST					**$13,000,000.00**
		Construction contingency	25.00%				$3,000,000.00
		FIELD COST (See Note A below)					**$16,000,000.00**
		Note A: This estimate does not include non-contract costs and should not be used for solicitation of funding.					
		Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE (FAC 09-02).					

QUANTITIES		PRICES	
BY: MR Campbell	CHECKED: MB Schuetz	BY: Jbabcock	CHECKED: Amy Lathram 12/16/09
DATE PREPARED: November 17, 2009	PEER REVIEW: E Cohen	DATE PREPARED: December 15, 2009	PEER REVIEW/DATE: DCA 12/16/09

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APPENDIX B

OPCC Fish Passage at Bumping Lake Dam

Yakima River Basin Water Storage Study
Fish Passages
Cle Elum Dam, Bumping lake Dam and Clear Creek Dam

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

10/21/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Fish Passages for Cle Elum and Bumping Lake consist of a downstream passage with in Lake Intake structure and concrete fish conduit to the river. Upstream passage consists of a short fish ladder to an adult collection facility for truck transport to the reservoir. Clear Lake fish passage consist of an Upstream/Downstream fish ladder with resting pools plus auxiliary attraction water pipeline connected to the fish ladder at the river through a velocity reduction structure.
Cost Estimates for Cle Elum and Bumping Lake Dams were developed using unit prices and quantities from previous Feasibility Estimates with a Price Level of Jan 08 adjusted using the appropriate CCT indices as noted on the Totals Page notes. Clear Creek was estimated using a conceptual design developed by HDR using Timberline Estimate with 3rd Qtr 2010 RS Means Database and quantities developed from the HDR design.
Neither noncontract costs nor escalation are included in these estimates.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
002 FISH PASSAGE - BUMPING LAKE DAM	1.00	LS			12,251,614			12,251,614

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Description	Amount	Totals	Rate
Labor			
Material			
Subcontract	12,251,614		
Equipment			
Other			
Subtotal		**12,251,614**	
Contractor's Fld Ovhd	735,097		6.000 %
Mobilization	490,065		4.000 %
Subtotal w/ mobilization		**13,476,776**	
Unlisted Items Minor	484,981		4.000 %
Design and Scope Changes Minor	484,981		4.000 %
Cost Est Refinements Minor	242,490		2.000 %
Contractor's Fee	1,468,923		10.000 %
Contractor's Bonds & Insurance	220,338		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**16,378,489**	
Contingencies	4,094,622		25.000 %
Field Cost		**20,473,111**	
Sales Tax Estimate (Mat & Eq)			8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Forecasted Feature Bid	**20,473,111**

CCT adjustments were made on the CleElum and Bumping Fish Passages - Adjustments were amde as follows:
Earth Dams - Dam Structure - 276/257:001-01.20; 002-01.20
Earth Dams - Outlet Works - 343/334:001-01.30; 001-02.10; 001-02.30; 002-01.30; 002-02.10; 002-02.20
Pumping Plants - 326/305:001-02.40; 002-02.30; 002-02.40
Secondary Roads - 411/394:001-01.10; 001-02.20; 002-01.10

Sales Tax for CleElum and Bumping are assumed to be in the previous estimate unit prices since it did not appear on the totals page of the January 2008 Feasibility Estimate.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Fish Passages
Cle Elum Dam, Bumping lake Dam and Clear Creek Dam

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

10/21/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Fish Passages for Cle Elum and Bumping Lake consist of a downstream passage with in Lake Intake structure and concrete fish conduit to the river. Upstream passage consists of a short fish ladder to an adult collection facility for truck transport to the reservoir. Clear Lake fish passage consist of an Upstream/Downstream fish ladder with resting pools plus auxiliary attraction water pipeline connected to the fish ladder at the river through a velocity reduction structure.
Cost Estimates for Cle Elum and Bumping Lake Dams were developed using unit prices and quantities from previous Feasibility Estimates with a Price Level of Jan 08 adjusted using the appropriate CCT indices as noted on the Totals Page notes. Clear Creek was estimated using a conceptual design developed by HDR using Timberline Estimate with 3rd Qtr 2010 RS Means Database and quantities developed from the HDR design. Neither noncontract costs nor escalation are included in these estimates.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
002 FISH PASSAGE - BUMPING LAKE DAM					
002-01.10	**Bumping Downstream Passage Facility - Road & Road Structures**				
02700.000	Bases, Ballasts, Pavements & Appurtenances	1,500.00	cy	57.26 /cy	85,887
Structural Impvts - 4" thick, road - 8" thick					
02750.000	Bridges - Dam Crest to Intake - Abutment, Structure, Deck	360.00	sf	332.60 /sf	119,736
002-01.10 Bumping Downstream Passage Facility - Road & Road Structures				**205,622.51 /ls**	**205,623**
1.00	**ls**				
002-01.20	**Bumping Downstream Passage Facility - Dams - Variable Level Intake**				
Variable Level folding gate intake structure to release water from elevations 3416 - 3426					
02110.000	Site Clearing	3.00	ac	12,128.88 /ac	36,387
02200.025	Strip and Respread Topsoil	5,000.00	cy	3.34 /cy	16,677
Borrow Area					
02200.500	Earthwork, Structural Excavation	600.00	cy	16.172/cy	9,703
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy,					
Bumping Downstream Dams - Intake Structure - 600 cy					
Bumping Downstream Waterways - Conduit - 19440 cy					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	530.00	cy	49.53 /cy	26,249
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall					
Bumping - Intake - Dams - Intake					
02207.006	Embankment Fill, impervious core material, including compaction	12,420.00	cy	46.12 /cy	572,807
02207.007	Embankment Fill, bentonite	570.00	ton	485.16 /ton	276,538
02207.010	Embankment Fill Zone 1	1,160.00	cy	24.26 /cy	28,139
02207.011	Embankment Fill Zone 1A	770.00	cy	19.204/cy	14,787
02207.015	Embankment Fill Zone 2	7,450.00	cy	82.41 /cy	613,923
sand fill					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02207.020	Embankment Fill Zone 3	10.00	cy	106.13 /cy	1,061
02207.025	Embankment Fill Zone 4	215.00	cy	18.80 /cy	4,042
02271.000	Stone Revetment (Rip Rap)	2,610.00	cy	41.55 /cy	108,432
CleElumDownstream -Dam - Rip Rap Bedding-8900 cy, Rip Rap 16600 cy					
CleElumUpstream -Wateway - Rip Rap Bedding-340 cy, Rip Rap 340 cy					
Bumping - Removal and stockpile of existing 2200 cy; Rip rap bedding 1100 cy; place rip rap from stockpile, 2700 cy					
02271.010	Rip Rap - Remove and Stockpile Existing	2,200.00	cy	9.30 /cy	20,457
02361.200	Cofferdam - Shore Driven	1.00	sf	1,545,724.69 /sf	1,545,725
Bumping - Construction & removal of upstream cofferedam outer shell, placing and removing rip rap, 4300 cy on the cofferdam, and gravel surface roadway, 830 cy, on top of the cofferdam.					
02512.000	Roadway Aggregate Base System	220.00	cy	51.55 /cy	11,341
02513.000	Asphaltic Concrete Vehicular Paving	100.00	cy	343.652/cy	34,365
02700.500	Guardrail - Metal, metal post	660.00	lf	26.28 /lf	17,344
Bumping - Intake - Dams - F&I remove and reinstall guard rail					
03002.040	Concrete-In-Place - Mud Slab, unreinforced	16.00	cy	475.05 /cy	7,601
03002.102	Concrete_Foundations_Walls-Intake	335.00	cy	2,324.702/cy	778,775
05505.000	Metal Fabrications	1.00	ls	159,717.140/ls	159,717
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls					
CleElum - UpstreamWaterway - Pump plt handrail 100 lf					
CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5'					
Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea					
Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
11280.000	Hydraulic Gates & Valves	3.00	ea	176,205.673/ea	528,617
CleElum - Downstream - Dams - F&I 10'x10' slide gate and hydraulic operator; F&I 8'x16' roller gates with guides and electric winches; F&I 8'x8' roller gates with guides and electric winches; F&I 8'x16' bulkhead gate; F&I roller gate controls					
CleElum Upstream Collection Facility - Aux Water - F&I Isolation Slide gate					
Bumping - Dams - Intake - F&I folding langemann control gates 10' w x 12' h with auotmatic controls; F&I slide gate, 7' x 7'					
Clr Crk - 4' high x 4' wide					
15115.610	Trash Rack Clean -Automatic with Trash conveyance	1.00	ea	303,222.00 /ea	303,222
16000.110	Electrical Subcontractor - Process	1.00	ls	17,687.95 /ls	17,688

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
002-01.20 Bumping Downstream Passage Facility - Dams - Variable Level Intake				**5,133,597.99 /ls**	**5,133,598**
1.00 ls					
002-01.30	**Bumping Downstream Passage Facility - Waterway Structures**				
02139.000	Diversion of River During Construction	1.00	ls	878,934.90 /ls	878,935
02200.500	Earthwork, Structural Excavation	19,440.00	cy	7.88 /cy	153,189
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy,					
Bumping Downstream Dams - Intake Structure - 600 cy					
Bumping Downstream Waterways - Conduit - 19440 cy					
02200.550	Earthwork, Structural Backfill, Borrow includes compaction	620.00	cy	44.452/cy	27,560
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	12,200.00	cy	8.89 /cy	108,463
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall					
Bumping - Intake - Dams - Intake					
03002.040	Concrete-In-Place - Mud Slab, unreinforced	30.00	cy	272.773/cy	8,183
03002.103	Concrete_Foundations_Walls-Outlet	475.00	cy	2,626.702/cy	1,247,683
03002.104	Concrete_Foundations_Walls-Flared End Concrete Section 10'	25.00	cy	1,515.41 /cy	37,885
002-01.30 Bumping Downstream Passage Facility - Waterway Structures				**2,461,898.680/ls**	**2,461,899**
1.00 ls					
002-02.10	**Bumping Upstream Passage Facility - Structures and Improvements**				
02110.000	Site Clearing	1.50	ac	8,418.91 /ac	12,628
02140.000	Dewatering	1.00	ls	96,985.92 /ls	96,986
02200.100	Earthwork, Site Cut to Fill	500.00	cy	32.33 /cy	16,164
02200.500	Earthwork, Structural Excavation	470.00	cy	11.62 /cy	5,461
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy,					
Bumping Downstream Dams - Intake Structure - 600 cy					
Bumping Downstream Waterways - Conduit - 19440 cy					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total
Description		**Quantity**		**Unit Cost**	**Amount**
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	75.00	cy	187.91 /cy	14,093
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall					
Bumping - Intake - Dams - Intake					
02221.000	Trenching, Backfilling and Compacting for Utilities	110.00	cy	88.904/cy	9,779
Excavation and backfill for conduit, 3:1 SLOPE					
02271.000	Stone Revetment (Rip Rap)	16.00	cy	304.98 /cy	4,880
CleElumDownstream -Dam - Rip Rap Bedding-8900 cy, Rip Rap 16600 cy					
CleElumUpstream -Wateway - Rip Rap Bedding-340 cy, Rip Rap 340 cy					
Bumping - Removal and stockpile of existing 2200 cy; Rip rap bedding 1100 cy; place rip rap from stockpile, 2700 cy					
02444.000	Chain Link Fence and Gates	435.00	lf	45.462/lf	19,776
02514.000	Aggregate Vehicular Drive, Compacted	225.00	cy	116.181/cy	26,141
Cle Elum - 4" Gravel drive 285 cy					
Clear Creek - 300' x 18' wide 12" aggregate base access road to control box					
02580.000	Gravel Pack Wells	1.00	ls	14,446.86 /ls	14,447
02930.000	Seeding, Sodding, and Landscaping	1,111.110	sy	1.773/sy	1,970
03002.100	Concrete_Foundations	105.00	cy	1,000.17 /cy	105,018
Clr Crk - Auxillary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation					
CleElum - Downstream Waterway - 2700 CY					
Bumping - Upstream Structures and Impvts - 105 cy					
03002.300	Concrete_Walls Exterior	120.00	cy	1,414.38 /cy	169,725
Clr Crk - Auxillary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade					
CleElum - Downstream Waterway - 1000 CY					
05505.000	Metal Fabrications	1.00	ls	231,195.24 /ls	231,195
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls					
CleElum - UpstreamWaterway - Pump plt handrail 100 lf					
CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5'					
Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea					
Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
08331.000	Motorized Roll-Up Doors	1.00	ea	9,092.43 /ea	9,092
13121.000	Metal Building Systems	3,960.00	sf	88.904/sf	352,059
CleElum - UpstreamStructureImpvts - Building shell 2575 sf @ 115/sf					
CleElum - UpstreamWaterwayStructures - Building Shell 1900 sf @ 100/sf					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
15062.000	Pipe: Ductile	660.00	lf	303.081/lf	200,033
15064.300	Pipe: Plastic, Sewer DW35	90.00	lf	242.47 /lf	21,822
15105.000	Globe Valves	1.00	ea	5,152.38 /ea	5,152
15440.000	Plumbing Fixtures & Equipment	1.00	ls	23,034.15 /ls	23,034
15509.258	Fish Collection Entry Pool - Fish steep Pass Ladder	50.00	lf	4,142.11 /lf	207,105
15509.260	Fish Collection Entry Pool - Fish V Trap	170.00	lb	61.63 /lb	10,477
CleElum - Upstream Collection - Structures and Impvts - 6' high x 4' wide					
Bumping - Upstream Collection - Structures and Impvts - 6' high x 4' wide					
15509.262	Fish Collection Entry Pool - Fish Crowder	300.00	lb	58.60 /lb	17,579
CleElum - Sustream Collection - 6' high x 8' wide					
Bumping - Sustream Collection - 6' high x 8' wide					
15509.264	Fish Collection Entry Pool - Bulkhead Gate	9,400.00	lb	17.68 /lb	166,189
6' high x 8' wide					
15509.265	Fish Collection Lock - Lifting Braile w/ hoist	400.00	lb	434.42 /lb	173,766
8' x 8'					
15509.270	Fish Collection Flume	1,100.00	lb	111.13 /lb	122,243
CleElum and Bumping Upstream Collection Flum - 2' wide x 1.25' deep					
15509.275	Fish Collection - Anesthetic Tank	115.00	lb	106.08 /lb	12,199
CleElum and Bumping - 5' long x1.5' wide x 2' deep					
15509.276	Fish Collection - Recovery Tank	300.00	lb	106.08 /lb	31,824
CleElum and Bumping - 4' long x 4.8' wide x 2' deep					
15509.295	Fish Collection - Transport Truck	1,500.00	gal	94.292/gal	141,438
16000.100	Electrical Subcontractor - Buildings	3,960.00	sf	53.58 /sf	212,157
002-02.10 Bumping Upstream Passage Facility - Structures and Improvements				**2,434,432.46 /ls**	**2,434,432**
1.00	**ls**				
002-02.20	**Bumping Upstream Passage Facility - Waterway Structures**				
02139.000	Diversion of River During Construction	1.00	ls	434,416.10 /ls	434,416
02140.000	Dewatering	1.00	ls	535,443.10 /ls	535,443
02200.500	Earthwork, Structural Excavation	480.00	cy	23.24 /cy	11,153
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Unit Cost	Total Amount
02200.500	Earthwork, Structural Excavation	480.00	cy	23.24 /cy	11,153
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy, Bumping Downstream Dams - Intake Structure - 600 cy Bumping Downstream Waterways - Conduit - 19440 cy					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	205.00	cy	128.12 /cy	26,265
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall Bumping - Intake - Dams - Intake					
02271.000	Stone Revetment (Rip Rap)	100.00	cy	226.81 /cy	22,681
CleElumDownstream -Dam - Rip Rap Bedding-8900 cy, Rip Rap 16600 cy CleElumUpstream -Wateway - Rip Rap Bedding-340 cy, Rip Rap 340 cy Bumping - Removal and stockpile of existing 2200 cy; Rip rap bedding 1100 cy; place rip rap from stockpile, 2700 cy					
02930.000	Seeding, Sodding, and Landscaping	1,111.110	sy	1.773/sy	1,970
03002.005	Concrete - Modifications	1.00	ls	1,717.45 /ls	1,717
CleElum Waterworks - Spillway modifications, 4 ea 34" square holes, 7' dia in wall for conduit Bumping Upstream Collection Waterworks - Concrete Demolition and Remove					
03002.100	Concrete_Foundations	180.00	cy	1,060.784/cy	190,941
Clr Crk - Auxillary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation CleElum - Downstream Waterway - 2700 CY Bumping - Upstream Structures and Impvts - 105 cy					
03002.300	Concrete_Walls Exterior	65.00	cy	1,414.38 /cy	91,935
Clr Crk - Auxillary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade CleElum - Downstream Waterway - 1000 CY					
05505.000	Metal Fabrications	1.00	ls	335,126.77 /ls	335,127
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls CleElum - UpstreamWaterway - Pump plt handrail 100 lf CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5' Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
002-02.20 Bumping Upstream Passage Facility - Waterway Structures				**1,651,647.49 /ls**	**1,651,647**
1.00	**ls**				
002-02.30	**Bumping Upstream Passage Facility - Auxillary Water Supply**				
05505.000	Metal Fabrications	1.00	ls	68,039.65 /ls	68,040
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf;					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
05505.000	Metal Fabrications	1.00	ls	68,039.65 /ls	68,040
misc metalwork 1 ls					
CleElum - UpstreamWaterway - Pump plt handrail 100 lf					
CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5'					
Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea					
Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
11061.000	Pumping Equipment: Non-Clog Centrifugal	1.00	ea	52,555.88 /ea	52,556
11083.010	Aeration Equipment: Diffusers	3.00	ea	5,639.65 /ea	16,919
11131.002	Pump Screens	2.00	ea	6,468.42 /ea	12,937
15067.100	Pipe: Polyethylene (HDPE), Drainage Pipe	40.00	lf	282.993/lf	11,320
CleElum - CollectionStructuresImpvts - 65 lf 12'					
CleElum - CollectionUpstreamAuxWater -40 lf 12"					
15103.000	Butterfly Valves	3.00	ea	5,659.863/ea	16,980
002-02.30 Bumping Upstream Passage Facility - Auxillary Water Supply				**178,750.63 /ls**	**178,751**
1.00	**ls**				
002-02.40	**Bumping Upstream Passage Facility - Accessory Electrical Equipment**				
16232.000	Engine Generator: LPG Gas	50.00	kw	3,133.14 /kw	156,657
16232.010	Engine Generator: LPG Gas Storage Tanks, Steel	2.00	ea	5,862.00 /ea	11,724
16232.020	Engine Generator: LPG Gas, Gas Piping Lines, Buried	90.00	lf	192.031/lf	17,283
002-02.40 Bumping Upstream Passage Facility - Accessory Electrical Equipment				**185,663.75 /ls**	**185,664**
1.00	**ls**				
002 FISH PASSAGE - BUMPING LAKE DAM				***12,251,613.51 /LS***	***12,251,614***
1.00	***LS***				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Description	Amount	Totals	Rate
Labor			
Material			
Subcontract	12,251,614		
Equipment			
Other			
Subtotal		**12,251,614**	
Contractor's Fld Ovhd	735,097		6.000 %
Mobilization	490,065		4.000 %
Subtotal w/ mobilization		**13,476,776**	
Unlisted Items Minor	484,981		4.000 %
Design and Scope Changes Minor	484,981		4.000 %
Cost Est Refinements Minor	242,490		2.000 %
Contractor's Fee	1,468,923		10.000 %
Contractor's Bonds & Insurance	220,338		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**16,378,489**	
Contingencies	4,094,622		25.000 %
Field Cost		**20,473,111**	
Sales Tax Estimate (Mat & Eq)			8.200 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Escal to NTP (NOTINCL)	
Forecasted Feature Bid	**20,473,111**

CCT adjustments were made on the CleElum and Bumping Fish Passages - Adjustments were amde as follows:
Earth Dams - Dam Structure - 276/257:001-01.20; 002-01.20
Earth Dams - Outlet Works - 343/334:001-01.30; 001-02.10; 001-02.30; 002-01.30; 002-02.10; 002-02.20
Pumping Plants - 326/305:001-02.40; 002-02.30; 002-02.40
Secondary Roads - 411/394:001-01.10; 001-02.20; 002-01.10

Sales Tax for CleElum and Bumping are assumed to be in the previous estimate unit prices since it did not appear on the totals page of the January 2008 Feasibility Estimate.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

CONSTRUCTION COST ESTIMATE

Project	Yakima Project WA	**Prepared by**	PN Regional Office Design Group
Division	Storage Division	**Estimate Date**	21-Apr-2008
Unit	Bumping Lake Dam	**Estimate Type**	Planning -- Feasibility
Feature	Fish Passage	**Price Level**	Jan-2008

Property Class	Identified Property	Plant Account	Item	Description	Quantity	Unit	Price	Amount	Field Cost	Total Field Cost	Noncontract Cost	Construction Cost
				FISH PASSAGE FACILITIES SUMMARY								
15				General Property						19,000,000	7,500,000	27,000,000
	03			Bumping Lake Dam juvenile downstream fish passage facility						12,000,000		
		140		Roads and Road Structures					310,000			
		151		Dams					7,700,000			
		153		Waterway Structures					3,700,000			
	04			Cle Elum Dam adult upstream fish passage facility						6,700,000		
		130		Structures and Improvements					3,640,000			
		153		Waterway Structures					2,470,000			
		160		Pumps and Prime Movers					270,000			
		170		Accessory Electrical Equipment					280,000			
				Noncontract Costs								
				Data Collection and Final Design							3,100,000	
				Construction Engineering and Inspection							4,000,000	
				NEPA, ESA, Permits, and Contract Administration							370,000	

CONSTRUCTION COST ESTIMATE

Project	Yakima Project WA	**Prepared by**	PN Regional Office Design Group
Division	Storage Division	**Estimate Date**	21-Apr-2008
Unit	Bumping Lake Dam	**Estimate Type**	Planning -- Feasibility
Feature	Fish Passage	**Price Level**	Jan-2008

Property Class	Identified Property	Plant Account	Item	Description	Quantity	Unit	Price	Amount	Field Cost	Total Field Cost	Noncontract Cost	Construction Cost
15				General Property								
	03			Bumping Lake Dam juvenile downstream fish passage facility						12,000,000		
		140		Roads and Road Structures					310,000			
				.01 Access road on right abutment								
			1	Mobilization & Preparation	Lump Sum	ls	Lump Sum	4,000				
			2	Access road improvement to construction site	1	Mi	$85,000	85,000				
			3	Allowance for unlisted items	Lump Sum	ls	Lump Sum	13,000				
				Subtotal				102,000				
				Contingencies (25% ±)				28,000				
				Field Cost 15.03.140.01				130,000				
				.02 Access bridge from dam crest to intake structure								
			1	Mobilization & Preparation	Lump Sum	ls	Lump Sum	6,000				
			2	F&I Steel truss access bridge 60 ft long by 6 ft wide (weathered steel)	1	ls	$105,000	105,000				
			3	Construct access bridge support and abutment	1	ls	$13,500	13,500				
			4	Allowance for unlisted items	Lump Sum	ls	Lump Sum	19,000				
				Subtotal				143,500				
				Contingencies (25% ±)				36,500				
				Field Cost 15.03.140.02				180,000				
		151		Dams					7,700,000			
				.01 Variable-level folding gate intake structure to release water from elevations 3416 -3426								
			1	Mobilization & Preparation	Lump Sum	ls	Lump Sum	254,000				
			2	Clearing and grubbing & disposal of debris	3	acres	12,000.00	36,000				
			3	Topsoil strip & stockpile (borrow area)	5000	cy	3.30	16,500				
			4	Removal & stockpile of existing riprap work area	2,200	cy	9.20	20,240				
			5	Construction & removal of upstream cofferdam outer shell	44,000	cy	26.00	1,144,000				
			6	F&I impervioius core material	8,000	cy	56.00	448,000				
			7	F&I bentonite material	570	ton	480.00	273,600				
			8	F&I zone 2 sand material	5,200	cy	77.00	400,400				
			9	F&I new Riprap	1,510	cy	38.00	57,380				
			10	Place & remove riprap on cofferdam	4,300	cy	51.00	219,300				
			11	F&I Gravel surface roadway on top cofferdam	830	cy	200.00	166,000				
			12	Structural excavation intake structure	600	cy	16.00	9,600				

CONSTRUCTION COST ESTIMATE

Project	Yakima Project WA	**Prepared by**	PN Regional Office Design Group
Division	Storage Division	**Estimate Date**	21-Apr-2008
Unit	Bumping Lake Dam	**Estimate Type**	Planning -- Feasibility
Feature	Fish Passage	**Price Level**	Jan-2008

Property Class	Identified Property	Plant Account	Item	Description	Quantity	Unit	Price	Amount	Field Cost	Total Field Cost	Noncontract Cost	Construction Cost
15	03			Bumping Lake Dam juvenile downstream fish passage facility (cont.)								
		151		Dams (cont.)								
				.01 Variable-level folding gate intake structure to release water from elevations 3416-3426 (cont.)								
			13	F&I Mud slab 3" concrete slab under structure	16	cy	470.00	7,520				
			14	F&I Reinforced concrete intake structure	335	cy	2,300.00	770,500				
			15	F&I Trash racks	5600	lb	6.00	33,600				
			16	F&I deck grating and supports	1440	sf	63.00	90,720				
			17	F&I Railings for Access Bridge and Structures	220	lf	110.00	24,200				
			18	F&I Folding Langemann control Gates 10'w x 12'h	2	ea	175,000.00	350,000				
			19	F&I Automated Controlers for folding gates	2	ea	24,000.00	48,000				
			20	F&I 7'x7' Slide Gate at entrance to 7 ft dia conduit	1	ea	125,000.00	125,000				
			21	F&I Stoplogs 13'l x 0.5'h x 0.33w	50	ea	190.00	9,500				
			22	F&I Trash rack trolley inclusive of guides and winch	1	ea	300,000.00	300,000				
			23	F&I Electrical service to intake sturucture gate control	1	ls	17,500.00	17,500				
			24	Furnish, Place, Compact Impervious Core zone	4240	cy	28.00	118,720				
			25	F&I Sand filter Zone 2 (chimney drain, diaphram, conduit)	2250	cy	92.00	207,000				
			26	Furnish and Place zone 1, 3" mixture with fines	1160	cy	24.00	27,840				
			27	Furnish and Place zone 1A, 3" mixture - 12% fines	770	cy	19.00	14,630				
			28	Furnish and Plance zone 4, 3" cobble material	215	cy	18.60	3,999				
			27	Furnish and Plance gravel drain Zone 3	10	cy	105.00	1,050				
			29	Compacted Structural Backfill (intake structure)	530	cy	49.00	25,970				
			30	Furnish and Place riprap bedding 15 inches	1100	cy	11.00	12,100				
			31	Furnish & Place riprap 2.5' from stockpile back on dam	2700	cy	14.00	37,800				
			32	Remove and Reinstall Raodway Guardrail	660	lf	26.00	17,160				
			33	Furnish and Place compaccted roadbase gravel	220	cy	51.00	11,220				
			34	Furnish and Place Asphalt Pavement	100	cy	340.00	34,000				
			35	Allowance for unlisted items	Lump Sum	ls	Lump Sum	800,000				
				Subtotal				6,133,049				
				Contingencies (25% ±)				1,566,951				
				Field Cost 15.03.151.01				7,700,000				
		153		Waterway Structures					3,700,000			
				.01 7' dia concrete fish passage conduit								
			1	Mobilization & Preparation	Lump Sum	ls	Lump Sum	122,000				
			2	Common excavation for conduit 3:1 sideslopes	19,440	cy	7.80	151,632				
			3	Furnish & Compact Select Bedding Material 3 ft	620	cy	44.00	27,280				
			4	Furnish 3" concrete mud slab on foundation	30	cy	270.00	8,100				
			5	Furnish & Place Reinforced Concrete for Outlet	475	cy	2,600.00	1,235,000				
			6	Furnish & Place Flared End concrete Section 10"	25	cy	1,500.00	37,500				
			7	Compacted Embankment Fill	12200	cy	8.80	107,360				
			8	Diversion & Care of Water (dewatering & unwatering)	1	ls	870,000.00	870,000				
			10	Allowance for unlisted items	Lump Sum	ls	Lump Sum	384,000				
				Subtotal				2,942,872				
				Contingencies (25% ±)				757,128				
				Field Cost 15.03.153.01				3,700,000				

CONSTRUCTION COST ESTIMATE

Project	Yakima Project WA	**Prepared by**	PN Regional Office Design Group
Division	Storage Division	**Estimate Date**	21-Apr-2008
Unit	Bumping Lake Dam	**Estimate Type**	Planning -- Feasibility
Feature	Fish Passage	**Price Level**	Jan-2008

Property Class	Identified Property	Plant Account	Item	Description	Quantity	Unit	Price	Amount	Field Cost	Total Field Cost	Noncontract Cost	Construction Cost
	04			Bumping Lake Dam adult upstream fish passage facility --						6,700,000		
				Barrier structure and collection facility located								
				immediately downstream from the outlet works channel								
		130		Structures and Improvements					3,640,000			
				.01 Fish ladder, collection and transportation facilities								
			1	Mobilization	Lump Sum	ls	Lump Sum	120,000				
			2	Dewatering	Lump Sum	ls	Lump Sum	96,000				
			3	Clear and Grub	Lump Sum	ls	Lump Sum	12,500				
			4	Site Grading	500	cy	32.00	16,000				0
			5	Structure Excavation	470	cy	11.50	5,405				
			6	Pipe Trenching w/Backfill	110	cy	88.00	9,680				
			7	F&I Structure Concrete [Flat Work]	105	cy	990.00	103,950				
			8	F&I Structure Concrete [Vertical Work]	120	cy	1,400.00	168,000				
			9	F&I Backfill for Structures	75	cy	150.00	11,250				
			10	Compact Backfill for Structures	75	cy	36.00	2,700				
			11	F&I Rip Rap Scour Protection	16	cy	195.00	3,120				
			12	F&I Bedding for Rip Rap Scour Protection	3	cy	570.00	1,710				
			13	F&I 16"D.I.Gravity Pipeline System	660	lf	300.00	198,000				
			14	F&I Globe Valve 6 inch	1	ea	5,100.00	5,100				
			15	F&I Steep Pass Ladder	50	lf	4,100.00	205,000				
			16	F&I False Weir 12 inch x 12 inch	1	ea	170.00	170				
			17	F&I Entry Pool V-Trap 6 ft H x 4 ft W	170	lb	61.00	10,370				
			18	F&I Entry Pool Crowder 6 ft H x 8 ft W	300	lb	58.00	17,400				
			19	F&I Entry Pool Bulkhead Gate 6 ft H x 8 ft W	9400	lb	17.50	164,500				
			20	F&I Fish Lock Lifting Braile w/Hoist 8 ft x 8 ft	400	lb	430.00	172,000				
			21	F&I Fish Flume 2 ft W x 1.25 ft D	1100	lb	110.00	121,000				
			22	F&I Anesthetic Tank 5ft L x 1.5ft W x 2 ft D	115	lb	105.00	12,075				
			23	F&I Recovery Tank 4ft L x 4.8ft W x 2ft D	300	lb	105.00	31,500				
			24	F&I Bathroom Facilities w/ Piped Septic Tank	Lump Sum	ls	Lump Sum	22,800				
			25	F&I Drain Pipe 4-inch Dia.	240	lf	90.00	21,600				
			26	F&I Potable Water Supply w/ Well	Lump Sum	ls	Lump Sum	14,300				
			27	F&I Steel Walkway Support Structure	8015	lb	17.00	136,255				
			28	Walkway Grating	890	sf	56.00	49,840				
			29	F&I Steel Stairway [2 each]	1000	lb	17.00	17,000				
			30	F&I 7-ft Security Fence	435	lf	45.00	19,575				
			31	F&I Handrail	140	lf	71.00	9,940				
			32	Miscellaneous Metalwork	920	lb	17.00	15,640				
			33	Building Shell 60 ft x 66 ft x 16 ft high	3960	sf	88.00	348,480				
			34	F&I Roll-up Garage Doors [12'W & 16'W x 16'H]	Lump Sum	ls	Lump Sum	9,000				
			35	F&I Interior Electrical	Lump Sum	ls	Lump Sum	210,000				
			36	Gravel Surfacing 4 inch Thick	225	cy	115.00	25,875				
			37	Re-seeding	10	Msf	195.000	1,950				
			38	Furnish Fish Transport Truck [1500 gal]	1	ea	140,000.00	140,000				
			39	Allowance for Unlisted Items	Lump Sum	ls	Lump Sum	379,000				

CONSTRUCTION COST ESTIMATE

Project	Yakima Project WA	**Prepared by**	PN Regional Office Design Group
Division	Storage Division	**Estimate Date**	21-Apr-2008
Unit	Bumping Lake Dam	**Estimate Type**	Planning -- Feasibility
Feature	Fish Passage	**Price Level**	Jan-2008

Property Class	Identified Property	Plant Account	Item	Description	Quantity	Unit	Price	Amount	Field Cost	Total Field Cost	Noncontract Cost	Construction Cost
15	04			Bumping Lake Dam adult upstream fish passage facility (cont.)								
		130		Structures and Improvements (cont.)								
				.01 Fish ladder, collection, and transportation facilities (cont.)								
				Subtotal				2,908,685				
				Contingencies (25% ±)				731,315				
				Field Cost 15.04.130.01				3,640,000				
		153		Waterway Structures					2,470,000			
				.01 Bar rack fish barrier structure								
			1	Mobilization	Lump Sum	ls	Lump Sum	82,000				
			2	Control of River During Construction [Cofferdam]	Lump Sum	ls	Lump Sum	430,000				
			3	Dewatering	Lump Sum	ls	Lump Sum	530,000				
			4	Sawcut and remove Concrete [11 cyd]	Lump Sum	ls	Lump Sum	1,700				
			5	F&I Compacted Embankment	40	cy	58.00	2,320				
			6	Structure Excavation	480	cy	23.00	11,040				
			7	F&I Structure Concrete [Flat Work]	180	cy	1,050.00	189,000				
			8	F&I Structure Concrete [Vertical Work]	65	cy	1,400.00	91,000				
			9	F&I Backfill for Structures	165	cy	130.00	21,450				
			10	Compact Backfill for Structures	165	cy	13.50	2,228				
			11	F&I Rip rap Scour Protection [24-inch thick]	100	cy	210.00	21,000				
			12	Select Bedding for Rip Rap [6-inch thick]	25	cy	58.00	1,450				
			13	F&I Embedded Metalwork	1,825	lb	17.00	31,025				
			14	F&I Metal Picketed Panels	13,100	lb	17.00	222,700				
			15	F&I Metal Support for Operating Deck	990	lb	17.00	16,830				
			16	F&I Operating Deck [16'x140', HS-10 Loading]	2,240	sf	22.00	49,280				
			17	F&I Handrail	45	lf	73.00	3,285				
			18	Re-seeding	10	Msf	195.00	1,950				
			19	F&I Metal Picketed Panel Lifting Device	1	ls	Lump Sum	8,600				
			20	Allowance for Unlisted Items	Lump Sum	ls	Lump Sum	258,000				
				Subtotal				1,974,858				
				Contingencies (25% ±)				495,143				
				Field Cost 15.04.153.01				2,470,000				

FOR OFFICIAL USE ONLY

CONSTRUCTION COST ESTIMATE

Project	Yakima Project WA	**Prepared by**	PN Regional Office Design Group
Division	Storage Division	**Estimate Date**	21-Apr-2008
Unit	Bumping Lake Dam	**Estimate Type**	Planning -- Feasibility
Feature	Fish Passage	**Price Level**	Jan-2008

Property Class	Identified Property	Plant Account	Item	Description	Quantity	Unit	Price	Amount	Field Cost	Total Field Cost	Noncontract Cost	Construction Cost
15	04			Bumping Lake Dam adult upstream fish passage facility (cont.)								
		160		Pumps and Prime Movers					270,000			
				.01 Water supply for fish collection facilities								
			1	Mobilization & Preparation	Lump Sum	ls	Lump Sum	9,000				
			2	F&I Pump Trashracks [2 each]	3,960	lb	17.00	67,320				
			3	F&I Pump Screens 30inch dia x 38 inch long	2	ea	6,400.00	12,800				
			4	F&I Centrifugal Pump 30 Hp	1	ea	52,000.00	52,000				
			5	F&I 12 inch HDPE Pressure Delivery Pipe	40	lf	280.00	11,200				
			6	F&I 6 inch Butterfly Valves	3	ea	5,600.00	16,800				
			7	F&I Floor Diffusers 3 ft x 3 ft [3 each]	540	lb	31.00	16,740				
			8	Allowance for Unlisted Items	Lump Sum	ls	Lump Sum	28,000				
				Subtotal				213,860				
				Contingencies (25% ±)				56,140				
				Field Cost 15.04.160.01				270,000				
		170		Accessory Electrical Equipment					280,000			
				.01 Power supply for fish collection facilities								
			1	Mobilization & Preparation	Lump Sum	ls	Lump Sum	9,000				
			2	F&I LPG Generator 50 Kw, 64 Kva	1	ea	155,000.00	155,000				
			3	F&I Twin Steel LPG Storage Tanks	2	ea	5,800.00	11,600				
			4	F&I Buried Gas Line for LPG Generator	90	lf	190.00	17,100				
			5	Allowance for Unlisted Items	Lump Sum	ls	Lump Sum	29,000				
				Subtotal				221,700				
				Contingencies (25% ±)				58,300				
				Field Cost 15.04.170.01				280,000				

APPENDIX C

OPCC Fish Passage at Clear Lake Dam

Yakima River Basin Water Storage Study
Fish Passages
Cle Elum Dam, Bumping lake Dam and Clear Creek Dam

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

10/21/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Fish Passages for Cle Elum and Bumping Lake consist of a downstream passage with in Lake Intake structure and concrete fish conduit to the river. Upstream passage consists of a short fish ladder to an adult collection facility for truck transport to the reservoir. Clear Lake fish passage consist of an Upstream/Downstream fish ladder with resting pools plus auxiliary attraction water pipeline connected to the fish ladder at the river through a velocity reduction structure.
Cost Estimates for Cle Elum and Bumping Lake Dams were developed using unit prices and quantities from previous Feasibility Estimates with a Price Level of Jan 08 adjusted using the appropriate CCT indices as noted on the Totals Page notes. Clear Creek was estimated using a conceptual design developed by HDR using Timberline Estimate with 3rd Qtr 2010 RS Means Database and quantities developed from the HDR design. Neither noncontract costs nor escalation are included in these estimates.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
003	FISH PASSAGE - CLEAR CREEK LAKE DAM	1.00	LS	449,867	580,177	199,695	119,132		1,348,871

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Description	Amount	Totals	Rate
Labor	449,867		
Material	580,177		
Subcontract	199,695		
Equipment	119,132		
Other			
Subtotal		1,348,871	
Contractor's Fld Ovhd	80,932		6.000 %
Mobilization	53,955		4.000 %
Subtotal w/ mobilization		1,483,758	
Unlisted Items Minor	50,974		4.000 %
Design and Scope Changes Minor	50,974		4.000 %
Cost Est Refinements Minor	25,487		2.000 %
Contractor's Fee	161,119		10.000 %
Contractor's Bonds & Insurance	24,168		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		1,796,480	
Contingencies	449,120		25.000 %
Field Cost		2,245,600	
Sales Tax Estimate (Mat & Eq)	57,123		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Forecasted Feature Bid	**2,302,723**

CCT adjustments were made on the CleElum and Bumping Fish Passages - Adjustments were amde as follows:
Earth Dams - Dam Structure - 276/257:001-01.20; 002-01.20
Earth Dams - Outlet Works - 343/334:001-01.30; 001-02.10; 001-02.30; 002-01.30; 002-02.10; 002-02.20
Pumping Plants - 326/305:001-02.40; 002-02.30; 002-02.40
Secondary Roads - 411/394:001-01.10; 001-02.20; 002-01.10

Sales Tax for CleElum and Bumping are assumed to be in the previous estimate unit prices since it did not appear on the totals page of the January 2008 Feasibility Estimate.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Fish Passages
Cle Elum Dam, Bumping lake Dam and Clear Creek Dam

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

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Fish Passages for Cle Elum and Bumping Lake consist of a downstream passage with in Lake Intake structure and concrete fish conduit to the river. Upstream passage consists of a short fish ladder to an adult collection facility for truck transport to the reservoir. Clear Lake fish passage consist of an Upstream/Downstream fish ladder with resting pools plus auxiliary attraction water pipeline connected to the fish ladder at the river through a velocity reduction structure.
Cost Estimates for Cle Elum and Bumping Lake Dams were developed using unit prices and quantities from previous Feasibility Estimates with a Price Level of Jan 08 adjusted using the appropriate CCT indices as noted on the Totals Page notes. Clear Creek was estimated using a conceptual design developed by HDR using Timberline Estimate with 3rd Qtr 2010 RS Means Database and quantities developed from the HDR design. Neither noncontract costs nor escalation are included in these estimates.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
003 FISH PASSAGE - CLEAR CREEK LAKE DAM					
003-01.05	**Clear Creek Fish Passage Facility - General Project Requirements**				
02110.000	Site Clearing	0.22	ac	3,771.50 /ac	830
02514.000	Aggregate Vehicular Drive, Compacted	200.00	cy	88.47 /cy	17,694
Cle Elum - 4" Gravel drive 285 cy					
Clear Creek - 300' x 18' wide 12" aggregate base access road to control box					
02930.000	Seeding, Sodding, and Landscaping	5,478.00	sy	2.794/sy	15,304
003-01.05 Clear Creek Fish Passage Facility - General Project Requirements				**33,827.96 /ls**	**33,828**
1.00	**ls**				
357.20	Labor hours				
107.51	Equipment hours				
003-01.10	**Clear Creek Fish Passage Facility - Ladder Control Structure**				
02200.500	Earthwork, Structural Excavation	339.00	cy	1.61 /cy	545
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy,					
Bumping Downstream Dams - Intake Structure - 600 cy					
Bumping Downstream Waterways - Conduit - 19440 cy					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	236.00	cy	20.464/cy	4,830
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall					
Bumping - Intake - Dams - Intake					
02271.000	Stone Revetment (Rip Rap)	28.00	cy	171.10 /cy	4,791
CleElumDownstream -Dam - Rip Rap Bedding-8900 cy, Rip Rap 16600 cy					
CleElumUpstream -Wateway - Rip Rap Bedding-340 cy, Rip Rap 340 cy					
Bumping - Removal and stockpile of existing 2200 cy; Rip rap bedding 1100 cy; place rip rap from stockpile, 2700 cy					
02361.200	Cofferdam - Shore Driven	1,200.00	sf	27.04 /sf	32,443
Bumping - Construction & removal of upstream cofferedam outer shell, placing and removing rip rap, 4300 cy on the cofferdam, and gravel surface roadway, 830 cy, on top of the cofferdam.					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02444.000	Chain Link Fence and Gates	62.00	lf	41.58 /lf	2,578
03002.100	Concrete_Foundations	14.00	cy	500.74 /cy	7,010
Clr Crk - Auxillary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation					
CleElum - Downstream Waterway - 2700 CY					
Bumping - Upstream Structures and Impvts - 105 cy					
03002.300	Concrete_Walls Exterior	20.00	cy	893.124/cy	17,862
Clr Crk - Auxillary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade					
CleElum - Downstream Waterway - 1000 CY					
05505.000	Metal Fabrications	1.00	ls	39,505.92 /ls	39,506
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls					
CleElum - UpstreamWaterway - Pump plt handrail 100 lf					
CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5'					
Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea					
Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
15115.000	Water Control Gates	2.00	ea	16,424.09 /ea	32,848
15509.210	Fish Screen Fixed Plate, Vertical,	70.00	sf	1,000.00 /sf	70,000
003-01.10 Clear Creek Fish Passage Facility - Ladder Control Structure				**212,412.28 /ea**	**212,412**
1.00	**ea**				
703.51	Labor hours				
123.06	Equipment hours				
003-01.20	**Clear Creek Fish Passage Facility - Fish Conduit**				
02221.000	Trenching, Backfilling and Compacting for Utilities	509.00	cy	56.70 /cy	28,858
Excavation and backfill for conduit, 3:1 SLOPE					
15067.000	Pipe: Polyethylene (HDPE)	160.00	lf	383.31 /lf	61,330
003-01.20 Clear Creek Fish Passage Facility - Fish Conduit				**574.440/lf**	**90,187**
157.00	**lf**				
325.53	Labor hours				
291.784	Equipment hours				
003-01.30	**Clear Creek Fish Passage Facility - Ladder**				
55ea, cast in place pools, 10.25" long x 6' wide x 8' deep with aluminum baffle plate per detail in summary report.					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02200.500	Earthwork, Structural Excavation	4,556.00	cy	1.61 /cy	7,318
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy,					
Bumping Downstream Dams - Intake Structure - 600 cy					
Bumping Downstream Waterways - Conduit - 19440 cy					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	2,492.00	cy	24.39 /cy	60,778
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall					
Bumping - Intake - Dams - Intake					
02271.000	Stone Revetment (Rip Rap)	22.00	cy	174.202/cy	3,832
CleElumDownstream -Dam - Rip Rap Bedding-8900 cy, Rip Rap 16600 cy					
CleElumUpstream -Wateway - Rip Rap Bedding-340 cy, Rip Rap 340 cy					
Bumping - Removal and stockpile of existing 2200 cy; Rip rap bedding 1100 cy; place rip rap from stockpile, 2700 cy					
03002.100	Concrete_Foundations	275.00	cy	660.921/cy	181,753
Clr Crk - Auxillary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation					
CleElum - Downstream Waterway - 2700 CY					
Bumping - Upstream Structures and Impvts - 105 cy					
03002.300	Concrete_Walls Exterior	334.00	cy	770.78 /cy	257,439
Clr Crk - Auxillary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade					
CleElum - Downstream Waterway - 1000 CY					
05505.000	Metal Fabrications	1.00	ls	288,694.49 /ls	288,694
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls					
CleElum - UpstreamWaterway - Pump plt handrail 100 lf					
CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5'					
Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea					
Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
003-01.30 Clear Creek Fish Passage Facility - Ladder				**14,542.09 /pool**	**799,815**

55.00	**pool**
6,196.19	Labor hours
1,011.725	Equipment hours

003-01.40 Clear Creek Fish Passage Facility - Resting Pool

3 ea. concrete tanks, 16' long x 10' wide x 10' deep

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Unit Cost	Total Amount
02200.500	Earthwork, Structural Excavation	1,299.00	cy	1.61 /cy	2,087
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy,					
Bumping Downstream Dams - Intake Structure - 600 cy					
Bumping Downstream Waterways - Conduit - 19440 cy					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	864.00	cy	11.83 /cy	10,218
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall					
Bumping - Intake - Dams - Intake					
03002.100	Concrete_Foundations	33.00	cy	605.542/cy	19,983
Clr Crk - Auxillary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation					
CleElum - Downstream Waterway - 2700 CY					
Bumping - Upstream Structures and Impvts - 105 cy					
03002.300	Concrete_Walls Exterior	63.00	cy	755.44 /cy	47,593
Clr Crk - Auxillary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade					
CleElum - Downstream Waterway - 1000 CY					
05505.000	Metal Fabrications	1.00	ls	23,228.89 /ls	23,229
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls					
CleElum - UpstreamWaterway - Pump plt handrail 100 lf					
CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5'					
Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea					
Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
003-01.40 Clear Creek Fish Passage Facility - Resting Pool				**34,369.51 /ea**	**103,109**
3.00	**ea**				
983.92	Labor hours				
175.864	Equipment hours				
003-01.50	**Clear Creek Fish Passage Facility - Auxillary Flow Pipeline**				
180' 18" sch 40 steel pipe, unlined, expoxy coated, above grade on concrete supports except for 20' on each end. Velocity baffling structure prior to going in to the fish ladder. CCT adjust 1/08 to 7/10-1.095%					
02200.500	Earthwork, Structural Excavation	81.00	cy	3.45 /cy	279
CleElum-Downstream Waterworks - Low permeable zone common excavation 16200 cy, fish conduit excavation 625000 cy					
CleElum-Upstream Waterworks - Retaining wall - 30,850 cy, Pad@ elev 2136 - 19500 cy, Pumping Plt - 41,410 cy,					
Bumping Downstream Dams - Intake Structure - 600 cy					
Bumping Downstream Waterways - Conduit - 19440 cy					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	60.00	cy	27.77 /cy	1,666
CleElum - Upstream Collection Waterworks - Pump Plt and Retaining Wall					
Bumping - Intake - Dams - Intake					
03002.100	Concrete_Foundations	3.00	cy	700.193/cy	2,101
Clr Crk - Auxillary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation					
CleElum - Downstream Waterway - 2700 CY					
Bumping - Upstream Structures and Impvts - 105 cy					
03002.300	Concrete_Walls Exterior	4.00	cy	652.54 /cy	2,610
Clr Crk - Auxillary Pipeline, pipe support, 4' wide, 12" thick, average ht 9', 5' above grade					
CleElum - Downstream Waterway - 1000 CY					
03002.910	Concrete_Pipe Supports	38.00	cy	545.28 /cy	20,720
Auxiliary Pipeline, pipe support foundation, 4'x3', 4' depth of bury, no rock excavation, pipe support, 4' wide, 12" thick, average ht 9', average 5' above grade					
05505.000	Metal Fabrications	1.00	ls	4,986.310/ls	4,986
CleElum - UpstreamStructuresImpvts - walkway support 3300 lb; walkway grating, 2870 sf; steel stairway 500 lb; handrail 280 lf; misc metalwork 1 ls					
CleElum - UpstreamWaterway - Pump plt handrail 100 lf					
CleElum - UpstreamPumps - Weir Wall steel 10' x 18'; wall diffuser, 10' x 5'					
Bumping - Downstream Intake - Trash Rakes, 5600 lb; Deck grating and supports, 1440 sf; railings, 220 lf; stoplogs 13' lg x 6" hg x 4" th, 50 ea					
Bumping - Upstream - Structures and Impvts - False Weir 12"x12"; Steel Walkway Support, 8015 #; grating, 890sf; stairway, 2 ea; Handrail, 140 lf;Misc, 920 lb					
09904.000	Painting and Protective Coatings	850.00	sf	1.461/sf	1,242
15061.000	Pipe: Steel	180.00	lf	366.02 /lf	65,883
15103.000	Butterfly Valves	1.00	ea	10,032.030/ea	10,032
003-01.50 Clear Creek Fish Passage Facility - Auxillary Flow Pipeline				**625.83 /lf**	**109,520**
175.00	**lf**				
882.174	Labor hours				
243.84	Equipment hours				
003 FISH PASSAGE - CLEAR CREEK LAKE DAM				***1,348,870.65 /LS***	***1,348,871***
1.00	***LS***				
9,448.51	Labor hours				
1,953.775	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Description	Amount	Totals	Rate
	449,867		
Material	580,177		
Subcontract	199,695		
Equipment	119,132		
Other			
Subtotal		1,348,871	
Contractor's Fld Ovhd	80,932		6.000 %
Mobilization	53,955		4.000 %
Subtotal w/ mobilization		1,483,758	
Unlisted Items Minor	50,974		4.000 %
Design and Scope Changes Minor	50,974		4.000 %
Cost Est Refinements Minor	25,487		2.000 %
Contractor's Fee	161,119		10.000 %
Contractor's Bonds & Insurance	24,168		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		1,796,480	
Contingencies	449,120		25.000 %
Field Cost		2,245,600	
Sales Tax Estimate (Mat & Eq)	57,123		8.200 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Escal to NTP (NOTINCL)	
Forecasted Feature Bid	**2,302,723**

CCT adjustments were made on the CleElum and Bumping Fish Passages - Adjustments were amde as follows:
Earth Dams - Dam Structure - 276/257:001-01.20; 002-01.20
Earth Dams - Outlet Works - 343/334:001-01.30; 001-02.10; 001-02.30; 002-01.30; 002-02.10; 002-02.20
Pumping Plants - 326/305:001-02.40; 002-02.30; 002-02.40
Secondary Roads - 411/394:001-01.10; 001-02.20; 002-01.10

Sales Tax for CleElum and Bumping are assumed to be in the previous estimate unit prices since it did not appear on the totals page of the January 2008 Feasibility Estimate.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

APPENDIX D

OPCC Wymer Reservoir with Adjacent Yakima River Intake

Yakima River Basin Water Storage Study
Wymer Offstream Storage Facility/Yakima River Intake
Penstock/Power House

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/8/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Reclamation has provided the enclosed cost estimate as a resource for us in discussions among interested parties evaluating this specific project, activity, concept, issue, etc. Presentation of this estimate does not in and of itself imply Reclamation's support for moving forward with the effort. When appropriate, Reclamation specifically will articulate support for further action through other means, such as a report containing recommendations.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001	YAKIMA RIVER INTAKE	1.00	LS			20,844,398			20,844,398
002	PUMPING STATION	1.00	LS			60,869,542			60,869,542
003	SWITCHYARD AND TRANSMISSION LINE	1.00	LS			6,544,784			6,544,784
004	DISCHARGE LINE	1.00	LS			27,723,982			27,723,982
005	DAM AND DIKE	1.00	LS			399,920,542			399,920,542
006	SPILLWAY AND OUTLET WORKS	1.00	LS			63,578,112			63,578,112
007	DIVERSION DURING CONSTRUCTION	1.00	LS			4,768,930			4,768,930
008	ROAD AND CREEK IMPROVEMENTS	1.00	LS			6,609,912			6,609,912

Partial Totals

Description	Amount	Totals	Rate
		590,860,203	
Contractor's Fee			6.000 %
Contractor's Bonds & Insurance			1.500 %
Subtotal		590,860,203	
Mobilization	17,725,806		3.000 %
Subtotal w/ Mobilization		608,586,009	
Unlisted Items Minor	24,343,440		4.000 %
Design and Scope Changes Minor	21,594,801		4.000 %
Cost Est Refinements Minor	10,797,400		2.000 %
Procurement Strategy Open Comp			
Contract Cost		665,321,650	
Contingencies	166,330,413		25.000 %
Field Cost		831,652,063	
Sales Tax Estimate (Mat & Eq)			8.200 %
Escal to NTP (Not Included)			
Forecasted Feature Bid		831,652,063	

Wymer Reservoir - Yakima River Intake was estimated used the USBR CCT. Numbers were assumed to include sales so all adjusted vales were placed in the estimate as subcontractors.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Wymer Offstream Storage Facility/Yakima River Intake
Penstock/Power House

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989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		001 YAKIMA RIVER INTAKE				
DIVISION 02		**SITE CONSTRUCTION**				
I-001		*Construct/Remove Cofferdam around intake*				
----		Sand bags, place by hand	300.00	cf	30.67 /cf	9,200
n	0925	Use 540 Sacks @ 3' x 3' x 3' = 540 CY of fill	1.00	ls	93,135.60 /ls	93,136
	1200	Liners, membrane lining systems PVC 40 mil thick	5,400.00	sf	1.893 /sf	10,224
n	0100	Gravel for French Drain, crushed stone, 3/4" to 1/2", excludes compaction	20.00	lcy	102.222 /lcy	2,044
	2110	Subdrainage Piping, plastic, perforated PVC, pipe, 6" diameter, excludes excavation and backfill	270.00	lf	13.63 /lf	3,680
		I-001 Construct/Remove Cofferdam around intake				*118,284*
I-002		*Construct/Remove Cofferdam around Intake Fish Return Structure*				
----		Sand bags, place by hand	115.00	cf	30.67 /cf	3,527
n	0925	Use 200 Sacks @ 3' x 3' x 3' = 200 CY of fill	1.00	ls	34,074.00 /ls	34,074
	1200	Liners, membrane lining systems PVC 40 mil thick	2,025.00	sf	1.704 /sf	3,450
n	0100	Gravel for French Drain, crushed stone, 3/4" to 1/2", excludes compaction	8.00	lcy	102.221 /lcy	818
	2110	Subdrainage Piping, plastic, perforated PVC, pipe, 6" diameter, excludes excavation and backfill	100.00	lf	13.63 /lf	1,363
		I-002 Construct/Remove Cofferdam around Intake Fish Return Structure				*43,231*
I-003		*Dewatering Intake and Pumping Plant*				
n	5500	Operate 11 sump pumps for 9 months; 30' TDH and 4 GPM each pump	1.00	ls	851,850.00 /ls	851,850

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
I-003		*Dewatering Intake and Pumping Plant*				
n	5500	Operate 10 sump pumps for 9 months; 45' TDH and 5 GPM each pump	1.00	ls	931,356.00 /ls	931,356
n	5500	Operate 3 sump pumps for 2 months; 12' TDH and 5 GPM each pump	1.00	ls	124,938.00 /ls	124,938
----		Install and remove 340 wellpoints	1.00	ls	4,088,880.00 /ls	4,088,880
----		Install and remove 40 wellpoints	1.00	ls	795,060.00 /ls	795,060
n	0200	Sand and gravel Filter Material	715.00	cy	80.642 /cy	57,659
n	1550	Wrap perf PVC pipe, geotextile fabric, non-woven, 120 lb. tensile strength, includes scarifying and compaction	475.00	sy	6.82 /sy	3,237
	2110	Subdrainage Piping, plastic, perforated PVC, pipe, 6" diameter, excludes excavation and backfill	2,150.00	lf	13.63 /lf	29,304
		I-003 Dewatering Intake and Pumping Plant				*6,882,284*
I-004		*Structural Excavation and Backfill*				
	6280	Structural excavation, BCY,sandy clay loam, 3-1/2 cy bucket,machine excavation,hydraulic backhoe	24,400.00	bcy	10.222 /bcy	249,422
----		Excavation of rock for structures (drill and shoot)	2,060.00	cy	68.15 /cy	140,385
n	1600	Backfill, bulk, 6" to 12" lifts, dozer backfilling	13,715.00	ecy	17.04 /ecy	233,662
n	2200	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	13,715.00	ecy	19.31 /ecy	264,817
		I-004 Structural Excavation and Backfill				*888,286*
I-008		*Fish Bypass Pipe - Earthwork (Alt 2 only)*				
n	4250	Struct concrete,ready mix,flowable fill,struct,140 psi,includes ash,cement,aggregate,sand,water,delivered,excludes all additives and treatments	330.00	cy	215.802 /cy	71,215
n	1030	Excavating, trench or continuous footing, common earth, 3 C.Y. excavator, 10' to 14' deep, excludes sheeting or dewatering	1,600.00	bcy	19.31 /bcy	30,894

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
I-008		*Fish Bypass Pipe - Earthwork (Alt 2 only)*				
n	2200	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	1,180.00	ecy	27.83 /ecy	32,836
		I-008 Fish Bypass Pipe - Earthwork (Alt 2 only)				*134,944*
		DIVISION 02 SITE CONSTRUCTION				**8,067,030**
DIVISION 03		**CONCRETE**				
I-005		*Construct Gated Intake and Fishscreen Structure*				
----		Cast-in-place concrete in place, 4000 psi, includes forms, excludes reinforcing steel, cement costs	2,950.00	cy	1,249.380 /cy	3,685,671
----		Furnish and place concrete reinforcement	353,860.00	lb	1.704 /lb	602,871
----		Furnish and handle cement	840.00	tons	170.37 /tons	143,111
		I-005 Construct Gated Intake and Fishscreen Structure				*4,431,653*
I-006		*Construct Intake Structure Retaining Walls*				
----		Cast-in-place concrete in place, 4000 psi, includes forms, excludes reinforcing steel, cement costs	203.00	cy	2,271.60 /cy	461,135
----		Furnish and place concrete reinforcement	24,300.00	lb	1.874 /lb	45,540
----		Furnish and handle cement	58.00	tons	204.444 /tons	11,858
		I-006 Construct Intake Structure Retaining Walls				*518,532*
I-007		*Construct Sump for Fish Pumps and Bypass*				
----		Cast-in-place concrete in place, 4000 psi, includes forms, excludes reinforcing steel, cement costs	1,040.00	cy	1,476.54 /cy	1,535,602
----		Furnish and place concrete reinforcement	124,620.00	lb	1.76 /lb	219,392
----		Furnish and handle cement	295.00	tons	181.73 /tons	53,610

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	I-007 Construct Sump for Fish Pumps and Bypass				*1,808,604*
I-011	*Control Building*				
----	Cast-in-place concrete in place, 4000 psi, includes forms, excludes reinforcing steel, cement costs	18.00	cy	1,135.80 /cy	20,444
----	Furnish and place concrete reinforcement	2,500.00	lb	2.044 /lb	5,111
----	Furnish and handle cement	5.00	tons	238.52 /tons	1,193
	I-011 Control Building				*26,748*
	DIVISION 03 CONCRETE				**6,785,537**
DIVISION 05	**METALS**				
I-005	*Construct Gated Intake and Fishscreen Structure*				
----	W-Beam Guardrails	40.00	lf	90.864 /lf	3,635
	I-005 Construct Gated Intake and Fishscreen Structure				*3,635*
I-009	*Structural Steel*				
----	3 ton hoist monorail beam and frames	2,000.00	lbs	5.68 /lbs	11,358
	I-009 Structural Steel				*11,358*
I-010	*Miscellaneous Metalwork*				
----	3' wide walkway, steel, safety grating at fish screens;	8,000.00	lbs	11.36 /lbs	90,864
----	- 75' each side with support frames at 11' on center				
----	- Gripstrut panels at 23.5 lbs/ft, guardrail, ladders and landings into Intake				

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		I-010 Miscellaneous Metalwork				*90,864*
I-011		*Control Building*				
----		Pre-engineered metal building, 15' eave height, 3:12 roof pitch, 20' long x 20 wide	1.00	ea	70,419.600 /ea	70,420
		I-011 Control Building				*70,420*
I-012		*Control Building*				
----		Trashracks and seats (steel)	20,400.00	lbs	9.09 /lbs	185,363
----		One trash rake, rails, supports (Assume Atlas Polar DT8300 Rake)	11,000.00	lbs	11.36 /lbs	124,938
----		One Conveyor (steel)	5,000.00	lbs	11.93 /lbs	59,630
----		Fish screen guides, support structure, braces, embedded seats, blank panel,and bypass walls (Steel); excludes walkway	105,000.00	lbs	9.09 /lbs	954,072
	9010	Stoplog guides and seats (steel)	2,800.00	lbs	12.494 /lbs	34,983
	9010	Stoplog lifting beam (steel)	1,000.00	lbs	5.111 /lbs	5,111
	9010	Stoplogs (steel)	13,600.00	lbs	4.543 /lbs	61,788
		I-012 Control Building				*1,425,883*
I-013		*Mechanical Process*				
----		Fish screens 11' wide x 11' high panels, 10 + 2 spares, Stainless Steel	14,600.00	lbs	28.40 /lbs	414,567
----		Fish screens 11' wide x 11' high panels, 10 + 2 spares, Structural Steel	14,600.00	lbs	9.09 /lbs	132,661
----		Barrier panels above fish screen, 11' wide x 11' high, 10 + 2 spares, Structural Steel	36,300.00	lbs	5.68 /lbs	206,148
----		Adjustable baffle panels, 10 bays, Structural Steel	60,500.00	lbs	5.68 /lbs	343,580
----		Fish screen cleaner w/ Travel rail, 2 systems w/ one brush cleaner arm per system; Structural Steel	8,200.00	lbs	6.82 /lbs	55,881
----		Fish screen cleaner w/ Travel rail, 2 systems w/ one brush cleaner arm per system; Stainless Steel	1,000.00	lbs	28.40 /lbs	28,395

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		I-013 Mechanical Process				*1,181,232*
		DIVISION 05 METALS				**2,783,391**
DIVISION 13		**SPECIAL CONSTRUCTION**				
I-013		*Mechanical Process*				
----		Water Level Measuring System; Sensors and Transducers	6.00	ea	5,679.00 /ea	34,074
----		Water Level Measuring System; Receivers and Transmitters	2.00	ea	11,358.00 /ea	22,716
----		Water Level Measuring System; 6" dia FRP Pipe Stilling Wells	120.00	ft	45.432 /ft	5,452
		I-013 Mechanical Process				*62,242*
I-014		*Pumping Unit for the Fish Bypass*				
	0010	Stainless steel shrouded pump impellers, casings and shafts	22,000.00	lbs	90.864 /lbs	1,999,008
	0010	Right Angle Gear Reducers (4:1)	2,200.00	lbs	64.741 /lbs	142,429
	0010	"Premium Efficiency" vertical induction motors, inverter-duty rated, TEFC, hollow shaft, 150 hp, 1200 rpm, 3ph/60Hz/460v	6,300.00	lbs	23.852 /lbs	150,266
	0010	Vertical Shafting (30') and couplings	2,800.00	lbs	18.173 /lbs	50,884
	0010	Common pump/gear reducer baseplate (11.25' x 9.25')	14,300.00	lbs	5.68 /lbs	81,210
		I-014 Pumping Unit for the Fish Bypass				*2,423,797*
		DIVISION 13 SPECIAL CONSTRUCTION				**2,486,039**
DIVISION 14		**CONVEYING SYSTEMS**				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount	
DIVISION 14		**CONVEYING SYSTEMS**					
							Master Format 1995
I-012		*Control Building*					
	2200	Material Handling Hoists, electric overhead, chain, hook hung, 15' lift, 3 ton capacity	1.00	ea	6,814.80 /ea	6,815	
		I-012 Control Building				*6,815*	
		DIVISION 14 CONVEYING SYSTEMS				**6,815**	
DIVISION 15		**MECHANICAL**					
I-012		*Control Building*					
	0025	Ventilating System for Fish Pump Electrical Equip Control Bldg	1.00	ls	3,407.40 /ls	3,407	
----		-1 each Centrifgugal Fan 500 cfm					
----		-1 each Backdraft damper 24" x 24"					
----		-1 each Intake Counterbalance Damper 24" x 24"					
----		-2 each 24" x 24" Stationary Louver					
		I-012 Control Building				*3,407*	
I-015		*Steel Pipe for the Fish Bypass*					
----		36" ID x 1/4" wall steel pipe 233 lf x 96 lbs/lf (22,368 lbs)	233.00	lf	436.15 /lf	101,622	
----		30" ID x 1/4" wall steel pipe 524 lf x 80 lbs/lf (41,920 lbs)	524.00	lf	363.46 /lf	190,451	
----		8 each - 36" AWWA Class D Flanges	2,144.00	lbs	4.543 /lbs	9,741	
----		All Welded Steel Plates	35,000.00	lbs	4.543 /lbs	159,012	

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		I-015 Steel Pipe for the Fish Bypass				*460,826*
I-016		*Valves for the Fish Bypass*				
	0200	2 each - 36" manually operated Knife Gate Valves (2,500 lbs per valve)	5,000.00	lbs	12.494 /lbs	62,469
		I-016 Valves for the Fish Bypass				*62,469*
		DIVISION 15 MECHANICAL				**526,702**
DIVISION 16		**ELECTRICAL**				
I-013		*Mechanical Process*				
	0150	Motors, 2 HP, gears, reducers w/ adjustable speed controllers and limit switches	2.00	ea	11,358.00 /ea	22,716
		I-013 Mechanical Process				*22,716*
I-017		*Service Equipment*				
	1300	Transformer load center, 15 kVa, 1-phase, 480-240/120 volt	1.00	ea	9,427.14 /ea	9,427
	3420	Distribution panelboard, indoor type, 480volts, 3-phase, 225 amp	1.00	ea	12,493.80 /ea	12,494
		I-017 Service Equipment				*21,921*
I-018		*Combination Motor Starters*				
	1100	NEMA Size 2 reversing contractor, 480V, 3-phase 480-120 volt control transformer NEMA Type 4 enclosure	2.00	ea	5,679.00 /ea	11,358
		I-018 Combination Motor Starters				*11,358*
I-019		*Adjustable Speed Drives*				
	----	480 volt, 3-phase, 200 amp	2.00	ea	62,469.00 /ea	124,938

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	I-019 Adjustable Speed Drives				*124,938*
I-020	*Lighting System*				
----	120 volt, fluorescent fixtures for 10' x 10' bldg	1.00	ls	7,950.60 /ls	7,951
	I-020 Lighting System				*7,951*
	DIVISION 16 ELECTRICAL				**188,884**
	001 YAKIMA RIVER INTAKE			***20,844,398.43 /LS***	***20,844,398***
	1.00 LS				
	002 PUMPING STATION				
DIVISION 02	**SITE CONSTRUCTION**				
PS-001	*Service Yard and Access Road*				
----	Common Excavation to Service Yard El. 1287	16,530.00	cy	7.683 /cy	127,003
----	Place and Compact embankment for service yard	18,500.00	cy	10.98 /cy	203,056
----	Stripping (Remove and dispose 6" of topsoil)	34,500.00	sy	5.49 /sy	189,336
----	Furnish and install 7' x 24' wide access gate	1.00	ea	4,829.44 /ea	4,829
----	Furnish and install 7' chain link fence for service yard	2,145.00	lf	27.44 /lf	58,859
----	Furnish and place bituminous pavement 3" thick	1,035.00	tons	104.272 /tons	107,922
----	Furnish and place 6" thick gravel surfacing	19,000.00	sy	8.781 /sy	166,835
----	Furnish and place 6" thick base course material	1,930.00	tons	32.93 /tons	63,551

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		PS-001 Service Yard and Access Road				*921,391*
PS-002		*Dewatering During Construction*				
n	4080	Loading, common earth, 5 C.Y. bucket, loading and/or spreading, front end loader, wheel-mounted	63,200.00	bcy	11.023 /bcy	696,631
n	0190	Fill, from stockpile, 300 H.P. dozer, 300' haul, spread fill, with front-end loader, excludes compaction	69,520.00	lcy	3.62 /lcy	251,345
n	5100	Compaction, riding, vibrating roller, 4 passes, 12" lifts	63,200.00	ecy	0.41 /ecy	25,881
----		Excavation of rock for structures (drill & shoot)	23,800.00	cy	32.93 /cy	783,686
----		Excavation of common materials for structures	79,900.00	cy	7.683 /cy	613,888
----		Furnish and place embedment material for manifold	485.00	cy	109.76 /cy	53,234
n	1600	Backfill, bulk, 6" to 12" lifts, dozer backfilling	63,200.00	ecy	4.39 /ecy	277,473
n	2200	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	63,200.00	ecy	3.951 /ecy	249,726
----		Furnish backfill for structures; assume on site borrow	63,200.00	cy		
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	69,520.00	lcy	5.11 /lcy	354,898
		PS-002 Dewatering During Construction				*3,306,762*
		DIVISION 02 SITE CONSTRUCTION				**4,228,154**
DIVISION 03		**CONCRETE**				
PS-003		*Concrete for Structures*				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

						Total		
Item		Description	Takeoff Qty		Unit Cost			Amount
PS-003		*Concrete for Structures*						
----		Cast-in-place concrete in place, 4000 psi, includes forms, excludes reinforcing steel, cement costs	15,050.00	cy	867.104	/cy		13,049,915
----		Furnish and install 6" PVC waterstop	8,000.00	lf	9.88	/lf		79,027
----		Furnish and place concrete reinforcement	1,956,500.00	lb	1.54	/lb		3,006,436
----		Furnish and handle cement	4,244.00	tons	142.69	/tons		605,568
		PS-003 Concrete for Structures						*16,740,946*
		DIVISION 03 CONCRETE						**16,740,946**
DIVISION 05		**METALS**						
PS-004		*Structural Steel*						
----		Furnish and install structural steel (painted); superstructure roof trusses and crane girders	328,000.00	lbs	5.49	/lbs		1,800,064
		PS-004 Structural Steel						*1,800,064*
PS-005		*Miscellaneous Metalwork*						
	0100	Air Chamber Cover, Triangle aluminum space truss w/ non corrugated closure panels	1.00	ls	911,008.00	/ls		911,008
n	2100	Metal roof decking, steel, open type B wide rib, galvanized, under 50 Sq, 1-1/2" D, 22 gauge	780.00	sf	10.98	/sf		8,561
n	2650	Metal roof decking, steel, open type B wide rib, galvanized, 50 to 500 Sq, 1-1/2" D, 20 gauge	15,820.00	sf	6.04	/sf		95,502
----		Pre-engineered metal stairs	26,000.00	lbs	9.88	/lbs		256,838
----		Furnish and install miscellaneous metalwork	73,000.00	lbs	10.98	/lbs		801,248
----		Roof Hatches: Bilco Type 8' x 14' Type D Double Leaf insul aluminum	1.00	ea	18,659.20	/ea		18,659
----		Floor hatches: 3' x 3' Type J Aluminum Floor Hatch	3.00	ea	9,878.40	/ea		29,635

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	PS-005 Miscellaneous Metalwork				*2,121,452*
	DIVISION 05 METALS				**3,921,516**
DIVISION 07	**THERMAL& MOISTURE PROTECTION**				
PS-006	*Standing Seam Roofing System*				
----	SSMR; Service Bay - 1" high rib @ 18" OC, 24 ga.	15,820.00	sf	9.66 /sf	152,803
----	G-90 hot-dipped galvanized steel, UL 90 rated				
----	Large roof - 3:12 hopped - 3,460 sf				
----	Small roof - 3:12 hipped - 560 sf				
----	SSMR; Unit Bay - 1" high rib @ 18" OC, 24 ga.				
----	G-90 hot-dipped galvanized steel, UL 90 rated				
----	Gabled w/ 3:12 pitch each side - 11,800 sf				
	PS-006 Standing Seam Roofing System				*152,803*
PS-007	*Roofing Felt*				
----	2-Layers 15# felt - 31,640 sf	31,640.00	sf	0.66 /sf	20,837
	PS-007 Roofing Felt				*20,837*
PS-008	*Roof Insulation*				
----	4" thick rigid insulation	4,020.00	sf	4.61 /sf	18,532
----	2" thick rigid insulation	11,800.00	sf	2.42 /sf	28,494
	PS-008 Roof Insulation				*47,026*
	DIVISION 07 THERMAL& MOISTURE PROTECTION				**220,666**
DIVISION 08	**DOORS & WINDOWS**				

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
PS-009	*Roll-Up Doors*					
----	4' x 7' manual operated, insulated roll-up door	1.00	ea	7,024.64	/ea	7,025
----	14' x 14' manual operated, insulated roll-up door	1.00	ea	9,878.40	/ea	9,878
	PS-009 Roll-Up Doors					*16,903*
PS-010	*Steel Doors and Frames*					
----	3' x 7' x 1-3/4", single door, 90 min. w/ hardware	18.00	ea	1,207.36	/ea	21,732
----	3' x 7' x 1-3/4", double door, 90 min. w/ hardware	5.00	ea	1,865.92	/ea	9,330
	PS-010 Steel Doors and Frames					*31,062*
	DIVISION 08 DOORS & WINDOWS					**47,965**
DIVISION 11	**EQUIPMENT**					
PS-011	*Mechanical Process*					
----	7 each - 60 cfs pump; double suction, horizontal split-case pumps, couplings, 900 rpm	161,000.00	lbs	24.15	/lbs	3,887,699
----	rated 480' THD, ductile iron casing, SST impeller w/ SST casing/impeller wearing					
----	rings, and common steel base palte for pump and motor (23,000 lbs each)					
----	7 each - 4,000 hp motors horizontal synchronous, 6600 volt, 900 rpm, TEWAC motor enclosure, brushless exciter (30,000 lbs ea)	210,000.00	lbs	28.54	/lbs	5,992,896
	PS-011 Mechanical Process					*9,880,595*
PS-014	*Steel Air Chamber*					
----	200 HP, 750 cfm Air Compressor, 230 psig	1.00	ls	241,472.00	/ls	241,472

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	PS-014 Steel Air Chamber				*241,472*
PS-015	*Mechanical Service*				
----	Compressed Air System: Consists of	1.00	ls	43,904.00 /ls	43,904
----	2 - 40 cfm @ 125 psi rotary screw air compressors				
----	1 - 300 gallon carbon steel air receiver				
----	1 - 80 cfm air dryer				
----	3,000 lbs of Schedule 40 carbon steel pipe, valves & fitting				
	PS-015 Mechanical Service				*43,904*
	DIVISION 11 EQUIPMENT				**10,165,971**
DIVISION 13	**SPECIAL CONSTRUCTION**				
PS-015	*Mechanical Service*				
----	Fire Suppression System: Consists of	1.00	ls	230,496.00 /ls	230,496
----	10 - Fire hose reels w/ 100 feet of hose				
----	20 - Portable hand-held 20 lb extinguishers				
----	3 - Wheeled portable 125 lb extinguishers				
----	55 - Sprinkler system discharge heads				
----	1 - 4-inch deluge valve, electric actuated				
----	1 - Fire hydrant, dry type				
----	1 - Fire department siamese connection				
----	1 - Fire pump, horizontal split case, 500 gpm @ 300' TDH				
----	10,000 lbs of Schedule 40 carbon steel pipe and fittings				
----	1 - Clean agent gas fire suppression system for 4,500 cf control room				

Item	Description	Takeoff Qty		Unit Cost		Total Amount	
	PS-015 Mechanical Service					*230,496*	
	DIVISION 13 SPECIAL CONSTRUCTION					**230,496**	
DIVISION 14	**CONVEYING SYSTEMS**						
PS-015	*Mechanical Service*						*DIVISION 14 - Master Format 1995*
----	Electric passenger elevator: Overhead, Geared traction type, capacity 3,500 lbs; Travel 43', 4 landings, 200 ft per minute	1.00	ls	186,592.00	/ls	186,592	
----	20-ton electric overhead traveling unit bay bridge crane, remote control, 56'-0" span, 30' lift	1.00	ls	362,208.00	/ls	362,208	
----	20-ton electric overhead traveling unit bay bridge crane, remote control, 55'-0" span, 25' lift	1.00	ls	307,328.00	/ls	307,328	
	PS-015 Mechanical Service					*856,128*	
	DIVISION 14 CONVEYING SYSTEMS					**856,128**	
DIVISION 15	**MECHANICAL**						
PS-012	*Valves*						
----	AWWA Class 150, motor operated butterfly valves: 7 each 48" diameter valves, 7,725 lbs per valve	54,075.00	lbs	5.49	/lbs	296,764	
----	ANSI Class 300, motor operated butterfly valves: 7 each 42" diameter valves, 6,000 lbs per valve	42,000.00	lbs	29.64	/lbs	1,244,678	
----	ANSI Class 300, motor operated butterfly valves: 4 each 24" diameter valves, 1,350 lbs per valve	5,400.00	lbs	24.15	/lbs	130,395	
----	ANSI Class 300, motor operated butterfly valves: 2 each 16" diameter valves, 550 lbs per valve	1,100.00	lbs	29.64	/lbs	32,599	

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
PS-012	*Valves*				
----	ANSI Class 300, tilting disk check valves: 7 each 42" diameter valves, 8,300 lbs per valve	58,100.00	lbs	26.342 /lbs	1,530,493
----	2" air combination valves: 22 each 300 psi valves, 75 lbs per valve	1,650.00	lbs	12.074 /lbs	19,921
----	2" ball valves: 22 each 300 psi valves, 3 lbs per valve	66.00	lbs	109.76 /lbs	7,244
	PS-012 Valves				*3,262,095*
PS-013	*Steel Piping*				
----	120" ID, 3/4" wall, L=321 ft x 968 lbs/ft (310,728 lbs)	321.00	lf	3,183.04 /lf	1,021,756
----	96" ID, 1" wall, L=400 ft x 1,036 lbs/ft (414,400 lbs)	1,036.00	lf	3,402.56 /lf	3,525,052
----	48" ID, 1/4" wall, L=210 ft x 128 lbs/ft (26,880 lbs)	210.00	lf	417.09 /lf	87,588
----	42" ID, 7/16" wall, L=210 ft x 198 lbs/ft (41,580 lbs)	210.00	lf	647.584 /lf	135,993
----	24" ID, 1/4" wall, L=40 ft x 64 lbs/ft (2,560 lbs)	40.00	lf	208.544 /lf	8,342
----	16" ID, 1/4" wall, L=90 ft x 43 lbs/ft (3,870 lbs)	90.00	lf	142.69 /lf	12,842
----	2 each - 96" AWWA Class E (3,625 lbs each)	7,250.00	lbs	4.061 /lbs	29,443
----	14 each - 48" AWWA Class D (440 lbs each)	6,160.00	lbs	5.71 /lbs	35,158
----	28 each - 42" AWWA Class F (992 lbs each)	27,780.00	lbs	5.49 /lbs	152,457
----	21 each - 36" AWWA Class D (268 lbs each)	5,630.00	lbs	5.71 /lbs	32,133
----	21 each - 30" AWWA Class F (545 lbs each)	11,450.00	lbs	5.60 /lbs	64,094
----	20 each - 24" AWWA Class F (384 lbs each)	7,680.00	lbs	5.38 /lbs	41,305
----	10 each - 16" AWWA Class F (174 lbs each)	1,740.00	lbs	5.93 /lbs	10,313
----	2 each - 120" AWWA Class D (3,558 lbs each)	7,120.00	lbs	4.281 /lbs	30,478
	PS-013 Steel Piping				*5,186,955*
PS-014	*Steel Air Chamber*				
----	46' diameter ID, Spherical air chamber ASTM A516 Grade 70 Steel	705,000.00	lbs	10.98 /lbs	7,738,080

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost		Total Amount
	PS-014 Steel Air Chamber					*7,738,080*
PS-015	*Mechanical Service*					
----	Service Water System: Consists of	1.00	ls	51,587.20	/ls	51,587
----	1 - Service water pump, 75 gpm @ 200' TDH					
----	1 - Hydropneumatic steel tank, 300 gallon					
----	1,500 lbs of Type K copper tubing, valves and fittings					
----	10 - Service water rubber hose; 1" diameter, 50' lengths					
----	Gravity Drainage System: Consists of	1.00	ls	164,640.00	/ls	164,640
----	50 - Floor drains, cast iron, 4"					
----	25,000 lbs of cast iron hub & spigot, service weight soil pipe					
----	Plant Unwatering System: Consists of	1.00	ls	230,496.00	/ls	230,496
----	2 - Vertical turbine type sump pump, 1,000 gpm @ 50' TDH					
----	1 - Drainage jet type drainage pump					
----	1,500 lbs of Type K copper tube, valves and fittings					
----	4,000 lbs of ductile iron, mechanical joint type and fittings					
----	Domestic Water and Sanitary Waste and Vent System: Consists of	1.00	ls	77,929.600	/ls	77,930
----	4 - Water closets					
----	2 - Urinals					
----	4 - Lavatories with faucets and accessories					
----	1 - Duplex sewage ejector assembly					
----	2 - Drench shower and eye wash					
----	1 - Water heater, 20 gallons, electric					
----	1 - Janitors service sink, 36" x 36" molded stone					
----	2,000 lbs of cast iron hub and spigot service weight sewer and vent pipe					

Item	Description	Takeoff Qty		Unit Cost		Total Amount
PS-015	*Mechanical Service*					
----	800 lbs of Type K copper tubing , valves and fittings					
----	Heating, Ventilation, and Air Conditioning System (HVAC)	1.00	ls	1,097,600.00	/ls	1,097,600
----	___for pumping plant building inteiror consisting of					
----	___197' long x 57' wide x 50' high unit bay					
----	___55' long x 57' wide x 82' high service bay					
----	___250' long x 25' wide x 12' high equipment gallery					
----	___for a total pumping plant volume of 893,520 cubic feet					
----	HVAC System designed for:					
----	Outdoor summer design conditions: 100 degrees F dry bulb and 86 degrees F wet bulb					
----	Outdoor winter design conditions: minus 3.8 degrees F dry bulb					
----	Indoor plant summer design conditions: 90 degrees F					
----	Indoor plant winter freeze protection: 45 degrees F dry bulb					
----	Indoor control room, communication room and office: 74 degrees F cooling and 68 degrees F heating					
----	HVAC Equipment Consists of:					
----	Central air handling units with hot water heating coils					
----	Hot water boilers, circulating pumps and appurtenances					
----	Office, control and communicating rooms air conditioning units					
----	Unit heater - hot water type					
----	Electric fan forced wall heaters					
----	Stairwell ventilation systems					

Item	Description	Takeoff Qty		Unit Cost		Total Amount
PS-015	*Mechanical Service*					
----	Ducts - galvanized steel					
----	Fire and smoke dampers					
----	Backdraft dampers					
----	Centrifugal fans					
----	Propeller fans					
----	Register/grilles/louvers					
----	Panel filters					
----	Control systems					
----	Copper tubing					
----	5,000 gallon propane tank and appurtenances					
----	Carbon steel gas piping components					
----	Unit Cooling Water System: Consists of	1.00	ls	340,256.00	/ls	340,256
----	7 - Supply pumps, end suction type, 150 gom at 60' TDH					
----	2 - 8" automatic, self cleaning strainers					
----	4,000 lbs of Type K copper tubing and fittings					
----	5,000 lbs of ductile iron, mechanical joint pipe and fittings					
----	4,000 lbs of cast iron valves					
----	2 - Mechanical seal end-suction pumping units; 25 gpm at 100' TDH					
----	2 - 4" self-cleaning filters, 25 micron					
----	Sump waste oil skimmer assembly, electric operated, with 55 gallon collection drum	1.00	ls	18,659.20	/ls	18,659
	PS-015 Mechanical Service					*1,981,168*
	DIVISION 15 MECHANICAL					**18,168,297**
DIVISION 16	**ELECTRICAL**					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost		Total Amount
PS-015	*Mechanical Service*					
----	200 kW diesel engine generator set with 500 gallon fuel tank (Con Vault)	1.00	ls	131,712.00	/ls	131,712
	PS-015 Mechanical Service					*131,712*
PS-016	*15 kV Non-Segregated Pahse Bus*					
----	15 kV, 3,000 amp, outdoor type	300.00	ft	7,134.40	/ft	2,140,320
	PS-016 15 kV Non-Segregated Pahse Bus					*2,140,320*
PS-017	*15 kV Metal Clad Sxitchgear*					
----	Indoor metal-clad switchgear with:	1.00	ea	439,040.00	/ea	439,040
----	15 kV 3,000 ampere bus					
----	3 - 3,000 amp vacuum power circuit breakers					
----	2 - 1,200 amp vacuum power circuit breakers					
	PS-017 15 kV Metal Clad Sxitchgear					*439,040*
PS-018	*Plant Service - Electrical Service Equipment*					
----	Indoor double-ended secondary unit substation with the following:	1.00	ea	241,472.00	/ea	241,472
----	600 volts, 2,000 amp main bus					
----	2 - dry-type transformers 6.9 kV-480Y/277 V, 1,500 kVa					
----	2 - 480V power-circuit breakers, 2,000 amp					
----	6 - 480V power-circuit breakers, 900 amp					
	PS-018 Plant Service - Electrical Service Equipment					*241,472*
PS-019	*7.2kV Motor control Equipment*					
----	NEMA 1 enclosure with the following:	1.00	ea	3,073,280.00	/ea	3,073,280
----	7.2 kV, 3,000 amp bus					
----	7 - 400 amp, class E2 full-voltage vacuum contactors					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost		Total Amount
PS-019	*7.2kV Motor control Equipment*					
----	Excitation equipment for 7 synchronous motors					
	PS-019 7.2kV Motor control Equipment					*3,073,280*
PS-020	*Motor control Centers*					
----	480 volts, 3-phase with 800 amp bus	2.00	ea	54,880.00	/ea	109,760
----	5 - 20 inch wide sections with the following equipment:					
----	7 - NEMA size 0 Full Voltage Reversing (FVR) contactors					
----	2 - NEMA size 2 Full Voltage Non-Reversing (FVNR) contactors					
----	3 - 100 amp, 3-pole molded-case circuit breakers					
	PS-020 Motor control Centers					*109,760*
PS-021	*Distribution Panelboards*					
----	480 volts, 3-phase with 800 amp bus and main center breaker	4.00	ea	8,780.80	/ea	35,123
----	208Y/120, 3-phase with 225 amp bus and main circuit breaker	3.00	ea	3,841.60	/ea	11,525
	PS-021 Distribution Panelboards					*46,648*
PS-022	*Lighting & Distribution Transformers*					
----	75 kVa, 480-208Y/120 volt, dry type	3.00	ea	21,952.00	/ea	65,856
	PS-022 Lighting & Distribution Transformers					*65,856*
PS-023	*Building Lighting System*					
----	Interior Luminaries: High-bay, high-pressure sodium, 400W, 208V	14.00	ea	1,756.16	/ea	24,586
----	Interior Luminaries: 4 foot, 2 lamp, 120V fluorescent fixtures	40.00	ea	263.424	/ea	10,537
----	Exterior Luminaries: High-pressure sodium, wall mounted, outdoor 70 watt, 120 volt	12.00	ea	515.872	/ea	6,190

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	PS-023 Building Lighting System				*41,314*
	DIVISION 16 ELECTRICAL				**6,289,402**
	002 PUMPING STATION			***60,869,541.660/LS***	***60,869,542***
	1.00 LS				
	003 SWITCHYARD AND TRANSMISSION LINE				
	DIVISION 02 SITE CONSTRUCTION				
ST-001	*Civil/Structural*				
n	0900 Excavation Common	1,005.00	cy	22.642 /cy	22,755
n	0900 Compacting Backfill about Structures	790.00	cy	15.10 /cy	11,925
n	0900 Gravelfill for Switchyard Foundations (Compacted)	65.00	cy	59.301 /cy	3,855
n	0900 7'-0" Chain Link Fence	400.00	lf	39.893 /lf	15,957
n	0900 Gravel Surfacing - 6" Thick	2,045.00	sy	14.02 /sy	28,664
n	0900 Oil-Spill Containment System	1.00	ls	40,971.60 /ls	40,972
n	0900 Geotextile fabric 4,255 SF (l2 oz per sq yard, 110 mils non-woven)	4,255.00	sf		
n	0900 Geomembrane liner: 2,130 SF (30 Mils XR-5 Seaman Corporation)	2,130.00	sf		
n	0900 Geocel: 1,635 SF (8" deep "enviro grid" polymeric cellular confinement system)	1,635.00	sf		
n	0900 Piping: 140 LF (6" Dia. Schedule 80 PVC pipe perforated)	140.00	lf		
n	0900 Piping: 3 EA (6" Dia. Schedule 80 PVC "L)	3.00	ea		
n	0900 Piping.: 1 EA (12" Dia.3'-2" long Schedule 80 PvC Cap)	1.00	ea		

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
ST-001		*Civil/Structural*				
n	0900	Piping: 3 LF (12" Dia. Schedule 80 PVC perforated pipe)	3.00	lf		
n	0900	Preservative-Treated Lumber: 75 LF (2"x4")	75.00	lf		
n	0900	Expansion Anchors (Stainless steel 3/8" x 5" drilled in conc): 84 EA	84.00	ea		
n	0900	Excavation: Included in excavation for structures				
n	0900	Uncompacted crushed aggregate: 135 CY (ASTM C33 Size No 4. 1 1l2" to3l4")	135.00	cy		
		ST-001 Civil/Structural				*124,128*
		DIVISION 02 SITE CONSTRUCTION				**124,128**
DIVISION 03		**CONCRETE**				
ST-001		*Civil/Structural*				
n	0900	Structural Concrete (Switchyard foundations and pullboxes)	120.00	cy	1,509.48 /cy	181,138
n	0900	Concrete Reinforcement	15,310.00	lbs	1.833 /lbs	28,062
		ST-001 Civil/Structural				*209,200*
		DIVISION 03 CONCRETE				**209,200**
DIVISION 05		**METALS**				
ST-001		*Civil/Structural*				
n	0900	Switchyard Steel Structures	35,800.00	lbs	5.93 /lbs	212,298
		ST-001 Civil/Structural				*212,298*

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		DIVISION 05 METALS				**212,298**
DIVISION 16		**ELECTRICAL**				
ST-001		*Civil/Structural*				
n	0900	5" PVC Schedule 80 Conduit (CIP Power Duct Bank) Includes:115 LF of 1.5' tall x 2.33' wide concrete CIP,15CY of concrete,1970 lbs of reinforcement	115.00	lf	291.114 /lf	33,478
		ST-001 Civil/Structural				*33,478*
ST-002		*Switchyard - Transformers, Breakers, Switches*				
n	0900	115-kV disconnect switches, 1200 amp, 3-phase	4.00	ea	37,737.00 /ea	150,948
n	0900	115-kV circuit breakers, 1200 amp, 31.5 kA Int, 3-phase, dead-tank, SF6 type	2.00	ea	172,512.00 /ea	345,024
n	0900	Oil-filled, conservator-type power transformer 20/26.66/33.33 MVA OA/FA/FA;115-6.9kV, 3-phase	2.00	ea	1,186,020.00 /ea	2,372,040
n	0900	115-kV oil filled voltage transformers	3.00	ea	22,642.20 /ea	67,927
n	0900	115-kV oil-filled 1200:5 MR current transformers	3.00	ea	21,564.00 /ea	64,692
		ST-002 Switchyard - Transformers, Breakers, Switches				*3,000,631*
ST-003		*Transmission Line*				
n	0900	Construct Transmission Line: 115-kV, steel single-pole towers, 556.5 AWG, 26/7 ACSR conductor	5.00	mi	593,010.00 /mi	2,965,050
		ST-003 Transmission Line				*2,965,050*

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		DIVISION 16 ELECTRICAL				**5,999,159**
		003 SWITCHYARD AND TRANSMISSION LINE			***6,544,783.98 /LS***	***6,544,784***
		1.00 LS				
		004 DISCHARGE LINE				
DIVISION 01		**GENERAL REQUIREMENTS**				
DL-005		*SH821 Detour for Open Cut Discharge Line*				
n	0900	Concrete jersey barriers (SH821)	200.00	lf	114.06 /lf	22,812
n	0900	Detour signage (SH821)	1.00	ls	79,842.00 /ls	79,842
n	0900	Detour removal (SH821)	1.00	ls	45,624.00 /ls	45,624
		DL-005 SH821 Detour for Open Cut Discharge Line				*148,278*
DL-012		*Electrical - Discharge Line*				
n	0900	Steel pipe @ end of discharge pipe (96" ID, 3/8" wall, 386lb/ft) Sta 49+00 to Sta 53+70	470.00	lf	1,106.382 /lf	520,000
		DL-012 Electrical - Discharge Line				*520,000*
		DIVISION 01 GENERAL REQUIREMENTS				**668,278**
DIVISION 02		**SITE CONSTRUCTION**				

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
DL-001		*Earthwork- PS Discharge Line to Reservior* *DL qty for PP yard to outlet* *DL piping through dam covered by 8410* *DL outlet El. 1610, right abutment*				
n	0900	Alt 2. - Clearing and grubbing (150'-0" wide along pipeline)	78,000.00	sy	1.141 /sy	88,967
n	0900	Alt 2 - Common Excavation for pipe	135,000.00	cy	6.844 /cy	923,886
n	0900	Alt 2 - Rock Excavation for pipe (drill and shoot)	100,000.00	cy	26.234 /cy	2,623,380
n	0900	Alt 2 - Backfill for pipe	181,000.00	cy	5.133 /cy	929,019
n	0900	Alt 2 - Rockfill for pipe (used instead fo backfill under dam)	37,000.00	cy	50.19 /cy	1,856,897
n	0900	Alt 2 - Soil cement slurry (CLSM)	14,000.00	cy	114.06 /cy	1,596,840
		DL-001 Earthwork- PS Discharge Line to Reservior				*8,018,988*
DL-005		*SH821 Detour for Open Cut Discharge Line*				
n	0900	Compacted Embankment (SH821)	6,900.00	cy	20.531 /cy	141,663
n	0900	Remove and replace concrete asphalt on SH821	135.00	tn	125.47 /tn	16,938
n	0900	Concrete asphalt for detour (SH821)	630.00	tn	114.06 /tn	71,858
n	0900	Remove and replace aggregate base on SH821	250.00	tn	57.03 /tn	14,258
n	0900	Aggregate base for detour (SH821)	1,150.00	tn	57.03 /tn	65,585
		DL-005 SH821 Detour for Open Cut Discharge Line				*310,300*
DL-007		*Outlet Structure - Discharge Line*				
n	0900	Excavation of common materials for structures (2:1)	960.00	cy	25.093 /cy	24,089
n	0900	Backfill (2:1)	700.00	cy	31.94 /cy	22,356
n	0900	Compacted backfill (2:1)	700.00	cy	11.41 /cy	7,984
n	0900	Embankment	790.00	cy	17.11 /cy	13,516
n	0900	Compacted embankment	790.00	cy	7.984 /cy	6,308
n	0900	Riprap (d50=24") (120lb/cf)	1,100.00	tn	79.842 /tn	87,826
n	0900	Riprap bedding (130 lb/cf)	450.00	tn	57.03 /tn	25,664

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		DL-007 Outlet Structure - Discharge Line				*187,743*
DL-008		*Outlet Chute - Discharge line*				
n	0900	Excavation of common materials for structures (2:1)	16,000.00	cy	17.11 /cy	273,744
n	0900	Backfill (2:1)	3,600.00	cy	25.55 /cy	91,978
n	0900	Compacted Backfill (2:1)	3,600.00	cy	9.13 /cy	32,849
n	0900	Embankment (chute crosses swale)	44,000.00	cy	9.923 /cy	436,622
n	0900	Compacted embankment (chute crosses swale)	44,000.00	cy	3.992 /cy	175,652
n	0900	Riprap (d250=24") (120lb/cf)	8,300.00	tn	71.86 /tn	596,420
n	0900	Riprap bedding (130lb/cf)	3,700.00	tn	51.33 /tn	189,910
		DL-008 Outlet Chute - Discharge line				*1,797,175*
		DIVISION 02 SITE CONSTRUCTION				**10,314,206**
DIVISION 03		**CONCRETE**				
DL-007		*Outlet Structure - Discharge Line*				
n	0900	Furnish, form, and place reinforced concrete	240.00	cy	1,802.15 /cy	432,516
n	0900	Furnish and place concrete reinforcement (ASSUME 120#/cy)	29,000.00	lbs	1.882 /lbs	54,578
n	0900	Furnish and handle cement (.282T/cy)	60.00	tn	205.31 /tn	12,318
		DL-007 Outlet Structure - Discharge Line				*499,412*
DL-008		*Outlet Chute - Discharge line*				
n	0900	Furnish, form, and place reinforced concrete	1,550.00	cy	1,448.562 /cy	2,245,271
n	0900	Furnish and place concrete reinforcement (Assume: 120#/cy)	185,000.00	lbs	1.711 /lbs	316,517
n	0900	Furnish and handle cement (.282T/cy)	430.00	tn	182.50 /tn	78,473

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

						Total
Item		Description	Takeoff Qty		Unit Cost	Amount
		DL-008 Outlet Chute - Discharge line				*2,640,261*
DL-009		*Miscellaneous Reinforced Concrete - Access Conduit for Discharge Line*				
n	0900	Concrete in access house (18x18x1 walls)	60.00	cy	2,110.11 /cy	126,607
n	0900	Concrete in access shaft (H=50')	240.00	cy	1,802.15 /cy	432,516
n	0900	Concrete in Gate Chamber (20' dia)	210.00	cy	1,824.96 /cy	383,242
n	0900	Concrete in access conduit (L=440)	1,980.00	cy	1,340.21 /cy	2,653,606
n	0900	Concrete in pipe saddles	35.00	cy	2,224.17 /cy	77,846
n	0900	Furnish and place concrete reinforcement (Assume 160#/cy)	404,000.00	lbs	1.711 /lbs	691,204
n	0900	Furnish and handle cement (.282T/cy)	712.00	tn	171.09 /tn	121,816
		DL-009 Miscellaneous Reinforced Concrete - Access Conduit for Discharge Line				*4,486,835*
		DIVISION 03 CONCRETE				**7,626,508**
DIVISION 13		**SPECIAL CONSTRUCTION**				
DL-002		*Pipe Line F&I*				
n	0900	Cathodic protection for pipeline	1.00	ls	71,857.80 /ls	71,858
		DL-002 Pipe Line F&I				*71,858*
DL-010		*Mechanical*				
n	0900	Ultrasonic flowmeter (2-path)	1.00	ls	108,357.00 /ls	108,357
		DL-010 Mechanical				*108,357*
		DIVISION 13 SPECIAL CONSTRUCTION				**180,215**
DIVISION 15		**MECHANICAL**				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
DL-002		*Pipe Line F&I*				
n	0900	96 300, pipe thickness = 0.4375 (456 lb/ft steel weight)	1,310.00	lf	1,300.284 /lf	1,703,372
n	0900	96 350, pipe thickness = 0.500 (521 lb/ft steel weight)	400.00	lf	1,482.78 /lf	593,112
n	0900	96 425, pipe thickness = 0.625 (652 lb/ft steel weight)	600.00	lf	1,859.18 /lf	1,115,507
n	0900	96 475, pipe thickness = 0.6875 (718 lb/ft steel weight)	500.00	lf	2,053.08 /lf	1,026,540
n	0900	96 525, pipe thickness = 0.75 (784 lb/ft steel weight)	300.00	lf	2,235.58 /lf	670,673
n	0900	96 575, pipe thickness = 0.8125 (850 lb/ft steel weight)	300.00	lf	2,429.48 /lf	728,843
n	0900	96 650, pipe thickness = 0.9375 (982 lb/ft steel weight)	400.00	lf	2,805.88 /lf	1,122,350
n	0900	96 700, pipe thickness = 1.0 (1048 lb/ft steel weight)	400.00	lf	2,988.372 /lf	1,195,349
n	0900	96x96x36 Tee for buried manhole	1.00	ls	67,295.40 /ls	67,295
		DL-002 Pipe Line F&I				*8,223,042*
DL-010		*Mechanical*				
n	0900	Bulkhead gate (13'x13'), gate frame, and guides above frame (steel)	39,000.00	lbs	6.844 /lbs	266,900
n	0900	Heating and ventilation system for discharge (Line valve access tunnel)	1.00	ls	85,545.00 /ls	85,545
n	0900	Electric unit heater (7.5 kw)	2.00	ea		
n	0900	Centrifugal fan (750 cfm)	1.00	ea		
n	0900	Propeller fan (2400 cfm)	1.00	ea		
n	0900	Axial fan (5000 cfm)	1.00	ea		
n	0900	Oval steel duct (38"x16"; galvanized)	550.00	ft		
n	0900	Control damper (60"x60"; motor-operated)	2.00	ea		
n	0900	Control damper (32"x32"; motor-operated)	2.00	ea		
n	0900	Stationary Louver (60"x60")	2.00	ea		

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
DL-010		*Mechanical*				
n	0900	Stationary louver (32"x32")	2.00	ea		
n	0900	Ventilating system for flowmeter vault	1.00	ls	6,843.60 /ls	6,844
n	0900	Centrifugal fan (450 cfm)	1.00	ea		
n	0900	Carbon steel pipe and fittings (8" dia; galvanized)	25.00	ft		
n	0900	Ventilating system for air chamber	1.00	ls	28,515.00 /ls	28,515
n	0900	Centifugal fan (4000 cfm)	1.00	ea		
n	0900	Carbon steel pipe and fittings (18" dia; galvanized)	50.00	ft		
		DL-010 Mechanical				*387,804*
DL-011		*Mechanical - Valves*				
n	0900	Discharge/Isolation valve (96" dia; motor operated 1800# slide gate frame, slide, and stem 25,000#; diff head= 132')	26,800.00	lbs	10.27 /lbs	275,113
		DL-011 Mechanical - Valves				*275,113*
DL-012		*Electrical - Discharge Line*				
n	0900	Steel pipe @ end of discharge pipe (14" OD, 1/4" wall, 38lbs/ft) Sta 49+00 to Sta 53+7) for filling line	20.00	lf	114.06 /lf	2,281
		DL-012 Electrical - Discharge Line				*2,281*
DL-013		*Mechanical - Valves*				
n	0900	Butterfly valve for filling line (AWWA class 150; manually operated; 14" dia, 400lbs/valve)	800.00	lbs	17.11 /lbs	13,687
		DL-013 Mechanical - Valves				*13,687*
		DIVISION 15 MECHANICAL				**8,901,927**
DIVISION 16		**ELECTRICAL**				
DL-014		*Electrical*				

Item		Description	Takeoff Qty		Unit Cost	Total Amount
DL-014		*Electrical*				
n	0900	Distribution panelboard, indoor type (480 volts, 3-phase w/ 225 ampere bus)	1.00	ea	11,976.30 /ea	11,976
n	0900	Transformer load center (15kVA, 1-phase, 480-240//120V)	1.00	ea	9,466.98 /ea	9,467
n	0900	Control transformer (NEMA sz 2 reversing contactor, 480V, 3-phase; 480-120V; NEMA type 4 encl)	1.00	ea	5,703.00 /ea	5,703
n	0900	120V, fluorescent NEMA type 4 fixtures for tower/gate chamber	1.00	ls	5,703.00 /ls	5,703
		DL-014 Electrical				*32,849*
		DIVISION 16 ELECTRICAL				**32,849**
		004 DISCHARGE LINE			***27,723,982.490/LS***	***27,723,982***
		1.00 LS				
		005 DAM AND DIKE				
DIVISION 02		**SITE CONSTRUCTION**				
DAM-001		*Foundation Excavation*				
		Assume common material stockpiled for reuse in misc fill, haul roads and similar.				
		Assume rock material stockpiled for use in zon4 fill. Stockpiles will be located withing 1/2 mile of dam.				
----		Excavation, rock, for dam foundation	22,000.00	cy	30.63 /cy	673,842
----		Excavation, stripping, of dam foundation	110,000.00	cy	2.74 /cy	300,823
----		Excavation, common, of dam foundation	2,680,000.00	cy	5.47 /cy	14,658,260

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	DAM-001 Foundation Excavation				*15,632,925*
DAM-002	*Misc. Surface Treatment - Foundation Treatment*				
	Inlcudes misc surface foundation treatment, consolidtion grouting, and curtain grouting				
----	Furnish/place Zone 2 sand filter on foundation	40,000.00	cy	49.23 /cy	1,969,020
----	Furnish/place Zone 3 gravel drain on foundation	20,000.00	cy	43.76 /cy	875,120
	DAM-002 Misc. Surface Treatment - Foundation Treatment				*2,844,140*
DAM-003	*Consolidation Grouting - Foundation Treatment*				
	Generally limited to area beneath plinth				
----	Setups for drilling grout holes; assume 2" diameter drilled at 7.5' on center	2,100.00	ea	164.09 /ea	344,579
----	Drill grout holes; assume 2" diameter x 30' long	63,000.00	lf	38.29 /lf	2,412,050
----	Hookups to grout holes	2,100.00	ea	65.634 /ea	137,831
----	Pressure grout; assume grouting process only minus cement, assume 2 CF per 1 LF of hole	130,000.00	cf	10.94 /cf	1,422,070
----	Furnish and handle cement for pressure grouting; assume 1 bag per CF	130,000.00	bag	12.033 /bag	1,564,277
	DAM-003 Consolidation Grouting - Foundation Treatment				*5,880,806*
DAM-004	*Curtain Grouting - Foundation Treatment*				
	Three row curtain beneath plinth				
----	Setups for drilling grout holes; assume 3 rows of 2" diameter drilled at 10' on center	1,200.00	ea	164.09 /ea	196,902
----	Drill grout holes; assume 2" diameter x 75' long to 225' long with average of 150'	180,000.00	lf	43.76 /lf	7,876,080
----	Hookups to grout holes	1,200.00	ea	65.634 /ea	78,761
----	Pressure grout; assume grouting process only minus cement, assume 3 CF per 1 LF of hole	540,000.00	cf	10.94 /cf	5,907,060
----	Furnish and handle cement for pressure grouting; assume 1 bag per CF	540,000.00	bag	10.94 /bag	5,907,060

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	DAM-004 Curtain Grouting - Foundation Treatment				*19,965,863*
DAM-005	*Embankment Construction*				
	Items are set up as furnish and place, which would include purchasing from commercial sitess, processing onsite, development of quarry, or transporting from stockplies or required excavation.				
----	Furnish and place zone 1 backfill:	285,000.00	cy	10.94 /cy	3,117,615
----	Consists of selected impervious soils stockpiled from equired excavation within 1/2 mile of dam				
----	Compaction in 6" lifts by tamping roller				
----	Furnish and place zone 2 filter backfill:	450,000.00	cy	43.76 /cy	19,690,200
----	Sand/gravel meterial processed commercially or developed on site				
----	If commercial, assume 17 mile one-way haul				
----	Compaction in 12" lifts by vibratory steel drum				
----	Furnish and place zone 3 drain:	450,000.00	cy	32.82 /cy	14,767,650
----	Gravel/cobble material processed commercially of developed on site				
----	If commercial, assume 17 mile one-way haul				
----	Compaction in 12" lifts by vibratory steel drum				
----	Furnish and place zone 4 rockfill	12,240,000.00	cy	12.58 /cy	153,977,364
----	Developed from basalt ridges surrounding reservoir				
----	Assume average 2-mile haul to dam				
----	Rock sizes up to 3 feet				
----	Compacted in 3' layers with vibratory steel drum				
----	Furnish and place miscellaneous fill	1,500,000.00	cy	8.751 /cy	13,126,800
----	Comes from stockpiles of required excavation within 1/2 mile of dam				
----	Generally consists of gravelly soils				
----	Compacted in 2' layers with vibratory steel drum				

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	DAM-005 Embankment Construction				*204,679,629*
DIKE-001	*Foundation Excavation* *Assume common material is stockpiled for reuse.* *Assume rock material stockpiled for reuse.* *Stockpliles will be located within .5 miles of dike.*				
	General Site work - Assume no clearing and grubbing required. Assume road improvements and haul roads are part of the unlisted items %.				
	Diversion and Dewatering - Assume ground water is below excavation. Assume nateral stream beds in area are dry.				
----	Excavation, rock, for dam foundation	2,000.00	cy	52.51 /cy	105,014
----	Excavation, stripping, of dam foundation	45,000.00	cy	4.38 /cy	196,902
----	Excavation, common, of dam foundation	1,260,000.00	cy	5.47 /cy	6,891,570
	DIKE-001 Foundation Excavation				*7,193,486*
DIKE-002	*Misc. Surface Treatment - Foundation Treatment* *Applied in areas of poor quality rock*				
	Foundation Treatment - Includes mic. foundation surface treatment, consolidation grouting and curtain grouting.				
----	Furnish/place Zone 2 sand filter on foundation	14,000.00	cy	49.23 /cy	689,157
----	Furnish/place Zone 3 gravel drain on foundation	7,000.00	cy	43.76 /cy	306,292
	DIKE-002 Misc. Surface Treatment - Foundation Treatment				*995,449*
DIKE-003	*Consolidation Grouting - Foundation Treatment*				
----	Setups for drilling grout holes; assume 2" diameter drilled at 10' on center	1,600.00	ea	164.09 /ea	262,536
----	Drill grout holes; assume 2" diameter x 30' long	48,000.00	lf	38.29 /lf	1,837,752
----	Hookups to grout holes	1,600.00	ea	65.634 /ea	105,014
----	Pressure grout; assume grouting process only minus cement, assume 2 CF per 1 LF of hole	100,000.00	cf	10.94 /cf	1,093,900
----	Furnish and handle cement for pressure grouting; assume 1 bag per CF	100,000.00	bag	10.94 /bag	1,093,900

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	DIKE-003 Consolidation Grouting - Foundation Treatment				*4,393,102*
DIKE-004	*Curtain Grouting - Foundation Treatment*				
----	Setups for drilling grout holes; assume 2 rows of 2" diameter drilled at 10' on center	500.00	ea	164.09 /ea	82,043
----	Drill grout holes; assume 2" diameter x 60' long to 120' long with average of 90'	45,000.00	lf	43.76 /lf	1,969,020
----	Hookups to grout holes	500.00	ea	65.634 /ea	32,817
----	Pressure grout; assume grouting process only minus cement, assume 3 CF per 1 LF of hole	135,000.00	cf	10.94 /cf	1,476,765
----	Furnish and handle cement for pressure grouting; assume 1 bag per CF	135,000.00	bag	10.94 /bag	1,476,765
	DIKE-004 Curtain Grouting - Foundation Treatment				*5,037,410*
DIKE-005	*Embankment Construction*				
	Items are set up as furnish and place, which would include purchasing from commercial sitess, processing onsite, development of quarry, or transporting from stockplies or required excavation.				
----	Furnish and place zone 1 core backfill:	390,000.00	cy	14.221 /cy	5,546,073
----	Acquired from source 5 miles from dam				
----	Compaction in 6" lifts by tamping roller				
----	Furnish and place zone 2 filter backfill:	190,000.00	cy	45.944 /cy	8,729,322
----	Sand/gravel meterial processed commercially or developed on site				
----	If commercial, assume 18 mile one-way haul				
----	Compaction in 12" lifts by vibratory steel drum				
----	Furnish and place zone 3 drain:	160,000.00	cy	36.10 /cy	5,775,792
----	Gravel/cobble material processed commercially of developed on site				
----	If commercial, assume 18 mile one-way haul				
----	Compaction in 12" lifts by vibratory steel drum				
----	Furnish and place zone 4 rockfill	2,000,000.00	cy	13.13 /cy	26,253,600

				Total	
Item	**Description**	**Takeoff Qty**		**Unit Cost**	**Amount**
DIKE-005	*Embankment Construction*				
----	Developed from basalt ridges surrounding reservoir				
----	Assume average 2-mile haul to dam				
----	Rock sizes up to 3 feet				
----	Compacted in 3' layers with vibratory steel drum				
----	Furnish and place miscellaneous fill	500,000.00	cy	9.85 /cy	4,922,550
----	Comes from stockpiles of required excavation within 1/2 mile of dam				
----	Generally consists of gravelly soils				
----	Compacted in 2' layers with vibratory steel drum				
	DIKE-005 Embankment Construction				*51,227,337*
	DIVISION 02 SITE CONSTRUCTION				**317,850,147**
DIVISION 03	**CONCRETE**				
DAM-002	*Misc. Surface Treatment - Foundation Treatment*				
	Inlcudes misc surface foundation treatment, consolidtion grouting, and curtain grouting				
----	Slush grouting of foundation surface (Assumed 40% of plenith area)	35,000.00	sf	6.563 /sf	229,719
----	Dental Concrete	2,000.00	cy	218.78 /cy	437,560
	DAM-002 Misc. Surface Treatment - Foundation Treatment				*667,279*
DAM-006	*Plinth - Concrete Face & Plinth Construction*				
	typical thickness will be 1.5				
	Width will range from 10' to 45', average-20'				
	Grouted anhors may be needed in poor rock areas				
----	Furnish and install grouted anchors; assume 1" diameter rebar grouted into rock; assume 15' lengths	86,000.00	lf	28.441 /lf	2,445,960

					Total
Item	**Description**	**Takeoff Qty**		**Unit Cost**	**Amount**
DAM-006	*Plinth - Concrete Face & Plinth Construction*				
----	Furnish and place reinforced concrete in plinth	4,500.00	cy	601.65 /cy	2,707,403
----	Furnish and place concrete reinforcement (100# / cy)	450,000.00	lbs	1.641 /lbs	738,383
----	Furnish and handle cement for concrete (.282 t / cy)	1,300.00	tons	158.62 /tons	206,200
	DAM-006 Plinth - Concrete Face & Plinth Construction				*6,097,946*
DAM-010	*Concrete Deck - Concrete Face & Plinth Construction*				
	Thickness will average 2'				
	Adjacent panels will have waterstops and dowels				
	Concrete paved on 1.5 to 1 upstream face of dam				
----	Furnish and place reinforced concrete in plinth	125,000.00	cy	421.152 /cy	52,643,938
----	Furnish and place concrete reinforcement (100# / cy)	12,500,000.00	lbs	1.422 /lbs	17,775,875
----	Furnish and handle cement for concrete (.282 t / cy)	35,000.00	tons	120.33 /tons	4,211,515
	DAM-010 Concrete Deck - Concrete Face & Plinth Construction				*74,631,328*
DIKE-002	*Misc. Surface Treatment - Foundation Treatment*				
	Applied in areas of poor quality rock				
	Foundation Treatment - Includes mic. foundation surface treatment, consolidation grouting and curtain grouting.				
----	Slush grouting of foundation surface (Assumed 30% of plenith area)	36,000.00	sf	6.563 /sf	236,282
----	Dental Concrete	2,000.00	cy	218.78 /cy	437,560
	DIKE-002 Misc. Surface Treatment - Foundation Treatment				*673,842*

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		DIVISION 03 CONCRETE				**82,070,394**
		005 DAM AND DIKE			***399,920,541.850/LS***	***399,920,542***
		1.00 LS				
		006 SPILLWAY AND OUTLET WORKS				
DIVISION 01		**GENERAL REQUIREMENTS**				
SPILLWAY-001		*Earthwork*				
n	0900	Common excavation	560,000.00	cy	5.32 /cy	2,978,080
		SPILLWAY-001 Earthwork				*2,978,080*
		DIVISION 01 GENERAL REQUIREMENTS				**2,978,080**
DIVISION 02		**SITE CONSTRUCTION**				
SPILLWAY-001		*Earthwork*				
n	0900	Rock excavation (drill and blast)	145,000.00	cy	22.34 /cy	3,238,662
n	0900	Pervious backfill behind chute walls	4,000.00	cy	12.231 /cy	48,926
n	0900	Misc backfill behind chute walls	15,000.00	cy	8.30 /cy	124,441
n	0900	Riprap inlet structure	2,600.00	cy	53.18 /cy	138,268
n	0900	Bedding for riprap inlet structure	1,400.00	cy	42.544 /cy	59,562
n	0900	Riprap for stilling basin	1,700.00	cy	53.18 /cy	90,406
n	0900	Bedding for riprap stilling basin	1,000.00	cy	42.544 /cy	42,544

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		SPILLWAY-001 Earthwork				*3,742,808*
SPILLWAY-003		*Drains*				
n	0900	6" dia PVC perf and non perf (90% perf)	16,000.00	lf	7.45 /lf	119,123
n	0900	Furnish and install sand for drains	4,600.00	cy	32.972 /cy	151,669
n	0900	Furnish and install gravel for drains	4,000.00	cy	32.972 /cy	131,886
		SPILLWAY-003 Drains				*402,679*
SPILLWAY-007		*Fencing*				
n	0900	Furnish and install 48" chain link fence for spillway	6,300.00	lf	21.272 /lf	134,014
		SPILLWAY-007 Fencing				*134,014*
SPILLWAY-008		*Access Bridge across Spillway*				
		Bridge will span spillway walls, which are 60' apart. the bridge superstructure will be supported on bearing seats, formed into the spillway walls. Therefore, no foundation elements are included in the estimate worksheet.				
		The bridge is located near the left abutment. the dam crest will be gravel surface. Chain link fence is required along the length of the spillway, so it is not included here. No approach guardrail is included in this estimate - see roadway estimate. Water treatment for the deck drainage is not include in this estimate.				
n	0900	Deck drains (2/side) R-4005-A2 as mfrd	4.00	ea	558.39 /ea	2,234
n	0900	Deck drains (2/side) 8"dia black steel pipe (ea L=4')	16.00	lf	202.084 /lf	3,233
		SPILLWAY-008 Access Bridge across Spillway				*5,467*
SPILLWAY-009		*Earthwork U/S-Channel, Intake, Conduit, Portal*				
n	0900	Excavate common materials for structures	500.00	cy	37.23 /cy	18,613
n	0900	Excavate rock materials for structures (drill & shoot)	1,500.00	cy	46.80 /cy	70,198
n	0900	F & P bedding for riprap (processed on-site)	70.00	cy	42.544 /cy	2,978
n	0900	F & P rockfill from dam excavation (riprap)	140.00	cy	49.99 /cy	6,998
n	0900	Furnish and install chain link fabric around portal	1,750.00	sf	3.191 /sf	5,584
n	0900	F&I l 8-inch x ll2 in. dia resin anchors for fabric support	24.00	ea	53.18 /ea	1,276

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		SPILLWAY-009 Earthwork U/S-Channel, Intake, Conduit, Portal				*105,647*
SPILLWAY-010		*Earthwork D/S- Portal. Conduit, House, Stilling Basin*				
n	0900	Excavate common materials for structures	1,000.00	cy	37.23 /cy	37,226
n	0900	Excavale rock materials for structures (drill & shoot)	3,000.00	cy	44.671 /cy	134,014
n	0900	Excavate common materials for basin	12,000.00	cy	10.64 /cy	127,632
n	0900	Excavate rock materials for basin (drill & shoot)	4,000.00	cy	44.671 /cy	178,685
n	0900	F & P bedding for riprap (processed on-site)	4,500.00	cy	27.654 /cy	124,441
n	0900	F & P rockfill from dam excavation (riprap)	2,250.00	cy	47.862 /cy	107,690
n	0900	Furnish and install chain link fabric around portal	2,000.00	sf	3.191 /sf	6,382
n	0900	F&l l8-inch x ll2in. dia resin anchors for fabric support	30.00	ea	53.18 /ea	1,595
		SPILLWAY-010 Earthwork D/S- Portal. Conduit, House, Stilling Basin				*717,664*
SPILLWAY-011		*ROW Tunnel U/S of Gate Chamber*				
n	0900	Drill and shoot 13.-5-ft O.D.circular shaped u/s tunnel	850.00	lf	2,127.20 /lf	1,808,120
n	0900	Remove and stockpile rock (assume local stockpile)	4,500.00	cy	20.21 /cy	90,938
n	0900	Furnish, drill and install 750- I 0-ft long x l-inch dia. A307, 20K rockbolts	5,200.00	lf	76.58 /lf	398,212
n	0900	Furnish and install 6 steel sets (WB x 40) (full circle)	11,400.00	lbs	6.382 /lbs	72,750
		SPILLWAY-011 ROW Tunnel U/S of Gate Chamber				*2,370,020*
SPILLWAY-012		*ROW Tunnel D/S of Gate Chamber*				
n	0900	Drill and shoot 19-ft OD circular shaped d/s tunnel	1,200.00	lf	2,978.08 /lf	3,573,696
n	0900	Remove and stockpile rock (assume local stockpile)	13,000.00	cy	20.21 /cy	262,709

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
SPILLWAY-012		*ROW Tunnel D/S of Gate Chamber*				
n	0900	Furnish, drill and install l250-l0ft long x l-inch dia. A307, 20K rockbolts	8,800.00	lf	76.58 /lf	673,897
n	0900	Furnish and install 6 steel sets (W10 x 40) in crown	20,000.00	lbs	6.382 /lbs	127,632
		SPILLWAY-012 ROW Tunnel D/S of Gate Chamber				*4,637,934*
SPILLWAY-013		*Gate Chamber*				
n	0900	Drill and shoot 20 ft OD spherical shaped chamber	20.00	lf	3,190.80 /lf	63,816
n	0900	Remove and stockpile rock (assume local stockpile)	340.00	cy	24.463 /cy	8,317
n	0900	Fumish, drill and install 30-10-ft long x l-inch dia. A307, 2 0K rockbohs	300.00	lf	148.904 /lf	44,671
		SPILLWAY-013 Gate Chamber				*116,805*
SPILLWAY-015		*Intake Shaft*				
n	0900	Drill and shoot 13.5-ft OD vertical shaft	30.00	lf	191.45 /lf	5,743
n	0900	Remove and stockpile rock (assume local stockpile)	160.00	cy	63.82 /cy	10,211
n	0900	Furnish, drill and install l2-10-ft long x l -inch dia. A307, 20K rockbolts	120.00	lf	86.152 /lf	10,338
n	0900	Setups for drilling grout holes (2-in dia holes, 1 ring with 6 holes/ring)	1.00	ea	531.80 /ea	532
n	0900	Drill grout holes (2" dia. and L=25')	150.00	lf	74.452 /lf	11,168
n	0900	Hookups to grout holes	6.00	ea	106.36 /ea	638
n	0900	Pressure grout (grouting process onlyminus cement) Assume 2 CF/1 LF of hole	300.00	cf	15.954 /cf	4,786
n	0900	Furnish and handle cement for pressure grouting (Assume 1 bag/CF)	300.00	bag	18.081 /bag	5,424

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		SPILLWAY-015 Intake Shaft				*48,841*
SPILLWAY-016		*Intake Shaft - Upper Ring Grout*				
n	0900	Setups for drilling grout holes (2-in dia holes,20 ft ctrs, and 6 holes per ring)	43.00	ea	265.90 /ea	11,434
n	0900	Drill grout holes (2-in dia and L=25')	6,450.00	lf	53.18 /lf	343,011
n	0900	Hookups to grout holes	260.00	ea	53.18 /ea	13,827
n	0900	Pressure grout (grouting process only minus cement; Assume 2 CF/1 LF of hole)	13,000.00	cf	13.83 /cf	179,748
n	0900	Furnish and handle cement for pressure gouting (Assume 2 CF/1 LF of hole)	13,000.00	bags	15.954 /bags	207,402
		SPILLWAY-016 Intake Shaft - Upper Ring Grout				*755,422*
SPILLWAY-018		*Gate Chamber - Ring Grout*				
n	0900	Setups for drilling grout holes (2-in dia holes, low, mid, and high rings and 6 holes/ring)	3.00	ea	425.44 /ea	1,276
n	0900	Drill grout holes (2-in dia and L=25 ft)	450.00	lf	63.82 /lf	28,717
n	0900	Hookups to grout holes	18.00	ea	74.452 /ea	1,340
n	0900	Pressure grout (grouting process only minus cement; Assume 2 CF/1 LF of hole)	900.00	cf	14.89 /cf	13,401
n	0900	Furnish and handle cement for pressure grouting (Assume 1 bag/CF)	900.00	bags	17.02 /bags	15,316
		SPILLWAY-018 Gate Chamber - Ring Grout				*60,051*
SPILLWAY-019		*ROW - Cast In Place Concrete*				
n	0900	Furnish and install 48" chain link fencing on wingwalls @ control house	80.00	lf	45.74 /lf	3,659
		SPILLWAY-019 ROW - Cast In Place Concrete				*3,659*
		DIVISION 02 SITE CONSTRUCTION				**13,101,010**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
DIVISION 03		**CONCRETE**				
SPILLWAY-002		*Concrete*				
n	0900	Concrete in inlet structure	1,100.00	cy	1,372.044 /cy	1,509,248
n	0900	Concrete in crest structure	1,500.00	cy	1,308.23 /cy	1,962,342
n	0900	Concrete in chute	14,500.00	cy	845.562 /cy	12,260,649
n	0900	Concrete in stilling basin structure	1,900.00	cy	1,255.05 /cy	2,384,591
n	0900	Furnish and place concrete reinforcement (Assume 150#/cy)	2,800,000.00	lbs	1.49 /lbs	4,169,312
n	0900	Furnish and handle cement (.282T/cy)	5,300.00	tn	138.27 /tn	732,820
		SPILLWAY-002 Concrete				*23,018,963*
SPILLWAY-004		*Waterstop*				
n	0900	Furnish and install 9" waterstops - spillway joints	15,000.00	lf	9.572 /lf	143,586
		SPILLWAY-004 Waterstop				*143,586*
SPILLWAY-005		*Anchor Bars*				
n	0900	Drill and grout anchor bars (rock drilling length - 1850')	370.00	ea	191.45 /ea	70,836
		SPILLWAY-005 Anchor Bars				*70,836*
SPILLWAY-006		*Anchor Bar Reinforcing*				
n	0900	Reinforcement for anchor bars	9,400.00	lbs	1.81 /lbs	16,996
		SPILLWAY-006 Anchor Bar Reinforcing				*16,996*

SPILLWAY-008 *Access Bridge across Spillway*

Bridge will span spillway walls, which are 60' apart. the bridge superstructure will be supported on bearing seats, formed into the spillway walls. Therefore, no foundation elements are included in the estimate worksheet.

The bridge is located near the left abutment. the dam crest will be gravel surface. Chain link fence is required along the length of the spillway, so it is not included here. No approach guardrail is included in this estimate - see roadway estimate. Water treatment for the deck drainage is not include in this estimate.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
SPILLWAY-008		*Access Bridge across Spillway*				
n	0900	Furnish and place reinforced concrete for deck parapets and diaphragms (fc=4000psi)	60.00	cy	1,967.66 /cy	118,060
n	0900	Furnish and install elastomeric bearing pads (3"x1'-6"x1'-10"; total # = 8)	22.00	sf	297.81 /sf	6,552
n	0900	Furnish and install compression joint seals (DS Brown CV-3500 preformed neoprene compresion joint seals, or equal)	54.00	lf	8.51 /lf	459
n	0900	Furnish and instal epoxy coated reinforcing steel (Fy=60000 psi)	16,000.00	lbs	1.81 /lbs	28,930
n	0900	Furnish and handle cement material	17.00	tn	207.402 /tn	3,526
n	0900	Furnish and install AASHTO type III precast, prestressed concrete beams (L=65')	4.00	ea	10,848.72 /ea	43,395
		SPILLWAY-008 Access Bridge across Spillway				*200,921*
SPILLWAY-014		*Upper Intake Structure*				
n	0900	FFP reinf. Conc - Upper Intake structure (L=30')	250.00	cy	1,595.40 /cy	398,850
n	0900	FFP reinf. Conc (Steel lined) upper intake shaft (L=30')	80.00	cy	2,180.38 /cy	174,430
n	0900	Fumish and place reinforcement (est 200#/cy)	50,000.00	lbs	1.702 /lbs	85,088
n	0900	Furnish and place reinforcement (est 150#/CY)	12,000.00	lbs	1.81 /lbs	21,697
n	0900	Fumish and handle cement (.282T/cy)	71.00	tn	191.45 /tn	13,593
n	0900	Furnish and handle cement (.282TICY)	23.00	tn	202.084 /tn	4,648
		SPILLWAY-014 Upper Intake Structure				*698,307*
SPILLWAY-019		*ROW - Cast In Place Concrete*				
n	0900	Furnish, form, and place reinf. Conc - Intake structu¡e	250.00	cy	1,595.40 /cy	398,850
n	0900	FFP reinf. Conc - Steel lined U/S conduit (L=50 u/s of tunnel)	375.00	cy	1,595.40 /cy	598,275
n	0900	FFP reinf. Conc - Steel lined U/S tunnel (L=850')	2,300.00	cy	1,223.140 /cy	2,813,222
n	0900	FFP reinf conc in gate chamber	180.00	cy	1,754.94 /cy	315,889
n	0900	FFP reinf. Concrete - D/S tunnel (L=1200') includes walkway and saddles	5,200.00	cy	1,052.964 /cy	5,475,413

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
SPILLWAY-019		*ROW - Cast In Place Concrete*				
n	0900	FFP reinf. concrete - D/S conduit (L=130 ft d/s of tunnel) includes walkway and saddles	290.00	cy	1,595.40 /cy	462,666
n	0900	FFP reinf. concrete - D/S access house (30' x 30 x 12' tall) includes wingwalls	580.00	cy	1,489.04 /cy	863,643
n	0900	Furnish and place reinforcement (est 200#/cy)	50,000.00	lbs	1.702 /lbs	85,088
n	0900	Furnish and place reinforcement (est 150#/CY)	56,250.00	lbs	1.702 /lbs	95,724
n	0900	Furnish and place reinforcement (est 150#/cy)	350,000.00	lbs	1.60 /lbs	558,390
n	0900	Furnish and place reinforcement (160#/cy)	29,000.00	lbs	1.81 /lbs	52,435
n	0900	Furnish and place reinforcement (est 150#/cy)	780,000.00	lbs	1.542 /lbs	1,202,932
n	0900	Furnish and place reinforcement (est 150#/cy)	43,500.00	lbs	1.702 /lbs	74,027
n	0900	Furnish and place reinforcement (est 150#/cy)	87,000.00	lbs	1.702 /lbs	148,053
n	0900	Furnish and handle cement (.282T/cy)	71.00	tns	191.45 /tns	13,593
n	0900	Furnish and handle cement (.282 T/cy)	106.00	tns	186.13 /tns	19,730
n	0900	Furnish and handle cement (.282T/cy)	650.00	tns	159.54 /tns	103,701
n	0900	Furnish and handle cement (.282 T/cy)	51.00	tn	191.45 /tn	9,764
n	0900	Furnish and handle cement (.282 T/cy)	1,500.00	tn	154.222 /tn	231,333
n	0900	Furnish and handle cement (.282 T/cy)	82.00	tn	186.13 /tn	15,263
n	0900	Furnish and handle cement (.282 T/cy)	164.00	tn	180.812 /tn	29,653
		SPILLWAY-019 ROW - Cast In Place Concrete				*13,567,643*
		DIVISION 03 CONCRETE				**37,717,252**
DIVISION 05		**METALS**				
SPILLWAY-020		*Mechancial - Systems*				
n	0900	Trashracks (steel) - Lower Intake	32,400.00	lbs	8.51 /lbs	275,685
n	0900	Trashracks (steel) - Upper Intake	32,400.00	lbs	8.51 /lbs	275,685
		SPILLWAY-020 Mechancial - Systems				*551,370*

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		DIVISION 05 METALS				**551,370**
DIVISION 07		**THERMAL& MOISTURE PROTECTION**				
SPILLWAY-003		*Drains*				
n	0900	Furnish and install 2" rigid insulation	130,000.00	sf	2.234 /sf	290,363
		SPILLWAY-003 Drains				*290,363*
		DIVISION 07 THERMAL& MOISTURE PROTECTION				**290,363**
DIVISION 13		**SPECIAL CONSTRUCTION**				
SPILLWAY-020		*Mechancial - Systems*				
n	0900	Ultrasonic flowmeter, 2-path	1.00	ls	101,042.00 /ls	101,042
		SPILLWAY-020 Mechancial - Systems				*101,042*
		DIVISION 13 SPECIAL CONSTRUCTION				**101,042**
DIVISION 15		**MECHANICAL**				
SPILLWAY-020		*Mechancial - Systems*				
n	0900	Bulkhead gate (13'x l3'), bulkhead gate frame and guides avove frame (steel) - Lower Intake	93,800.00	lbs	6.913 /lbs	648,477
n	0900	Bulkhead gate (13'x l3'), bulkhead gate frame and guides avove frame (steel) - Upper Intake	86,300.00	lbs	6.913 /lbs	596,626
n	0900	Heating and Ventilating Systems for Outlet Works Access Tunnel and Control House	1.00	ls	170,176.00 /ls	170,176
n	0900	Electric unit heat:7.5 kw	2.00	ea		

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
SPILLWAY-020		*Mechanical - Systems*				
n	0900	Cenrifusal fan:750 cfm	1.00	ea		
n	0900	Prooeller fan: 2400 cfm	1.00	ea		
n	0900	Axial fan: 6,000 cfm	1.00	ea		
n	0900	Oval steel duct;38-inch x 16-inch, galvanized	1,900.00	ft		
n	0900	Cont¡ol damper;60inch by 60inch; motor-operate	2.00	ea		
n	0900	Control damper:32-inch by 32-inch; motor-operated	2.00	ea		
n	0900	60inch by 60-inch stationary louver	2.00	ea		
n	0900	32-inch by 32-inch stationary louver	2.00	ea		
		SPILLWAY-020 Mechancial - Systems				*1,415,279*
SPILLWAY-021		*Mechancial - Steel Pipe*				
n	0900	24-inch lD steel pipe for air vent (l/4-inch wall,64 lb per lin. ft.)	20.00	lf	170.18 /lf	3,404
n	0900	14-inch ID steel pipe for filling line (1/4-inch wall,38 lb per lin. ft.)	20.00	lf	101.042 /lf	2,021
n	0900	1/4 -inch ID steel liner (7/8" wal, 1074 lb/LF)	900.00	lf	2,871.72 /lf	2,584,548
n	0900	102-inch ID steel pipe, Supported on concrete saddles (1/2" wall, 547 lb/LF)	1,330.00	lf	1,489.04 /lf	1,980,423
n	0900	72-inch ID steel pipe, encased in concrete (3/8" wall, 390 lb/LF)	60.00	lf	4,148.04 /lf	248,882
n	0900	30-inch ID steel pipe (1/4--inch wall,80 lb per lin. ft,)	30.00	lf	212.72 /lf	6,382
		SPILLWAY-021 Mechancial - Steel Pipe				*4,825,660*
SPILLWAY-022		*Mechancial - Valves*				
n	0900	AWWA Class 25O manually operated butterfly valve (for air vent): 1 -24" dia valve. 1350 lbs. per valve.	1,350.00	lbs	8.51 /lbs	11,487
n	0900	AWWA Class 250, manually operated (filling line) butterfly valves: 2 -14" Dia valves,450 lbs. per valve.	900.00	lbs	10.64 /lbs	9,572

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
SPILLWAY-022		*Mechanical - Valves*				
n	0900	AWWA Class 300. hydraulically operated ball valve: 1 -30" Diameter valve, 5900 lbs. per valve.	5,900.00	lbs	14.89 /lbs	87,853
n	0900	Combination air valve (for air vent to prevent vacuum) 1 -24" dia valve,2600 lbs. per valve	2,600.00	lbs	10.64 /lbs	27,654
		SPILLWAY-022 Mechancial - Valves				*136,566*
SPILLWAY-023		*Mechancial - Gates and Controls*				
n	0900	7'x9' Hydraulicallv-actuated outlet gate; Head = 367 feet	102,000.00	lbs	8.51 /lbs	867,898
n	0900	Two tandem sets 4'x6' hydraulically-actuated outlet gates Head = 367 feet	130,000.00	lbs	9.572 /lbs	1,244,412
n	0900	30" Hydraulically-actuated jet-flow gate and stand Head = 367 feet	10,000.00	lbs	10.64 /lbs	106,360
n	0900	Hydraulic controls for 7'x9' emergency outlet gate, and four 4'x6' outlet gates	3,200.00	lbs	11.70 /lbs	37,439
n	0900	Hydraulic controls for 30" Jet-flow gate	800.00	lbs	12.763 /lbs	10,211
		SPILLWAY-023 Mechancial - Gates and Controls				*2,266,319*
		DIVISION 15 MECHANICAL				**8,643,824**
DIVISION 16		**ELECTRICAL**				
SPILLWAY-020		*Mechancial - Systems*				
n	0900	50Kw Diesel engine-generator set with 125 gal fuel tank (assume ConVault)	1.00	ls	63,816.00 /ls	63,816
		SPILLWAY-020 Mechancial - Systems				*63,816*
SPILLWAY-024		*Electrical -*				
		Assumption: Bring pwoer to dam is part of unlisted items				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
SPILLWAY-024		*Electrical -*				
n	0900	600V motor control center, 3-phase, 800 amp bus 4-20" wide sections 5 NEMA size 1 FVR contactors * 3-100 A,3-pole molded-case circuit breakers	1.00	ea	42,544.00 /ea	42,544
n	0900	Transformer load center 30 kVA, 3-phase, 480-208Y/120 volt	1.00	ea	19,676.60 /ea	19,677
n	0900	120 volt, fluorescent NEMA Type 4 fixtures for control house, l900 foot long tunnel, & gate chamber	1.00	ls	69,134.00 /ls	69,134
		SPILLWAY-024 Electrical -				*131,355*
		DIVISION 16 ELECTRICAL				**195,171**
		006 SPILLWAY AND OUTLET WORKS			***63,578,112.030/LS***	***63,578,112***
		1.00 LS				
		007 DIVERSION DURING CONSTRUCTION				
DIVISION 02		**SITE CONSTRUCTION**				
DIV-001		*Excavation - Cofferdam*				
----		Excavation, common, for cofferdam; assume alluvial soils and no dewatering	4,400.00	cy	21.61 /cy	95,066
		DIV-001 Excavation - Cofferdam				*95,066*
DIV-002		*Cofferdam*				

Item	Description	Takeoff Qty		Unit Cost	Total Amount
DIV-002	*Cofferdam*				
----	Embankment fill; assume overburden from dam excavation is used; probably of mix of silts to gravels, placed and compacted in 9" lifts	171,000.00	cy	17.29 /cy	2,955,701
----	Geotextile; assume 16 ounce non-woven fabric	26,000.00	sy	3.241 /sy	84,263
----	Geomembrane; assume 40 mil HDPE	13,000.00	sy	16.21 /sy	210,659
	DIV-002 Cofferdam				*3,250,623*
DIV-003	*Excavation - Pipe Saddles*				
----	Excavation, common, for 6' pipe saddles; assume alluvial soil and weathered rock; no dewatering)	4,000.00	cy	17.29 /cy	69,139
----	Excavation, rock, for 6' pipe saddles; assume drill and blast; no dewatering	2,000.00	cy	45.373 /cy	90,745
	DIV-003 Excavation - Pipe Saddles				*159,884*
DIV-005	*Dewatering*				
----	Dewatering Pumps: 2 ea - 10 cfs (4,500 gpm) Flygt C3300 Wastewater Submersible Pumps,	4,600.00	lbs	21.61 /lbs	99,388
----	low head (LT), Curve/Impeller No. 809, S-installation, 20' TDH, 900 rpm, 50 hp, 12" discharge, 3-ph/60Hz/460v (2,300 lbs ea)				
----	Pumping costs; estimate pumping 6 hours per day for 2 years	4,400.00	hrs	102.63 /hrs	451,565
	DIV-005 Dewatering				*550,953*
	DIVISION 02 SITE CONSTRUCTION				**4,056,527**
DIVISION 03	**CONCRETE**				
DIV-004	*Concrete - Pipe Saddles*				
----	Furnish and place reinforced concrete for pipe supports spaced @ 40' on center (16 each)	20.00	cy	2,160.60 /cy	43,212

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
DIV-004	*Concrete - Pipe Saddles*				
----	Furnish and place unreinforced concrete for thrust blocks; assume 2 blocks 10 x 10 x 10 3,000psi	75.00	cy	864.24 /cy	64,818
----	Furnish and place concrete reinforcement (170# / cy)	3,400.00	lbs	1.95 /lbs	6,611
----	Furnish and handle cement for concrete (.212 t / cy)	22.00	tons	205.26 /tons	4,516
	DIV-004 Concrete - Pipe Saddles				*119,157*
	DIVISION 03 CONCRETE				**119,157**
DIVISION 15	**MECHANICAL**				
DIV-006	*Mechanical - Steel Pipe*				
----	20" diameter schedule 10, 1/4" thick wall, 53 lbs/lf	250.00	lf	183.651 /lf	45,913
----	12" diameter schedule 20, 1/4" thick wall, 34 lbs/lf	50.00	lf	118.833 /lf	5,942
----	72" diameter steel pipe, 5/16" thick wall, 241 lbs/lf	600.00	lf	842.634 /lf	505,580
	DIV-006 Mechanical - Steel Pipe				*557,435*
DIV-007	*Mechanical - Valves*				
----	2 each - 12" class 150 AWWA butterfly valves (250 lbs each)	500.00	lbs	11.883 /lbs	5,942
----	2 ea - 12" class 125 double door check valves (150 lbs each)	300.00	lbs	11.883 /lbs	3,565
	DIV-007 Mechanical - Valves				*9,507*
	DIVISION 15 MECHANICAL				**566,941**
DIVISION 16	**ELECTRICAL**				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
DIV-005	*Dewatering*				
----	Submersible electrical cable; 3 - power conductor, 600 V, #4 AWG	500.00	lf	21.61 /lf	10,803
----	Submersible electrical cable; 2 - thermal sensor cables, #10 AWG	500.00	lf	1.62 /lf	810
----	Submersible electrical cable; 1 - ground cable, #6 AWG	500.00	lf	2.161 /lf	1,080
----	Sump pump level controls; 2 floats, control relay in a NEMA 4 enclosure	1.00	ea	1,728.48 /ea	1,728
----	Combination pump motor starters, 600 volt, NEMA 4 enclosure, Size 3, non-reversing contactor	2.00	ea	5,941.65 /ea	11,883
	DIV-005 Dewatering				*26,305*
	DIVISION 16 ELECTRICAL				**26,305**
	007 DIVERSION DURING CONSTRUCTION			***4,768,930.34 /LS***	***4,768,930***
	1.00 LS				
	008 ROAD AND CREEK IMPROVEMENTS				
DIVISION 02	**SITE CONSTRUCTION**				
AR-001	*Road from SH821 to other side of Dam*				
	Civil - Road - All roadways sections assume 2 12' lanes w/o shoulders, 3:1 sloped ditches to 1' depth, cut slopes 2:1. A slope greater than 12% was utilized in several areas. Upon final design alignment will be modified to better suit exisitng earthwork conditions and eliminatee slopes greater than 12%.				
----	Excavation	25,000.00	cy	6.593 /cy	164,835
----	Compacted Embankment	52,000.00	cy	7.473 /cy	388,571

Item	Description	Takeoff Qty		Unit Cost	Total Amount
AR-001	*Road from SH821 to other side of Dam*				
----	24" Corrugated Metal Pipe Culvert (assume five 35' lengths)	595.00	lf	65.934 /lf	39,231
----	Gravel surfacing - 6" depth	7,000.00	ton	49.451 /ton	346,154
----	Metal beam guard railing with wooden post to installed across dam	6,400.00	lf	41.76 /lf	267,252
	AR-001 Road from SH821 to other side of Dam				*1,206,043*
AR-002	*Road from Access House to other Side of Dike*				
----	Excavation	5,700.00	cy	12.09 /cy	68,901
----	Compacted Embankment	13,000.00	cy	12.09 /cy	157,143
----	24" Corrugated Metal Pipe Culvert (assume five 35' lengths)	175.00	lf	65.934 /lf	11,538
----	Gravel surfacing - 6" depth	4,300.00	ton	49.451 /ton	212,637
----	Metal beam guard railing with wooden post to installed across dam	5,200.00	lf	41.76 /lf	217,143
	AR-002 Road from Access House to other Side of Dike				*667,362*
AR-003	*Road from SH821 to Outlet Works*				
----	Excavation	100.00	cy	54.95 /cy	5,495
----	Compacted Embankment	330.00	cy	24.18 /cy	7,978
----	24" Corrugated Metal Pipe Culvert (assume five 35' lengths)	245.00	lf	65.934 /lf	16,154
----	Gravel surfacing - 6" depth	3,000.00	ton	54.95 /ton	164,835
	AR-003 Road from SH821 to Outlet Works				*194,461*
AR-004	*Earthwork and other Improvements - Lumuma Creek*				
----	Common excavation of outlet channel	86,000.00	cy	5.702 /cy	490,329
----	Excavation for sheet piles	1,300.00	cy	28.51 /cy	37,060
----	Embankment	11,500.00	cy	11.403 /cy	131,135
----	Compacted Embankment	11,501.00	cy	7.982 /cy	91,802
----	Furnish/place geotextile	45,000.00	sy	14.824 /sy	667,076

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost	Total Amount
AR-004	*Earthwork and other Improvements - Lumuma Creek*				
----	Furnish/place rock rip-rap (d50 6", d100 12"), 120 lb/cf	24,000.00	tons	34.21 /tons	821,016
----	Furnish 7 steel sheet pile control structures; using AZ13 sheet piles	17,000.00	sf	22.81 /sf	387,702
----	Furnish and place cement bentonite slurry	1,300.00	cy	136.84 /cy	177,887
----	Furnish and handle cement in cement bentonite slurry	195.00	tons	239.463 /tons	46,695
	AR-004 Earthwork and other Improvements - Lumuma Creek				*2,850,701*
AR-005	*I-82 Bridges - Embankment Protection*				
	Protect exisitng 2:1 slope bridge embankments. Apply wterproofing membrane to exisitng bridge piers that will be submerged				
----	Excavation existing protection	10,500.00	cy	16.69 /cy	175,219
----	Furnish and place rip rap on embankments (D50 = 24"0)	34,000.00	tons	33.38 /tons	1,134,750
----	Furnish and place rip rap bedding	16,000.00	tons	22.25 /tons	356,000
	AR-005 I-82 Bridges - Embankment Protection				*1,665,969*
AR-006	*I-82 Bridges - Pier Protection*				
----	Water jet face of piers	490.00	sy	22.25 /sy	10,903
	AR-006 I-82 Bridges - Pier Protection				*10,903*
	DIVISION 02 SITE CONSTRUCTION				**6,595,438**
DIVISION 03	**CONCRETE**				
AR-006	*I-82 Bridges - Pier Protection*				
----	Remove spalling concrete (5% total area)	25.00	sy	55.63 /sy	1,391
----	Furnish and install liquid applied CIM 1000 urethane; spray application	490.00	sy	12.24 /sy	5,996

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
AR-006	*I-82 Bridges - Pier Protection*				
----	Furnish and install liquid applied CIM 1000 urethane; spray application	490.00	sy	14.463 /sy	7,087
	AR-006 I-82 Bridges - Pier Protection				*14,474*
	DIVISION 03 CONCRETE				**14,474**
	008 ROAD AND CREEK IMPROVEMENTS			***6,609,911.91 /LS***	***6,609,912***
	1.00 LS				

Partial Totals

Description	Amount	Totals	Rate
Subtotal		**590,860,203**	
Contractor's Fee			6.000 %
Contractor's Bonds & Insurance			1.500 %
Subtotal		**590,860,203**	
Mobilization	17,725,806		3.000 %
Subtotal w/ Mobilization		**608,586,009**	
Unlisted Items Minor	24,343,440		4.000 %
Design and Scope Changes Minor	21,594,801		4.000 %
Cost Est Refinements Minor	10,797,400		2.000 %
Procurement Strategy Open Comp			
Contract Cost		**665,321,650**	
Contingencies	166,330,413		25.000 %
Field Cost		**831,652,063**	
Sales Tax Estimate (Mat & Eq)			8.200 %
Escal to NTP (Not Included)			
Forecasted Feature Bid		**831,652,063**	

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Wymer Reservoir - Yakima River Intake was estimated used the USBR CCT. Numbers were assumed to include sales so all adjusted vales were placed in the estimate as subcontractors.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Summary

Summary Sheet 1 of 1

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: C:\Documents and Settings\jwzander\My Documents\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]River Intake(12)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Wymer Offstream Storage Facility consists of:					
		Fish-screened Intake on Yakima River, 400 cfs Pumping Plant and Switchyard,					
		Concrete-Faced Rockfill Dam, Crest El. 1750. Central Core Rockfill Dike, Crest EL. 1750.					
		Spillway and Outlet Works, Road (Access and I82) and Lmuma Creek Improvements					
		Yakima River Intake					$ 18,352,464.00
		Pumping Plant					$ 54,246,343.00
		Switchyard and Transmission Line					$ 6,070,102.00
		Discharge Line					$ 24,306,490.00
		Dam and Dike					$ 365,591,500.00
		Spillway and Outlet Works					$ 59,776,337.00
		Diversion during Construction					$ 4,414,450.00
		Road and Creek Improvements					$ 5,902,027.00
		Subtotal					$ 538,659,713.00
		Mobilization				+/- 5%	$ 27,000,000.00
		Subtotal w/ mobilization					$ 565,659,713.00
		Unlisted Items				+/- 10%	$ 54,340,287.00
		Procurement Strategy = (USC 638, TERO tax, etc)				+/- 0%	$ -
		CONTRACT COST					**$ 620,000,000.00**
		Contingencies				+/- 25%	$ 160,000,000.00
		FIELD COST					**$ 780,000,000.00**
		Note : Non-contract costs are to be provided by others. This estimate does not include non-contract costs.					
		This estimate should not be used for funding purposes.					
		Esculation for cost increases that will occur during the construction period and cost increases that may occur prior to the contract award are not included.					
		This estimate assumes a procurement strategy consisting of full and open competition.					

QUANTITIES		PRICES	
BY Design Team	**CHECKED**	**BY** Jerry Zander 6/4/2007	**CHECKED**
DATE PREPARED May 2, 2007	**PEER REVIEW**	**DATE PREPARED** June 4, 2007	**PEER REVIEW** 6/4/2007

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake
Dewatering/Unwatering and Cofferdam

Geotechnical/Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct/Remove Cofferdam around Intake					
		Max River WS: El. 1284					
		Bottom of River: El. 1272					
		Assumed Construction WS: El. 1280					
		Assumed top of Rock: ±El. 1260					
	1	Furnish, fill, install, and remove "Super Sacks"		1	LS	$ 82,000.00	$ 82,000.00
		- Use 540 sacks @ 3'x3'x3' = 540 cy of fill					
		- Place sacks with crane - 8 tons at 35ft reach					
		- Use fill from Intake excavation to fill sacks with minor					
		processing for 3"minus (run through "grizzly")					
	2	Furnish, install, and remove 40 mil PVC Geomembrane		600	SY	$ 15.00	$ 9,000.00
		- Use 20 ft long roll					
	3	Furnish, fill, and place Sand Bags		300	CF	$ 27.00	$ 8,100.00
		Placed by hand					
		Unwatering behind cofferdam					
		Furnish and install "french drains"					
	4	Gravel - (sand and/or gravel w/ less then 5% fines)		20	CY	$ 90.00	$ 1,800.00
	5	Slotted 6-in dia. PVC or HDPE		270	LF	$ 12.00	$ 3,240.00
		Sheet Subtotal =					**$ 104,140.00**

QUANTITIES

BY Bob Davis	**CHECKED** Bill Engemoen
DATE PREPARED April 30, 2007	**PEER REVIEW** Al Kiene

PRICES

BY Jerry Zander	**CHECKED**
DATE PREPARED May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake
Dewatering/Unwatering and Cofferdam

Geotechnical/Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct/Remove Cofferdam around Intake Fish Return Structure					
		Max River WS: El. 1284					
		Bottom of River: El. 1272					
		Assumed Construction WS: El. 1280 (Q= cfs)					
		Assumed top of Rock: ±El. 1260					
	6	Furnish, fill, install, and remove "Super Sacks"		1	LS	$ 30,000.00	$ 30,000.00
		- Use 200 sacks @ 3'x3'x3' = 200 cy of fill					
		- Place sacks with crane - 8 tons at 35ft reach					
		- Use fill from pipeline excavation to fill sacks with minor					
		processing for 3"minus (run through "grizzly")					
	7	Furnish, install, and remove 40 mil PVC Geomembrane		225	SY	$ 15.00	$ 3,375.00
		- Use 20 ft long roll					
	8	Furnish, fill, and place Sand Bags		115	CF	$ 27.00	$ 3,105.00
		Unwatering behind cofferdam					
		Furnish and install "french drains"					
	9	Gravel - (sand and/or gravel w/ less then 5% fines)		8	CY	$ 90.00	$ 675.00
	10	Slotted 6-in dia. PVC or HDPE		100	LF	$ 12.00	$ 1,200.00
		Sheet Subtotal =					**$ 38,355.00** ✓

QUANTITIES

BY Bob Davis	**CHECKED** Bill Engemoen	**BY** Jerry Zander #3	**CHECKED** cg
DATE PREPARED April 30, 2007	**PEER REVIEW** Al Kiene	**DATE PREPARED** May 31, 2007	**PEER REVIEW** DwD

PRICES

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake
Dewatering/Unwatering and Cofferdam

Geotechnical/Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Dewatering Intake and Pumping Plant					
		Max River WS: El. 1284					
		Bottom of River: El. 1272					
		Assumed Construction WS: El. 1280 (Q= cfs)					
		Assumed top of Rock: ±El. 1260					
		Assumed Ground WS: El. 1280 (same as river)					
	11	Wellpoints about Intake and PP structures		1	LS	$ 3,600,000.00	$ 3,600,000.00
		- Install and remove 340 wellpoints					
		- Operate well points approximately 9 months					
		- Do **not** assume well points are jetted.					
		- Each wellpoint installed by:					
		- Drilling borehole, 8" diameter 20-ft deep					
		- Backfill borehole with sand (place with sand casing)					
		- Install wellpoint using 1.5" steel riser pipe w/					
		self jetting wellpoint screen (2" dia typ)					
		- Wellpoints are placed at 6 ft centers 20 ft deep					
		- Assume excavation to El. 1280 before placement of wellpoints					
	12	Wellpoints behind cofferdam		1	LS	$ 700,000.00	$ 700,000.00
		- Install and remove 40 wellpoints					
		- Operate well points approximately 3 months					
		- Do **not** assume well points are jetted.					
		- Each wellpoint installed by:					
		- Drilling borehole, 8" diameter 12-ft deep					
		- Backfill borehole with sand (place with sand casing)					
		- Install wellpoint using 1.5" steel riser pipe w/					
		self jetting wellpoint screen (2" dia typ)					
		- Wellpoints are placed at 6 ft centers 12 ft deep					
		- Assume installation of cofferdam before placement of wellpoints					
		Sheet Subtotal =					**$ 4,300,000.00**

QUANTITIES		PRICES	
BY Bob Davis	**CHECKED** Bill Engemoen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED April 30, 2007	**PEER REVIEW** Al Kiene	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake
Dewatering/Unwatering and Cofferdam

Geotechnical/Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Unwatering Intake and Pumping Plant					
		Max River WS: El. 1284					
		Bottom of River: El. 1272					
		Assumed Construction WS: El. 1280 (Q= cfs)					
		Assumed top of Rock: ±El. 1260					
		Assumed Ground WS: El. 1280 (same as river)					
		Unwatering at base of soil excavation					
		- Furnish, install, and remove (filter toe drain):					
	13	Sand/gravel filter material		715	CY	$ 71.00	$ 50,765.00
	14	Slotted pipe 6-in dia. PVC or HDPE		2,150	LF	$ 12.00	$ 25,800.00
	15	Wrap slotted pipe in non-woven filter fabric		475	SY	$ 6.00	$ 2,850.00
	16	- Furnish and operate sump pumps					
		- Operate 11 sump pumps for 9 months		1	LS	$ 750,000.00	$ 750,000.00
		- Each pump should have a 30 ft lift					
		and have a flow of about 4 gpm					
	17	Unwatering at base of rock excavation					
		- Furnish and operate sump pumps					
		- Operate 10 sump pumps for 9 months		1	LS	$ 820,000.00	$ 820,000.00
		- Each pump should have a 45 ft lift					
		and have a flow of about 5 gpm					
		- Operate 3 sump pumps for 9 months					
		- Each pump should have a 55 ft lift					
		and have a flow of about 5 gpm					
	18	Unwatering about fish return pipeline					
		- Furnish and operate sump pumps					
		- Operate 3 sump pumps for 2 months		1	LS	$ 110,000.00	$ 110,000.00
		- Each pump should have a 12 ft lift					
		and have a flow of about 5 gpm					
		Sheet Subtotal =					**$ 1,759,415.00**

QUANTITIES

BY Bob Davis	**CHECKED** Bill Engemoen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED April 30, 2007	**PEER REVIEW** Al Kiene	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

PRICES

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Structural Excavation and Backfill					
		Excavation and backfill quantities are to existing ground level.					
		Excavation and backfill above existing ground level covered under PP yard.					
		Assume top of rock is at El.					
		Assume stockpile excavated material and use for backfill or embankment.					
	19	Excavation of common materials for structures (2:1)	8140	24,400	CY	$ 9.00	$ 219,600.00
	20	Excavation of rock for structures (drill & shoot) (1/2:1)	8140	2,060	CY	$ 60.00	$ 123,600.00
	21	Furnish backfill for structures (assume local borrow)	8140	13,715	CY	$0.00	$ -
	22	Place backfill around structures	8140	13,715	CY	$ 15.00	$ 205,725.00
	23	Compact backfill around structures	8140	13,715	CY	$ 17.00	$ 233,155.00
		STRUCTURAL					
		Construct Gated Intake and Fishscreen Structure					
	24	Furnish, form, and place reinforced concrete (f'c=4ksi)	8140	2,950	CY	$ 1,100.00	$ 3,245,000.00
	25	Furnish and place concrete reinforcement.	8140	353,860	LBS	$ 1.50	$ 530,790.00
	26	Furnish and handle cement	8140	840	TONS	$ 150.00	$ 126,000.00
	27	W-Beam guardrails	8140	40	LF	$ 80.00	$ 3,200.00
		Construct Intake Structure Retaining Walls					
	28	Furnish, form, and place reinforced concrete (f'c=4ksi)	8140	203	CY	$ 2,000.00	$ 406,000.00
	29	Furnish and place concrete reinforcement.	8140	24,300	LBS	$ 1.65	$ 40,095.00
	30	Furnish and handle cement	8140	58	TONS	$ 180.00	$ 10,440.00
		Construct Sump for Fish Pumps and Bypass					
	31	Furnish, form, and place reinforced concrete (f'c=4ksi)	8140	1,040	CY	$ 1,300.00	$ 1,352,000.00
	32	Furnish and place concrete reinforcement.	8140	124,620	LBS	$ 1.55	$ 193,161.00
	33	Furnish and handle cement	8140	295	TONS	$ 160.00	$ 47,200.00
		Sheet Subtotal =					**$ 6,735,966.00**

QUANTITIES

BY Joe Gemperline	**CHECKED** Chou Cha / Dave Gesundheit
DATE PREPARED 5/1/2007	**PEER REVIEW** David K. Edwards

PRICES

BY Jerry Zander	**CHECKED**
DATE PREPARED May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: C:\Documents and Settings\jwzander\My Documents\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]River Intake(12)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Earthwork for Fish Bypass Pipe					
		Price Alternative 2. Alternative 1 for reference only.					
		Alternative 1 Prices not included in sheet total					
		Alternative 1 - Payline Quantities - Vertical Trench Walls					
		Bypass pipe common excavation	8140	580	CY		
		Bypass pipe backfill	8140	310	CY		
		Bypass pipe soil cement bedding (100 psi)	8140	175	CY		
		(Soil Cement Slurry CLSM)					
		Alternative 2 - Takeoff Quantities - 2:1 Trench Walls					
	34	Bypass pipe common excavation	8140	1,600	CY	$ 17.00	$ 27,200.00
	35	Bypass pipe backfill	8140	1,180	CY	$ 24.50	$ 28,910.00
	36	Bypass pipe soil cement bedding (100 psi)	8140	330	CY	$ 190.00	$ 62,700.00
		(Soil Cement Slurry CLSM)					
		Notes:					
		Clearing and grubbing by other group	8120				
		Fencing by other group	8120				
		People guardrail by other group	8120				
		Gravel surfacing by other group	8120				
		Yard earthwork by other group	8120				
		Coffer Dam and Dewatering by other group	8312				
		Sheet Subtotal =					$ 118,810.00

QUANTITIES		PRICES	
BY Joe Gemperline	**CHECKED** Chou Cha / Dave Gesundheit	**BY** Jerry Zander	**CHECKED**
DATE PREPARED 5/1/2007	**PEER REVIEW** David K. Edwards	**DATE PREPARED** June 4, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Structural Steel					
	37	Furnish and install structural steel (painted):	8120	2,000	LBS	$ 5.00	$ 10,000.00
		3-Ton Hoist monorail beam and frames					
	38	**Miscellaneous Metalwork**	8120	8,000	LBS	$ 10.00	$ 80,000.00
		3' wide walkway, steel, safety grating along fish screens					
		75-ft ea side with support frames at 11-ft centers					
		Gripstrut panels @ 23.5 lbs/ft					
		Guardrail					
		Ladders and landings into Intake					
		Control Building					
	39	Pre-engineered metal building - 15 ft. eave height	8120	1	EA	$ 62,000.00	$ 62,000.00
		3:12 roof pitch, 20' long x 20' wide					
	40	Furnish, form, and place reinforced concrete (f'c=4ksi)	8120	18	CY	$ 1,000.00	$ 18,000.00
		Assume 1-ft x 22-ft x 22-ft base slab					
	41	Furnish and place concrete reinforcement. (135 lbs/CY)	8120	2,500	LBS	$ 1.80	$ 4,500.00
	42	Furnish and handle cement (.282T/CY)	8120	5	TONS	$ 210.00	$ 1,050.00
		Sheet Subtotal =					**$ 175,550.00**

QUANTITIES		PRICES	
BY Dick LaFond	**CHECKED** Brian Goplen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW** Brian Goplen	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
	43	Ventilating System for Fish Pump	8410	1	L.S.	$ 3,000.00	$ 3,000.00
		Electrical Equipment Control Building:					
		Consists of:					
		1 - Centrifugal fan; 500 cfm					
		1 - Backdraft damper; 24-inch by 24-inch					
		1 - Intake counterbalance damper; 24-inch by 24-inch					
		2 - 24-inch by 24-inch stationary louver					
	44	One (3) ton capacity, electric, wirerope, monorail hoist	8410	1	L.S.	$ 6,000.00	$ 6,000.00
		with manual trolley for intake structure stop logs					
		(hoist only; hoist beam provided by 8120)					
	45	Stoplog guides and seats (steel)	8410	2,800	LBS	$ 11.00	$ 30,800.00
	46	Stoplog lifting beam (steel)	8410	1,000	LBS	$ 4.50	$ 4,500.00
	47	Stoplogs (steel)	8410	13,600	LBS	$ 4.00	$ 54,400.00
	48	Trashracks and seats (steel)	8410	20,400	LBS	$ 8.00	$ 163,200.00
	49	One trash rake, rails, supports	8410	11,000	LBS	$ 10.00	$ 110,000.00
		(assume Atlas Polar DT8300 rake)					
	50	One conveyor (steel)	8410	5,000	LBS	$ 10.50	$ 52,500.00
	51	Fish screen guides, support structure, braces	8410				
		embedded seats, blank panel, and bypass walls					
		Structural steel		105,000	LBS	$ 8.00	$ 840,000.00
		(Does not include walkway, see 8120)					
		Sheet Subtotal =					**$ 1,264,400.00** ✓

QUANTITIES		PRICES	
BY: J. Grass / P. Schlein R. Christensen	**CHECKED** Rick Christensen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED: 4/28/07	**PEER REVIEW** Dave Hulse	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
	52	Fish screens 11' W x11' H panels, 10 + 2 spares	8410				
		Stainless steel		14,600	LBS	$ 25.00	$ 365,000.00
		Structural steel		14,600	LBS	$ 8.00	$ 116,800.00
	53	Barrier panels above fish screens, 11' W x 11' H	8410				
		10 + 2 spares					
		Structural steel		36,300	LBS	$ 5.00	$ 181,500.00
	54	Adjustable baffle panels, 10 bays	8410				
		Structural steel		60,500	LBS	$ 5.00	$ 302,500.00
	55	Fish screen cleaner with travel rail, 2 systems with	8410				
		one brush cleaner arm per system					
		a. Structural steel		8,200	LBS	$ 6.00	$ 49,200.00
		b. Stainless steel		1,000	LBS	$ 25.00	$ 25,000.00
		c. 2 Hp motors/gear reducers, with adj. speed		2	UNITS	$ 10,000.00	$ 20,000.00
		controllers and limit switches					
	56	Water level measuring systems	8410				
		Sensors/transducers		6	UNITS	$ 5,000.00	$ 30,000.00
		Receivers/transmitters		2	UNITS	$ 10,000.00	$ 20,000.00
		6" Dia. FRP pipe stilling wells		120	FT	$ 40.00	$ 4,800.00
		Sheet Subtotal =					**$ 1,114,800.00**

QUANTITIES		PRICES	
BY: R. Christensen	**CHECKED** John Grass	**BY** Jerry Zander	**CHECKED**
DATE PREPARED: 4/28/07	**PEER REVIEW** Dave Hulse	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Est Notes - A

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pumping Units for Fish Bypass	8420				
		Furnish and Install:					
		Two - Wemco Hidrostal Model N36A screw					
		centrifugal fish pumps w/ shrouded s.st.					
		impellers, s.st. casings and s.st. pump					
		shafts, right-angle gear drives, 60 cfs @ 14' TDH,					
		150 hp, TEFC, vertical induction motors, and					
		vertical shafting with couplings					
		- Government to witness pump shop test					
		- Field testing with on-site pump mfr's rep.					
	57	a. stainless steel shrouded pump impellers,		22,000	LBS	$ 80.00	$ 1,760,000.00
		casings, and shafts					
	58	b. right-angle gear reducers (4:1)		2,200	LBS	$ 57.00	$ 125,400.00
	59	c. "Premium Efficiency" vertical induction		6,300	LBS	$ 21.00	$ 132,300.00
		motors, inverter-duty rated, TEFC, hollow					
		shaft, 150 hp, 1200 rpm, 3Ph/60Hz/460 V					
	60	d. vertical shafting (30') and couplings		2,800	LBS	$ 16.00	$ 44,800.00
	61	e. common pump/gear reducer baseplate		14,300	LBS	$ 5.00	$ 71,500.00
		(11.25 ft x 9.25 ft)					
		Variable Frequency Drives					
		(on 8430 qty. est. worksheet)					
		Sheet Subtotal =					**$ 2,134,000.00**

QUANTITIES

BY R. Zelenka	**CHECKED** T. Hummel 4/24/07
DATE PREPARED April 23, 2007	**PEER REVIEW** T. Hummel 4/24/07

PRICES

BY Jerry Zander	**CHECKED**
DATE PREPARED May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
		Steel Pipe for Fish Bypass	8420				
	62	36" ID X 1/4" wall steel pipe					
		233 lin. Ft. @ 96 lbs. per lin. Ft. (22368 lbs.)		233	LF	$ 384.00	$ 89,472.00
	63	30" ID X 1/4" wall steel pipe					
		524 lin. Ft. @ 80 lbs. per lin. Ft. (41920 lbs.)		524	LF	$ 320.00	$ 167,680.00
		Flanges					
	64	8 - 36" AWWA Class D flanges		2,144	lbs	$ 4.00	$ 8,576.00
		Rectangular Pipe and Transition (Bypass Inlet)	8420				
	65	All welded steel plates		35,000	lbs	$ 4.00	$ 140,000.00
		Valves for Fish Bypass	8420				
	66	2 - 36" Manually Operated Knifegate Valves					
		2500 lbs per valve		5,000	lbs	$ 11.00	$ 55,000.00
		Sheet Subtotal =					**$ 460,728.00**

QUANTITIES		PRICES	
BY Rick Frisz	**CHECKED** Ken Smith	**BY** Jerry Zander	**CHECKED**
DATE PREPARED 4-30-07	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Intake

Electrical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: C:\Documents and Settings\jwzander\My Documents\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Pumping Plant(12)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Service Equipment (F&I)	8430				
	67	Distribution panelboard, indoor type		1	EA	$ 11,000.00	$ 11,000.00
		480 volts, 3-phase with 225 ampere bus					
	68	Transformer load center		1	EA	$ 8,300.00	$ 8,300.00
		15 kVA, 1-phase, 480-240/120 volt					
		Combination Motor Starters (F&I)	8430				
	69	NEMA size 2 reversing contactor, 480V, 3-phase		2	EA	$ 5,000.00	$ 10,000.00
		480-120 volt control transformer					
		NEMA type 4 enclosure					
		Adjustable Speed Drives (F&I)	8430				
	70	480 volt, 3-phase, 200 ampere		2	EA	$ 55,000.00	$ 110,000.00
		Lighting System (F&I)	8430				
	71	120 volt, fluorescent fixtures for 10' x 10' bldg		1	LS	$ 7,000.00	$ 7,000.00
		Sheet Subtotal =					**$ 146,300.00**

QUANTITIES		PRICES	
BY Mike Schuh	**CHECKED** George Girgis	**BY** Jerry Zander	**CHECKED**
DATE PREPARED April 25, 2007	**PEER REVIEW** George Girgis	**DATE PREPARED** May 29, 2007	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL	8120				
		HP Pumping Plant Yard= El. 1287					
		Site excavation for intake structure included in yard quantity.					
		Service Yard and Access Road					
	1	Stripping (remove and dispose 6" of topsoil)		34,500	SY	$ 5.00	$ 172,500.00
	2	Common excavation to Service Yard El. 1287		16,530	CY	$ 7.00	$ 115,710.00
	3	Place and compact embankment for service yard		18,500	CY	$ 10.00	$ 185,000.00
	4	Furnish and place 6-inch thick gravel surfacing		19,000	SY	$ 8.00	$ 152,000.00
	5	Furnish and place base course material - 6" thick		1,930	TONS	$ 30.00	$ 57,900.00
	6	Furnish and place bituminous Pavement - 3" thick		1,035	TONS	$ 95.00	$ 98,325.00
	7	Furnish and install 7-foot chain link fence for service yard		2,145	LF	$ 25.00	$ 53,625.00
	8	Furnish and install 7-foot x 24-foot access gate		1	EA	$ 4,400.00	$ 4,400.00
		Dewatering During Construction:					
		Included in quantities under River Intake.					
		Structural Excavation and Backfill					
		Assume top of rock= El. 1262.0					
		Assume stockpile rock for later use as riprap or rockfill.					
	9	Excavation of common materials for structures		79,900	CY	$ 7.00	$ 559,300.00
	10	Excavation of rock for structures (drill & shoot)		23,800	CY	$ 30.00	$ 714,000.00
	11	Furnish backfill for structures (assume local borrow, include in #12)		63,200	CY	$ -	$ -
	12	Place backfill around structures		63,200	CY	$ 4.00	$ 252,800.00
	13	Compact backfill around structures		63,200	CY	$ 3.60	$ 227,520.00
	14	Furnish & place embedment material for manifold		485	CY	$ 100.00	$ 48,500.00
		pipe trench (CLSM)					
		Sheet Subtotal =					**$ 2,641,580.00** ✓

QUANTITIES		PRICES	
BY Brian Goplen	**CHECKED** John Pattie	**BY** Jerry Zander	**CHECKED**
DATE PREPARED April 26, 2007	**PEER REVIEW** Dick LaFond	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL	8120				
		Concrete for Structures					
		Includes: Pumping Plant Structure = 13,000 CY					
		Air Chamber Foundation = 1800 CY					
		Flow Meter Vault = 240 CY					
		Miscellaneous Slabs = 10 CY					
	15	Furnish, form, and place reinforced concrete		15,050	CY	$ 790.00	$ 11,889,500.00
	16	Furnish and place concrete reinforcement.		1,956,500	LBS	$ 1.40	$ 2,739,100.00
		Assume 130 #/CY					
	17	Furnish and handle cement (.282T/CY)		4,244	TONS	$ 130.00	$ 551,720.00
	18	Furnish and install 6" PVC Waterstop		8,000	LF	$ 9.00	$ 72,000.00
		Structural Steel					
	19	Furnish and install structural steel (painted):					
		Superstructure roof trusses and crane girders		328,000	LBS	$ 5.00	$ 1,640,000.00
		Miscellaneous Metalwork					
	20	Furnish and install miscellaneous metalwork		73,000	LBS	$ 10.00	$ 730,000.00
	21	Pre-engineered metal stairs		26,000	LBS	$ 9.00	$ 234,000.00
	22	Roof Hatches: Bilco Type 8'x14' Type D Double leaf insul alum.		1	EA	$ 17,000.00	$ 17,000.00
	23	Floor Hatches: 3'x3' Type J alum floor hatch		3	EA	$ 9,000.00	$ 27,000.00
		Metal decking for roof system					
	24	1.5B20		15,820	SF	$ 5.50	$ 87,010.00
	25	1.5VL22		780	SF	$ 10.00	$ 7,800.00
	26	Air chamber cover:		1	LS	$ 830,000.00	$ 830,000.00
		Triang. Alum. Space Truss w/ non corrugated closure					
		panels. 58 ft. dia. clear span, 7 ft. high					
		self supporting from periphery concrete walls					
		(similar to Durango Pumping Plant)					
		Sheet Subtotal =					**$ 18,825,130.00**

QUANTITIES		PRICES	
BY Brian Goplen	**CHECKED** Dick LaFond	**BY** Jerry Zander	**CHECKED**
DATE PREPARED April 26, 2007	**PEER REVIEW** Dick LaFond	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ARCHITECTURAL	8120				
	27	**Standing Seam Roofing System**		15,820	SF	$ 8.80	$ 139,216.00
		Service Bay - 1" high rib @ 18" o.c., 24ga.,					
		G-90 hot-dipped galvanized steel, UL 90 rated					
		Large roof - 3/12 hipped - 3,460 s.f.					
		Small roof - 3/12 hipped - 560 s.f.					
		Unit Bay - 1" high rib @ 18" o.c., 24ga., G-90,					
		hot-dipped galvanized steel, UL 90 rated					
		Gabled with 3/12 pitch each side - 11,800 s.f.					
		Roofing Felt					
	28	2-layers 15# - 31,640 s.f.	8120	31,640	SF	$ 0.60	$ 18,984.00
		Roof Insulation					
	29	4" thick, rigid	8120	4,020	SF	$ 4.20	$ 16,884.00
	30	2" thick, rigid	8120	11,800	SF	$ 2.20	$ 25,960.00
		Roll-up Doors (complete with hardware)					
		Exterior					
	31	4'-0" x 7'-0", manual operated, insulated roll-up door		1	EA.	$ 6,400.00	$ 6,400.00
	32	14'-0" x 14'-0", manual operated, insulated roll-up door		1	EA.	$ 9,000.00	$ 9,000.00
		Steel Doors & Frames (complete with hardware)					
		Interior					
	33	3'-0" x 7'-0" x 1 3/4", single, 90 min.		18	EA.	$ 1,100.00	$ 19,800.00
	34	3'-0" x 7'-0" x 1 3/4", double, 90 min.		5	EA.	$ 1,700.00	$ 8,500.00
		Sheet Subtotal =					**$ 244,744.00**

QUANTITIES		PRICES	
BY Brian Goplen	**CHECKED** Dick LaFond	**BY** Jerry Zander	**CHECKED**
DATE PREPARED April 26, 2007	**PEER REVIEW** Dick LaFond	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Est Notes - A

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Major Mechanical Equipment:					
		Furnish and Install:					
	35	Seven 60 cfs Pumps	8420	161,000	LBS	$ 22.00	$ 3,542,000.00
		Double suction, horizontal split-case pumps, coupling, 900 rpm, rated 480 feet TDH, ductile iron casing, s.st. impeller w/ s.st. casing/impeller wearing rings, and common steel base plate for pump and motor (23,000 lbs. ea.) - Government to witness pump shop test - pump shop testing with job motor					
	36	Seven 4,000 hp Motors	8430	210,000	LBS	$ 26.00	$ 5,460,000.00
		Horizontal synchronous, 6600 volt, 900 rpm, TEWAC motor enclosure, brushless exciter (30,000 lbs. ea.)					
		Sheet Subtotal =					**$ 9,002,000.00**

QUANTITIES

BY R. Zelenka	**CHECKED** T. Hummel 4/24/07
DATE PREPARED April 23, 2007	**PEER REVIEW** T. Hummel 4/24/07

PRICES

BY Jerry Zander	**CHECKED**
DATE PREPARED May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Major Mechanical Equipment					
		Valves	8420				
	37	AWWA Class 150, Motor operated butterfly valves:					
		7 -48" Diameter valves, 7725 lbs. per valve.		54,075	LBS	$ 5.00	$ 270,375.00
	38	ANSI Class 300, Motor operated butterfly valves:					
		7 -42" Diameter valves, 6000 lbs. per valve.		42,000	LBS	$ 27.00	$ 1,134,000.00
	39	ANSI Class 300, Tilting disk check valves:					
		7 -42" Diameter valves, 8300 lbs. per valve.		58,100	LBS	$ 24.00	$ 1,394,400.00
	40	ANSI Class 300, Manually operated butterfly valves:					
		4 -24" Diameter valves, 1350 lbs. per valve.		5,400	LBS	$ 22.00	$ 118,800.00
	41	ANSI Class 300, Manually operated butterfly valves:					
		2 -16" Diameter valves, 550 lbs. per valve.		1,100	LBS	$ 27.00	$ 29,700.00
	42	2" Combination Air Valves					
		22 - 300 psi valves, 75 lbs. per valve		1,650	LBS	$ 11.00	$ 18,150.00
	43	2" Ball Valves					
		22 - 300 psi valves, 3 lbs. per valve		66	LBS	$ 100.00	$ 6,600.00
		Sheet Subtotal =					**$ 2,972,025.00**

QUANTITIES		PRICES	
BY Rick Frisz	**CHECKED** Ken Smith	**BY** J.erry Zander #3	**CHECKED**
DATE PREPARED 4-30-07	**PEER REVIEW** KRS	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Pumping Plant(12)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Steel Manifold (Suction and Discharge Manifolds)	8420				
		Steel plate used for pipe fabrication:					
		ASTM A36: Sy = 36 kpsi					
		(All pipe sizes are inside diameters)					
	44	120" ID, 3/4" wall, L= 321 ft., 968 lbs/ft (310728 lbs)		321	Lin. Ft.	$ 2,900.00	$ 930,900.00
	45	96" ID, 1" wall, L= 400 ft., 1036 lbs/ft (414400 lbs)		1,036	Lin. Ft.	$ 3,100.00	$ 3,211,600.00
	46	48" ID, 1/4" wall, L= 210 ft., 128 lbs/ft (26880 lbs)		210	Lin. Ft.	$ 380.00	$ 79,800.00
	47	42" ID., 7/16" wall, L= 210 ft., 198 lbs/ft (41580 lbs)		210	Lin. Ft.	$ 590.00	$ 123,900.00
	48	24" ID, 1/4" wall, L= 40 ft., 64 lbs/ft (2560 lbs)		40	Lin. Ft.	$ 190.00	$ 7,600.00
	49	16" ID, 1/4" wall, L= 90 ft., 43 lbs/ft (3870 lbs)		90	Lin. Ft.	$ 130.00	$ 11,700.00
		Flanges					
	50	2 - 96" AWWA Class E (3625 lb. ea.)		7,250	LBS	$ 3.70	$ 26,825.00
	51	14 - 48" AWWA Class D (440 lb. ea.)		6,160	LBS	$ 5.20	$ 32,032.00
	52	28 - 42" AWWA Class F (992 lb. ea.)		27,780	LBS	$ 5.00	$ 138,900.00
	53	21 - 36" AWWA Class D (268 lb. ea.)		5,630	LBS	$ 5.20	$ 29,276.00
	54	21 - 30" AWWA Class F (545 lb. ea.)		11,450	LBS	$ 5.10	$ 58,395.00
	55	20 - 24" AWWA Class F (384 lb. ea.)		7,680	LBS	$ 4.90	$ 37,632.00
	56	10 - 16" AWWA Class F (174 lb. ea.)		1,740	LBS	$ 5.40	$ 9,396.00
	57	2 - 120" AWWA Class D (3558 lb. ea.)		7,120	LBS	$ 3.90	$ 27,768.00
		Steel Air Chamber	8420				
	58	46 ft. ID, Spherical air chamber		705,000	LBS	$ 10.00	$ 7,050,000.00
		ASTM A 516 Grade 70 steel					
	59	200 horsepower, 750 cfm air compressor, 230 psig		1	LS	$ 220,000.00	$ 220,000.00
		Sheet Subtotal =					**$ 11,995,724.00**

QUANTITIES		PRICES	
BY Rick Frisz	**CHECKED** Ken Smith	**BY** J.erry Zander	**CHECKED**
DATE PREPARED 4-30-07	**PEER REVIEW** KRS	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
	60	Fire Suppression System: Consists of	8410	1	L.S.	$ 210,000.00	$ 210,000.00
		10 - Fire hose reels w/ 100 feet of hose					
		20 - Portable hand-held 20 lb. extinguishers					
		3 - Wheeled portable 125 lb. extinguishers					
		55 - Sprinkler system discharge heads					
		1 - 4-inch deluge valve, electric actuated					
		1 - Fire hydrant, dry type					
		1 - Fire department siamese connection					
		1 - Fire pump, horz. split-case, 500 gpm @ 300 ft of hd					
		10,000 lbs. of sch. 40 carbon steel pipe and fittings					
		1 - Clean agent gas fire suppression system for					
		4,500 ft^3 control room					
	61	Unit Cooling Water System: Consists of	8410	1	L.S.	$ 310,000.00	$ 310,000.00
		7 - Supply pumps, end-suction type, 150 gpm at 60 ft hd.					
		2 - 8-inch automatic, self cleaning strainers					
		4,000 lbs. of type K copper tubing & fittings					
		5,000 lbs. of ductile iron, mechanical joint pipe & fittings					
		4,000 lbs. of cast iron valving					
		2 - Mechanical seal end-suction pumping units; 25 gpm					
		at 100 ft hd.					
		2 - 4-inch self-cleaning filters, 25 micron					
	62	Compressed Air System: Consists of	8410	1	L.S.	$ 40,000.00	$ 40,000.00
		2 - 40 cfm @ 125 psi rotary screw air compressors					
		1 - 300 gal. carbon steel air receiver					
		1 - 80 cfm air dryer					
		3,000 lbs. of sch. 40 carbon steel pipe, valves & fittings					
	63	Service Water System: Consists of	8410	1	L.S.	$ 47,000.00	$ 47,000.00
		1 - Service water pump, 75 gpm @ 200 ft. of hd.					
		1 - Hydropneumatic steel tank, 300 gal.					
		1,500 lbs. of type K copper tubing, valves & fittings					
		10 - Service water rubber hose; 1-inch dia., 50 ft lengths					
		Sheet Subtotal =					**$ 607,000.00** ✓

QUANTITIES		PRICES	
BY: J. Grass	**CHECKED** Rick Christensen	**BY** J.erry Zander	**CHECKED**
DATE PREPARED: 4/27/07	**PEER REVIEW** Dave Hulse	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	64	Gravity Drainage System: Consists of	8410	1	L.S.	$ 150,000.00	$ 150,000.00
		50 - Floor drains, cast iron, 4-inch					
		25,000 lbs. of cast iron hub & spigot, service weight					
		soil pipe					
	65	Plant Unwatering System: Consists of	8410	1	L.S.	$ 210,000.00	$ 210,000.00
		2 - Vertical turbine type sump pump, 1000 gpm @ 50 ft hd					
		1 - Drainage jet type drainage pump					
		1,500 lbs. of type K copper tube, valves & fittings					
		4,000 lbs. of ductile iron, mechanical joint pipe & fittings					
	66	Domestic Water and Sanitary Waste and Vent System:	8410	1	L.S.	$ 71,000.00	$ 71,000.00
		Consists of:					
		4 - Water Closets					
		2 - Urinal					
		4 - Lavatories w/ faucets & accessories					
		1 - Duplex sewage ejector assembly					
		2 - Drench shower and eye wash					
		1 - Water heater, 20 gallons, electric					
		1 - Janitor's service sink, 36" x 36" molded stone					
		2,000 lbs. of cast iron hub & spigot service weight					
		sewer and vent pipe					
		800 lbs. of type K copper tubing, valves & fittings					
	67	20-ton Electric overhead traveling unit bay bridge crane,	8410	1	L.S.	$ 330,000.00	$ 330,000.00
		remote control, 56'-0" span; 30 ft. lift					
	68	20-ton Electric overhead traveling service bay bridge	8410	1	L.S.	$ 280,000.00	$ 280,000.00
		crane, remote control, 55'-0" span; 25 ft. lift					
	69	Electric passenger elevator:	8410	1	L.S.	$ 170,000.00	$ 170,000.00
		Overhead, Geared traction type, Capacity =3500 pounds,					
		Travel = 43 feet, Landings = 4, Speed = 200 ft/min.					
	70	Sump waste oil skimmer assembly, electric operated,	8410	1	L.S.	$ 17,000.00	$ 17,000.00
		w/ 55 gallon collection drum					
		Sheet Subtotal =					**$ 1,228,000.00**

QUANTITIES		PRICES	
BY: J. Grass / A. Ritt	**CHECKED** Rick Christensen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED: 4/27/07	**PEER REVIEW** Dave Hulse	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	71	Heating, Ventilating, and Air Conditioning System (HVAC)	8410	1	L.S.	$ 1,000,000.00	$ 1,000,000.00
		for pumping plant building interior consisting of					
		197-ft long by 57-ft wide by 50-ft high unit bay,					
		55-ft long by 57-ft wide by 82-ft high service bay and					
		250-ft long by 25-ft wide by 12-ft high equipment gallery					
		for a total pumping plant volume of 893,520 ft^3					
		HVAC system designed for:					
		Outdoor summer design conditions: 100 degrees F					
		dry bulb and 86 degrees F wet bulb					
		Outdoor winter design conditions: minus 3.8 degree					
		dry bulb					
		Indoor plant summer design conditions: 90 degrees F					
		Indoor plant winter freeze protection: 45 degrees F dry bulb					
		Indoor control room, communication room and					
		office : 74 degrees F cooling and 68 degrees F heating					
		HVAC equipment consists of:					
		Central air handling units w/ hot water heating coils					
		Hot water boilers, circulating pumps and appurtenances					
		Office, control and communicating rooms air conditioning units					
		Unit heaters - hot water type					
		Electric fan forced wall heaters					
		Stairwell ventilation fans					
		Ducts - galvanized steel					
		Fire and smoke dampers					
		Backdraft dampers					
		Centrifugal fans					
		Propeller fans					
		Register/grills/louvers					
		Panel filters					
		Control system					
		Copper tubing					
		5,000 gallon propane tank and appurtenances					
		Carbon steel gas piping components					
		Sheet Subtotal =					**$ 1,000,000.00**

QUANTITIES		PRICES	
BY: J. Grass / P. Schlein	**CHECKED** Rick Christensen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED: 4/27/07	**PEER REVIEW** Dave Hulse	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	72	200 Kw diesel engine generator set with 500 gallon fuel tank (assume ConVault tank)	8410	1	L.S.	$ 120,000.00	$ 120,000.00
		Sheet Subtotal =					**$ 120,000.00**

QUANTITIES		PRICES	
BY: R. Christensen	**CHECKED** John Grass	**BY** Jerry Zander	**CHECKED**
DATE PREPARED: 4/28/07	**PEER REVIEW** Dave Hulse	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Electrical

PROJECT:

Yakima River Basin Water Storage Study

WOID: YRSSW | **ESTIMATE LEVEL:** Appraisal

REGION PN | **PRICE LEVEL:** Apr-07

FILE: C:\Documents and Settings\jwzander\My Documents\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Est Notes - A

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		15 kV Non-Segregated-Phase Bus (F&I)	8430				
	73	15 kV, 3,000 amperes, outdoor type		300	FT	$ 6,500.00	$ 1,950,000.00
		15 kV Metal-Clad Switchgear (F&I)	8430				
	74	Indoor metal-clad switchgear with following features:		1	EA	$ 400,000.00	$ 400,000.00
		15 kV, 3,000 ampere bus					
		three 3,000 ampere vacuum power circuit breakers*					
		two 1,200 ampere vacuum power circuit breakers*					
		Plant Station-Service Equipment (F&I)	8430				
	75	Indoor double-ended secondary unit substation with		1	EA	$ 220,000.00	$ 220,000.00
		following features:					
		600 volts, 2,000 ampere main bus					
		Two dry-type transformers 6.9 kV-480Y/277 V, 1,500 KVA					
		Two 480 V power-circuit breakers, 2,000 amperes					
		Six 480 V power-circuit breakers, 800 amperes					
		7.2 kV Motor Control Equipment (F&I)	8430				
	76	NEMA 1 enclosure with following features:		1	EA	$ 2,800,000.00	$ 2,800,000.00
		7.2 kV, 3,000 ampere bus					
		Seven 400 ampere, class E2 full-voltage vacuum					
		contactors					
		Excitation equipment for 7 synchronous motors					
		Motor Control Centers (F&I)	8430				
	77	480 volts, 3-phase with 800 ampere bus		2	EA	$ 50,000.00	$ 100,000.00
		Five 20 inch wide sections w/ following equipment:					
		7 NEMA size 0 FVR contactors **					
		2 NEMA size 2 FVNR contactors ***					
		Three 100 A, 3-pole molded-case circuit breakers					
		* Continuous current rating					
		** FVR - Full-voltage reversing					
		*** FVNR - Full-voltage non-reversing					
		Sheet Subtotal =					**$ 5,470,000.00**

QUANTITIES		PRICES	
BY Mike Schuh	**CHECKED** GN Girgis	**BY** J.erry Zander	**CHECKED**
DATE PREPARED April 25, 2007	**PEER REVIEW** George Girgis GN Girgis	**DATE PREPARED** May 29, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Yakima River Pumping Plant

Electrical

PROJECT:

Yakima River Basin Water Storage Study

WOID: YRSSW | **ESTIMATE LEVEL:** Appraisal

REGION PN | **PRICE LEVEL:** Apr-07

FILE: C:\Documents and Settings\jwzander\My Documents\2007 JWZ Estimates\Red River 3 - WTP\Estimators Log\[Estimators Log - Red River 3 - ND.xls]Estimate Log

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	78	**Distribution Panelboards (F&I)**	8430				
	a	480 volts, 3-phase with 800 ampere bus &		4	EA	$ 8,000.00	$ 32,000.00
		main circuit breaker					
	b	208Y/120, 3-phase with 225 ampere bus &		3	EA	$ 3,500.00	$ 10,500.00
		main circuit breaker					
	79	**Lighting & Distribution Transformer (F&I)**	8430				
		75 kVA, 480-208Y/120 volt, dry type		3	EA	$ 20,000.00	$ 60,000.00
		Building Lighting System (F&I)	8430				
		Interior luminaires:					
	80	High bay, high-pressure sodium, 400 W, 208 V		14	EA	$ 1,600.00	$ 22,400.00
	81	4 foot, 2 lamp, 120 V fluorescent fixtures		40	EA	$ 240.00	$ 9,600.00
	82	Exterior luminaires:					
		High-pressure sodium, wall mounted, outdoor		12	EA	$ 470.00	$ 5,640.00
		70 watt, 120 volt					
		Assumptions:					
		Redundant power transformers in switchyard					
		Split motor bus with tie breaker					
		Sheet Subtotal =					**$ 140,140.00**

QUANTITIES		PRICES	
BY Mike Schuh	CHECKED GGirgis	BY Jerry Zander #3	CHECKED
DATE PREPARED April 25, 2007	PEER REVIEW George Girgis GGirgis	DATE PREPARED May 29, 2007	PEER REVIEW

FEATURE:

Wymer Offstream Storage Facility
Switchyard and Transmission Line

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL/STRUCTURAL	8120				
	1	**Excavation** (Common)		1,005	CY	$ 21.00	$ 21,105.00
	2	**Structural Concrete**		120	CY	$ 1,400.00	$ 168,000.00
		(Switchyard foundations and pullboxes)					
	3	**Concrete Reinforcement**		15,310	LBS	$ 1.70	$ 26,027.00
	4	**Compacting Backfill about Structures**		790	CY	$ 14.00	$ 11,060.00
	5	**Switchyard Steel Structures**		35,800	LBS	$ 5.50	$ 196,900.00
	6	**Gravel Surfacing - 6-inch thick**		2,045	SY	$ 13.00	$ 26,585.00
	7	**Oil-Spill Containment System**		1	LS	$ 38,000.00	$ 38,000.00
		Geotextile fabric 4,255 SF (12 oz per sq yard, 110 mils non-woven)					
		Geomembrane liner: 2,130 SF (30 Mils XR-5 Seaman Corporation)					
		Geocel: 1,635 SF (8" deep "enviro grid" polymeric cellular confinement system)					
		Piping: 140 LF (6" Dia. Schedule 80 PVC pipe perforated)					
		Piping: 3 EA (6" Dia. Schedule 80 PVC "L")					
		Piping: 1 EA (12" Dia. 3'-2" long Schedule 80 PVC Cap)					
		Piping: 3 LF (12" Dia. Schedule 80 PVC perforated pipe)					
		Preservative-Treated Lumber: 75 LF (2"x4")					
		Expansion Anchors (Stainless steel 3/8" x 5" drilled in conc): 84 EA					
		Excavation: Included in excavation for structures					
		Uncompacted crushed aggregate: 135 CY (ASTM C33 Size No 4, 1 1/2" to 3/4")					
	8	**Gravelfill for Switchyard Foundations** (Compacted)		65	CY	$ 55.00	$ 3,575.00
	9	**5-Inch PVC Schedule 80 Conduit** (CIP Power Duct Bank)		115	LF	$ 270.00	$ 31,050.00
		Includes:					
		115 LF of 1.5' tall x 2.33' wide concrete CIP					
		15 CY of concrete					
		1970 lbs of reinforcement					
	10	**7-foot Chain link fence**		400	LF	$ 37.00	$ 14,800.00
		Sheet Subtotal =					**$ 537,102.00**

QUANTITIES		**PRICES**	
BY Brian Goplen	**CHECKED** Dick LaFond	**BY** Jerry Zander	**CHECKED**
DATE PREPARED April 26, 2007	**PEER REVIEW** Dick LaFond	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Switchyard and Transmission Line

Electrical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: H:\D8170\EST\Spreadsheet\Mar\Wymer Offstream Storage\[Wymer PP& Resrv Part of Electical Worksheets - dmar- 5-07.xls]Switchyard&T-Line(2)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Switchyard					
		Furnish and Install:					
	11	Oil-filled, conservator-type power transformer	-68440	2	EA	$ 1,100,000.00	$ 2,200,000.00
		20/26.66/33.33 MVA OA/FA/FA; 115-6.9kV, 3-phase					
	12	115-kV disconnect switches, 1200 amp, 3-phase	-68440	4	EA	$ 35,000.00	$ 140,000.00
	13	115-kV circuit breakers, 1200 amp, 31.5-kA Int,	-68440	2	EA	$ 160,000.00	$ 320,000.00
		3-phase, dead-tank, SF6 type					
	14	115-kV oil-filled voltage transformers	-68440	3	EA	$ 21,000.00	$ 63,000.00
	15	115-kV oil-filled 1200:5 MR current transformers	-68440	3	EA	$ 20,000.00	$ 60,000.00
	16	**Construct Transmission Line**	-68440	5	MILES	$ 550,000.00	$ 2,750,000.00
		115-kV, steel single-pole towers, 556.5 AWG,					
		26/7 ACSR conductor					
		Sheet Subtotal =					**$ 5,533,000.00**

QUANTITIES		PRICES	
BY Doug Crawford	**CHECKED** Jim Zeiger	**BY** Dan Mar	**CHECKED**
DATE PREPARED April 20, 2007	**PEER REVIEW** Jim Zeiger	**DATE PREPARED** 05-22-07	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Discharge Line to Reservoir

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Discharge Line					
		Discharge line quantities are from PP yard to outlet.					
		Discharge line piping through dam covered by 8410					
		Discharge line outlet: El. 1610, right abutment					
		Earthwork for Discharge Pipe					
		Price Alternative 2. Alternative 1 for reference only.					
		Alternative 1 - Payline Quantities - Vertical Trench Walls					
		Clearing and Grubbing (150 ft wide along pipeline)	8140	78,000	SY		
		Common Excavation for pipe	8140	24,000	CY		
		Rock Excavation for pipe - (drill and shoot)	8140	30,000	CY		
		Backfill for pipe	8140	22,000	CY		
		Rockfill for pipe (used instead of backfill under dam)	8140	12,000	CY		
		Soil Cement Slurry (CLSM)	8140	3,700	CY		
		Alternative 2 - Takeoff Quantities - 1-1/2:1 Trench Walls					
		except use 1/2:1 trench walls under dam)					
	1	Clearing and Grubbing (150 ft wide along pipeline)	8140	78,000	SY	$ 1.00	$ 78,000.00
	2	Common Excavation for pipe	8140	135,000	CY	$ 6.00	$ 810,000.00
	3	Rock Excavation for pipe - (drill and shoot)	8140	100,000	CY	$ 23.00	$ 2,300,000.00
	4	Backfill for pipe	8140	181,000	CY	$ 4.50	$ 814,500.00
	5	Rockfill for pipe (used instead of backfill under dam)	8140	37,000	CY	$ 44.00	$ 1,628,000.00
	6	Soil Cement Slurry (CLSM)	8140	14,000	CY	$ 100.00	$ 1,400,000.00
		96-inch Diameter Steel Pipe					
		(Mortar lined w/ flexible lining)					
	7	96 300, pipe thickness = 0.4375 (456 lb/ft steel weight)	8140	1,310	LF	$ 1,140.00	$ 1,493,400.00
	8	96 350, pipe thickness = 0.500 (521 lb/ft steel weight)	8140	400	LF	$ 1,300.00	$ 520,000.00
	9	96 425, pipe thickness = 0.625 (652 lb/ft steel weight)	8140	600	LF	$ 1,630.00	$ 978,000.00
	10	96 475, pipe thickness = 0.6875 (718 lb/ft steel weight)	8140	500	LF	$ 1,800.00	$ 900,000.00
	11	96 525, pipe thickness = 0.75 (784 lb/ft steel weight)	8140	300	LF	$ 1,960.00	$ 588,000.00
	12	96 575, pipe thickness = 0.8125 (850 lb/ft steel weight)	8140	300	LF	$ 2,130.00	$ 639,000.00
	13	96 650, pipe thickness = 0.9375 (982 lb/ft steel weight)	8140	400	LF	$ 2,460.00	$ 984,000.00
	14	96 700, pipe thickness = 1.0 (1048 lb/ft steel weight)	8140	400	LF	$ 2,620.00	$ 1,048,000.00
	15	**Cathodic protection for pipeline**	8140	1	LS	$ 63,000.00	$ 63,000.00
	16	**96"x96"x36" Tee for buried manhole**	8140	1	EA	$ 59,000.00	$ 59,000.00
		Sheet Subtotal =					**$ 14,302,900.00**

QUANTITIES		**PRICES**	
BY Anne Pavol	**CHECKED** Linda M. Bowles/Joe Gemperline	**BY** J.erry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW** David K. Edwards	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Discharge Line to Reservoir

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		SH821 Detour for open cut discharge line					
	17	Remove and Replace Concrete Asphalt on SH821	8140	135	ton	$ 110.00	$ 14,850.00
	18	Remove and Replace Aggregate base on SH821	8140	250	ton	$ 50.00	$ 12,500.00
	19	Compacted Embankment	8140	6,900	CY	$ 18.00	$ 124,200.00
	20	Concrete Asphalt for detour	8140	630	ton	$ 100.00	$ 63,000.00
	21	Aggregate base for detour	8140	1,150	ton	$ 50.00	$ 57,500.00
	22	Concrete Jersey Barriers	8140	200	LF	$ 100.00	$ 20,000.00
	23	Detour signage	8140	1	LS	$ 70,000.00	$ 70,000.00
	24	Detour removal	8140	1	LS	$ 40,000.00	$ 40,000.00
		Discharge Line Outlet Structure					
	25	Excavation of common materials for structures (2:1)	8140	960	CY	$ 22.00	$ 21,120.00
	26	Backfill (2:1)	8140	700	CY	$ 28.00	$ 19,600.00
	27	Compacted Backfill (2:1)	8140	700	CY	$ 10.00	$ 7,000.00
	28	Embankment	8140	790	CY	$ 15.00	$ 11,850.00
	29	Compacted Embankment	8140	790	CY	$ 7.00	$ 5,530.00
	30	Riprap (d50=24") (120 lb/cf)	8140	1,100	TONS	$ 70.00	$ 77,000.00
	31	Riprap Bedding (130 lb/cf)	8140	450	TONS	$ 50.00	$ 22,500.00
	32	Furnish, form, and place reinforced concrete	8140	240	CY	$ 1,580.00	$ 379,200.00
	33	Furnish and place concrete reinforcement.	8140	29,000	LBS	$ 1.65	$ 47,850.00
		Assume 120 #/CY					
	34	Furnish and handle cement (.282T/CY)	8140	60	TONS	$ 180.00	$ 10,800.00
		Discharge Line Outlet Chute					
	35	Excavation of common materials for structures (2:1)	8140	16,000	CY	$ 15.00	$ 240,000.00
	36	Backfill (2:1)	8140	3,600	CY	$ 22.40	$ 80,640.00
	37	Compacted Backfill (2:1)	8140	3,600	CY	$ 8.00	$ 28,800.00
	38	Embankment (chute crosses swale)	8140	44,000	CY	$ 8.70	$ 382,800.00
	39	Compacted Embankment (chute crosses swale)	8140	44,000	CY	$ 3.50	$ 154,000.00
	40	Riprap (d50=24") (120 lb/cf)	8140	8,300	TONS	$ 63.00	$ 522,900.00
	41	Riprap Bedding (130 lb/cf)	8140	3,700	TONS	$ 45.00	$ 166,500.00
	42	Furnish, form, and place reinforced concrete	8140	1,550	CY	$ 1,270.00	$ 1,968,500.00
	43	Furnish and place concrete reinforcement.	8140	185,000	LBS	$ 1.50	$ 277,500.00
		Assume 120 #/CY					
	44	Furnish and handle cement (.282T/CY)	8140	430	TONS	$ 160.00	$ 68,800.00
		Sheet Subtotal =					**$ 4,894,940.00**

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Anne Pavol	Joe Gemperline/ K. A. Sayer	J.erry Zander	
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED**	**PEER REVIEW**
May 1, 2007	David K. Edwards	May 31, 2007	

FEATURE:

Wymer Offstream Storage Facility
Discharge Line
Access conduit

Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	45	**Concrete**	8130				
		Concrete in access house (18 x 18 x 1 foot walls)		60	CY	$ 1,850.00	$ 111,000.00
		Concrete in access shaft (H = 50')		240	CY	$ 1,580.00	$ 379,200.00
		Concrete in Gate Chamber (20 ft dia.)		210	CY	$ 1,600.00	$ 336,000.00
		Concrete in access conduit (L =440)		1,980	CY	$ 1,175.00	$ 2,326,500.00
		Concrete in pipe saddles		35	CY	$ 1,950.00	$ 68,250.00
		(concrete total)		2,525			
	46	Furnish and place concrete reinforcement.					
		Assume 160 #/CY		404,000	LBS	$ 1.50	$ 606,000.00
	47	Furnish and handle cement (.282T/CY)		712	TONS	$ 150.00	$ 106,800.00
		Sheet Subtotal =					**$ 3,933,750.00**

QUANTITIES		PRICES	
BY Doug Stanton	**CHECKED** Tom Scobell	**BY** J.erry Zander	**CHECKED**
DATE PREPARED May 2, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Discharge Line to Reservoir

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: H:\D8170\EST\Spreadsheet\Mar\Wymer Offstream Storage\[Wymer PP& Resrv - Part of Electical Worksheets - dmar- 5-07.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
	48	Heating and Ventilating System for Discharge	8410	1	L.S.		$ 75,000.00
		Line Valve Access Tunnel:					
		Consists of:					
		2 - Electric unit heater; 7.5 kw					
		1 - Centrifugal fan; 750 cfm					
		1 - Propeller fan; 2400 cfm					
		1 - Axial fan: 5,000 cfm					
		550 ft. Oval steel duct; 38-inch x 16-inch; galvanized					
		2 - Control damper; 60-inch by 60-inch; motor-operated					
		2 - Control damper; 32-inch by 32-inch; motor-operated					
		2 - 60-inch by 60-inch stationary louver					
		2 - 32-inch by 32-inch stationary louver					
	49	Ventilating System for Flowmeter Vault:	8410	1	L.S.		$ 6,000.00
		Consists of:					
		1 - Centrifugal fan, 450 cfm					
		25 ft. carbon steel pipe and fittings, 8-inch dia., galv.					
	50	Ventilating System for Air Chamber	8410	1	L.S.		$ 25,000.00
		Structure:					
		Consists of:					
		1 - Centrifugal fan, 4000 cfm					
		50 ft. carbon steel pipe and fittings, 18-inch dia., galv.					
	51	Ultrasonic flowmeter, 2-path	8410	1	L.S.		$ 95,000.00
	52	Bulkhead gate (13' x 13'), bulkhead gate frame	8410	39,000	LBS	$ 6.00	$ 234,000.00
		and guides above frame (steel)					
		Sheet Subtotal =					**$ 435,000.00**

QUANTITIES		PRICES	
BY: J. Grass / P. Schlein R. Christensen	CHECKED Rick Christensen	BY Dan Mar	CHECKED
DATE PREPARED: 4/28/07	PEER REVIEW Dave Hulse	DATE PREPARED 05-29-07	PEER REVIEW

FEATURE:

Wymer Offstream Storage Facility
Discharge Line to Reservoir

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical					
		Discharge/Isolation Valve					
	53	96-inch dia. Motor-operated Slide gate					
		(for Discharge manifold outlet into the					
		reservoir. Pressure on downstream side of gate)					
		Differential head = 132 feet					
		Slide gate frame, slide, and stem: 25,000 #					
		Motor operator: 1,800 #	8420	26,800	LBS	$ 9.00	$ 241,200.00
		Steel Pipe: Sta. 49+00 to Sta. 53+70 (End of Discharge Pipe)					
	54	96-inch ID, 3/8-inch wall, 386 lb/ft	8420	470	LF	$ 970.00	$ 455,900.00
	55	14-inch OD steel pipe for filling line					
		(1/4-inch wall, 38 lb per lin. ft.)	8420	20	LF	$ 100.00	$ 2,000.00
		Valves					
	56	AWWA Class 150, manually operated butterfly valves (for filling line):					
		2 -14" Diameter valves, 400 lbs. per valve.	8420	800	LBS	$ 15.00	$ 12,000.00
		Sheet Subtotal =					**$ 711,100.00**

QUANTITIES

BY	CHECKED
Don Read, Rick Frisz	Rick Frisz, Ken Smith
DATE PREPARED	**PEER REVIEW**
May 1, 2007	KRS

PRICES

BY	CHECKED
Jerry Zander JWZ	GP
DATE PREPARED	**PEER REVIEW**
May 31, 2007	DCA

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Discharge Line to Reservoir

Electrical

PROJECT:

Yakima River Basin Water Storage Study

WOID: YRSSW **ESTIMATE LEVEL:** Appraisal

REGION PN **PRICE LEVEL:** Apr-07

FILE: H:\D8170\EST\Spreadsheet\Mar\Wymer Offstream Storage\[Wymer PP& Resrv - Part of Electical Worksheets - dmar- 5-07.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Access Shaft/Gate Chamber Structure					
		Bldg Electrical Service Equipment (F&I)	8430				
	57	Distribution panelboard, indoor type		1	EA	$ 10,500.00	$ 10,500.00
		480 volts, 3-phase with 225 ampere bus					
	58	Transformer load center		1	EA	$ 8,300.00	$ 8,300.00
		15 kVA, 1-phase, 480-240/120 volt					
		Combination Motor Starters (F&I)	8430				
	59	NEMA size 2 reversing contactor, 480V, 3-phase		1	EA	$ 5,000.00	$ 5,000.00
		480-120 volt control transformer					
		NEMA type 4 enclosure					
		Lighting System (F&I)	8430				
	60	120 volt, fluorescent NEMA type 4 fixtures for		1	LS		$ 5,000.00
		tower/gate chamber					
		Assumptions:					
		Bringing power to dam is part of unlisted items					
		Sheet Subtotal =					**$ 28,800.00**

QUANTITIES		PRICES	
BY: Mike Schuh	CHECKED: George Girgis	BY: Dan Mar	CHECKED
DATE PREPARED: April 25, 2007	PEER REVIEW: George Girgis	DATE PREPARED: 05-29-07	PEER REVIEW

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Concrete-Faced Rockfill Dam

Dam Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GENERAL SITEWORK	8312				
		Assume no clearing and grubbing required					
		Assume road improvements and haul roads are part of unlisted items					
		DIVERSION & DEWATERING	8312				
		Given shallow alluvium & narrow valley, dewatering assumed to be minor (part of unlisted items)					
		FOUNDATION EXCAVATION					
		Assume common material stockpiled for reuse in misc. fill, haul roads, and similar					
		Assume rock material stockpiled for use (zone 4)					
		Stockpiles will be located within 1/2 mile of dam					
	1	Excavation, stripping, of dam foundation	8312	110,000	CY	$ 2.50	$ 275,000.00
		Assume depth of stripping 12 inches or less					
		Assume stripping will be stockpiled for topsoil use					
	2	Excavation, common, for dam foundation	8312	2,680,000	CY	$ 5.00	$ 13,400,000.00
		Assume about 35% of volume requires ripping					
		Assume suitable materials will be stockpiled for use as miscellaneous fill					
	3	Excavation, rock, for dam foundation	8312	22,000	CY	$ 28.00	$ 616,000.00
		Assume drill and blast in areas along plinth					
		FOUNDATION TREATMENT					
		Includes misc. surface foundation treatment, consolidation grouting, and curtain grouting					
	4	Slush grouting of foundation surface	8312	35,000	SF	$ 6.00	$ 210,000.00
		Over assumed 40% of plinth area					
	5	Dental concrete	8312	2,000	CY	$ 200.00	$ 400,000.00
	6	Furnish/place zone 2 sand filter on foundation	8312	40,000	CY	$ 45.00	$ 1,800,000.00
		Over assumed 10% of area between u/s toe and axis					
		Assume a 3-ft thickness above & below zone 3					
	7	Furnish/place zone 3 gravel drain on foundation	8312	20,000	CY	$ 40.00	$ 800,000.00
		Between the zone 2 filters in a 3-ft thickness					
		Sheet Subtotal =					**$ 17,501,000.00**

QUANTITIES		**PRICES**	
BY Will Gonzales	**CHECKED** Bill Engemoen	**BY** J.erry Zander	**CHECKED**
DATE PREPARED May 2, 2007	**PEER REVIEW** Chuck Redlinger	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Concrete-Faced Rockfill Dam

Dam Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID: YRSSW **ESTIMATE LEVEL:** Appraisal

REGION PN **PRICE LEVEL:** Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		FOUNDATION TREATMENT (continued)					
		Consolidation Grouting of Foundation					
		Generally limited to area beneath plinth					
	8	Setups for drilling grout holes	8312	2,100	EA	$ 150.00	$ 315,000.00
		Assume 2-inch dia. drilled on 7.5-foot centers					
	9	Drill grout holes	8312	63,000	LF	$ 35.00	$ 2,205,000.00
		Assume 2-inch dia. w/length= 30 feet					
	10	Hookups to grout holes	8312	2,100	EA	$ 60.00	$ 126,000.00
	11	Pressure grout	8312	130,000	CF	$ 10.00	$ 1,300,000.00
		Assume grouting process only minus cement					
		Assume 2 CF per 1 LF of hole					
	12	Furnish and handle cement for pressure grouting	8312	130,000	BAGS	$ 11.00	$ 1,430,000.00
		Assume 1 bag per CF					
		Curtain Grouting of Foundation					
		Three-row curtain beneath plinth					
	13	Setups for drilling grout holes	8312	1,200	EA	$ 150.00	$ 180,000.00
		Assume 3 rows of 2-inch dia.on 10-ft centers					
	14	Drill grout holes	8312	180,000	LF	$ 40.00	$ 7,200,000.00
		Assume 2-inch dia. w/length from 75 to 225 feet,					
		with average of 150 feet					
	15	Hookups to grout holes	8312	1,200	EA	$ 60.00	$ 72,000.00
	16	Pressure grout	8312	540,000	CF	$ 10.00	$ 5,400,000.00
		Assume grouting process only minus cement					
		Assume 3 CF per 1 LF of hole					
	17	Furnish and handle cement for pressure grouting	8312	540,000	BAGS	$ 10.00	$ 5,400,000.00
		Sheet Subtotal =					**$ 23,628,000.00**

QUANTITIES

BY	CHECKED
Will Gonzales	Bill Engemoen
DATE PREPARED	**PEER REVIEW**
May 2, 2007	Chuck Redlinger

PRICES

BY	CHECKED
Jerry Zander	
DATE PREPARED	**PEER REVIEW**
May 31, 2007	

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Concrete-Faced Rockfill Dam

Dam Civil/Structural

PROJECT: Yakima River Basin Water Storage Study

WOID: YRSSW | **ESTIMATE LEVEL:** Appraisal

REGION PN | **PRICE LEVEL:** Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		EMBANKMENT CONSTRUCTION					
		Items are set up as furnish and place, which would include purchasing from commercial sites, processing onsite, development of quarry, or transporting from stockpiles of required excavation					
	18	Furnish and place zone 1	8312	285,000	CY	$ 10.00	$ 2,850,000.00
		Consists of selected impervious soils stockpiled from reqd exc within 1/2 mile of dam					
		Compaction to 6-inch lifts by tamping roller					
	19	Furnish and place zone 2 filter	8312	450,000	CY	$ 40.00	$ 18,000,000.00
		Sand/gravel material processed commercially or developed onsite					
		If commercial, assume 17 mile one-way haul					
		Compacted to 12-inch layers by vibratory steel drum					
	20	Furnish and place zone 3 drain	8312	450,000	CY	$ 30.00	$ 13,500,000.00
		Gravel/cobble material processed commercially or developed onsite					
		If commercial, assume 17 mile one-way haul					
		Compacted to 12-inch layers by vibratory steel drum					
	21	Furnish and place zone 4 rockfill	8312	12,240,000	CY	$ 11.50	$ 140,760,000.00
		Developed from basalt ridges surrounding reservoir					
		Assume average 2-mile haul to dam					
		Rock sizes up to 3-foot					
		Compacted in 3-ft layers by vibratory steel drum					
	22	Furnish and place miscellaneous fill	8312	1,500,000	CY	$ 8.00	$ 12,000,000.00
		Comes from stockpiles of required excavation within 1/2 mile of dam					
		Generally consists of gravelly soils					
		Compacted in 2-ft layers by vibratory steel drum					
		Sheet Subtotal =					**$ 187,110,000.00**

QUANTITIES		PRICES	
BY Will Gonzales	**CHECKED** Bill Engemoen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 2, 2007	**PEER REVIEW** Chuck Redlinger	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Concrete-Faced Rockfill Dam

Dam Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CONCRETE FACE & PLINTH CONSTRUCTION					
		Plinth					
		Typical thickness will be 1.5 feet					
		Width will range from 10 to 45 feet, avg=20 ft					
		Grouted anchors may be needed in poor rock areas					
	23	Furnish and place reinforced concrete in plinth	8312	4,500	CY	$ 550.00	$ 2,475,000.00
	24	Furnish and place concrete reinforcement (100#/CY)	8312	450,000	LBS	$ 1.50	$ 675,000.00
	25	Furnish and handle cement for concrete (.282T/CY)	8312	1,300	TONS	$ 145.00	$ 188,500.00
	26	Furnish and install grouted anchors	8312	86,000	LF	$ 26.00	$ 2,236,000.00
		Assume 1-inch diameter rebar grouted into rock					
		Assume 15-foot lengths					
		Concrete Deck					
		Thickness will average 2 feet					
		Adjacent panels will have waterstops and dowels					
		Concrete paved on 1.5:1 upstream face of dam					
	27	Furnish and place reinforced concrete in deck	8312	125,000	CY	$ 385.00	$ 48,125,000.00
	28	Furnish and place concrete reinforcement (100#/CY)	8312	12,500,000	LBS	$ 1.30	$ 16,250,000.00
	29	Furnish and handle cement for concrete (.282T/CY)	8312	35,000	TONS	$ 110.00	$ 3,850,000.00
		MISCELLANEOUS					
		Instrumentation					
		Assume part of unlisted items					
		Toe Drains					
		Assume part of unlisted items					
		Site cleanup and relandscaping					
		Assume part of unlisted items					
		Sheet Subtotal =					**$ 73,799,500.00**

QUANTITIES		PRICES	
BY Will Gonzales	**CHECKED** Bill Engemoen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 2, 2007	**PEER REVIEW** Chuck Redlinger	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Central Core Rockfill Dike

Dike Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GENERAL SITEWORK					
		Assume no clearing and grubbing required					
		Assume road improvements and haul roads are					
		part of unlisted items					
		DIVERSION & DEWATERING					
		Assume groundwater is below excavation					
		Assume natural stream beds in area are dry					
		FOUNDATION EXCAVATION					
		Assume common material stockpiled for reuse					
		Assume rock material stockpiled for reuse					
		Stockpiles will be located within 1/2 mile of dam					
	30	Excavation, stripping, of dam foundation	8312	45,000	CY	$ 4.00	$ 180,000.00
		Assume depth of stripping 12 inches or less					
		Assume stripping will be stockpiled for topsoil use					
	31	Excavation, common, for dam foundation	8312	1,260,000	CY	$ 5.00	$ 6,300,000.00
		Assume about 35% of volume requires ripping					
		Assume suitable materials will be stockpiled					
		for use as miscellaneous fill					
	32	Excavation, rock, for dam foundation	8312	2,000	CY	$ 48.00	$ 96,000.00
		Assume drill and blast in random locations					
		FOUNDATION TREATMENT					
		Includes misc. foundation surface treatment,					
		consolidation grouting, and curtain grouting					
		Miscellaneous Foundation Areas					
		Applied in areas of poor quality rock					
	33	Slush grouting of foundation surface	8312	36,000	SF	$ 6.00	$ 216,000.00
		Over assumed 30% of area beneath zone 1					
	34	Dental concrete	8312	2,000	CY	$ 200.00	$ 400,000.00
	35	Furnish/place zone 2 sand filter on foundation	8312	14,000	CY	$ 45.00	$ 630,000.00
		Over 10% of area between zone 1 and d/s toe					
		Assume a 3-ft thickness above and below zone 3					
	36	Furnish/place zone 3 gravel drain on foundation	8312	7,000	CY	$ 40.00	$ 280,000.00
		Between the zone 2 filters in a 3-ft thickness					
		Sheet Subtotal =					**$ 8,102,000.00**

QUANTITIES

BY	CHECKED
Will Gonzales	Bill Engemoen
DATE PREPARED	**PEER REVIEW**
May 2, 2007	Chuck Redlinger

PRICES

BY	CHECKED
Jerry Zander	
DATE PREPARED	**PEER REVIEW**
May 31, 2007	

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Central Core Rockfill Dike

Dike Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		FOUNDATION TREATMENT (continued)					
		Consolidation Grouting of Foundation					
		Generally limited to area beneath zone 1					
	37	Setups for drilling grout holes	8312	1,600	EA	$ 150.00	$ 240,000.00
		Assume 2-inch dia. drilled on 10-foot centers					
	38	Drill grout holes	8312	48,000	LF	$ 35.00	$ 1,680,000.00
		Assume 2-inch dia. w/length= 30 feet					
	39	Hookups to grout holes	8312	1,600	EA	$ 60.00	$ 96,000.00
	40	Pressure grout	8312	100,000	CF	$ 10.00	$ 1,000,000.00
		Assume grouting process only minus cement					
		Assume 2 CF per 1 LF of hole					
	41	Furnish and handle cement for pressure grouting	8312	100,000	BAGS	$ 10.00	$ 1,000,000.00
		Assume 1 bag per CF					
		Curtain Grouting of Foundation					
		Two-row curtain beneath zone 1					
	42	Setups for drilling grout holes	8312	500	EA	$ 150.00	$ 75,000.00
		Assume 2-rows of 2-inch dia.on 10-ft centers					
	43	Drill grout holes	8312	45,000	LF	$ 40.00	$ 1,800,000.00
		Assume 2-inch dia. w/length from 60 to 120 feet,					
		with an average of 90 feet					
	44	Hookups to grout holes	8312	500	EA	$ 60.00	$ 30,000.00
	45	Pressure grout	8312	135,000	CF	$ 10.00	$ 1,350,000.00
		Assume grouting process only minus cement					
		Assume 3 CF per 1 LF of hole					
	46	Furnish and handle cement for pressure grouting	8312	135,000	BAGS	$ 10.00	$ 1,350,000.00
		Assume 1 bag per CF					
		Sheet Subtotal =					**$ 8,621,000.00**

QUANTITIES

BY	CHECKED
Will Gonzales	Bill Engemoen
DATE PREPARED	**PEER REVIEW**
May 2, 2007	Chuck Redlinger

PRICES

BY	CHECKED
Jerry Zander	
DATE PREPARED	**PEER REVIEW**
May 31, 2007	

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Central Core Rockfill Dike

Dike Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID: YRSSW **ESTIMATE LEVEL:** Appraisal

REGION PN **PRICE LEVEL:** Apr-07

FILE: C:\Documents and Settings\jwzander\My Documents\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Dam and Dike(8)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		EMBANKMENT CONSTRUCTION					
		Items are set up as furnish and place, which would include purchasing from commercial sites, processing onsite, development of quarry, or transporting from stockpiles of required excavation					
	47	Furnish and place zone 1 core	8312	390,000	CY	$ 13.00	$ 5,070,000.00
		Acquired from source 5 miles from dam					
		Compacted to 6-inch lifts by tamping roller					
	48	Furnish and place zone 2 filter	8312	190,000	CY	$ 42.00	$ 7,980,000.00
		Sand/gravel material processed commercially or developed onsite					
		If commercial, assume 18 mile one-way haul					
		Compacted to 12-inch layers by vibratory steel drum					
	49	Furnish and place zone 3 drain	8312	160,000	CY	$ 33.00	$ 5,280,000.00
		Gravel/cobble material processed commercially or developed onsite					
		If commercial, assume 18 mile one-way haul					
		Compacted to 12-inch layers by vibratory steel drum					
	50	Furnish and place zone 4 rockfill	8312	2,000,000	CY	$ 12.00	$ 24,000,000.00
		Developed from basalt ridges surrounding reservoir					
		Assume average 2-mile haul to dam					
		Rock sizes up to 3-foot					
		Compacted in 3-ft layers by vibratory steel drum					
	51	Furnish and place miscellaneous fill	8312	500,000	CY	$ 9.00	$ 4,500,000.00
		Comes from stockpiles of required excavation within 1/2 mile of dam					
		Generally consists of gravelly soils					
		Compacted in 2-ft layers by vibratory steel drum					
		Sheet Subtotal =					**$ 46,830,000.00**

QUANTITIES		PRICES	
BY Will Gonzales	**CHECKED** Bill Engemoen	**BY** JWZ Jerry Zander	**CHECKED**
DATE PREPARED May 2, 2007	**PEER REVIEW** Chuck Redlinger	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Dam and Dike
Central Core Rockfill Dike

Dike Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MISCELLANEOUS					
		Instrumentation					
		Assume part of unlisted items					
		Toe Drains					
		Assume part of unlisted items					
		Site cleanup and relandscaping					
		Assume part of unlisted items					
		Sheet Subtotal =					$ -

QUANTITIES		PRICES	
BY Will Gonzales	**CHECKED** Bill Engemoen	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 2, 2007	**PEER REVIEW** Chuck Redlinger	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Spillway

Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Uncontrolled Spillway (no gates)					
		Located on left abutment with crest at El. 1730					
		Earthwork	8130				
	1	Common excavation		560,000	CY	$ 5.00	$ 2,800,000.00
	2	Rock excavation (drill and blast)		145,000	CY	$ 21.00	$ 3,045,000.00
	3	Pervious backfill behind chute walls		4,000	CY	$ 11.50	$ 46,000.00
	4	Misc backfill behind chute walls		15,000	CY	$ 7.80	$ 117,000.00
	5	Riprap inlet structure		2,600	CY	$ 50.00	$ 130,000.00
	6	Bedding for riprap inlet structure		1,400	CY	$ 40.00	$ 56,000.00
	7	Riprap for stilling basin		1,700	CY	$ 50.00	$ 85,000.00
	8	Bedding for riprap stilling basin		1,000	CY	$ 40.00	$ 40,000.00
		Concrete	8130				
	9	Concrete in Inlet structure		1,100	CY	$ 1,290.00	$ 1,419,000.00
	10	Concrete in Crest structure		1,500	CY	$ 1,230.00	$ 1,845,000.00
	11	Concrete in Chute		14,500	CY	$ 795.00	$ 11,527,500.00
	12	Concrete in Stilling Basin structure		1,900	CY	$ 1,180.00	$ 2,242,000.00
	13	Furnish and place concrete reinforcement.		2,800,000	LBS	$ 1.40	$ 3,920,000.00
		Assume 150 #/CY					
	14	Furnish and handle cement (.282T/CY)		5,300	TONS	$ 130.00	$ 689,000.00
		Drains - Furnish and install	8130				
	15	6-inch dia PVC perf. And non perf. (90% perf.)		16,000	LF	$ 7.00	$ 112,000.00
	16	Furnish and install sand for drains		4,600	CY	$ 31.00	$ 142,600.00
	17	Furnish and install gravel for drains		4,000	CY	$ 31.00	$ 124,000.00
	18	Furnish and install 2-inch rigid insulation		130,000	SF	$ 2.10	$ 273,000.00
	19	Furnish and install 9-inch waterstops - spillway joints	8130	15,000	LF	$ 9.00	$ 135,000.00
	20	Drill and grout anchor bars	8130	370	EA	$ 180.00	$ 66,600.00
		(Total length of rock drilling= 1,850 feet)					
	21	Reinforcement for anchor bars	8130	9,400	LBS	$ 1.70	$ 15,980.00
	22	Furnish and install 48-inch chain link fencing	8130	6,300	LF	$ 20.00	$ 126,000.00
		for spillway					
		Sheet Subtotal =					**$ 28,956,680.00**

QUANTITIES		PRICES	
BY Tom Scobell	**CHECKED**	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Spillway

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: C:\DOCUME~1\Rlafond\LOCALS~1\Temp\[SpillwayandOW.estimateworksheet.Stanton.v3.xls]Spillway and Outlet Works

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Access Bridge across Spillway	8140				
	23	Furnish and install AASHTO Type III precast,		4	Each	$ 10,200.00	$ 40,800.00
		prestressed concrete beams, L = 65 feet					
	24	Furnish and place reinforced concrete for deck					
		parapets and diaphragms, f'c = 4,000 psi		60	CY	$ 1,850.00	$ 111,000.00
	25	Furnish and handle cement material		17	Tons	$ 195.00	$ 3,315.00
	26	Furnish and install epoxy coated reinforcing steel		16,000	LBS	$ 1.70	$ 27,200.00
		Fy = 60,000 psi					
	27	Furnish and install elastomeric bearing pads,		22	SF	$ 280.00	$ 6,160.00
		(3" x 1'-6" x 1'-10"), total # = 8					
	28	Furnish and install compression joint seals		54	LF	$ 8.00	$ 432.00
		DS Brown CV-3500 preformed neoprene					
		compression joint seals, or equal					
		Deck drains (2 per side)					
	29	R-4005-A2 as manufactured by NEENAH		4	EA	$ 525.00	$ 2,100.00
		Foundry or equal. Each one weighs~ 105 lbs					
	30	8-inch diameter black steel pipe, each L = 4'		16	LF	$ 190.00	$ 3,040.00
		Bridge will span spillway walls, which are 60-feet					
		apart. The bridge superstructure will be supported					
		on bearing seats, formed onto the spillway walls.					
		Therefore, no foundation elements are included in					
		this estimate worksheet.					
		The bridge is located near the left abutment. The					
		dam crest will be gravel surfaced. Chain link fence					
		is required along the length of the spillway, so it is					
		not included here. No approach guardrail is					
		included in this estimate (see roadwork estimate).					
		Water treatment for deck drainage is not included					
		in this estimate.					
		Sheet Subtotal =					**$ 194,047.00**

QUANTITIES

BY	CHECKED
Jesus G. Romero	Nicholas W. Clough, PE
DATE PREPARED	**PEER REVIEW**
5/1/07	David K. Edwards, PE

PRICES

BY	CHECKED
Jerry Zander	
DATE PREPARED	**PEER REVIEW**
May 31, 2007	

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Earthwork U/S - channel, intake, conduit, portal	8130				
	31	Excavate common materials for structures		500	CY	$ 35.00	$ 17,500.00
	32	Excavate rock materials for structures (drill & shoot)		1,500	CY	$ 44.00	$ 66,000.00
	33	F & P bedding for riprap (processed on-site)		70	CY	$ 40.00	$ 2,800.00
	34	F & P rockfill from dam excavation (riprap)		140	CY	$ 47.00	$ 6,580.00
	35	Furnish and install chain link fabric around portal		1,750	SF	$ 3.00	$ 5,250.00
	36	F&I 18-inch x 1/2 in. dia resin anchors for fabric support		24	EA	$ 50.00	$ 1,200.00
		Earthwork D/S - portal, conduit, house, stilling basin	8130				
	37	Excavate common materials for structures		1,000	CY	$ 35.00	$ 35,000.00
	38	Excavate rock materials for structures (drill & shoot)		3,000	CY	$ 42.00	$ 126,000.00
	39	Excavate common materials for basin		12,000	CY	$ 10.00	$ 120,000.00
	40	Excavate rock materials for basin (drill & shoot)		4,000	CY	$ 42.00	$ 168,000.00
	41	F & P bedding for riprap (processed on-site)		4,500	CY	$ 26.00	$ 117,000.00
	42	F & P rockfill from dam excavation (riprap)		2,250	CY	$ 45.00	$ 101,250.00
	43	Furnish and install chain link fabric around portal		2,000	SF	$ 3.00	$ 6,000.00
	44	F&I 18-inch x 1/2 in. dia resin anchors for fabric support		30	EA	$ 50.00	$ 1,500.00
		Construct ROW tunnel u/s of gate chamber	8130				
	45	Drill and shoot 13.5-ft O.D.circular shaped u/s tunnel		850	LF	$ 2,000.00	$ 1,700,000.00
	46	Remove and stockpile rock (assume local stockpile)		4,500	CY	$ 19.00	$ 85,500.00
		Furnish, drill and install 750-10-ft long x 1-inch dia.					
	47	A307, 20K rockbolts		5,200	LF	$ 72.00	$ 374,400.00
	48	Furnish and install 6 steel sets (W8 x 40) (full circle)		11,400	LBS	$ 6.00	$ 68,400.00
		Construct ROW tunnel d/s of gate chamber	8130				
	49	Drill and shoot 19-ft OD circular shaped d/s tunnel		1,200	LF	$ 2,800.00	$ 3,360,000.00
	50	Remove and stockpile rock (assume local stockpile)		13,000	CY	$ 19.00	$ 247,000.00
		Furnish, drill and install 1250-10-ft long x 1-inch dia.					
	51	A307, 20K rockbolts		8,800	LF	$ 72.00	$ 633,600.00
	52	Furnish and install 6 steel sets (W10 x 40) in crown		20,000	LBS	$ 6.00	$ 120,000.00
		Construct Gate chamber					
	53	Drill and shoot 20-ft OD spherical shaped chamber		20	LF	$ 3,000.00	$ 60,000.00
	54	Remove and stockpile rock (assume local stockpile)		340	CY	$ 23.00	$ 7,820.00
		Furnish, drill and install 30-10-ft long x 1-inch dia.					
	55	A307, 20K rockbolts		300	LF	$ 140.00	$ 42,000.00
		Sheet Subtotal =					**$ 7,472,800.00**

QUANTITIES		PRICES	
BY Doug Stanton	**CHECKED**	**BY** J.erry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct Upper Intake Structure					
	56	FFP reinf. Conc - Upper Intake structure	8130	250	CY	$ 1,500.00	$ 375,000.00
	57	Furnish and place reinforcement (est 200#/CY)		50,000	LBS	$ 1.60	$ 80,000.00
	58	Furnish and handle cement (.282T/CY)		71	TONS	$ 180.00	$ 12,780.00
	59	FFP reinf. Conc (Steel lined) upper intake shaft (L=30')	8130	80	CY	$ 2,050.00	$ 164,000.00
	60	Furnish and place reinforcement (est 150#/CY)		12,000	LBS	$ 1.70	$ 20,400.00
	61	Furnish and handle cement (.282T/CY)		23	TONS	$ 190.00	$ 4,370.00
		Construct Intake Shaft	8130				
	62	Drill and shoot 13.5-ft OD vertical shaft		30	LF	$ 180.00	$ 5,400.00
	63	Remove and stockpile rock (assume local stockpile)		160	CY	$ 60.00	$ 9,600.00
		Furnish, drill and install 12-10-ft long x 1-inch dia.					
	64	A307, 20K rockbolts		120	LF	$ 81.00	$ 9,720.00
		Ring Grout Upper Intake Shaft	8130				
	65	Setups for drilling grout holes (2-in dia holes, 1 ring		1	EA	$ 500.00	$ 500.00
		with 6 holes per ring					
	66	Drill grout holes (2-in dia and L=25 ft)		150	LF	$ 70.00	$ 10,500.00
	67	Hookups to grout holes		6	EA	$ 100.00	$ 600.00
	68	Pressure grout (grouting process only minus cement)		300	CF	$ 15.00	$ 4,500.00
		Assume 2 CF per 1 LF of hole					
	69	Furnish and handle cement for pressure grouting		300	BAGS	$ 17.00	$ 5,100.00
		Assume 1 bag per CF					
		Sheet Subtotal =					**$ 702,470.00**

QUANTITIES		PRICES	
BY Doug Stanton	**CHECKED**	**BY** J.erry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Ring Grout Upstream Conduit	8130				
	70	Setups for drilling grout holes (2-in dia holes, 20 ft ctrs,		43	EA	$ 250.00	$ 10,750.00
		and 6 holes per ring)					
	71	Drill grout holes (2-in dia and L=25 ft)		6,450	LF	$ 50.00	$ 322,500.00
	72	Hookups to grout holes		260	EA	$ 50.00	$ 13,000.00
	73	Pressure grout (grouting process only minus cement)		13,000	CF	$ 13.00	$ 169,000.00
		Assume 2 CF per 1 LF of hole					
	74	Furnish and handle cement for pressure grouting		13,000	BAGS	$ 15.00	$ 195,000.00
		Assume 1 bag per CF					
		Ring Grout Gate Chamber	8130				
	75	Setups for drilling grout holes (2-in dia holes, low, mid		3	EA	$ 400.00	$ 1,200.00
		and high rings and 6 holes per ring					
	76	Drill grout holes (2-in dia and L=25 ft)		450	LF	$ 60.00	$ 27,000.00
	77	Hookups to grout holes		18	EA	$ 70.00	$ 1,260.00
	78	Pressure grout (grouting process only minus cement)		900	CF	$ 14.00	$ 12,600.00
		Assume 2 CF per 1 LF of hole					
	79	Furnish and handle cement for pressure grouting		900	BAGS	$ 16.00	$ 14,400.00
		Assume 1 bag per CF					
		Sheet Subtotal =					**$ 766,710.00**

QUANTITIES		PRICES	
BY Doug Stanton	**CHECKED**	**BY** J.erry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Civil

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\|Final Est - Wymer PP and Reservoir.xls|Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Construct ROW cast in place (CIP) concrete	8130				
	80	Furnish, form, and place reinf. Conc - Intake structure		250	CY	$ 1,500.00	$ 375,000.00
	81	Furnish and place reinforcement (est 200#/CY)		50,000	LBS	$ 1.60	$ 80,000.00
	82	Furnish and handle cement (.282T/CY)		71	TONS	$ 180.00	$ 12,780.00
	83	FFP reinf. Conc - Steel lined U/S conduit (L=50' u/s of tunnel)		375	CY	$ 1,500.00	$ 562,500.00
	84	Furnish and place reinforcement (est 150#/CY)		56,250	LBS	$ 1.60	$ 90,000.00
	85	Furnish and handle cement (.282T/CY)		106	TONS	$ 175.00	$ 18,550.00
	86	FFP reinf. Conc - Steel lined U/S tunnel (L=850')		2,300	CY	$ 1,150.00	$ 2,645,000.00
	87	Furnish and place reinforcement (est 150#/CY)		350,000	LBS	$ 1.50	$ 525,000.00
	88	Furnish and handle cement (.282T/CY)		650	TONS	$ 150.00	$ 97,500.00
	89	FFP reinf. Concrete in gate chamber		180	CY	$ 1,650.00	$ 297,000.00
	90	Furnish and place reinforcement (160#/CY)		29,000	LBS	$ 1.70	$ 49,300.00
	91	Furnish and handle cement (.282T/CY)		51	TONS	$ 180.00	$ 9,180.00
	92	FFP reinf. Concrete - D/S tunnel (L=1200')		5,200	CY	$ 990.00	$ 5,148,000.00
		includes walkway and saddles					
	93	Furnish and place reinforcement (est 150#/CY)		780,000	LBS	$ 1.45	$ 1,131,000.00
	94	Furnish and handle cement (.282T/CY)		1,500	TONS	$ 145.00	$ 217,500.00
	95	FFP reinf. concrete - D/S conduit (L=130 ft d/s of tunnel)		290	CY	$ 1,500.00	$ 435,000.00
		includes walkway and saddles					
	96	Furnish and place reinforcement (est 150#/CY)		43,500	LBS	$ 1.60	$ 69,600.00
	97	Furnish and handle cement (.282T/CY)		82	TONS	$ 175.00	$ 14,350.00
	98	FFP reinf. concrete - D/S access house (30' x 30' x 12' tall)		580	CY	$ 1,400.00	$ 812,000.00
		includes wingwalls					
	99	Furnish and place reinforcement (est 150#/CY)		87,000	LBS	$ 1.60	$ 139,200.00
	100	Furnish and handle cement (.282T/CY)		164	TONS	$ 170.00	$ 27,880.00
	101	Furnish and install 48-inch chain link fencing	8130				
		on wingwalls @ Control House		80	LF	$ 43.00	$ 3,440.00
		Sheet Subtotal =					**$ 12,759,780.00**

QUANTITIES		**PRICES**	
BY Doug Stanton	**CHECKED**	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical	8410				
	102	Heating and Ventilating Systems for Outlet Works	8410	1	L.S.	$ 160,000.00	$ 160,000.00
		Access Tunnel and Control House:					
		Consists of:					
		2 - Electric unit heater; 7.5 kw					
		1 - Centrifugal fan; 750 cfm					
		1 - Propeller fan; 2400 cfm					
		1 - Axial fan: 6,000 cfm					
		1,900 ft. Oval steel duct; 38-inch x 16-inch, galvanized					
		2 - Control damper; 60-inch by 60-inch; motor-operated					
		2 - Control damper; 32-inch by 32-inch; motor-operated					
		2 - 60-inch by 60-inch stationary louver					
		2 - 32-inch by 32-inch stationary louver					
		Lower Intake					
	103	Trashracks (steel)	8410	32,400	LBS	$ 8.00	$ 259,200.00
	104	Bulkhead gate (13' x 13'), bulkhead gate frame	8410	93,800	LBS	$ 6.50	$ 609,700.00
		and guides above frame (steel)					
		Upper Intake					
	105	Trashracks (steel)	8410	32,400	LBS	$ 8.00	$ 259,200.00
	106	Bulkhead gate (13' x 13'), bulkhead gate frame	8410	86,300	LBS	$ 6.50	$ 560,950.00
		and guides above frame (steel)					
	107	Ultrasonic flowmeter, 2-path	8410	1	L.S.	$ 95,000.00	$ 95,000.00
	108	50 Kw Diesel engine-generator set with 125 gallon	8410	1	L.S.	$ 60,000.00	$ 60,000.00
		fuel tank (assume ConVault)					
		Sheet Subtotal =					**$ 2,004,050.00**

QUANTITIES

BY John Grass Paul Schlein, Rick Christensen	**CHECKED** Rick Christensen
DATE PREPARED April 28, 2007	**PEER REVIEW** Dave Hulse

PRICES

BY Jerry Zander, Dan Mar	**CHECKED**
DATE PREPARED May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Steel Pipe	8420				
	109	114-inch ID steel liner		900	LF	$ 2,700.00	$ 2,430,000.00
		(7/8-inch wall, 1074 lb per lin. ft.)					
	110	102-inch ID steel pipe, Supported on concrete saddles		1,330	LF	$ 1,400.00	$ 1,862,000.00
		(1/2-inch wall, 547 lb per lin. ft.)					
	111	72-inch ID steel pipe, encased in concrete		60	LF	$ 3,900.00	$ 234,000.00
		(3/8-inch wall, 290 lb per lin. ft.)					
	112	30-inch ID steel pipe					
		(1/4-inch wall, 80 lb per lin. ft.)		30	LF	$ 200.00	$ 6,000.00
	113	24-inch ID steel pipe for air vent					
		(1/4-inch wall, 64 lb per lin. ft.)		20	LF	$ 160.00	$ 3,200.00
	114	14-inch ID steel pipe for filling line					
		(1/4-inch wall, 38 lb per lin. ft.)		20	LF	$ 95.00	$ 1,900.00
		Valves					
	115	AWWA Class 250, manually operated butterfly valve (for air vent):					
		1 -24" Diameter valve, 1350 lbs. per valve.		1,350	LBS	$ 8.00	$ 10,800.00
	116	Combination air valve (for air vent to prevent vacuum)					
		1 -24" Diameter valve, 2600 lbs. per valve.		2,600	LBS	$ 10.00	$ 26,000.00
	117	AWWA Class 300, hydraulically operated ball valve:					
		1 -30" Diameter valve, 5900 lbs. per valve.		5,900	LBS	$ 14.00	$ 82,600.00
	118	AWWA Class 250, manually operated (filling line)butterfly valves:					
		2 -14" Diameter valves, 450 lbs. per valve.		900	LBS	$ 10.00	$ 9,000.00
		Sheet Subtotal =					**$ 4,665,500.00**

QUANTITIES		PRICES	
BY Rick Frisz	**CHECKED** Ken Smith	**BY** Jerry Zander	**CHECKED**
DATE PREPARED 4-30-07	**PEER REVIEW** KRS	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Gates and Gate Controls					
		Furnish and Install					
		7'x9' Hydraulically-actuated outlet gate					
	119	Head = 367 feet	8420	102,000	LBS	$ 8.00	$ 816,000.00
		Two tandem sets 4'x6' hydraulically-actuated outlet gates					
	120	Head = 367 feet	8420	130,000	LBS	$ 9.00	$ 1,170,000.00
		30" Hydraulically-actuated jet-flow gate and stand					
	121	Head = 367 feet	8420	10,000	LBS	$ 10.00	$ 100,000.00
		Hydraulic controls for 7'x9' emergency outlet gate, and					
	122	four 4'x6' outlet gates	8420	3,200	LBS	$ 11.00	$ 35,200.00
	123	Hydraulic controls for 30" jet-flow gate	8420	800	LBS	$ 12.00	$ 9,600.00
		Sheet Subtotal =					**$ 2,130,800.00**

QUANTITIES		PRICES	
BY Don Read	**CHECKED** Rick Frisz	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

FEATURE:

Wymer Offstream Storage Facility
Spillway and Outlet Works
Outlet Works

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Electrical					
		Bldg Electrical Service Equipment (F&I)	8430				
	124	600 volt motor control center, 3-phase, 800 amp bus		1	EA	$ 40,000.00	$ 40,000.00
		Four 20 inch wide sections					
		5 NEMA size 1 FVR contactors *					
		Three 100 A, 3-pole molded-case circuit breakers					
	125	Transformer load center		1	EA	$ 18,500.00	$ 18,500.00
		30 kVA, 3-phase, 480-208Y/120 volt					
		Lighting System (F&I)	8430				
	126	120 volt, fluorescent NEMA Type 4 fixtures for control		1	LS	$ 65,000.00	$ 65,000.00
		house, 1900 foot long tunnel, & gate chamber					
		* FVR - Full-voltage reversing					
		Assumptions:					
		Bringing power to dam is part of unlisted items					
		Sheet Subtotal =					$ 123,500.00

QUANTITIES		PRICES	
BY Mike Schuh	**CHECKED**	**BY** Dan Mar	**CHECKED**
DATE PREPARED April 25, 2007	**PEER REVIEW** George Girgis	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Diversion During Dam Construction

Geotechnical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Excavation					
		For Cofferdam					
	1	Common		4,400	CY	$ 20.00	$ 88,000.00
		(assume alluvial soils; no dewatering)					
		Cofferdam					
	2	Embankment fill		171,000	CY	$ 16.00	$ 2,736,000.00
		(assume overburden from dam excavation					
		is used; probably of mix of silts to gravels,					
		placed and compacted in 9-inch lifts)					
	3	Geomembrane		13,000	SY	$ 15.00	$ 195,000.00
		(assume 40-mil HDPE)					
	4	Geotextile		26,000	SY	$ 3.00	$ 78,000.00
		(assume 16-ounce non-woven fabric)					
		Sheet Subtotal =					**$ 3,097,000.00**

QUANTITIES		PRICES	
BY Bill Engemoen	**CHECKED**	**BY** Jerry Zander	**CHECKED** M.C.
DATE PREPARED May 2, 2007	**PEER REVIEW** Chuck Redlinger	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Diversion During Dam Construction

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Diversion (4)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Excavation					
		For 6-foot pipe and saddles	8130				
	5	Common		4,000	CY	$ 16.00	$ 64,000.00
		(Assume alluvial soil and weathered rock; no dewatering)					
	6	Rock		2,000	CY	$ 42.00	$ 84,000.00
		(Assume drill and blast; no dewatering)					
	7	Furnish and place reinforced concrete for pipe supports	8130	20	CY	$ 2,000.00	$ 40,000.00
		spaced @ 40 feet (16 required)					
	8	Furnish and place unreinforced concrete thrust blocks	8130	75	CY	$ 800.00	$ 60,000.00
		Assume 2 blocks 10 x 10 x 10 @ 3000 psi					
	9	Furnish and handle cement (.212T/CY)	8130	22	TONS	$ 190.00	$ 4,180.00
	10	Furnish and place concrete reinforcement.	8130	3,400	LBS	$ 1.80	$ 6,120.00
		Assume 170 #/CY					
		Sheet Subtotal =					**$ 258,300.00**

QUANTITIES		PRICES	
BY Doug Stanton	**CHECKED**	**BY** Jerry Zander	**CHECKED** M.C.
DATE PREPARED May 1, 2007	**PEER REVIEW**	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Diversion During Dam Construction

Mechanical/Electrical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Diversion (4)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Diverting Stream into Diversion pipe					
		Dewatering Pumps:	8420				
	11	Two - 10 cfs (4500 gpm) Flygt C 3300 Wastewater		4,600	lbs	$ 20.00	$ 92,000.00
		Submersible Pumps, low head (LT), Curve/					
		Impeller No. 809, S-installation, 20' TDH, 900 rpm,					
		50 hp (34 kW), ~12" disch., 3 ph/60 Hz/460 V					
		(2300 lbs. ea.)					
		Submersible electrical cable	8430				
	12	3 - power conductor, 600 V, #4 AWG		500	LF	$ 20.00	$ 10,000.00
	13	2 - thermal sensor cables, #10 AWG		500	LF	$ 1.50	$ 750.00
	14	1 - ground cable, #6 AWG		500	LF	$ 2.00	$ 1,000.00
	15	Combination pump motor starters, 600 volt, NEMA 4	8430	2	each	$ 5,500.00	$ 11,000.00
		enclosure, Size 3, non-reversing contactor					
	16	Pump sump level controls	8430				
		2 floats, control relay in a NEMA 4 enclosure		1	each	$ 1,600.00	$ 1,600.00
	17	Pumping Costs					
		Estimate pumping 6 hours per day for 2 years		4,400	HRS	$ 95.00	$ 418,000.00
		Sheet Subtotal =					**$ 534,350.00**

QUANTITIES		**PRICES**	
BY R. Zelenka	**CHECKED** T. Hummel 4/26/07	**BY** Dan Mar	**CHECKED** A.C.
DATE PREPARED April 25, 2007	**PEER REVIEW** T. Hummel 4/26/07	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Diversion During Construction

Mechanical

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Diverting Stream into Diversion pipe					
		Steel Pipe	8420				
	18	72-inch dia. Steel pipe, 5/16-in thick wall, 241 lb/ft		600	LF	$ 780.00	$ 468,000.00
	19	20-inch dia. Sch. 10, 1/4-in thick wall, 53 lb/ft		250	LF	$ 170.00	$ 42,500.00
	20	12-inch dia. Sch. 20, 1/4-in thick wall, 34 lb/ft		50	LF	$ 110.00	$ 5,500.00
		Valves	8420				
	21	2 - 12-inch, Class 125 Double door check valves					
		(150 lbs. each)		300	lbs	$ 11.00	$ 3,300.00
	22	2 - 12-inch, Class 150 AWWA Butterfly Valves					
		(250 lbs. each)		500	lbs	$ 11.00	$ 5,500.00
		Sheet Subtotal =					**$ 524,800.00**

QUANTITIES		PRICES	
BY Rick Frisz	**CHECKED** Bob Zelenka	**BY** Jerry Zander	**CHECKED** M.C.
DATE PREPARED April, 30, 2007	**PEER REVIEW** RF	**DATE PREPARED** May 31, 2007	**PEER REVIEW** DCA

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Road and Creek Improvements
Dam and Dike Access Roads

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL - ROAD					
		All roadway sections assume two 12' lanes w/o shoulders, 3:1 sloped ditches to 1' depth, and cut slopes of 2:1. A slope greater than 12% was utilized in several areas. Upon final design, alignment will be modified to better suit existing earthwork conditions and eliminate slopes greater than 12%.					
		Road from SH821 to other side of Dam					
		8200 LF of roadway					
	1	Excavation		25,000	CY	$ 6.00	$ 150,000.00
	2	Compacted Embankment		52,000	CY	$ 6.80	$ 353,600.00
	3	Gravel Surfacing (6" Depth)		7,000	TON	$ 45.00	$ 315,000.00
	4	24" CMP Culvert (assume five 35' lengths)		595	LF	$ 60.00	$ 35,700.00
	5	Metal Beam Guard Railing with Wooden Post to be installed across dam		6,400	LF	$ 38.00	$ 243,200.00
		Road from access house to other side of dike					
		2600 LF of roadway					
	6	Excavation		5,700	CY	$ 11.00	$ 62,700.00
	7	Compacted Embankment		13,000	CY	$ 11.00	$ 143,000.00
	8	Gravel Surfacing (6" Depth)		4,300	TON	$ 45.00	$ 193,500.00
	9	24" CMP Culvert (assume four 35' lengths)		175	LF	$ 60.00	$ 10,500.00
	10	Metal Beam Guard Railing with Wooden Post to be installed across dike		5,200	LF	$ 38.00	$ 197,600.00
		Road from SH821 to outlet works					
		3600 LF of roadway					
	11	Excavation		100	CY	$ 50.00	$ 5,000.00
	12	Compacted Embankment		330	CY	$ 22.00	$ 7,260.00
	13	Gravel Surfacing (6" Depth)		3,000	TON	$ 50.00	$ 150,000.00
	14	24" CMP Culvert (assume two 35' lengths)		245	LF	$ 60.00	$ 14,700.00
		Sheet Subtotal =					**$ 1,881,760.00**

QUANTITIES

BY	CHECKED
Nick Clough	Chris Duke, Anne Pavol
DATE PREPARED	**PEER REVIEW**
May 2, 2007, Revised May 9, 2007	Dave Edwards

PRICES

BY	CHECKED
Jerry Zander	M.C.
DATE PREPARED	**PEER REVIEW**
May 31, 2007	

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Road and Creek Improvements
Improvements to Existing Lmuma Creek

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Earthwork (Lmuma Creek)					
	15	Common excavation of outlet channel	8140	86,000	CY	$ 5.00	$ 430,000.00
	16	Embankment	8140	11,500	CY	$ 10.00	$ 115,000.00
	17	Compacted Embankment	8140	11,501	CY	$ 7.00	$ 80,507.00
	18	Furnish/place rock riprap (d50 6", d100 12"), 120lb/cf	8140	24,000	TONS	$ 30.00	$ 720,000.00
	19	Furnish/place geotextile	8140	45,000	SY	$ 13.00	$ 585,000.00
	20	Furnish 7 steel sheet pile control structures	8140	17,000	SF	$ 20.00	$ 340,000.00
		using AZ13 sheet piles					
	21	Excavation for sheet piles	8140	1,300	CY	$ 25.00	$ 32,500.00
	22	Furnish and place cement bentonite slurry	8140	1,300	CY	$ 120.00	$ 156,000.00
	23	Furnish and handle cement in cement bentonite slurry	8140	195	TONS	$ 210.00	$ 40,950.00
		Sheet Subtotal =					**$ 2,499,957.00**

QUANTITIES		**PRICES**	
BY K. A. Sayer	**CHECKED** Anne Pavol	**BY** Jerry Zander	**CHECKED**
DATE PREPARED May 1, 2007	**PEER REVIEW** David K. Edwards	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

ESTIMATE WORKSHEET

FEATURE:

Wymer Offstream Storage Facility
Road and Creek Improvements
I-82 Bridge Protection

Civil/Structural

PROJECT:

Yakima River Basin Water Storage Study

WOID:	YRSSW	**ESTIMATE LEVEL:**	Appraisal
REGION	PN	**PRICE LEVEL:**	Apr-07

FILE: J:\2007 JWZ Estimates\Wymer Dam\Total Final Est\[Final Est - Wymer PP and Reservoir.xls]Discharge (6)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		I-82 Bridges					
		Protect existing 2:1 slope bridge embankments					
		Apply waterproof membrane to existing bridge piers					
		that will be submerged					
		Embankment Protection					
	24	Furnish and place riprap on embankments, (D50 = 24")	8140	34,000	TONS	$ 30.00	$ 1,020,000.00
	25	Furnish and place riprap bedding	8140	16,000	TONS	$ 20.00	$ 320,000.00
	26	Excavate existing protection (18" deep)	8140	10,500	CY	$ 15.00	$ 157,500.00
		Bridge Pier Protection					
		Apply membrane to Bridge piers					
	27	Water jet face of piers	8140	490	SY	$ 20.00	$ 9,800.00
	28	Remove spalling concrete (5% total area)	8140	25	SY	$ 50.00	$ 1,250.00
	29	Furnish and install liquid applied CIM 1000 urethane	8140	490	SY	$ 11.00	$ 5,390.00
		(spray application)					
	30	Furnish and install liquid applied CIM 61 primer	8140	490	SY	$ 13.00	$ 6,370.00
		(spray application)					
		coating on piers manufactured by					
		Permabond, Inc. Telephone (801) 465-2890.					
		Contact: Stan Terry 720-368-1357					
		Sheet Subtotal =					**$ 1,520,310.00**

QUANTITIES		PRICES	
BY Joe Gemperline	**CHECKED** Anne Pavol	**BY** Jerry Zander	**CHECKED** M.C. 1H
DATE PREPARED April 30, 2007	**PEER REVIEW** David K. Edwards	**DATE PREPARED** May 31, 2007	**PEER REVIEW**

APPENDIX E

OPCC Alternate Wymer Supply from Yakima River at Thorp

Yakima River Basin Water Storage Study
Thorp PS-KRD Canal North Branch-Wymer Reservoir Fill Alternative
Without Power House or Control Valve Structure At Wymer

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/27/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Scope Work in this estimate includes construction of a diversion dam, 1000 cfs intake with fish screens, 1000 cfs pump station with surge protection, 10,072 lf of 144" steel pipe to the North Branch of the KRD Canal with a discharge structure, expansion of 30 miles of canal to handle an additional 1000 cfs, supply to Wymer Reservoir including a 15,850 LF siphon under Badger Creek, 16,750 LF of tunnel, 3,850 LF penstock and discharge structure. Additionally, expansion of existing facilities with parallel tunnels at #4 & #5 and enlargement of the siphons at Big Johnson creek and Little Johnson creek to handle the total flow is included in the total cost. Estimate assumes different contractors on individual portions of the project to eliminate double mark ups on specialty contractors and six construction seasons of six months each with a minimum of three contractors in each season to complete modifications of the North Branch of the KRD canal. Cost is included in the estimate to leave potions of the canal with the existing profile until the last construction season to ensure functionality at 200 cfs within the sections of the canal that have been enlarged.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

				Labor	Material	Subcontract	Equipment	Other	Total
Description		Quantity		Amount	Amount	Amount	Amount	Amount	Amount
001.00	DIVERSION CONTROL DAM	200.00	LF	153,252	1,286,420	50,809	76,161		1,566,642
002.00	INTAKE	1,000.00	CFS	1,210,046	2,555,248	44,100	518,485	15,000	4,342,880
004.00	PUMP STATION TO PIPELINE	1.00	LS	2,892,841	26,177,050	13,801,062	1,295,440	169,302	44,335,694
005.00	PIPELINE - 144" TO NORTH BRANCH KRD	10,072.00	LF	2,525,203	14,684,869		5,020,228	1,283,532	23,513,832
006.00	PUMP STATION PIPELINE FLOW DISCHARGE STRUCTURE KRD CANAL	1.00	LS	364,888	413,876	324,000	63,364	5,405	1,171,533
008.01	KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BADGER CREEK	15,850.00	LF	1,694,037	22,568,229	287,250	1,566,233	1,956,366	28,072,114
008.02	KRD NORTH BRANCH IMPROVEMENTS - TUNNEL, WYMER FILL	16,750.00	LF			59,313,197			59,313,197
008.03	KRD NORTH BRANCH IMPROVEMENTS - PENSTOCK, WYMER FILL	3,850.00	LF	817,975	5,866,802		969,595	475,206	8,129,578
008.04	KRD NORTH BRANCH IMPROVEMENTS - CANAL	30.00	MILE	11,405,891	649,607	10,477,970	22,981,937	5,405	45,520,809
008.05	KRD NORTH BRANCH IMPROVEMENTS - TUNNEL #4	452.00	LF	17,003	15,719	2,907,261	15,100		2,955,084
008.06	KRD NORTH BRANCH IMPROVEMENTS - TUNNEL #5	3,446.00	LF	17,003	15,719	11,923,362	15,100		11,971,184
008.07	KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BIG JOHNSON CREEK	1,745.00	LF	1,075,895	2,845,424	2,905,632	602,268	186,379	7,615,598
008.08	KRD NORTH BRANCH IMPROVEMENTS - SIPHON, LITTLE JOHNSON CREEK	284.00	LF	126,664	586,443		172,456	32,092	917,655

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	22,300,698		
Material	77,665,405		
Subcontract	102,034,643		
Equipment	33,296,368		
Other	4,128,687		
Subtotal		**239,425,801**	
Contractor's Fld Ovhd	9,577,032		4.000 %
Mobilization	14,365,548		6.000 %
Subtotal w/ mobilization		**263,368,381**	
Unlisted Items Minor	13,923,766		6.000 %
Design and Scope Changes Minor	16,244,393		7.000 %
Cost Est Refinements Minor	6,961,883		3.000 %
Contractor's Fee	21,034,890		7.000 %
Contractor's Bonds & Insurance	4,507,476		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**326,040,789**	
Contingencies	81,510,197		25.000 %
Field Cost		**407,550,986**	
Sales Tax Estimate (Mat & Eq)	8,787,066		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**416,338,052**

1. Mobilization is increased to cover the 6 year construction period for expansion of the North Branch of the KRD Canal.
2. Contingency percentages are increased to reflect the lack of specific information on the canal expansion, operational impacts, and schedule uncertainty.
3. Extent of subcontractor mark ups has been reduced to reflect multiple contracts with a focus on direct contracting to specialty contractors.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Thorp PS-KRD Canal North Branch-Wymer Reservoir Fill Alternative
Without Power House or Control Valve Structure At Wymer

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/27/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Scope Work in this estimate includes construction of a diversion dam, 1000 cfs intake with fish screens, 1000 cfs pump station with surge protection, 10,072 lf of 144" steel pipe to the North Branch of the KRD Canal with a discharge structure, expansion of 30 miles of canal to handle an additional 1000 cfs, supply to Wymer Reservoir including a 15,850 LF siphon under Badger Creek, 16,750 LF of tunnel, 3,850 LF penstock and discharge structure. Additionally, expansion of existing facilities with parallel tunnels at #4 & #5 and enlargement of the siphons at Big Johnson creek and Little Johnson creek to handle the total flow is included in the total cost. Estimate assumes different contractors on individual portions of the project to eliminate double mark ups on specialty contractors and six construction seasons of six months each with a minimum of three contractors in each season to complete modifications of the North Branch of the KRD canal. Cost is included in the estimate to leave potions of the canal with the existing profile until the last construction season to ensure functionality at 200 cfs within the sections of the canal that have been enlarged.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
001.00	***DIVERSION CONTROL DAM***				
DIVISION 02	**SITE CONSTRUCTION**				
02200.505	Earthwork, Structural Excavation - Dam foundation	385.00	cy	18.662/cy	7,185
02361.100	Cofferdam - Water Installations	4.00	mo	20,819.00 /mo	83,276
DIVISION 02 SITE CONSTRUCTION				**90,461.02 /ls**	**90,461**
1.00	**ls**				
315.41	Labor hours				
309.473	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.105	Concrete_Foundations - Diversion Dam	334.00	cy	352.823/cy	117,843
Estimate includes a 200' long dam with a foundation 13' wide at the river bottom, 5' deep and 5' wide at the bottom. Dam built in the dry using a Port-a-Dam					
03002.305	Concrete_Diversion Dam above foundation	278.00	cy	384.53 /cy	106,898
Estimate includes a 200' long dam 10' wide at the river bottom (on top of foundation), 5' high and 5' wide at the top. Dam built in the dry using a Port-a-Dam. Assumptions the average water depth at the PS is 5'.					
03002.905	Concrete_Miscellaneous - Fish Ladder	20.00	cy	367.253/cy	7,345
DIVISION 03 CONCRETE				**232,086.38 /ls**	**232,086**
1.00	**ls**				
1,845.814	Labor hours				
151.272	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13000.000	Inflatable Crest Gate Systems	1.00	ls	1,106,676.600/ls	1,106,677
Vendor quote on material					
DIVISION 13 SPECIAL CONSTRUCTION				**1,106,676.600/ls**	**1,106,677**
1.00	**ls**				
640.00	Labor hours				
160.00	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	852.00	cy	8.002/cy	6,817
15062.000	Pipe: Ductile	1.00	ls	108,507.63 /ls	108,508
Sediment Trap Drain, 60" DIP CL 150					
15115.000	Water Control Gates	1.00	ea	22,093.31 /ea	22,093
KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BADGER CREEK - 60" Canal Gate @ siphon canal inlet as shown on plans					
KRD NORTH BRANCH IMPROVEMENTS - CANAL - 26 ea canal gates and 3 ea 60" canal for control of water to purchasers of irrigation water from the canal.					
DIVISION 15 MECHANICAL				**137,418.230/ls**	**137,418**
1.00	**ls**				
461.702	Labor hours				
127.34	Equipment hours				
001.00 DIVERSION CONTROL DAM				***7,833.211/LF***	***1,566,642***
200.00	***LF***				
3,262.922	Labor hours				
748.084	Equipment hours				
002.00	***INTAKE***				
DIVISION 02	**SITE CONSTRUCTION**				
02140.000	Dewatering	1.00	ls	116,492.91 /ls	116,493
4" drilled wells, steel casing, 4" well screen, 4" pump, ,36 ea/ 60' deep, piped to the Yakima river					
02200.500	Earthwork, Structural Excavation	16,481.00	cy	19.70 /cy	324,677
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	1,128.00	cy	8.464/cy	9,548
02271.000	Stone Revetment (Rip Rap)	980.00	sy	86.231/sy	84,507
Rip-rap and rock lining, random, broken stone, 3/8 to 1/4 C.Y. pieces, machine placed for erosion protection, grouted, 50' lg x 40' wide @					
PS DISCHARGE INTO THORP CANAL					
PENSTOCK DISCHARGE INTO WYMER RESERVOIR					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02361.000	Driven Steel Sheet Piling	15,980.00	sf	42.33 /sf	676,385
For PS construction					
02361.200	Cofferdam - Shore Driven	8,875.00	sf	27.04 /sf	239,943
380 lf of sheeting, driven 25" for the installtion of the trash rake structure and transition to intake					
DIVISION 02 SITE CONSTRUCTION				**1,451,552.24 /ls**	**1,451,552**
1.00	**ls**				
6,469.904	Labor hours				
5,017.604	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.110	Concrete_Foundations_TRASH RACK AND WALKWAY	75.00	cy	415.21 /cy	31,141
03002.119	Concrete_Foundations - Pump Station Intake Screen	2,423.00	cy	380.183/cy	921,184
03002.315	Concrete_Walls - Pump Station Intake Screen	685.00	cy	807.78 /cy	553,328
Center wall of passage system = 2' rather than 1' typ for walls in this takeoff					
03002.506	Concrete_Columns - Pump Station Intake Screen	52.00	cy	1,491.43 /cy	77,554
03002.510	Concrete_Columns_TRASH RACK AND WALKWAY	55.00	cy	690.721/cy	37,990
03002.605	Concrete_Elevated Slab_TRASH RACK AND WALKWAY	37.00	cy	538.224/cy	19,914
03002.620	Concrete_Elevated Slab - Pump Station Intake Screen	707.00	cy	516.631/cy	365,258
DIVISION 03 CONCRETE				**2,006,368.98 /ls**	**2,006,369**
1.00	**ls**				
18,041.99	Labor hours				
1,458.71	Equipment hours				
DIVISION 05	**METALS**				
05505.000	Metal Fabrications	50,158.00	lb	3.47 /lb	173,811
PUMP STATION INTAKE - Trash Rack, 7ea, 6' h x 10' w; 19.67#/sf, SIPHON INLET - Trash Rack, 420 sf, 19.67#/sf					
05505.010	Metal Fabrications_TRASH RACK AND WALKWAY	1.00	ls	33,817.89 /ls	33,818

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
05522.005	Aluminum Railings_TRASH RACK AND WALKWAY	400.00	lf	78.65 /lf	31,459
05900.000	Miscellaneous Metal	1,040.00	sf	72.87 /sf	75,781
DIVISION 05 METALS				**314,868.58 /ls**	**314,869**
1.00	**ls**				
684.633	Labor hours				
188.082	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
15509.200	Fish Screen Fixed Plate, Vertical, Self Cleaning Brush System	3,000.00	sf	190.03 /sf	570,090
DIVISION 13 SPECIAL CONSTRUCTION				**570,089.95 /ls**	**570,090**
1.00	**ls**				
352.020	Labor hours				
88.020	Equipment hours				
002.00 INTAKE				***4,342.88 /CFS***	***4,342,880***
1,000.00	***CFS***				
25,548.55	Labor hours				
6,752.42	Equipment hours				
004.00	***PUMP STATION TO PIPELINE***				
DIVISION 02	**SITE CONSTRUCTION**				
02072.000	Demolition, Cutting and Patching	1.00	ls	13,726.80 /ls	13,727
Demolition and disposal of existing structures					
02110.000	Site Clearing	6.22	ac	14,484.71 /ac	90,095
Clear and chip, grub stumps, 12" and 24" trees					
02140.000	Dewatering	1.00	ls	216,343.95 /ls	216,344
4" drilled wells, steel casing, 4" well screen, 4" pump, ,36 ea/ 60' deep, piped to the Yakima river					

Description		Quantity		Total Unit Cost	Total Amount
02200.002	Earthwork - Site Cut to Fill, Pump Station site	26,868.00	cy	7.073/cy	190,025
02200.500	Earthwork, Structural Excavation	100,034.00	cy	8.51 /cy	850,964
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	9,057.00	cy	4.941/cy	44,751
02361.000	Driven Steel Sheet Piling	29,695.00	sf	42.23 /sf	1,253,989
For PS construction					
02444.000	Chain Link Fence and Gates	2,793.00	lf	25.53 /lf	71,306
6' high galv chain link fence, 3 strands of BW, 2ea 12' wide cantilever gates with motor ope, 3ea 4' personnel gates					
02700.000	Bases, Ballasts, Pavements & Appurtenances	3,190.00	sy	30.891/sy	98,541
Asphalt pavement, 6" stone, 2" asphalt binder course, 2" wearing course					
02930.000	Seeding, Sodding, and Landscaping	1.00	ls	143,271.41 /ls	143,271
03002.890	Concrete_Sidewalks	8,900.00	sf	3.93 /sf	34,962
6" thick, 4' wide					
DIVISION 02 SITE CONSTRUCTION				**3,007,974.87 /ls**	**3,007,975**
1.00	**ls**				
14,692.420	Labor hours				
13,660.39	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.100	Concrete_Foundations	1,845.00	cy	376.62 /cy	694,859
03002.109	Concrete_Foundations - Surge Tanks	504.00	cy	417.892/cy	210,618
03002.300	Concrete_Walls Exterior	4,212.00	cy	471.73 /cy	1,986,917
Center wall of passage system = 2' rather than 1' typ for walls in this takeoff					
03002.550	Concrete_Elevated Beams	33.00	cy	795.74 /cy	26,259
03002.600	Concrete_Elevated Slab	1,228.00	cy	427.67 /cy	525,174
03002.700	Concrete_Slab on Grade	828.00	cy	343.244/cy	284,206
Slab on Grade with heavy reinforcing was chosen rather than a water bearing foundation					
Fish Bypass (trough) Slab on Grade thickness was also estimated with a 2' thickness					
03002.800	Concrete_Equipment Pads	42.00	cy	413.111/cy	17,351
For Vertical turbine Pumps					

Description		Quantity		Total Unit Cost	Total Amount
03431.005	Precast and Prestressed Concrete_PUMP ROOM	1.00	ls	801,229.31 /ls	801,229
03431.010	Precast and Prestressed Concrete_ELECTRICAL ROOM	1.00	ls	155,750.40 /ls	155,750
DIVISION 03 CONCRETE				**4,702,362.66 /ls**	**4,702,363**
1.00	**ls**				
36,345.62	Labor hours				
2,703.05	Equipment hours				
DIVISION 05	**METALS**				
05211.005	Steel Joists_PUMP ROOM	3,640.00	lf	11.904/lf	43,330
05211.010	Steel Joists_ELECTRICAL ROOM	2,145.00	lf	11.904/lf	25,534
05313.005	Metal Deck_PUMP ROOM	14,000.00	sf	2.08 /sf	29,111
05313.010	Metal Deck_ELECTRICAL ROOM	8,030.00	sf	2.08 /sf	16,697
DIVISION 05 METALS				**114,671.52 /ls**	**114,672**
1.00	**ls**				
375.222	Labor hours				
103.452	Equipment hours				
DIVISION 07	**THERMAL& MOISTURE PROTECTION**				
07501.005	Built-Up Roofing System (BUR)_PUMP ROOM	14,000.00	sf	7.453/sf	104,347
07501.010	Built-Up Roofing System (BUR)_ELECTRICAL ROOM	8,000.00	sf	7.964/sf	63,713
DIVISION 07 THERMAL& MOISTURE PROTECTION				**168,060.19 /ls**	**168,060**
1.00	**ls**				
1,384.614	Labor hours				
67.692	Equipment hours				
DIVISION 08	**DOORS & WINDOWS**				
08110.031	Metal Doors & Frames (3070)_PUMP ROOM	2.00	ea	1,555.08 /ea	3,110
08110.032	Metal Doors & Frames (3070)_ELECTRICAL ROOM	4.00	ea	1,555.083/ea	6,220

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
08110.061	Metal Doors & Frames (6070)_PUMP ROOM	2.00	ea	2,949.46 /ea	5,899
08332.005	Steel Rolling Overhead Doors_PUMP ROOM	4.00	ea	7,738.15 /ea	30,953
08332.010	Steel Rolling Overhead Doors_ELECTRICAL ROOM	1.00	ea	4,598.99 /ea	4,599
DIVISION 08 DOORS & WINDOWS				**3,906.231/ea**	**50,781**
13.00	**ea**				
155.213	Labor hours				
DIVISION 11	**EQUIPMENT**				
11072.000	Pumping Equipment: Vertical Turbine (Line Shaft)	6.00	ea	3,020,564.43 /ea	18,123,387
Vertical Turbine Pumps_200 cfs @ 470' TDH, 36' shaft, below base discharge, 54", 15,000 Hp motors, TEFC, constant speed					
Escalated from the 10/6/06 estimate for Pump Station 1, Yakima Pump Exchange, Pre-Appraisal Estimate using RS Means CCI					
10/1/2006 material - 191.1, 7/1/2010 material - 231.5, multiplier 1.21141, Bridge crane used during most of the installation					
DIVISION 11 EQUIPMENT				**18,123,386.56 /ls**	**18,123,387**
1.00	**ls**				
2,160.000	Labor hours				
96.00	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13005.000	Stop Log System - FRP	1,080.00	sf	184.35 /sf	199,094
Estimate is based on a gate fabricated of fiberglass plate and structural members. Installation is a 5 man crew, 1-90 ton crane, $12500 mobilization/demobilization					
BACKWATER STRUCTURE - 8 ea 10' long, 3'6" high					
PUMP STATION - 6 ea 18' long, 10' high					
CANAL DIVERSION - 8 ea 10' long, 3'6" high					
13421.010	Welded Steel Tanks - Surge with Air Compressor and Controls	6.00	ea	316,000.00 /ea	1,896,000
40' dia x 25' steel tank, air compressor and system controls, 6 ea					
DIVISION 13 SPECIAL CONSTRUCTION				**2,095,094.27 /ls**	**2,095,094**
1.00	**ls**				
1,431.84	Labor hours				
200.16	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 14	**CONVEYING SYSTEMS**				
14305.005	Bridge Cranes_PUMP ROOM	1.00	ea	184,322.01 /ea	184,322
DIVISION 14 CONVEYING SYSTEMS				**7,372.88 /ton**	**184,322**
25.00	**ton**				
212.000	Labor hours				
26.67	Equipment hours				
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	4,000.00	cy	13.19 /cy	52,751
15061.100	Pipe: Steel- 26" and larger	1,500.00	lf	1,466.174/lf	2,199,262
15103.000	Butterfly Valves	14.00	ea	123,426.264/ea	1,727,968
PUMP STATION TO PIPELINE - 66" pump shut off valves in valve vault and 54" surge inlet valves, material price BASED ON VENDOR QUOTE. PENSTOCK @ WYMER - 150" BFV, material price BASED ON VENDOR QUOTE.					
15111.000	Pump Control Valves	6.00	ea	91,321.92 /ea	547,932
54" pump control valves, material priced from Yakima Pump Exchange Estimate of 10/6/06 escalated using RS Means CCI with a 1.21141 multiplier. Bridge crane used during most of the installation (see Pump Equipment Notes)					
15114.400	Steel Pipe Expansion Joints	18.00	ea	25,043.84 /ea	450,789
DIVISION 15 MECHANICAL					**4,978,701**
3,623.603	Labor hours				
1,720.36	Equipment hours				
DIVISION 16	**ELECTRICAL**				
16000.200	Electrical Subcontractor - Substation	1.00	ls	4,250,000.00 /ls	4,250,000
Complete substation					
16000.210	Electrical Subcontractor - Substation Power Feed with Relays	1.00	ls	4,400,000.00 /ls	4,400,000
Allowance assumes the Power Supplier will perform the cut in at the existing source, ROW cost is not included in the allowance. Assumed distance 4 miles, all pumps are 4160 V, 3 phase. Normal operation for 5 of 6 15,000 Hp motors to be operating.					
16000.300	Electrical Subcontractor - Generator with ATS	1.00	ls	1,150,000.00 /ls	1,150,000
Generator with interlock.ATS/Fuel tank/Slab/SoundReducingEnclosure					
16000.400	Electrical Subcontractor - Service electrical	1.00	ls	793,590.00 /ls	793,590
PUMP STATION - Lighting, PS and building power, grounding, switchgear, HVAC connections/pumps, motor connections, electrical service, feeders, subfeeders, security system, security devices, intake service, exterior and					

Description		Quantity		Total Unit Cost	Total Amount
16000.400	Electrical Subcontractor - Service electrical	1.00	ls	793,590.00 /ls	793,590
interior lighting, service to exterior entrance gates, overhead doors, surge tanks, valves vault, fence security and detection, fire detection and alarm system, feed from the substation.					
DISCHARGE AND SIPHON INLET - Lighting, PS and building power, grounding, switchgear, HVAC, electrical service, feeders, subfeeders, security system, security devices, exterior and interior lighting, overhead doors, surge tanks, valves vault, fence security and detection, fire detection.					
16000.500	Electrical Subcontractor - Instrumentation	1.00	ls	316,750.00 /ls	316,750
PLC with all ancillary work, Instrumentation devices with wiring, radio equipment, antenna with support mast and foundation					
DIVISION 16 ELECTRICAL				**10,910,340.00 /ls**	**10,910,340**
1.00	**ls**				
004.00 PUMP STATION TO PIPELINE				***44,335,694.460/LS***	***44,335,694***
1.00	***LS***				
60,380.525	Labor hours				
18,577.763	Equipment hours				
005.00	***PIPELINE - 144" TO NORTH BRANCH KRD***				
DIVISION 02	**SITE CONSTRUCTION**				
02100.000	Site Remediation	1.00	ls	15,000.00 /ls	15,000
02110.000	Site Clearing	27.96	ac	1,885.731/ac	52,725
Clear and chip, grub stumps, 12" and 24" trees					
02513.000	Asphaltic Concrete Vehicular Paving	2,136.00	sy	33.941/sy	72,497
02930.000	Seeding, Sodding, and Landscaping	1.00	ls	27,227.94 /ls	27,228
DIVISION 02 SITE CONSTRUCTION				**167,450.02 /ls**	**167,450**
1.00	**ls**				
1,027.50	Labor hours				
700.50	Equipment hours				

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	188,963.00	cy	46.98 /cy	8,876,460
15061.100	Pipe: Steel- 26" and larger	10,000.00	lf	1,446.992/lf	14,469,921
DIVISION 15 MECHANICAL				**23,346,381.960/ls**	**23,346,382**
1.00	**ls**				
51,883.522	Labor hours				
84,699.36	Equipment hours				
005.00 PIPELINE - 144" TO NORTH BRANCH KRD				***2,334.574/LF***	***23,513,832***
10,072.00	***LF***				
52,911.02	Labor hours				
85,399.855	Equipment hours				
006.00	***PUMP STATION PIPELINE FLOW DISCHARGE STRUCTURE KRD CANAL***				
DIVISION 02	**SITE CONSTRUCTION**				
02200.704	Earthwork - Excavation, Backfill, Discharge Structure	5,782.00	cy	7.041/cy	40,709
02271.000	Stone Revetment (Rip Rap)	222.00	sy	116.30 /sy	25,818
Rip-rap and rock lining, random, broken stone, 3/8 to 1/4 C.Y. pieces, machine placed for erosion protection, grouted, 50' lg x 40' wide @ PS DISCHARGE INTO THORP CANAL PENSTOCK DISCHARGE INTO WYMER RESERVOIR					
DIVISION 02 SITE CONSTRUCTION				**66,527.13 /ls**	**66,527**
1.00	**ls**				
455.411	Labor hours				
424.412	Equipment hours				
DIVISION 03	**CONCRETE**				

Description		Quantity		Total Unit Cost	Total Amount
03002.107	Concrete_Foundations - Backcheck Dam KRD North Canal	167.00	cy	352.83 /cy	58,922
Estimate includes a 100' long dam 10' wide at the canal bottom 5' high and 5' wide at the top. Assumes flow is shut off during construction					
03002.113	Concrete_Foundations - Discharge Structures	565.00	cy	394.58 /cy	222,936
03002.301	Concrete _Backcheck Dam KRD North Canal above foundation	139.00	cy	384.532/cy	53,450
Estimate includes a 100' long dam 10' wide at the canal bottom 5' high and 5' wide at the top. Assumes flow is shut off during construction					
03002.309	Concrete_Walls - Discharge Structures	431.00	cy	601.791/cy	259,372
Center wall of passage system = 2' rather than 1' typ for walls in this takeoff					
03002.614	Concrete_Elevated Slab - Discharge Structures	293.00	cy	459.772/cy	134,713
DIVISION 03 CONCRETE				**729,393.86 /ls**	**729,394**
	1.00	**ls**			
	6,973.364	Labor hours			
	555.91	Equipment hours			
DIVISION 13	**SPECIAL CONSTRUCTION**				
13005.000	Stop Log System - FRP	280.00	sf	184.33 /sf	51,612
Estimate is based on a gate fabricated of fiberglass plate and structural members. Installation is a 5 man crew, 1-90 ton crane, $12500 mobilization/demobilization					
BACKWATER STRUCTURE - 8 ea 10' long, 3'6" high					
PUMP STATION - 6 ea 18' long, 10' high					
CANAL DIVERSION - 8 ea 10' long, 3'6" high					
13020.000	Building Modules	375.00	sf	210.00 /sf	78,750
Discharge structure, siphon/tunnel connections locations as shown on design documents - allowance for a PMB					
DIVISION 13 SPECIAL CONSTRUCTION				**130,362.41 /ls**	**130,362**
	1.00	**ls**			
	371.192	Labor hours			
	51.892	Equipment hours			
DIVISION 16	**ELECTRICAL**				
16000.400	Electrical Subcontractor - Service electrical	1.00	ls	118,500.00 /ls	118,500
PUMP STATION - Lighting, PS and building power, grounding, switchgear, HVAC connections/pumps, motor connections, electrical service, feeders, subfeeders, security system, security devices, intake service, exterior and					

Description		Quantity		Total Unit Cost	Total Amount
16000.400	Electrical Subcontractor - Service electrical	1.00	ls	118,500.00 /ls	118,500
interior lighting, service to exterior entrance gates, overhead doors, surge tanks, valves vault, fence security and detection, fire detection and alarm system, feed from the substation.					
DISCHARGE AND SIPHON INLET - Lighting, PS and building power, grounding, switchgear, HVAC, electrical service, feeders, subfeeders, security system, security devices, exterior and interior lighting, overhead doors, surge tanks, valves vault, fence security and detection, fire detection.					
16000.500	Electrical Subcontractor - Instrumentation	1.00	ls	126,750.00 /ls	126,750
PLC with all ancillary work, Instrumentation devices with wiring, radio equipment, antenna with support mast and foundation					
DIVISION 16 ELECTRICAL				**245,250.00 /ls**	**245,250**
1.00 ls					
006.00 PUMP STATION PIPELINE				***1,171,533.40 /LS***	***1,171,533***
FLOW DISCHARGE STRUCTURE KRD CANAL					
1.00 LS					
7,799.97	Labor hours				
1,032.210	Equipment hours				
008.01	***KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BADGER CREEK***				
DIVISION 02	**SITE CONSTRUCTION**				
02110.000	Site Clearing	39.44	ac	1,885.73 /ac	74,373
Clear and chip, grub stumps, 12" and 24" trees					
02200.700	Earthwork, Structural Fill - Siphon/Tunnel Connection	11,744.00	cy	13.48 /cy	158,297
Assume 80" dia tunnel shaft, dirt hauled to site from canal modifications, fill by dragline, spread by dozer, compacted by vibrating roller					
02200.702	Earthwork - Excavation, Backfill. Siphon Inlet	14,284.00	cy	5.34 /cy	76,210
02930.000	Seeding, Sodding, and Landscaping	34.44	ls	1,115.32 /ls	38,411

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION				**347,291.54 /ls**	**347,292**
1.00	**ls**				
3,195.961	Labor hours				
2,314.78	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.103	Concrete_Foundations - Siphon Inlet from Canal	438.00	cy	400.511/cy	175,424
03002.111	Concrete_Foundations - Siphon/Tunnel Connection	245.00	cy	417.54 /cy	102,297
03002.307	Concrete Walls Exterior - Siphon/Tunnel connection	1,002.00	cy	517.70 /cy	518,735
03002.311	Concrete_Walls - Siphon Inlet from Canal	776.00	cy	514.16 /cy	398,984
03002.612	Concrete_Elevated Slab - Siphon/Tunnel Connection	157.00	cy	419.61 /cy	65,879
03002.616	Concrete_Elevated Slab - Siphon Inlet from Canal	244.00	cy	421.29 /cy	102,795
03002.703	Concrete_Slab on Grade-Siphon Inlet Apron	519.00	cy	326.27 /cy	169,334
DIVISION 03 CONCRETE				**1,533,448.19 /ls**	**1,533,448**
1.00	**ls**				
15,050.532	Labor hours				
1,137.733	Equipment hours				
DIVISION 05	**METALS**				
05505.000	Metal Fabrications	8,261.00	lb	3.47 /lb	28,628
PUMP STATION INTAKE - Trash Rack, 7ea, 6' h x 10' w; 19.67#/sf, SIPHON INLET - Trash Rack, 420 sf, 19.67#/sf					
DIVISION 05 METALS				**28,627.69 /ls**	**28,628**
1.00	**ls**				
78.401	Labor hours				
22.39	Equipment hours				
DIVISION 08	**DOORS & WINDOWS**				

Description		Quantity		Total Unit Cost	Total Amount
08305.000	Access Doors	2.00	ea	2,939.51 /ea	5,879
In the elevated slab for the discharge structures or the siphon inlet structures for access.					
DIVISION 08 DOORS & WINDOWS				**2,939.51 /ea**	**5,879**
2.00	**ea**				
7.111	Labor hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13020.000	Building Modules	200.00	sf	210.00 /sf	42,000
Discharge structure, siphon/tunnel connections locations as shown on design documents - allowance for a PMB					
DIVISION 13 SPECIAL CONSTRUCTION				**42,000.00 /ls**	**42,000**
1.00	**ls**				
DIVISION 15	**MECHANICAL**				
02221.002	Trenching, Backfilling and Compacting for Utilities-Badger Crk Siphon	259,103.00	cy	7.083/cy	1,835,189
Estimate assumes NO ROCK, 3' bury, 1' of bedding stone, 1/2 TO 1 ditch slope, 18.5' bottom width, MINIMAL SEEDING.					
02950.000	Site Restoration & Rehabilitation	132,083.00	sy	1.96 /sy	258,748
Estimate assumes a 75' distrubed width.					
15061.100	Pipe: Steel- 26" and larger	15,850.00	lf	1,498.154/lf	23,745,739
15115.000	Water Control Gates	1.00	ea	29,941.75 /ea	29,942
KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BADGER CREEK - 60" Canal Gate @ siphon canal inlet as shown on plans					
KRD NORTH BRANCH IMPROVEMENTS - CANAL - 26 ea canal gates and 3 ea 60" canal for control of water to purchasers of irrigation water from the canal.					
DIVISION 15 MECHANICAL				**25,869,617.560/ls**	**25,869,618**
1.00	**ls**				
15,528.633	Labor hours				
17,864.20	Equipment hours				
DIVISION 16	**ELECTRICAL**				
16000.400	Electrical Subcontractor - Service electrical	1.00	ls	118,500.00 /ls	118,500

PUMP STATION - Lighting, PS and building power, grounding, switchgear, HVAC connections/pumps, motor connections, electrical service, feeders, subfeeders, security system, security devices, intake service, exterior and interior lighting, service to exterior entrance gates, overhead doors, surge tanks, valves vault, fence security and detection, fire detection and alarm system, feed from the substation.

DISCHARGE AND SIPHON INLET - Lighting, PS and building power, grounding, switchgear, HVAC, electrical service, feeders, subfeeders, security system, security devices, exterior and interior lighting, overhead doors,

Description		Quantity		Total Unit Cost	Total Amount
16000.400	Electrical Subcontractor - Service electrical	1.00	ls	118,500.00 /ls	118,500
surge tanks, valves vault, fence security and detection, fire detection.					
16000.500	Electrical Subcontractor - Instrumentation	1.00	ls	126,750.00 /ls	126,750
PLC with all ancillary work, Instrumentation devices with wiring, radio equipment, antenna with support mast and foundation					
DIVISION 16 ELECTRICAL				**245,250.00 /ls**	**245,250**
1.00	**ls**				
008.01 KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BADGER CREEK				***1,771.111/LF***	***28,072,114***
15,850.00	***LF***				
33,860.64	Labor hours				
21,339.094	Equipment hours				
008.02	***KRD NORTH BRANCH IMPROVEMENTS - TUNNEL, WYMER FILL***				
DIVISION 02	**SITE CONSTRUCTION**				
02400.300	Tunnel, Main	16,750.00	lf	3,541.09 /lf	59,313,197
Tunnel and shaft from end of Badger Crk Siphon to portal at Wymer penstock. 150" tunnel, concrete lined 15% with 3" shotcrete mixed on site, assuming $125/cy for shotcrete, Rock Bolts. Portal at Penstock end, 500'x500' with 4" of shotcrete with rock bolts.					
DIVISION 02 SITE CONSTRUCTION				**59,313,197.000/ls**	**59,313,197**
1.00	**ls**				
008.02 KRD NORTH BRANCH IMPROVEMENTS - TUNNEL, WYMER FILL				***3,541.09 /LF***	***59,313,197***
16,750.00	***LF***				
008.03	***KRD NORTH BRANCH IMPROVEMENTS - PENSTOCK, WYMER FILL***				

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 02	**SITE CONSTRUCTION**				
02110.000	Site Clearing	7.00	ac	1,885.731/ac	13,200
Clear and chip, grub stumps, 12" and 24" trees					
02200.704	Earthwork - Excavation, Backfill, Discharge Structure	5,782.00	cy	7.041/cy	40,709
02271.000	Stone Revetment (Rip Rap)	222.00	sy	116.30 /sy	25,818
Rip-rap and rock lining, random, broken stone, 3/8 to 1/4 C.Y. pieces, machine placed for erosion protection, grouted, 50' lg x 40' wide @ PS DISCHARGE INTO THORP CANAL PENSTOCK DISCHARGE INTO WYMER RESERVOIR					
02930.000	Seeding, Sodding, and Landscaping	1.00	ls	6,817.44 /ls	6,817
DIVISION 02 SITE CONSTRUCTION				**86,544.69 /ls**	**86,545**
1.00	**ls**				
660.745	Labor hours				
573.75	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.113	Concrete_Foundations - Discharge Structures	565.00	cy	394.58 /cy	222,936
03002.309	Concrete_Walls - Discharge Structures	431.00	cy	601.791/cy	259,372
Center wall of passage system = 2' rather than 1' typ for walls in this takeoff					
03002.614	Concrete_Elevated Slab - Discharge Structures	293.00	cy	459.772/cy	134,713
DIVISION 03 CONCRETE				**617,021.64 /ls**	**617,022**
1.00	**ls**				
6,088.062	Labor hours				
481.672	Equipment hours				
DIVISION 08	**DOORS & WINDOWS**				
08305.000	Access Doors	2.00	ea	2,939.51 /ea	5,879
In the elevated slab for the discharge structures or the siphon inlet structures for access.					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 08 DOORS & WINDOWS				**2,939.51 /ea**	**5,879**
2.00 ea					
7.111 Labor hours					
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	48,379.00	cy	28.49 /cy	1,378,277
15061.100	Pipe: Steel- 26" and larger	3,850.00	lf	1,498.954/lf	5,770,971
15103.000	Butterfly Valves	1.00	ea	270,884.50 /ea	270,885
PUMP STATION TO PIPELINE - 66" pump shut off valves in valve vault and 54" surge inlet valves, material price BASED ON VENDOR QUOTE.					
PENSTOCK @ WYMER - 150" BFV, material price BASED ON VENDOR QUOTE.					
DIVISION 15 MECHANICAL				**7,420,132.66 /ls**	**7,420,133**
1.00 ls					
10,486.34 Labor hours					
18,268.85 Equipment hours					
008.03 KRD NORTH BRANCH IMPROVEMENTS - PENSTOCK, WYMER FILL				***2,111.58 /LF***	***8,129,578***
3,850.00 LF					
17,242.255 Labor hours					
19,324.264 Equipment hours					
008.04	***KRD NORTH BRANCH IMPROVEMENTS - CANAL***				
DIVISION 02	**SITE CONSTRUCTION**				
02072.500	Demolition - Bridges	53,270.00	sf	89.69 /sf	4,777,679
Assumes 16 ea state routes, 26' wide x 70' long, 23 ea county routes, 16' x 70' long, hauled 40 miles RT to CD landfill					
02200.000	Earthwork - Canal, Mass Excavation to Stockpile, 20 mile RT	1,461,723.00	cy	19.511/cy	28,519,509
80% of excavation by scraper, 20% by large excavator, slope sides and 20' both sides oF canal fine graded, seeding 20' both sides of canal					
02200.001	Earthwork - Allowance for Temporary Canal Restrictions until completed	1.00	ls	1,005,210.00 /ls	1,005,210

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02200.001	Earthwork - Allowance for Temporary Canal Restrictions until completed	1.00	ls	1,005,210.00 /ls	1,005,210
Allowance for leaving portions of the canal at the smaller dimensions at the end of each construction season to ensure functionality at 200 cfs until all work is completed for 1000 cfs flow. Cost covers additional cost to excavate the small zones in the last construction season.					
02200.507	Earthwork, Structural Excavation and Backfill, Canal Diversions, Large	300.00	cy	5.522/cy	1,657
3 ea, large diversions with dam					
02200.508	Earthwork, Structural Excavation and Backfill, Canal Diversions, Small	1,300.00	cy	5.522/cy	7,179
DIVISION 02 SITE CONSTRUCTION				**34,311,233.780/ls**	**34,311,234**
1.00	**ls**				
229,763.13	Labor hours				
414,624.231	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.302	Concrete_Diversion Small, NO DAM, KRD North Canal	130.00	cy	507.272/cy	65,945
18" Canal gate in concrete structure, NO DAM					
03002.303	Concrete_Diversion, Large, @ Dam KRD North Canal	136.00	cy	408.63 /cy	55,573
3 ea, large diversions with dam, 85' long dam 10' wide at the river bottom 5' high and 5' wide at the top and 60" canal gate in concrete structure					
03431.050	Precast and Prestressed Concrete; Bridges	92,480.00	sf	113.30 /sf	10,477,970
Estimate assumes all replacement bridges are precast concrete, State Routes, 16 ea, 125' lg, 26' wide, County Routes, 23 ea, 110' lg, 16' wide					
DIVISION 03 CONCRETE				**10,599,487.91 /ls**	**10,599,488**
1.00	**ls**				
1,159.585	Labor hours				
94.352	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13005.000	Stop Log System - FRP	280.00	sf	184.33 /sf	51,612
Estimate is based on a gate fabricated of fiberglass plate and structural members. Installation is a 5 man crew, 1-90 ton crane, $12500 mobilization/demobilization					
BACKWATER STRUCTURE - 8 ea 10' long, 3'6" high					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
13005.000	Stop Log System - FRP	280.00	sf	184.33 /sf	51,612
PUMP STATION - 6 ea 18' long, 10' high					
CANAL DIVERSION - 8 ea 10' long, 3'6" high					
DIVISION 13 SPECIAL CONSTRUCTION				**51,612.40 /ls**	**51,612**
1.00	**ls**				
371.192	Labor hours				
51.892	Equipment hours				
DIVISION 15	**MECHANICAL**				
02423.500	Creek Crossing System - 60" RCP under Canal with Headwalls	10.00	ea	44,110.91 /ea	441,109
15115.000	Water Control Gates	29.00	ea	4,047.11 /ea	117,366
KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BADGER CREEK - 60" Canal Gate @ siphon canal inlet as shown on plans					
KRD NORTH BRANCH IMPROVEMENTS - CANAL - 26 ea canal gates and 3 ea 60" canal for control of water to purchasers of irrigation water from the canal.					
DIVISION 15 MECHANICAL				**558,475.13 /ls**	**558,475**
1.00	**ls**				
4,455.40	Labor hours				
857.11	Equipment hours				
008.04 KRD NORTH BRANCH IMPROVEMENTS - CANAL				***1,517,360.31 /MILE***	***45,520,809***
30.00	***MILE***				
235,749.304	Labor hours				
415,627.582	Equipment hours				
008.05	***KRD NORTH BRANCH IMPROVEMENTS - TUNNEL #4***				
DIVISION 02	**SITE CONSTRUCTION**				
02200.004	Earthwork - Tunnel to Canal Transitions	1,000.00	cy	19.511/cy	19,511
80% of excavation by scraper, 20% by large excavator, slope sides and 20' both sides or canal fine graded, seeding 20' both sides of canal					
02400.304	Tunnel, Parallel, #4	452.00	lf	6,431.994/lf	2,907,261
150" tunnel, concrete lined 15% with 3" shotcrete mixed on site, assuming $125/cy for shotcrete, Rock Bolts. Shafts average 80' dia by 60 deep					

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION				**2,926,772.20 /ls**	**2,926,772**
1.00	**ls**				
130.833	Labor hours				
242.91	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.705	Concrete_Slab on Grade-Liner for Canal to Tunnel Transitions	70.00	cy	404.45 /cy	28,311
DIVISION 03 CONCRETE				**28,311.41 /ls**	**28,311**
1.00	**ls**				
248.104	Labor hours				
55.96	Equipment hours				
008.05 KRD NORTH BRANCH IMPROVEMENTS - TUNNEL #4				***6,537.80 /LF***	***2,955,084***
452.00	***LF***				
378.94	Labor hours				
298.863	Equipment hours				
008.06	***KRD NORTH BRANCH IMPROVEMENTS - TUNNEL #5***				
DIVISION 02	**SITE CONSTRUCTION**				
02200.004	Earthwork - Tunnel to Canal Transitions	1,000.00	cy	19.511/cy	19,511
80% of excavation by scraper, 20% by large excavator, slope sides and 20' both sides or canal fine graded, seeding 20' both sides of canal					
02400.306	Tunnel, Parallel, #5	3,446.00	lf	3,460.06 /lf	11,923,362
Tunnel and 2 ea transitions parallel to existing tunnel number 5. 150' tunnel, concrete lined 15% with 3" shotcrete mixed on site, assuming $125/cy for shotcrete, Rock Bolts.					
DIVISION 02 SITE CONSTRUCTION				**11,942,873.02 /ls**	**11,942,873**
1.00	**ls**				
130.833	Labor hours				
242.91	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 03	**CONCRETE**				
03002.705	Concrete_Slab on Grade-Liner for Canal to Tunnel Transitions	70.00	cy	404.45 /cy	28,311
DIVISION 03 CONCRETE				**28,311.42 /ls**	**28,311**
1.00	**ls**				
248.104	Labor hours				
55.96	Equipment hours				
008.06 KRD NORTH BRANCH IMPROVEMENTS - TUNNEL #5				***3,473.94 /LF***	***11,971,184***
3,446.00	***LF***				
378.94	Labor hours				
298.863	Equipment hours				
008.07	***KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BIG JOHNSON CREEK***				
DIVISION 02	**SITE CONSTRUCTION**				
02072.004	Demolition, Cutting and Patching - Big John Creek Siphon	1.00	ls	36,013.50 /ls	36,014
Demolition and disposal of existing 72" PCCP					
02200.700	Earthwork, Structural Fill - Siphon/Tunnel Connection	23,487.00	cy	13.48 /cy	316,593
Assume 80" dia tunnel shaft, dirt hauled to site from canal modifications, fill by dragline, spread by dozer, compacted by vibrating roller					
02400.302	Tunnel, Big Johnson Creek	235.00	lf	11,142.05 /lf	2,618,382
Tunnel and 2 ea shafts from end of 1673+09.98 to 1675+45 as a part of the Big Johnson Creek Siphon. 150" tunnel, concrete lined 15% with 3" shotcrete mixed on site, assuming $125/cy for shotcrete, Rock Bolts. Shafts average 80' dia by 60 deep					
02930.000	Seeding, Sodding, and Landscaping	1.73	ls	975.613/ls	1,688
DIVISION 02 SITE CONSTRUCTION				**2,972,676.32 /ls**	**2,972,676**
1.00	**ls**				
3,115.57	Labor hours				
1,754.18	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 03	**CONCRETE**				
03002.111	Concrete_Foundations - Siphon/Tunnel Connection	490.00	cy	490.91 /cy	240,543
03002.117	Concrete_Foundations - Siphon Inlet/Outlet Structures	134.00	cy	390.88 /cy	52,377
03002.307	Concrete Walls Exterior - Siphon/Tunnel connection	2,004.00	cy	517.70 /cy	1,037,469
03002.313	Concrete_Walls - Siphon Inlet/Outlet Structures	32.00	cy	677.73 /cy	21,687
Center wall of passage system = 2' rather than 1' typ for walls in this takeoff					
03002.612	Concrete_Elevated Slab - Siphon/Tunnel Connection	314.00	cy	419.61 /cy	131,758
03002.618	Concrete_Elevated Slab - Siphon Inlet/Outlet Structures	14.00	cy	540.41 /cy	7,566
DIVISION 03 CONCRETE				**1,491,400.72 /ls**	**1,491,401**
1.00	**ls**				
14,755.053	Labor hours				
1,013.12	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13020.000	Building Modules	200.00	sf	210.00 /sf	42,000
Discharge structure, siphon/tunnel connections locations as shown on design documents - allowance for a PMB					
DIVISION 13 SPECIAL CONSTRUCTION				**42,000.00 /ls**	**42,000**
1.00	**ls**				
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	12,625.00	cy	61.83 /cy	780,568
15061.102	Pipe: Steel- 26" and larger - Johnson Creek Siphon	1,510.00	lf	1,377.53 /lf	2,080,064
Estimate is based on repalcement of the 72" PCCP with 150" steel pipe on both sides from the new 150" tunnel. (see USBR drawing 33-D-54/23964)					
15062.002	Pipe: Ductile - Siphon Air Release	1.00	ls	2,675.74 /ls	2,676
Sediment Trap Drain, 60" DIP CL 150					

Description		Quantity		Total Unit Cost	Total Amount
15101.000	Gate Valves	1.00	ea	963.62 /ea	964
DIVISION 15 MECHANICAL				**2,864,270.91 /ls**	**2,864,271**
1.00	**ls**				
4,750.29	Labor hours				
7,515.474	Equipment hours				
DIVISION 16	**ELECTRICAL**				
16000.400	Electrical Subcontractor - Service electrical	1.00	ls	118,500.00 /ls	118,500
PUMP STATION - Lighting, PS and building power, grounding, switchgear, HVAC connections/pumps, motor connections, electrical service, feeders, subfeeders, security system, security devices, intake service, exterior and interior lighting, service to exterior entrance gates, overhead doors, surge tanks, valves vault, fence security and detection, fire detection and alarm system, feed from the substation.					
DISCHARGE AND SIPHON INLET - Lighting, PS and building power, grounding, switchgear, HVAC, electrical service, feeders, subfeeders, security system, security devices, exterior and interior lighting, overhead doors, surge tanks, valves vault, fence security and detection, fire detection.					
16000.500	Electrical Subcontractor - Instrumentation	1.00	ls	126,750.00 /ls	126,750
PLC with all ancillary work, Instrumentation devices with wiring, radio equipment, antenna with support mast and foundation					
DIVISION 16 ELECTRICAL				**245,250.00 /ls**	**245,250**
1.00	**ls**				
008.07 KRD NORTH BRANCH IMPROVEMENTS - SIPHON, BIG JOHNSON CREEI	***LF***			***4,364.24 /LF***	***7,615,598***
22,620.911	Labor hours				
10,282.77	Equipment hours				
008.08	***KRD NORTH BRANCH IMPROVEMENTS - SIPHON, LITTLE JOHNSON CREEK***				
DIVISION 02	**SITE CONSTRUCTION**				
02072.002	Demolition, Cutting and Patching - Little John Creek Siphon	1.00	ls	6,201.00 /ls	6,201
Demolition and disposal of existing 72" PCCP					

Description		Quantity		Total Unit Cost	Total Amount
02930.000	Seeding, Sodding, and Landscaping	1.73	ls	975.61 /ls	1,688
DIVISION 02 SITE CONSTRUCTION				**7,888.80 /ls**	**7,889**
1.00	**ls**				
9.243	Labor hours				
9.243	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.117	Concrete_Foundations - Siphon Inlet/Outlet Structures	134.00	cy	390.88 /cy	52,377
03002.313	Concrete_Walls - Siphon Inlet/Outlet Structures	32.00	cy	677.73 /cy	21,687
Center wall of passage system = 2' rather than 1' typ for walls in this takeoff					
03002.618	Concrete_Elevated Slab - Siphon Inlet/Outlet Structures	14.00	cy	540.41 /cy	7,566
DIVISION 03 CONCRETE				**81,630.350/ls**	**81,630**
1.00	**ls**				
768.45	Labor hours				
59.82	Equipment hours				
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	2,167.00	cy	199.82 /cy	433,011
15061.100	Pipe: Steel- 26" and larger	260.00	lf	1,505.713/lf	391,485
15062.002	Pipe: Ductile - Siphon Air Release	1.00	ls	2,675.74 /ls	2,676
Sediment Trap Drain, 60" DIP CL 150					
15101.000	Gate Valves	1.00	ea	963.62 /ea	964
DIVISION 15 MECHANICAL				**828,135.73 /ls**	**828,136**
1.00	**ls**				
1,868.795	Labor hours				
2,345.00	Equipment hours				

Description	Quantity	Total Unit Cost	Total Amount
008.08 KRD NORTH BRANCH IMPROVEMENTS - SIPHON, LITTLE JOHNSON CREEK 284.00 LF		***3,231.18 /LF***	***917,655***
2,646.484 Labor hours			
2,414.062 Equipment hours			

Estimate Totals

Description	Amount	Totals	Rate
Labor	22,300,698		
Material	77,665,405		
Subcontract	102,034,643		
Equipment	33,296,368		
Other	4,128,687		
Subtotal		**239,425,801**	
Contractor's Fld Ovhd	9,577,032		4.000 %
Mobilization	14,365,548		6.000 %
Subtotal w/ mobilization		**263,368,381**	
Unlisted Items Minor	13,923,766		6.000 %
Design and Scope Changes Minor	16,244,393		7.000 %
Cost Est Refinements Minor	6,961,883		3.000 %
Contractor's Fee	21,034,890		7.000 %
Contractor's Bonds & Insurance	4,507,476		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**326,040,789**	
Contingencies	81,510,197		25.000 %
Field Cost		**407,550,986**	
Sales Tax Estimate (Mat & Eq)	8,787,066		8.200 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Escal to NTP (NOTINCL)	
Forecasted Feature Bid	**416,338,052**

1. Mobilization is increased to cover the 6 year construction period for expansion of the North Branch of the KRD Canal.
2. Contingency percentages are increased to reflect the lack of specific information on the canal expansion, operational impacts, and schedule uncertainty.
3. Extent of subcontractor mark ups has been reduced to reflect multiple contracts with a focus on direct contracting to specialty contractors.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

APPENDIX F

OPCC Wymer Power Recovery and Conveyance to Roza Dam

Yakima River Basin Water Storage Study
Wymer Offstream Storage Facility/Yakima River Intake
Penstock/Power House

US Department of the Interior

Bureau of Reclamation

Pacific Northwest Region

HDR Engineering, Inc

9/8/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Reclamation has provided the enclosed cost estimate as a resource for us in discussions among interested parties evaluating this specific project, activity, concept, issue, etc. Presentation of this estimate does not in and of itself imply Reclamation's support for moving forward with the effort. When appropriate, Reclamation specifically will articulate support for further action through other means, such as a report containing recommendations.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
010 PENSTOCK - INTAKE, TUNNELS, SIPHON	15.00	MW	3,989,816	5,867,185	97,573,507	4,951,846		112,382,355
011 TAILRACE FLUME	2.00	LS	377,026	420,351	2,164,557	104,581		3,066,516
012 POWERHOUSE REPORTS	1.00	LS			45,678,885			45,678,885

Partial Totals

Description	Amount	Totals	Rate
Subtotal		**161,127,756**	
Contractor's Fee	9,667,665		6.000 %
Contractor's Bonds & Insurance	2,416,916		1.500 %
Subtotal		**173,212,337**	
Mobilization	5,196,370		3.000 %
Subtotal w/ Mobilization		**178,408,707**	
Unlisted Items Minor	7,136,348		4.000 %
Design and Scope Changes Minor	6,445,110		4.000 %
Cost Est Refinements Minor	3,222,555		2.000 %
Procurement Strategy Open Comp			
Contract Cost		**195,212,720**	
Contingencies	48,803,180		25.000 %
Field Cost		**244,015,900**	
Sales Tax Estimate (Mat & Eq)	930,205		8.200 %
Escal to NTP (Not Included)			
Forecasted Feature Bid		**244,946,105**	

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Wymer Offstream Storage Facility/Yakima River Intake
Penstock/Power House

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989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		010 PENSTOCK - INTAKE, TUNNELS, SIPHON				
DIVISION 01		**GENERAL REQUIREMENTS**				
PEN-005		*Penstock, steel, 10', CMCL, 168+50 to 177+75*				
n	9055	10' Penstock_Safety, ventilation,lights,	36.00	week	4,272.30 /week	153,803
n	0100	10' Penstock Temporary, roads, gravel fill, 8" gravel depth, excl surfacing	1,233.333	sy	11.582 /sy	14,285
		PEN-005 Penstock, steel, 10', CMCL, 168+50 to 177+75				*168,087*
		1,536.262 Labor hours				
		16.05 Equipment hours				
PEN-008		*Penstock, steel, 9.5', CMCL, 265+25 to 294+50*				
n	9055	9.5' Penstock_Safety, ventilation,lights,	10.00	week	4,272.30 /week	42,723
n	0100	9.5' Penstock Temporary, roads, gravel fill, 8" gravel depth, excl surfacing	3,900.00	sy	11.582 /sy	45,170
		PEN-008 Penstock, steel, 9.5', CMCL, 265+25 to 294+50				*87,893*
		704.40 Labor hours				
		50.74 Equipment hours				
		DIVISION 01 GENERAL REQUIREMENTS				**255,981**
		2,240.66 Labor hours				
		66.785 Equipment hours				
DIVISION 02		**SITE CONSTRUCTION**				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-001		*Intake Structure*				
n	0020	Clearing & grubbing, cut & chip light trees, to 6" diameter	2.09	acre	3,406.794 /acre	7,120
n	0200	Intake Struct Rip-rap and rock lining, random, broken stone, 18" minimum thickness, machine placed for slope protection, not grouted	1,400.00	sy	109.53 /sy	153,335
		PEN-001 Intake Structure				*160,455*
		2,318.844 Labor hours				
		278.20 Equipment hours				
PEN-005		*Penstock, steel, 10', CMCL, 168+50 to 177+75*				
n	0020	10' Penstock Clearing & grubbing, cut & chip light trees, to 6" diameter	1.062	acre	3,406.79 /acre	3,618
n	0020	Fill, dumped material, spread, by dozer, excludes compaction	21,432.55	lcy	1.81 /lcy	38,700
n	0020	Fill, dumped material, spread, by dozer, excludes compaction	11,181.60	lcy	1.81 /lcy	20,190
	0020	Seeding, mechanical seeding, 215 lb/acre	1.06	acre	926.51 /acre	982
n	5200	Drilling and blasting rock, 3 C.Y. excavator, excavate and load blasted rock	9,318.00	bcy	1.58 /bcy	14,725
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	21,432.55	lcy	2.47 /lcy	52,942
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	11,181.60	lcy	2.47 /lcy	27,620
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	15,756.00	lcy	2.47 /lcy	38,920

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		PEN-005 Penstock, steel, 10', CMCL, 168+50 to 177+75				*197,698*
		1,127.36 Labor hours				
		979.91 Equipment hours				
PEN-008		*Penstock, steel, 9.5', CMCL, 265+25 to 294+50*				
n	0020	9.5' Penstock Clearing & grubbing, cut & chip light trees, to 6" diameter	3.36	acre	3,406.792 /acre	11,437
n	0020	Fill, dumped material, spread, by dozer, excludes compaction	63,724.950	lcy	1.81 /lcy	115,067
n	0020	Fill, dumped material, spread, by dozer, excludes compaction	33,247.20	lcy	1.81 /lcy	60,034
	0020	Seeding, mechanical seeding, 215 lb/acre	3.36	acre	926.51 /acre	3,113
n	5200	Drilling and blasting rock, 3 C.Y. excavator, excavate and load blasted rock	27,706.00	bcy	1.58 /bcy	43,782
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	63,724.950	lcy	2.47 /lcy	157,411
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	33,247.20	lcy	2.47 /lcy	82,126
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	40,914.00	lcy	2.47 /lcy	101,064
		PEN-008 Penstock, steel, 9.5', CMCL, 265+25 to 294+50				*574,033*
		3,291.30 Labor hours				
		2,849.70 Equipment hours				

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
DIVISION 02		**SITE CONSTRUCTION**				**932,186**
		6,737.50 Labor hours				
		4,107.802 Equipment hours				
DIVISION 03		**CONCRETE**				
PEN-001		*Intake Structure*				
n	0300	Excavating, bulk bank measure, 3 C.Y. capacity = 160 C.Y./hour, backhoe, hydraulic, crawler mounted, excluding truck loading	26,111.00	bcy	1.541 /bcy	40,243
n	1300	Backfill, bulk, to 300' haul, dozer backfilling, excludes compaction	15,333.00	lcy	1.51 /lcy	23,080
n	1600	Backfill, bulk, 6" to 12" lifts, dozer backfilling	13,333.00	ecy	2.83 /ecy	37,736
	0300	Intake Structure Rock Anchors	48.00	ea	1,390.13 /ea	66,726
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	920.00	sfca	7.751 /sfca	7,131
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	600.00	sfca	3.02 /sfca	1,809
n	3005	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_FOUNDATIONS	300.00	lf	12.11 /lf	3,632
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	50.063	ton	2,042.46 /ton	102,252
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	50.063	ton	53.38 /ton	2,672
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	50.063	ton	58.021 /ton	2,905
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	445.00	cy	25.904 /cy	11,527

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-001		*Intake Structure*				
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	445.00	cy	125.00 /cy	55,625
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	6,000.00	sf	0.40 /sf	2,401
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	300.00	lf	0.10 /lf	30
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	300.00	lf	2.244 /lf	673
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	60.00	csf	16.723 /csf	1,003
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	167.00	ecy	53.173 /ecy	8,880
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	400.00	lf	15.94 /lf	6,374
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	16,000.00	sfca	10.402 /sfca	166,434
n	5200	Chamfer strip, wood, 3/4" wide	800.00	lf	1.464 /lf	1,171
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	14.00	c	124.44 /c	1,742
n	3010	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_WALLS	800.00	lf	12.11 /lf	9,686
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	51.98	ton	1,771.42 /ton	92,070
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	51.98	ton	53.38 /ton	2,774
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	51.98	ton	58.021 /ton	3,016

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total	
Item		**Description**	**Takeoff Qty**		**Unit Cost**	**Amount**
PEN-001		*Intake Structure*				
n	4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	594.00	cy	47.924 /cy	28,467
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	594.00	cy	125.00 /cy	74,250
n	0210	Control joint, clean out control joint of debris_WALLS	400.00	lf	0.10 /lf	40
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	400.00	lf	2.244 /lf	898
n	0020	Concrete finishing, walls, includes breaking ties and patching voids	16,000.00	sf	1.054 /sf	16,865
n	0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	8,000.00	sf	1.274 /sf	10,192
n	2150	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	5,850.00	sf	8.59 /sf	50,246
n	7000	C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	450.00	lf	5.142 /lf	2,314
n	0400	Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	48.713	ton	1,906.43 /ton	92,868
n	2040	Reinforcing steel, unload and sort, add to base_ELEVATE SLABS	48.713	ton	53.38 /ton	2,600
n	2218	Reinforcing steel, crane cost for handling, average, add_ELEVATED SLABS	48.713	ton	58.021 /ton	2,826
n	1400	Structural concrete, placing, elevated slab, pumped, less than 6" thick, includes strike off & consolidation, excludes material	433.00	cy	34.231 /cy	14,822

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
PEN-001		*Intake Structure*				
n	0820	Struct ELEV SLAB concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	433.00	cy	125.00 /cy	54,125
n	0256	Concrete finishing, floors, manual screed, bull float, machine float & steel trowel (walk-behind)_ELEV SLAB	5,850.00	sf	0.95 /sf	5,559
n	9000	Concrete finishing, elev slabs, includes patching voids	5,850.00	sf	0.55 /sf	3,195
n	6850	Int Struct ,place,stairs (3500 psi),3'-6"wd,cast grnd,includes forms(4 us),reinforcing steel,concrete,placing and finishing,includes safety treads	325.00	nose	70.71 /nose	22,980
n	2300	Drilling and blasting rock, Intake Struct, over 1500 C.Y.	13,055.00	bcy	107.37 /bcy	1,401,720
		PEN-001 Intake Structure				*2,435,560*
		25,857.98 Labor hours				
		17,196.964 Equipment hours				
		DIVISION 03 CONCRETE				**2,435,560**
		25,857.98 Labor hours				
		17,196.964 Equipment hours				
DIVISION 15		**MECHANICAL**				
PEN-002		*Transition, Intake to 14' tunnel*				
n	0500	Concrete pressure grouting, epoxy cement grout, maximum	691.00	cf	511.55 /cf	353,480

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		PEN-002 Transition, Intake to 14' tunnel				*353,480*
		484.91 Labor hours				
		193.964 Equipment hours				
PEN-004		*Transition, Sta 168+30, 14' tunnel to 10' pipeline*				
n	0500	Concrete pressure grouting, epoxy cement grout, maximum	691.00	cf	511.55 /cf	353,480
		PEN-004 Transition, Sta 168+30, 14' tunnel to 10' pipeline				*353,480*
		484.91 Labor hours				
		193.964 Equipment hours				
PEN-005		*Penstock, steel, 10', CMCL, 168+50 to 177+75*				
n	8050	Compaction, 3 passes, 6" to 11", 4" lifts, rammer tamper	4,667.00	ecy	3.65 /ecy	17,016
n	1378	Excavating, trench or continuous footing, common earth, 3 C.Y. excavator, 10' to 14' deep,	18,637.00	bcy	2.904 /bcy	54,116
n	1378	Loading,from stockpile, common earth, 3 C.Y. excavator,	13,701.00	bcy	0.38 /bcy	5,179
n	0050	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	5,366.00	lcy	35.091 /lcy	188,296
n	1900	Backfill, trench, to 300' haul, dozer backfilling, excludes compaction	15,756.15	lcy	2.01 /lcy	31,612
n	2200	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	13,701.00	ecy	3.24 /ecy	44,319
n	0136	Steel Pipe, 36" access manway, furnish and install	2.00	ea	1,408.78 /ea	2,818
n	9650	Steel Pipe, Spiral Weld AWWA C200, 120" dia, 0.50 wall, 40' lengths; incl puchase pipe only; excl string, install, weld, coating, and lining	925.00	lf	791.74 /lf	732,360
n	2000	Steel Pipe, Installation, String and Installation 84" to 144"; excludes purchasing pipe, welding, coating, and lining	925.00	lf	25.892 /lf	23,950

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-005		*Penstock, steel, 10', CMCL, 168+50 to 177+75*				
n	9650	Steel Pipe, Welding per joint, 96" dia, 0.50 wall, .25 fillet weld 2 passes; incl welding only; excl purchase pipe, string, install, coat, and line	25.00	ea	1,051.504 /ea	26,288
n	1096	Steel Pipe, Cement Lining, Field Applied, 120" dia; excludes purchasing pipe, string, install, welding, and coating	925.00	lf	251.34 /lf	232,486
n	2300	Drilling and blasting rock, 10' Penstock trenches,	9,318.00	bcy	107.373 /bcy	1,000,501
		PEN-005 Penstock, steel, 10', CMCL, 168+50 to 177+75				*2,358,939*
		11,151.803 Labor hours				
		13,530.984 Equipment hours				
PEN-006		*Transition, Sta 177+75, 10' steel pipeline to 14' tunnel*				
n	0500	Concrete pressure grouting, epoxy cement grout, maximum	691.00	cf	511.55 /cf	353,480
		PEN-006 Transition, Sta 177+75, 10' steel pipeline to 14' tunnel				*353,480*
		484.91 Labor hours				
		193.964 Equipment hours				
PEN-008		*Penstock, steel, 9.5', CMCL, 265+25 to 294+50*				
n	8050	Compaction, 3 passes, 6" to 11", 4" lifts, rammer tamper	12,158.00	ecy	3.65 /ecy	44,328
n	1378	Excavating, trench or continuous footing, common earth, 3 C.Y. excavator, 10' to 14' deep, includes trench box, excludes dewatering	55,413.00	bcy	2.53 /bcy	139,954
n	1378	Loading,from stockpile, common earth, 3 C.Y. excavator,	35,577.00	bcy	0.38 /bcy	13,449
n	0050	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	13,981.00	lcy	35.091 /lcy	490,600
n	1900	Backfill, trench, to 300' haul, dozer backfilling, excludes compaction	40,913.550	lcy	2.01 /lcy	82,086

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

						Total	
Item		**Description**	**Takeoff Qty**		**Unit Cost**		**Amount**
PEN-008		*Penstock, steel, 9.5', CMCL, 265+25 to 294+50*					
n	2200	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	35,577.391	ecy	3.24 /ecy		115,084
n	9650	9.5' Penstock Pipe_steel_ Welding, joint blast labor per joint, 120" pipe size, schedule 80, welding	93.00	ea	4,307.78 /ea		400,624
n	0136	Steel Pipe, 36" access manway, furnish and install	4.00	ea	1,408.78 /ea		5,635
n	0204	Steel Pipe, 4" weld lead access, furnish and install; need to add blind flange and gasket & bolt set	4.00	ea	176.10 /ea		704
n	2000	Steel Pipe, Installation, String and Installation 84" to 144"; excludes purchasing pipe, welding, coating, and lining	2,925.00	lf	25.892 /lf		75,735
n	1096	Steel Pipe, Cement Lining, Field Applied, 114" dia; excludes purchasing pipe, string, install, welding, and coating	2,925.00	lf	238.77 /lf		698,396
n	3320	9.5' Penstock piping,Steel,cement lined,20' lengths, 10' dia, Excludes excavation, backfill, bedding	2,925.00	lf	610.22 /lf		1,784,891
n	2300	Drilling and blasting rock, 9.5' Penstock trenches,	27,706.00	bcy	107.373 /bcy		2,974,873
		PEN-008 Penstock, steel, 9.5', CMCL, 265+25 to 294+50					*6,826,360*
		45,223.123 Labor hours					
		39,752.71 Equipment hours					
PEN-011		*Transition, Sta 265+25, 9.5' steel pipeline to 14' tunnel*					
n	0500	Concrete pressure grouting, epoxy cement grout, maximum	691.00	cf	511.55 /cf		353,480
		PEN-011 Transition, Sta 265+25, 9.5' steel pipeline to 14' tunnel					*353,480*
		484.91 Labor hours					
		193.964 Equipment hours					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	DIVISION 15 MECHANICAL				**10,599,218**
	58,314.563 Labor hours				
	54,059.55 Equipment hours				
*** unassigned ***					
PEN-001	*Intake Structure*				
----	Roller Gate with Hoists, 30' x 30'	1.00	ea	863,923.56 /ea	863,924
----	Bulkhead gate with Hoists, 40' x 30'	1.00	ea	552,804.44 /ea	552,804
----	Trash Rake, 50' x 30'	29,500.00	lb	3.392 /lb	100,057
----	Hoist House, 20' x20' x 12' ht, PMB, insulated, 12" concrete floor	400.00	sf	175.00 /sf	70,000
----	Electrical and I&C as a % of Direct Cost	1.00	ls	558,095.00 /ls	558,095
	PEN-001 Intake Structure				*2,144,880*
	1,653.96 Labor hours				
	465.95 Equipment hours				
PEN-002	*Transition, Intake to 14' tunnel*				
----	Transition sta, sub quote Norm Wagner	1.00	ea	350,341.00 /ea	350,341
	PEN-002 Transition, Intake to 14' tunnel				*350,341*
PEN-003	*Tunnel, 14' diameter, transitions,1+00 to 168+50 Modified Horseshoe, 12" thick concrete lining*				
----	Tunnel 1+00 to 168+50 subcontract quote Norm Wagner	16,750.00	lf	1,969.602 /lf	32,990,827
----	Portal sta 1+00 subcontract quote Norm Wagner	1.00	ea	445,455.00 /ea	445,455
----	Concrete Tunnel Liner 1+00 to 168+50 subcontract quote Norm Wagner	91,357.00	cy	273.113 /cy	24,950,815

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	PEN-003 Tunnel, 14' diameter, transitions,1+00 to 168+50				*58,387,097*
PEN-004	*Transition, Sta 168+30, 14' tunnel to 10' pipeline*				
----	Transition sta subcontract quote Norm Wagner	1.00	ea	350,341.00 /ea	350,341
	PEN-004 Transition, Sta 168+30, 14' tunnel to 10' pipeline				*350,341*
PEN-006	*Transition, Sta 177+75, 10' steel pipeline to 14' tunnel*				
----	Transition sta subcontractor Norm Wagner	1.00	ea	350,341.00 /ea	350,341
	PEN-006 Transition, Sta 177+75, 10' steel pipeline to 14' tunnel				*350,341*
PEN-007	*Tunnel, 14' diameter, 177+75 to 265+25 Modified Horseshoe, 12" thick concrete lining*				
----	Portal sta 177+75 subcontract Norm Wagner	1.00	ea	445,455.00 /ea	445,455
----	Tunnel, 177+75 to 264+25 subcontract Norm Wagner	8,750.00	lf	2,599.61 /lf	22,746,553
----	Concrete Tunnel Liner 177+75 to 265+25 subcontract Norm Wagner	47,724.00	cy	273.113 /cy	13,034,061
	PEN-007 Tunnel, 14' diameter, 177+75 to 265+25				*36,226,069*
PEN-011	*Transition, Sta 265+25, 9.5' steel pipeline to 14' tunnel*				
----	Transition subcontract quote Norm Wagner	1.00	ea	350,341.00 /ea	350,341
	PEN-011 Transition, Sta 265+25, 9.5' steel pipeline to 14' tunnel				*350,341*
	*** unassigned ***				**98,159,409**
	1,653.96 Labor hours				
	465.95 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		010 PENSTOCK - INTAKE, TUNNELS, SIPHON			***7,492,156.982/MW***	***112,382,355***
		15.00 MW				
		94,804.653 Labor hours				
		75,897.042 Equipment hours				
		011 TAILRACE FLUME				
DIVISION 02		**SITE CONSTRUCTION**				
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	0300	Excavating, bulk bank measure, 3 C.Y. capacity = 160 C.Y./hour, backhoe, hydraulic, crawler mounted, excluding truck loading	222.00	bcy	1.541 /bcy	342
n	1300	Backfill, bulk, to 300' haul, dozer backfilling, excludes compaction	190.00	lcy	1.51 /lcy	286
n	1600	Backfill, bulk, 6" to 12" lifts, dozer backfilling	166.00	ecy	2.83 /ecy	470
n	0020	Fill, dumped material, spread, by dozer, excludes compaction	255.30	lcy	1.81 /lcy	461
n	1110	Hauling, excavated or borrow material, loose cubic yards, 5 mile round trip, 1 load/hour, 16.5 C.Y. dump trailer, highway haulers, excludes loading	64.40	lcy	9.79 /lcy	630
n	2080	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.0 loads/hour, 34 C.Y. rear or bottom dump, off highway haulers	255.30	lcy	2.47 /lcy	631

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		PEN-010 Tailrace flume, 295+25 to 301+30				*2,820*
		17.002 Labor hours				
		20.10 Equipment hours				
		DIVISION 02 SITE CONSTRUCTION				**2,820**
		17.002 Labor hours				
		20.10 Equipment hours				
DIVISION 03		**CONCRETE**				
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	1300	Backfill, bulk, to 300' haul, dozer backfilling, excludes compaction	6,696.00	lcy	1.51 /lcy	10,079
n	1600	Backfill, bulk, 6" to 12" lifts, dozer backfilling	5,823.00	ecy	2.83 /ecy	16,481
n	1255	Hauling, borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers	6,696.00	lcy	13.752 /lcy	92,081
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,683.360	sfca	4.162 /sfca	7,007
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	208.00	sfca	4.162 /sfca	866
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,345.00	sfca	4.162 /sfca	5,598
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	420.00	sfca	4.162 /sfca	1,748
n	9000	C.I.P. concrete forms, slab on grade, hung edge form, 12" to 24" high, 4 use, includes erecting, bracing, stripping and cleaning	1,008.00	lf	22.332 /lf	22,511

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	9000	C.I.P. concrete forms, slab on grade, hung edge form, 12" to 24" high, 4 use, includes erecting, bracing, stripping and cleaning	538.00	lf	22.332 /lf	12,015
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	673.92	sfca	1.63 /sfca	1,098
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	67.20	sfca	1.63 /sfca	110
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	415.400	sfca	1.63 /sfca	677
n	3005	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_FOUNDATIONS	576.00	lf	9.831 /lf	5,663
n	3005	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_FOUNDATIONS	33.60	lf	9.831 /lf	330
n	3005	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_FOUNDATIONS	207.700	lf	9.831 /lf	2,042
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	57.263	ton	1,461.65 /ton	83,698
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	5.63	ton	1,461.65 /ton	8,222
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	36.001	ton	1,461.65 /ton	52,621
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	3.83	ton	1,461.65 /ton	5,591
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	57.263	ton	30.64 /ton	1,754

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	5.63	ton	30.64 /ton	172
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	36.001	ton	30.64 /ton	1,103
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	3.83	ton	30.64 /ton	117
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	57.263	ton	33.302 /ton	1,907
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	5.63	ton	33.301 /ton	187
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	36.001	ton	33.302 /ton	1,199
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	3.83	ton	33.302 /ton	127
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	509.00	cy	15.233 /cy	7,754
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	50.00	cy	15.233 /cy	762
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	320.00	cy	15.233 /cy	4,875
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	34.00	cy	15.233 /cy	518
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	509.00	cy	125.00 /cy	63,625

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	50.00	cy	125.00 /cy	6,250
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	320.00	cy	125.00 /cy	40,000
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	34.00	cy	125.00 /cy	4,250
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	11,520.00	sf	0.20 /sf	2,258
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	672.00	sf	0.20 /sf	132
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	4,154.00	sf	0.20 /sf	814
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	300.00	sf	0.20 /sf	59
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	576.00	lf	0.05 /lf	26
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	33.60	lf	0.05 /lf	2
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	207.700	lf	0.05 /lf	10
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	576.00	lf	1.21 /lf	696
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	33.60	lf	1.21 /lf	41
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	207.700	lf	1.21 /lf	251

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total	
Item		Description	Takeoff Qty		Unit Cost	Amount
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	115.20	csf	11.86 /csf	1,366
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	6.72	csf	11.86 /csf	80
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	41.54	csf	11.86 /csf	493
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	3.00	csf	11.86 /csf	36
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	25.00	ecy	37.19 /ecy	930
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	153.00	ecy	37.19 /ecy	5,690
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	12.00	ecy	37.19 /ecy	446
n	1135	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	29.00	lcy	19.58 /lcy	568
n	1135	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	176.00	lcy	19.58 /lcy	3,446
n	1135	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	14.00	lcy	19.58 /lcy	274
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	480.00	lf	8.64 /lf	4,146
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	119.00	lf	8.64 /lf	1,028
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	66.00	lf	8.64 /lf	570

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	19,200.00	sfca	5.501 /sfca	105,616
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	4,700.00	sfca	5.501 /sfca	25,854
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	2,640.00	sfca	5.501 /sfca	14,522
n	5200	Chamfer strip, wood, 3/4" wide	960.00	lf	0.84 /lf	801
n	5200	Chamfer strip, wood, 3/4" wide	236.00	lf	0.84 /lf	197
n	5200	Chamfer strip, wood, 3/4" wide	132.00	lf	0.84 /lf	110
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	16.00	c	124.44 /c	1,991
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	6.00	c	124.44 /c	747
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	4.00	c	124.44 /c	498
n	3010	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_WALLS	1,440.00	lf	9.831 /lf	14,157
n	3010	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_WALLS	249.00	lf	9.831 /lf	2,448
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	46.73	ton	1,326.13 /ton	61,963
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	15.49	ton	1,326.13 /ton	20,539

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	8.58	ton	1,326.13 /ton	11,372
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	46.73	ton	30.64 /ton	1,432
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	15.49	ton	30.64 /ton	475
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	8.58	ton	30.64 /ton	263
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	46.73	ton	33.302 /ton	1,556
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	15.49	ton	33.302 /ton	516
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	8.58	ton	33.303 /ton	286
n	4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	534.00	cy	28.181 /cy	15,048
n	4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	177.00	cy	28.181 /cy	4,988
n	5350	Structural concrete, placing, walls, pumped, 15" thick, includes strike off & consolidation, excludes material	98.00	cy	23.484 /cy	2,301
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	534.00	cy	125.00 /cy	66,750
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	177.00	cy	125.00 /cy	22,125

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
PEN-010		*Tailrace flume, 295+25 to 301+30*				
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	98.00	cy	125.00 /cy	12,250
n	0210	Control joint, clean out control joint of debris_WALLS	480.00	lf	0.05 /lf	22
n	0210	Control joint, clean out control joint of debris_WALLS	119.00	lf	0.05 /lf	5
n	0210	Control joint, clean out control joint of debris_WALLS	66.00	lf	0.05 /lf	3
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	480.00	lf	1.21 /lf	580
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	119.00	lf	1.21 /lf	144
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	66.00	lf	1.21 /lf	80
n	0020	Concrete finishing, walls, includes breaking ties and patching voids	19,200.00	sf	0.55 /sf	10,485
n	0020	Concrete finishing, walls, includes breaking ties and patching voids	4,700.00	sf	0.55 /sf	2,567
n	0020	Concrete finishing, walls, includes breaking ties and patching voids	2,640.00	sf	0.55 /sf	1,442
n	0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	9,600.00	sf	0.65 /sf	6,229
n	0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	2,350.00	sf	0.65 /sf	1,525
n	0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	1,320.00	sf	0.65 /sf	856

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	PEN-010 Tailrace flume, 295+25 to 301+30				*899,139*
	9,692.932 Labor hours				
	1,949.881 Equipment hours				
	DIVISION 03 CONCRETE				**899,139**
	9,692.932 Labor hours				
	1,949.881 Equipment hours				
*** unassigned ***					
PEN-010	*Tailrace flume, 295+25 to 301+30*				
----	Drilled Shaft and Columns subcontract quote Norm Wagner	6.00	ea	121,841.17 /ea	731,047
----	Column Caps subcontract quote Norm Wagner	75.00	cy	2,314.39 /cy	173,579
----	Dbl Tee subcontract quote Norm Wagner	1,570.00	00	802.504 /00	1,259,931
	PEN-010 Tailrace flume, 295+25 to 301+30				*2,164,557*
	*** unassigned ***				**2,164,557**
	011 TAILRACE FLUME			***1,533,257.78 /LS***	***3,066,516***
	2.00 LS				
	9,709.934 Labor hours				
	1,969.98 Equipment hours				
	012 POWERHOUSE REPORTS				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost		Total Amount
*** unassigned ***						
PEN-009	*Powerhouse, 294+50 to 295+25*					
	Includes, all work from the Penstock thrust block to the tailrace, (transmission main, and transformer and switch yard excluded).					
	$/Kw based on CPUC CHG Modeling v4, 10/25/07 document Table B2, page 6. 2008$ escalated to 2010 using Bureau of Rec CCT of 1.3% to esclate to 2009$ and to 2010$					
n ----	15000kw Power House, excluding Penstock Thurst Blk and Tailrace	15,000.00	kw	3,045.26 /kw		45,678,885
	PEN-009 Powerhouse, 294+50 to 295+25					*45,678,885*
	*** unassigned ***					**45,678,885**
	012 POWERHOUSE REPORTS			***45,678,885.000/LS***		***45,678,885***
	1.00 LS					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Partial Totals

Description	Amount	Totals	Rate
Subtotal		**161,127,756**	
Contractor's Fee	9,667,665		6.000 %
Contractor's Bonds & Insurance	2,416,916		1.500 %
Subtotal		**173,212,337**	
Mobilization	5,196,370		3.000 %
Subtotal w/ Mobilization		**178,408,707**	
Unlisted Items Minor	7,136,348		4.000 %
Design and Scope Changes Minor	6,445,110		4.000 %
Cost Est Refinements Minor	3,222,555		2.000 %
Procurement Strategy Open Comp			
Contract Cost		**195,212,720**	
Contingencies	48,803,180		25.000 %
Field Cost		**244,015,900**	
Sales Tax Estimate (Mat & Eq)	930,205		8.200 %
Escal to NTP (Not Included)			
Forecasted Feature Bid		**244,946,105**	

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

New Large and Small Hydroelectric Generation Resource, Cost, and Performance Assumptions

Current Status of Technology

Hydroelectric generation currently provides 15-25% of the electricity used to serve California loads, depending on the annual availability of hydro resources and the method of assigning generation to imports.[1] Within the WECC as a whole, hydro constitutes 20-30% of the total electricity supply.[2] Due to its versatility as a generation resource, hydro can be used for both baseload and load following. Typically, it is stored for release during peak hours when generation costs are high.

Hydroelectric generation does not produce significant GHG emissions. Lifecycle GHG emissions from dam materials and construction, reservoir flooding, and other upstream and downstream processes are not included in the California emissions inventory, and so the emissions intensity of hydro generation is zero.[3] Due to concerns about the environmental effects of large dams, only hydroelectric facilities of 30 MW of capacity or less, commonly referred to as "small hydro," are considered qualifying resources for the California Renewables Portfolio Standard. Small hydro is also a preferred resource for AB32 compliance.

Because of the distinction between small and large hydro (facilities of more than 30 MW), these resources are treated separately in the GHG calculator and in the discussion and tables below.

Reference Case Resource, Cost, and Performance Assumptions

Tables A1 and A2 give the reference case resource, cost, and performance assumptions for new large hydro and small hydro generation, respectively. The nominal reference technology to which these assumptions apply, following the EIA's *2007 Annual Energy Outlook*, is a new 500 MW hydro facility with reservoir storage.[4] However, the cost of hydroelectric generation is highly site-specific, depending strongly on hydrologic characteristics, site accessibility, and distance from transmission. The values used in the GHG calculator are for specific projects.

The zonal estimates of large and small hydro resource availability in the U.S. portion of the WECC are based on the EIA's dataset of site-specific resource availability and cost

[1] The CEC 2006 Net System Power Report shows 43,088 GWh of specified large hydro generation and 5,788 GWh of specified small hydro generation. It also shows, and 10,951 GWh of large hydro and 6,236 GWh of small hydro in unspecified imports, out of a total gross system power of 294,865 GWh in 2006.
[2] CEC 2007 IEPR Scenarios, 2009 Scorecard. WECC average hydro is 246,000 GWh.
[3] CARB 2007.
[4] EIA AEO Assumptions 2007, Table 39.

used in the Renewable Fuels Module of the *2007 AEO*. The EIA data includes all sites with the potential for projects of 1 MW or more "from new dams, existing dams without hydroelectricity, and from adding capacity at existing hydroelectric dams. Summary hydroelectric potential is derived from reported lists of potential new sites assembled from Federal Energy Regulatory Commission (FERC) license applications and other survey information, plus estimates of capital and other costs prepared by the Idaho National Energy & Engineering Laboratory (INEEL). Annual performance estimates (capacity factors) were taken from the generally lower but site specific FERC estimates rather than from the general estimates prepared by INEEL, and only sites with estimated costs 10 cents per kilowatt-hour or lower are included in the supply." Each site in the EIA hydro dataset contains a specific estimate of MW potential at the site, capital costs, fixed and variable O&M costs, capacity factor and indicators for whether a number of environmental factors or other factors may lower the probability of site development.

Based on conversations with experts in hydro development, siting, and environmental regulation, E3 filtered the EIA site list by *excluding any sites with environmental factors indicated that could negatively affect the probability of site development, including all potential sites that would require new dams.* The filtered resource availability shown in Tables A1 and A2 includes a total of 221 MW at 36 small hydro sites in California, and 514 MW at 95 small hydro sites in the rest of the U.S. portion of the WECC. For hydro at sites larger than 30 MW, the filtered list includes 440 MW at 5 sites in California, and 2,003 MW at 8 sites in the rest of the U.S. portion of the WECC.

The zonal hydro resource potential also includes data from the BC Hydro 2006 Integrated Energy Plan, which includes 100 MW of small hydro potential and 100 MW of large hydro for Alberta, and 1,521 MW of small hydro potential and 3,342 MW of large hydro potential for BC.

Because of its site dependence, costs for hydroelectric generation vary widely. The sources cited above give an overnight capital cost range of $1122-2193/kW for the listed large hydro sites, and $1758-5170/kW for the small hydro sites, prior to applying zonal cost multipliers and financing costs during construction, but after adjustment for inflation and recent increases in the cost of materials. The reference capital cost for typical new hydro facilities of both kinds is $2402/kW. This value is based on the *AEO 2007* total overnight cost assumption, adjusted as described above. Reference case variable O&M costs are $3.55/MWh and fixed O&M costs are $14.15/kW-year.

The nominal reference case capacity factor for both small and large hydro is 50%, which follows the *AEO 2007* assumptions, but capacity factors in the GHG calculator are based on site-specific evaluations in the resource dataset. The range of capacity factors for the included resources is 12-65%.

Table A1. Large Hydro Cost, Resources, & Performance (Facilities of 30MW and Above)

	2008 value	2020 reference case value (in 2008$)	2020 tech growth case	Range of 2008 values in model	Sources
Base overnight capital cost ($/kW)	$2,402[1,2]	$2,402	$2,402	$1,122 - $2,193[2]	Reference case: [EIA, 2007] Tech growth case: [Assumed no change.] Range of values: [EIA site data, 2007]
AFUDC Multiplier (%)	122.4%	122.4%	122.4%	122.4%	[CEC, 2007 Beta Model]
Base Non-Fuel Variable O&M ($/MWh)	$3.55[3]	$3.55	$3.55	$1.30 - $2.64[2]	[EIA site data, 2007]
Base Fixed O&M ($/kW-yr)	$14.15[3]	$14.15	$14.15	$5.28 - $12.96[2]	[EIA site data, 2007]
Gross resource in WECC (MW)	11,068	11,068	11,068	11,068	[EIA site data, 2007]
Filtered resource in CA (MW)	440[4]	440	440	440	[EIA site data, 2007]
Filtered resource in Rest of WECC (MW)	5,466[4]	5,466	5,466	5,466	[EIA site data, 2007]
Capacity factor (%)	50%	50%	50%	12% - 65%[2]	[EIA site data, 2007]

Notes:

[1]Base value originally reported in 2005$ in EIA AEO 2007. Cost has been adjusted: (a) from 2005$ to 2007$ at rate of 25% to account for recent price escalation, (c) from 2007$ to 2008$ at general inflation rate of 2.5%. Costs vary significantly by site, and base value from EIA represent "cost of the least expensive plant that could be built in the Northwest Power Pool region."

[2]Capital costs, Fixed O&M costs, Variable O&M costs, and capacity factors in model vary by specific hydro site, based on site-specific cost estimates data from EIA. Capital costs and Fixed O&M also vary by region, based on state-specific factors from US Army Corps of Engineers, Civil Works Construction Cost Index System (CWCCIS), March 2007.

[3]Fixed and Variable O&M costs originally reported by EIA in 2005$. Costs have been adjusted from 2005$ to 2008$ at general inflation rate of 2.5%.

[4]Excludes sites in Western U.S. with environmental factors indicated that could negatively affect the probability of site development, including all potential sites that would require new dams

Table A2. Small Hydro Cost, Resources, & Performance (Facilities of Less than 30MW)

	2008 value	2020 reference case value (in 2008$)	2020 tech growth case	Range of 2008 values in model	Sources
Base overnight capital cost ($/kW)	$2,402[1]	$2,402	$2,402	$1,758 - $5,170[2]	Reference case: [EIA, 2007] Tech growth case: [Assumed no change.] Range of values: [EIA site data, 2007]
AFUDC Multiplier (%)	122.4%	122.4%	122.4%	122.4%	[CEC, 2007 Beta Model]
Base Non-Fuel Variable O&M ($/MWh)	$3.55[3]	$3.55	$3.55	$2.50 - $5.72[2]	[EIA site data, 2007]
Base Fixed O&M ($/kW-yr)	$14.15[3]	$14.15	$14.15	$11.37 - $30.64[3]	[EIA site data, 2007]
Gross resource in WECC (MW)	5,351	5,351	5,351	5,351	[EIA site data, 2007]
Filtered resource in CA (MW)	221[4]	221	221	221	[EIA site data, 2007]
Filtered resource in Rest of WECC (MW)	2,134[4]	2,134	2,134	2,134	[EIA site data, 2007]
Capacity factor (%)	50%	50%	50%	22% - 65%[3]	[EIA site data, 2007]

Notes:

[1]Base value originally reported in 2005$ in EIA AEO 2007. Cost has been adjusted: (a) from 2005$ to 2007$ at rate of 25% to account for recent price escalation, (c) from 2007$ to 2008$ at general inflation rate of 2.5%. Costs vary significantly by site, and base value from EIA represent "cost of the least expensive plant that could be built in the Northwest Power Pool region."

[2]Capital costs, Fixed O&M costs, Variable O&M costs, and capacity factors in model vary by specific hydro site, based on site-specific cost estimates data from EIA. Capital costs and Fixed O&M also vary by

region, based on state-specific factors from US Army Corps of Engineers, Civil Works Construction Cost Index System (CWCCIS), March 2007.
[3]Fixed and Variable O&M costs originally reported by EIA in 2005$. Costs have been adjusted from 2005$ to 2008$ at general inflation rate of 2.5%.
[4]Excludes sites in Western U.S. with environmental factors indicated that could negatively affect the probability of site development, including all potential sites that would require new dams

Zonal Resource Potential and Zonal Levelized Costs

Tables B1 and B2 show reference case levelized costs for new large and small hydro generation, respectively, in each of the 12 WECC zones used in the GHG calculator. They are derived by applying zonal cost multipliers from the U.S. Army Corps of Engineers to the base generation and O&M costs in Tables A1 and A2. With the site-specific performance and capital costs and the merchant financing assumptions described in the "Financing and Incentives" report, the resulting reference case range of levelized cost of energy (LCOE) for small hydro generation in the WECC is $82-289/MWh, and for large hydro is $68-365/MWh. Other costs associated with new hydro generation in addition to busbar costs, for example the costs of transmission interconnection and long-distance transmission, are covered in separate reports.

Table B1. Large Hydro Busbar Levelized Cost by Zone

Resource Zone	Zonal Cost Multiplier	Capital Cost ($/kW)	Fixed O&M ($/kW-yr)	Fuel Cost ($/MMBTU)	Capacity Factor Range	Busbar LCOE Range ($/MWH)	Net Resource Potential (MW)
Base Value	**1.00**	**$2,402**	**$14**		**50%**		**5,885**
AB	1.00	$2,002	$6	$0.00	50%	$93	100
AZ-S. NV	1.00	n/a	n/a	$0.00	n/a	n/a	-
BC	1.00	$1,240 - $2,002	$6 - $10	$0.00	20% - 50%	$78 - $163	3,342
CA	1.20	$1,486 - $2,193	$9 - $13	$0.00	12% - 57%	$93 - $365	440
CFE	1.00	n/a	n/a	$0.00	n/a	n/a	-
CO	0.97	n/a	n/a	$0.00	n/a	n/a	-
MT	1.02	n/a	n/a	$0.00	n/a	n/a	-
NM	0.96	n/a	n/a	$0.00	n/a	n/a	-
N. NV	1.09	n/a	n/a	$0.00	n/a	n/a	-
NW	1.11	$1,122 - $2,028	$5 - $11	$0.00	15% - 37%	$120 - $230	1,861
UT-S. ID	1.00	$1,760 - $2,031	$9 - $11	$0.00	25% - 65%	$68 - $170	143
WY	0.92	n/a	n/a	$0.00	n/a	n/a	-

Notes:
[1]All values shown in 2008$. Cost entries of "n/a" indicate that no sites for that zone remained in the final filtered resource potential dataset.
[2]Capital Cost and Fixed O&M Cost ranges for each zone reflect the range of EIA site-specific costs for all sites in each zone that remain after E3 applied site filters. Site-specific capital Cost and Fixed O&M Cost are also adjusted by multiplying by the zonal cost multiplier.
[3]Capacity factor range by zone reflect the range of EIA site-specific capacity factors for all sites in each zone that remain after E3 applied site filters.

[4]Levelized Cost of Energy (LCOE) is calculated using cost and performance data from this table, as well as: (a) financing during construction cost multiplier and non-fuel variable O&M costs from preceding table, (b) insurance of 0.5% of capital cost, (c) property tax of 1% of capital cost, and (d) income tax liability.

Table B2. Small Hydro Busbar Levelized Cost by Zone

Resource Zone	Zonal Cost Multiplier	Capital Cost ($/kW)	Fixed O&M ($/kW-yr)	Fuel Cost ($/MMBTU)	Capacity Factor Range	Busbar LCOE Range ($/MWH)	Net Resource Potential (MW)
Base Value	**1.00**	**$2,402**	**$14**		**50%**		**2,356**
AB	1.00	$3,288	$19	$0.00	50%	$144	100
AZ-S. NV	1.00	n/a	n/a	$0.00	n/a	n/a	-
BC	1.00	$2,002 - $2,803	$19	$0.00	50%	$99 - $127	1,521
CA	1.20	$2,539 - $5,170	$14 - $31	$0.00	25% - 65%	$105 - $289	221
CFE	1.00	n/a	n/a	$0.00	n/a	n/a	-
CO	0.97	n/a	n/a	$0.00	n/a	n/a	-
MT	1.02	$2,158 - $2,547	$12 - $14	$0.00	35% - 65%	$78 - $164	37
NM	0.96	n/a	n/a	$0.00	n/a	n/a	-
N. NV	1.09	$2,559 - $4,593	$24 - $27	$0.00	35% - 54%	$164 - $181	10
NW	1.11	$1,758 - $4,782	$13 - $28	$0.00	23% - 65%	$88 - $284	230
UT-S. ID	1.00	$2,092 - $4,255	$11 - $25	$0.00	22% - 65%	$82 - $255	221
WY	0.92	$2,276 - $3,877	$13 - $23	$0.00	62% - 65%	$85 - $129	17

Notes:
[1]All values shown in 2008$. Cost entries of "n/a" indicate that no sites for that zone remained in the final filtered resource potential dataset.
[2]Capital Cost and Fixed O&M Cost ranges for each zone reflect the range of EIA site-specific costs for all sites in each zone that remain after E3 applied site filters. Site-specific capital Cost and Fixed O&M Cost are also adjusted by multiplying by the zonal cost multiplier.
[3]Capacity factor range by zone reflect the range of EIA site-specific capacity factors for all sites in each zone that remain after E3 applied site filters.
[4]Levelized Cost of Energy (LCOE) is calculated using cost and performance data from this table, as well as: (a) financing during construction cost multiplier and non-fuel variable O&M costs from preceding table, (b) insurance of 0.5% of capital cost, (c) property tax of 1% of capital cost, and (d) income tax liability.

Sources

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APPENDIX G

OPCC Pipeline from Lake Keechelus to Lake Kachess

US Department of the Interior

Bureau of Reclamation

Pacific Northwest Region

HDR Engineering, Inc

9/10/2010

Appraisal
3rdQtr 2010 Union
Open Competition

27,000 LF of 96" Steel Pipe, 0.4" wall thickness, Fish Screen inlet into Existing Tower, Bore and Jack Under I-90, Roadway Relocation and Restoration, excludes Outlet Control Valve and Structure.

989-WA-YAKIMA

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001.00	INTAKE SCREENS & CONNECTION TO EXISTING AQUA DUCT	1.00	LS	102,096	1,480,775	5,214	180,277		1,768,362
002.00	WYE STRUCTURE & CONNECTIONS TO EXISTING	1.00	LS	165,238	4,186,912	39,796	51,267	3,000	4,446,213
003.00	PIPELINE FROM WYE STRUCTURE TO FUTURE OUTLET CONTROL VALVE BUILDING	23,440.00	LF	24,615,162	18,373,733	1,931,816	41,415,578	36,880	86,373,170
005.00	PIPELINE FROM FUTURE OUTLET CONTROL VALVE BUILDING TO STA 275+10	510.00	LF	103,409	496,643	55,835	248,594	53,568	958,049

Estimate Totals

Description	Amount	Totals	Rate
Labor	24,985,905		
Material	24,538,064		
Subcontract	2,032,661		
Equipment	41,895,716		
Other	93,448		
Subtotal		**93,545,794**	
Contractor's Fld Ovhd	1,870,916		2.000 %
Mobilization	935,458		1.000 %
Subtotal w/ mobilization		**96,352,168**	
Unlisted Items Minor	3,529,449		4.000 %
Design and Scope Changes Minor	3,529,449		4.000 %
Cost Est Refinements Minor	1,764,724		2.000 %
Contractor's Fee	6,310,547		6.000 %
Contractor's Bonds & Insurance	1,577,637		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**113,063,974**	
Contingencies	28,265,993		25.000 %
Field Cost		**141,329,967**	
Sales Tax Estimate (Mat & Eq)	5,339,311		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**146,669,278**

The current design requires a 50' deep cut at the top of the saddle. This alignment would result in a disturbed area at least 200' wide for 10,000 lf, storage of the overburden within 5000 lf, construction of a temporary bypass road with in the cut, replacement of the overburden, and rebuilding of the road back in the original location. This would place the final location of the pipeline within the saddle zone at depths up to 50'.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Keechelus to Kachess Pipeline

US Department of the Interior
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Pacific Northwest Region

HDR Engineering, Inc

9/10/2010

Appraisal
3rdQtr 2010 Union
Open Competition

27,000 LF of 96" Steel Pipe, 0.4" wall thickness, Fish Screen inlet into Existing Tower, Bore and Jack Under I-90, Roadway Relocation and Restoration, excludes Outlet Control Valve and Structure.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
001.00 INTAKE SCREENS & CONNECTION TO EXISTING AQUA DUCT				
DIVISION 01 GENERAL REQUIREMENTS				
01500.300 Mobilization /Demobilization	1.00	ls	46,908.03 /ls	46,908
Mobilization for equipment related to the scope of work in the water.				
DIVISION 01 GENERAL REQUIREMENTS			**46,908.03 /ls**	**46,908**
1.00 ls				
533.333 Labor hours				
200.00 Equipment hours				
DIVISION 02 SITE CONSTRUCTION				
02316.000 Driven Steel Piling in Water	200.00	vlf	65.914/vlf	13,183
02361.100 Cofferdam - Water Installations	3,200.00	sf	67.482/sf	215,942
DIVISION 02 SITE CONSTRUCTION			**229,124.25 /ls**	**229,124**
1.00 ls				
455.022 Labor hours				
1,556.893 Equipment hours				
DIVISION 03 CONCRETE				
03002.300 Concrete_Walls Exterior_Pipe connection to existing tower	47.00	cy	996.094/cy	46,816
DIVISION 03 CONCRETE			**996.094/cy**	**46,816**
47.00 cy				
611.94 Labor hours				
55.50 Equipment hours				
DIVISION 13 SPECIAL CONSTRUCTION				
13300.000 Fish Screens - SS Wedge Wire Cylinders	1,000.00	cfs	1,390.072/cfs	1,390,072
96" dia x 132" lg, ss, #69 wedge wire with .068 openings, includes self cleaning brush system				
Budget pricing from ISI				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 13 SPECIAL CONSTRUCTION			**1,390,072.49 /ls**	**1,390,072**
1.00 ls				
312.00 Labor hours				
40.00 Equipment hours				
DIVISION 15 MECHANICAL				
15061.100 Pipe: Steel- 26" and larger	50.00	lf	1,108.82 /lf	55,441
96" Steel pipe and fittings, epoxy coated, field cement lined, budget pricing from NWPipe. For cement lining fitting length assumed to be 2 pipe dia. for 90/45, 3 for tees and wyes.				
DIVISION 15 MECHANICAL			**55,440.78 /ls**	**55,441**
1.00 ls				
41.50 Labor hours				
62.86 Equipment hours				
001.00 INTAKE SCREENS & CONNECTION TO EXISTING AQUA DUCT			***1,768,361.96 /LS***	***1,768,362***
1.00 LS				
1,953.793 Labor hours				
1,915.25 Equipment hours				
002.00 WYE STRUCTURE & CONNECTIONS TO EXISTING				
DIVISION 02 SITE CONSTRUCTION				
02072.000 Demolition, Cutting and Patching	1.00	sy	13,023.92 /sy	13,024
Demolition of exisitng bypass piping 22" and exisitng aquaduct 150'				
02200.000 Earthwork	1,339.00	cy	3.63 /cy	4,856
Excavation and backfill of control valve vault				
DIVISION 02 SITE CONSTRUCTION			**17,880.310/ls**	**17,880**
1.00 ls				
281.324 Labor hours				
63.331 Equipment hours				
DIVISION 03 CONCRETE				

Description		Quantity		Total Unit Cost	Total Amount
03002.100	Concrete_Foundations	106.00	cy	371.31 /cy	39,358
03002.300	Concrete_Walls Exterior_Pipe connection to existing tower	121.00	cy	328.88 /cy	39,794
03002.600	Concrete_Elevated Slab	39.00	cy	508.401/cy	19,828
DIVISION 03 CONCRETE				**372.11 /cy**	**98,980**
266.00	**cy**				
762.19	Labor hours				
80.103	Equipment hours				
DIVISION 05	**METALS**				
05505.000	Metal Fabrications	1.00	ls	1,162.160/ls	1,162
Ladder inside control valve vault					
DIVISION 05 METALS				**1,162.160/ls**	**1,162**
1.00	**ls**				
7.53	Labor hours				
1.882	Equipment hours				
DIVISION 08	**DOORS & WINDOWS**				
08305.000	Access Doors	2.00	ea	2,707.98 /ea	5,416
Control valve vault access					
DIVISION 08 DOORS & WINDOWS				**2,707.98 /ea**	**5,416**
2.00	**ea**				
7.111	Labor hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13121.000	Metal Building Systems	200.00	sf	150.00 /sf	30,000
Control building for valves at Outlet valves bifucation per figure 8					
13400.000	Measurement & Control Equipment	1.00	ea	34,988.59 /ea	34,989
Ultrasonic, inset flow meter with FIT, radio transmitter					
DIVISION 13 SPECIAL CONSTRUCTION				**64,988.59 /ls**	**64,989**
1.00	**ls**				
32.00	Labor hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	335.00	cy	152.984/cy	51,250
Excavation, and backfill for new bypass pipe, 22"					
15061.000	Pipe: Steel - 24" and Smaller	150.00	lf	397.04 /lf	59,555
New Bypass pipe, 22" around new control valve vault					
15061.100	Pipe: Steel- 26" and larger	100.00	lf	11,409.05 /lf	1,140,905
96" Steel pipe and fittings, epoxy coated, field cement lined, budget pricing from NWPipe. For cement lining fitting length assumed to be 2 pipe dia. for 90/45, 3 for tees and wyes.					
15103.000	Butterfly Valves	2.00	ea	1,503,038.14 /ea	3,006,076
2 - 96" motor oper BFV with controls					
DIVISION 15 MECHANICAL				**4,257,786.26 /ls**	**4,257,786**
1.00	**ls**				
2,183.281	Labor hours				
1,313.343	Equipment hours				
002.00 WYE STRUCTURE & CONNECTIONS TO EXISTING				***4,446,213.37 /LS***	***4,446,213***
1.00	***LS***				
3,273.434	Labor hours				
1,458.66	Equipment hours				
003.00	***PIPELINE FROM WYE STRUCTURE TO FUTURE OUTLET CONTROL VALVE BUILDING***				
DIVISION 01	**GENERAL REQUIREMENTS**				
01500.500	Mobilization /Demobilization - Subcontractors				75,000
Mobilization of cement lining specialty contractor included.					
DIVISION 01 GENERAL REQUIREMENTS				**75,000.01 /ls**	**75,000**
1.00	**ls**				
DIVISION 02	**SITE CONSTRUCTION**				

Description		Quantity		Total Unit Cost	Total Amount
02072.900	Demolition and Removal of Existing Asphaltic Pavement	34,400.00	sy	153.734/sy	5,288,447
Scope of work includes removal of pavement for existing road and the temporary bypass road built for construction.					
02110.000	Site Clearing	68.30	ac	5,028.62 /ac	343,454
Assumes no Burning, Clearing from 50+00 to 115+00 100' wide, Clearing from 115+00 to 270+00 150' wide					
02200.500	Earthwork - Removing and Replacing Overburden	1,388,888.00	cy	10.31 /cy	14,318,971
Scope of work includes 12,900 lf of 24' wide temporary vehicular traffic roadway, built to DOT standards and the replacement of the same amount of permanent road once the overburden is put back in place.					
02221.500	Traffic Control - Personnel and Equipment	1.00	ls	336,560.00 /ls	336,560
02224.000	Pipeline Undercrossings	500.00	lf	1,119.19 /lf	559,594
Bore and Jack under I-90					
02512.000	Foundation (Subsurface) Drain System	19,350.00	cy	44.933/cy	869,461
Scope of work includes 12,900 lf of 24' wide temporary vehicular traffic roadway, built to DOT standards and the replacement of the same amount of permanent road once the overburden is put back in place.					
02513.000	Asphaltic Concrete Vehicular Paving	154,800.00	sy	11.592/sy	1,794,409
Scope of work includes 12,900 lf of 24' wide temporary vehicular traffic roadway, built to DOT standards and the replacement of the same amount of permanent road once the overburden is put back in place.					
02515.000	Precast Concrete Manhole Structure	6.00	ea	2,903.17 /ea	17,419
DIVISION 02 SITE CONSTRUCTION				**23,528,315.830/ls**	**23,528,316**
1.00	**ls**				
122,777.201	Labor hours				
126,337.17	Equipment hours				
DIVISION 15	**MECHANICAL**				
02221.100	Trenching, Backfilling and Compacting for Utilities - Pipeline	849,221.00	cy	55.032/cy	46,734,147
Assumes 100% of the pipe trench is rock in the 10,000 lf through the saddle and 25% for the balance of the pipeline. Rock hauled 4 miles RT to a site not yet identified.					
15061.100	Pipe: Steel- 26" and larger	23,440.00	lf	683.552/lf	16,022,466
96" Steel pipe and fittings, epoxy coated, field cement lined, budget pricing from NWPipe. For cement lining fitting length assumed to be 2 pipe dia. for 90/45, 3 for tees and wyes.					
15114.000	Miscellaneous Valves				13,241
6 ea, 3" Air Release Assemblies					

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 15 MECHANICAL			**62,769,853.880/ls**	**62,769,854**
1.00 ls				
363,209.824 Labor hours				
477,705.94 Equipment hours				
003.00 PIPELINE FROM WYE STRUCTURE TO FUTURE OUTLET CONTROL VALVE BUILDING			***3,684.862/LF***	***86,373,170***
23,440.00 LF				
485,987.025 Labor hours				
604,043.103 Equipment hours				

005.00 PIPELINE FROM FUTURE OUTLET CONTROL VALVE BUILDING TO STA 275+10

DIVISION 01	**GENERAL REQUIREMENTS**				
01500.200	Task Specific Equipment	30.00	dys	5,892.06 /dys	176,762
Additional equipment required for installation of the in water piping					
01500.300	Mobilization /Demobilization				109,858
Mobilization for equipment related to the scope of work in the water.					
DIVISION 01 GENERAL REQUIREMENTS				**286,619.39 /ls**	**286,619**
1.00 ls					
640.000 Labor hours					
1,680.00 Equipment hours					
DIVISION 02	**SITE CONSTRUCTION**				
02221.200	Trenching for Utilities - Underwater Pipeline	2,061.00	cy	17.48 /cy	36,020
Includes excavation and pipe installation by water utilizing 4 barges and one tug. Pipe to be floated, submerged and anchored. Assume minimum excavation of lake bottom, no rock excavation, no bedding.					
02930.000	Seeding, Sodding, and Landscaping	1.00	ls	15,150.00 /ls	15,150

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION			**51,169.90 /ls**	**51,170**
1.00 ls				
80.73 Labor hours				
77.56 Equipment hours				
DIVISION 15 MECHANICAL				
15061.100 Pipe: Steel- 26" and larger	510.00	lf	1,216.20 /lf	620,260
96" Steel pipe and fittings, epoxy coated, field cement lined, budget pricing from NWPipe. For cement lining fitting length assumed to be 2 pipe dia. for 90/45, 3 for tees and wyes.				
DIVISION 15 MECHANICAL			**620,260.11 /ls**	**620,260**
1.00 ls				
258.45 Labor hours				
309.43 Equipment hours				
005.00 PIPELINE FROM FUTURE OUTLET CONTROL VALVE BUILDING TO STA 275+10			***1,878.53 /LF***	***958,049***
510.00 LF				
979.18 Labor hours				
2,066.983 Equipment hours				

Estimate Totals

Description	Amount	Totals	Rate
Labor	24,985,905		
Material	24,538,064		
Subcontract	2,032,661		
Equipment	41,895,716		
Other	93,448		
Subtotal		**93,545,794**	
Contractor's Fld Ovhd	1,870,916		2.000 %
Mobilization	935,458		1.000 %
Subtotal w/ mobilization		**96,352,168**	
Unlisted Items Minor	3,529,449		4.000 %
Design and Scope Changes Minor	3,529,449		4.000 %
Cost Est Refinements Minor	1,764,724		2.000 %
Contractor's Fee	6,310,547		6.000 %
Contractor's Bonds & Insurance	1,577,637		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**113,063,974**	
Contingencies	28,265,993		25.000 %
Field Cost		**141,329,967**	
Sales Tax Estimate (Mat & Eq)	5,339,311		8.200 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Escal to NTP (NOTINCL)	
Forecasted Feature Bid	**146,669,278**

The current design requires a 50' deep cut at the top of the saddle. This alignment would result in a disturbed area at least 200' wide for 10,000 lf, storage of the overburden within 5000 lf, construction of a temporary bypass road with in the cut, replacement of the overburden, and rebuilding of the road back in the original location. This would place the final location of the pipeline within the saddle zone at depths up to 50'.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

APPENDIX H

OPCC Lake Kachess Inactive Storage

APPENDIX H.1

OPCC Lake Kachess Inactive Storage - Alternative 1

Yakima River Basin Water Storage Study
Kachess Inactive Storage
Alternate 1 - Tunnel to Yakima

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/20/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

This Feature involves modifying the existing natural lake reservoir so that water can be taken at depths below the current minimum pool elevation. This would be the equivalent of enlarging the reservoir without requiring additional land to be inundated, allows the current reservoir to remain operational during much of the construction process, and is less costly than enlarging the existing reservoir. Alternative one would be a tunnel aligned from the portal next to the lake approximately 24,200 lf southeast and downstream to a discharge into the Yakima River through a portal next to the river. A 20 cfs pump station would be constructed in the lakeside portal as a minimum in stream flow to the Kachess River.

				Labor	Material	Subcontract	Equipment	Other	Total
Description		**Quantity**		**Amount**	**Amount**	**Amount**	**Amount**	**Amount**	**Amount**
01_TUNNEL	LAKE KACHESS OUTLET TO PUMP STATION	2,900.00	LF	355,388	2,730,509	9,441,731	381,771		12,909,399
02_PUMP STATION	PUMP STATION_20 CFS	1.00	LS	1,619,413	3,833,789	9,581,981	187,327	106,000	15,328,510
03_PIPELINE	PIPELINE_20" FROM PUMP STATION TO KACHESS RIVER DISCHARGE	1.00	LS	1,088,045	645,082		1,389,124		3,122,252
04_TUNNEL	TUNNEL FROM PUMP STATION TO YAKIMA RIVER	24,200.00	LF			85,996,593			85,996,593
05_YR DISCHARGE	YAKIMA RIVER DISCHARGE STRUCTURE	1.00	LS	1,904,497	1,700,480		884,402		4,489,379
06_KR DISCHARGE	KACHESS RIVER DISCHARGE STRUCTURE	1.00	LS	129,571	106,138	326,620	23,981		586,311

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	5,096,915		
Material	9,015,998		
Subcontract	105,346,925		
Equipment	2,866,606		
Other	106,000		
Subtotal		**122,432,444**	
Contractor's Fld Ovhd	4,897,298		4.000 %
Mobilization	2,448,649		2.000 %
Subtotal w/ mobilization		**129,778,391**	
Unlisted Items Minor	4,862,604		4.000 %
Design and Scope Changes Minor	4,862,604		4.000 %
Cost Est Refinements Minor	2,431,302		2.000 %
Contractor's Fee	11,354,792		8.000 %
Contractor's Bonds & Insurance	2,129,023		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**155,418,716**	
Contingencies	38,854,679		25.000 %
Field Cost		**194,273,395**	
Sales Tax Estimate (Mat & Eq)	969,982		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**195,243,377**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Kachess Inactive Storage
Alternate 1 - Tunnel to Yakima

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/20/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

This Feature involves modifying the existing natural lake reservoir so that water can be taken at depths below the current minimum pool elevation. This would be the equivalent of enlarging the reservoir without requiring additional land to be inundated, allows the current reservoir to remain operational during much of the construction process, and is less costly than enlarging the existing reservoir. Alternative one would be a tunnel aligned from the portal next to the lake approximately 24,200 lf southeast and downstream to a discharge into the Yakima River through a portal next to the river. A 20 cfs pump station would be constructed in the lakeside portal as a minimum in stream flow to the Kachess River.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Unit Cost	Total Amount
01_TUNNEL	***LAKE KACHESS OUTLET TO PUMP STATION***				
DIVISION 02	**SITE CONSTRUCTION**				
02400.100	Tunneling Lake Inlet to Pump Station	1.00	ls	9,216,731.00 /ls	9,216,731
Tunnel from Lake Kachess Outlet to Pump Station; includes but not limited to shaft, tunnel, rock trap, and rock plug					
DIVISION 02 SITE CONSTRUCTION				**9,216,731.00 /ls**	**9,216,731**
1.00	**ls**				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13300.000	Fish Screens - SS Wedge Wire Cylinders	1,000.00	cfs	3,692.67 /cfs	3,692,668
1000cfs fish screen, 7'dia x 26' long(4ea), mounted on 20' dia. SS Pipe grouted into rock lake bottom					
DIVISION 13 SPECIAL CONSTRUCTION				**3,692,668.38 /ls**	**3,692,668**
1.00	**ls**				
7,936.000	Labor hours				
3,392.00	Equipment hours				
01_TUNNEL LAKE KACHESS OUTLET TO PUMP STATION				***4,451.52 /LF***	***12,909,399***
2,900.00	***LF***				
7,936.000	Labor hours				
3,392.00	Equipment hours				
02_PUMP STATION	***PUMP STATION_20 CFS***				
DIVISION 02	**SITE CONSTRUCTION**				
02400.200	Pump Station Shaft	1.00	ls	4,183,831.00 /ls	4,183,831
70' diameter					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total	
Description		**Quantity**			**Unit Cost**	**Amount**
02513.000	Asphaltic Concrete Vehicular Paving	2,670.00	sy		33.941/sy	90,621
DIVISION 02 SITE CONSTRUCTION					**4,274,452.27 /ls**	**4,274,452**
1.00	**ls**					
259.19	Labor hours					
130.04	Equipment hours					
DIVISION 03	**CONCRETE**					
03002.111	20cfs Valve Vault_Concrete_Foundations	19.00	cy		401.18 /cy	7,622
Excavation included in Div 15						
03002.300	Concrete_Walls Exterior	6,529.00	cy		375.19 /cy	2,449,610
03002.311	20cfs Valve Vault_Concrete_Walls Exterior	83.00	cy		508.90 /cy	42,238
03002.600	Concrete_Elevated Slab	2,276.00	cy		369.88 /cy	841,835
03002.611	20cfs Valve Vault_Concrete_Elevated Slab	9.00	cy		538.272/cy	4,844
03002.700	Concrete_Slab on Grade	304.00	cy		338.59 /cy	102,931
03002.825	Concrete_Stairs	32.00	cy		1,075.78 /cy	34,425
05900.000	Miscellaneous Metal	1.00	ls		4,077.83 /ls	4,078
DIVISION 03 CONCRETE					**381.532/cy**	**3,487,584**
9,141.00	**cy**					
30,771.534	Labor hours					
2,400.484	Equipment hours					
DIVISION 05	**METALS**					
05505.000	Metal Fabrications	1.00	LS		5,316.19 /LS	5,316
05522.000	Aluminum Railings	550.00	LF		120.87 /LF	66,479
DIVISION 05 METALS					**71,794.81 /ls**	**71,795**
1.00	**ls**					
293.332	Labor hours					
DIVISION 08	**DOORS & WINDOWS**					
08305.000	Access Doors	10.00	EA		2,939.51 /EA	29,395

Description		Quantity		Total Unit Cost	Total Amount
083450.50	Watertight Doors	1.00	EA	23,154.57 /EA	23,155
DIVISION 08 DOORS & WINDOWS				**52,549.62 /ls**	**52,550**
1.00	**ls**				
67.56	Labor hours				
8.00	Equipment hours				
DIVISION 11	**EQUIPMENT**				
11065.000	Pumping Equipment: Sump	1.00	ea	168,543.32 /ea	168,543
11072.000	Pumping Equipment: Vertical Turbine (Line Shaft)	2.00	ea	472,214.19 /ea	944,428
DIVISION 11 EQUIPMENT				**1,112,971.69 /ls**	**1,112,972**
1.00	**ls**				
449.000	Labor hours				
74.833	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13020.000	Building Modules	1.00	ls	1,204,000.00 /ls	1,204,000
DIVISION 13 SPECIAL CONSTRUCTION				**1,204,000.00 /ls**	**1,204,000**
1.00	**ls**				
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	1,046.00	cy	65.09 /cy	68,079
Includes excavation for valve vault					
15062.000	Pipe: Ductile	1.00	lf	42,919.88 /lf	42,920
15103.000	Butterfly Valves	4.00	ea	8,583.42 /ea	34,334
15115.000	Water Control Gates	3.00	ea	247,225.733/ea	741,677
15190.010	Pipe Expansion Joints - Bellows Style	4.00	ea	1,856.96 /ea	7,428
DIVISION 15 MECHANICAL				**894,437.57 /ls**	**894,438**
1.00	**ls**				
2,503.162	Labor hours				
939.282	Equipment hours				

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 16	**ELECTRICAL**				
16000.100	Electrical Subcontractor	1.00	ls	394,150.00 /ls	394,150
Pump Station, Discharge Control Building/ Electrical_I&C.					
16000.210	Electrical Subcontractor - Substation Power Feed with Relays	4.00	mile	950,000.00 /mile	3,800,000
Allowance assumes the Power Supplier will perform the cut in at the existing source, ROW cost is not included in the allowance. Assumed distance 4 miles, all pumps are 4160 V, 3 phase. Normal operation for 2, 1200 Hp motors to be operating.					
16230.000	Engine Generator: Diesel	1.00	ls	36,569.34 /ls	36,569
Backup power for emergency functions not for pump operation. Pad included.					
DIVISION 16 ELECTRICAL				**4,230,719.34 /LS**	**4,230,719**
	1.00 LS				
	51.282 Labor hours				
	10.26 Equipment hours				
02_PUMP STATION PUMP STATION_20 CFS				***15,328,509.62 /LS***	***15,328,510***
	1.00 LS				
	34,395.054 Labor hours				
	3,562.90 Equipment hours				
03_PIPELINE	***PIPELINE_20" FROM PUMP STATION TO KACHESS RIVER DISCHARGE***				
DIVISION 01	**GENERAL REQUIREMENTS**				
01300.000	Administrative Requirements	1.00	ls	21,221.15 /ls	21,221
DIVISION 01 GENERAL REQUIREMENTS				**21,221.15 /ls**	**21,221**
	1.00 ls				
	397.87 Labor hours				
	99.47 Equipment hours				
DIVISION 02	**SITE CONSTRUCTION**				

Description		Quantity		Total Unit Cost	Total Amount
02110.000	Site Clearing	7.46	acre	9,059.042/acre	67,580
Includes 6500LF @ 50FT wide					
02930.000	Seeding, Sodding, and Landscaping	7.46	acre	974.052/acre	7,266
DIVISION 02 SITE CONSTRUCTION				**74,846.88 /ls**	**74,847**
1.00	**ls**				
730.47	Labor hours				
559.930	Equipment hours				
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	40,925.00	cy	50.133/cy	2,051,710
Includes excavation for valve vault					
15062.000	Pipe: Ductile	6,599.00	lf	147.67 /lf	974,474
DIVISION 15 MECHANICAL				**3,026,183.58 /ls**	**3,026,184**
1.00	**ls**				
21,067.615	Labor hours				
19,326.58	Equipment hours				
03_PIPELINE PIPELINE_20" FROM PUMP STATION TO KACHESS RIVER DISCHARGE				***3,122,251.61 /LS***	***3,122,252***
1.00	***LS***				
22,195.95	Labor hours				
19,985.974	Equipment hours				
04_TUNNEL	***TUNNEL FROM PUMP STATION TO YAKIMA RIVER***				
DIVISION 02	**SITE CONSTRUCTION**				
02400.300	Tunnel Main	24,200.00	lf	3,553.58 /lf	85,996,593
DIVISION 02 SITE CONSTRUCTION				**85,996,593.000/ls**	**85,996,593**
1.00	**ls**				

Description	Quantity		Total Unit Cost	Total Amount
04_TUNNEL TUNNEL FROM PUMP STATION TO YAKIMA RIVER			***3,553.58 /LF***	***85,996,593***
24,200.00 LF				
05_YR DISCHARGE YAKIMA RIVER DISCHARGE STRUCTURE				
DIVISION 02 SITE CONSTRUCTION				
02360.000 Cofferdam	3,000.00	sf	22.924/sf	68,773
DIVISION 02 SITE CONSTRUCTION			**68,773.240/ls**	**68,773**
1.00 ls				
584.34 Labor hours				
292.17 Equipment hours				
DIVISION 03 CONCRETE				
02200.000 Earthwork	46,998.00	cy	24.86 /cy	1,168,152
Hauling to stockpile 20 mile RT				
03002.100 Concrete_Foundations	4,709.00	cy	391.17 /cy	1,842,001
03002.300 Concrete_Walls Exterior	1,379.00	cy	740.711/cy	1,021,441
03002.600 Concrete_Elevated Slab	556.00	cy	512.912/cy	285,179
03002.700 Concrete_Slab on Grade	194.00	cy	383.06 /cy	74,313
03002.835 Concrete Spillway	28.00	cy	1,054.304/cy	29,521
DIVISION 03 CONCRETE			**641.23 /cy**	**4,420,606**
6,894.00 cy				
40,460.75 Labor hours				
10,607.31 Equipment hours				
05_YR DISCHARGE YAKIMA RIVER DISCHARGE STRUCTURE			***4,489,379.10 /LS***	***4,489,379***
1.00 LS				
41,045.09 Labor hours				
10,899.48 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Unit Cost	Total Amount
06_KR DISCHARGE	***KACHESS RIVER DISCHARGE STRUCTURE***				
DIVISION 02	**SITE CONSTRUCTION**				
02360.000	Cofferdam	3,000.00	sf	22.924/sf	68,773
02513.000	Asphaltic Concrete Vehicular Paving	667.50	sy	24.44 /sy	16,310
02930.000	Seeding, Sodding, and Landscaping	1.00	acre	25,250.00 /acre	25,250
DIVISION 02 SITE CONSTRUCTION				**110,333.52 /ls**	**110,334**
1.00	**ls**				
632.81	Labor hours				
313.23	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.100	Concrete_Foundations	89.00	cy	476.523/cy	42,411
03002.300	Concrete_Walls Exterior	77.00	cy	739.94 /cy	56,975
03002.600	Concrete_Elevated Slab	44.00	cy	517.06 /cy	22,751
03002.700	Concrete_Slab on Grade	59.00	cy	388.992/cy	22,951
03002.835	Concrete Spillway	28.00	cy	1,054.304/cy	29,521
DIVISION 03 CONCRETE				**641.94 /cy**	**174,607**
272.00	**cy**				
2,115.78	Labor hours				
182.265	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13020.000	Building Modules	1.00	ls	56,250.00 /ls	56,250
DIVISION 13 SPECIAL CONSTRUCTION				**56,250.00 /ls**	**56,250**
1.00	**ls**				
DIVISION 16	**ELECTRICAL**				
16000.100	Electrical Subcontractor				245,120
Pump Station, Discharge Control Building/ Electrical_I&C.					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity	Total Unit Cost	Total Amount
DIVISION 16 ELECTRICAL			**245,120**
06_KR DISCHARGE KACHESS RIVER DISCHARGE STRUCTURE		***586,310.65 /LS***	***586,311***
1.00 LS			
2,748.59 Labor hours			
495.492 Equipment hours			

Estimate Totals

Description	Amount	Totals	Rate
Labor	5,096,915		
Material	9,015,998		
Subcontract	105,346,925		
Equipment	2,866,606		
Other	106,000		
Subtotal		**122,432,444**	
Contractor's Fld Ovhd	4,897,298		4.000 %
Mobilization	2,448,649		2.000 %
Subtotal w/ mobilization		**129,778,391**	
Unlisted Items Minor	4,862,604		4.000 %
Design and Scope Changes Minor	4,862,604		4.000 %
Cost Est Refinements Minor	2,431,302		2.000 %
Contractor's Fee	11,354,792		8.000 %
Contractor's Bonds & Insurance	2,129,023		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**155,418,716**	
Contingencies	38,854,679		25.000 %
Field Cost		**194,273,395**	
Sales Tax Estimate (Mat & Eq)	969,982		8.200 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Escal to NTP (NOTINCL)	
Forecasted Feature Bid	**195,243,377**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

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APPENDIX H.2

OPCC Lake Kachess Inactive Storage - Alternative 2

Yakima River Basin Water Storage Study
Kachess Inactive Storage
Alternative 2 - 1000 cfs Pump Station to the Kachess River

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

8/16/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

This Feature involves modifying the existing natural lake reservoir so that water can be taken at depths below the current minimum pool elevation. This would be the equivalent of enlarging the reservoir without requiring additional land to be inundated, allows the current reservoir to remain operational during much of the construction process, and is less costly than enlarging the existing reservoir. Alternative two would be a 1000 cfs pump station located in the portal next to the lake. The pump station would pump water from the shorter lake tap tunnel through a 6500 lf pipeline aligned to the southwest to discharge in to the Kachess River downstream of the existing Kachess Dam outlet channel. The pump station would also include 20 cfs pumps to provide a minimum in stream flow to the Kachess River.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
01_TUNNEL	LAKE KACHESS OUTLET TO PUMP STATION	2,900.00	LF	355,388	2,730,509	9,441,730	381,771		12,909,398
02_PUMP STATION	PUMP STATION_1,000 CFS	1.00	LS	5,088,850	52,333,003	20,811,525	961,518	56,000	79,250,896
03_PIPELINE	PIPELINE_PUMP STATION TO KACHESS RIVER DISCHARGE	6,500.00	LF	2,701,729	6,641,615	650,000	4,521,180		14,514,524
04_KR DISCHARGE	KACHESS RIVER DISCHARGE STRUCTURE	1.00	LS	435,614	363,187	349,250	195,350		1,343,400

Estimate Totals

Description	Amount	Totals	Rate
Labor	8,581,581		
Material	62,068,314		
Subcontract	31,252,505		
Equipment	6,059,818		
Other	56,000		
Subtotal		**108,018,218**	
Contractor's Fld Ovhd	4,320,729		4.000 %
Mobilization	2,160,364		2.000 %
Subtotal w/ mobilization		**114,499,311**	
Unlisted Items Minor	4,237,050		4.000 %
Design and Scope Changes Minor	4,237,050		4.000 %
Cost Est Refinements Minor	2,118,525		2.000 %
Contractor's Fee	7,505,516		6.000 %
Contractor's Bonds & Insurance	1,876,379		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**134,473,831**	
Contingencies	33,618,458		25.000 %
Field Cost		**168,092,289**	
Sales Tax Estimate (Mat & Eq)	5,527,320		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**173,619,609**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Kachess Inactive Storage
Alternative 2 - 1000 cfs Pump Station to the Kachess River

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

8/16/2010

Appraisal
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This Feature involves modifying the existing natural lake reservoir so that water can be taken at depths below the current minimum pool elevation. This would be the equivalent of enlarging the reservoir without requiring additional land to be inundated, allows the current reservoir to remain operational during much of the construction process, and is less costly than enlarging the existing reservoir. Alternative two would be a 1000 cfs pump station located in the portal next to the lake. The pump station would pump water from the shorter lake tap tunnel through a 6500 lf pipeline aligned to the southwest to discharge in to the Kachess River downstream of the existing Kachess Dam outlet channel. The pump station would also include 20 cfs pumps to provide a minimum in stream flow to the Kachess River.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Unit Cost	Total Amount
01_TUNNEL	***LAKE KACHESS OUTLET TO PUMP STATION***			
DIVISION 02	**SITE CONSTRUCTION**			
02400.100	Tunneling Lake Inlet to Pump Station	1.00 ls	9,216,730.00 /ls	9,216,730
Tunnel from Lake Kachess Outlet to Pump Station; includes but not limited to shaft, tunnel, rock trap, and rock plug				
DIVISION 02 SITE CONSTRUCTION			**9,216,730.00 /ls**	**9,216,730**
1.00 ls				
DIVISION 13	**SPECIAL CONSTRUCTION**			
13300.000	Fish Screens - SS Wedge Wire Cylinders	1.00 ls	3,692,668.38 /ls	3,692,668
1000cfs fish screen, 7'dia x 26' long(4ea), mounted on 20' dia. SS Pipe grouted into rock lake bottom				
DIVISION 13 SPECIAL CONSTRUCTION			**3,692,668.38 /sf**	**3,692,668**
1.00 sf				
7,936.000 Labor hours				
3,392.00 Equipment hours				
01_TUNNEL LAKE KACHESS OUTLET TO PUMP STATION			***4,451.52 /LF***	***12,909,398***
2,900.00 LF				
7,936.000 Labor hours				
3,392.00 Equipment hours				
02_PUMP STATION	***PUMP STATION_1,000 CFS***			
DIVISION 02	**SITE CONSTRUCTION**			
02400.200	Pump Station Shaft	1.00 ls	8,251,335.00 /ls	8,251,335
110' diameter				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02513.000	Asphaltic Concrete Vehicular Paving	2,670.00	sy	33.941/sy	90,621
DIVISION 02 SITE CONSTRUCTION				**8,341,956.27 /ls**	**8,341,956**
1.00	**ls**				
259.19	Labor hours				
130.04	Equipment hours				
DIVISION 03	**CONCRETE**				
03002.300	Concrete_Walls Exterior	23,781.00	cy	353.57 /cy	8,408,145
03002.600	Concrete_Elevated Slab	5,984.00	cy	366.54 /cy	2,193,361
03002.700	Concrete_Slab on Grade	698.00	cy	355.19 /cy	247,922
03002.825	Concrete_Stairs	32.00	cy	1,075.78 /cy	34,425
DIVISION 03 CONCRETE				**357.281/cy**	**10,883,852**
30,463.00	**cy**				
90,754.212	Labor hours				
7,827.98	Equipment hours				
DIVISION 05	**METALS**				
05505.000	Metal Fabrications	1.00	ls	25,163.12 /ls	25,163
05522.000	Aluminum Railings	550.00	lf	120.87 /lf	66,479
DIVISION 05 METALS				**91,641.75 /ls**	**91,642**
1.00	**ls**				
332.28	Labor hours				
5.65	Equipment hours				
DIVISION 08	**DOORS & WINDOWS**				
08305.000	Access Doors	10.00	ea	2,939.51 /ea	29,395
083450.50	Watertight Doors	1.00	ea	23,154.56 /ea	23,155
DIVISION 08 DOORS & WINDOWS				**52,549.61 /ls**	**52,550**
1.00	**ls**				
67.56	Labor hours				
8.00	Equipment hours				

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 11	**EQUIPMENT**				
11065.000	Pumping Equipment: Sump				168,543
11072.000	Pumping Equipment: Vertical Turbine (Line Shaft)				34,394,020
DIVISION 11 EQUIPMENT				**34,562,563.230/ls**	**34,562,563**
1.00	**ls**				
1,889.000	Labor hours				
314.833	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13020.000	Building Modules				3,141,600
DIVISION 13 SPECIAL CONSTRUCTION				**210.00 /sf**	**3,141,600**
14,960.00	**sf**				
DIVISION 14	**CONVEYING SYSTEMS**				
14305.000	Bridge Cranes	1.00	ea	199,441.37 /ea	199,441
DIVISION 14 CONVEYING SYSTEMS				**199,441.37 /sf**	**199,441**
1.00	**sf**				
153.413	Labor hours				
12.03	Equipment hours				
DIVISION 15	**MECHANICAL**				
02221.000	Trenching, Backfilling and Compacting for Utilities	12,007.00	cy	57.872/cy	694,873
03002.110	200cfs Valve Vault_Concrete_Foundations	178.00	CY	385.022/CY	68,534
03002.111	20cfs Valve Vault_Concrete_Foundations	19.00	cy	365.48 /cy	6,944
03002.310	200cfs Valve Vault_Concrete_Walls	190.00	cy	737.61 /cy	140,146
03002.311	20cfs Valve Vault_Concrete_Walls Exterior	83.00	cy	508.90 /cy	42,238

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
03002.605	200cfs Valve Vault_Concrete_Elevated Slab	88.00	cy	521.791/cy	45,918
03002.611	20cfs Valve Vault_Concrete_Elevated Slab	9.00	cy	538.272/cy	4,844
15061.100	Pipe: Steel- 26" and larger	7,000.00	lf	1,298.672/lf	9,090,703
15062.000	Pipe: Ductile	100.00	lf	407.084/lf	40,708
15103.000	Butterfly Valves	16.00	ea	48,760.20 /ea	780,163
15106.000	Check Valves	6.00	ea	94,062.60 /ea	564,376
15115.000	Water Control Gates	5.00	ea	106,473.384/ea	532,367
15190.010	Pipe Expansion Joints - Fabricated	16.00	ea	31,243.70 /ea	499,899
DIVISION 15 MECHANICAL				**12,511,712.94 /ls**	**12,511,713**
1.00	**ls**				
14,955.743	Labor hours				
9,376.820	Equipment hours				
DIVISION 16	**ELECTRICAL**				
16000.100	Electrical Subcontractor	1.00	ls	5,018,590.00 /ls	5,018,590
Pump Station, PS Substation, Discharge Control Building/ Electrical_I&C.					
16000.210	Electrical Subcontractor - Substation Power Feed with Relays	4.00	mile	1,100,000.00 /mile	4,400,000
Allowance assumes the Power Supplier will perform the cut in at the existing source, ROW cost is not included in the allowance. Assumed distance 4 miles, all pumps are 4160 V, 3 phase. Normal operation for 2, 1200 Hp motors to be operating.					
16230.000	Engine Generator: Diesel	1.00	ea	46,988.71 /ea	46,989
Backup power for emergency functions not for pump operation. Pad included.					
DIVISION 16 ELECTRICAL				**9,465,578.710/ls**	**9,465,579**
1.00	**ls**				
64.52	Labor hours				
12.903	Equipment hours				
02_PUMP STATION PUMP STATION_1,000 CFS				***79,250,896.330/LS***	***79,250,896***
1.00	***LS***				
108,475.904	Labor hours				
17,688.25	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
03_PIPELINE	***PIPELINE_PUMP STATION TO KACHESS RIVER DISCHARGE***			
DIVISION 01	**GENERAL REQUIREMENTS**			
01300.000 Administrattive Requirements	1.00	ls	44,488.79 /ls	44,489
DIVISION 01 GENERAL REQUIREMENTS			**44,488.79 /ls**	**44,489**
1.00 ls				
836.853 Labor hours				
149.213 Equipment hours				
DIVISION 02	**SITE CONSTRUCTION**			
02110.000 Site Clearing	11.19	acre	9,058.64 /acre	101,366
02930.000 Seeding, Sodding, and Landscaping	11.19	acre	973.922/acre	10,898
DIVISION 02 SITE CONSTRUCTION			**112,264.35 /ls**	**112,264**
1.00 ls				
1,095.65 Labor hours				
839.853 Equipment hours				
DIVISION 15	**MECHANICAL**			
02221.000 Trenching, Backfilling and Compacting for Utilities	93,167.00	cy	75.474/cy	7,031,661
15061.100 Pipe: Steel- 26" and larger	6,500.00	lf	1,127.094/lf	7,326,110
DIVISION 15 MECHANICAL			**14,357,770.49 /ls**	**14,357,770**
1.00 ls				
54,088.45 Labor hours				
84,921.804 Equipment hours				
03_PIPELINE PIPELINE_PUMP STATION TO KACHESS RIVER DISCHARGE			***2,233.004/LF***	***14,514,524***
6,500.00 LF				
56,020.95 Labor hours				
85,910.87 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
04_KR DISCHARGE	***KACHESS RIVER DISCHARGE STRUCTURE***				
DIVISION 02	**SITE CONSTRUCTION**				
02360.000	Cofferdam	4,160.00	sf	37.37 /sf	155,443
02513.000	Asphaltic Concrete Vehicular Paving	667.50	sy	33.02 /sy	22,041
02950.000	Site Restoration & Rehabilitation	1.00	ls	25,250.00 /ls	25,250
DIVISION 02 SITE CONSTRUCTION				**202,733.72 /ls**	**202,734**
1.00	**ls**				
1,284.32	Labor hours				
642.27	Equipment hours				
DIVISION 03	**CONCRETE**				
02200.000	Earthwork	8,634.00	cy	31.954/cy	275,887
03002.100	Concrete_Foundations	354.00	cy	373.76 /cy	132,311
03002.300	Concrete_Walls Exterior	300.00	cy	705.86 /cy	211,758
03002.600	Concrete_Elevated Slab	177.00	cy	512.194/cy	90,658
03002.700	Concrete_Slab on Grade	119.00	cy	395.06 /cy	47,012
03002.835	Concrete Spillway	56.00	cy	1,054.304/cy	59,041
DIVISION 03 CONCRETE				**85.17 /cy**	**816,667**
9,589.00	**cy**				
7,977.87	Labor hours				
2,781.79	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
13020.000	Building Modules	375.00	sf	210.00 /sf	78,750
DIVISION 13 SPECIAL CONSTRUCTION				**210.00 /sf**	**78,750**
375.00	**sf**				
DIVISION 16	**ELECTRICAL**				
16000.100	Electrical Subcontractor	1.00	ls	245,250.00 /ls	245,250
Pump Station, PS Substation, Discharge Control Building/ Electrical_I&C.					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity	Total Unit Cost	Total Amount
DIVISION 16 ELECTRICAL		**245,250.00 /ls**	**245,250**
1.00 ls			
04_KR DISCHARGE KACHESS RIVER DISCHARGE STRUCTURE		***1,343,400.24 /LS***	***1,343,400***
1.00 LS			
9,262.185 Labor hours			
3,424.06 Equipment hours			

Estimate Totals

Description	Amount	Totals	Rate
Labor	8,581,581		
Material	62,068,314		
Subcontract	31,252,505		
Equipment	6,059,818		
Other	56,000		
Subtotal		**108,018,218**	
Contractor's Fld Ovhd	4,320,729		4.000 %
Mobilization	2,160,364		2.000 %
Subtotal w/ mobilization		**114,499,311**	
Unlisted Items Minor	4,237,050		4.000 %
Design and Scope Changes Minor	4,237,050		4.000 %
Cost Est Refinements Minor	2,118,525		2.000 %
Contractor's Fee	7,505,516		6.000 %
Contractor's Bonds & Insurance	1,876,379		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**134,473,831**	
Contingencies	33,618,458		25.000 %
Field Cost		**168,092,289**	
Sales Tax Estimate (Mat & Eq)	5,527,320		8.200 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Escal to NTP (NOTINCL)	
Forecasted Feature Bid	**173,619,609**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

APPENDIX I

OPCC Fish Passage at Box Canyon Creek

Yakima River Basin Water Storage Study
Fish Passage
Between Box Canyon Creek and Kachess Lake

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

12/3/2010

Appraisal
4rd Qtr 2010 Union
Open Competition

Fish Passage between Box Canyon Creek and Kachess Lake - Under certain Kachess Lake pool elevations, fish passage to and from Box Canyon Creek does not occur due to possible creek flows infiltrating into the porous stream/lake sub-strata of gravel/silt material. The cost estimate is for the provision of a lined (impermeable) roughened channel through the portion of the creek/lake bed where the channel appears to be a concern, approximately 1475 lf. The impervious roughened channel is to be constructed using a Geosynthetic clay liner (GCL) in the stream channel wide enough to pass the max. Fish flow of 114 cfs. The GCL shall be installed in a shingled fashion where the first shingle starts at the downstream end and proceeds upstream to the head of the roughened channel.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001	FISH PASSAGE - BOX CANYON CREEK TO KACHESS LAKE	1.00	LS	284,635	130,305		87,559	14,183	516,682

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	284,635		
Material	130,305		
Subcontract			
Equipment	87,559		
Other	14,183		
Subtotal		**516,682**	
Contractor's Fld Ovhd	31,001		6.000 %
Mobilization	31,001		6.000 %
Subtotal w/ mobilization		**578,684**	
Unlisted Items Minor	18,849		4.000 %
Design and Scope Changes Minor	18,849		4.000 %
Cost Est Refinements Minor	18,849		4.000 %
Contractor's Fee	63,523		10.000 %
Contractor's Bonds & Insurance	9,528		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**708,282**	
Contingencies	177,071		25.000 %
Field Cost		**885,353**	
Sales Tax Estimate (Mat & Eq)	17,865		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**903,218**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Fish Passage
Between Box Canyon Creek and Kachess Lake

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

12/3/2010

Appraisal
4rd Qtr 2010 Union
Open Competition

Fish Passage between Box Canyon Creek and Kachess Lake - Under certain Kachess Lake pool elevations, fish passage to and from Box Canyon Creek does not occur due to possible creek flows infiltrating into the porous stream/lake sub-strata of gravel/silt material. The cost estimate is for the provision of a lined (impermeable) roughened channel through the portion of the creek/lake bed where the channel appears to be a concern, approximately 1475 lf. The impervious roughened channel is to be constructed using a Geosynthetic clay liner (GCL) in the stream channel wide enough to pass the max. Fish flow of 114 cfs. The GCL shall be installed in a shingled fashion where the first shingle starts at the downstream end and proceeds upstream to the head of the roughened channel.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
001 FISH PASSAGE - BOX CANYON CREEK TO KACHESS LAKE				
003-01.05	**Box Creek Fish Passage Facility - General Project Requirements**			
02514.000	Aggregate Vehicular Drive, Compacted	600.00 sy	29.49 /sy	17,694
Box Creek - 300' x 18' wide 12" aggregate base access road to Channel				
003-01.05 Box Creek Fish Passage Facility - General Project Requirements			**17,694.060/ls**	**17,694**
1.00 ls				
83.704	Labor hours			
56.65	Equipment hours			
003-01.10	**Box Creek Fish Passage Facility - Channel Construction**			
02110.000	Site Clearing	90,000.00 sf	0.21 /sf	18,406
Assume cleared area of 1500' long by 60' wide to allow for channel constrcution and wasting area for channel dirt.				
02200.005	Earthwork - Channel and Anchor Ditch Excavation	4,588.890 cy	1.68 /cy	7,689
(RS Means) Anchor side ditches excavation, assume uniformly sloping hill for installation of fish passage ditch.				
02200.010	Earthwork - Anchor Ditch Backfill, Native Material includes compaction	437.00 cy	5.29 /cy	2,309
02271.000	Stone Revetment (Rip Rap)	2,240.00 cy	172.42 /cy	386,217
(RS Means) Assume a ditch length of 1475 lf, rip width of 20.5'				
02776.000	Geosynthetic Clay Liner (GCL)	46,500.00 sf	1.454/sf	67,603
GSE Bentoliner CNSL GCL, Assume a ditch length of 1475 lf, GCL width of 31' with 6" lap, approximately 3' shingle overlap each roll, total of 22 rolls, 15.5' x 150'/roll.				
02950.005	Site Restoration & Rehabilitation - Fine grade and seed	6,000.00 sy	2.794/sy	16,763
Assume 1500' x 30' plus 20%				
003-01.10 Box Creek Fish Passage Facility - Channel Construction			**338.30 /lf**	**498,988**
1,475.00 lf				
5,930.08	Labor hours			
936.391	Equipment hours			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity	Total Unit Cost	Total Amount
001 FISH PASSAGE - BOX CANYON CREEK TO KACHESS LAKE		***516,681.70 /LS***	***516,682***
1.00 LS			
6,013.782 Labor hours			
993.04 Equipment hours			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Escal to NTP (NOTINCL)	
Forecasted Feature Bid	**903,218**

AACE Classification Accuracy Range

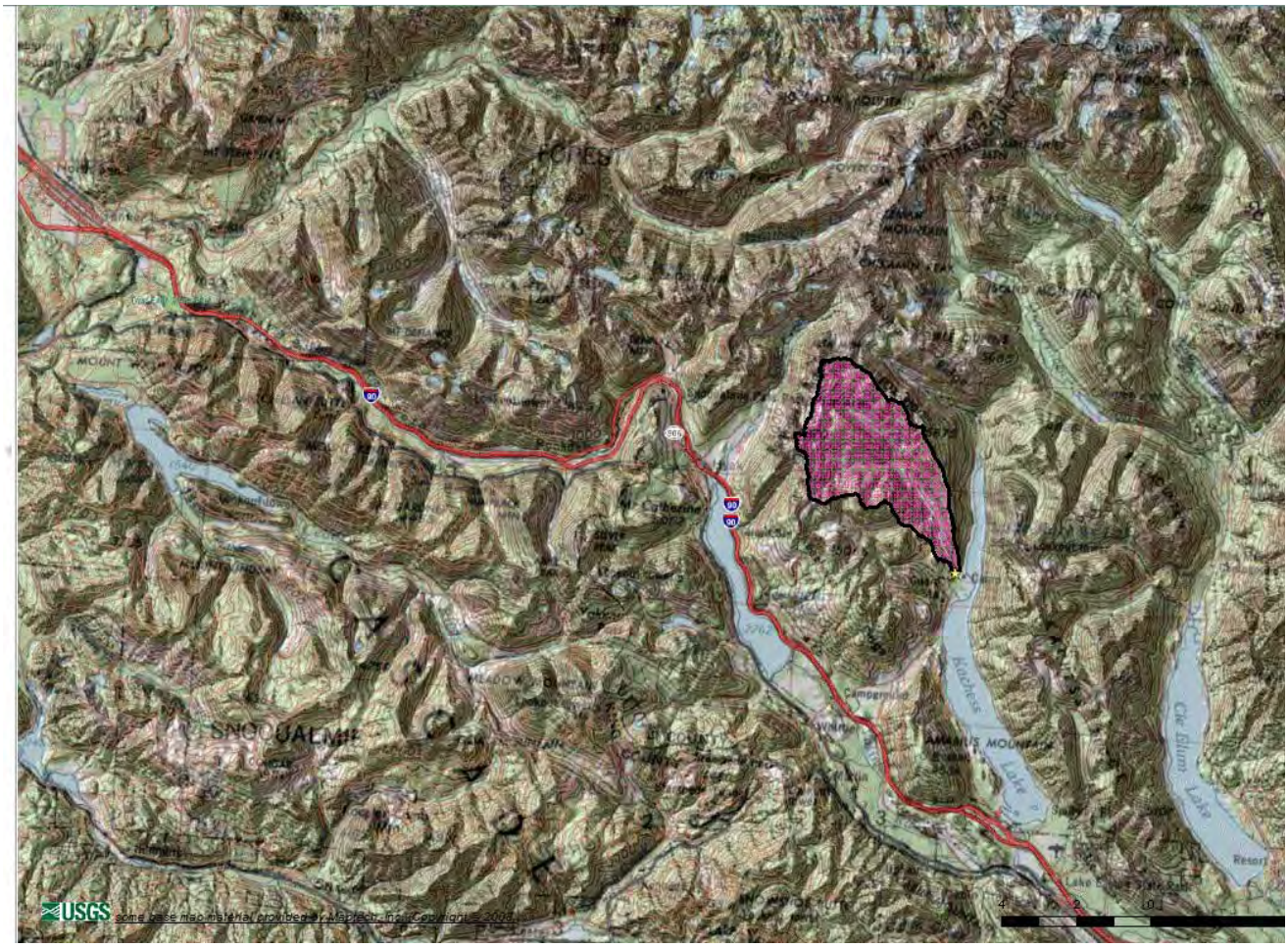
Upper Range +40% **Lower Range -20%**

HDR

Memo

To:	**Yakima Basin Study Project File – Box Canyon Fish Passage Roughened Channel Alternative**
From: John D. Nelson	**Project:** Yakima Basin Study Project
Date: 11-18-10	**Job No:** 00002-000000000139926-006

Given: Kachess Lake and Box Canyon Creek, WA



Box Canyon Creek Drainage Area using Washington StreamStats

Problem: Under certain Kachess Lake pool elevations, fish passage to and from Box Canyon Creek to Kachess Lake does not occur due to possible creek flows infiltrating into the porous stream/lake sub-straight porous gravel/silt materials.

Solution:
This evaluation only looks at providing a lined (impermeable) roughened channel through the portion of creek/lake where creek/lake channel materials appear to be a concern.

Assumptions:

Min. fish passage flow = 5 cfs (Bull Trout Passage Options at Box Canyon Meeting Notes, 7/2/08)
Max. fish passage flow = 114 cfs (Bull Trout Passage Options at Box Canyon Meeting Notes, 7/2/08)
500-year flood flow = 689 cfs (using UGSG StreamStats)

Streamflow Statistics Report

USGS Utah StreamStats

Streamstats Ungaged Site Report

Date: Wed Nov 17 2010 18:14:02 Mountain Standard Time
Site Location: Washington
NAD27 Latitude: 47.3603 (47 21 37)
NAD27 Longitude: -121.2467 (-121 14 48)
NAD83 Latitude: 47.3601 (47 21 37)
NAD83 Longitude: -121.2479 (-121 14 53)
Drainage Area: 12.13 mi2

Peak-Flow Basin Characteristics

100% Region 5 (12.1 mi2)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	12.1	0.38	638

Peak-Flow Streamflow Statistics

Statistic	Flow (ft^3/s)	Standard Error (percent)	Equivalent years of record	90-Per Mini
PK2	112	96	1	
PK10	251	63	2	
PK25	337	56	3	
PK50	408	53	5	
PK100	485	52	6	
PK500	689			

Basin Characteristics Report

USGS Utah StreamStats

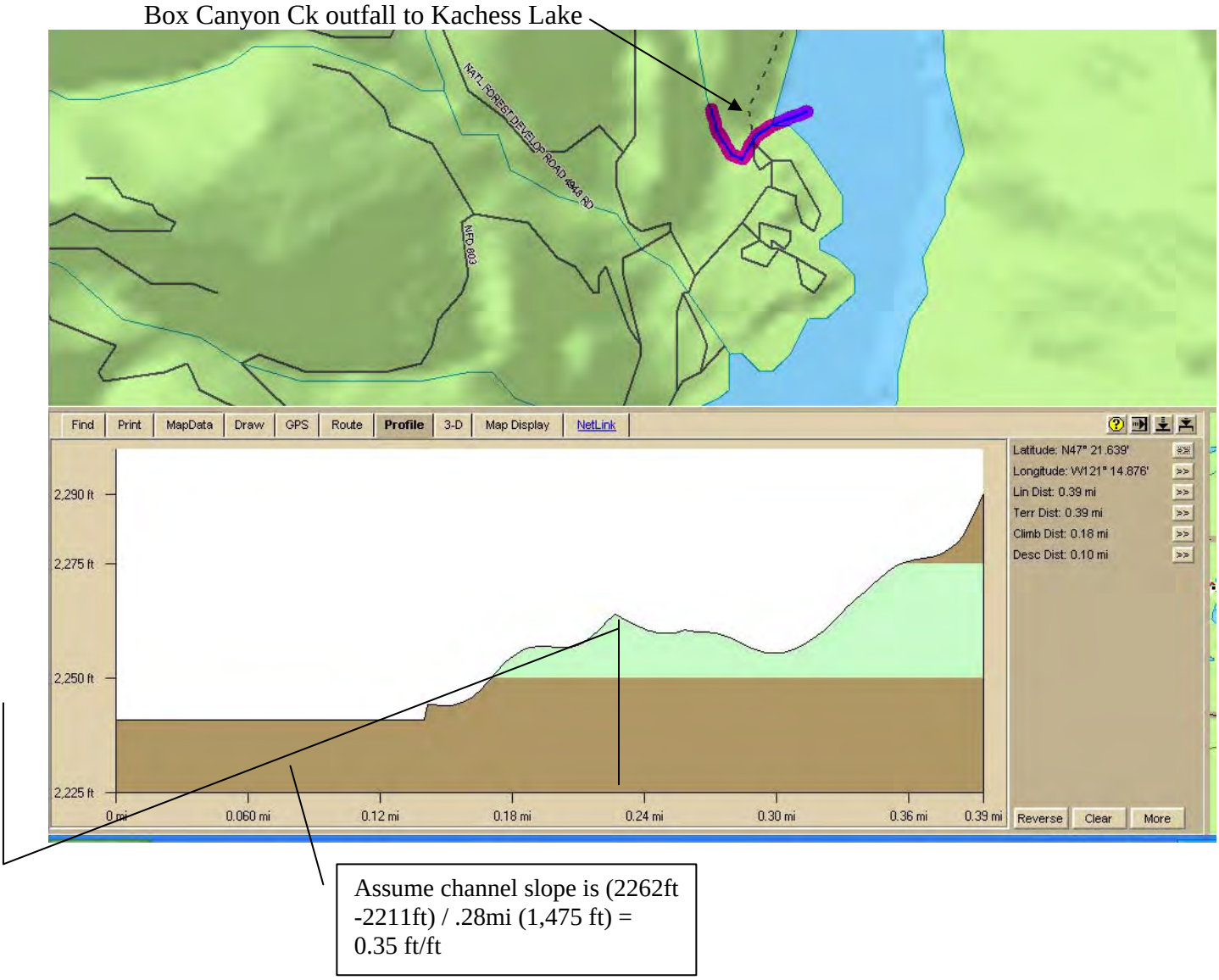
Basin Characteristics Report

Date: Wed Nov 17 2010 18:04:22 Mountain Standard Time
NAD27 Latitude: 47.3603 (47 21 37)
NAD27 Longitude: -121.2467 (-121 14 48)
NAD83 Latitude: 47.3601 (47 21 37)
NAD83 Longitude: -121.2479 (-121 14 53)

Parameter	Value
Area that drains to a point on a stream, in square miles	12.13
Mean Basin Elevation in feet	3990
Minimum Basin Elevation in feet	2280
Maximum Basin Elevation in feet	6530
Relief (maximum - minimum elevation), in feet	4250
Mean basin slope in percent	53.8
Percent of area with slope greater than 30 percent	86.8
Percent of area with slope greater than 30 percent and facing North	16.6
Area-weighted forest canopy, in percent, computed from NLCD 2001 canopy dataset	61.5
Mean annual precipitation, in inches	83.6

Design a roughened channel using a geosynthetic clay liner (GCL) under stream channel wide enough to pass the max. fish flow of 114 cfs. The GCL shall be installed in a shingled fashion, such as a shingle roof, where the first shingle starts at the downstream end of the channel and proceeds upstream to the head of the roughened channel.

Step 1. Determine channel slope using available topographical information



Assume channel slope is (2262ft -2211ft) / .28mi (1,475 ft) = 0.35 ft/ft

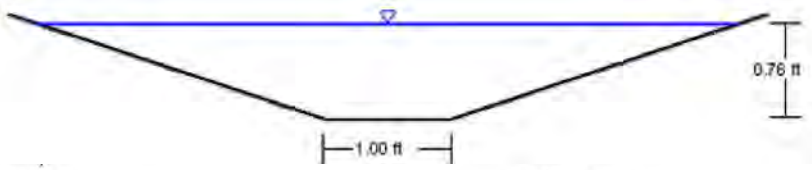
Step 2: Calculate channel cross section to carry min 5 cfs, max 114 cfs and withstand a 500-year 689 cfs flood event. The roughened channel was designed to provide a minimum of 0.75 ft of depth at the minimum fish passage flow of 5 cfs, and max depth of 2.76 ft at the high fish passage flow rate of 114 cfs.

For earthwork, assume fish passage channel is 1,475 feet long V-channel with 3H:1V side slopes as shown on page 5 of 5.

	Min fish passage flow - 5 cfs		, max fish passage flow - 114 cfs	
Project Description				
Friction Method	Manning Formula		Manning Formula	
Solve For	Normal Depth		Normal Depth	
Input Data				
Roughness Coefficient	0.078		0.078	
Channel Slope	0.03500	ft/ft	0.03500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)	3.00	ft/ft (H:V)
Bottom Width	1.00	ft	1.00	ft
Discharge	5.00	ft³/s	114.00	ft³/s
Results				
Normal Depth	0.76	ft	2.76	ft
Flow Area	2.47	ft²	25.68	ft²
Wetted Perimeter	5.78	ft	18.48	ft
Hydraulic Radius	0.43	ft	1.39	ft
Top Width	5.54	ft	17.58	ft
Critical Depth	0.56	ft	2.30	ft
Critical Slope	0.13356	ft/ft	0.08843	ft/ft
Velocity	2.02	ft/s	4.44	ft/s
Velocity Head	0.06	ft	0.31	ft
Specific Energy	0.82	ft	3.07	ft
Froude Number	0.53		0.65	
Flow Type	Subcritical		Subcritical	

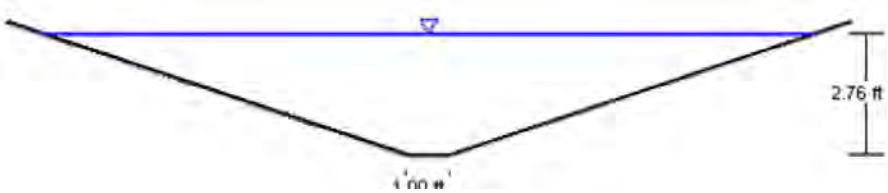
Normal Depth	0.76	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	1.00	ft
Discharge	5.00	ft³/s

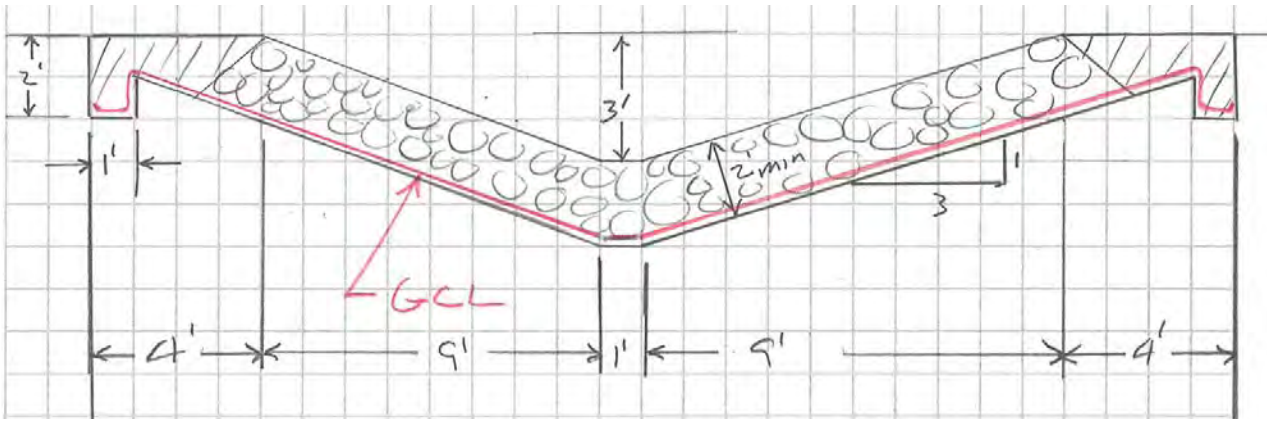
Cross Section Image



Normal Depth	2.76	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	1.00	ft
Discharge	114.00	ft³/s

Cross Section Image





Typical Cross Section of Box Canyon Fish Passage Channel

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APPENDIX J

OPCC Bumping Lake Reservoir Enlargement

Yakima River Basin Water Storage Study
Bumping Lake Dam Enlargement
Cap. 198 AF

US Department of the Interior

Bureau of Reclamation

Pacific Northwest Region

HDR Engineering, Inc

10/13/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Bumping Lake Dam Enlargement - Rockfill Dam, Crest Elevation 3510 ft, located on the Bumping River, approximately 4500 feet downstream of the existing Bumping Lake Dam in Yakima county, WA. Estimate assumes Bauer Scenario 2 is required.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
100	LAND RIGHTS	1.00	LS	371,329	10,324		330,968		712,621
110	RELOCATION OF PROPERTY OF OTHERS	1.00	LS	591,479	304,833	1,957,724	533,957	100,433	3,488,426
120	CLEARING LANDS	1.00	LS	4,927,875	1,914,875		4,423,731		11,266,482
140	ROADS AND ROAD STRUCTURES	1.00	LS	343,625	3,054,715	150,896	469,762		4,018,998
151	DAMS	1.00	LS	24,185,876	15,754,873	89,202,671	49,665,402	1,908,176	180,716,998

Estimate Totals

Description	Amount	Totals	Rate
Labor	30,420,183		
Material	21,039,620		
Subcontract	91,311,292		
Equipment	55,423,821		
Other	2,008,609		
Subtotal		**200,203,525**	
Contractor's Fld Ovhd	4,004,071		2.000 %
Mobilization	2,002,035		1.000 %
Subtotal w/ mobilization		**206,209,631**	
Unlisted Items Minor	7,813,861		4.000 %
Design and Scope Changes Minor	7,813,861		4.000 %
Cost Est Refinements Minor	3,906,930		2.000 %
Contractor's Fee	13,544,657		6.000 %
Contractor's Bonds & Insurance	3,386,164		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**242,675,104**	
Contingencies	60,668,776		25.000 %
Field Cost		**303,343,880**	
Sales Tax Estimate (Mat & Eq)	6,270,002		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**309,613,882**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Bumping Lake Dam Enlargement
Cap. 198 AF

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

10/13/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Bumping Lake Dam Enlargement - Rockfill Dam, Crest Elevation 3510 ft, located on the Bumping River, approximately 4500 feet downstream of the existing Bumping Lake Dam in Yakima county, WA. Estimate assumes Bauer Scenario 2 is required.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Unit Cost	Total Amount
		100 LAND RIGHTS				
	DIVISION 02	**SITE CONSTRUCTION**				
		000 Relocation of Bumping Creek Road -Demo				
		9200 lf, asphalt paved, 24 feet wide				
n	0100	Selective demolition, highway guard rails & barriers, corrugated steel	9,200.00	lf	2.543 /lf	23,399
n	0280	Selective demolition, metal drainage piping, CMP fittings, steel or aluminum, 24"-48", diameter, excludes excavation	50.00	ea	117.04 /ea	5,852
n	0400	Selective demolition, manholes & catch basins, manhole top, precast, 8" thick, 4'-6' dia, excludes excavation	20.00	ea	190.763 /ea	3,815
n	0900	Demolition, 3" asphalt paving, 12" base	220,800.00	sf	0.85 /sf	186,800
n	1131	Hauling, demolition material, tns, 60 mile round trip, 0.25 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	42,799.00	lcy	11.23 /lcy	480,572
	1300	Security vehicle barriers, concrete barrier, jersey, 10' long x 2' by 0.5' wide x 30" high, w/warning signage	20.00	ea	609.14 /ea	12,183
		000 Relocation of Bumping Creek Road -Demo				*712,621*
		8,177.03 Labor hours				
		5,850.20 Equipment hours				
		DIVISION 02 SITE CONSTRUCTION				**712,621**
		8,177.03 Labor hours				
		5,850.20 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		100 LAND RIGHTS			***712,621.02 /LS***	***712,621***
		1.00 LS				
		8,177.03 Labor hours				
		5,850.20 Equipment hours				
		110 RELOCATION OF PROPERTY OF OTHERS				
DIVISION 01		**GENERAL REQUIREMENTS**				
		002 Relocation of Recreational Facilities				
n	0100	Trail System	20.00	Mile	57,981.56 /Mile	1,159,631
		002 Relocation of Recreational Facilities				*1,159,631*
		1.561 Labor hours				
		0.260 Equipment hours				
		003 Cabin Surveys and Access Roads for Cabin Sites				
n	0320	Cabin Site and access road surveys	1.00	LS	295,614.85 /LS	295,615
		003 Cabin Surveys and Access Roads for Cabin Sites				*295,615*
		4,753.481 Labor hours				
		145.070 Equipment hours				
		DIVISION 01 GENERAL REQUIREMENTS				**1,455,246**
		4,755.042 Labor hours				
		145.330 Equipment hours				

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
DIVISION 02		**SITE CONSTRUCTION**				
		001 Relocation of Bumping Creek Road -Rebuild 9200 lf, asphalt paved, 24 feet wide				
n	0250	Clearing & grubbing, trees to 12" diameter, grub stumps and remove	5.00	acre	3,676.812 /acre	18,384
	0020	Seeding, mechanical seeding, 215 lb/acre	5.00	acre	974.474 /acre	4,872
n	1300	Structural excavation for minor structures, bank measure, heavy soil or clay, hand loading trucks from stock pile	65.00	bcy	45.30 /bcy	2,944
n	1255	Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	75.00	lcy	14.52 /lcy	1,089
n	1300	Structural excavation for minor structures, bank measure, heavy soil or clay, hand loading trucks from stock pile	310.00	bcy	45.30 /bcy	14,042
n	1255	Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	356.00	lcy	14.52 /lcy	5,168
n	0100	Excavation, bulk, bank measure, light clay, 3/4 C.Y. bucket, excavate and load on truck	20,000.00	bcy	5.852 /bcy	117,033
n	1255	Hauling, excavated or borrow material, loose cubic yards, 20 mile round trip, 0.5 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	23,000.00	lcy	14.52 /lcy	333,882
n	0600	Backfill, 6" layers, compaction layers, vibrating plate, add to above	275.00	ecy	6.643 /ecy	1,827
n	2020	Backfill, structural, common earth, 80 H.P. dozer, 50' haul, excludes compaction	316.00	lcy	1.142 /lcy	361

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item		Description	Takeoff Qty		Unit Cost	Total Amount
			001 Relocation of Bumping Creek Road -Rebuild				
n		1250	Hauling, excavated or borrow material, loose cubic yards, 10 mile round trip, 0.75 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	23,000.00	lcy	10.294 /lcy	236,752
n		0100	Aggregate for earthwork, bank run gravel, spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	1,125.00	cy	29.84 /cy	33,566
n		0012	Fine grading, finish grading, small area, to be paved with grader	4,995.00	sy	3.73 /sy	18,617
n		5020	Compaction, riding, vibrating roller, 3 passes, 6" lifts	1,125.00	ecy	0.521 /ecy	586
		0130	Plant-mix asphalt paving, for highways and large paved areas, binder course, 2-1/2" thick, no hauling included	4,995.00	sy	11.22 /sy	56,046
		0300	Plant-mix asphalt paving, for highways and large paved areas, wearing course, 1" thick, no hauling included	4,005.00	sy	4.673 /sy	18,714
		0710	Painted pavement markings, thermoplastic, white or yellow, 4" wide	6,000.00	lf	1.314 /lf	7,882
		0240	Fixed vehicle delineators, traffic channelizing pavement markers, plowable, concrete pavement, 9-1/4" x 5-7/8" x 1/4" high, install	90.00	ea	43.334 /ea	3,900
n		0110	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	133.333	bcy	5.22 /bcy	696
n		1700	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with sheepsfoot roller	133.330	ecy	3.24 /ecy	432
n		2140	Public storm utility drainag piping,corrgtd metal pipe,galv and bitumns coated with paved invert,20'lgs,14ga, 24"dm,excludes excavation and backfill	150.00	lf	54.113 /lf	8,117

						Total
Item		**Description**	**Takeoff Qty**		**Unit Cost**	**Amount**
		001 Relocation of Bumping Creek Road -Rebuild				*884,912*
		6,144.180 Labor hours				
		9,599.41 Equipment hours				
		002 Relocation of Recreational Facilities				
n	0925	Allowance_Boating Day Use Relocation	1.00	ls	30,696.00 /ls	30,696
n	0020	Relocate Day Use Picnic	10.00	EA	8,526.700 /EA	85,267
n	0040	Relocate Campsites	60.00	EA	10,232.00 /EA	613,920
n	0060	Relocate Boat In Campsites	10.00	EA	6,821.00 /EA	68,210
		002 Relocation of Recreational Facilities				*798,093*
		19.071 Labor hours				
		6.36 Equipment hours				
		DIVISION 02 SITE CONSTRUCTION				**1,683,005**
		6,163.252 Labor hours				
		9,605.77 Equipment hours				
DIVISION 03		**CONCRETE**				
		001 Relocation of Bumping Creek Road -Rebuild				
		9200 lf, asphalt paved, 24 feet wide				
n	2000	C.I.P. concrete forms, beams and girders, interior, plywood, 12" wide, 1 use, includes shoring, erecting, bracing, stripping and cleaning	1,566.00	sfca	11.802 /sfca	18,482
n	4000	C.I.P. concrete forms, beams, sides only, vertical, plywood, 36" high, 1 use, includes shoring, erecting, bracing, stripping and cleaning	1,175.00	sfca	13.82 /sfca	16,234
n	0100	Reinforcing Steel, in place, beams and girders, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	11.00	ton	1,920.75 /ton	21,128

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		001 Relocation of Bumping Creek Road -Rebuild				
n	2035	Reinforcing steel, unload and sort, add to base_ELEVATE BEAMS	11.00	ton	34.974 /ton	385
n	2217	Reinforcing steel, crane cost for handling, average, add_ELEVATED BEAMS	11.00	ton	38.02 /ton	418
n	0050	Structural concrete, placing, beam, small, elevated, pumped, includes strike off & consolidation, excludes material	87.00	cy	53.29 /cy	4,636
n	0920	Struct ELEV BEAM concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	87.00	cy	118.244 /cy	10,287
n	9010	Concrete finishing, elev beams, includes patching voids	2,741.00	sf	0.034 /sf	93
n	2150	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	1,728.00	sf	5.712 /sf	9,870
n	7000	C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	192.00	lf	3.123 /lf	600
n	0400	Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	6.95	ton	1,533.311 /ton	10,657
n	2040	Reinforcing steel, unload and sort, add to base_ELEVATE SLABS	6.95	ton	34.974 /ton	243
n	2218	Reinforcing steel, crane cost for handling, average, add_ELEVATED SLABS	6.95	ton	38.014 /ton	264
n	1400	Structural concrete, placing, elevated slab, pumped, less than 6" thick, includes strike off & consolidation, excludes material	64.00	cy	22.84 /cy	1,462
n	0820	Struct ELEV SLAB concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	64.00	cy	118.244 /cy	7,568

	Item	Description	Takeoff Qty		Unit Cost	Total Amount
		001 Relocation of Bumping Creek Road -Rebuild				
n	0256	Concrete finishing, floors, manual screed, bull float, machine float & steel trowel (walk-behind)_ELEV SLAB	1,728.00	sf	0.58 /sf	993
n	9000	Concrete finishing, elev slabs, includes patching voids	1,728.00	sf	0.644 /sf	1,113
n	1600	Fabricated highway bridges, precast, prestressed concrete, I beams, 60' to 80' span	6.00	ea	16,738.80 /ea	100,433
		001 Relocation of Bumping Creek Road -Rebuild				*204,865*
		1,113.77 Labor hours				
		56.821 Equipment hours				
		DIVISION 03 CONCRETE				**204,865**
		1,113.77 Labor hours				
		56.821 Equipment hours				
DIVISION 05		**METALS**				
		001 Relocation of Bumping Creek Road -Rebuild				
		9200 lf, asphalt paved, 24 feet wide				
n	9999	Miscellaneous Metals - ALLOWANCE	770.00	lbs	4.33 /lbs	3,330
		001 Relocation of Bumping Creek Road -Rebuild				*3,330*
		38.50 Labor hours				
		DIVISION 05 METALS				**3,330**
		38.50 Labor hours				
DIVISION 07		**THERMAL& MOISTURE PROTECTION**				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		001 Relocation of Bumping Creek Road -Rebuild				
		9200 lf, asphalt paved, 24 feet wide				
n	0300	Asphalt primer,	32.00	gal	360.00 /gal	11,520
n	1300	Asphalt cement,	0.00	gal		
		001 Relocation of Bumping Creek Road -Rebuild				*11,520*
		DIVISION 07 THERMAL& MOISTURE PROTECTION				**11,520**
		*** unassigned ***				
		001 Relocation of Bumping Creek Road -Rebuild				
		9200 lf, asphalt paved, 24 feet wide				
	0100	Vehicle guide rails, corrugated steel, galvanized steel posts, install metal guide/guard rail, double face, wood posts 6'-3" O.C., 6" x 8" posts	3,000.00	lf	43.18 /lf	129,540
	0200	Vehicle guide rails, corrugated steel, wood posts, install metal guide/guard rail,end sections,galvanized,flared	6.00	ea	153.45 /ea	921
		001 Relocation of Bumping Creek Road -Rebuild				*130,461*
		172.260 Labor hours				
		86.130 Equipment hours				
		*** unassigned ***				**130,461**
		172.260 Labor hours				
		86.130 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	110 RELOCATION OF PROPERTY OF OTHERS			***3,488,426.13 /LS***	***3,488,426***
	1.00 LS				
	12,242.82 Labor hours				
	9,894.05 Equipment hours				
	120 CLEARING LANDS				
DIVISION 02	**SITE CONSTRUCTION**				
	004 Clearing				
n 0150	Light Clearing & grubbing, grub stumps	840.00	acre	1,034.243 /acre	868,764
0020	Seeding, mechanical seeding, 215 lb/acre	840.00	acre	974.48 /acre	818,559
n 0350	Clearing & grubbing, heavy stumps, to 24" diameter,	2,820.00	acre	2,422.39 /acre	6,831,137
0020	Seeding, mechanical seeding, 215 lb/acre	2,820.00	acre	974.48 /acre	2,748,021
	004 Clearing				*11,266,482*
	97,110.93 Labor hours				
	97,110.93 Equipment hours				
	DIVISION 02 SITE CONSTRUCTION				**11,266,482**
	97,110.93 Labor hours				
	97,110.93 Equipment hours				

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		120 CLEARING LANDS			***11,266,481.66 /LS***	***11,266,482***
		1.00 LS				
		97,110.93 Labor hours				
		97,110.93 Equipment hours				
		140 ROADS AND ROAD STRUCTURES				
DIVISION 02		**SITE CONSTRUCTION**				
		005 Roads				
n	0400	Excavation, bulk, scrapers, bank measure, common earth, 5000' haul, 11 C.Y. bucket, elevating scraper, 1/4 push dozer	100,000.00	bcy	4.42 /bcy	441,876
n	1250	Hauling, excavated or borrow material, loose cubic yards, 10 mile round trip, 0.75 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	7,282.95	lcy	10.294 /lcy	74,968
n	1513	Base course drainag layers,aggregt base course for roadwys and large paved areas,alternt method figure base course,crushed stone,compctd,3/4",12"deep	6,333.00	ecy	45.08 /ecy	285,483
n	2023	Base course draing layers,aggregt base course for roadwys and large paved areas,alternt method figure base course,crushed stone,2"max size,12"deep	30,800.00	ton	26.444 /ton	814,475
	0200	Plant-mix asphalt paving, for highways and large paved areas, binder course, 4" thick, no hauling included	70,000.00	sy	17.26 /sy	1,208,015

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		005 Roads				
	0380	Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	70,000.00	sy	9.83 /sy	687,896
	0710	Painted pavement markings, thermoplastic, white or yellow, 4" wide	104,996.00	lf	1.314 /lf	137,933
n	2412	Public Storm Utility Drainage Piping, tees, corrugated metal pipe, galvanized and bituminous coated with paved invert, 24" diameter, 14 ga.	1.00	ls	150,918.34 /ls	150,918
		005 Roads				*3,801,564*
		6,807.23 Labor hours				
		4,343.273 Equipment hours				
		DIVISION 02 SITE CONSTRUCTION				**3,801,564**
		6,807.23 Labor hours				
		4,343.273 Equipment hours				

*** unassigned ***

		005 Roads				
	0100	Vehicle guide rails, corrugated steel, galvanized steel posts, install metal guide/guard rail, double face, wood posts 6'-3" O.C., 6" x 8" posts	5,000.00	lf	43.18 /lf	215,900
	0200	Vehicle guide rails, corrugated steel, wood posts, install metal guide/guard rail,end sections,galvanized,flared	10.00	ea	153.45 /ea	1,535
		005 Roads				*217,435*
		287.10 Labor hours				
		143.55 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		*** unassigned ***				**217,435**
		287.10 Labor hours				
		143.55 Equipment hours				
		140 ROADS AND ROAD STRUCTURES			***4,018,998.37 /LS***	***4,018,998***
		1.00 LS				
		7,094.33 Labor hours				
		4,486.823 Equipment hours				
		151 DAMS				
DIVISION 01		**GENERAL REQUIREMENTS**				
		006 Dam Structure				
n	0900	Diversion & care of river during construction and removal of water from foundations	1.00	ls	1,008,380.00 /ls	1,008,380
		006 Dam Structure				*1,008,380*
		007 Spillway				
n	9000	Mobilization and Preparatory Work	0.00	ls		
		DIVISION 01 GENERAL REQUIREMENTS				**1,008,380**
DIVISION 02		**SITE CONSTRUCTION**				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		006 Dam Structure				
n	2023	Base course draing layers,aggregt base course for roadwys and large paved areas,alternt method figure base course,crushed stone,2"max size,12"deep	1,890.00	ton	26.444 /ton	49,979
	5330	Excavating, large volume projects, 200,000 plus B.C.Y., 7 C. Y. bucket, excavator, 100 % fill factor, with truck loading	787,500.00	lcy	0.764 /lcy	601,292
n	2160	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 2.6 loads/hour, 60 C.Y. rear or bottom dump, off highway haulers	905,625.00	lcy	1.652 /lcy	1,495,675
	0600	Excavating, large volume projects, 200,000 plus B.C.Y., 8 C. Y. bucket, loader, 90 % fill factor, unrestricted operation	516,206.00	lcy	0.581 /lcy	299,803
n	2140	Hauling, excavated or borrow material, loose cubic yards, 1/2mile round trip, 3.4 loads/hour, 60 C.Y. rear or bottom dump, off highway haulers	516,206.00	lcy	1.69 /lcy	871,287
n	2000	Ripping trap rock, very hard, ideal conditions, 410 H.P., dozer with double shank ripper	536,667.00	bcy	6.313 /bcy	3,388,118
	5720	Excavating, large volume projects, 200,000 plus B.C.Y., 6 C. Y. bucket, excavator, 80 % fill factor, with truck loading	644,000.40	lcy	1.063 /lcy	684,878
n	4040	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 4 miles,25 mph,excldsloadng eqpmnt	644,000.40	lcy	2.98 /lcy	1,919,028
n	1200	Topsoil stripping and stockpiling, topsoil, clay, very hard, ideal conditions, 400 H.P. dozer	510,000.00	cy	0.822 /cy	419,315
n	1650	Loading, bulk bank measure, 5 C.Y. capacity = 185 C.Y./hour, wheel mounted,	510,000.00	bcy	0.173 /bcy	88,102
n	2160	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 2.6 loads/hour, 60 C.Y. rear or bottom dump, off highway haulers	586,500.00	lcy	2.202 /lcy	1,291,504

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		006 Dam Structure				
	5540	Excavating, large volume projects, 200,000 plus B.C.Y., 7 C. Y. bucket, shovel, 90 % fill factor, with truck loading	1,661,750.00	lcy	0.66 /lcy	1,089,221
n	2140	Hauling, excavated or borrow material, loose cubic yards, 1/2mile round trip, 3.4 loads/hour, 60 C.Y. rear or bottom dump, off highway haulers	1,661,750.00	lcy	1.69 /lcy	2,804,814
	5540	Excavating, large volume projects, 200,000 plus B.C.Y., 7 C. Y. bucket, shovel, 90 % fill factor, with truck loading	1,332,732.00	lcy	0.66 /lcy	873,560
n	4042	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 6 miles,25 mph,excld loadng eqpmnt	1,332,732.00	lcy	3.54 /lcy	4,715,805
	5540	Excavating, large volume projects, 200,000 plus B.C.Y., 7 C. Y. bucket, shovel, 90 % fill factor, with truck loading	143,750.00	lcy	0.66 /lcy	94,223
n	4042	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 6 miles,25 mph,excld loadng eqpmnt	143,750.00	lcy	3.54 /lcy	508,654
	0305	Excavating, bulk bank measure, 3.5 C.Y. capacity = 160 C.Y./hour, backhoe, hydraulic, crawler mounted,	125,000.00	bcy	1.602 /bcy	200,201
n	4042	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 6 miles,25 mph,excld loadng eqpmnt	143,750.00	lcy	3.54 /lcy	508,654
	0305	Excavating, bulk bank measure, 3.5 C.Y. capacity = 160 C.Y./hour, backhoe, hydraulic, crawler mounted,	208,333.00	bcy	1.602 /bcy	333,668

	Item		Description	Takeoff Qty		Total Unit Cost	Amount
			006 Dam Structure				
n		4042	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 6 miles,25 mph,excldsloadng eqpmnt	239,583.00	lcy	3.54 /lcy	847,755
		5540	Excavating, large volume projects, 200,000 plus B.C.Y., 7 C. Y. bucket, shovel, 90 % fill factor, with truck loading	2,481,448.00	lcy	0.66 /lcy	1,626,505
n		4042	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 6 miles,25 mph,excldsloadng eqpmnt	2,481,448.00	lcy	3.54 /lcy	8,780,478
		5540	Excavating, large volume projects, 200,000 plus B.C.Y., 7 C. Y. bucket, shovel, 90 % fill factor, with truck loading	2,481,448.00	lcy	0.66 /lcy	1,626,505
n		4042	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 6 miles,25 mph,excldsloadng eqpmnt	2,481,448.00	lcy	3.54 /lcy	8,780,478
		0305	Excavating, bulk bank measure, 3.5 C.Y. capacity = 160 C.Y./hour, backhoe, hydraulic, crawler mounted,	143,750.00	bcy	1.602 /bcy	230,231
n		4042	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvtd borrow,loose cubic yards,15 min ld/wt/,20 truck,cycle 6 miles,25 mph,excldsloadng eqpmnt	143,750.00	lcy	3.54 /lcy	508,654
n		0020	Fill, dumped material, spread, by dozer, excludes compaction	2,316,417.40	lcy	1.913 /lcy	4,430,258
n		5060	Compaction, riding, vibrating roller, 2 passes, 12" lifts	2,105,834.00	ecy	0.231 /ecy	485,626
n		0020	Fill, dumped material, spread, by dozer, excludes compaction	137,500.00	lcy	1.913 /lcy	262,975
n		5060	Compaction, riding, vibrating roller, 2 passes, 12" lifts	125,000.00	ecy	0.231 /ecy	28,826

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
			006 Dam Structure				
n		0020	Fill, dumped material, spread, by dozer, excludes compaction	137,500.00	lcy	1.913 /lcy	262,975
n		5060	Compaction, riding, vibrating roller, 2 passes, 12" lifts	125,000.00	ecy	0.231 /ecy	28,826
n		0020	Fill, dumped material, spread, by dozer, excludes compaction	229,166.00	lcy	1.913 /lcy	438,291
n		5060	Compaction, riding, vibrating roller, 2 passes, 12" lifts	208,333.00	ecy	0.231 /ecy	48,044
n		0020	Fill, dumped material, spread, by dozer, excludes compaction	5,788,750.00	lcy	1.913 /lcy	11,071,259
n		5060	Compaction, riding, vibrating roller, 2 passes, 12" lifts	5,262,500.00	ecy	0.231 /ecy	1,213,585
n		0020	Fill, dumped material, spread, by dozer, excludes compaction	132,000.00	lcy	1.913 /lcy	252,456
n		5060	Compaction, riding, vibrating roller, 2 passes, 12" lifts	120,000.00	ecy	0.231 /ecy	27,673
n		0300	Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	243,000.00	ton	30.07 /ton	7,306,493
n		0800	Rock removal, drilling only for rock quarry for hole for pre-splitting, 3" hole	5,430.00	lf	13.83 /lf	75,080
n		0800	Rock removal, drilling only for rock quarry for hole for pre-splitting, 3" hole	2,870.00	lf	17.284 /lf	49,605
n		0800	Rock removal, drilling only for rock quarry for hole for pre-splitting, 3" hole	2,140.00	lf	21.61 /lf	46,235
n		0200	Concrete pressure grouting, cement and sand, 1:1 mix, minimum	9,800.00	cf	33.083 /cf	324,216
n		0600	Grouting, average mobilization cost	1.00	ea	19,999.00 /ea	19,999
n		0300	Concrete pressure grouting, cement and sand, 1:1 mix, maximum	0.00	cf		
n		0100	Wells, for dewatering, with steel casing,150' deep, 2' diameter, maximum	3,600.00	vlf	100.20 /vlf	360,719
	----		Pressure Relief Inspection Wells	0.00	EA		

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		006 Dam Structure				
n	0300	Excavating, trench or continuous footing, common earth, 1/2 C.Y. excavator, truck mounted, 4' to 6' deep, excludes sheeting or dewatering	6,400.00	bcy	8.542 /bcy	54,669
n	0050	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	614.00	lcy	35.78 /lcy	21,968
n	8050	Compaction, 3 passes, 6" to 11", 4" lifts, rammer tamper	534.00	ecy	4.25 /ecy	2,267
n	1900	Backfill, trench, to 300' haul, dozer backfilling, excludes compaction	5,507.00	lcy	2.13 /lcy	11,703
n	2200	Backfill, TRENCH, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	4,681.00	ecy	3.39 /ecy	15,862
n	2180	Well Drains,corrgtd metal pipe,galv and bitumns coated with paved invert,20'lgs,12ga, 36"dm,excludes excavation and backfill	2,400.00	lf	103.551 /lf	248,522
n	1370	Excavating, trench or continuous footing, common earth, 1 C.Y. excavator, 6' to 10' deep, includes trench box, excludes dewatering	11,978.00	bcy	4.831 /bcy	57,864
n	0050	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	5,191.00	lcy	35.78 /lcy	185,726
n	8050	Compaction, 3 passes, 6" to 11", 4" lifts, rammer tamper	4,514.00	ecy	4.25 /ecy	19,167
n	1900	Backfill, trench, to 300' haul, dozer backfilling, excludes compaction	5,923.00	lcy	2.13 /lcy	12,587
n	2200	Backfill, TRENCH, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	5,035.00	ecy	3.39 /ecy	17,062
	2060	Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 36" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	3,300.00	lf	105.36 /lf	347,681
n	0800	Rock removal, drilling only for rock quarry for hole for pre-splitting, 3" hole	14,400.00	lf	17.284 /lf	248,887

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item		Description	Takeoff Qty		Unit Cost	Total Amount
			006 Dam Structure				
n		0300	Concrete pressure grouting, labor & equipment, 1:1 mix	14,700.00	cf	17.98 /cf	264,313
			006 Dam Structure				*72,879,806*
			398,311.38 Labor hours				
			529,284.75 Equipment hours				
			007 Spillway				
n		2600	Excavation, bulk, scrapers, bank measure, clay, 5000' haul, 21 C.Y. bucket, self propelled scrapers, 1/4 push dozer	140,000.00	bcy	8.80 /bcy	1,231,301
n		0100	Drilling and blasting rock, over 1500 C.Y.	50,000.00	bcy	12.09 /bcy	604,524
n		5460	Drilling and blasting rock, 25 ton off-highway dump, 4 mile round trip, haul boulders	50,000.00	bcy	9.22 /bcy	460,767
n		6020	Excavating, blasted rock, 3 C.Y. bucket, loading and/or spreading, shovel	50,000.00	bcy	9.234 /bcy	461,716
n		0200	Soils for earthwork, common borrow, spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	11,000.00	cy	6.74 /cy	74,103
n		5100	Compaction, riding, vibrating roller, 4 passes, 12" lifts	11,000.00	ecy	0.461 /ecy	5,073
n		4000	Backfill, structural, sand and gravel, 200 H.P. dozer, 50' haul	4,025.00	lcy	0.77 /lcy	3,079
n		0020	Borrow, material only, bank run gravel	3,500.00	bcy	10.22 /bcy	35,770
n		1120	Hauling, excavated or borrow material, loose cubic yards, 10 mile round trip, 0.6 load/hour, 16.5 C.Y. dump trailer, highway haulers, excludes loading	4,025.00	lcy	13.961 /lcy	56,192
n		0300	Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	9,450.00	ton	30.07 /ton	284,141
n		0300	Mobilization, 150 ton, set up and remove crane, with pile leads and pile hammer	1.00	ea	15,664.23 /ea	15,664
n		0700	Sheet steel piles, "H" Sections, 50' long, HP12 x 53, excludes mobilization or demobilization	9,500.00	vlf	31.20 /vlf	296,391

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Unit Cost		Total Amount
		007 Spillway					
n	1700	Sheet steel piles, "H" section pile, splice on standard points, not in leads, 12" or 14", excludes mobilization or demobilization	237.50	ea	233.05	/ea	55,349
		007 Spillway					*3,584,071*
		13,797.413 Labor hours					
		13,032.25 Equipment hours					
		008 Outlet Works					
	0305	Excavating, bulk bank measure, 3.5 C.Y. capacity = 160 C.Y./hour, backhoe, hydraulic, crawler mounted,	60,000.00	bcy	1.602	/bcy	96,097
n	1245	Hauling, excavated or borrow material, loose cubic yards, 5 mile round trip, 1.1 loads/hour, 20 C.Y. dump trailer, highway haulers, excludes loading	60,000.00	lcy	7.92	/lcy	475,087
n	2160	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 2.6 loads/hour, 60 C.Y. rear or bottom dump, off highway haulers	9,831.42	lcy	2.202	/lcy	21,649
	0420	Shaft construction, shaft excavation, rock, 20' diameter, includes mucking, maximum	1,780.30	cy	175.37	/cy	312,211
	0120	Rock excavation, tunnel boring general, bored tunnels, rock excavation, 11' diameter, includes mucking, maximum	659.00	lf	726.34	/lf	478,656
	0120	Rock excavation, tunnel boring general, bored tunnels, rock excavation, 14' diameter, includes mucking, maximum	770.00	lf	1,176.17	/lf	905,651
n	0020	Concrete pressure grouting, cement and sand, 1:1 mix, minimum	7,000.00	bag	31.39	/bag	219,722
n	0600	Grouting, average mobilization cost	1.00	ea	19,999.00	/ea	19,999
n	4000	Backfill, structural, sand and gravel, 200 H.P. dozer, 50' haul	1,380.00	lcy	0.77	/lcy	1,056
n	0020	Borrow, material only, bank run gravel	1,200.00	bcy	10.22	/bcy	12,264

	Item		Description	Takeoff Qty		Unit Cost	Total Amount
			008 Outlet Works				
n		1120	Hauling, excavated or borrow material, loose cubic yards, 10 mile round trip, 0.6 load/hour, 16.5 C.Y. dump trailer, highway haulers, excludes loading	1,380.00	lcy	13.961 /lcy	19,266
n		0300	Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,890.00	ton	30.07 /ton	56,828
n		0300	Mobilization, 150 ton, set up and remove crane, with pile leads and pile hammer	1.00	ea	15,664.23 /ea	15,664
n		0700	Sheet steel piles, "H" Sections, 50' long, HP12 x 53, excludes mobilization or demobilization	6,000.00	vlf	31.20 /vlf	187,194
n		1700	Sheet steel piles, "H" section pile, splice on standard points, not in leads, 12" or 14", excludes mobilization or demobilization	150.00	ea	233.05 /ea	34,957
n		2065	Rock bolts, hollow core, prestressable, ASTM A615, 2" diameter, 10' long	1,000.00	ea	769.20 /ea	769,196
			008 Outlet Works				*3,625,498*
			7,715.983 Labor hours				
			8,468.20 Equipment hours				
			009 Breach Exisitng Dam				
n		0330	Excavation, bulk, dragline, bank measure, unclassified soil, 3 C.Y. bucket, excavate and load on truck	65,000.00	bcy	4.56 /bcy	296,371
n		0020	Fill, dumped material, spread, by dozer, excludes compaction	74,750.00	lcy	1.913 /lcy	142,963
n		2160	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 2.6 loads/hour, 60 C.Y. rear or bottom dump, off highway haulers	74,750.00	lcy	2.202 /lcy	164,603
		0020	Seeding, mechanical seeding, 215 lb/acre	5.00	acre	974.474 /acre	4,872
	----		Removal of 48" chain link fence	800.00	LF	6.25 /LF	4,999
n		0100	Selective demolition, dump charges, typical urban city, building construction materials, includes tipping fees only	101.25	ton	34.00 /ton	3,443

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
			009 Breach Exisitng Dam				
n		1040	Selective demolition, torch cutting, steel, reinforced concrete walls, 12" to 16" thick, oxygen lance cutting	115.00	lf	35.99 /lf	4,138
n		0060	Selective concrete demolition, average reinforcing, break into small pieces, excludes shoring, bracing,	50.00	cy	101.771 /cy	5,089
n		3672	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,30 min ld/w/,16.5 truck,cycle 40 miles,35 mph,excld s loadng eqpmnt	63.00	lcy	13.46 /lcy	848
n		0100	Selective demolition, dump charges, typical urban city, building construction materials, includes tipping fees only	506.25	ton	34.00 /ton	17,213
n		1040	Selective demolition, torch cutting, steel, reinforced concrete walls, 12" to 16" thick, oxygen lance cutting	985.00	lf	35.99 /lf	35,446
n		0060	Selective concrete demolition, average reinforcing, break into small pieces, excludes shoring, bracing,	250.00	cy	101.771 /cy	25,443
n		3672	Cycle hlng(,load,travl,unld dump&rtrn) time per cycle,excvt borrw,loose cubic yards,30 min ld/w/,16.5 truck,cycle 40 miles,35 mph,excld s loadng eqpmnt	375.00	lcy	13.46 /lcy	5,046
n		0200	Bridge demolition, pedestrian, steel, 50' to 160' long, 8' to 10' wide	6,000.00	sf	9.26 /sf	55,538
	----		Removal of Timber Spillway flume	1.00	ls	41,665.00 /ls	41,665
	----		Removal of outlet trashracks,slide gates, & op equip	40,000.00	LB	3.13 /LB	124,996

Item		Description	Takeoff Qty		Unit Cost	Total Amount
		009 Breach Exisitng Dam				*932,672*
		5,747.77 Labor hours				
		4,418.98 Equipment hours				
		DIVISION 02 SITE CONSTRUCTION				**81,022,047**
		425,572.54 Labor hours				
		555,204.173 Equipment hours				
DIVISION 03		**CONCRETE**				
		006 Dam Structure				
n	2300	Mobilization, on site concrete batch plant, 200cy/hr	1.00	ea	24,307.04 /ea	24,307
n	0300	Highway equipment rental, portable elec. conc. batch plant, 200 C.Y./hr.	540.00	day	476.523 /day	257,322
n	2300	Demobilization, on site concrete batch plant, 200cy/hr	1.00	ea	17,538.01 /ea	17,538
----		Slush grouting cracked rock Zone 1	11,000.00	SY	20.17 /SY	221,870
n ----		Concrete foundation cutoff wall 3ft thick	565,000.00	SF	144.00 /SF	81,360,000
		006 Dam Structure				*81,881,037*
		488.443 Labor hours				
		4,659.020 Equipment hours				
		007 Spillway				
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	4,324.00	sfca	4.86 /sfca	21,000
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	8,100.00	sfca	1.90 /sfca	15,356

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		007 Spillway				
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	675.00	ton	1,572.002 /ton	1,061,101
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	675.00	ton	34.973 /ton	23,607
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	675.00	ton	38.02 /ton	25,660
n	4602	Structural concrete, placing, foundation, direct chute, over 6" thick, includes vibrating, excludes material	6,000.00	cy	10.814 /cy	64,886
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	6,000.00	cy	118.244 /cy	709,464
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	81,000.00	sf	0.233 /sf	18,912
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	4,050.00	lf	0.06 /lf	222
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	4,050.00	lf	1.41 /lf	5,689
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	810.00	csf	12.79 /csf	10,358
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	3,000.00	ecy	39.81 /ecy	119,423
n	1135	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	3,450.00	lcy	20.683 /lcy	71,356
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	1,823.00	lf	10.05 /lf	18,320
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	72,900.00	sfca	6.45 /sfca	470,073

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
			007 Spillway				
n		5200	Chamfer strip, wood, 3/4" wide	3,645.00	lf	0.96 /lf	3,487
n		1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	61.00	c	124.20 /c	7,576
n		0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	236.25	ton	1,410.731 /ton	333,285
n		2020	Reinforcing steel, unload and sort, add to base_WALLS	236.25	ton	34.973 /ton	8,262
n		2214	Reinforcing steel, crane cost for handling, average, add_WALLS	236.25	ton	38.02 /ton	8,981
n		4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	2,700.00	cy	31.974 /cy	86,328
n		0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	2,700.00	cy	118.244 /cy	319,259
n		0210	Control joint, clean out control joint of debris_WALLS	1,823.00	lf	0.06 /lf	100
n		0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	1,823.00	lf	1.41 /lf	2,561
n		0020	Concrete finishing, walls, includes breaking ties and patching voids	72,900.00	sf	0.644 /sf	46,956
n		0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	36,450.00	sf	0.77 /sf	27,938
n		2150	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	1,620.00	sf	5.712 /sf	9,253
n		7000	C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	183.00	lf	3.123 /lf	571

	Item		Description	Takeoff Qty		Unit Cost	Total Amount
			007 Spillway				
n		0400	Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	6.75	ton	1,533.313 /ton	10,350
n		2040	Reinforcing steel, unload and sort, add to base_ELEVATE SLABS	6.75	ton	34.973 /ton	236
n		2218	Reinforcing steel, crane cost for handling, average, add_ELEVATED SLABS	6.75	ton	38.013 /ton	257
n		1400	Structural concrete, placing, elevated slab, pumped, less than 6" thick, includes strike off & consolidation, excludes material	60.00	cy	22.84 /cy	1,370
n		0820	Struct ELEV SLAB concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	60.00	cy	118.244 /cy	7,095
n		0256	Concrete finishing, floors, manual screed, bull float, machine float & steel trowel (walk-behind)_ELEV SLAB	1,620.00	sf	0.58 /sf	931
n		9000	Concrete finishing, elev slabs, includes patching voids	1,620.00	sf	0.644 /sf	1,043
			007 Spillway				*3,511,267*
			30,952.464 Labor hours				
			2,623.17 Equipment hours				
			008 Outlet Works				
n		4465	Rock bolts, drill hole for rock bolt, 2-1/4" diameter for 2" bolt, 10' long	700.00	ea	471.682 /ea	330,178
n		4460	Rock bolts, drill hole for rock bolt, 3-1/2" diameter for 2" bolt, 5' long	280.00	ea	235.841 /ea	66,036
	----		Cement for pressure grouting	0.00	BAGS		
	----		Cement	0.00	Ton		
	----		Reinforcement	0.00	LB		

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,200.00	sfca	4.86 /sfca	5,828
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	900.00	sfca	1.90 /sfca	1,706
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	320.00	lf	10.05 /lf	3,216
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	12,800.00	sfca	6.45 /sfca	82,537
n	5200	Chamfer strip, wood, 3/4" wide	640.00	lf	0.96 /lf	612
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	12.00	c	124.20 /c	1,490
n	3005	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_FOUNDATIONS	180.00	lf	10.26 /lf	1,846
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	75.04	ton	1,572.002 /ton	117,960
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	52.15	ton	1,410.731 /ton	73,570
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	75.04	ton	34.973 /ton	2,624
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	52.15	ton	34.973 /ton	1,824
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	75.04	ton	38.02 /ton	2,853
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	52.15	ton	38.02 /ton	1,982

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	600.00	cy	17.283 /cy	10,370
n	4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	500.00	cy	31.974 /cy	15,987
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	600.00	cy	118.244 /cy	70,946
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	500.00	cy	118.244 /cy	59,122
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	3,600.00	sf	0.233 /sf	841
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	180.00	lf	0.06 /lf	10
n	0210	Control joint, clean out control joint of debris_WALLS	320.00	lf	0.06 /lf	18
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	180.00	lf	1.41 /lf	253
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	320.00	lf	1.41 /lf	449
n	0020	Concrete finishing, walls, includes breaking ties and patching voids	12,800.00	sf	0.644 /sf	8,245
n	0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	6,400.00	sf	0.77 /sf	4,905
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	36.00	csf	12.79 /csf	460
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	133.00	ecy	39.81 /ecy	5,294

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Unit Cost	Total Amount
		008 Outlet Works				
n	1135	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	153.00	lcy	20.683 /lcy	3,164
n	1040	Concrete lining	5,000.00	cy	273.00 /cy	1,365,000
n	2150	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	1,600.00	sf	5.712 /sf	9,139
n	7000	C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	160.00	lf	3.123 /lf	500
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	920.00	sfca	4.86 /sfca	4,468
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	529.00	sfca	1.90 /sfca	1,003
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	192.00	lf	10.05 /lf	1,930
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	7,600.00	sfca	6.45 /sfca	49,006
n	5200	Chamfer strip, wood, 3/4" wide	380.00	lf	0.96 /lf	364
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	8.00	c	124.20 /c	994
n	3005	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_FOUNDATIONS	105.80	lf	10.26 /lf	1,085
n	0400	Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	20.03	ton	1,533.313 /ton	30,705

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	44.10	ton	1,572.002 /ton	69,325
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	24.85	ton	1,410.731 /ton	35,057
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	44.10	ton	34.973 /ton	1,542
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	24.85	ton	34.973 /ton	869
n	2040	Reinforcing steel, unload and sort, add to base_ELEVATE SLABS	20.03	ton	34.973 /ton	700
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	44.10	ton	38.02 /ton	1,676
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	24.85	ton	38.014 /ton	945
n	2218	Reinforcing steel, crane cost for handling, average, add_ELEVATED SLABS	20.03	ton	38.02 /ton	761
n	1400	Structural concrete, placing, elevated slab, pumped, less than 6" thick, includes strike off & consolidation, excludes material	200.00	cy	22.84 /cy	4,568
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	450.00	cy	17.283 /cy	7,777
n	4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	350.00	cy	31.974 /cy	11,191
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	450.00	cy	118.244 /cy	53,210

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	350.00	cy	118.244 /cy	41,385
n	0820	Struct ELEV SLAB concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	200.00	cy	118.244 /cy	23,649
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	2,116.00	sf	0.233 /sf	494
n	0256	Concrete finishing, floors, manual screed, bull float, machine float & steel trowel (walk-behind)_ELEV SLAB	1,600.00	sf	0.58 /sf	919
n	9000	Concrete finishing, elev slabs, includes patching voids	1,600.00	sf	0.644 /sf	1,031
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	105.80	lf	0.06 /lf	6
n	0210	Control joint, clean out control joint of debris_WALLS	192.00	lf	0.06 /lf	11
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	105.80	lf	1.41 /lf	149
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	192.00	lf	1.41 /lf	270
n	0020	Concrete finishing, walls, includes breaking ties and patching voids	7,600.00	sf	0.644 /sf	4,895
n	0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	3,800.00	sf	0.77 /sf	2,913
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	21.16	csf	12.79 /csf	271
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	78.00	ecy	39.81 /ecy	3,105

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	1135	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	90.00	lcy	20.683 /lcy	1,861
n	1040	Concrete lining	500.00	cy	446.36 /cy	223,180
n	2150	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	400.00	sf	5.712 /sf	2,285
n	7000	C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	80.00	lf	3.123 /lf	250
n	3050	C.I.P. concrete forms, slab on grade, edge, wood, 7" to 12" high, 4 use, includes erecting, bracing, stripping and cleaning	80.00	sfca	4.05 /sfca	324
n	9015	C.I.P. concrete forms, bulkhead for slab on grade w/ keyway, up to 12", exp metal, includes erecting, bracing, stripping and cleaning	20.00	sfca	2.35 /sfca	47
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	40.00	lf	10.05 /lf	402
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	1,600.00	sfca	6.45 /sfca	10,317
n	5200	Chamfer strip, wood, 3/4" wide	80.00	lf	0.96 /lf	77
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	4.00	c	124.20 /c	497
n	0400	Reinforcing Steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.79	ton	1,533.33 /ton	1,208
n	0600	Reinforcing Steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	1.313	ton	1,572.00 /ton	2,064

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	2.80	ton	1,410.732 /ton	3,950
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	2.80	ton	34.98 /ton	98
n	2040	Reinforcing steel, unload and sort, add to base_ELEVATE SLABS	0.79	ton	34.96 /ton	28
n	2050	Reinforcing steel, unload and sort, add to base_SLAB ON GRADE	1.313	ton	34.97 /ton	46
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	2.80	ton	38.02 /ton	106
n	2218	Reinforcing steel, crane cost for handling, average, add_ELEVATED SLABS	0.79	ton	38.02 /ton	30
n	2220	Reinforcing steel, crane cost for handling, average, add_SLAB ON GRADE	1.313	ton	38.012 /ton	50
n	1400	Structural concrete, placing, elevated slab, pumped, less than 6" thick, includes strike off & consolidation, excludes material	9.00	cy	22.84 /cy	206
n	4350	Structural concrete, placing, slab on grade, pumped, up to 6" thick, includes strike off & consolidation, excludes material	16.00	cy	24.594 /cy	394
n	4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	35.00	cy	31.973 /cy	1,119
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	35.00	cy	118.244 /cy	4,139
n	0720	Struct SLAB ON GRADE concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	16.00	cy	118.244 /cy	1,892

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	0820	Struct ELEV SLAB concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	9.00	cy	118.244 /cy	1,064
n	0255	Concrete finishing, floors, manual screed, bull float, machine float & steel trowel (walk-behind)_SOG	400.00	sf	0.58 /sf	230
n	0256	Concrete finishing, floors, manual screed, bull float, machine float & steel trowel (walk-behind)_ELEV SLAB	400.00	sf	0.58 /sf	230
n	9000	Concrete finishing, elev slabs, includes patching voids	400.00	sf	0.644 /sf	258
n	0122	Control joint, concrete floor slab, sawcut in green concrete, 1" depth_SOG	20.00	lf	0.484 /lf	10
n	0210	Control joint, clean out control joint of debris_WALLS	40.00	lf	0.06 /lf	2
n	0215	Control joint, clean out control joint of debris_SOG	20.00	lf	0.06 /lf	1
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	40.00	lf	1.41 /lf	56
n	0367	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_SOG	40.00	lf	1.41 /lf	56
n	0020	Concrete finishing, walls, includes breaking ties and patching voids	1,600.00	sf	0.644 /sf	1,031
n	0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	800.00	sf	0.77 /sf	613
n	0310	Concrete surface treatment, curing, sprayed membrane compound_SOG	4.00	csf	12.79 /csf	51
n	1200	Vapor Retarders, building paper, polyethylene vapor barrier, standard, .010" thick	4.00	sq	15.12 /sq	60
n	1010	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_SOG	17.00	ecy	39.81 /ecy	677

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	1136	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	17.00	lcy	20.682 /lcy	352
n	3061	C.I.P. concrete forms, foundation, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	1,200.00	sfca	4.86 /sfca	5,828
n	9011	C.I.P. concrete forms, bulkhead for foundation w/ keyway, 12" and greater, exp metal, includes erecting, bracing, stripping and cleaning	2,250.00	sfca	1.90 /sfca	4,265
n	3005	Waterstop, rubber, center bulb, 1/4" thick x 6" wide_FOUNDATIONS	1,125.00	lf	10.26 /lf	11,540
n	0605	Reinforcing steel, in place, FOUNDATIONS, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	187.54	ton	1,572.002 /ton	294,810
n	2005	Reinforcing steel, unload and sort, add to base_FOUNDATIONS	187.54	ton	34.973 /ton	6,559
n	2211	Reinforcing steel, crane cost for handling, average, add_FOUNDATIONS	187.54	ton	38.02 /ton	7,129
n	4652	Structural concrete, placing, foundations, pumped, over 6" thick, includes vibrating, excludes material	1,700.00	cy	17.283 /cy	29,381
n	0300	Struct FOUNDATION concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	1,700.00	cy	118.244 /cy	201,015
n	0105	Concrete finishing, floors, manual screed, bull float_FOUNDATIONS	22,500.00	sf	0.233 /sf	5,253
n	0205	Control joint, clean out control joint of debris_FOUNDATIONS	1,125.00	lf	0.06 /lf	62
n	0365	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_FOUNDATIONS	1,125.00	lf	1.41 /lf	1,580
n	0305	Concrete surface treatment, curing, sprayed membrane compound_FOUNDATIONS	225.00	csf	12.79 /csf	2,877

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
		008 Outlet Works				
n	1005	Fill, gravel fill, compacted, under floor slabs, alternate pricing method, 4" deep_FOUND	833.00	ecy	39.81 /ecy	33,160
n	1135	Hauling, excavated borrow material, loose cubic yards, 20 mile round trip, 0.4 loads/hour, 16.5 c.y. dump trailer, highway haulers, excludes loading	958.00	lcy	20.683 /lcy	19,814
n	0500	C.I.P. concrete forms, wall, wood bulkhead with 2 piece keyway, 1 use, includes erecting, bracing, stripping and cleaning	1,218.00	lf	10.05 /lf	12,240
n	2550	C.I.P. concrete forms, wall, job built, plywood, 8 to 16' high, 4 use, includes erecting, bracing, stripping and cleaning	48,720.00	sfca	6.45 /sfca	314,156
n	5200	Chamfer strip, wood, 3/4" wide	2,436.00	lf	0.96 /lf	2,331
n	1400	Tie cones, plastic, for coil tie system, for CIP wall forms, 1/2" bolt diameter x 1" setback length, includes material only	42.00	c	124.20 /c	5,216
n	0700	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	158.03	ton	1,410.731 /ton	222,931
n	2020	Reinforcing steel, unload and sort, add to base_WALLS	158.03	ton	34.973 /ton	5,527
n	2214	Reinforcing steel, crane cost for handling, average, add_WALLS	158.03	ton	38.02 /ton	6,007
n	4950	Structural concrete, placing, walls, pumped, 8" thick, includes strike off & consolidation, excludes material	1,800.00	cy	31.974 /cy	57,552
n	0520	Struct WALLS concrete,ready mix,normal wt,4000 psi,includes local aggregate,sand,portland cement and water,delivered,excludes all additives	1,800.00	cy	118.244 /cy	212,839
n	0210	Control joint, clean out control joint of debris_WALLS	1,218.00	lf	0.06 /lf	67
n	0366	Control joint, joint sealant, polyurethane, 1/4" x 1/4" (308 LF/Gal)_WALLS	1,218.00	lf	1.41 /lf	1,711

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

	Item		Description	Takeoff Qty		Unit Cost	Total Amount
			008 Outlet Works				
n		0020	Concrete finishing, walls, includes breaking ties and patching voids	48,720.00	sf	0.644 /sf	31,381
n		0050	Concrete finishing, walls, burlap rub with grout, includes breaking ties and patching voids	24,360.00	sf	0.77 /sf	18,671
	----		Structural Steel Tunnel Supports	55,000.00	lbs	2.00 /lbs	110,000
	----		Shaft Metalwork	24,000.00	lbs	3.50 /lbs	84,000
	----		Bulkhead Gate, 11'x11' (H=210)	27,500.00	lbs	5.60 /lbs	154,005
	----		Seats & Guides for Bulkhead Gates	5,000.00	lbs	2.50 /lbs	12,500
	----		4-5'x7' outlet gates w/hoists (H=210')	180,000.00	lbs	8.92 /lbs	1,604,732
	----		Controls for Outlet Gates	0.00	lbs		
	----		Jet Flow Gate, 24" w/controls for bypass	6,000.00	lbs	24.00 /lbs	144,000
			008 Outlet Works				*6,487,636*
			29,400.771 Labor hours				
			9,484.44 Equipment hours				
			DIVISION 03 CONCRETE				**91,879,940**
			60,841.68 Labor hours				
			16,766.63 Equipment hours				
DIVISION 14			**CONVEYING SYSTEMS**				
			008 Outlet Works				
n		1025	Elevators, hydraulic freight, base unit, standard finish, 2000 lb, 50 fpm, 2 stop	1.00	ea	97,605.83 /ea	97,606
n		1275	Elevators, hydraulic freight, for 10000 lb capacity, add	1.00	ea	56,524.00 /ea	56,524
n		1575	Elevators, hydraulic freight, for travel over 20 V.L.F., add	100.00	vlf	1,990.054 /vlf	199,005

	Item	Description	Takeoff Qty		Unit Cost	Total Amount
		008 Outlet Works				*353,135*
		380.69 Labor hours				
		DIVISION 14 CONVEYING SYSTEMS				**353,135**
		380.69 Labor hours				
DIVISION 15		**MECHANICAL**				
		006 Dam Structure				
n	2190	Pipe, stainless steel, butt weld, 24" diameter, schedule 10, type 304,	3,600.00	lf	315.23 /lf	1,134,814
		006 Dam Structure				*1,134,814*
		4,114.30 Labor hours				
		1,371.42 Equipment hours				
		008 Outlet Works				
n	2220	Pipe, steel, black, welded, 24" diameter, schedule 40, Spec. A-53,	250.00	lf	392.132 /lf	98,033
n	9420	Pipe, steel, Welding labor per joint, 24" pipe size, schedule 40, welding	8.00	ea	663.27 /ea	5,306
n	2240	Pipe, steel, black, welded, 30" diameter, schedule 40, Spec. A-53, includes two rod, roll hanger & saddle, sized for covering, 10' OC	50.00	lf	608.98 /lf	30,449
n	9420	Pipe, steel, Welding labor per joint, 30" pipe size, schedule 40, welding	2.00	ea	663.27 /ea	1,327
n	3830	Valves, iron body, gate, OS&Y, flanged, 125 lb., 30"	1.00	ea	32,176.53 /ea	32,177

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	008 Outlet Works				*167,291*
	1,104.67 Labor hours				
	370.00 Equipment hours				
	DIVISION 15 MECHANICAL				**1,302,105**
	5,218.963 Labor hours				
	1,741.42 Equipment hours				

*** unassigned ***

	006 Dam Structure					
1600	Vehicle guide rails, wood guide posts	280.00	ea	64.37	/ea	18,024
----	Screening excavated material, on iste mobile screen plant	516,206.00	lcy	0.60	/lcy	309,724
----	Screening excavated material, on iste mobile screen plant	1,661,750.00	lcy	0.60	/lcy	997,050
----	Screening excavated material, on iste mobile screen plant	1,332,732.00	lcy	0.60	/lcy	799,639
----	Screening excavated material, on iste mobile screen plant	143,750.00	lcy	0.60	/lcy	86,250
----	Screening excavated material, on iste mobile screen plant	143,750.00	lcy	0.60	/lcy	86,250
----	Screening excavated material, on iste mobile screen plant	239,583.00	lcy	0.60	/lcy	143,750
----	Screening excavated material, on iste mobile screen plant	2,481,448.00	lcy	0.60	/lcy	1,488,869
----	Screening excavated material, on iste mobile screen plant	143,750.00	lcy	0.60	/lcy	86,250
----	Mobilization, rock drilling equipment and personnel	1.00	ls	3,501.81	/ls	3,502
----	Mobilization, rock drilling equipment and personnel	1.00	ls	3,501.81	/ls	3,502

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	006 Dam Structure				
----	Mobilization, rock drilling equipment and personnel	1.00	ls	3,501.81 /ls	3,502
	006 Dam Structure				*4,026,310*
	59.732 Labor hours				
	29.87 Equipment hours				
	007 Spillway				
----	Cement for spillway, included in concrete unit prices				
----	Reinforcement for spillway, include in concrete unit prices				
	008 Outlet Works				
----	Portal Face, for tunnels to daylight	80,000.00	sf	1.782 /sf	142,560
----	Mobilization	1.00	ea	50,000.00 /ea	50,000
----	Trash Rake, 3600 ft	126,000.00	lb	3.47 /lb	436,620
----	Electrical Subcontract	1.00	ls	495,900.00 /ls	495,900
	008 Outlet Works				*1,125,080*
	1,195.74 Labor hours				
	341.46 Equipment hours				
	*** unassigned ***				**5,151,390**
	1,255.472 Labor hours				
	371.33 Equipment hours				
	151 DAMS			***180,716,997.890/LS***	***180,716,998***
	1.00 LS				
	493,269.341 Labor hours				
	574,083.55 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	30,420,183		
Material	21,039,620		
Subcontract	91,311,292		
Equipment	55,423,821		
Other	2,008,609		
Subtotal		**200,203,525**	
Contractor's Fld Ovhd	4,004,071		2.000 %
Mobilization	2,002,035		1.000 %
Subtotal w/ mobilization		**206,209,631**	
Unlisted Items Minor	7,813,861		4.000 %
Design and Scope Changes Minor	7,813,861		4.000 %
Cost Est Refinements Minor	3,906,930		2.000 %
Contractor's Fee	13,544,657		6.000 %
Contractor's Bonds & Insurance	3,386,164		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**242,675,104**	
Contingencies	60,668,776		25.000 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Field Cost		**303,343,880**	
Sales Tax Estimate (Mat & Eq)	6,270,002		8.200 %
Escal to NTP (NOTINCL)			
Forecasted Feature Bid		**309,613,882**	

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

APPENDIX K

OPCC Pool Level Increase at Cle Elum Dam

US Department of the Interior

Bureau of Reclamation

Pacific Northwest Region

HDR Engineering, Inc

9/17/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Shoreline Protection: includes costs of site development, material production, shoreline placement, shoreline earthwork, site maintenance.
Radial Gate Modifications: Includes fabrication and installation of five 3'8" foot high by 37 foot wide stiffened FRP flashboards for the five radial gates on the Cle Elum Dam spillway.
Upstream Inundation Impacts: None
Recreational Facility Impacts were estimated by escalating the 2000 Estimate values by the appropriate RS Means CCI.
Soft cost such as NRPA/Environmental Compliance, and Cultural Resources are not included in this OPCC estimate.
Land Purchase and Easement Costs included on the Totals Page 2
Mobilization and field general condition costs, bonds and BR insurance, O&P, contingencies are shown for the entire project on the totals page.

989-WA-YAKIMA

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001	CLIP ENGINEERING COST ESTIMATE	1.00	LS	1,771,903	928,230	265,500	2,165,128	12,500	5,143,261
003	CLIP LAND RELATED COST ESTIMATE	1.00	LS			1,128,497			1,128,497

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	1,771,903		
Material	928,230		
Subcontract	1,393,997		
Equipment	2,165,128		
Other	12,500		
Subtotal		**6,271,758**	
Contractor's Fld Ovhd	376,305		6.000 %
Mobilization	125,435		2.000 %
Subtotal w/ mobilization		**6,773,498**	
Unlisted Items Minor	239,554		4.000 %
Design and Scope Changes Minor	239,554		4.000 %
Cost Est Refinements Minor	119,777		2.000 %
Contractor's Fee	589,791		8.000 %
Contractor's Bonds & Insurance	110,586		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**8,072,760**	
Contingencies	2,018,190		25.000 %
Field Cost		**10,090,950**	
Sales Tax Estimate (Mat & Eq)	253,655		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid		**10,344,605**
Land Costs USBR's Detailed Est	2,251,000	
Purchase of Easement to 2243'	361,000	
Feature Cost Including Land		**12,956,605**

Summary of Land Acqusistion Costs
1. Land costs of parcels included in the USBR's detailed estimate for purchase (estimated using USBR take lines)
2. Additional Land Costs for purchase of easement to 2243' elevation for parcels outside of USBR's detailed estimate.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Cle Elum Improvements Project without Fish Passage

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/17/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Shoreline Protection: includes costs of site development, material production, shoreline placement, shoreline earthwork, site maintenance.
Radial Gate Modifications: Includes fabrication and installation of five 3'8" foot high by 37 foot wide stiffened FRP flashboards for the five radial gates on the Cle Elum Dam spillway.
Upstream Inundation Impacts: None
Recreational Facility Impacts were estimated by escalating the 2000 Estimate values by the appropriate RS Means CCI.
Soft cost such as NRPA/Environmental Compliance, and Cultural Resources are not included in this OPCC estimate.
Land Purchase and Easement Costs included on the Totals Page 2
Mobilization and field general condition costs, bonds and BR insurance, O&P, contingencies are shown for the entire project on the totals page.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Unit Cost	Total Amount
001 CLIP ENGINEERING COST ESTIMATE					
001-01.1	**Shoreline Protection Costs - Site Development**				
01300.010	Administrattive Requirements-Survey, Topographical	10.00	ac	1,629.584/ac	16,296
Estimate based on an average of RS Means Minimum and Maximu for this scope of work.					
01410.000	Testing	1.00	ls	192,000.00 /ls	192,000
02700.010	Haul Road Improvements - Grading, Fabric, 12" Aggregate Base	8,215.00	sy	18.32 /sy	150,454
Scope of Work includes, rough grading to remove ruts, fine grading to +.1/-.1, layer of non-woven fabric, 12" of aggregate base course palced and compacted. Assumed not additional clearing is required.					
02700.020	Haul Roadway Construction along Shoreline	9,800.00	sy	27.62 /sy	270,632
Scope of Work includes, clearing and chipping, grubbing, hauling off stumps, 40 mile RT, rough grading,, fine grading to +.1/-.1, layer of non-woven fabric, 12" of aggregate base course placed and compacted.					
02700.030	Borrow Area - Clear, Grub, Restore	10.00	ac	44,217.43 /ac	442,174
Scope of work includes silt fence, clearing, chipping, chips stockpiled, grubbing, stumps hauled 40 miles RT, stripping topsoil to stock pile, spreading topsoiland fine grading, seeding					
001-01.1 Shoreline Protection Costs - Site Development				**1,071,556.340/ls**	**1,071,556**
1.00	**ls**				
4,219.141	Labor hours				
2,864.125	Equipment hours				
001-01.2	**Shoreline Protection Costs - Material Production**				
02700.040	Stone Production - Drilling & Blasting, 43,000 ecy	43,000.00	cy	9.11 /cy	391,546
Scope of work includes drilling and blsting rock in a borrow pit environment					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02700.042	Stone Production - Rock Excavation, Hauling to Crusher	43,000.00	cy	3.34 /cy	143,498
Scope of work includes excavating the shot rock, loading into a truck, hauling < 1 mile RT					
02700.044	Stone Production - Crushing, Screening	24,500.00	cy	3.00 /cy	73,500
Scope of work includes subcontract price to mobize crusher, cruch blast rock and place in stock piles					
02700.046	Stone Production - Hauling to Shoreline	38,400.00	cy	31.36 /cy	1,204,060
Scope of work includes loading crushed rock, rip rap or bedding, hauling 40 miles RT					
001-01.2 Shoreline Protection Costs - Material Production				**1,812,604.02 /ls**	**1,812,604**
1.00	**ls**				
10,331.46	Labor hours				
10,930.88	Equipment hours				
001-01.3	**Shoreline Protection Costs - Shoreline Placement**				
02271.000	Rip Rap placement	24,500.00	cy	21.16 /cy	518,364
02271.010	Bedding placement	13,900.00	cy	4.11 /cy	57,110
001-01.3 Shoreline Protection Costs - Shoreline Placement				**575,473.51 /ls**	**575,474**
1.00	**ls**				
9,023.61	Labor hours				
1,703.644	Equipment hours				
001-01.4	**Shoreline Protection Costs - Shoreline Earthwork**				
02700.031	Clear and Grub	4.00	ac	9,048.05 /ac	36,192
Scope of work includes silt fence, clearing and removal of trees by others, grubbing, stumps hauled 40 miles RT,					
02700.052	Earthwork - Excavation to Fill	24,700.00	cy	6.75 /cy	166,655
Scope of work includes excavating, hauling to on site fill area, spreading, compacting.					
02700.054	Earthwork - Excavation to off site waste site	55,800.00	cy	20.104/cy	1,121,789
Scope of work includes excavating, loading, hauling 40 miles RT to waste site, spreading average 3' fill, no compaction, grassing.					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
001-01.4 Shoreline Protection Costs - Shoreline Earthwork				**1,324,636.090/ls**	**1,324,636**
1.00 ls					
9,434.201 Labor hours					
14,659.48 Equipment hours					
001-01.5	**Shoreline Protection Costs - Site Maintenance**				
02700.060	Haul Road Maintenance	100.00	day	625.892/day	62,589
Scope of work includes a grader with operator.					
02700.062	Dust Control - Heavy	100.00	day	1,767.704/day	176,770
Scope of work includes a water truck, operator, pump to fill from lake.					
02700.064	Flaggers - 2	200.00	day	45.26 /day	9,052
Scope of work includes a flagger at the borrow site and the shoreline					
001-01.5 Shoreline Protection Costs - Site Maintenance				**248,411.27 /ls**	**248,411**
1.00 ls					
2,600.00 Labor hours					
4,000.00 Equipment hours					
001-02	**Radial Gate Modification Costs**				
06610.000	Fiberglass Reinforced Plastic Fabrications	5.00	ea	22,115.864/ea	110,579
Estimate is based on a gate similar to that described in the 2000 report fabricated of fiberglass plate and structural members. 5ea - 37' long x 3'8" high					
Installation is a 5 man crew, 1-90 ton crane, $12500 mobilization/demobilization, 3 days per gate					
001-02 Radial Gate Modification Costs				**110,579.32 /ls**	**110,579**
1.00 ls					
819.732 Labor hours					
120.000 Equipment hours					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
001 CLIP ENGINEERING COST ESTIMATE			***5,143,260.55 /LS***	***5,143,261***
1.00 LS				
36,428.14 Labor hours				
34,278.123 Equipment hours				
003 CLIP LAND RELATED COST ESTIMATE				
002-03.1	**Recreation Costs Allowance - Wish Poosh Campground**			
02513.010	Asphaltic Concrete Vehicular Paving - Roads	1.00 ls	675,086.46 /ls	675,086
Allowance for the relocation of roads and parking for the recreation facilities was estimated by adjusting the 2000 values using the RS Means CCI for site construction. Jan/2000 - 127.0, July/2010 - 163.4. Put in the estimate as a subcontract value				
02513.020	Asphaltic Concrete Vehicular Paving - Parking	1.00 ls	226,572.76 /ls	226,573
Allowance for the relocation of roads and parking for the recreation facilities was estimated by adjusting the 2000 values using the RS Means CCI for site construction. Jan/2000 - 127.0, July/2010 - 163.4. Put in the estimate as a subcontract value				
13020.010	Facilities	1.00 ls	84,452.11 /ls	84,452
Allowance for the relocation of facilities for the recreation facilities was estimated by adjusting the 2000 values using the RS Means CCI weighted average for buildings. Jan/2000 - 120.7, July/2010 - 181.7. Put in the estimate as a subcontract value				
15509.010	Utilities	1.00 ls	63,500.43 /ls	63,500
Allowance for the relocation of utilities for the recreation facilities was estimated by adjusting the 2000 values using the RS Means CCI for mechanical work. Jan/2000 - 117.5, July/2010 - 226.1. Put in the estimate as a subcontract value				
002-03.1 Recreation Costs Allowance - Wish Poosh Campground			**1,049,611.76 /ls**	**1,049,612**
1.00 ls				
002-03.2	**Recreation Costs Allowance - Cle Elum River Campground**			

Description		Quantity		Total Unit Cost	Total Amount
02513.010	Asphaltic Concrete Vehicular Paving - Roads	1.00	ls	16,983.310/ls	16,983
Allowance for the relocation of roads and parking for the recreation facilities was estimated by adjusting the 2000 values using the RS Means CCI for site construction. Jan/2000 - 127.0, July/2010 - 163.4. Put in the estimate as a subcontract value					
02513.020	Asphaltic Concrete Vehicular Paving - Parking	1.00	ls	19,299.21 /ls	19,299
Allowance for the relocation of roads and parking for the recreation facilities was estimated by adjusting the 2000 values using the RS Means CCI for site construction. Jan/2000 - 127.0, July/2010 - 163.4. Put in the estimate as a subcontract value					
13020.010	Facilities	1.00	ls	42,602.40 /ls	42,602
Allowance for the relocation of facilities for the recreation facilities was estimated by adjusting the 2000 values using the RS Means CCI weighted average for buildings. Jan/2000 - 120.7, July/2010 - 181.7. Put in the estimate as a subcontract value					
002-03.2 Recreation Costs Allowance - Cle Elum River Campground		**1.00**	**ls**	**78,884.92 /ls**	**78,885**
003 CLIP LAND RELATED COST ESTIMATE		***1.00***	***LS***	***1,128,496.68 /LS***	***1,128,497***

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	1,771,903		
Material	928,230		
Subcontract	1,393,997		
Equipment	2,165,128		
Other	12,500		
Subtotal		6,271,758	
Contractor's Fld Ovhd	376,305		6.000 %
Mobilization	125,435		2.000 %
Subtotal w/ mobilization		6,773,498	
Unlisted Items Minor	239,554		4.000 %
Design and Scope Changes Minor	239,554		4.000 %
Cost Est Refinements Minor	119,777		2.000 %
Contractor's Fee	589,791		8.000 %
Contractor's Bonds & Insurance	110,586		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		8,072,760	
Contingencies	2,018,190		25.000 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Field Cost		**10,090,950**	
Sales Tax Estimate (Mat & Eq)	253,655		8.200 %
Escal to NTP (NOTINCL)			
Forecasted Feature Bid		**10,344,605**	
Land Costs USBR's Detailed Est	2,251,000		
Purchase of Easement to 2243'	361,000		
Feature Cost Including Land		**12,956,605**	

Summary of Land Acqusistion Costs
1. Land costs of parcels included in the USBR's detailed estimate for purchase (estimated using USBR take lines)
2. Additional Land Costs for purchase of easement to 2243' elevation for parcels outside of USBR's detailed estimate.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

APPENDIX L

OPCC KRD Main Canal and South Branch Modifications

Yakima River Basin Water Storage Study
Kittitas Reclamation District South Branch Modification
Pipeline Connections, 15 AF Reservoir, and two 8cfs Pumps Stations

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/17/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

KRD South Canal Improvements replaces open laterals on the Main Canal and South Branch Canal with pressurized pipe systems to allow water discharge directly to tributary creeks or to supply water users currently diverting from tributary creeks. In addition it includes a 15 AF lined reservoir with 8 cfs pump station and a 8 cfs pump station at KRD Canal and 29,000 lf of pressurized pipeline supplying Manastash Creek.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001	M 4.9	1,788.00	LF	57,963	104,201	3,236	23,424	352	189,177
002	M 6.1	4,916.00	LF	137,649	206,489	3,236	63,908	352	411,634
003	M 7.7	4,886.00	LF	147,037	165,549	2,832	91,396	352	407,165
004	M 13.6	8,860.00	LF	448,118	881,924	4,045	200,157	2,376	1,536,620
005	M 16.9	677.00	LF	22,107	27,602	2,023	11,178	88	62,997
006	SB 9.9	6,724.00	LF	259,862	477,790	3,641	111,718	616	853,627
007	SB 13.8	16,840.00	LF	676,510	1,169,900	4,045	294,339	1,232	2,146,026
008	SB 14.3	16,791.00	LF	848,894	1,764,124	4,045	349,181	1,496	2,967,740
009	SB 16.7_17.6	25,917.00	LF	1,006,226	1,885,313	4,045	431,411	2,376	3,329,372
010	PUMPING TO MANASTASH CREEK	1.00	LS	956,560	2,081,119	207,750	509,793		3,755,221
011	RESERVOIR - 15 AF	15.00	AF	406,255	588,638	207,750	221,388		1,424,031

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	4,967,181		
Material	9,352,649		
Subcontract	446,647		
Equipment	2,307,895		
Other	9,240		
Subtotal		**17,083,612**	
Contractor's Fld Ovhd	341,672		2.000 %
Mobilization	427,090		2.500 %
Subtotal w/ mobilization		**17,852,374**	
Unlisted Items Minor	651,621		4.000 %
Design and Scope Changes Minor	651,621		4.000 %
Cost Est Refinements Minor	325,811		2.000 %
Contractor's Fee	1,558,514		8.000 %
Contractor's Bonds & Insurance	292,221		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**21,332,162**	
Contingencies	5,333,041		25.000 %
Field Cost		**26,665,203**	
Sales Tax Estimate (Mat & Eq)	956,165		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**27,621,368**

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Kittitas Reclamation District South Branch Modification
Pipeline Connections, 15 AF Reservoir, and two 8cfs Pumps Stations

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989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
001 M 4.9				
DIVISION 02 SITE CONSTRUCTION				
02072.000 Demolition Road Crossing	67.00	sy	22.82 /sy	1,529
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge				
02180.000 Reestablish Drainage Pattern	1,788.00	cy	8.804/cy	15,742
02513.000 Restore Road Crossing	67.00	sy	33.814/sy	2,266
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt				
02515.000 Lateral Inlet Structure	1.00	ea	8,827.49 /ea	8,827
02930.000 Seeding, Sodding, and Landscaping	3,973.00	sy	2.78 /sy	11,038
DIVISION 02 SITE CONSTRUCTION			**39,402.25 /ls**	**39,402**
1.00 ls				
364.205 Labor hours				
194.580 Equipment hours				
DIVISION 15 MECHANICAL				
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.				
02221.000 Trenching, Backfilling and Compacting for Utilities	900.00	cy	23.68 /cy	21,310
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.				
15064.000 Pipe: Plastic	1,788.00	lf	45.66 /lf	81,633
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250				
15114.500 Flow Meter Assemblies	4.00	EA	10,872.12 /EA	43,488
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
15115.000	Water Control Gates				3,343
DIVISION 15 MECHANICAL				**149,774.88 /ls**	**149,775**
1.00	**ls**				
833.09	Labor hours				
176.824	Equipment hours				
001 M 4.9				***105.804/LF***	***189,177***
1,788.00	***LF***				
1,197.294	Labor hours				
371.404	Equipment hours				
002 M 6.1					
DIVISION 02	**SITE CONSTRUCTION**				
02072.000	Demolition Road Crossing	67.00	sy	22.82 /sy	1,529
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge					
02180.000	Reestablish Drainage Pattern	3,595.00	cy	8.804/cy	31,652
02513.000	Restore Road Crossing	67.00	sy	33.814/sy	2,266
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt					
02515.000	Lateral Inlet Structure	1.00	ea	8,827.49 /ea	8,827
02930.000	Seeding, Sodding, and Landscaping	10,902.00	sy	2.78 /sy	30,289
DIVISION 02 SITE CONSTRUCTION				**74,562.350/ls**	**74,562**
1.00	**ls**				
766.84	Labor hours				
406.983	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Unit Cost	Total Amount
DIVISION 15 MECHANICAL				
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.				
02221.000 Trenching, Backfilling and Compacting for Utilities	3,366.00	cy	31.00 /cy	104,333
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.				
15064.000 Pipe: Plastic	4,916.00	lf	38.50 /lf	189,250
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250				
15114.500 Flow Meter Assemblies	4.00	EA	10,872.12 /EA	43,488
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet				
DIVISION 15 MECHANICAL			**337,071.52 /ls**	**337,072**
1.00 ls				
2,135.66 Labor hours				
770.67 Equipment hours				
002 M 6.1			***83.733/LF***	***411,634***
4,916.00 LF				
2,902.50 Labor hours				
1,177.650 Equipment hours				
003 M 7.7				
DIVISION 02 SITE CONSTRUCTION				

					Total	
Description		**Quantity**			**Unit Cost**	**Amount**
02072.000	Demolition Road Crossing	134.00	sy		22.82 /sy	3,057
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge						
02180.000	Reestablish Drainage Pattern	5,365.00	cy		8.804/cy	47,236
02513.000	Restore Road Crossing	134.00	sy		33.814/sy	4,531
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt						
02515.000	Lateral Inlet Structure	2.00	ea		4,211.50 /ea	8,423
02930.000	Seeding, Sodding, and Landscaping	10,858.00	sy		2.78 /sy	30,166
DIVISION 02 SITE CONSTRUCTION					**93,413.70 /ls**	**93,414**

1.00 ls
998.78 Labor hours
530.43 Equipment hours

DIVISION 15 MECHANICAL

Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.

02221.000	Trenching, Backfilling and Compacting for Utilities	4,535.00	cy		29.16 /cy	132,229
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.						
15064.000	Pipe: Plastic	4,886.00	lf		28.10 /lf	137,292
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250						
15114.500	Flow Meter Assemblies	4.00	EA		11,057.69 /EA	44,231
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet						
DIVISION 15 MECHANICAL					**313,751.75 /ls**	**313,752**

1.00 ls
2,060.02 Labor hours
1,130.872 Equipment hours

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
003 M 7.7			***83.333/LF***	***407,165***
4,886.00 LF				
3,058.794 Labor hours				
1,661.301 Equipment hours				
004 M 13.6				
DIVISION 02 SITE CONSTRUCTION				
02072.000 Demolition Road Crossing	134.00	sy	20.851/sy	2,794
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge				
02180.000 Reestablish Drainage Pattern	15,549.00	cy	8.804/cy	136,901
02513.000 Restore Road Crossing	134.00	sy	33.814/sy	4,531
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt				
02515.000 Lateral Inlet Structure	1.00	ea	10,250.120/ea	10,250
02930.000 Seeding, Sodding, and Landscaping	19,689.00	sy	2.78 /sy	54,701
DIVISION 02 SITE CONSTRUCTION			**209,177.13 /ls**	**209,177**
1.00 ls				
2,445.54 Labor hours				
1,265.900 Equipment hours				
DIVISION 15 MECHANICAL				

Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.

Description		Quantity		Total Unit Cost	Total Amount
02221.000	Trenching, Backfilling and Compacting for Utilities	9,356.00	cy	31.72 /cy	296,774
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.					
15064.000	Pipe: Plastic	8,860.00	lf	76.05 /lf	673,769
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250					
15114.500	Flow Meter Assemblies	27.00	EA	13,218.49 /EA	356,899
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet					
DIVISION 15 MECHANICAL				**1,327,442.52 /ls**	**1,327,443**

1.00 ls
7,062.474 Labor hours
2,434.201 Equipment hours

004 M 13.6 ***173.433/LF*** ***1,536,620***

8,860.00 LF
9,508.010 Labor hours
3,700.102 Equipment hours

005 M 16.9

DIVISION 02	**SITE CONSTRUCTION**				
02072.000	Demolition Road Crossing	67.00	sy	22.82 /sy	1,529
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge					
02180.000	Reestablish Drainage Pattern	996.00	cy	8.804/cy	8,769
02513.000	Restore Road Crossing	67.00	sy	33.814/sy	2,266
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02515.000	Lateral Inlet Structure	1.00	ea	6,236.07 /ea	6,236
02930.000	Seeding, Sodding, and Landscaping	1,504.00	sy	2.78 /sy	4,179
DIVISION 02 SITE CONSTRUCTION				**22,977.99 /ls**	**22,978**

1.00 ls
202.04 Labor hours
109.831 Equipment hours

DIVISION 15 MECHANICAL

Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.

02221.000	Trenching, Backfilling and Compacting for Utilities	433.00	cy	27.75 /cy	12,015

Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.

15064.000	Pipe: Plastic	677.00	lf	26.06 /lf	17,640

Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250

15114.500	Flow Meter Assemblies	1.00	EA	10,363.97 /EA	10,364

Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet

DIVISION 15 MECHANICAL				**40,018.89 /ls**	**40,019**

1.00 ls
256.583 Labor hours
95.293 Equipment hours

005 M 16.9				***93.053/LF***	***62,997***

677.00 LF
458.62 Labor hours
205.124 Equipment hours

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
006 SB 9.9				
DIVISION 02 **SITE CONSTRUCTION**				
02072.000 Demolition Road Crossing	201.00	sy	22.82 /sy	4,586
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge				
02180.000 Reestablish Drainage Pattern	9,536.00	cy	8.804/cy	83,959
02513.000 Restore Road Crossing	201.00	sy	33.814/sy	6,797
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt				
02515.000 Lateral Inlet Structure	1.00	ea	9,845.63 /ea	9,846
02930.000 Seeding, Sodding, and Landscaping	14,942.00	sy	2.78 /sy	41,513
DIVISION 02 SITE CONSTRUCTION			**146,700.34 /ls**	**146,700**
1.00 ls				
1,629.851 Labor hours				
859.48 Equipment hours				
DIVISION 15 **MECHANICAL**				
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.				
02221.000 Trenching, Backfilling and Compacting for Utilities	5,009.00	cy	37.60 /cy	188,337
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.				
15064.000 Pipe: Plastic	6,724.00	lf	63.63 /lf	427,825
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250				
15114.500 Flow Meter Assemblies	7.00	EA	12,966.44 /EA	90,765
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 15 MECHANICAL			**706,926.91 /ls**	**706,927**
1.00 ls				
3,914.545 Labor hours				
1,262.42 Equipment hours				
006 SB 9.9			***126.952/LF***	***853,627***
6,724.00 LF				
5,544.40 Labor hours				
2,121.894 Equipment hours				
007 SB 13.8				
DIVISION 02 SITE CONSTRUCTION				
02072.000 Demolition Road Crossing	67.00	sy	22.82 /sy	1,529
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge				
02180.000 Reestablish Drainage Pattern	27,469.00	cy	8.804/cy	241,850
02513.000 Restore Road Crossing	67.00	sy	33.814/sy	2,266
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt				
02515.000 Lateral Inlet Structure	1.00	ea	10,250.13 /ea	10,250
02930.000 Seeding, Sodding, and Landscaping	37,422.00	sy	2.78 /sy	103,968
DIVISION 02 SITE CONSTRUCTION			**359,862.32 /ls**	**359,862**
1.00 ls				
4,320.014 Labor hours				
2,225.431 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total
Description		**Quantity**		**Unit Cost**	**Amount**
DIVISION 15	**MECHANICAL**				
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.					
02221.000	Trenching, Backfilling and Compacting for Utilities	13,617.00	cy	34.40 /cy	468,380
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.					
15064.000	Pipe: Plastic	16,840.00	lf	67.31 /lf	1,133,452
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250					
15114.500	Flow Meter Assemblies	14.00	EA	13,166.57 /EA	184,332
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet					
DIVISION 15 MECHANICAL				**1,786,164.01 /ls**	**1,786,164**
1.00	**ls**				
10,077.463	Labor hours				
3,458.79	Equipment hours				
007 SB 13.8				***127.44 /LF***	***2,146,026***
16,840.00	***LF***				
14,397.48	Labor hours				
5,684.22	Equipment hours				
008 SB 14.3					
DIVISION 02	**SITE CONSTRUCTION**				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total	
Description		**Quantity**			**Unit Cost**	**Amount**
02072.000	Demolition Road Crossing	268.00	sy		22.82 /sy	6,115
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge						
02180.000	Reestablish Drainage Pattern	24,891.00	cy		8.804/cy	219,152
02513.000	Restore Road Crossing	268.00	sy		33.814/sy	9,062
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt						
02515.000	Lateral Inlet Structure	1.00	ea		10,250.120/ea	10,250
02930.000	Seeding, Sodding, and Landscaping	37,313.00	sy		2.78 /sy	103,665
DIVISION 02 SITE CONSTRUCTION					**348,244.14 /ls**	**348,244**
1.00	**ls**					
4,081.572	Labor hours					
2,128.68	Equipment hours					
DIVISION 15	**MECHANICAL**					
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.						
02221.000	Trenching, Backfilling and Compacting for Utilities	18,554.00	cy		34.12 /cy	632,968
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.						
15064.000	Pipe: Plastic	23,629.00	lf		74.66 /lf	1,764,097
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250						
15114.500	Flow Meter Assemblies	17.00	EA		13,084.18 /EA	222,431
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet						
DIVISION 15 MECHANICAL					**2,619,495.96 /ls**	**2,619,496**
1.00	**ls**					
14,275.631	Labor hours					
4,642.532	Equipment hours					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
008 SB 14.3			***176.75 /LF***	***2,967,740***
16,791.00 LF				
18,357.203 Labor hours				
6,771.21 Equipment hours				
009 SB 16.7_17.6				
DIVISION 02 SITE CONSTRUCTION				
02072.000 Demolition Road Crossing	418.75	sy	22.82 /sy	9,554
Assumes 24' wide roadway and 20' wide cut. Includes 9" base rock, 3 1/2" asphalt, Hauled 22 miles RT to asphalt plant for reuse, no dumping charge				
02180.000 Reestablish Drainage Pattern	40,803.00	cy	8.804/cy	359,249
02515.000 Lateral Inlet Structure	1.00	ea	10,250.13 /ea	10,250
02930.000 Seeding, Sodding, and Landscaping	57,593.00	sy	2.78 /sy	160,008
DIVISION 02 SITE CONSTRUCTION			**539,061.47 /ls**	**539,061**
1.00 ls				
6,531.133 Labor hours				
3,402.82 Equipment hours				
DIVISION 15 MECHANICAL				
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.				
02221.000 Trenching, Backfilling and Compacting for Utilities	20,015.00	cy	32.843/cy	657,351
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
15064.000	Pipe: Plastic	25,917.00	lf	69.27 /lf	1,795,211
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250					
15114.500	Flow Meter Assemblies	27.00	EA	12,509.212/EA	337,749
Assumed reducing tee, 10' of 8" PVC pipe, a 8" GV, Meter Vault, 4'x4'x4' dp, AMCO 8" T4000 Water Meter Direct Read, Cubic Feet					
DIVISION 15 MECHANICAL				**2,790,310.39 /ls**	**2,790,310**
1.00	**ls**				
14,899.32	Labor hours				
4,857.322	Equipment hours				
009 SB 16.7_17.6				***128.463/LF***	***3,329,372***
25,917.00	***LF***				
21,430.450	Labor hours				
8,260.142	Equipment hours				

010 PUMPING TO MANASTASH CREEK

DIVISION 02	**SITE CONSTRUCTION**				
02140.000	Dewatering	1.00	ls	16,666.34 /ls	16,666
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	2,997.00	cy	8.972/cy	26,888
02361.200	Cofferdam - Shore Driven	600.00	sf	27.04 /sf	16,222
02514.000	Plant Access Road	2,082.00	sy	27.451/sy	57,152
Assumes 15' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt @PS 15 AF Reservoir same with no 20' wide cut					
02930.000	Seeding, Sodding, and Landscaping	535.00	sy	3.353/sy	1,794

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION			**118,722.24 /ls**	**118,722**
1.00 ls				
718.972 Labor hours				
813.004 Equipment hours				
DIVISION 03 CONCRETE				
03002.100 Concrete_Foundations	73.00	cy	384.29 /cy	28,053
Pump Station				
@15 Af reservoir includes diversion structure				
03002.300 Concrete_Walls Exterior	109.00	cy	520.04 /cy	56,684
Pump Station				
@15 Af reservoir includes diversion structure				
03002.600 Concrete_Elevated Slab	9.00	cy	551.321/cy	4,962
Pump Station				
@15 Af reservoir includes diversion structure				
03002.700 Concrete_Slab on Grade	428.00	cy	330.58 /cy	141,486
Pump Station				
@15 Af reservoir includes diversion structure				
03002.800 Concrete_Equipment Pads	4.00	cy	408.123/cy	1,632
DIVISION 03 CONCRETE			**1,385.821/cy**	**232,818**
168.00 cy				
2,090.68 Labor hours				
201.103 Equipment hours				
DIVISION 05 METALS				
05505.000 Metal Fabrications	1.00	ls	3,035.53 /ls	3,036
Pump Station				
05522.000 Aluminum Railings	60.00	lf	78.65 /lf	4,719
Pump Station				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 05 METALS			**7,754.34 /ls**	**7,754**
1.00 ls				
29.074 Labor hours				
7.27 Equipment hours				
DIVISION 08 DOORS & WINDOWS				
08305.000 Access Doors	2.00	ea	2,174.79 /ea	4,350
Pump Station				
DIVISION 08 DOORS & WINDOWS			**4,349.57 /ls**	**4,350**
1.00 ls				
6.40 Labor hours				
DIVISION 11 EQUIPMENT				
11065.000 Pumping Equipment: Sump	1.00	ea	2,343.52 /ea	2,344
Pump Station				
11072.000 Pumping Equipment: Vertical Turbine (Line Shaft)	2.00	ea	203,003.48 /ea	406,007
Assumed 50 HP pumps for the Reservoir and 400 HP pumps for the PS				
15509.100 Fish Screen Fixed Plate Inclined	1.00	ea	43,276.06 /ea	43,276
Price based on self cleaning screen from a a bid in 2007 excalated to today. used $219/sf for a 10' x 15' self cleaning fish screen.				
DIVISION 11 EQUIPMENT			**451,626.55 /ls**	**451,627**
1.00 ls				
342.000 Labor hours				
57.000 Equipment hours				
DIVISION 13 SPECIAL CONSTRUCTION				
01000.000 Building Allowances	225.00	sf	210.00 /sf	47,250

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 13 SPECIAL CONSTRUCTION			**210.00 /sf**	**47,250**
225.00 sf				
DIVISION 15 MECHANICAL				
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.				
02221.000 Trenching, Backfilling and Compacting for Utilities	20,069.00	cy	28.052/cy	562,968
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.				
15064.000 Pipe: Plastic	29,030.00	lf	74.292/lf	2,156,711
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250				
15103.000 Butterfly Valves	2.00	ea	2,623.12 /ea	5,246
15106.000 Check Valves	2.00	ea	3,638.21 /ea	7,276
DIVISION 15 MECHANICAL			**2,732,200.77 /ls**	**2,732,201**
1.00 ls				
17,464.02 Labor hours				
5,698.624 Equipment hours				
DIVISION 16 ELECTRICAL				
16000.100 Electrical Subcontractor				160,500
Includes all power from the transformer to facilities. Assumes SCADA will include flows and system controls, radio transmission Tranformer and Power Feed NOT INCLUDED				
DIVISION 16 ELECTRICAL			**160,500.00 /ls**	**160,500**
1.00 ls				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
010 PUMPING TO MANASTASH CREEK			***3,755,221.48 /LS***	***3,755,221***
1.00 LS				
20,651.14 Labor hours				
6,777.00 Equipment hours				
011 RESERVOIR - 15 AF				
DIVISION 02 SITE CONSTRUCTION				
02110.000 Site Clearing	2.30	acre	7,340.05 /acre	16,882
Reservoir and PS				
02200.000 Earthwork	13,080.00	cy	8.971/cy	117,342
02200.600 Earthwork, Structural Backfill, Native Material includes compaction	2,997.00	cy	7.86 /cy	23,551
02270.000 Soil Erosion and Sediment Control	12,000.00	lf	0.871/lf	10,447
02444.000 Chain Link Fence and Gates	1,000.00	lf	54.782/lf	54,782
02514.000 Plant Access Road	2,082.00	sy	27.451/sy	57,152
Assumes 15' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt @PS 15 AF Reservoir same with no 20' wide cut				
02775.000 High-Density Polyethylene (HDPE) Membrane Liner	4,070.00	sy	45.691/sy	185,961
02930.000 Seeding, Sodding, and Landscaping	3,600.00	sy	2.991/sy	10,769
DIVISION 02 SITE CONSTRUCTION			**476,886.10 /ls**	**476,886**
1.00 ls				
3,519.93 Labor hours				
1,720.25 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 03	**CONCRETE**				
03002.100	Concrete_Foundations	146.00	cy	384.29 /cy	56,106
Pump Station					
@15 Af reservoir includes diversion structure					
03002.300	Concrete_Walls Exterior	218.00	cy	520.04 /cy	113,368
Pump Station					
@15 Af reservoir includes diversion structure					
03002.600	Concrete_Elevated Slab	18.00	cy	551.321/cy	9,924
Pump Station					
@15 Af reservoir includes diversion structure					
03002.700	Concrete_Slab on Grade	856.00	cy	330.58 /cy	282,973
Pump Station					
@15 Af reservoir includes diversion structure					
03002.800	Concrete_Equipment Pads	8.00	cy	408.124/cy	3,265
DIVISION 03 CONCRETE				**1,108.66 /cy**	**465,636**
420.00	**cy**				
4,181.353	Labor hours				
402.21	Equipment hours				
DIVISION 05	**METALS**				
05505.000	Metal Fabrications	1.00	ls	3,035.53 /ls	3,036
Pump Station					
05522.000	Aluminum Railings	60.00	lf	78.65 /lf	4,719
Pump Station					
DIVISION 05 METALS				**7,754.34 /ls**	**7,754**
1.00	**ls**				
29.074	Labor hours				
7.27	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 08	**DOORS & WINDOWS**				
08305.000	Access Doors	2.00	ea	2,174.79 /ea	4,350
Pump Station					
DIVISION 08 DOORS & WINDOWS				**4,349.57 /ls**	**4,350**
1.00	**ls**				
6.40	Labor hours				
DIVISION 11	**EQUIPMENT**				
11065.000	Pumping Equipment: Sump	1.00	ea	2,343.510/ea	2,344
Pump Station					
11072.000	Pumping Equipment: Vertical Turbine (Line Shaft)	2.00	ea	61,008.99 /ea	122,018
Assumed 50 HP pumps for the Reservoir and 400 HP pumps for the PS					
15115.600	Trash Racks-Manual Clean	1.00	ea	11,734.08 /ea	11,734
Provided and allowance of $9000 for the trash rack					
DIVISION 11 EQUIPMENT				**136,095.57 /ls**	**136,096**
1.00	**ls**				
166.00	Labor hours				
25.00	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
01000.000	Building Allowances				47,250
DIVISION 13 SPECIAL CONSTRUCTION				**47,250.00 /sf**	**47,250**
1.00	**sf**				
DIVISION 15	**MECHANICAL**				

Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Trench safety is included in the excavation unit costs. Assumed PVC pipe to the nearest larger size. Average depth of bury 2' with trench box and 6" of bedding below and up to the springline. Piping appurtenances are included.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total
Description		**Quantity**		**Unit Cost**	**Amount**
02221.000	Trenching, Backfilling and Compacting for Utilities	1,359.00	cy	41.97 /cy	57,035
Assumed piping from ground elevation although much may be installed in existing ditches or canals. No removing of unsuitable materials or filling of oversized canals. Spoil wasted near ditch. Trench safety is included in the excavation unit costs.					
15064.000	Pipe: Plastic	820.00	lf	57.042/lf	46,774
Estimate assumes all yard piping is PVC with DIP fittings, 2' of bury, bedding to the spring line. Except Nanastash FM which is one half DIP CL 250					
15101.000	Gate Valves	1.00	ea	9,227.76 /ea	9,228
15103.000	Butterfly Valves	2.00	ea	2,623.12 /ea	5,246
15106.000	Check Valves	2.00	ea	3,638.21 /ea	7,276
DIVISION 15 MECHANICAL				**125,559.61 /ls**	**125,560**
1.00	**ls**				
672.37	Labor hours				
246.39	Equipment hours				
DIVISION 16	**ELECTRICAL**				
16000.100	Electrical Subcontractor	1.00	ls	160,500.00 /ls	160,500
Includes all power from the transformer to facilities. Assumes SCADA will include flows and system controls, radio transmission Tranformer and Power Feed NOT INCLUDED					
DIVISION 16 ELECTRICAL				**160,500.00 /ls**	**160,500**
1.00	**ls**				
011 RESERVOIR - 15 AF				***94,935.41 /AF***	***1,424,031***
15.00	***AF***				
8,575.12	Labor hours				
2,401.11	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	4,967,181		
Material	9,352,649		
Subcontract	446,647		
Equipment	2,307,895		
Other	9,240		
Subtotal		**17,083,612**	
Contractor's Fld Ovhd	341,672		2.000 %
Mobilization	427,090		2.500 %
Subtotal w/ mobilization		**17,852,374**	
Unlisted Items Minor	651,621		4.000 %
Design and Scope Changes Minor	651,621		4.000 %
Cost Est Refinements Minor	325,811		2.000 %
Contractor's Fee	1,558,514		8.000 %
Contractor's Bonds & Insurance	292,221		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**21,332,162**	
Contingencies	5,333,041		25.000 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Field Cost		**26,665,203**	
Sales Tax Estimate (Mat & Eq)	956,165		8.200 %
Escal to NTP (NOTINCL)			
Forecasted Feature Bid		**27,621,368**	

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

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APPENDIX M

OPCC Wapatox Canal Conveyance Improvements

APPENDIX M.1

OPCC Wapatox Canal Conveyance Improvements – Alternative 1

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/17/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Replace existing Wapatox Ditch lining from Fish Screen to the Wenas Grade PS, Install a force main from Wenas PS to downstream end of the Wapatox Canal, Install a force main through the old power plant from end of the canal to the tailrace, Install a force main from the tailrace to the Gleed Ditch, Install a force main from the tailrace to the City of Yakima WTP intake, Install the Wenas PS (136 cfs @ 40' TDH), Install a spill pipeline from the Wenas PS to the Naches River, Install distribution pump stations and distribution piping to serve NSID customers upstream of Wenas grade.

989-WA-YAKIMA

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001	DEMO OF EXISTING CANAL LINING - WAPATOX CANAL	163,500.00	SY	3,361,320	1,126,197		670,292		5,157,809
002	INSTALL NEW DITCH LINING - FISH SCREEN TO WENAS GRADE PS LOCATIONS	108,000.00	SY	1,395,865	2,235,120		1,097,858		4,728,843
003	INSTALL NEW CHECK STRUCTURE IN EXISTING CANAL UPSTREAM WENAS GRADE PS	6.00	EA	35,194	65,351		2,299		102,843
004	PRESSURIZED PIPELINE - WENAS GRADE PS TO END WAPATOX CANAL, 60"	15,820.00	LF	714,520	4,295,157	1,149,870	821,177		6,980,725
60" DIA, 38 psi MAX STATIC PRESSURE									
005	PRESSURIZED PIPELINE - END OF WAPATOX CANAL TO TAILRACE, 48"	650.00	LF	76,626	236,420	3,000	75,390		391,437
48" DIA, 101 psi MAX STATIC PRESSURE AROUND POWER HOUSE									
006	PRESSURIZED PIPELINE - FROM TAILRACE TO CITY OF YAKIMA WTP INTAKE, 42"	900.00	LF	121,710	345,392		107,481	18,482	593,064
42" DIA, 102 psi MAX STATIC PRESSURE									
007	PRESSURIZED PIPELINE - FROM TAILRACE TO GLEED DITCH, 36"	2,550.00	LF	264,791	556,952	6,000	189,117		1,016,860
36" DIA, 103 psi MAX STATIC PRESSURE									
008	WENAS GRADE PUMP STATION	1.00	LS	90,534	835,990	203,565	42,724		1,172,813
009	WENAS GRADE PUMP STATION DISCHARGE PIPELINE TO NSID CANAL BELOW WGPS	300.00	LF	9,543	78,363	21,804	10,205		119,916
010	DISCHARGE STRUCTURE AT NSID CANAL	1.00	LS	62,527	35,201		16,581		114,310
011	SPILL PIPELINE FROM WENAS GRADE PS TO NACHES RIVER	6,100.00	LF	382,418	1,364,807		246,683	18,440	2,012,348
012	DISTRIBUTION PUMP STATIONS - NSID CUSTOMERS UPSTREAM OF WENAS GRADE PS	4.00	EA	104,282	205,963	87,750	22,038		420,033
013	PRESSURIZED PIPELINE - NSID CUSTOMERS UPSTREAM WENAS GRADE PS	14,000.00	LF	2,752,591	804,691		1,103,647		4,660,929

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
014	CONNECTION TO EXISTING WAPATOX DITCH COMPANY TURNOUTS	63.00	EA	96,098	86,435		40,031		222,563
015	CONNECTION TO EXISTING NSID TURNOUTS	12.00	EA	27,258	17,191		39,749		84,198
016	DEMOLITION OF EXISTING NSID DIVERSION	900.00	LF	185,524	1,754		44,371		231,649
017	DEMOLITION OF EXISTING GLEED DITCH DIVERSION	150.00	LF	26,976	292		5,096		32,365

Estimate Totals

Description	Amount	Totals	Rate
Labor	9,707,778		
Material	12,291,276		
Subcontract	1,471,989		
Equipment	4,534,740		
Other	36,922		
Subtotal		**28,042,705**	
Contractor's Fld Ovhd	1,121,708		4.000 %
Mobilization	560,854		2.000 %
Subtotal w/ mobilization		**29,725,267**	
Unlisted Items Minor	1,049,879		4.000 %
Design and Scope Changes Minor	1,049,879		4.000 %
Cost Est Refinements Minor	524,939		2.000 %
Contractor's Fee	2,587,997		8.000 %
Contractor's Bonds & Insurance	485,249		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**35,423,210**	
Contingencies	8,855,803		25.000 %
Field Cost		**44,279,013**	
Sales Tax Estimate (Mat & Eq)	1,359,582		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**45,638,595**

1. Pipeline costs would include materials and labor to trench and install pipe, fittings, bedding, backfill, and other appurtnenances.
2. Connections to existing Wapatox Ditch Company trunouts based on NSID Conservation Plan Supplement - Wapatox Canal Improvements.
3. Number of connections to NSID turnouts is not known. quantity represents best gues based on flow rate.
4, Wenas Grade PS - TOTAL 135 cfs @ 40'TDH, PIPING, FITTINGS, VALVES, METER, CONTROLS, VFD, STRUCTURE.
5. NISD Distribution PS - 2 cfs @ 40' TDH

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Yakima River Basin Water Storage Study
Wapatox Canal Improvements - Option 1

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/17/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Replace existing Wapatox Ditch lining from Fish Screen to the Wenas Grade PS, Install a force main from Wenas PS to downstream end of the Wapatox Canal, Install a force main through the old power plant from end of the canal to the tailrace, Install a force main from the tailrace to the Gleed Ditch, Install a force main from the tailrace to the City of Yakima WTP intake, Install the Wenas PS (136 cfs @ 40' TDH), Install a spill pipeline from the Wenas PS to the Naches River, Install distribution pump stations and distribution piping to serve NSID customers upstream of Wenas grade.

989-WA-YAKIMA

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
001 DEMO OF EXISTING CANAL LINING - WAPATOX CANAL				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02270.000 Soil Erosion and Sediment Control	54,000.00	lf	1.03 /lf	55,370
DIVISION 02 SITE CONSTRUCTION			**55,369.53 /ls**	**55,370**
1.00 ls				
724.68 Labor hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				
02072.100 Demolition, Cutting and Patching - Canal Lining - Wapatox	163,500.00	sy	31.21 /sy	5,102,440
Estimate assumes that the majority of the canal lining is 4"thick,lloaded by a large excavator, will be hauled to a CD landfill, 20 miles RT @ 35 mph, CD landfill tipping fee of $20/ton.				
DIVISION 03 CONCRETE			**5,102,439.64 /ls**	**5,102,440**
1.00 ls				
73,248.000 Labor hours				
75,864.000 Equipment hours				
001 DEMO OF EXISTING CANAL LINING - WAPATOX CANAL			***31.55 /SY***	***5,157,809***
163,500.00 SY				
73,972.680 Labor hours				
75,864.000 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount

002 INSTALL NEW DITCH LINING - FISH SCREEN TO WENAS GRADE PS LOCATIONS

DIVISION 02 SITE CONSTRUCTION

Erosion control in Demo Existing Canal Lining

02200.050	Earthwork - Find grade	972.00	msf	162.204/msf	157,662

Estimate assumes that existing canal after demo of lining will not require additional fill before relining to WGPS. Reshaping through fine grading only.

02950.000	Site Restoration & Rehabilitation	120,000.00	sy	1.374/sy	164,852

Fine grading and seeding

DIVISION 02 SITE CONSTRUCTION **322,514.30 /ls** **322,514**

1.00 ls
3,230.25 Labor hours
1,807.13 Equipment hours

DIVISION 03 CONCRETE

Canal or River Discharge

03002.710	Concrete_Canal Lining, 4" Gunite on Geotectile Fabric, no reinforcing	108,000.00	sy	40.80 /sy	4,406,329

Estimate assumes a 6" average lining depth fo the entire 108,000 sy, reinforced at 12#/sy

DIVISION 03 CONCRETE **4,406,328.95 /ls** **4,406,329**

1.00 ls
31,622.40 Labor hours
31,104.00 Equipment hours

Description	Quantity		Total Unit Cost	Total Amount
002 INSTALL NEW DITCH LINING - FISH SCREEN TO WENAS GRADE PS LOCATIONS			***43.79 /SY***	***4,728,843***
108,000.00 SY				
34,852.65 Labor hours				
32,911.13 Equipment hours				
003 INSTALL NEW CHECK STRUCTURE IN EXISTING CANAL UPSTREAM WENAS GRADE PS				
DIVISION 03 CONCRETE				
Canal or River Discharge				
03002.250 Concrete_Grade Beams	66.00	cy	392.18 /cy	25,884
03002.300 Concrete_Walls Exterior	18.00	cy	608.791/cy	10,958
Concrete Walls for the Naches River, Gleed Canal, and NSID Canal diffuser.				
03002.500 Concrete_Columns	12.00	cy	1,343.973/cy	16,128
03002.600 Concrete_Elevated Slab	36.00	cy	562.66 /cy	20,256
Concrete Elevate slab for the Naches River, Gleed Canal, and NSID Canal diffuser				
DIVISION 03 CONCRETE			**73,225.39 /ls**	**73,225**
1.00 ls				
662.86 Labor hours				
43.614 Equipment hours				
DIVISION 05 METALS				
05522.000 Aluminum Railings	420.00	lf	70.52 /lf	29,618

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 05 METALS			**29,617.90 /ls**	**29,618**
1.00 ls				
98.104 Labor hours				
24.524 Equipment hours				
003 INSTALL NEW CHECK STRUCTURE IN EXISTING CANAL UPSTREAM WENAS GRADE PS 6.00 EA			***17,140.55 /EA***	***102,843***
760.961 Labor hours				
68.14 Equipment hours				
004 PRESSURIZED PIPELINE - WENAS GRADE PS TO END WAPATOX CANAL, 60" 60" DIA, 38 psi MAX STA TIC PR SSU RE				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02200.100 Earthwork - Fill Existing Canal with Native Borrow Wapatox below WGPS	61,921.00	cy	10.001/cy	619,298
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal below Drop Plt to downstream end of Wapatox Canal. Estimate assumes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included. Assumed 50% available next to canal,				
02270.000 Soil Erosion and Sediment Control	32,000.00	lf	1.03 /lf	32,812
02950.000 Site Restoration & Rehabilitation	105,467.00	sy	1.374/sy	144,887
Fine grading and seeding				
DIVISION 02 SITE CONSTRUCTION			**796,996.04 /ls**	**796,996**
1.00 ls				
5,200.10 Labor hours				
5,316.303 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 15	**MECHANICAL**			
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL				
02221.000 Trenching, Backfilling and Compacting for Utilities	35,448.00	cy	22.243/cy	788,457
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.				
Pipe at Pump Stations included 20' beyond building				
15061.100 Pipe: Steel- 26" and larger	15,820.00	lf	341.041/lf	5,395,272
Steel pipe, poly coating, cement lining, .3" wall thickness for pressures under 50 psi, .4" for pressures over 50 psi				
DIVISION 15 MECHANICAL			**6,183,728.88 /ls**	**6,183,729**
1.00 ls				
8,905.20 Labor hours				
7,381.733 Equipment hours				
004 PRESSURIZED PIPELINE - WENAS GRADE PS TO END WAPATOX CANAL, 60"			***441.26 /LF***	***6,980,725***
15,820.00 LF				
14,105.30 Labor hours				
12,698.04 Equipment hours				

005 PRESSURIZED PIPELINE - END OF WAPATOX CANAL TO TAILRACE, 48"

48" DIA, 101 psi MAX

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total	
Description		**Quantity**			**Unit Cost**	**Amount**
005 PRESSURIZED PIPELINE - END OF WAPATOX CANAL TO TAILRACE, 48"						
				STA		
DIVISION 15	**MECHANICAL**			*TIC*		
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				*PRE*		
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL				*SSU*		
02110.000	Site Clearing	1.00	ac		3,000.00 /ac	3,000
02221.000	Trenching, Backfilling and Compacting for Utilities	1,541.00	cy	*ARO UND*	22.15 /cy	34,126
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.				*PO*		
Pipe at Pump Stations included 20' beyond building				*WE*		
02270.000	Soil Erosion and Sediment Control	1,300.00	lf	*R*	1.03 /lf	1,333
02950.000	Site Restoration & Rehabilitation	4,333.33	sy	*HOU*	2.78 /sy	12,039
Fine grading and seeding						
15062.000	Pipe: Ductile	650.00	lf		524.521/lf	340,939
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser						
DIVISION 15 MECHANICAL					**391,437.01 /ls**	**391,437**
1.00	**ls**					
1,555.02	Labor hours					
528.561	Equipment hours					
005 PRESSURIZED PIPELINE - END OF WAPATOX CANAL TO TAILRACE, 48"					***602.211/LF***	***391,437***
650.00	***LF***					
1,555.02	Labor hours					
528.561	Equipment hours					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Unit Cost	Total Amount
006 PRESSURIZED PIPELINE - FROM TAILRACE TO CITY OF YAKIMA WTP INTAKE, 42"				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL				
02221.000 Trenching, Backfilling and Compacting for Utilities	1,958.00	cy	77.252/cy	41,611
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.				
Pipe at Pump Stations included 20' beyond building				
02270.000 Soil Erosion and Sediment Control	1,800.00	lf	1.03 /lf	1,846
02445.000 Horizontal Bore and Jack	100.00	lf	712.33 /lf	71,233
100 lf of 48" casing under Hwy 12				
02950.000 Site Restoration & Rehabilitation	6,000.00	sy	2.78 /sy	16,670
Fine grading and seeding				
15062.000 Pipe: Ductile	900.00	lf	478.314/lf	430,483
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser				
15103.000 Butterfly Valves	1.00	ea	31,222.76 /ea	31,223
DIVISION 15 MECHANICAL			**593,064.19 /ls**	**593,064**
1.00 ls				
2,388.89 Labor hours				
840.143 Equipment hours				
006 PRESSURIZED PIPELINE - FROM TAILRACE TO CITY OF YAKIMA WTP INTAKE, 42"			***658.96 /LF***	***593,064***
900.00 LF				
2,388.89 Labor hours				
840.143 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
007 PRESSURIZED PIPELINE - FROM TAILRACE TO GLEED DITCH, 36"					
				36"	
DIVISION 02	**SITE CONSTRUCTION**			*DIA,*	
Erosion control in Demo Existing Canal Lining				*103*	
02140.000	Dewatering	1.00	ls	11,555.60 /ls	11,556
02200.500	Earthwork, Structural Excavation	1,124.00	cy	*MAX* 1.61 /cy	1,805
Structure excavation for river or canal diffusers or the PS				*STA*	
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	680.00	cy	*TIC* 16.57 /cy	11,264
Structure backfill including hauling off excess for river or canal diffusers or the PS				*PRE*	
				SSU	
DIVISION 02 SITE CONSTRUCTION				*RE* **24,625.48 /ls**	**24,625**
1.00	**ls**				
256.49	Labor hours				
469.791	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
03002.100	Concrete_Foundations	22.00	cy	504.912/cy	11,108
Concrete foundation for the Naches River, Gleed Canal, and NSID Canal diffuser					
03002.300	Concrete_Walls Exterior	28.00	cy	748.30 /cy	20,952
Concrete Walls for the Naches River, Gleed Canal, and NSID Canal diffuser.					
03002.600	Concrete_Elevated Slab	13.00	cy	522.122/cy	6,788
Concrete Elevate slab for the Naches River, Gleed Canal, and NSID Canal diffuser					

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 03 CONCRETE			**38,848.00 /ls**	**38,848**
1.00 ls				
461.495 Labor hours				
26.14 Equipment hours				
DIVISION 05 METALS				
05505.000 Metal Fabrications	1.00	ls	21,548.57 /ls	21,549
Includes a Trash Rake, 5' x 13' and Ladder				
DIVISION 05 METALS			**21,548.57 /ls**	**21,549**
1.00 ls				
105.49 Labor hours				
21.10 Equipment hours				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL				
02110.000 Site Clearing	2.00	ac	3,000.00 /ac	6,000
02221.000 Trenching, Backfilling and Compacting for Utilities	5,634.00	cy	20.301/cy	114,374
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.				
Pipe at Pump Stations included 20' beyond building				
02270.000 Soil Erosion and Sediment Control	5,100.00	lf	1.03 /lf	5,229
02950.000 Site Restoration & Rehabilitation	17,000.00	sy	1.374/sy	23,354
Fine grading and seeding				
15062.000 Pipe: Ductile	2,550.00	lf	297.792/lf	759,369
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser				
15103.000 Butterfly Valves	1.00	ea	23,511.13 /ea	23,511

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 15 MECHANICAL			**931,837.59 /ls**	**931,838**
1.00 ls				
4,430.123 Labor hours				
1,599.84 Equipment hours				
007 PRESSURIZED PIPELINE - FROM TAILRACE TO GLEED DITCH, 36"			***398.77 /LF***	***1,016,860***
2,550.00 LF				
5,253.593 Labor hours				
2,116.863 Equipment hours				
008 WENAS GRADE PUMP STATION				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02200.500 Earthwork, Structural Excavation	1,008.00	cy	1.61 /cy	1,619
Structure excavation for river or canal diffusers or the PS				
02200.600 Earthwork, Structural Backfill, Native Material includes compaction	791.00	cy	11.43 /cy	9,039
Structure backfill including hauling off excess for river or canal diffusers or the PS				
02270.000 Soil Erosion and Sediment Control	4,000.00	lf	1.03 /lf	4,101
02514.000 Plant Access Road	267.00	sy	12.31 /sy	3,286
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt				
02950.000 Site Restoration & Rehabilitation	1,667.00	sy	2.78 /sy	4,630
Fine grading and seeding				

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION			**22,675.36 /ls**	**22,675**
1.00 ls				
205.355 Labor hours				
142.902 Equipment hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				
03002.100 Concrete_Foundations	32.00	cy	562.77 /cy	18,009
Concrete foundation for the Naches River, Gleed Canal, and NSID Canal diffuser				
03002.300 Concrete_Walls Exterior	35.00	cy	751.47 /cy	26,301
Concrete Walls for the Naches River, Gleed Canal, and NSID Canal diffuser.				
03002.700 Concrete_Slab on Grade	7.00	cy	423.931/cy	2,968
03002.800 Concrete_Equipment Pads	3.00	cy	385.283/cy	1,156
DIVISION 03 CONCRETE			**48,433.18 /ls**	**48,433**
1.00 ls				
588.95 Labor hours				
28.46 Equipment hours				
DIVISION 05 METALS				
05505.000 Metal Fabrications	1.00	ls	18,632.580/ls	18,633
Includes a Trash Rake, 5' x 13' and Ladder				
05522.000 Aluminum Railings	40.00	lf	78.65 /lf	3,146
DIVISION 05 METALS			**21,778.45 /ls**	**21,778**
1.00 ls				
62.395 Labor hours				
17.325 Equipment hours				
DIVISION 08 DOORS & WINDOWS				

Description		Quantity		Total Unit Cost	Total Amount
08305.000	Access Doors	1.00	ea	2,174.79 /ea	2,175
DIVISION 08 DOORS & WINDOWS				**2,174.79 /ea**	**2,175**
1.00	**ea**				
3.20	Labor hours				
DIVISION 11	**EQUIPMENT**				
11072.000	Pumping Equipment: Vertical Turbine (Line Shaft)	3.00	ea	72,278.35 /ea	216,835
DIVISION 11 EQUIPMENT				**216,835.04 /ls**	**216,835**
1.00	**ls**				
288.000	Labor hours				
36.000	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
01000.000	Building Allowances	400.00	sf	118.13 /sf	47,250
Assume a Split Face block CMU Building with Metal Roof or PMB with split face block walls. Not AC included					
15114.500	Flow Meter Assemblies	1.00	ea	41,271.70 /ea	41,272
10" Mag Meter with LIT with 6' dia precast manhole for vault for NSID Distribution PS					
42" Mag Meter with LIT with same Vault for Wenas Grade PS					
DIVISION 13 SPECIAL CONSTRUCTION				**88,521.70 /ls**	**88,522**
1.00	**ls**				
79.691	Labor hours				
15.00	Equipment hours				
DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02221.000	Trenching, Backfilling and Compacting for Utilities	58.00	cy	18.51 /cy	1,073
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
15062.000	Pipe: Ductile	20.00	lf	3,119.41 /lf	62,388
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser					
15062.100	Pipe: Ductile - Interior with Valves, Couplings, Hangers and Supports	1.00	ls	251,500.57 /ls	251,501
Interior Pipe and Fittings for PS and Meter					
15103.000	Butterfly Valves	4.00	ea	23,602.36 /ea	94,409
15111.000	Pump Control Valves	3.00	ea	68,902.72 /ea	206,708
DIVISION 15 MECHANICAL				**616,079.61 /ls**	**616,080**
1.00	**ls**				
593.841	Labor hours				
46.00	Equipment hours				
DIVISION 16	**ELECTRICAL**				
16000.100	Electrical Subcontractor	1.00	ls	156,314.85 /ls	156,315
Includes all power from the transformer. Assumes SCADA will include flows and system controls, radio transmission BackUp Power, Tranformer and Power Feed NOT INCLUDED					
DIVISION 16 ELECTRICAL				**156,314.85 /ls**	**156,315**
1.00	**ls**				
008 WENAS GRADE PUMP STATION				***1,172,812.98 /LS***	***1,172,813***
1.00	***LS***				
1,821.43	Labor hours				
285.68	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
009 WENAS GRADE PUMP STATION DISCHARGE PIPELINE TO NSID CANAL BELOW WGPS				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL				
02221.000 Trenching, Backfilling and Compacting for Utilities	673.00	cy	22.22 /cy	14,950
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.				
Pipe at Pump Stations included 20' beyond building				
02270.000 Soil Erosion and Sediment Control	600.00	lf	1.03 /lf	615
02950.000 Site Restoration & Rehabilitation	1,111.00	sy	2.78 /sy	3,087
Fine grading and seeding				
15061.100 Pipe: Steel- 26" and larger	300.00	lf	337.543/lf	101,263
Steel pipe, poly coating, cement lining, .3" wall thickness for pressures under 50 psi, .4" for pressures over 50 psi				
DIVISION 15 MECHANICAL			**119,915.55 /ls**	**119,916**
1.00 ls				
186.292 Labor hours				
158.855 Equipment hours				
009 WENAS GRADE PUMP STATION DISCHARGE PIPELINE TO NSID CANAL BELOW WGPS 300.00 LF			***399.72 /LF***	***119,916***
186.292 Labor hours				
158.855 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total	
Description		**Quantity**			**Unit Cost**	**Amount**
010 DISCHARGE STRUCTURE AT NSID CANAL						
DIVISION 02	**SITE CONSTRUCTION**					
Erosion control in Demo Existing Canal Lining						
02140.000	Dewatering	1.00	ls		16,666.330/ls	16,666
02200.500	Earthwork, Structural Excavation	1,686.00	cy		1.61 /cy	2,708
Structure excavation for river or canal diffusers or the PS						
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	1,020.00	cy		16.57 /cy	16,897
Structure backfill including hauling off excess for river or canal diffusers or the PS						
02270.000	Soil Erosion and Sediment Control	1,500.00	lf		1.03 /lf	1,538
02950.000	Site Restoration & Rehabilitation	535.00	sy		5.14 /sy	2,747
Fine grading and seeding						
DIVISION 02 SITE CONSTRUCTION					**40,556.300/ls**	**40,556**
1.00	**ls**					
438.58	Labor hours					
713.79	Equipment hours					
DIVISION 03	**CONCRETE**					
Canal or River Discharge						
03002.100	Concrete_Foundations	41.00	cy		508.01 /cy	20,828
Concrete foundation for the Naches River, Gleed Canal, and NSID Canal diffuser						
03002.300	Concrete_Walls Exterior	52.00	cy		755.51 /cy	39,286
Concrete Walls for the Naches River, Gleed Canal, and NSID Canal diffuser.						
03002.600	Concrete_Elevated Slab	24.00	cy		530.35 /cy	12,728
Concrete Elevate slab for the Naches River, Gleed Canal, and NSID Canal diffuser						

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 03 CONCRETE			**72,842.81 /ls**	**72,843**
1.00 ls				
865.325 Labor hours				
49.01 Equipment hours				
DIVISION 05 METALS				
05505.000 Metal Fabrications	1.00	ls	910.67 /ls	911
Includes a Trash Rake, 5' x 13' and Ladder				
DIVISION 05 METALS			**910.67 /ls**	**911**
1.00 ls				
4.52 Labor hours				
1.13 Equipment hours				
010 DISCHARGE STRUCTURE AT NSID CANAL			***114,309.78 /LS***	***114,310***
1.00 LS				
1,308.421 Labor hours				
763.924 Equipment hours				

011 SPILL PIPELINE FROM WENAS GRADE PS TO NACHES RIVER

DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02072.200 Demolition, Cutting and Patching - Existing Roadway	5,467.00	sy	12.30 /sy	67,221

Estimate assumes that the majority of the canal lining is 4" -6" think, rod reinforced, capable of being broken up and loaded by a large excavator, will be hauled to a CD landfill, 20 miles RT @ 35 mph, CD landfill tipping fee of $35/ton.

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02140.000	Dewatering	1.00	ls	16,666.34 /ls	16,666
02200.500	Earthwork, Structural Excavation	1,686.00	cy	1.61 /cy	2,708
Structure excavation for river or canal diffusers or the PS					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	1,020.00	cy	16.57 /cy	16,897
Structure backfill including hauling off excess for river or canal diffusers or the PS					
02361.200	Cofferdam - Shore Driven	1,000.00	sf	27.04 /sf	27,036
02700.000	Bases, Ballasts, Pavements & Appurtenances	5,467.00	sy	25.063/sy	137,018
DIVISION 02 SITE CONSTRUCTION				**267,545.79 /ls**	**267,546**
1.00	**ls**				
1,349.141	Labor hours				
1,583.21	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
03002.100	Concrete_Foundations	83.00	cy	501.89 /cy	41,656
Concrete foundation for the Naches River, Gleed Canal, and NSID Canal diffuser					
03002.300	Concrete_Walls Exterior	105.00	cy	748.30 /cy	78,571
Concrete Walls for the Naches River, Gleed Canal, and NSID Canal diffuser.					
03002.600	Concrete_Elevated Slab	48.00	cy	530.35 /cy	25,457
Concrete Elevate slab for the Naches River, Gleed Canal, and NSID Canal diffuser					
DIVISION 03 CONCRETE				**145,684.03 /ls**	**145,684**
1.00	**ls**				
1,730.64	Labor hours				
98.02	Equipment hours				
DIVISION 05	**METALS**				

Description		Quantity		Total Unit Cost	Total Amount
05505.000	Metal Fabrications	7,914.00	ls	5.11 /ls	40,412
Includes a Trash Rake, 5' x 13' and Ladder					
DIVISION 05 METALS				**40,412.01 /ls**	**40,412**
1.00	**ls**				
197.84	Labor hours				
39.57	Equipment hours				
DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL					
02221.000	Trenching, Backfilling and Compacting for Utilities	13,670.00	cy	37.13 /cy	507,508
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
02270.000	Soil Erosion and Sediment Control	12,200.00	lf	1.03 /lf	12,509
02445.000	Horizontal Bore and Jack	100.00	lf	712.33 /lf	71,233
100 lf of 48" casing under Hwy 12					
02950.000	Site Restoration & Rehabilitation	30,567.00	sy	1.374/sy	41,992
Fine grading and seeding					
15067.100	Pipe: Polyethylene (HDPE), Drainage Pipe	6,100.00	lf	151.72 /lf	925,464
DIVISION 15 MECHANICAL				**1,558,706.17 /ls**	**1,558,706**
1.00	**ls**				
4,973.30	Labor hours				
3,149.92	Equipment hours				

Description	Quantity		Total Unit Cost	Total Amount
011 SPILL PIPELINE FROM WENAS GRADE PS TO NACHES RIVER			***329.893/LF***	***2,012,348***
6,100.00 LF				
8,250.91 Labor hours				
4,870.712 Equipment hours				
012 DISTRIBUTION PUMP STATIONS - NSID CUSTOMERS UPSTREAM OF WENAS GRADE PS				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02200.500 Earthwork, Structural Excavation	1,038.00	cy	1.61 /cy	1,667
Structure excavation for river or canal diffusers or the PS				
02200.600 Earthwork, Structural Backfill, Native Material includes compaction	906.00	cy	6.35 /cy	5,751
Structure backfill including hauling off excess for river or canal diffusers or the PS				
02270.000 Soil Erosion and Sediment Control	1,000.00	lf	1.03 /lf	1,025
02514.000 Plant Access Road	267.00	sy	12.31 /sy	3,286
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt				
02950.000 Site Restoration & Rehabilitation	1,111.00	sy	2.78 /sy	3,087
Fine grading and seeding				
DIVISION 02 SITE CONSTRUCTION			**14,816.67 /ls**	**14,817**
1.00 ls				
132.71 Labor hours				
79.621 Equipment hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				

					Total	
Description		**Quantity**			**Unit Cost**	**Amount**
03002.100	Concrete_Foundations	39.00	cy		595.17 /cy	23,211
Concrete foundation for the Naches River, Gleed Canal, and NSID Canal diffuser						
03002.300	Concrete_Walls Exterior	54.00	cy		728.71 /cy	39,350
Concrete Walls for the Naches River, Gleed Canal, and NSID Canal diffuser.						
03002.600	Concrete_Elevated Slab	24.75	cy		537.993/cy	13,315
Concrete Elevate slab for the Naches River, Gleed Canal, and NSID Canal diffuser						
03002.700	Concrete_Slab on Grade	6.00	cy		428.322/cy	2,570
03002.800	Concrete_Equipment Pads	4.00	cy		385.01 /cy	1,540
DIVISION 03 CONCRETE					**79,986.960/ls**	**79,987**
1.00	**ls**					
949.924	Labor hours					
46.743	Equipment hours					
DIVISION 05	**METALS**					
05505.000	Metal Fabrications	1.00	ls		3,035.53 /ls	3,036
Includes a Trash Rake, 5' x 13' and Ladder						
05522.000	Aluminum Railings	136.00	lf		78.65 /lf	10,696
DIVISION 05 METALS					**13,731.49 /ls**	**13,731**
1.00	**ls**					
46.83	Labor hours					
11.71	Equipment hours					
DIVISION 08	**DOORS & WINDOWS**					
08305.000	Access Doors	4.00	ea		901.66 /ea	3,607
DIVISION 08 DOORS & WINDOWS					**901.66 /ea**	**3,607**
4.00	**ea**					
10.67	Labor hours					
DIVISION 11	**EQUIPMENT**					

Description		Quantity		Total Unit Cost	Total Amount
11072.000	Pumping Equipment: Vertical Turbine (Line Shaft)	4.00	ea	18,341.62 /ea	73,366
DIVISION 11 EQUIPMENT				**73,366.48 /ls**	**73,366**
1.00	**ls**				
192.000	Labor hours				
48.000	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
15114.500	Flow Meter Assemblies	4.00	ea	17,123.23 /ea	68,493
10" Mag Meter with LIT with 6' dia precast manhole for vault for NSID Distribution PS					
42" Mag Meter with LIT with same Vault for Wenas Grade PS					
DIVISION 13 SPECIAL CONSTRUCTION				**68,492.91 /ls**	**68,493**
1.00	**ls**				
171.32	Labor hours				
40.881	Equipment hours				
DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL					
02221.000	Trenching, Backfilling and Compacting for Utilities	376.00	cy	41.50 /cy	15,603
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
15062.000	Pipe: Ductile	80.00	lf	214.03 /lf	17,122
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser					
15062.100	Pipe: Ductile - Interior with Valves, Couplings, Hangers and Supports	4.00	ls	4,437.483/ls	17,750
Interior Pipe and Fittings for PS and Meter					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
15103.000	Butterfly Valves	4.00	ea	4,318.943/ea	17,276
15106.000	Check Valves	4.00	ea	2,632.74 /ea	10,531
DIVISION 15 MECHANICAL				**78,282.12 /ls**	**78,282**
1.00	**ls**				
706.96	Labor hours				
92.90	Equipment hours				
DIVISION 16	**ELECTRICAL**				
16000.100	Electrical Subcontractor	1.00	ls	87,750.00 /ls	87,750
Includes all power from the transformer. Assumes SCADA will include flows and system controls, radio transmission BackUp Power, Tranformer and Power Feed NOT INCLUDED					
DIVISION 16 ELECTRICAL				**87,750.00 /ls**	**87,750**
1.00	**ls**				
012 DISTRIBUTION PUMP STATIONS - NSID CUSTOMERS UPSTREAM OF WENAS GRADE PS				***105,008.32 /EA***	***420,033***
4.00	***EA***				
2,210.404	Labor hours				
319.851	Equipment hours				

013 PRESSURIZED PIPELINE - NSID CUSTOMERS UPSTREAM WENAS GRADE PS

DIVISION 02	**SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining					
02200.200	Earthwork - Fill Existing Canal with Native Borrow NSID	80,650.00	cy	10.30 /cy	830,662
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal. Estimate assumes that 100% of the canal upstream of the WGPS will be filled, cross section is 8' bottom, 5'					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02200.200	Earthwork - Fill Existing Canal with Native Borrow NSID	80,650.00	cy	10.30 /cy	830,662
depth, 1 to 1 sides. Estimate includes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included.					
02270.000	Soil Erosion and Sediment Control	67,000.00	lf	1.03 /lf	68,699
02950.000	Site Restoration & Rehabilitation	260,555.00	sy	1.374/sy	357,943
Fine grading and seeding					
DIVISION 02 SITE CONSTRUCTION				**1,257,304.370/ls**	**1,257,304**
1.00	**ls**				
8,899.251	Labor hours				
8,356.24	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
02072.300	Demolition, Cutting and Patching - Canal Lining - NSID	40,945.00	sy	31.21 /sy	1,277,794
Estimate assumes that 50% of the 33,500 lf of canal hasl lining 4" -6" think, rod reinforced, capable of being broken up and loaded by a large excavator, will be hauled to a CD landfill, 20 miles RT @ 35 mph, CD landfill tipping fee of $35/ton.					
Canal cross section where lined is 5' deep, 8' bottom, 1 to 1 sides					
02072.400	Demolition, Cutting and Patching - Misc Flumes and Trestles- NSID Cana	1.00	ls	438,000.00 /ls	438,000
Estimate includes an allowance lump sum amount for undefined scope of work					
DIVISION 03 CONCRETE				**1,715,794.44 /ls**	**1,715,794**
1.00	**ls**				
18,343.360	Labor hours				
18,998.480	Equipment hours				
DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02221.000	Trenching, Backfilling and Compacting for Utilities	19,137.00	cy	70.95 /cy	1,357,682
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
15064.000	Pipe: Plastic	14,000.00	lf	23.10 /lf	323,396
15101.000	Gate Valves	5.00	ea	1,350.56 /ea	6,753
DIVISION 15 MECHANICAL				**1,687,830.64 /ls**	**1,687,831**
1.00	**ls**				
26,438.503	Labor hours				
4,774.20	Equipment hours				
013 PRESSURIZED PIPELINE - NSID				***332.924/LF***	***4,660,929***
CUSTOMERS UPSTREAM WENAS GRADE PS					
14,000.00	***LF***				
53,681.114	Labor hours				
32,128.914	Equipment hours				
014 CONNECTION TO EXISTING WAPATOX DITCH COMPANY TURNOUTS					
DIVISION 02	**SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining					
02300.000	Reconnected Wapatox Ditch Company Turnouts - Canal	33.00	ea	3,358.472/ea	110,830
Estiamte assumes 33ea-12" canal gates, cast into concrete outlet on side of canal					

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION			**110,829.57 /ls**	**110,830**
1.00 ls				
864.621 Labor hours				
230.032 Equipment hours				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL				
02300.100 Reconnected Wapatox Ditch Company Turnouts - Pipe	30.00	ea	3,724.46 /ea	111,734
Item - 14 - Estimate assumes 2 ea-36", 8ea-24", 10ea-12",10ea-10". Weldolets off 48", DIP 20', plus valve, and plug				
Item - 15 - Estimate assumes 2 ea-16", 14", 12", 8", 6" using DIP reducing tees, 20' of DIP and a valve.				
DIVISION 15 MECHANICAL			**111,733.70 /ls**	**111,734**
1.00 ls				
1,047.231 Labor hours				
283.97 Equipment hours				
014 CONNECTION TO EXISTING WAPATOX DITCH COMPANY TURNOUTS			***3,532.75 /EA***	***222,563***
63.00 EA				
1,911.852 Labor hours				
514.000 Equipment hours				
015 CONNECTION TO EXISTING NSID TURNOUTS				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 15 **MECHANICAL**				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NSID CANAL				
02300.200 Reconnected Existing NSID Turnouts - Pipe	12.00	ea	7,016.534/ea	84,198
Item - 15 - Estimate assumes 2 ea-16", 14", 12", 8", 6" using DIP reducing tees, 20' of DIP and a valve.				
DIVISION 15 MECHANICAL			**84,198.41 /ls**	**84,198**
1.00 ls				
553.17 Labor hours				
434.171 Equipment hours				
015 CONNECTION TO EXISTING NSID TURNOUTS			***7,016.534/EA***	***84,198***
12.00 EA				
553.17 Labor hours				
434.171 Equipment hours				
016 DEMOLITION OF EXISTING NSID DIVERSION				
DIVISION 02 **SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining				
02200.300 Earthwork - Fill Existing Canal with Native Borrow NSID DIVERSION	7,200.00	cy	2.54 /cy	18,275
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal. Estimate assumes that 100% of the canal upstream of the WGPS will be filled, cross section is 8' bottom, 5' depth, 1 to 1 sides. Estimate includes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included.				
02270.000 Soil Erosion and Sediment Control	1,800.00	lf	1.03 /lf	1,846

Description		Quantity		Total Unit Cost	Total Amount
02950.000	Site Restoration & Rehabilitation	6,000.00	sy	1.374/sy	8,243
Fine grading and seeding					
DIVISION 02 SITE CONSTRUCTION				**28,363.50 /ls**	**28,364**
1.00	**ls**				
225.012	Labor hours				
130.73	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
02072.500	Demolition, Cutting and Patching - Headgate Structure NSID	200.00	cy	1,016.43 /cy	203,286
Estimate assumes demolition of 200 cy of concrete					
DIVISION 03 CONCRETE				**203,285.67 /ls**	**203,286**
1.00	**ls**				
5,000.000	Labor hours				
5,000.000	Equipment hours				
016 DEMOLITION OF EXISTING NSID DIVERSION				***257.39 /LF***	***231,649***
900.00	***LF***				
5,225.012	Labor hours				
5,130.73	Equipment hours				

017 DEMOLITION OF EXISTING GLEED DITCH DIVERSION

DIVISION 02 **SITE CONSTRUCTION**
Erosion control in Demo Existing Canal Lining

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02200.300	Earthwork - Fill Existing Canal with Native Borrow NSID DIVERSION	75.00	cy	2.54 /cy	190
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal. Estimate assumes that 100% of the canal upstream of the WGPS will be filled, cross section is 8' bottom, 5' depth, 1 to 1 sides. Estimate includes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included.					
02270.000	Soil Erosion and Sediment Control	300.00	lf	1.03 /lf	308
02950.000	Site Restoration & Rehabilitation	1,000.00	sy	1.374/sy	1,374
Fine grading and seeding					
DIVISION 02 SITE CONSTRUCTION				**1,871.73 /ls**	**1,872**
1.00	**ls**				
18.12	Labor hours				
8.862	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
02072.500	Demolition, Cutting and Patching - Headgate Structure NSID	30.00	cy	1,016.43 /cy	30,493
Estimate assumes demolition of 200 cy of concrete					
DIVISION 03 CONCRETE				**30,492.86 /ls**	**30,493**
1.00	**ls**				
750.000	Labor hours				
750.000	Equipment hours				
017 DEMOLITION OF EXISTING GLEED DITCH DIVERSION				***215.764/LF***	***32,365***
150.00	***LF***				
768.12	Labor hours				
758.862	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	9,707,778		
Material	12,291,276		
Subcontract	1,471,989		
Equipment	4,534,740		
Other	36,922		
Subtotal		**28,042,705**	
Contractor's Fld Ovhd	1,121,708		4.000 %
Mobilization	560,854		2.000 %
Subtotal w/ mobilization		**29,725,267**	
Unlisted Items Minor	1,049,879		4.000 %
Design and Scope Changes Minor	1,049,879		4.000 %
Cost Est Refinements Minor	524,939		2.000 %
Contractor's Fee	2,587,997		8.000 %
Contractor's Bonds & Insurance	485,249		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**35,423,210**	
Contingencies	8,855,803		25.000 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Field Cost		**44,279,013**	
Sales Tax Estimate (Mat & Eq)	1,359,582		8.200 %
Escal to NTP (NOTINCL)			
Forecasted Feature Bid		**45,638,595**	

1. Pipeline costs would include materials and labor to trench and install pipe, fittings, bedding, backfill, and other appurtnenances.
2. Connections to existing Wapatox Ditch Company trunouts based on NSID Conservation Plan Supplement - Wapatox Canal Improvements.
3. Number of connections to NSID turnouts is not known. quantity represents best gues based on flow rate.
4. Wenas Grade PS - TOTAL 135 cfs @ 40'TDH, PIPING, FITTINGS, VALVES, METER, CONTROLS, VFD, STRUCTURE.
5. NISD Distribution PS - 2 cfs @ 40' TDH

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

APPENDIX M.2

OPCC Wapatox Canal Conveyance Improvements – Alternative 2

US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

HDR Engineering, Inc

9/17/2010

Appraisal
3rd Qtr 2010 Union
Open Competition

Demolition of Wapatox Canal Lining, Replace from Fish Screen to Wenas Grade PS with 96" steel pipe, 10 psi,, Install a force main from Wenas PS to downstream end of the Wapatox Canal, Install a force main through the old power plant from end of the canal to the tailrace, Install a force main from the tailrace to the Gleed Ditch, Install a force main from the tailrace to the City of Yakima WTP intake, Install the Wenas PS (136 cfs @ 40' TDH), Install a spill pipeline from the Wenas PS to the Naches River, Install distribution pump stations and distribution piping to serve NSID customers upstream of Wenas grade.

989-WA-YAKIMA

	Description	Quantity		Labor Amount	Material Amount	Subcontract Amount	Equipment Amount	Other Amount	Total Amount
001	DEMO OF EXISTING CANAL LINING - WAPATOX CANAL	163,500.00	SY	3,361,320	1,126,197		670,292		5,157,809
002	PIPELINE, GRAVITY FOR LOW PRESSURE - FISH SCRN TO WENAS GRADE PS 96"	26,690.00	LF	1,591,942	11,348,638	2,560,224	2,024,600		17,525,404
003	PRESSURIZED PIPELINE - WENAS GRADE PS TO END WAPATOX CANAL 60"	15,820.00	LF	714,520	4,295,157	1,149,870	821,177		6,980,725
004	PRESSURIZED PIPELINE - END OF WAPATOX CANAL TO TAILRACE, 48"	650.00	LF	76,626	236,420	3,000	75,390		391,437
005	PRESSURIZED PIPELINE - FROM TAILRACE TO CITY OF YAKIMA WTP INTAKE, 42"	900.00	LF	121,710	345,392		107,481	18,482	593,064
006	PRESSURIZED PIPELINE - FROM TAILRACE TO GLEED DITCH, 36"	2,550.00	LF	264,791	556,952	6,000	189,117		1,016,860
007	WENAS GRADE PUMP STATION	1.00	LS	90,534	835,990	203,565	42,724		1,172,813
008	WENAS GRADE PUMP STATION DISCHARGE PIPELINE TO NSID CANAL BELOW WGPS	300.00	LF	9,543	78,363	21,804	10,205		119,916
009	DISCHARGE STRUCTURE AT NSID CANAL	1.00	LS	62,527	35,201		16,581		114,310
010	DISTRIBUTION PUMP STATIONS - NSID CUSTOMERS UPSTREAM OF WENAS GRADE PS	4.00	EA	104,282	205,963	87,750	22,038		420,033
011	PRESSURIZED PIPELINE - NSID CUSTOMERS UPSTREAM WENAS GRADE PS	14,000.00	LF	2,752,591	804,691		1,103,647		4,660,929
012	CONNECTION TO EXISTING WAPATOX DITCH COMPANY TURNOUTS	63.00	EA	96,098	86,435		40,031		222,563
013	CONNECTION TO EXISTING NSID TURNOUTS	12.00	EA	27,258	17,191		39,749		84,198
016	DEMOLITION OF EXISTING NSID DIVERSION	900.00	LF	185,524	1,754		44,371		231,649
017	DEMOLITION OF EXISTING GLEED DITCH DIVERSION	150.00	LF	26,976	292		5,096		32,365

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	9,486,243		
Material	19,974,637		
Subcontract	4,032,213		
Equipment	5,212,501		
Other	18,482		
Subtotal		**38,724,076**	
Contractor's Fld Ovhd	1,548,963		4.000 %
Mobilization	774,482		2.000 %
Subtotal w/ mobilization		**41,047,521**	
Unlisted Items Minor	1,458,496		4.000 %
Design and Scope Changes Minor	1,458,496		4.000 %
Cost Est Refinements Minor	729,248		2.000 %
Contractor's Fee	3,575,501		8.000 %
Contractor's Bonds & Insurance	670,406		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**48,939,668**	
Contingencies	12,234,917		25.000 %
Field Cost		**61,174,585**	
Sales Tax Estimate (Mat & Eq)	2,004,087		8.200 %
Escal to NTP (NOTINCL)			

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Forecasted Feature Bid	**63,178,672**

1. Pipeline costs would include materials and labor to trench and install pipe, fittings, bedding, backfill, and other appurtnenances.
2. Connections to existing Wapatox Ditch Company trunouts based on NSID Conservation Plan Supplement - Wapatox Canal Improvements.
3. Number of connections to NSID turnouts is not known. quantity represents best gues based on flow rate.
4, Wenas Grade PS - TOTAL 135 cfs @ 40'TDH, PIPING, FITTINGS, VALVES, METER, CONTROLS, VFD, STRUCTURE.
5. NISD Distribution PS - 2 cfs @ 40' TDH

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

US Department of the Interior

Bureau of Reclamation

Pacific Northwest Region

HDR Engineering, Inc

9/17/2010

Appraisal
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Open Competition

Demolition of Wapatox Canal Lining, Replace from Fish Screen to Wenas Grade PS with 96" steel pipe, 10 psi,, Install a force main from Wenas PS to downstream end of the Wapatox Canal, Install a force main through the old power plant from end of the canal to the tailrace, Install a force main from the tailrace to the Gleed Ditch, Install a force main from the tailrace to the City of Yakima WTP intake, Install the Wenas PS (136 cfs @ 40' TDH), Install a spill pipeline from the Wenas PS to the Naches River, Install distribution pump stations and distribution piping to serve NSID customers upstream of Wenas grade.

989-WA-YAKIMA

Description	Quantity		Total Unit Cost	Total Amount
001 DEMO OF EXISTING CANAL LINING - WAPATOX CANAL				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02270.000 Soil Erosion and Sediment Control	54,000.00	lf	1.03 /lf	55,370
DIVISION 02 SITE CONSTRUCTION			**55,369.53 /ls**	**55,370**
1.00 ls				
724.68 Labor hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				
02072.100 Demolition, Cutting and Patching - Canal Lining - Wapatox	163,500.00	sy	31.21 /sy	5,102,440
Estimate assumes that the majority of the canal lining is 4" -6" think, rod reinforced, capable of being broken up and loaded by a large excavator, will be hauled to a CD landfill, 20 miles RT @ 35 mph, CD landfill tipping fee of $35/ton.				
DIVISION 03 CONCRETE			**5,102,439.64 /ls**	**5,102,440**
1.00 ls				
73,248.000 Labor hours				
75,864.000 Equipment hours				
001 DEMO OF EXISTING CANAL LINING - WAPATOX CANAL			***31.55 /SY***	***5,157,809***
163,500.00 SY				
73,972.680 Labor hours				
75,864.000 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
002 PIPELINE, GRAVITY FOR LOW PRESSURE - FISH SCRN TO WENAS GRADE PS 96"					
DIVISION 02	**SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining					
02200.300	Earthwork - Fill Existing Wapatox Canal with Native Borrow FS to WGPS	128,962.00	cy	10.222/cy	1,318,244
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal from the Fish Screen to Wenas Grade PS, Provide a concrete Transition at the Fish Screen into the pipe. Estimate assumes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included. Assume 50% is available at the ditch.					
02200.500	Earthwork, Structural Excavation	909.00	cy	1.61 /cy	1,460
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	620.00	cy	12.263/cy	7,603
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02270.000	Soil Erosion and Sediment Control	60,000.00	lf	1.03 /lf	61,522
02950.000	Site Restoration & Rehabilitation	207,589.00	sy	1.374/sy	285,179
Fine grading and seeding of 40' for the 27,000 lf of ditch					
DIVISION 02 SITE CONSTRUCTION				**1,674,008.04 /ls**	**1,674,008**
1.00	**ls**				
10,810.944	Labor hours				
11,348.05	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
03002.100	Concrete_Foundations	45.00	cy	448.87 /cy	20,199
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
03002.300	Concrete_Walls Exterior	31.00	cy	503.70 /cy	15,615
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					
03002.600	Concrete_Elevated Slab	19.00	cy	523.493/cy	9,946
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					
DIVISION 03 CONCRETE				**45,760.01 /ls**	**45,760**
1.00	**ls**				
463.234	Labor hours				
27.184	Equipment hours				
DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL					
02221.000	Trenching, Backfilling and Compacting for Utilities	133,450.00	cy	11.58 /cy	1,544,754
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
15061.100	Pipe: Steel- 26" and larger	26,690.00	lf	534.32 /lf	14,260,882
Steel pipe and fittings, poly coating, cement lining, .3" wall thickness for pressures under 50 psi, .4" for pressures over 50 psi. Factory coated under 40", field coated 40" and over.					
DIVISION 15 MECHANICAL				**15,805,635.90 /ls**	**15,805,636**
1.00	**ls**				
19,839.165	Labor hours				
17,168.31	Equipment hours				
002 PIPELINE, GRAVITY FOR LOW PRESSURE - FISH SCRN TO WENAS GRADE PS 96"				***656.63 /LF***	***17,525,404***
26,690.00	***LF***				
31,113.343	Labor hours				
28,543.54	Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount

003 PRESSURIZED PIPELINE - WENAS GRADE PS TO END WAPATOX CANAL 60"

DIVISION 02 SITE CONSTRUCTION

Erosion control in Demo Existing Canal Lining

02200.100	Earthwork - Fill Existing Canal with Native Borrow Wapatox below WGPS	61,921.00	cy	10.001/cy	619,298

Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal below Drop Plt to downstream end of Wapatox Canal. Estimate assumes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included.

02270.000	Soil Erosion and Sediment Control	32,000.00	lf	1.03 /lf	32,812
02950.000	Site Restoration & Rehabilitation	105,467.00	sy	1.374/sy	144,887

Fine grading and seeding of 40' for the 27,000 lf of ditch

DIVISION 02 SITE CONSTRUCTION **796,996.04 /ls** **796,996**

1.00	**ls**
5,200.10	Labor hours
5,316.303	Equipment hours

DIVISION 15 MECHANICAL

60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline

NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL

02221.000	Trenching, Backfilling and Compacting for Utilities	35,448.00	cy	22.243/cy	788,457

2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.

Pipe at Pump Stations included 20' beyond building

Description		Quantity		Unit Cost	Total Amount
15061.100	Pipe: Steel- 26" and larger	15,820.00	lf	341.041/lf	5,395,272

Steel pipe and fittings, poly coating, cement lining, .3" wall thickness for pressures under 50 psi, .4" for pressures over 50 psi. Factory coated under 40", field coated 40" and over.

DIVISION 15 MECHANICAL **6,183,728.89 /ls** **6,183,729**

1.00 ls
8,905.20 Labor hours
7,381.733 Equipment hours

003 PRESSURIZED PIPELINE - WENAS GRADE PS TO END WAPATOX CANAL 60" ***441.26 /LF*** ***6,980,725***

15,820.00 LF
14,105.30 Labor hours
12,698.04 Equipment hours

004 PRESSURIZED PIPELINE - END OF WAPATOX CANAL TO TAILRACE, 48"

DIVISION 15 MECHANICAL

60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline

NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL

02110.000	Site Clearing	1.00	ac	3,000.00 /ac	3,000
02221.000	Trenching, Backfilling and Compacting for Utilities	1,541.00	cy	22.15 /cy	34,126

2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.

Pipe at Pump Stations included 20' beyond building

02270.000	Soil Erosion and Sediment Control	1,300.00	lf	1.03 /lf	1,333

Description		Quantity		Unit Cost	Total Amount
02950.000	Site Restoration & Rehabilitation	4,333.33	sy	2.78 /sy	12,039
Fine grading and seeding of 40' for the 27,000 lf of ditch					
15062.000	Pipe: Ductile	650.00	lf	524.521/lf	340,939
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser					
DIVISION 15 MECHANICAL				**391,437.00 /ls**	**391,437**
1.00	**ls**				
1,555.02	Labor hours				
528.561	Equipment hours				
004 PRESSURIZED PIPELINE - END OF WAPATOX CANAL TO TAILRACE, 48"				***602.211/LF***	***391,437***
650.00	***LF***				
1,555.02	Labor hours				
528.561	Equipment hours				

005 PRESSURIZED PIPELINE - FROM TAILRACE TO CITY OF YAKIMA WTP INTAKE, 42"

DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL					
02221.000	Trenching, Backfilling and Compacting for Utilities	1,958.00	cy	21.252/cy	41,611
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
02270.000	Soil Erosion and Sediment Control	1,800.00	lf	1.03 /lf	1,846

Description		Quantity		Total Unit Cost	Total Amount
02445.000	Horizontal Bore and Jack	100.00	lf	712.33 /lf	71,233
100 lf of 48" casing under Hwy 12					
02950.000	Site Restoration & Rehabilitation	6,000.00	sy	2.78 /sy	16,670
Fine grading and seeding of 40' for the 27,000 lf of ditch					
15062.000	Pipe: Ductile	900.00	lf	478.314/lf	430,483
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser					
15103.000	Butterfly Valves	1.00	ea	31,222.76 /ea	31,223
DIVISION 15 MECHANICAL				**593,064.19 /ls**	**593,064**

1.00 ls
2,388.89 Labor hours
840.143 Equipment hours

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005 PRESSURIZED PIPELINE - FROM TAILRACE TO CITY OF YAKIMA WTP INTAKE, 42" — ***658.96 /LF*** — ***593,064***

900.00 LF
2,388.89 Labor hours
840.143 Equipment hours

006 PRESSURIZED PIPELINE - FROM TAILRACE TO GLEED DITCH, 36"

DIVISION 02	**SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining					
02140.000	Dewatering	1.00	ls	11,555.60 /ls	11,556
02200.500	Earthwork, Structural Excavation	1,124.00	cy	1.61 /cy	1,805
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	680.00	cy	16.57 /cy	11,264
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION			**24,625.48 /ls**	**24,625**
1.00 ls				
256.49 Labor hours				
469.791 Equipment hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				
03002.100 Concrete_Foundations	22.00	cy	504.912/cy	11,108
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser				
03002.300 Concrete_Walls Exterior	28.00	cy	748.30 /cy	20,952
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser				
03002.600 Concrete_Elevated Slab	13.00	cy	522.122/cy	6,788
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser				
DIVISION 03 CONCRETE			**38,848.01 /ls**	**38,848**
1.00 ls				
461.495 Labor hours				
26.14 Equipment hours				
DIVISION 05 METALS				
05505.000 Metal Fabrications	1.00	ls	21,548.57 /ls	21,549
Includes a Trash Rake, 5' x 13' and Ladder				
DIVISION 05 METALS			**21,548.57 /ls**	**21,549**
1.00 ls				
105.49 Labor hours				
21.10 Equipment hours				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 15	**MECHANICAL**				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL					
02110.000	Site Clearing	2.00	ac	3,000.00 /ac	6,000
02221.000	Trenching, Backfilling and Compacting for Utilities	5,634.00	cy	20.301/cy	114,374
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
02270.000	Soil Erosion and Sediment Control	5,100.00	lf	1.03 /lf	5,229
02950.000	Site Restoration & Rehabilitation	17,000.00	sy	1.374/sy	23,354
Fine grading and seeding of 40' for the 27,000 lf of ditch					
15062.000	Pipe: Ductile	2,550.00	lf	297.792/lf	759,369
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser					
15103.000	Butterfly Valves	1.00	ea	23,511.13 /ea	23,511
DIVISION 15 MECHANICAL				**931,837.59 /ls**	**931,838**

1.00 ls
4,430.123 Labor hours
1,599.84 Equipment hours

006 PRESSURIZED PIPELINE - FROM TAILRACE TO GLEED DITCH, 36" ***398.77 /LF*** ***1,016,860***

2,550.00 LF
5,253.593 Labor hours
2,116.863 Equipment hours

007 WENAS GRADE PUMP STATION

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 02	**SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining					
02200.500	Earthwork, Structural Excavation	1,008.00	cy	1.61 /cy	1,619
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	791.00	cy	11.43 /cy	9,039
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02270.000	Soil Erosion and Sediment Control	4,000.00	lf	1.03 /lf	4,101
02514.000	Plant Access Road	267.00	sy	12.31 /sy	3,286
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt					
@Pump Station for 15 AF Reservoir there is no 20' wide cut					
02950.000	Site Restoration & Rehabilitation	1,667.00	sy	2.78 /sy	4,630
Fine grading and seeding of 40' for the 27,000 lf of ditch					
DIVISION 02 SITE CONSTRUCTION				**22,675.36 /ls**	**22,675**
1.00	**ls**				
205.355	Labor hours				
142.902	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
03002.100	Concrete_Foundations	32.00	cy	562.77 /cy	18,009
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					
03002.300	Concrete_Walls Exterior	35.00	cy	751.47 /cy	26,301
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					
03002.700	Concrete_Slab on Grade	7.00	cy	423.931/cy	2,968
03002.800	Concrete_Equipment Pads	3.00	cy	385.28 /cy	1,156

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 03 CONCRETE			**48,433.17 /ls**	**48,433**
1.00 ls				
588.95 Labor hours				
28.46 Equipment hours				
DIVISION 05 METALS				
05505.000 Metal Fabrications	1.00	ls	18,632.580/ls	18,633
Includes a Trash Rake, 5' x 13' and Ladder				
05522.000 Aluminum Railings	40.00	lf	78.65 /lf	3,146
DIVISION 05 METALS			**21,778.46 /ls**	**21,778**
1.00 ls				
62.395 Labor hours				
17.325 Equipment hours				
DIVISION 08 DOORS & WINDOWS				
08305.000 Access Doors	1.00	ea	2,174.79 /ea	2,175
DIVISION 08 DOORS & WINDOWS			**2,174.79 /ea**	**2,175**
1.00 ea				
3.20 Labor hours				
DIVISION 11 EQUIPMENT				
11072.000 Pumping Equipment: Vertical Turbine (Line Shaft)	3.00	ea	72,278.35 /ea	216,835
DIVISION 11 EQUIPMENT			**216,835.04 /ls**	**216,835**
1.00 ls				
288.000 Labor hours				
36.000 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 13	**SPECIAL CONSTRUCTION**				
01000.000	Building Allowances	400.00	sf	118.13 /sf	47,250
Assume a Split Face block CMU Building with Metal Roof or PMB with split face block walls. Not AC included					
15114.500	Flow Meter Assemblies	1.00	ea	41,271.69 /ea	41,272
10" Mag Meter with LIT with 6' dia precast manhole for vault for NISD Distribution PS					
42" Mag Meter with LIT with same Vault for Wenas Grade PS					
DIVISION 13 SPECIAL CONSTRUCTION				**88,521.69 /ls**	**88,522**
1.00	**ls**				
79.691	Labor hours				
15.00	Equipment hours				
DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL					
02221.000	Trenching, Backfilling and Compacting for Utilities	58.00	cy	18.51 /cy	1,073
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
15062.000	Pipe: Ductile	20.00	lf	3,119.41 /lf	62,388
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser					
15062.100	Pipe: Ductile - Interior with Valves, Couplings, Hangers and Supports	1.00	ls	251,500.57 /ls	251,501
Interior Pipe and Fittings for PS and Meter					
15103.000	Butterfly Valves	4.00	ea	23,602.36 /ea	94,409
15111.000	Pump Control Valves	3.00	ea	68,902.72 /ea	206,708

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 15 MECHANICAL			**616,079.62 /ls**	**616,080**
1.00 ls				
593.841 Labor hours				
46.00 Equipment hours				
DIVISION 16 ELECTRICAL				
16000.100 Electrical Subcontractor	1.00	ls	156,314.85 /ls	156,315
Includes all power from the transformer. Assumes SCADA will include flows and system controls, radio transmission				
Backup Power, Tranformer and Power Feed NOT INCLUDED				
DIVISION 16 ELECTRICAL			**156,314.85 /ls**	**156,315**
1.00 ls				
007 WENAS GRADE PUMP STATION			***1,172,812.98 /LS***	***1,172,813***
1.00 LS				
1,821.43 Labor hours				
285.68 Equipment hours				
008 WENAS GRADE PUMP STATION DISCHARGE PIPELINE TO NSID CANAL BELOW WGPS				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02221.000	Trenching, Backfilling and Compacting for Utilities	673.00	cy	22.22 /cy	14,950
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.					
Pipe at Pump Stations included 20' beyond building					
02270.000	Soil Erosion and Sediment Control	600.00	lf	1.03 /lf	615
02950.000	Site Restoration & Rehabilitation	1,111.00	sy	2.78 /sy	3,087
Fine grading and seeding of 40' for the 27,000 lf of ditch					
15061.100	Pipe: Steel- 26" and larger	300.00	lf	337.543/lf	101,263
Steel pipe and fittings, poly coating, cement lining, .3" wall thickness for pressures under 50 psi, .4" for pressures over 50 psi. Factory coated under 40", field coated 40" and over.					
DIVISION 15 MECHANICAL				**119,915.54 /ls**	**119,916**
1.00	**ls**				
186.292	Labor hours				
158.855	Equipment hours				
008 WENAS GRADE PUMP STATION				***399.72 /LF***	***119,916***
DISCHARGE PIPELINE TO NSID CANAL BELOW					
WGPS 300.00 LF					
186.292	Labor hours				
158.855	Equipment hours				
009 DISCHARGE STRUCTURE AT NSID CANAL					
DIVISION 02	**SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining					
02140.000	Dewatering	1.00	ls	16,666.34 /ls	16,666
02200.500	Earthwork, Structural Excavation	1,686.00	cy	1.61 /cy	2,708
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					

Description		Quantity		Total Unit Cost	Total Amount
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	1,020.00	cy	16.57 /cy	16,897
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02270.000	Soil Erosion and Sediment Control	1,500.00	lf	1.03 /lf	1,538
02950.000	Site Restoration & Rehabilitation	535.00	sy	5.14 /sy	2,747
Fine grading and seeding of 40' for the 27,000 lf of ditch					
DIVISION 02 SITE CONSTRUCTION				**40,556.300/ls**	**40,556**
1.00	**ls**				
438.58	Labor hours				
713.79	Equipment hours				
DIVISION 03	**CONCRETE**				
Canal or River Discharge					
03002.100	Concrete_Foundations	41.00	cy	508.01 /cy	20,828
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					
03002.300	Concrete_Walls Exterior	52.00	cy	755.51 /cy	39,286
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					
03002.600	Concrete_Elevated Slab	24.00	cy	530.35 /cy	12,728
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser					
DIVISION 03 CONCRETE				**72,842.81 /ls**	**72,843**
1.00	**ls**				
865.325	Labor hours				
49.01	Equipment hours				
DIVISION 05	**METALS**				
05505.000	Metal Fabrications	1.00	ls	910.68 /ls	911
Includes a Trash Rake, 5' x 13' and Ladder					

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 05 METALS			**910.68 /ls**	**911**
1.00 ls				
4.52 Labor hours				
1.13 Equipment hours				
009 DISCHARGE STRUCTURE AT NSID CANAL			***114,309.79 /LS***	***114,310***
1.00 LS				
1,308.421 Labor hours				
763.924 Equipment hours				

010 DISTRIBUTION PUMP STATIONS - NSID CUSTOMERS UPSTREAM OF WENAS GRADE PS

DIVISION 02	**SITE CONSTRUCTION**				
Erosion control in Demo Existing Canal Lining					
02200.500	Earthwork, Structural Excavation	1,038.00	cy	1.61 /cy	1,667
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02200.600	Earthwork, Structural Backfill, Native Material includes compaction	906.00	cy	6.35 /cy	5,751
Structure excavation for river or canal diffusers, transition to pipe from fish screen or the PS					
02270.000	Soil Erosion and Sediment Control	1,000.00	lf	1.03 /lf	1,025
02514.000	Plant Access Road	267.00	sy	12.31 /sy	3,286
Assumes 24' wide roadway and 20' cut. Includes 9" base rock, 3 1/2" asphalt					
@Pump Station for 15 AF Reservoir there is no 20' wide cut					
02950.000	Site Restoration & Rehabilitation	1,111.00	sy	2.78 /sy	3,087
Fine grading and seeding of 40' for the 27,000 lf of ditch					

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 02 SITE CONSTRUCTION			**3,704.17 /ls**	**14,817**
4.00 ls				
132.71 Labor hours				
79.621 Equipment hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				
03002.100 Concrete_Foundations	39.00	cy	595.17 /cy	23,211
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser				
03002.300 Concrete_Walls Exterior	54.00	cy	728.71 /cy	39,350
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser				
03002.600 Concrete_Elevated Slab	24.75	cy	537.993/cy	13,315
Concrete foundation for the Wapatox Transiton to Pipe @ Fish Screen, Gleed Canal, and NSID Canal diffuser				
03002.700 Concrete_Slab on Grade	6.00	cy	428.322/cy	2,570
03002.800 Concrete_Equipment Pads	4.00	cy	385.01 /cy	1,540
DIVISION 03 CONCRETE			**19,996.740/ls**	**79,987**
4.00 ls				
949.924 Labor hours				
46.743 Equipment hours				
DIVISION 05 METALS				
05505.000 Metal Fabrications	1.00	ls	3,035.53 /ls	3,036
Includes a Trash Rake, 5' x 13' and Ladder				
05522.000 Aluminum Railings	136.00	lf	78.65 /lf	10,696
DIVISION 05 METALS			**3,432.873/ls**	**13,731**
4.00 ls				
46.83 Labor hours				
11.71 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
DIVISION 08	**DOORS & WINDOWS**				
08305.000	Access Doors	4.00	ea	901.66 /ea	3,607
DIVISION 08 DOORS & WINDOWS				**901.66 /ea**	**3,607**
4.00	**ea**				
10.67	Labor hours				
DIVISION 11	**EQUIPMENT**				
11072.000	Pumping Equipment: Vertical Turbine (Line Shaft)	4.00	ea	18,341.62 /ea	73,366
DIVISION 11 EQUIPMENT				**18,341.62 /ls**	**73,366**
4.00	**ls**				
192.000	Labor hours				
48.000	Equipment hours				
DIVISION 13	**SPECIAL CONSTRUCTION**				
15114.500	Flow Meter Assemblies	4.00	ea	17,123.23 /ea	68,493
10" Mag Meter with LIT with 6' dia precast manhole for vault for NISD Distribution PS					
42" Mag Meter with LIT with same Vault for Wenas Grade PS					
DIVISION 13 SPECIAL CONSTRUCTION				**17,123.23 /ls**	**68,493**
4.00	**ls**				
171.32	Labor hours				
40.881	Equipment hours				
DIVISION 15	**MECHANICAL**				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline					
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

					Total	
Description		**Quantity**			**Unit Cost**	**Amount**
02221.000	Trenching, Backfilling and Compacting for Utilities	376.00	cy		41.50 /cy	15,603
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.						
Pipe at Pump Stations included 20' beyond building						
15062.000	Pipe: Ductile	80.00	lf		214.03 /lf	17,122
42" CL 250 DIP,to Yakima, 36" to Gleed, bedding to the spring line, 3' of cover, Includes connection to Yakima River Intake and connection to Gleed Diffuser						
15062.100	Pipe: Ductile - Interior with Valves, Couplings, Hangers and Supports	4.00	ls		4,437.483/ls	17,750
Interior Pipe and Fittings for PS and Meter						
15103.000	Butterfly Valves	4.00	ea		4,318.943/ea	17,276
15106.000	Check Valves	4.00	ea		2,632.74 /ea	10,531
DIVISION 15 MECHANICAL					**19,570.53 /ls**	**78,282**
4.00	**ls**					
706.96	Labor hours					
92.90	Equipment hours					
DIVISION 16	**ELECTRICAL**					
16000.100	Electrical Subcontractor	4.00	ls		21,937.50 /ls	87,750
Includes all power from the transformer. Assumes SCADA will include flows and system controls, radio transmission						
Backup Power, Tranformer and Power Feed NOT INCLUDED						
DIVISION 16 ELECTRICAL					**21,937.50 /ls**	**87,750**
4.00	**ls**					
010 DISTRIBUTION PUMP STATIONS - NSID					***105,008.313/EA***	***420,033***
CUSTOMERS UPSTREAM OF WENAS GRADE PS						
4.00	***EA***					
2,210.404	Labor hours					
319.851	Equipment hours					

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
011 PRESSURIZED PIPELINE - NSID CUSTOMERS UPSTREAM WENAS GRADE PS				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02200.200 Earthwork - Fill Existing Canal with Native Borrow NISD	80,650.00	cy	10.30 /cy	830,662
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal. Estimate assumes that 100% of the canal upstream of the WGPS will be filled, cross section is 8' bottom, 5' depth, 1 to 1 sides. Estimate includes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included.				
02270.000 Soil Erosion and Sediment Control	67,000.00	lf	1.03 /lf	68,699
02950.000 Site Restoration & Rehabilitation	260,555.00	sy	1.374/sy	357,943
Fine grading and seeding of 40' for the 27,000 lf of ditch				
DIVISION 02 SITE CONSTRUCTION			**1,257,304.370/ls**	**1,257,304**
1.00 ls				
8,899.251 Labor hours				
8,356.24 Equipment hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				
02072.300 Demolition, Cutting and Patching - Canal Lining - NSID	40,945.00	sy	31.21 /sy	1,277,794
Estimate assumes that 50% of the 33,500 lf of canal hasl lining 4" -6" think, rod reinforced, capable of being broken up and loaded by a large excavator, will be hauled to a CD landfill, 20 miles RT @ 35 mph, CD landfill tipping fee of $35/ton.				
Canal cross section where lined is 5' deep, 8' bottom, 1 to 1 sides				
02072.400 Demolition, Cutting and Patching - Misc Flumes and Trestles- NSID Cana	1.00	ls	438,000.00 /ls	438,000
Estimate includes an allowance lump sum amount for undefined scope of work				

Description	Quantity		Total Unit Cost	Total Amount
DIVISION 03 CONCRETE			**1,715,794.45 /ls**	**1,715,794**
1.00 ls				
18,343.360 Labor hours				
18,998.480 Equipment hours				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL				
02221.000 Trenching, Backfilling and Compacting for Utilities	19,137.00	cy	70.95 /cy	1,357,682
2' cover, bedding 6" under pipe that up to spring line, balance of backfill native material. Seeding of disturded area included. Clearing if not in the existing canal.				
Pipe at Pump Stations included 20' beyond building				
15064.000 Pipe: Plastic	14,000.00	lf	23.10 /lf	323,396
15101.000 Gate Valves	5.00	ea	1,350.56 /ea	6,753
DIVISION 15 MECHANICAL			**1,687,830.63 /ls**	**1,687,831**
1.00 ls				
26,438.503 Labor hours				
4,774.20 Equipment hours				
011 PRESSURIZED PIPELINE - NSID CUSTOMERS UPSTREAM WENAS GRADE PS			***332.924/LF***	***4,660,929***
14,000.00 LF				
53,681.114 Labor hours				
32,128.914 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity	Total Unit Cost	Total Amount

012 CONNECTION TO EXISTING WAPATOX DITCH COMPANY TURNOUTS

DIVISION 02 SITE CONSTRUCTION

Erosion control in Demo Existing Canal Lining

02300.000	Reconnected Wapatox Ditch Company Turnouts - Canal	33.00	ea	3,358.472/ea	110,830

Estiamte assumes 5ea-60", 5ea-48", 13ea-42", 5ea-36", 5ea-30" canal gates, cast into concrete outlet on side of canal

DIVISION 02 SITE CONSTRUCTION **110,829.57 /ls** **110,830**

1.00 ls
864.621 Labor hours
230.032 Equipment hours

DIVISION 15 MECHANICAL

60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline

NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL

02300.100	Reconnected Wapatox Ditch Company Turnouts - Pipe	30.00	ea	3,724.46 /ea	111,734

Item - 14 - Estimate assumes 2 ea-36", 8ea-24", 10ea-12",10ea-10". Weldolets off 48", DIP 20', plus valve, and plug

Item - 15 - Estimate assumes 2 ea-16", 14", 12", 8", 6" using DIP reducing tees, 20' of DIP and a valve.

DIVISION 15 MECHANICAL **111,733.70 /ls** **111,734**

1.00 ls
1,047.231 Labor hours
283.97 Equipment hours

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
012 CONNECTION TO EXISTING WAPATOX DITCH COMPANY TURNOUTS			***3,532.75 /EA***	***222,563***
63.00 EA				
1,911.852 Labor hours				
514.000 Equipment hours				
013 CONNECTION TO EXISTING NSID TURNOUTS				
DIVISION 15 MECHANICAL				
60" DIA, 18 psi MAX PRESSURE for Wenas Grade PS Discharge and Spill pipeline				
NSID Pipeline 18" DIA - 10" DIA, DIP INCLUDES FILLING 33500 LF OF NISD CANAL				
02300.200 Reconnected Existing NSID Turnouts - Pipe	12.00	ea	7,016.534/ea	84,198
Item - 15 - Estimate assumes 2 ea-16", 14", 12", 8", 6" using DIP reducing tees, 20' of DIP and a valve.				
DIVISION 15 MECHANICAL			**84,198.41 /ls**	**84,198**
1.00 ls				
553.17 Labor hours				
434.171 Equipment hours				
013 CONNECTION TO EXISTING NSID TURNOUTS			***7,016.534/EA***	***84,198***
12.00 EA				
553.17 Labor hours				
434.171 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
016 DEMOLITION OF EXISTING NSID DIVERSION				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02200.300 Earthwork - Fill Existing Wapatox Canal with Native Borrow FS to WGPS	7,200.00	cy	2.54 /cy	18,275
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal from the Fish Screen to Wenas Grade PS, Provide a concrete Transition at the Fish Screen into the pipe. Estimate assumes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included. Assume 50% is available at the ditch.				
02270.000 Soil Erosion and Sediment Control	1,800.00	lf	1.03 /lf	1,846
02950.000 Site Restoration & Rehabilitation	6,000.00	sy	1.374/sy	8,243
Fine grading and seeding of 40' for the 27,000 lf of ditch				
DIVISION 02 SITE CONSTRUCTION			**28,363.50 /ls**	**28,364**
1.00 ls				
225.012 Labor hours				
130.73 Equipment hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				
02072.500 Demolition, Cutting and Patching - Headgate Structure NSID	200.00	cy	1,016.43 /cy	203,286
Estimate assumes demolition of 200 cy of concrete				
DIVISION 03 CONCRETE			**203,285.67 /ls**	**203,286**
1.00 ls				
5,000.000 Labor hours				
5,000.000 Equipment hours				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description	Quantity		Total Unit Cost	Total Amount
016 DEMOLITION OF EXISTING NSID DIVERSION			***257.39 /LF***	***231,649***
900.00 LF				
5,225.012 Labor hours				
5,130.73 Equipment hours				
017 DEMOLITION OF EXISTING GLEED DITCH DIVERSION				
DIVISION 02 SITE CONSTRUCTION				
Erosion control in Demo Existing Canal Lining				
02200.300 Earthwork - Fill Existing Wapatox Canal with Native Borrow FS to WGPS	75.00	cy	2.54 /cy	190
Purchase, excavate, load, haul 20 miles RT, place and compact fill dirt in existing canal from the Fish Screen to Wenas Grade PS, Provide a concrete Transition at the Fish Screen into the pipe. Estimate assumes a $5 charge at the borrow pit which does not include loading. leveling and seeding of borrow pit included. Assume 50% is available at the ditch.				
02270.000 Soil Erosion and Sediment Control	300.00	lf	1.03 /lf	308
02950.000 Site Restoration & Rehabilitation	1,000.00	sy	1.374/sy	1,374
Fine grading and seeding of 40' for the 27,000 lf of ditch				
DIVISION 02 SITE CONSTRUCTION			**1,871.73 /ls**	**1,872**
1.00 ls				
18.12 Labor hours				
8.862 Equipment hours				
DIVISION 03 CONCRETE				
Canal or River Discharge				

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Description		Quantity		Total Unit Cost	Total Amount
02072.500	Demolition, Cutting and Patching - Headgate Structure NSID	30.00	cy	1,016.43 /cy	30,493
Estimate assumes demolition of 200 cy of concrete					
DIVISION 03 CONCRETE				**30,492.86 /ls**	**30,493**

1.00 ls
750.000 Labor hours
750.000 Equipment hours

017 DEMOLITION OF EXISTING GLEED DITCH DIVERSION				***215.764/LF***	***32,365***

150.00 LF
768.12 Labor hours
758.862 Equipment hours

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Description	Amount	Totals	Rate
Labor	9,486,243		
Material	19,974,637		
Subcontract	4,032,213		
Equipment	5,212,501		
Other	18,482		
Subtotal		**38,724,076**	
Contractor's Fld Ovhd	1,548,963		4.000 %
Mobilization	774,482		2.000 %
Subtotal w/ mobilization		**41,047,521**	
Unlisted Items Minor	1,458,496		4.000 %
Design and Scope Changes Minor	1,458,496		4.000 %
Cost Est Refinements Minor	729,248		2.000 %
Contractor's Fee	3,575,501		8.000 %
Contractor's Bonds & Insurance	670,406		1.500 %
Procurement Strategy-Open Comp			
Contract Cost		**48,939,668**	
Contingencies	12,234,917		25.000 %

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

Estimate Totals

Field Cost		**61,174,585**	
Sales Tax Estimate (Mat & Eq)	2,004,087		8.200 %
Escal to NTP (NOTINCL)			
Forecasted Feature Bid		**63,178,672**	

1. Pipeline costs would include materials and labor to trench and install pipe, fittings, bedding, backfill, and other appurtnenances.
2. Connections to existing Wapatox Ditch Company trunouts based on NSID Conservation Plan Supplement - Wapatox Canal Improvements.
3. Number of connections to NSID turnouts is not known. quantity represents best gues based on flow rate.
4. Wenas Grade PS - TOTAL 135 cfs @ 40'TDH, PIPING, FITTINGS, VALVES, METER, CONTROLS, VFD, STRUCTURE.
5. NISD Distribution PS - 2 cfs @ 40' TDH

AACE Classification Accuracy Range

Upper Range +40% **Lower Range -20%**

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APPENDIX N

Operations and Maintenance Costs for Major Capital Projects

APPENDIX N.1

Operations and Maintenance Costs for Major Capital Projects – Basis of Costs

Fish Passage at Clear Lake Dam

- Utilities – facility is not expected to require dedicated communications capabilities or utilities
- Power Consumption - monthly service charge
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week)
- Pump and/or Gate Lubrication
- Staffing:
    - Fisheries staff periodic inspections only (1 supervisor and 2 biologists with one part time assistant)
    - Operator for systems
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
    - Miscellaneous costs for supplies, small equipment, and instrumentation

Wymer Reservoir with Adjacent Yakima River Intake

Wymer Reservoir

- Utilities – communications, water service monthly charge, and costs for a septic system
- Power Consumption - monthly service charge
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week; however, this will not cover operations of the pumps, just heat for the building and minor systems.)
- Pump and/or Gate Lubrication
- Staffing:
    - Operator for the dam
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
    - Miscellaneous costs for supplies, small equipment, and instrumentation

Yakima River Pump Station Adjacent to Wymer Reservoir

- Utilities – communications and water service monthly charge
- Power Consumption
    - Monthly service charge
    - Seasonal Demand and Energy Charge when 1000 cfs pump station is in operation
    - Seasonal Demand and Energy Charge when 1000 cfs pump station is in maintenance operational mode (Maintenance operational mode is each 1000 cfs pump running once a month for 2 hours to keep pumps in operational condition when pump station is not needed, i.e. during non-drought years)
    - Seasonal Demand and Energy Charge when 1000 cfs Pump Station is pumping additional 30,000 ac ft every five years
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week; however, this will not cover operations of the pumps, just heat for the building and minor systems)

- Pump and/or Gate Lubrication
- Staffing:
    - Operator(s) and staffing for pump station, fish ladder, fish screen, trash rack, and inflatable dam system operation, cleaning, and preventive maintenance
    - Operator for monitoring pipeline and discharge structure
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
    - Miscellaneous costs for supplies, small equipment, and instrumentation

Similar to the Thorp Pump Station, the Wymer Pump station pumps 135,000 acre feet every year but 165,000 acre feet every five years during drought conditions.

Alternate Wymer Supply from Yakima River at Thorp

Pump Station Near Thorp

- Utilities – communications and water service monthly charge
- Power Consumption
    - Monthly service charge
    - Seasonal Demand and Energy Charge when 1000 cfs pump station is in operation
    - Seasonal Demand and Energy Charge when 1000 cfs pump station is in maintenance operational mode (Maintenance operational mode is each 1000 cfs pump running once a month for 2 hours to keep pumps in operational condition when pump station is not needed, i.e. during non-drought years)
    - Seasonal Demand and Energy Charge when 1000 cfs Pump Station is pumping additional 30,000 ac ft every five years
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week; however, this will not cover operations of the pumps, just heat for the building and minor systems)
- Pump and/or Gate Lubrication
- Staffing:
    - Operator for monitoring pipeline and discharge structure
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
    - Operator(s) and staffing for pump station, fish ladder, fish screen, trash rack, and inflatable dam system operation, cleaning, and preventive maintenance
    - Miscellaneous costs for supplies, small equipment, and instrumentation

The Thorp Pump Station pumps 135,000 acre feet every year but 165,000 acre feet every five years during drought conditions.

KRD North Branch Canal Improvements for Conveyance to Wymer

- Utilities – communications between the canal control buildings at Thorp and Wippel
- Power Consumption - monthly service charge for the canal control buildings at Thorp and Wippel
- Standby Generator – no standby generator is included in the design

- Pump and/or Gate Lubrication
- Staffing:
    - Operator for additional canal management above and beyond that provided by the KRD staff for the existing canal
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment including the canal control buildings at Thorp and Wippel
    - Miscellaneous costs for supplies, small equipment, and instrumentation.

The KRD North Branch Canal will be enlarged and receive water from the Thorp Pump Station at a rate of 135,000 acre feet every year but 165,000 acre feet every five years during drought conditions. The work above is to supplement that provided by the KRD staff for the existing canal. For example, the new canal will have parallel tunnels or siphons in several locations and these will necessitate additional diversion gates. In addition, existing diversion structures will be much larger than the current structures which will require additional time for the operators.

Siphon and Tunnel for Conveyance from KDR System to Wymer Reservoir

- Utilities –
- Power Consumption - the siphon and tunnel and associates structures are not expected to require power systems
- Standby Generator – no standby generator is included in the design
- Pump and/or Gate Lubrication – no pumps or gates have been included in the initial design
- Staffing:
    - Operator for monitoring pipeline and discharge structure
    - Operator(s) and staffing costs for preventive maintenance of mechanical and electrical equipment at the canal control building at Wippel is included with the KRD North Branch Canal project
    - Miscellaneous costs for supplies, small equipment, and instrumentation.

Although there is the potential to recover some energy costs with a powerplant at the outlet into the Wymer Reservoir, the OPCC costs do not include energy recovery benefits at this time.

Wymer Power Recovery and Conveyance to Roza Dam

New Wymer Powerplant below Wymer Dam

- Utilities – communications and water service monthly charge
- Power Consumption - Monthly service charge
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week; however, this will not cover operations of the pumps, just heat for the building and minor systems)
- Pump and/or Gate Lubrication
- Staffing:
    - Operator(s) and staffing for power plant

- Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
- Miscellaneous costs for supplies, small equipment, and instrumentation

Although there is the potential to recover energy costs with a powerplant, the OPCC costs do not include energy recovery benefits at this time.

Wymer Downstream Tunnel and Pipe Annual Operating Costs

O&M costs for these facilities were not calculated independently, but would be similar to the Wymer Upstream Siphon and Tunnel Annual Operating Costs of $80,000.

Pipeline from Lake Keechelus to Lake Kachess

- Utilities – communications for the control valve building
- Power Consumption - Monthly service charge for the control valve building
- Standby Generator – no standby generator is included in the design
- Pump and/or Gate Lubrication – no pumps or gates have been included in the design
- Staffing and Miscellaneous Costs:
  - Operator for monitoring pipeline
  - Operator(s) and staffing costs for preventive maintenance of mechanical and electrical equipment for the control valve building
  - Miscellaneous costs for supplies, small equipment, and instrumentation.

Although there is the potential to recover some energy costs with a powerplant at the outlet into the Wymer Reservoir, the OPCC costs do not include energy recovery benefits at this time.

Lake Kachess Inactive Storage - Alternate 1: Tunnel

- Utilities – communications and water service monthly charge
- Power Consumption
  - Monthly service charge
  - Seasonal Demand and Energy Charge when 20 cfs pump station is in operation every five years
  - Seasonal Demand and Energy Charge when 20 cfs pump station is in maintenance operational mode (Maintenance operational mode is each pump running once a month for two hours to keep pumps in operational condition when pump station is not needed, i.e. during non-drought years.)
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week; however, this will not cover operations of the pumps, just heat for the building and minor systems.)
- Pump and/or Gate Lubrication
- Staffing:
  - Inspection of Lake Kachess lake tap fish screens (Fish screens do not have self-cleaning function. Assumes a diver will inspect and clean fish screens at the lake tap. Diving to a 150 ft depth is specialty diving.)
  - Operator for monitoring pipeline and discharge structures

- Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment.
- Miscellaneous costs for supplies, small equipment, and instrumentation.

Lake Kachess Inactive Storage - Alternate 2: Pump Station

- Utilities – communications and water service monthly charge
- Power Consumption
    - Monthly service charge
    - Seasonal Demand and Energy Charge when 20 cfs and 1000 cfs pump stations are in operation every five years
    - Seasonal Demand and Energy Charge when 20 cfs pump station is in maintenance operational mode (maintenance operational mode is each pump running once a month for two hours to keep pumps in operational condition when pump station is not needed, i.e. during non-drought years)
    - Seasonal Demand and Energy Charge when 1000 cfs pump station is in maintenance operational mode (Maintenance operational mode is each 1000 cfs pump running once a month for 2 hours to keep pumps in operational condition when pump station is not needed, i.e. during non-drought years)
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week; however, this will not cover operations of the pumps, just heat for the building and minor systems)
- Pump and/or Gate Lubrication
- Staffing:
    - Inspection of Lake Kachess lake tap fish screens (Fish screens do not have self-cleaning function. Assumes a diver will inspect and clean fish screens at the lake tap. Diving to a 150 ft depth is specialty diving)
    - Operator for monitoring pipelines and discharge structures
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
    - Miscellaneous costs for supplies, small equipment, and instrumentation

Fish Passage at Box Canyon Creek

- Staffing:
    - Fisheries Engineer and Fisheries Biologist quarterly inspection of channel restoration (assume quarterly 4 hours/inspection)
    - Operator(s) and staffing for maintenance/repair of channel restoration (assume 24 hours/year)
    - Miscellaneous costs for supplies (woody debris and riparian vegetation replenishment) and small equipment (assume $5,000/yr for supplies and 24 hours/year for equipment usage.)

Bumping Lake Reservoir Enlargement

- Utilities – communications, water service monthly charge, and costs for a septic system
- Power Consumption - monthly service charge

- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one winter power outage for one week; however, this will not cover operations of the pumps, just heat for the building and minor systems.)
- Pump and/or Gate Lubrication
- Staffing:
    - Operator for the dam
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
    - Miscellaneous costs for supplies, small equipment, and instrumentation

Pool Level Increase at Cle Elum Dam

O&M costs for this project are assumed to be no higher than the current O&M costs for Cle Elum Reservoir. Therefore the additional O&M cost related to the Integrated Plan is treated as zero.

KRD Main Canal and South Branch Modifications

- Utilities – communications
- Power Consumption
    - Power monthly service charge
    - Seasonal Demand and Energy Charge when pump stations are in operation
- Standby Generator – no standby generator is included in this design
- Pump and/or Gate Lubrication
- Staffing:
    - Operator for operating monitoring pipelines and discharge structures
    - Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment
    - Operator(s) and staffing for pump station
    - Miscellaneous costs for supplies, small equipment, and instrumentation

O&M costs for the Lateral Piping portion of the project are assumed to be no higher than the current O&M costs incurred by KRD for the affected canals.

Wapatox Canal Conveyance Improvements - Alternative 1

- Utilities – communications
- Power Consumption
    - Power monthly service charge
    - Seasonal Demand and Energy Charge when pump stations are in operation
- Standby Generator - monthly maintenance operation and operations during a power outage (Assumes one power outage for three days. It is assumed 650kW generator will cover operations of the pumps and minor systems, plus heat for the building)
- Pump and/or Gate Lubrication
- Staffing:

- Operator for operating monitoring pipelines and discharge structures
- Operator(s) and staffing for preventive maintenance of mechanical and electrical equipment.
- Operator(s) and staffing for pump station
- Miscellaneous costs for supplies, small equipment, and instrumentation.

Wapatox Canal Conveyance Improvements – Alternative 2

Annual cost categories and costs for Alternative 2 are same as those for Alternative 1.

APPENDIX N.2

Operations and Maintenance Costs for Major Capital Projects – Cost Tables

Table 1. Fish Passage at Clear Lake Dam
Annual O&M Costs

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Assume there is no utilities or communications req'd.					
Power Consumption					
Power Monthly Service Charge	$ 100	Monthly	12	$ 1,200	Allowance.
Standby Generator					
Standby Generator Monthly Maintenance Operation (off-road diesel)	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage (off-road diesel)	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Gate and Miscellaneous Lubrication	$ 2,500	Yearly	1	$ 2,500	Allowance.
Staffing and Miscellaneous Costs					
Inspection and Testing of Fishway Systems	$ 2,500	Yearly	1	$ 2,500	Allowance.
Upstream Trap & Haul Operations					
Fisheries staff (1 supervisor and 2 biologists with one part time assistant) - Periodic inspections for fisheries only	$ 250	Hours	200	$ 50,000	Assume operation from March to December, with peak June through November, 0.1 FTE = 200 hours per year.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	20	$ 2,000	0.04 FTE = 80 hours per year.
Labor Electrical	$ 125	Hours	20	$ 2,500	0.04 FTE = 80 hours per year.
Equipment	$ 500	Monthly	10	$ 5,000	Allowance.
Instrumentation	$ 500	Monthly	10	$ 5,000	Allowance.
			Total	**$ 70,000**	rounded
Notes:					
1) Labor costs are estimates only.					

Table 2a. Wymer Reservoir
Annual O&M Costs – Reservoir Component Only

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 160	Monthly	12	$ 1,920	Allowance.
Water Service Monthly Charge	$ 80	Monthly	12	$ 960	Allowance.
Costs for Septic System Maintenance	$ 5	Monthly	12	$ 60	Allowance.
Power Consumption					
Power Monthly Service Charge	$ 200	Monthly	12	$ 2,400	Allowance.
Standby Generator					
Standby Generator Monthly Maintenance Operation	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Gate and Miscellaneous Lubrication	$ 5,000	Yearly	1	$ 5,000	Allowance.
Staffing and Miscellaneous Costs					
Inspection and Testing of Dam Systems	$ 5,000	Yearly	1	$ 5,000	Allowance.
Operator Labor	$ 75	Hours	4000	$ 300,000	2 FTE = 4000 hours per year.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	500	$ 50,000	0.25 FTE = 500 hours per year.
Labor Electrical	$ 125	Hours	500	$ 62,500	0.25 FTE = 500 hours per year.
Equipment	$ 500	Monthly	12	$ 6,000	Allowance.
Instrumentation	$ 500	Monthly	12	$ 6,000	Allowance.
			Total	**$ 440,000**	rounded
Notes:					
1) Labor costs are estimates only.					

Table 2b. Wymer Reservoir with Adjacent Yakima River Intake
Annual O&M Costs – Adjacent Pump Station (Regular) Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 145	Monthly	12	$ 1,740	Allowance.
Water Service Monthly Charge	$ 80	Monthly	12	$ 960	Allowance.
Power Consumption					
Power Monthly Service Charge when Pump Station is Not in Operation	$ 150	Monthly	12	$ 1,800	Allowance.
Power Seasonal Demand and Energy Charge when 1000 cfs Pump Station is pumping 135,000 ac ft every year (See Note 4.)	$ 2,718,245	Season		$ 2,718,245	
Standby Generator					
Standby Generator Monthly Maintenance Operation	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Pump Lubrication	$ 450	Monthly	12	$ 5,400	Six pumps. Allowance.
Gate Lubrication	$ 125	Yearly	1	$ 125	Two gates. Allowance.
Staffing and Miscellaneous Costs					
Inspection and Testing of Inflatable Dam System	$ 1,200	Yearly	1	$ 1,200	Allowance.
Operator - Labor	$ 75	Hours	2000	$ 150,000	1.0 FTE = 2000 hours per year. Includes drive by inspection of transmission main and outlet structure on a weekly basis.
Fish ladder operation and cleaning - Labor	$ 65	Hours	1000	$ 65,000	0.5 FTE = 1000 hours per year.
Fish screen and trash rack cleaning - Labor	$ 65	Hours	500	$ 32,500	0.25 FTE = 500 hours per year.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	500	$ 50,000	0.25 FTE = 500 hours per year.
Labor Electrical	$ 125	Hours	500	$ 62,500	0.25 FTE = 500 hours per year.
Equipment	$ 400	Monthly	12	$ 4,800	Allowance.
Instrumentation	$ 250	Monthly	12	$ 3,000	Allowance.
			Total	**$ 3,100,000**	rounded

Notes:

1) Standby generator operates basic systems only, not pumps.
2) Fish screens have self-cleaning function.
3) Labor costs are estimates only.
4) Pump station pumps 135,000 ac ft every year but 165,000 ac ft every five years during drought conditions.

Table 2c. Wymer Reservoir with Adjacent Yakima River Intake
Annual O&M Costs – Adjacent Pump Station (Annualized Non-Annual Costs) Component

Element	Work Cost	Years	Capitalized Cost of Element	Notes
Power Seasonal Demand and Energy Charge when 1000 cfs Pump Station is pumping additional 30,000 ac ft every five years (See Note 3.)	$ 604,054	5	$ 120,811	See power calculations below.
		Total	**$121,000**	rounded
Notes:				
1) Interest rate is not used for five year period. Power costs are divided by the number of years.				
2) Estimate assumes all costs occur whether system is in use or not.				
3) Pump station pumps 135,000 ac ft every year but 165,000 ac ft every five years during drought conditions. Difference is 30,000 ac ft.				
4) No maintenance operational pumping required since pumps run every year.				

Table 3a. Alternate Wymer Supply from Yakima River at Thorp
Annual O&M Costs – Thorp Pump Station (Regular) Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 145	Monthly	12	$ 1,740	Allowance.
Water Service Monthly Charge	$ 80	Monthly	12	$ 960	Allowance.
Power Consumption					
Power Monthly Service Charge when Pump Station is Not in Operation	$ 150	Monthly	12	$ 1,800	Allowance.
Power Seasonal Demand and Energy Charge when 1000 cfs Pump Station is pumping 135,000 ac ft every year (See Note 4.)	$ 2,807,858	Season		$ 2,807,858	
Standby Generator					
Standby Generator Monthly Maintenance Operation	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Pump Lubrication	$ 450	Monthly	12	$ 5,400	Six pumps. Allowance.
Gate Lubrication	$ 125	Yearly	1	$ 125	Two gates. Allowance.
Staffing and Miscellaneous Costs					
Inspection and Testing of Inflatable Dam System	$ 1,200	Yearly	1	$ 1,200	Allowance.
Operator - Labor	$ 75	Hours	2000	$ 150,000	1.0 FTE = 2000 hours per year. Includes drive by inspection of transmission main and outlet structure on a weekly basis.
Fish ladder operation and cleaning - Labor	$ 65	Hours	1000	$ 65,000	0.5 FTE = 1000 hours per year.
Fish screen and trash rack cleaning - Labor	$ 65	Hours	500	$ 32,500	0.25 FTE = 500 hours per year.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	500	$ 50,000	0.25 FTE = 500 hours per year.
Labor Electrical	$ 125	Hours	500	$ 62,500	0.25 FTE = 500 hours per year.
Equipment	$ 400	Monthly	12	$ 4,800	Allowance.
Instrumentation	$ 250	Monthly	12	$ 3,000	Allowance.
			Total	**$ 3,190,000**	rounded

Notes:

1) Standby generator operates basic systems only, not pumps.
2) Fish screens have self-cleaning function.
3) Labor costs are estimates only.
4) Pump station pumps 135,000 ac ft every year but 165,000 ac ft every five years during drought conditions.

Table 3b. Alternate Wymer Supply from Yakima River at Thorp
Annual O&M Costs – Thorp Pump Station (Annualized Non-Annual Costs) Component

Element	Power Cost	Years	Capitalized Cost of Element	Notes
Power Seasonal Demand and Energy Charge when 1000 cfs Pump Station is pumping additional 30,000 ac ft every five years (See Note 3.)	$ 623,968	5	$ 124,794	See power calculations below.
		Total	**$125,000**	rounded
Notes:				
1) Interest rate is not used for five year period. Power costs are divided by the number of years.				
2) Estimate assumes all costs occur whether system is in use or not.				
3) Pump station pumps 135,000 ac ft every year but 165,000 ac ft every five years during drought conditions. Difference is 30,000 ac ft.				
4) No maintenance operational pumping required since pumps run every year.				

Table 3c. Alternate Wymer Supply from Yakima River at Thorp
Annual O&M Costs – Siphon and Tunnel Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Assume there is no utilities or communications req'd.					
Power Consumption					
Assume no power needed					
Standby Generator					
No standby generator is included in the design					
Pump and/or Gate Lubrication					
No pumps or gates included in the design					
Staffing and Miscellaneous Costs					
Additional Siphon and Tunnel Management					
Management of Siphon and Tunnel	$ 75	Hours	600	$ 45,000	
Operator Labor	$ 75	Hours	500	$ 37,500	0.25 FTE = 500 hours per year. Includes drive by inspection.
Preventive Maintenance					
Equipment	$ 20	Monthly	12	$ 240	Allowance.
			Total	**$ 80,000**	rounded
Notes:					
1) Regular ditch riding is assumed to be part of the work.					
2) Does not include monitoring of the outlet structure at Wymer which is assumed to be part of dam operations.					
3) Labor costs are estimates only.					

Table 3d. Alternate Wymer Supply from Yakima River at Thorp
Annual O&M Costs – KRD Canal Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 290	Monthly	12	$3,480	Allowance. Canal control buildings at Thorp and Wippel.
Power Consumption					
Power Monthly Service Charge	$ 160	Monthly	12	$1,920	Allowance. Canal control buildings at Thorp and Wippel.
Standby Generator					
No standby generator is included in the design					
Pump and/or Gate Lubrication					
Assumes gates are part of regular maintenance for existing canal					
Staffing and Miscellaneous Costs					
Inspection of Canal Discharge and Diversion					
Operator Labor	$ 75	Hours	50	$3,750	50 hours per year.
Additional Canal Management					
Management of Diversion Gates	$ 75	Hours	600	$45,000	
Management of Stop Logs at Diversions	$ 75	Hours	400	$30,000	
Operator Labor	$ 75	Hours	200	$15,000	0.1 FTE = 200 hours per year. Includes drive by inspection.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	100	$10,000	0.05 FTE = 100 hours per year.
Labor Electrical	$ 125	Hours	100	$12,500	0.05 FTE = 100 hours per year.
Equipment	$ 20	Monthly	12	$240	Allowance.
Instrumentation	$ 20	Monthly	12	$240	Allowance.
			Total	**$120,000**	rounded

Notes:

1) Annual operation costs include only those items specific to operation of the canal when water is being moved to the Wymer Reservoir.
   Regular ditch riding is assumed to be a work already being done by KRD.
2) Includes additional O&M for parallel Tunnels #4 and #5 but no additional O&M for the two siphons since both are being enlarged, not paralleled..
3) Does not include monitoring of the outlet structure at Wymer, assumed to be part of dam operations.
4) Labor costs are estimates only.

Table 4a. Wymer Power Recovery and Conveyance to Roza Dam
Annual O&M Costs – Powerhouse Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 160	Monthly	12	$ 1,920	Allowance.
Water Service Monthly Charge	$ 80	Monthly	12	$ 960	Allowance.
Power Consumption					
Power Monthly Service Charge	$ 200	Monthly	12	$ 2,400	Allowance.
Standby Generator					
Standby Generator Monthly Maintenance Operation	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Gate , Valve, and Miscellaneous Lubrication	$ 7,500	Yearly	1	$ 7,500	Allowance.
Staffing and Miscellaneous Costs					
Inspection and Testing of Plant Systems	$ 5,000	Yearly	1	$ 5,000	Allowance.
Operator Labor	$ 75	Hours	4000	$ 300,000	2 FTE = 4000 hours per year.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	500	$ 50,000	0.25 FTE = 500 hours per year.
Labor Electrical	$ 125	Hours	500	$ 62,500	0.25 FTE = 500 hours per year.
Equipment	$ 500	Monthly	12	$ 6,000	Allowance.
Instrumentation	$ 500	Monthly	12	$ 6,000	Allowance.
			Total	**$ 440,000**	rounded
Notes:					
1) Labor costs are estimates only.					

Table 4b. Wymer Power Recovery and Conveyance to Roza Dam
Annual O&M Costs – Downstream Conveyance Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Assume there is no utilities or communications req'd.					
Power Consumption					
Assume no power needed					
Standby Generator					
No standby generator is included in the design					
Pump and/or Gate Lubrication					
Pump at the intake structure	$ 75	Hours	100	$ 7,500	
Staffing and Miscellaneous Costs					
Additional Siphon and Tunnel Management					
Management of Siphon and Tunnel	$ 75	Hours	600	$ 45,000	
Operator Labor	$ 75	Hours	500	$ 37,500	0.25 FTE = 500 hours per year. Includes drive by inspection.
Preventive Maintenance					
Equipment	$ 20	Monthly	12	$ 240	Allowance.
			Total	**$ 90,000**	rounded
Notes:					
1) Regular ditch riding is assumed to be part of the work.					
2) Does not include monitoring of the outlet structure at Wymer which is assumed to be part of dam operations.					
3) Labor costs are estimates only.					

Table 5. Pipeline from Lake Keechelus to Lake Kachess
Annual O&M Costs

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 145	Monthly	12	$ 1,740	Allowance.
Power Consumption					
Monthly Service Charge for control valve bldg	$ 80	Monthly	12	$ 960	Allowance.
Standby Generator					
No standby generator is included in the design					
Pump and/or Gate Lubrication					
No pumps or gates included in the design					
Staffing and Miscellaneous Costs					
Inspection of Fish Screens	$ 750	Yearly	1	$ 750	Diver to inspect and clean fish screens (specialty diving.)
Operator Labor	$ 75	Hours	500	$ 37,500	0.25 FTE = 500 hours per year. Includes drive by inspection of, transmission main, valve house, and, air valves, drains, and outlet on a weekly basis.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	200	$ 20,000	0.1 FTE = 200 hours per year.
Labor Electrical	$ 125	Hours	200	$ 25,000	0.1 FTE = 200 hours per year.
Equipment	$ 20	Monthly	12	$ 240	Allowance.
Instrumentation	$ 20	Monthly	12	$ 240	Allowance.
			Total	**$ 90,000**	rounded
Notes:					
1) Labor costs are estimates only.					

Table 6a. Lake Kachess Inactive Storage - Alternative 1 Tunnel
Annual O&M Costs - Regular Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 145	Monthly	12	$ 1,740	Allowance.
Water Service Monthly Charge	$ 40	Monthly	12	$ 480	Allowance.
Power Consumption					
Power Monthly Service Charge when Pump Station Is Not in Operation	$ 100	Monthly	12	$ 1,200	Allowance.
Power Seasonal Demand and Energy Charge when 20 cfs Pump Station is in Maintenance Operational Mode (See Note 3.)	$ 4,352	Seasonal		$ 4,352	See power calculations below for 20 cfs pump system in Maintenance Operational Mode.
Standby Generator					
Standby Generator Monthly Maintenance Operation	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Pump Lubrication	$ 20	Monthly	12	$ 240	Two pumps. Allowance.
Gate Lubrication	$ 100	Yearly	1	$ 100	Three gates. Allowance.
Staffing and Miscellaneous Costs					
Inspection of Lake Tap Fish Screens	$ 1,200	Yearly	1	$ 1,200	Diver - inspect/clean fish screens (150 ft dive depth is specialty diving.)
Operator Labor	$ 75	Hours	2000	$ 150,000	1.0 FTE = 2000 hours per year. Includes drive by inspection of transmission main and outlet structure on a weekly basis.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	500	$ 50,000	0.25 FTE = 500 hours per year.
Labor Electrical	$ 125	Hours	500	$ 62,500	0.25 FTE = 500 hours per year.
Equipment	$ 50	Monthly	12	$ 600	Allowance.
Instrumentation	$ 50	Monthly	12	$ 600	Allowance.
			Total	**$ 270,000**	rounded

Notes:

1) Standby generator operates basic systems only, not large pumps.
2) Fish screens do not have self-cleaning function.
3) Maintenance operation mode is one of two 20 cfs pumps running for two days to keep pumps in operational condition when pump station is not needed, i.e. during non-drought years.
4) Labor costs are estimates only.

Table 6b. Lake Kachess Inactive Storage - Alternative 1 Tunnel
Annual O&M Costs - Annualized Non-Annual Costs Component

Element	Power Cost	Years	Capitalized Cost of Element	Notes
Power Seasonal Demand and Energy Charge when 20 cfs Pump Station is in Operational Mode	$ 58,919	5	$ 11,784	Operational Mode is 180 days once every five years.
		Total	**$12,000**	rounded
Notes:				
1) Interest rate is not used for five year period. Power cost is divided by the number of years.				

Table 6c. Lake Kachess Inactive Storage - Alternative 2 Pump Station
Annual O&M Costs - Regular Component

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 145	Monthly	12	$ 1,740	Allowance.
Water Service Monthly Charge	$ 40	Monthly	12	$ 480	Allowance.
Power Consumption					
Power Monthly Service Charge when Pump Station is Not in Operation	$ 100	Monthly	12	$ 1,200	Allowance.
Power Seasonal Demand and Energy Charge when 20 cfs Pump Station is in Maintenance Operational Mode (See Note 3.)	$ 4,352	Seasonal		$ 4,352	See power calculations below for 20 cfs pump system in Maintenance Operational Mode.
Power Seasonal Demand and Energy Charge when 1000 cfs Pump Station is in Maintenance Operational Mode (See Note 4.)	$ 312,064	Seasonal		$ 312,064	See power calculations below for 1000 cfs pump system in Maintenance Operational Mode.
Standby Generator					
Standby Generator Monthly Maintenance Operation	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Pump Lubrication	$ 100	Monthly	12	$ 1,200	Eight pumps. Allowance.
Gate Lubrication	$ 125	Yearly	1	$ 125	Five gates. Allowance.
Staffing and Miscellaneous Costs					
Inspection of Lake Tap Fish Screens	$ 1,200	Yearly	1	$ 1,200	Diver to inspect and clean fish screens (150 ft dive depth is specialty diving.)
Operator Labor	$ 75	Hours	2000	$ 150,000	1.0 FTE = 2000 hours per year. Includes drive by inspection of transmission main and outlet structure on a weekly basis.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	500	$ 50,000	0.25 FTE = 500 hours per year.
Labor Electrical	$ 125	Hours	500	$ 62,500	0.25 FTE = 500 hours per year.
Equipment	$ 400	Monthly	12	$ 4,800	Allowance.
Instrumentation	$ 250	Monthly	12	$ 3,000	Allowance.
			Total	**$ 590,000**	rounded

Notes:

1) Standby generator operates basic systems only, not large or small pumps.
2) Fish screens do not have self-cleaning function.
3) Maintenance Operational Mode is each 20 cfs pump running once a month for 2 hours to keep pumps in operational condition when pump station is not needed i.e. during non-drought years.
4) Maintenance Operational Mode is each 200 cfs pump running once a month for 2 hours to keep pumps in operational condition when pump station is not needed i.e. during non-drought years.
5) Labor costs are estimates only.

Table 6d. Lake Kachess Inactive Storage - Alternative 2 Pump Station
Annual O&M Costs - Annualized Non-Annual Costs Component

Element	Power Cost	Years	Capitalized Cost of Element	Notes
Power Seasonal Demand and Energy Charge when Large Pump Station is in Operational Mode	$ 1,548,858	5	$ 309,772	Operational Mode at 180 days once every five years.
Power Seasonal Demand and Energy Charge when Small Pump Station is in Operational Mode	$ 58,919	5	$ 11,784	Operational Mode at 180 days once every five years.
		Total	**$ 322,000**	rounded
Notes:				
1) Interest rate is not used for five year period. Power costs are divided by the number of years.				

Table 7. Bumping Lake Reservoir Enlargement
Annual O&M Costs

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 160	Monthly	12	$ 1,920	Allowance.
Water Service Monthly Charge	$ 80	Monthly	12	$ 960	Allowance.
Costs for Septic System Maintenance	$ 5	Monthly	12	$ 60	Allowance.
Power Consumption					
Power Monthly Service Charge	$ 200	Monthly	12	$ 2,400	Allowance.
Standby Generator					
Standby Generator Monthly Maintenance Operation	$ 3.50	Gal of fuel	104	$ 364	Start and load test weekly for one hour (52 weeks x 1 hr) and 2 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gal of fuel	336	$ 1,176	Assume one winter power outage for one week (7 days x 24 hr/day = 168 hours) and 2 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Gate and Miscellaneous Lubrication	$ 2,500	Yearly	1	$ 2,500	Allowance.
Staffing and Miscellaneous Costs					
Inspection and Testing of Dam Systems	$ 2,500	Yearly	1	$ 2,500	Allowance.
Operator Labor	$ 75	Hours	2000	$ 150,000	1 FTE = 2000 hours per year.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	200	$ 20,000	0.1 FTE = 200 hours per year.
Labor Electrical	$ 125	Hours	200	$ 25,000	0.1 FTE = 200 hours per year.
Equipment	$ 250	Monthly	12	$ 3,000	Allowance.
Instrumentation	$ 250	Monthly	12	$ 3,000	Allowance.
			Total	**$ 210,000**	rounded
Notes:					
1) Labor costs are estimates only.					

Table 8. KRD Main Canal and South Branch Modifications
Annual O&M Costs

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 290	Monthly	12	$ 3,480	Allowance for telemetry at re-reg reservoir and Yakima River PS.
Power Consumption					
Power Monthly Service Charge when Pump Stations are Not in Operation	$ 150	Monthly	13	$ 1,950	5 months of no operation for re-reg reservoir and 8 months of no operation for Yakima River PS. Allowance.
Power Seasonal Demand and Energy Charge when both Pump Stations are in Operation.	$ 59,506	Seasonal	1	$ 59,506	Pumping season is 180 days for re-reg reservoir and 120 days for Yakima River PS.
Pump and/or Gate Lubrication					
Pump Lubrication	$ 300	Monthly	12	$ 3,600	Four pumps. Allowance.
Gate Lubrication	$ 50	Yearly	1	$ 50	One outlet gate at re-reg reservoir. Allowance.
Staffing and Miscellaneous Costs					
Operator Labor	$ 75	Hours	500	$ 37,500	0.25 FTE = 500 hours per year. Includes drive by inspection of reservoir, transmission mains, pump stations, valves, and spill pipe outlet on a weekly basis.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	200	$ 20,000	0.10 FTE = 200 hours per year.
Labor Electrical	$ 125	Hours	200	$ 25,000	0.10 FTE = 200 hours per year.
Equipment	$ 20	Monthly	12	$ 240	Allowance.
Instrumentation	$ 20	Monthly	12	$ 240	Allowance.
			Total	**$ 150,000**	rounded

Notes:

1) Assumes neither pump station will have a standby generator.

2) Labor costs are estimates only.

Table 9a. Wapatox Canal Conveyance Improvements - Alternative 1
Annual O&M Costs

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 145	Monthly	12	$ 1,740	Allowance for telemetry at Wenas Grade PS.
Power Consumption					
Power Monthly Service Charge when Pump Station is Not in Operation	$ 150	Monthly	5	$ 750	Allowance.
Power Seasonal Demand and Energy Charge when both Pump Stations are in Operation.	$ 54,609	Seasonal	1	$ 54,609	Pumping season is April 1 to October 31 (Duration of NSID Water Right).
Standby Generator					
Standby Generator Monthly Maintenance Operation (See Note 1.)	$ 3.50	Gallon	2340	$ 8,190	Start and load test weekly for one hour (52 weeks x 1 hr) and 45 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gallon	3240	$ 11,340	Assume one power outage per year for 3 days (72 hours) and 45 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Pump Lubrication	$ 750	Monthly	12	$ 9,000	Nine pumps. Allowance.
Gate Lubrication	$ 300	Yearly	1	$ 300	Five gates. Allowance.
Staffing and Miscellaneous Costs					
Operator Labor	$ 75	Hours	1000	$ 75,000	0.50 FTE = 1000 hours per year. Includes drive by inspection of canal, transmission mains, pump stations, valves, and spill pipe outlet on a weekly basis.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	200	$ 20,000	0.10 FTE = 200 hours per year.
Labor Electrical	$ 125	Hours	200	$ 25,000	0.10 FTE = 200 hours per year.
Equipment	$ 20	Monthly	12	$ 240	Allowance.
Instrumentation	$ 20	Monthly	12	$ 240	Allowance.
			Total	**$ 210,000**	rounded

Notes:

1) Assumes new Wenas Grade pump station will have 650 kW standby generator.

2) Labor costs are estimates only.

Table 9b. Wapatox Canal Conveyance Improvements - Alternative 2
Annual O&M Costs

Element	Unit Cost	Unit of measure	Number of Units	Total cost of Element	Notes
Utilities					
Communications	$ 145	Monthly	12	$ 1,740	Allowance for telemetry at Wenas Grade PS.
Power Consumption					
Power Monthly Service Charge when Pump Station is Not in Operation	$ 150	Monthly	5	$ 750	Allowance.
Power Seasonal Demand and Energy Charge when both Pump Stations are in Operation.	$ 54,609	Seasonal	1	$ 54,609	
Standby Generator					
Standby Generator Monthly Maintenance Operation (See Note 1)	$ 3.50	Gallon	2340	$ 8,190	Start and load test weekly for one hour (52 weeks x 1 hr) and 45 gal/hour fuel consumption.
Standby Generator during Power Outage	$ 3.50	Gallon	3240	$ 11,340	Assume one power outage per year for 3 days (72 hours) and 45 gal/hour fuel consumption.
Pump and/or Gate Lubrication					
Pump Lubrication	$ 750	Monthly	12	$ 9,000	Nine pumps. Allowance.
Gate Lubrication	$ 300	Yearly	1	$ 300	Five gates. Allowance.
Staffing and Miscellaneous Costs					
Operator Labor	$ 75	Hours	1000	$ 75,000	0.50 FTE = 1000 hours per year. Includes drive by inspection of transmission mains, pump stations, valves, and spill pipe outlet on a weekly basis.
Preventive Maintenance					
Labor Mechanical	$ 100	Hours	200	$ 20,000	0.10 FTE = 200 hours per year.
Labor Electrical	$ 125	Hours	200	$ 25,000	0.10 FTE = 200 hours per year.
Equipment	$ 20	Monthly	12	$ 240	Allowance.
Instrumentation	$ 20	Monthly	12	$ 240	Allowance.
			Total	**$ 210,000**	rounded

Notes:

1) Assumes new Wenas Grade pump station will have standby generator.

2) Labor costs are estimates only.

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APPENDIX O

Real Estate Costs

Alternate Wymer Supply from Yakima River at Thorp

Thorp Pump Station Component

The Kittitas County Assessor's web site was used to compile data for this real estate cost estimate. The estimate covers the cost of the required Right-of-Way (ROW) for the construction of the pump station and pipeline from the Yakima River to the Kittitas Reclamation District (KRD) Canal at Thorp. The data compiled in this cost estimate is based on the aerial map provided the Thorp Pump Station and Wymer Upstream Conveyance reports.

The cost estimate is based on the assumption that parcels where the pipeline will cross open space will need a 50 foot permanent easement and a 100 foot temporary easement. Assessed land values for the required easements were found to be inconsistent with land values in the surrounding areas as well as the values previously evaluated on parcels concerning the K-K Pipeline and the Kachess Inactive Storage projects. Because of these inconsistencies, accompanied by the fact that all parcels are zoned for agriculture and are privately owned, it was decided that the price of easements would be at the parcels' fee value range, and not at a percent of that value, as were the values for the prior two sections of the project.

From the map reconnaissance, the parcels valued at $0.10/SF appear to be open space and those valued at $0.50/SF appear to be croplands. Land value for all parcels was found by segregating parcels into three groups and doing a statistical analysis of land values for each of the three groups and cross-checking values for consistency against a recent, similar project in Kittitas County. Values for the three groups are as follows: $0.50/Sq Ft for parcels less than four acres, $0.50 for parcels from four to eight acres, and $0.10 for parcels larger than eight acres. It should also be noted that there is an unknown parcel in the northeast portion of the pipeline in this section of which no information could be obtained by the Kittitas County Assessor's web site. Approximately 576 feet of pipeline will cross over this parcel and its value is not estimated in this report, but will need to be reevaluated if the project moves forward and easements are required.

The total estimated cost of the required easements for the project would be approximately $363,000, with $121,000 in permanent easements and $242,000 in temporary easements. The required Right-of-Way is comprised of 20 total parcels with 11 separate landowners. The pump station would require 5 acres of land and would cost approximately $22,000. All 20 of the parcels of the required easements for this section of the project have private ownership. The estimated cost for the easement acquisition of these parcels is approximately $55,000 (11 landowners x $5,000/landowner) for valuation and acquisition services. Total easement acquisition cost is estimated at $440,000.

Thorp Pump Station and Pipeline Parcels

Parcel Group	Prop type	Parcel Count	Perm Esmt Count	Temp Esmt Count	Area (Acres)	Perm Esmt Value	Total Esmt Value	ACQ Val Cost	Total Easement Acq Cost
Grp 1 - 2 Owners	0 to <4 Acres	3	3	3	10.28	$24,816	$74,448	$10,000	$84,448
Grp 2 - 3 Owners	4 to <8 Acres	7	7	7	34.85	$68,376	$205,128	$15,000	$220,128
Grp 3 - 6 Owners	8+ Acres	10	10	10	267.24	$27,561	$82,685	$30,000	$112,685
Pump Station - Fee	5 Acres				5				$21,780
Discharge Structure						$120	$120		$120
Totals		20	20	20		$120,873	$362,381	$55,000	$439,161

The following assumptions were made to prepare this preliminary ROW cost estimate:

1. No impacts to any major improvements.
2. Basis for evaluating land value was assessed land value and similar project experience.
3. Property costs for value done in bulk by property type.
4. Value of the loss of any timber is not estimated.
5. Public land was valued as if available for private use.
6. Total linear footage estimated by GIS application from Kittitas County Assessor's web site.
7. GIS data used for cost estimate is based on approximate pipeline length of 9,816 feet.
8. Acquisition and Valuation costs were estimated at $5,000 per parcel based on a mix of complex and non complex parcels.
9. Land zoned AG-20 is valued at 100 percent of fee for easements to account for possible crop damage and crop damage will need to be evaluated further if ROW negotiation services are obtained at a later time.
10. The pump station will require 5 acres of land to be acquired in fee.
11. Fee acquisition for pump station will not cause any damage to the remainder of the parcel.
12. Permanent easement cost for discharge structure will be 100 percent of fee land value as land use on the easement may not be available after construction.

KRD North Branch Canal Improvements for Conveyance to Wymer Component

Approximate land costs were also estimated for the KRD North Branch Canal Improvements. For this appraisal level study, it was assumed that the additional required canal property would be on uphill, no-arable land valued at $5,000 per acre. However, additional arable land valued at $20,000 per acre would be required in some areas. Therefore, a weighted average of $10,000 per

acre was used for an average of 30 feet of land purchased along 31 miles of canal (113 acres). This resulted in an approximate land cost for KRD canal improvements of $1,130,000.

Siphon and Tunnel for Conveyance from KDR System to Wymer Reservoir Component

The Kittitas County Assessor's web site was again used to compile data for the real estate cost estimate for required property rights for the construction of the pipeline from the KRD Canal Siphon to the Wymer Reservoir. The cost estimate is based on the aerial maps provided from pages 14 and 15 of the Thorp Pump Station and Wymer Upstream Conveyance packet.

The cost estimate is based on the assumption that parcels where the pipeline will cross open space will need a 50 foot permanent easement and a 100 foot temporary easement. Assessed land values for the required easements were found to be inconsistent with land values in the surrounding areas as well as the values previously evaluated on parcels concerning the K-K Pipeline and the Kachess Inactive Storage projects. Instead they were assumed to be the same as for the Thorp Pump Station.

Because many of the parcels are zoned for agriculture and are private ownership, it was decided that the price of easements would be at the parcels' fee value range, and not at a percent of that value as were K-K Pipeline and the Kachess Inactive Storage projects. Easements on the 11 parcels that fall to the east and west sides of Interstate 82 are zoned Forest and Range and Commercial Ag, will also be value at 100% fee value. From our map reconnaissance the parcels valued at $0.10/SF appear to be open space and those valued at $0.50/SF appear to be croplands where crop damages will occur. Land value for all parcels was found by segregating parcels into three groups and doing a statistical analysis of land values for each of the three groups and cross-checking values for consistency against a recent, similar project in Kittitas County. Values for the three groups are as follows: $0.50/Sq Ft for parcels less than four acres in size, $0.50 for parcels from four to eight acres large and $0.10 for parcels larger than eight acres.

The total estimated cost of the required right-of-way for the project would be approximately $712,000, with $238,000 in permanent easements and $474,000 in temporary easements. The required easement is comprised of 32 total parcels with 16 separate landowners. Twenty three parcels of the required easements for this section of the project have private ownership, six parcels are owned by the Army Corp of Engineers, and three by the State of Washington. The estimated cost for the ROW acquisition of these parcels is $80,000 (16 landowners x $5,000/landowner) for valuation and acquisition services. Total real estate acquisition cost is estimated at $792,000.

Wymer Upstream Siphon and Tunnel

Parcel Group	Prop type	Parcel Count	Perm Esmt Count	Temp Esmt Count	Area (Acres)	Perm Esmt Value	Total Esmt Value	ACQ Val Cost	Total Easement Acq Cost
Grp 1 - 2 Owners	0 to <4 Acres	3	3	3	9.6	$15,576	$46,728	$15,000	$61,728
Grp 2 - 3 Owners	4 to <8 Acres	4	4	4	22.56	$45,540	$136,620	$15,000	$151,620
Grp 3 - 6 Owners	8+ Acres	25	25	25	4289.9	$175,745	$527,234	$50,000	$577,234
Diversion Structure						$600	$600		$600
Siphon to Tunnel						$120	$120		$120
Totals		32	32	32		$237,581	$711,302	$80,000	$791,302

The following assumptions were made to prepare this preliminary ROW cost estimate:

1. No impacts to any major improvements.
2. Basis for evaluating land value was assessed land value and similar project experience.
3. Property costs for value done in bulk by property type.
4. Value of the loss of any timber is not estimated.
5. Public land was valued as if available for private use.
6. Total linear footage estimated by GIS application from County site.
7. Assumed that easements would be assumed across all properties.
8. GIS data used for cost estimate is based on approximate pipeline length of 37.594 feet.
9. Acquisition and Valuation costs were estimated at $5000/parcel based on a mix of complex and non complex parcels.
10. Land zoned AG-20 is valued at 100 percent of fee for easements to account for possible crop damage and crop damage will need to be evaluated if real estate negotiation services are obtained at a later time.
11. Full fee value was used for easements on land zoned Forest and Range due to extremely low assessed value, inconsistent with values in the area, and lack of comparable sales.
12. The diversion structure will require an additional permanent easement of 1200 square feet.
13. The siphon to tunnel connection structure will require an additional permanent easement of 1200 square feet.
14. Permanent easement costs for discharge structure and siphon to tunnel connection structure will be 100 percent of fee land value as land use on the easement may not be available after construction.

Summing all three land cost components and rounding up the total results in a total estimated land cost for the Thorp to Wymer Upstream Conveyance project of approximately $2.5 million.

Pipeline from Lake Keechelus to Lake Kachess

The Kittitas County Assessor's web site was used to compile data for the Lake Keechelus to Lake Kachess pipeline real estate. The data was then used to estimate the cost of the required Right-of-Way for the pipeline.

The data compiled in this estimate is based on the aerial map from the Yakima River Basin Study/Keechelus to Kachess (K to K) Conveyance report. Data was compiled by using GIS tools on the Kittitas County Assessor's website and re-drawing the proposed route on a parcel map. Data was then collected for each parcel along the route and combined with data from surrounding parcels not on the route in order to create a realistic cost.

The cost estimate is based on the assumption that parcels where the pipeline will cross open space will need a 50 foot permanent easement and a 100 foot temporary easement, while parcels that run parallel with Kachess Lake Road will need a 25 foot temporary easement on each side of the road and no permanent easements.

The price for each permanent easement is based on 30 percent of the land value per square foot, while the temporary easement values will be priced at 10 percent of the land value. Land value for all parcels was found by segregating parcels into three groups and doing a statistical analysis of land values for each of the three groups and cross checking values for consistency against a recent similar project in Kittitas County. Values for the three groups are as follows: $2.00/Sq Ft for parcels less than four acres, $1.00 for parcels from four to eight acres large and $0.50 for parcels larger than eight acres.

The total estimated cost of the required easements for the project will be $201,000, with $83,000 in permanent easements and $118,000 in temporary easements. The required Right-of-Way is comprised of 64 total parcels with 39 separate landowners. Forty six parcels are owned by private landowners, eight by the Kittitas Conservation Trust, six by the Wenatchee National Forest and four by the United States of America. The estimated cost for the ROW acquisition of these parcels is $195,000 (39 landowners x $5000/landowner) for valuation and acquisition services. Total ROW acquisition cost is estimated at $396,000.

Keechelus to Kachess Conveyance

Parcel Group	Property Size	Parcel Count	Perm Esmt Count	Temp Esmt Count	Area Acres	Perm Esmt Value	Total Esmt Value	ACQ Val Cost	Total Esmt Acq Cost
Group 1 - 16 Owners	0 to <4 Acres	20	1	20	57.43	$3,960	$31,574	$80,000	$111,574
Group 2 - 17 Owners	4 to <8 Acres	28	3	28	153.76	$10,534	$40,709	$85,000	$125,709
Group 3 - 6 Owners	8+ Acres	16	5	16	2919	$68,468	$128,515	$30,000	$158,515
Totals		64	9	64		$82,962	$200,798	$195,000	$395,798

The above costs were rounded up to $500,000. An additional $500,000 was budgeted for increased easements and/or property acquisition that may be required if the alignment is refined and adjusted during design to include more private property. In addition, due to the current uncertainty of the alignment, another 50 percent was added in contingency, resulting in a total recommended project real estate budget of $1.5 million.

The following assumptions were made to prepare this preliminary ROW cost estimate:

1. No impacts to any major improvements.
2. Perm easement costs at 30% of fee land value.
3. Temp easement cost at 10% of fee land value.
4. Basis for evaluating land value was assessed land value and similar project experience.
5. Property costs for value done in bulk by property type.
6. Value of the loss of any timber is not estimated.
7. Public land was valued as if available for private use.
8. Where proposed route follows road, only temporary easements are needed.
9. Used last sale dates for two of the large parcels that were recently transferred to public entities
10. Total linear footage estimated by GIS application from Kittitas County Assessor's web site.
11. Assumed that easements would be required across all properties.
12. GIS data used for cost estimate is based on approximate pipeline length of 24,700 feet.
13. Acquisition and Valuation costs were estimated at $5000/parcel based on a mix of complex and non complex parcels.

Lake Kachess Inactive Storage – Both Alternatives

Similar to the Lake Keechelus to Lake Kachess pipeline, the Kittitas County Assessor's web site was used to compile data for the required Right-of-Way for the pipeline from the gate house and pump station at Lake Kachess to the Yakima River portal. The data compiled in this cost estimate is based on the aerial map provided from page 5 of the Kachess Inactive Storage packet.

The cost estimate is based on the assumption that parcels where the pipeline will cross open space will need a 50 foot permanent easement and a 100 foot temporary easement. The price for each temporary and permanent easement was calculate the same as the Lake Keechelus to Lake Kachess pipeline project.

The total estimated cost of the required easements for the project will be $484,000, with $291,000 in permanent easements and $193,000 in temporary easements. The required Right-of-Way is comprised of 26 total parcels with three separate landowners. The six acres to be acquired for the project portals will cost approximately $131,000 in fee acquisition. Fifteen

parcels are owned by private landowners and 11 by the Wenatchee National Forest. The estimated cost for the easement acquisition of these parcels is $15,000 (3 landowners x $5000/landowner) for valuation and acquisition services. Total real estate acquisition cost is estimated at $630,000. Adding $250,000 for additional property acquisition that may be required at the portal and flow discharge locations as well as a contingency, results in a total recommended real estate budget of $1 million for the tunnel alternative.

For the Pump Station Alternative 2, the cost would be the same less the cost of the tunnel easements; or approximately $500,000 as a recommended real estate budget.

Inactive Storage Tunnel Plan

Parcel Group	Prop type	Parcel Count	Perm Esmt Count	Temp Esmt Count	Area (Acres)	Perm Esmt Value	Total Esmt Value	ACQ Val Cost	Total Easement Acq Cost
Grp 1 - 1 Owner	0 to <4 Acres	4	4	4	12	$33,264	$55,440	$5,000	$60,440
Grp 2 - 0 Owners	4 to <8 Acres	0	0	0	0	$0	$0	$0	$0
Grp 3 - 2 Owners	8+ Acres	22	22	22	3463	$256,806	$428,010	$10,000	$438,010
Portals (2) Fee Take	6 Acres	2	0	0	6	$0	$0		$130,680
Discharge Facility	1,200SF					$600	$600		$600
Totals		26	26	26		$290,670	$484,050	$15,000	$629,730

The following assumptions were made to prepare this preliminary ROW cost estimate.
Assumptions

1. No impacts to any major improvements.
2. Perm easement costs at 30% of fee land value.
3. Temp easement cost at 10% of fee land value.
4. Basis for evaluating land value was assessed land value and similar project experience.
5. Property costs for value done in bulk by property type.
6. Value of the loss of any timber is not estimated.
7. Public land was valued as if available for private use.
8. Total linear footage estimated by GIS application from Kittitas County Assessor's web site.
9. Assumed that easements would be assumed across all properties.
10. GIS data used for cost estimate is based on approximate pipeline length of 31,669 feet.
11. Acquisition and Valuation costs were estimated at $5000/parcel based on a mix of complex and non complex parcels.
12. Portals will require 3 acres land to be acquired in fee.
13. Fee acquisitions for Portals will not cause any damage to the remainder of the parcel.
14. Permanent easement cost for discharge structure will be 100% of fee land value as land use on the easement may not be available after construction.

Pool Level Increase at Cle Elum Dam

Land area needed to be acquired to allow for construction of shoreline protection and inundation of additional area was estimated in a prior report by Reclamation (Reclamation 2000). The non-federal land area needed for acquisition or easement was estimated in the 2000 study using two approaches: by reviewing survey maps of properties at the southeast portion of the lake where shoreline protection was proposed to prevent erosion, and by assuming a 300-ft wide strip of land would be needed to accommodate the additional inundation around the remaining perimeter of the lake that is not federally owned. Reclamation identified 21 parcels in the southeast portion of the lake where shoreline protection would be needed. A portion of those parcels would need to be acquired to accommodate the shoreline protection project. Although Reclamation did not provide an estimate of the area within those parcels that would need to be obtained, they provided plan views of the parcels with estimated "take lines" (Young, pers. comm.). The total acreage is estimated to be 22 acres. The area of the 300-ft wide strip around the remaining perimeter of the lake on non-federal properties was estimated by Reclamation to be about 155 acres. The total acreage needed for purchase or easement was estimated to be approximately 177 acres.

An updated approach was used to estimate the area within non-federal parcels below the 2,243-foot contour that would need to be obtained by purchase or easement to accommodate additional inundation around the rest of the lake. These were measured using LiDAR topography and GIS analysis. The results from this more specific analysis show 45 acres would need to be acquired, in comparison to the 155 acres estimated by Reclamation in the 2000 study. The updated estimate of total area required for acquisition or easement is 67 acres. The reason for the reduction in total area needed to be acquired in comparison to the 2000 study is a more exact definition of the area below the 2,243-foot elevation is possible with LiDAR mapping that was not available at the time of Reclamation's study. For their study, they assumed a 300-foot wide strip of land would need to be acquired.

Land acquisition cost estimates were revised from the 2000 study based on updated land values and the updated total non-federal acreage that would need to be acquired. The Kittitas County Assessor provided parcel values with two components: land values and improvement (structures) values. Only the land values for each parcel were used in the estimate of land acquisition costs as it was assumed no structures would need acquiring or removing to accommodate the shoreline protection project and increased inundation. A review of aerial photos was made to confirm the assumption as best possible. Some parcels had very low land values so a minimum value of $1,000 per acre was estimated and used in those instances. The total estimated land acquisition cost using assessor's data is $2,612,000, with $2,251,000 of the cost from the 22 acres needed for shoreline protection projects. The cost of acquiring the remaining 45 acres was estimated to be $361,000. Because this estimate is based on assessor valuation, the estimate may not reflect market costs and may be understating the actual costs that may be incurred.