Technical Memorandum No. 9A - Hillsboro Water Supply Options Cost Estimating Detail

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DATE: June 22, 2012 – FINAL-R1

PROJECT NUMBER: 407893

1.0 INTRODUCTION

This technical memorandum summarizes the process CH2M Hill used to estimate the capital cost of six water supply options that emerged from the earlier technical memorandums. In addition to estimating capital costs, potential future operating and maintenance costs were also estimated. The six options include:

1. Tualatin Basin Water Supply Project (TBWSP) Option
2. Willamette-Wilsonville Option
3. Portland Supply Option
4. Two Willamette-Newberg Options
    a. Newberg-West Sub-Option
    b. Newberg-East Sub-Option
5. Northern Groundwater Supply Option

The capital cost estimates for the Tualatin Basin Water Supply Project (TBWSP) Option were obtained from Clean Water Services for the Haag Lake dam raise portions, the City of Hillsboro, the JWC Master Plan, and the JWC Ozone Filtration Pilot Test report (expanding the ozone implementation cost for 75 MGD to 155 MGD). CH2M HILL provided the ozone cost estimates and received the estimates for the other portions of this project from others to combine them to create the TBWSP option. CH2M Hill developed the capital cost estimates for the other five options.

The process used to identify the components of the water supply options are described in detail in other technical memoranda. The quantities used to estimate the Northern Groundwater Supply Option were developed by CH2M Hill. The quantities used to estimate the other options were extracted from reports prepared by other firms and provided to CH2M Hill by Black & Veatch.

2.0 SYSTEM CAPACITIES

All estimates are based on systems providing a sustained peak-day capacity of 80 MGD of additional treated water (above the sustained peak-day 75 MGD available from the existing JWC WTP) in addition to providing the needed raw water storage for the partners.

3.0 CAPITAL COST SUMMARY

Table 1 shows the estimated project costs in 2020 dollars. The table is broken into two columns, one to highlight the estimated municipal and industrial (M&I) partner costs and the other to show the estimated total project costs. The estimated capital costs for the M&I users (JWC Partners and CWS only) are shown in the "Estimated M&I portion of Capital Cost in 2020 Dollars" column of . Total project costs are shown under the "Total Project Capital Costs in 2020 Dollars" column. The total project costs include all project costs associated with dam improvements/expansions for each supply option (either short or large). The cost difference between the two columns are anticipated to be funded by the United States Bureau of Reclamation (USBOR) and Tualatin Valley Irrigation District.

Operational and maintenance cost associated with each option are not included in this table. The Willamette-Wilsonville Option has the lowest estimated capital cost and the TBWSP Option has the highest estimated capital cost.

Table 1
Summary of Estimated Capital Costs in 2020 Dollars

Water Supply Options	Estimated M&I portion of Capital Costs in 2020 Dollars	Total Project Capital Costs in 2020 Dollars
TBWSP Option	$1,378,300,000	$2,087,320,000
Willamette-Wilsonville Option	$1,010,690,000	$1,669,630,000
Newberg-East Sub-Option	$1,278,170,000	$1,937,090,000
Newberg-West Sub-Option	$1,289,540,000	$1,948,460,000
Northern Groundwater Option	$1,362,970,000	$2,021,890,000
Portland Supply Option	$1,389,200,000	$2,048,110,000

The capital cost estimates for the Willamette-Wilsonville Option, Portland Supply Option, Newberg-West Sub-Option, Newberg-East Sub-Option, and Northern Groundwater Supply Option are Class 3 as defined by the Association for the Advancement of Cost Estimating International. Class 3 estimates are suitable for selecting the preferred alternative for implementation. Additional investigation will be necessary to develop a budget for the preferred alternative after it has been selected. For the scope of work identified in this memorandum, the actual capital cost of the improvements is likely to be between 70 to 130 per cent of the estimate if constructed in 2012. The capital cost estimate summaries provided for the TBWSP option do not have a stated precision.

Table 2 provides the capital cost estimate details for the water supply options. The table also includes operational, maintenance, electrical power, and water purchase costs for each option for the single year of 2012 (last four rows in the table). Capital costs are presented for source development (wells or river intakes), water treatment, pumping stations, treated

Table 2
Summary of Estimated Costs for Water Supply Options (M&I Portion Only)

Component	Water Supply Option					
Class 3 estimates are suitable for selection of the preferred alternative. Additional investigations will be needed to develop a budget for the preferred alternative after it is selected.	**TBWSP** (From 2009 Master Plan and Carollo Cost Estimates reference material)	**Willamette-Wilsonville** (Class 3 estimate)	**Portland Supply** (Class 3 estimate)	**Newberg West** (Class 3 estimate)	**Newberg East** (Class 3 estimate)	**Northern Groundwater Supply** (Class 3 estimate)
Connected electrical load (Hp); (Does not include the electrical load for any use of the JWC Water Treatment Plant/Spring Hill Raw Water Pump Station since said use is included in the $0.39/ccf unit cost utilized with the TBWSP at the 155 MGD and 75 MGD level.)	3,800	11,620	1,221	12,044	10,525	14,800
Connected electrical load (KW); (Does not include the electrical load for any use of the JWC Water Treatment Plant/Spring Hill Raw Water Pump Station since said use is included in the $0.39/ccf unit cost utilized with the TBWSP at the 155 MGD and 75 MGD level. These loads will be 5,200 kWh for 80 mgd expansion)	2,835	8,546	898	8,858	7,741	10,885
Number of pump stations	2	3	1	3	3	2
Pipeline length (ft)	99,400' STL; 18,000' RWP	137,500	227,300	210,700	158,600	135,700
Pipeline diameters (inches)	48, 60, 96	48, 60, 66	48,60	48, 60, 66	48. 60, 66	24, 30, 42, 48, 54, 60, 66
Source	Additional storage in Hagg Lake	Existing river intake	Powell Butte Reservoir	New river intake	New river intake	8 collector wells
Water treatment processes	Ozone, sedimentation, filtration, disinfection	Ozone, Actiflo, GAC, filter, disinfection	Dechlorination, ozone, Actiflo, GAC, filter, disinfection	Ozone, Actiflo, GAC, filter, disinfection	Ozone, Actiflo, GAC, filter, disinfection	Dual media filtration, split stream reverse osmosis, disinfection
Water treatment capacity (MGD)	JWC = 155 Other = 0	JWC = 75 Other = 80	JWC = 75 Other = 36 Hills Only	JWC = 75 Other = 80	JWC = 75 Other = 80	JWC = 75 Other = 80
Capital costs (July 2012)						
Wells (Includes standby power at each well) (Includes contractor OHP)	N/A	N/A	N/A	N/A	N/A	$ 37,000,000
River intake and raw water pump station (for the TBWSP option, the Raw Water Pipeline is included in this value. Includes contractor OHP)	$ 200,700,000	$ 7,036,000	N/A	$ 12,792,000	$ 12,792,000	N/A
Water treatment plant (includes 20 mg clearwell and finished water pump station) (Includes contractor OHP) (All estimates are for 80 mgd additional capacity)	$ 186,000,000	$ 105,385,000	$ 50,058,000	$ 105,385,000	$ 105,385,000	$ 201,446,000
Booster pumping stations (Includes contractor OHP)	$ 3,500 000	$ 19,519,000	$ 7,357,000	$ 19,519,000	$ 19,519,000	$ 12,262,000
20 MG reservoir (Includes contractor OHP)	$ 12,185,000	$ 12,185,000	$ 12,185,000	$ 12,185,000	$ 12,185,000	$ 12,185,000
Pipelines (Includes contractor OHP)	$ 112,400,000	$ 245,915,000	$ 463,728,000	$ 341,230,000	$ 350,185,000	$ 279,938,000
Subtotal of above M&I Construction cost (2012 dollars) (Includes contractor OHP@20%)	$514,800,000	$ 390,040,000	$ 533,328,000	$ 491,111,000	$ 500,066,000	$ 542,831,000
Construction Contingencies @ 30% (TBWSP at 25% from Carollo and B&V estimates)	$ 128,700,000	$ 117,012,000	$ 159,998,400	$ 147,333,300	$ 150,019,800	$ 162,849,300
Subtotal M&I Costs with contingency	$ 643,500,000	$ 507,052,000	$ 693,326,400	$ 638,444,300	$ 650,085,800	$ 705,680,300
Engineering Costs (Non-construction services costs) @30% (TBWSP at 20% from Carollo and B&V estimates)	$ 128,700,000	$ 152,115,600	$ 208,000,000	$ 191,533,000	$ 195,026,000	$ 211,704,090
Subtotal M&I project construction with contingency and engineering costs (2012 dollars)	$ 772,185,000	$ 659,167,600	$ 901,326,400	$ 829,977,300	$ 845,111,800	$ 917,384,390
40' Dam Construction Cost in 2012 dollars. (Original cost from CWS in 2009 dollars was $658,000,000. Used annual escalation factor of 4%.)	$ 740,000,000	N/A	N/A	N/A	N/A	N/A
9' Dam Construction Cost in 2012 dollars. (Original cost from CWS in 2009 dollars was $434,918,290. Used annual escalation factor of 4%.)	N/A	$ 489,000,000	$ 489,000,000	$ 489,000,000	$ 489,000,000	$ 489,000,000
Reduction in Dam Project Cost related to 85% Federal Contribution of funds for Seismic Upgrades in 2012 dollars (-85% of $556M)	$ (472,600,000)	$ (472,600,000)	$ (472,600,000)	$ (472,600,000)	$ (472,600,000)	$ (472,600,000)

Table 2
Summary of Estimated Costs for Water Supply Options (M&I Portion Only)

Reduction in Dam Project Cost related to the TVID Contribution of funds for Seismic Upgrades in 2012 dollars (-54.5% of Local Contribution Cost)	$ ($45,453,000)	$ (8,938,000)	$ (8,938,000)	$ (8,938,000)	$ (8,938,000)	$ (8,938,000)
Total estimated M&I project construction, contingency, engineering, and apportioned value of dam construction cost (July 2012)	994,130,000	$ 666,629,600	$ 908,788,400	$ 837,439,300	$ 852,573,800	$ 924,846,390
Allowance for easements & ROW occupancy @ $15/SF	-	$ 61,875,000	$ 102,285,000	$ 94,815,000	$ 71,370,000	$ 61,065,000
Allowance for property acquisition	$ 13,000,000	$ 10,000,000	$ 4,000,000	$ 10,000,000	$ 10,000,000	$ 10,000,000
Total estimated M&I project capital cost if bid January 2012	$ 1,007,130,000	$ 738,504,600	$ 1,015,073,400	$ 942,254,300	$ 933,943,800	$ 995,911,390
Escalation Addition for 2012-2020 (8 years) @ 4% annually	$ 384,200,000	$ 272,189,939	$ 374,124,639	$ 347,285,773	$ 344,222,779	$ 367,062,115
Total estimated M&I project capital cost if bid in 2020 (rounded to the nearest $10,000)	**1,378,330,000**	**$ 1,010,690,000**	**$ 1,389,200,000**	**$ 1,289,540,000**	**$ 1,278,170,000**	**$ 1,362,970,000**
Annual costs for year 2012 (Based on Average Day Demand)						
O&M for TBWSP @ $0.39/CCF/year at Average Day Demand (Based on JWC estimated budget value for fiscal year 2011-12 @ Peak Day Demand = 155 MGD = 1.7 X Average Day Demand)	$ 17,351,565	N/A	N/A	N/A	N/A	N/A
O&M for TBWSP @ $0.39/CCF/year at Average Day Demand (Based on JWC estimated budget value for fiscal year 2011-12 @ Peak Day Demand = 75 MGD = 1.7 X Average Day Demand)	N/A	$ 8,395,918	$ 8,395,918	$ 8,395,918	$ 8,395,918	$ 8,395,918
O&M at Average Day Demand other than power @ $0.30/CCF/year based on supplying Peak Day Demand = 80 MGD = 1.7 X Average Day Demand. (Portland Option cost based on 36 mgd a@ $0.30/CCF and 44 mgd @ $0.02/CCF) (NGSO includes additional $0.05 for split stream reverse osmosis)	N/A	$ 6,888,959	$ 3,352,941	$ 6,888,959	$ 6,888,959	$ 8,037,119
Annual electrical power at Average Day Demand at $0.073/kWh (Peak Day Demand = 80 MGD = 1.7 X Average Day Demand) (For TBWSP, included in $0.39/CCF operating cost)	N/A	$ 3,214,891	$ 337,812	$ 3,332,199	$ 2,911,939	$ 4,094,698
Purchase of water at Average Day Demand (Peak Day Demand = 80 MGD = 1.7 X Average Day Demand)	N/A	N/A	$ 30,591,830	N/A	N/A	N/A
Total 2012 single year annual costs operating at Peak Day demand of 155 MGD = 1.7 X Average Day Demand without amortization of capital costs (rounded to the nearest $10,000)	**$17,350,000**	**$18,500,000**	**$42,680,000**	**$18,620,000**	**$18,200,000**	**$ 21,160,000**
Calculated Unit Cost ($/MGD at Average Daily Demand)	**$ 190,307**	**$ 202,901**	**$ 468,087**	**$ 204,188**	**$ 199,578**	**$ 232,086**

water storage, pipelines, easements and right-of-way occupancy fees, and property acquisition. Summary data for connected electrical load, pipeline length, pipeline diameters, water treatment processes, and water treatment plant capacities are also provided. Supporting detail is provided in the appendices to this memorandum. Later technical memoranda will combine the estimated operational and maintenance costs along with the phased capital improvement costs and projected water demand forecasts to develop a common present worth value of each option in an effort to yield a level comparison method.

4.0 ASSUMPTIONS

Capital and operating costs were estimated for the midpoint of 2012 and escalated to 2020 using an annual inflation rate of 4 percent. Planning, permitting, and design activities are expected to occur in the period between 2012 and 2020. During this period, costs are expected to escalate, particularly for construction materials. The costs of construction materials are expected to increase faster than in the past due to increasing global competition for petroleum, cement, iron, copper, and other raw materials. The annual inflation rate of 4 percent provides for the expected cost escalation between 2012 and 2020 as worldwide demand increases.

Data was obtained from the Department of Energy for average electrical power costs in Oregon from 2000 through 2009. Inflation data was obtained from the Bureau of Labor Statistics for the same period. Over the 10 year period, electrical power costs increased 1 percent faster than prices overall.

Operations and maintenance costs including electrical power are $0.39 per hundred cubic feet (CCF) for the JWC treatment plant as budgeted during the 2011-12 fiscal year. Based on these operating costs, operating costs exclusive of electrical power for options with source development, treatment, pumping and pipelines are assumed to be $0.30 per CCF. For the Portland Supply option, operations and maintenance costs were assumed to be lower since the operating costs are primarily for pipeline maintenance. For the Portland option, operating costs are assumed to be $0.02 per CCF for the portion not requiring treatment and $0.30 per CCF for the portion requiring treatment.

Operations and maintenance costs were calculated for a total finish water production at a Peak Day Demand of 155 MGD and a ratio of Peak Day Demand to Average Day Demand of 1.7. Additional analysis will be needed to determine the impact of seasonal demand fluctuations and the loading of the existing JWC Water Treatment Plant and any of the new source supplies. However, since all options had their operations and maintenance cost calculated at this same constant production level, relative cost comparisons between the options can be made. The TBWSP option has all 155 MGD being produced at the JWC Water Treatment Plant. All other options had 75 MGD being produced at the JWC Water Treatment Plant and 80 MGD being produced at the specific option location.

For the TBWSP Option, a $658M cost estimate was provided by CWS for the dam replacement at Haag Lake.. This value was provided in 2009 dollars. For inclusion into Table 2, the price was escalated to 2012 dollars. The appraisal estimate provided by CWS for the seismic modifications of the existing dam is approximately $494M in 2009 dollars. This value was increased to $556M to provide equivalent 2012 dollar based estimates and adjustments in the M&I-attributable costs in Table 2. As currently understood, the TBWSP

will be working with Reclamation and Congress to secure federal funding through the Safety of Dams Program to provide federal government funding for Reclamation's 85% share of the seismic modifications. This would provide federal funding of $472.6M toward the total project costs of all of the supply options. The remaining local share is then prorated between the M&I and Irrigation District users, based on the stored water volume behind the existing dam. This proration is calculated at 54.5% Irrigation District, and 45.5% M&I. The M&I group of local share match providers for the dam safety improvements would include: Cities of Forest Grove, Hillsboro, Beaverton, Lake Oswego Corporation, and Clean Water Services.

For all projects that do not include the 40 foot dam raise, each project includes the cost for a 9' Dam Construction Raise. The estimated cost was provided by CWS for this project element. An estimate of $435M (2009 dollars) was escalated to $489M (2012 dollars). As with the 40 foot dam raise option, the appraisal estimate for the seismic modifications is approximately $494M (2009 dollars), which TBWSP believes will be funded similarly by Reclamation as described previously. All project costs received from CWS included a 25% contingency and all related costs.

For the Portland Supply Option, treated water would be purchased from the Portland Water Bureau. This estimate assumes the annual purchase price would be adjusted over time based on the existing regional water supply agreement between Tualatin Valley Water District (TVWD) and the Portland Water Bureau. The impact of the factors in cost sharing formula depends on future events and future responses to regulatory requirements.

Allowances were included for easements, rights-of-way occupancy fees, and property acquisition for treatment plants, reservoirs, and pumping stations. The purpose of the allowances is to budget for costs whose exact magnitude cannot be known until the design phase of the project. An allowance of $15 per square foot for easements and rights-of-way occupancy fees was included. This allowance is based on total length of the pipelines and a width of 30 feet. An allowance of $10 million was also included in each option for the purchase of property. These costs do not include right of way agent fees which are included in the non-construction costs.

All of the options include new 20 million gallon treated water storage in an above ground circular pre-stressed concrete reservoir to provide storage to level hour-to-hour variations in demand.

Each treatment plant and intake pumping station estimate includes a 20 percent allowance for site development, site electrical, site piping, and plant instrumentation and controls. The booster pumping stations include a 4 percent allowance for allowance for site development, site electrical, site piping, and plant instrumentation and controls. The reservoir estimates include a 13 percent allowance for site development, site electrical, site piping, and plant instrumentation and controls. The pipeline estimates do not include an allowance for site development, site electrical, site piping, and plant instrumentation and controls, as these items do not apply to pipeline construction.

It is assumed that the Northern Groundwater Supply Option can be developed in a manner that does not damage existing water rights.

A contingency of 30 percent has been applied to each of the estimates (with the exception of the CWS provided cost estimates for dam modifications, which were provided at 25

percent) to account for possible changes in scope, such as small changes in alignment, and to account for components that have not been specifically identified in the estimating process. A contingency of 30 percent is consistent with a Class 3 estimate.

5.0 ESTIMATE METHODOLOGY

Planning-level conceptual costs were developed for five water supply options using the CH2M Hill Parametric Cost Estimating System (CPES). CPES is a proprietary parametric cost estimating tool developed by CH2M Hill. It uses standardized infrastructure models developed from actual projects and builds up estimates using current material, equipment, and labor prices based on project inputs. The built-up estimates include a 4.5 percent adjustment to adjust the price to mid-2012 and a 0.1 percent adjustment to account for location. The adjustments are based on Engineering News-Record cost index data. The midpoint of construction was assumed to be July 2012 and costs were then escalated to the year 2020 at an annual inflation rate of 4 percent. The cost estimates are Class 3 as defined by the Association for the Advancement of Cost Estimating International. The actual cost of the improvements is likely to be between 70 to 130 per cent of the estimate if constructed in 2012.

Each of the five alternatives estimated by CH2M Hill was organized into source development (wells or river intake), raw water pumping, water treatment, treated water pumping, pipeline, and treated water storage components using the project descriptions summarized in previous sections of this technical memorandum. The pipeline components were divided into segments reflecting anticipated construction conditions, including soil or rock excavation, depth, traffic control, utility conflicts, paving removal and replacement, groundwater, microtunneling, and pier supports. Each component of the project was then estimated using CPES. The capital cost estimates include allowances of 20 per cent for contractor overhead and profit (10% overhead, 5% profit, 5% mobilization), 30 per cent for contingencies, and 30 per cent for non-construction related costs (permitting, engineering, services during construction, startup and commissioning, legal, right of way acquisition agent services, administration, and others.) The estimates were adjusted for local market conditions. The market adjustment for construction in the Portland area is 99.9 per cent of the national average.

Many of the options have similar components. For example, all of the options have a 20 MG treated water storage tank. The Newberg West Sub-Option, Newberg East Sub-Option, and Willamette-Wilsonville Options have similar intake, treatment plant, and transmission pumping components. Where a component was similar, it was estimated once and the estimated cost was used for the each of the options that used that component. Detailed cost estimating reports from CPES outputs are included as an appendix to this memorandum.

Budgetary pricing for collector wells was obtained from Layne Christensen Company and include estimated cost of pumps, electrical systems, instrumentation, and site improvements. The collector well estimates include emergency power generators.

Pipeline estimates are based on using polyethylene encased ductile iron pipe for pipe diameters of 30 inches and smaller, rubber gasketed steel pipe for pipe diameters of 36 to 48 inches, and welded steel pipe for pipe diameters of 54 inches and larger. Line valves and blowoff valves are included at intervals of 5,000 feet. Air relief valves are included at

intervals of 5,000 to 10,000 feet, depending on the alignment. The steel pipe would be mortar coated and lined. The pipeline is assumed to include provisions to resist seismic forces, including extensibility and swing joints at structures, stream crossings, and microtunnels. All pipes would be placed within public rights-of-way or within existing power line easements. The depth of cover to top of exterior pipe was assumed to be 4 feet. The bedding thickness was assumed to be 12 inches below the exterior bottom of the pipe and the pipe zone material tobe 1 foot above the exterior top of pipe. Where pipe would be constructed under a paved street or highway, bedding and backfill was assumed to be controlled density fill and shoring was used to minimize trench width and traffic impacts. Bedding and backfill for the remaining pipe was assumed to be imported fill. Dewatering was assumed to be required for all trenches. Micro tunneling is assumed for all stream and river crossings.

6.0 POTENTIAL RISKS AND UNCERTAINTIES ASSOCIATED WITH ESTIMATES

Five types of risks apply to the estimates and since all of the costs estimates were prepared using similar levels of detail, all of the estimates have the same level of risk:

- Risk related to possible changes in scope. Large projects often experience significant changes in scope as each component of the project is designed. The preliminary estimates presented in this memorandum are based on reconnaissance-level investigations, some of which were reported in work by others. Changes to design and component assumptions are likely to change the cost.

- Risk related to uncertainties of permitting and environmental mitigation requirements. After a project is selected for implementation, the requirements of right-of-way owners and regulatory agencies can be reviewed with those parties and the impacts addressed in the design of the project. This mitigation effort is likely to change the estimated cost.

- Risk related to errors in unit prices for materials, equipment, and labor. The cost estimates are based on unit prices that were updated in January 2011 and escalated to July 2012. Unit prices for materials and petroleum are likely to increase over time. To maintain the stated level of accuracy, the cost estimates would need to be updated using current unit prices after that time.

- Risk related to escalation between the time the estimates were prepared and the time one of the options is created. Once a water supply project is selected, it may not be constructed for 10 years or more. Prices of material, equipment, and labor are likely to escalate during that time. Annual escalation at 4 per cent would increase project costs by a little less than 50 percent over a 10 year time period. While the actual rate of escalation cannot be known, it is important to allow for some increase in costs to increase the probability that decisions are based on future costs.

- Risk created by possible changes in loading assumptions, resulting in a future need to reconfigure a project and re-allocate costs. The cost estimates are based on systems loaded at 155 mgd. As the evaluation process moves forward in later parts of TM09, the present worth evaluation will utilize the Calculated Unit Cost and projected

demand curves to develop an estimated operational cost over a period of time. However, it is impossible to accurately estimate the true demand production at each facility in the future and therefore the actual post-construction loading of the systems may be different than what is being utilized in this report. Therefore there is an inherent risk that as loading drops relative to capacity, capital cost may have a higher economic impact relative to operating costs which will not be known during this current evaluation process.

Appendix
Cost Estimating Detail

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011 | Click for CPES QA/ QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	NGSO 20 MG stoage
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	20 MG storage reservoir
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10.000

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This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT		Cost
	Yes	Concrete Clearwell: 20MGStor		$8,480,000
SUBTOTAL - PROJECT COST				$8,480,000
ADDITIONAL PROJECT COSTS:				
Demolition		0%		$0
Overall Sitework		5%		$430,000
Plant Computer System		1%		$90,000
Yard Electrical		2%		$170,000
Yard Piping		5%		$430,000
UD #1 Default Description		0%		$0
UD #2 Default Description		0%		$0
UD #3 Default Description		0%		$0
SUBTOTAL with Additional Project Costs				$9,600,000
CONTRACTOR MARKUPS:				
Overhead		10%	$9,600,000	$960,000
Subtotal				$10,560,000
Profit		5%	$10,560,000	$530,000
Subtotal				$11,090,000
Mob/Bonds/Insurance		5%	$11,090,000	$560,000
Subtotal				$11,650,000
Contingency		30%	$11,650,000	$3,500,000
SUBTOTAL with Markups				$15,150,000
ESCALATION (to Mid-Point of Construction):		4.6%	$15,150,000	$700,000
SUBTOTAL with Escalation				$15,850,000
LOCATION ADJUSTMENT FACTOR		99.9	$15,850,000	$15,840,000
SUBTOTAL - with Local Adjustment Factor				$15,840,000
MARKET ADJUSTMENT FACTOR		0%	$15,840,000	$0
SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor				$15,840,000
Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:				
Name of Process Reviewer			Gomez	Click for Reviewe
Name of Estimator Reviewer			Meyer	
MAXIMUM CONSTRUCTION COST				$15,840,000
NON-CONSTRUCTION COSTS:				
Permitting		3%	$15,840,000	$480,000
Engineering		8%	$15,840,000	$1,270,000
Services During Construction		8%	$15,840,000	$1,270,000
Commissioning & Startup		5%	$15,840,000	$800,000
Land / ROW		3%	$15,840,000	$480,000
Legal / Admin		10%	$15,840,000	$1,590,000
Other Default Description		0%	$15,840,000	$0
SUBTOTAL - Non-Construction Costs				$5,890,000
TOTAL - CAPITAL COST				$21,730,000

Currency Conversion of TOTAL CAPITAL COST:

Currency	Unit of Measure	Conversion Rate	Converted Amount
None	U.S.Dollar	1	21,730,000

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011 | Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	80 MGD Surface Water Treatment Plant
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	Newberg and Wilsonville 80 MGD WTP
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

☐ This Report is for INTERNAL Distributio

☑ This Report is for EXTERNAL Distributic

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT		Cost
	Yes	Inline Rapid Mix: RPDMX		$1,280,000
	Yes	Actiflo: ACTIFLO		$8,360,000
	Yes	Filters: FILTERS		$22,920,000
	Yes	Ozone O-U: OZONE		$20,960,000
	Yes	Chlorine Gas: CL2GAS		$1,260,000
	Yes	Concrete Clearwell: CLRWLL		$9,400,000
	Yes	Liquid Chemical: COAGULANT		$530,000
	Yes	Sludge Drying Beds: RESIDUALS		$2,640,000
	Yes	Gravity Thickener: Thickener		$480,000
	Yes	Filter BW PS: BCKWSHPMP		$1,340,000
	Yes	Liquid Chemical: New CAPoly		$280,000
SUBTOTAL - PROJECT COST				$69,450,000
ADDITIONAL PROJECT COSTS:				
Demolition		0%		$0
Overall Sitework		8%		$5,560,000
Plant Computer System		2%		$1,390,000
Yard Electrical		5%		$3,480,000
Yard Piping		5%		$3,480,000
UD #1 Default Description		0%		$0
UD #2 Default Description		0%		$0
UD #3 Default Description		0%		$0
SUBTOTAL with Additional Project Costs				$83,360,000
CONTRACTOR MARKUPS:				
Overhead		10%	$83,360,000	$8,340,000
Subtotal				$91,700,000
Profit		5%	$91,700,000	$4,590,000
Subtotal				$96,290,000
Mob/Bonds/Insurance		5%	$96,290,000	$4,820,000
Subtotal				$101,110,000
Contingency		30%	$101,110,000	$30,340,000
SUBTOTAL with Markups				$131,450,000
ESCALATION (to Mid-Point of Construction)		4.6%	$131,450,000	$6,050,000
SUBTOTAL with Escalation				$137,500,000
LOCATION ADJUSTMENT FACTOR		99.9	$137,500,000	$137,370,000
SUBTOTAL - with Local Adjustment Factor				$137,370,000
MARKET ADJUSTMENT FACTOR		0%	$137,370,000	$0
SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor				$137,370,000
Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:				
Name of Process Reviewer			Gomez	Click for Reviewe
Name of Estimator Reviewer			Meyer	
MAXIMUM CONSTRUCTION COST				$137,370,000
NON-CONSTRUCTION COSTS:				
Permitting		3%	$137,370,000	$4,130,000
Engineering		8%	$137,370,000	$10,990,000
Services During Construction		9%	$137,370,000	$12,370,000
Commissioning & Startup		2%	$137,370,000	$2,750,000
Land / ROW		3%	$137,370,000	$4,130,000
Legal / Admin		5%	$137,370,000	$6,870,000
Other Default Description		0%	$137,370,000	$0
SUBTOTAL - Non-Construction Costs				$41,240,000
TOTAL - CAPITAL COST				$178,610,000

Currency Conversion of TOTAL CAPITAL COST:

Currency	Unit of Measure	Conversion Rate	Converted Amount
None	U.S.Dollar	1	178,610,000

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/7/2011

Click for CPES QA/ QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Wilsonville pipelines
Project Number:	
Project Manager:	
Estimator:	
Project Description:	
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

☐ This Report is for INTERNAL Distributio

☐ This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT		Cost
	Yes	Pressure Pipe: Seg1		$38,400,000
	Yes	Pressure Pipe: Seg2		$43,600,000
	Yes	Pressure Pipe: Seg3		$15,250,000
	Yes	Pressure Pipe: Seg4		$11,120,000
	Yes	Pressure Pipe: Seg5		$5,550,000
	Yes	Pressure Pipe: Seg6		$46,840,000
	Yes	Pressure Pipe: Seg7		$13,270,000
	Yes	Pressure Pipe: Seg8		$20,000,000
	No	Pressure Pipe: seg9		$0
SUBTOTAL - PROJECT COST				$194,030,000
ADDITIONAL PROJECT COSTS:				
Demolition		0%		$0
Overall Sitework		0%		$0
Plant Computer System		0%		$0
Yard Electrical		0%		$0
Yard Piping		0%		$0
UD #1 Default Description		0%		$0
UD #2 Default Description		0%		$0
UD #3 Default Description		0%		$0
SUBTOTAL with Additional Project Costs				$194,030,000
CONTRACTOR MARKUPS:				
Overhead		10%	$194,030,000	$19,410,000
Subtotal				$213,440,000
Profit		5%	$213,440,000	$10,680,000
Subtotal				$224,120,000
Mob/Bonds/Insurance		5%	$224,120,000	$11,210,000
Subtotal				$235,330,000
Contingency		30%	$235,330,000	$70,600,000
SUBTOTAL with Markups				$305,930,000
ESCALATION (to Mid-Point of Construction		4.6%	$305,930,000	$14,080,000
SUBTOTAL with Escalation				$320,010,000
LOCATION ADJUSTMENT FACTOR		99.9	$320,010,000	$319,690,000
SUBTOTAL - with Local Adjustment Factor				$319,690,000
MARKET ADJUSTMENT FACTOR		0%	$319,690,000	$0
SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor				$319,690,000

Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:

Name of Process Reviewer		Price	Click for Review
Name of Estimator Reviewer		Meyer	
MAXIMUM CONSTRUCTION COST			$319,690,000

NON-CONSTRUCTION COSTS:				
Permitting	3%	$319,690,000	$9,600,000
Engineering	8%	$319,690,000	$25,580,000
Services During Construction	9%	$319,690,000	$28,780,000
Commissioning & Startup	2%	$319,690,000	$6,400,000
Land / ROW	3%	$319,690,000	$9,600,000
Legal / Admin	5%	$319,690,000	$15,990,000
Other Default Description	0%	$319,690,000	$0
SUBTOTAL - Non-Construction Costs			$95,950,000
TOTAL - CAPITAL COST			$415,640,000

Currency Conversion of TOTAL CAPITAL COST:

Currency	Unit of Measure	Conversion Rate	Converted Amount
None	U.S.Dollar	1	415,640,000

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011 | Click for CPES QA/ QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Portland pipelines
Project Number:	
Project Manager:	
Estimator:	
Project Description:	
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

☐ This Report is for INTERNAL Distributio

☒ This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT		Cost
	Yes	Pressure Pipe: Portland		$243,900,000
	Yes	Pressure Pipe: Hillsboro		$28,760,000
	Yes	Pressure Pipe: 60inch		$113,780,000
SUBTOTAL - PROJECT COST				$386,440,000
ADDITIONAL PROJECT COSTS:				
Demolition		0%		$0
Overall Sitework		0%		$0
Plant Computer System		0%		$0
Yard Electrical		0%		$0
Yard Piping		0%		$0
UD #1 Default Description		0%		$0
UD #2 Default Description		0%		$0
UD #3 Default Description		0%		$0
SUBTOTAL with Additional Project Costs				$386,440,000
CONTRACTOR MARKUPS:				
Overhead		10%	$386,440,000	$38,650,000
Subtotal				$425,090,000
Profit		5%	$425,090,000	$21,260,000
Subtotal				$446,350,000
Mob/Bonds/Insurance		5%	$446,350,000	$22,320,000
Subtotal				$468,670,000
Contingency		30%	$468,670,000	$140,610,000
SUBTOTAL with Markups				$609,280,000
ESCALATION (to Mid-Point of Construction		4.6%	$609,280,000	$28,030,000
SUBTOTAL with Escalation				$637,310,000
LOCATION ADJUSTMENT FACTOR		99.9	$637,310,000	$636,680,000
SUBTOTAL - with Local Adjustment Factor				$636,680,000
MARKET ADJUSTMENT FACTOR		0%	$636,680,000	$0
SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor				$636,680,000

Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:

Name of Process Reviewer		Price	Click for Reviewe
Name of Estimator Reviewer		Meyer	
MAXIMUM CONSTRUCTION COST			$636,680,000
NON-CONSTRUCTION COSTS:			
Permitting	0%	$636,680,000	$0
Engineering	8%	$636,680,000	$50,940,000
Services During Construction	9%	$636,680,000	$57,310,000
Commissioning & Startup	2%	$636,680,000	$12,740,000
Land / ROW	3%	$636,680,000	$19,110,000
Legal / Admin	5%	$636,680,000	$31,840,000
Other Default Description	0%	$636,680,000	$0
SUBTOTAL - Non-Construction Costs			$171,940,000
TOTAL - CAPITAL COST			$808,620,000

Currency Conversion of TOTAL CAPITAL COST:

Currency	Unit of Measure	Conversion Rate	Converted Amount
None	U.S.Dollar	1	808,620,000

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Newberg West
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	Newberg West Pipelines
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

This Report is for INTERNAL Distributio

This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	Pressure Pipe: NWSEG1	$8,340,000
	Yes	Pressure Pipe: NWSEG2	$900,000
	Yes	Pressure Pipe: NWSEG2MICR	$1,520,000
	Yes	Pressure Pipe: NWSEG3	$2,440,000
	Yes	Pressure Pipe: NWSEG4	$12,220,000
	Yes	Pressure Pipe: NWWWSEG5	$84,670,000
	Yes	Pressure Pipe: NWSEG6	$330,000
	Yes	Pressure Pipe: NWSEG7	$38,600,000
	Yes	Pressure Pipe: NWSEG8	$10,420,000
	Yes	Pressure Pipe: NWSEG9	$590,000
	Yes	Pressure Pipe: NWSEG10	$1,490,000
	Yes	Pressure Pipe: NWSEG11	$2,410,000
	Yes	Pressure Pipe: NWSEG12	$3,720,000
	Yes	Pressure Pipe: NWSEG13	$5,060,000
	Yes	Pressure Pipe: NWSEG14	$35,400,000
	Yes	Pressure Pipe: NWSEG15	$3,610,000
	Yes	Pressure Pipe: NWSEG16	$12,150,000
	Yes	Pressure Pipe: NWSEG17	$7,960,000
	Yes	Pressure Pipe: NWSEG18	$4,790,000
	Yes	Pressure Pipe: NWSEG19	$7,300,000
	Yes	Gravity Pipe: GFAV	$0
	Yes	Pressure Pipe: NWSEG20	$21,390,000
	Yes	Pressure Pipe: NWSEG21	$14,500,000
	Yes	Pressure Pipe: NWSEG22	$1,550,000
SUBTOTAL - PROJECT COST			$281,360,000
ADDITIONAL PROJECT COSTS:			
Demolition		0%	$0
Overall Sitework		0%	$0
Plant Computer System		0%	$0
Yard Electrical		0%	$0
Yard Piping		0%	$0
UD #1 Default Description		0%	$0

	A	B	C	D	E
56		***UD #2 Default Description***	**0%**		**$0**
57		***UD #3 Default Description***	**0%**		**$0**
58		***SUBTOTAL with Additional Project Costs***			**$281,360,000**
59					
60	***CONTRACTOR MARKUPS:***				
61		***Overhead***	**10%**	**$281,360,000**	**$28,140,000**
62		***Subtotal***			**$309,500,000**
63		***Profit***	**5%**	**$309,500,000**	**$15,480,000**
64		***Subtotal***			**$324,980,000**
65		***Mob/Bonds/Insurance***	**5%**	**$324,980,000**	**$16,250,000**
66		***Subtotal***			**$341,230,000**
67		***Contingency***	**30%**	**$341,230,000**	**$102,370,000**
68		***SUBTOTAL with Markups***			**$443,600,000**
69					
70	***ESCALATION (to Mid-Point of Construction)***		**4.6%**	**$443,600,000**	**$20,410,000**
71		***SUBTOTAL with Escalation***			**$464,010,000**
72					
73	***LOCATION ADJUSTMENT FACTOR***		**99.9**	**$464,010,000**	**$463,550,000**
74		***SUBTOTAL - with Local Adjustment Factor***			**$463,550,000**
75					
76	***RED FLAGS:***				
77	***1***	***Rock Excavation***			
78	***2***	***Pile Foundations***			
79	***3***	***Seismic Foundations***			
80	***4***	***Dewatering Conditions***			
81	***5***	***Wetlands Mitigation***			
82	***6***	***Weather Impacts***			
83	***7***	***Depth of Structures***			
84	***8***	***Local Building Code Restrictions***			
85	***9***	***Coatings or Finishes***			
86	***10***	***Building or Architectural Considerations***			
87	***11***	***Client Material Preferences***			
88	***12***	***Client Equipment Preferences***			
89	***13***	***Piping Galleries, Piping Trenches, Piping Racks***			
90	***14***	***Yard Piping Complexity***			
91	***15***	***Existing Site Utilities (New, Retrofit, and Complexity)***			
92	***16***	***I & C Automation (New or Retrofit)***			
93	***17***	***Electrical Feed (New or Retrofit)***			
94	***18***	***Electrical Distribution***			
95	***19***	***Shoring***			
96	***20***	***Contamination***			
97	***21***	***User Defined Red Flag 1***			
98	***22***	***User Defined Red Flag 2***			
99	***23***	***User Defined Red Flag 3***			
100	***24***	***User Defined Red Flag 4***			
101	***25***	***User Defined Red Flag 5***			
102	***26***	***User Defined Red Flag 6***			
103	***27***	***User Defined Red Flag 7***			
104	***TOTAL - RED FLAGS***				**$0**
105					
106	***SUBTOTAL - CONSTRUCTION COST with Red Flags***				**$463,550,000**
107					
108	***MARKET ADJUSTMENT FACTOR***		**0%**	**$463,550,000**	**$0**
109	***SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor***				**$463,550,000**
110	***Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:***				
111	***Name of Process Reviewer***			**Price**	**Click for Reviewe**
112	***Name of Estimator Reviewer***			**Meyer**	

	A	B	C	D	E
113	***MAXIMUM CONSTRUCTION COST***				**$463,550,000**
114					
115	***NON-CONSTRUCTION COSTS:***				
116	***Permitting***		**0%**	**$463,550,000**	**$0**
117	***Engineering***		**0%**	**$463,550,000**	**$0**
118	***Services During Construction***		**0%**	**$463,550,000**	**$0**
119	***Commissioning & Startup***		**0%**	**$463,550,000**	**$0**
120	***Land / ROW***		**0%**	**$463,550,000**	**$0**
121	***Legal / Admin***		**0%**	**$463,550,000**	**$0**
122	***Other Default Description***		**0%**	**$463,550,000**	**$0**
123	***SUBTOTAL - Non-Construction Costs***				**$0**
124					
125	***TOTAL - CAPITAL COST***				**$463,550,000**
126					
127	***Currency Conversion of TOTAL CAPITAL COST:***				
128		***Currency***	***Unit of Measure***	***Conversion Rate***	***Converted Amount***
129		**None**	**U.S.Dollar**	**1**	**463,550,000**

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011 | Click for CPES QA/ QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Newberg Screens and Raw Water Pump Station
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

☐ This Report is for INTERNAL Distributio

☐ This Report is for EXTERNAL Distributic

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT		Cost
	Yes	RW Screening & PS: SCRNPMP		$8,380,000
SUBTOTAL - PROJECT COST				$8,380,000
ADDITIONAL PROJECT COSTS:				
Demolition		0%		$0
Overall Sitework		8%		$680,000
Plant Computer System		2%		$170,000
Yard Electrical		5%		$420,000
Yard Piping		5%		$420,000
UD #1 Default Description		0%		$0
UD #2 Default Description		0%		$0
UD #3 Default Description		0%		$0
SUBTOTAL with Additional Project Costs				$10,070,000
CONTRACTOR MARKUPS:				
Overhead		10%	$10,070,000	$1,010,000
Subtotal				$11,080,000
Profit		5%	$11,080,000	$560,000
Subtotal				$11,640,000
Mob/Bonds/Insurance		5%	$11,640,000	$590,000
Subtotal				$12,230,000
Contingency		30%	$12,230,000	$3,670,000
SUBTOTAL with Markups				$15,900,000
ESCALATION (to Mid-Point of Construction):		4.6%	$15,900,000	$740,000
SUBTOTAL with Escalation				$16,640,000
LOCATION ADJUSTMENT FACTOR		99.9	$16,640,000	$16,630,000
SUBTOTAL - with Local Adjustment Factor				$16,630,000
MARKET ADJUSTMENT FACTOR		0%	$16,630,000	$0
SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor				$16,630,000
Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:				
Name of Process Reviewer			Gomez	Click for Reviewe
Name of Estimator Reviewer			Meyer	
MAXIMUM CONSTRUCTION COST				$16,630,000
NON-CONSTRUCTION COSTS:				
Permitting		3%	$16,630,000	$500,000
Engineering		8%	$16,630,000	$1,340,000
Services During Construction		9%	$16,630,000	$1,500,000
Commissioning & Startup		2%	$16,630,000	$340,000
Land / ROW		3%	$16,630,000	$500,000
Legal / Admin		5%	$16,630,000	$840,000
Other Default Description		0%	$16,630,000	$0
SUBTOTAL - Non-Construction Costs				$5,020,000
TOTAL - CAPITAL COST				$21,650,000

Currency Conversion of TOTAL CAPITAL COST:

Currency	Unit of Measure	Conversion Rate	Converted Amount
None	U.S.Dollar	1	21,650,000

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Newberg East Pipelines
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	Newberg East Pipelines
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

☐ This Report is for INTERNAL Distributio

☐ This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT		Cost
	Yes	Pressure Pipe: NE1		$2,740,000
	Yes	Pressure Pipe: NE2		$17,100,000
	Yes	Pressure Pipe: NE3		$59,380,000
	Yes	Pressure Pipe: NE4		$10,230,000
	Yes	Pressure Pipe: NE5		$25,260,000
	Yes	Pressure Pipe: NE6		$47,790,000
	Yes	Pressure Pipe: NE7		$16,050,000
	Yes	Pressure Pipe: NE8		$12,250,000
	Yes	Pressure Pipe: NE9		$21,730,000
SUBTOTAL - PROJECT COST				$212,530,000
ADDITIONAL PROJECT COSTS:				
Demolition		0%		$0
Overall Sitework		0%		$0
Plant Computer System		0%		$0
Yard Electrical		0%		$0
Yard Piping		0%		$0
UD #1 Default Description		0%		$0
UD #2 Default Description		0%		$0
UD #3 Default Description		0%		$0
SUBTOTAL with Additional Project Costs				$212,530,000
CONTRACTOR MARKUPS:				
Overhead		10%	$212,530,000	$21,260,000
Subtotal				$233,790,000
Profit		5%	$233,790,000	$11,690,000
Subtotal				$245,480,000
Mob/Bonds/Insurance		5%	$245,480,000	$12,280,000
Subtotal				$257,760,000
Contingency		30%	$257,760,000	$77,330,000
SUBTOTAL with Markups				$335,090,000

	A	B	C	D	E
54					
55	***ESCALATION (to Mid-Point of Construction)***		**4.6%**	**$335,090,000**	**$15,420,000**
56	***SUBTOTAL with Escalation***				**$350,510,000**
57					
58	***LOCATION ADJUSTMENT FACTOR***		**99.9**	**$350,510,000**	**$350,160,000**
59	***SUBTOTAL - with Local Adjustment Factor***				**$350,160,000**
60					
93	***MARKET ADJUSTMENT FACTOR***		**0%**	**$350,160,000**	**$0**
94	***SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor***				**$350,160,000**
95	***Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:***				
96	***Name of Process Reviewer***			**Price**	**Click for Reviewe**
97	***Name of Estimator Reviewer***			**Meyer**	
98	***MAXIMUM CONSTRUCTION COST***				**$350,160,000**
99					
100	***NON-CONSTRUCTION COSTS:***				
101	***Permitting***		**3%**	**$350,160,000**	**$10,510,000**
102	***Engineering***		**8%**	**$350,160,000**	**$28,020,000**
103	***Services During Construction***		**9%**	**$350,160,000**	**$31,520,000**
104	***Commissioning & Startup***		**2%**	**$350,160,000**	**$7,010,000**
105	***Land / ROW***		**3%**	**$350,160,000**	**$10,510,000**
106	***Legal / Admin***		**5%**	**$350,160,000**	**$17,510,000**
107	***Other Default Description***		**0%**	**$350,160,000**	**$0**
108	***SUBTOTAL - Non-Construction Costs***				**$105,080,000**
109					
110	***TOTAL - CAPITAL COST***				**$455,240,000**
111					
112	***Currency Conversion of TOTAL CAPITAL COST:***				
113		***Currency***	***Unit of Measure***	***Conversion Rate***	***Converted Amount***
114		**None**	**U.S.Dollar**	**1**	**455,240,000**

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	NGSO Water Treatment Plant Scappoose
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	Dual Media WTP for iron and manganese removal and groundwater under influence of surface water: With generator
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

○ This Report is for INTERNAL Distributio

◉ This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	Inline Rapid Mix: NGSORPDMX	$880,000
	No	UV Disinfection: NGSOUV	$0
	Yes	Chlorine Gas: CL2	$1,320,000
	Yes	V.P. Filter: Dual Media	$61,620,000
	Yes	Concrete Clearwell: Clearwell	$8,500,000
	Yes	Sludge Drying Beds: Sludge	$11,780,000
	Yes	Vertical Turbine PS: Pumping	$9,340,000
	Yes	Pressure Membrane: ROsplit	$48,460,000

SUBTOTAL - PROJECT COST			$141,900,000
ADDITIONAL PROJECT COSTS:			
Demolition	0%		$0
Overall Sitework	2%		$2,840,000
Plant Computer System	2%		$2,840,000
Yard Electrical	4%		$5,680,000
Yard Piping	4%		$5,680,000
UD #1 Default Description	0%		$0
UD #2 Default Description	0%		$0
UD #3 Default Description	0%		$0
SUBTOTAL with Additional Project Costs			$158,940,000
CONTRACTOR MARKUPS:			
Overhead	10%	$158,940,000	$15,900,000
Subtotal			$174,840,000
Profit	5%	$174,840,000	$8,750,000
Subtotal			$183,590,000
Mob/Bonds/Insurance	5%	$183,590,000	$9,180,000
Subtotal			$192,770,000
Contingency	30%	$192,770,000	$57,840,000
SUBTOTAL with Markups			$250,610,000

	A	B	C	D	E
53					
54	ESCALATION (to Mid-Point of Construction)		4.6%	$250,610,000	$11,530,000
55	SUBTOTAL with Escalation				$262,140,000
56					
57	LOCATION ADJUSTMENT FACTOR		99.9	$262,140,000	$261,880,000
58	SUBTOTAL - with Local Adjustment Factor				$261,880,000
91					
92	MARKET ADJUSTMENT FACTOR		0%	$261,880,000	$0
93	SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor				$261,880,000
94	Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:				
95	Name of Process Reviewer			Gomez	Click for Reviewe
96	Name of Estimator Reviewer			Meyer	
97	MAXIMUM CONSTRUCTION COST				$261,880,000
98					
99	NON-CONSTRUCTION COSTS:				
100	Permitting		3%	$261,880,000	$7,860,000
101	Engineering		8%	$261,880,000	$20,960,000
102	Services During Construction		7%	$261,880,000	$18,340,000
103	Commissioning & Startup		2%	$261,880,000	$5,240,000
104	Land / ROW		3%	$261,880,000	$7,860,000
105	Legal / Admin		5%	$261,880,000	$13,100,000
106	Other Default Description		0%	$261,880,000	$0
107	SUBTOTAL - Non-Construction Costs				$73,360,000
108					
109	TOTAL - CAPITAL COST				$335,240,000
110					
111	Currency Conversion of TOTAL CAPITAL COST:				
112		Currency	Unit of Measure	Conversion Rate	Converted Amount
113		None	U.S.Dollar	1	335,240,000

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/7/2011

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Northern Groundwater Supply Option
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	Pipelines for Northern Groundwater Supply Option
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

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Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	Pressure Pipe: NGSO_1	$1,460,000
	Yes	Pressure Pipe: NGSO_2	$1,430,000
	Yes	Pressure Pipe: NGSO_3	$2,530,000
	Yes	Pressure Pipe: NGSO_3T	$530,000
	Yes	Pressure Pipe: NGSO_4	$2,410,000
	Yes	Pressure Pipe: NGSO_5	$3,440,000
	Yes	Pressure Pipe: NGSO_5T	$380,000
	Yes	Pressure Pipe: NGSO_6	$3,200,000
	Yes	Pressure Pipe: NGSO_6T	$570,000
	Yes	Pressure Pipe: NGSO_7	$3,970,000
	Yes	Pressure Pipe: NGSO_7T	$590,000
	Yes	Pressure Pipe: NGSO_8	$3,140,000
	Yes	Pressure Pipe: NGSO_8T	$630,000
	Yes	Pressure Pipe: NGSO_9	$4,530,000
	Yes	Pressure Pipe: NGSO_9T	$3,310,000
	Yes	Pressure Pipe: NGSO_10	$6,570,000
	Yes	Pressure Pipe: NGSO_10T	$670,000
	Yes	Pressure Pipe: NGSO_11	$14,550,000
	Yes	Pressure Pipe: NGSO_12	$19,220,000
	Yes	Pressure Pipe: NGSO_13	$40,610,000
	Yes	Pressure Pipe: NGSO_14	$12,640,000
	Yes	Pressure Pipe: NGSO_14T	$630,000
	Yes	Pressure Pipe: NGSO_15	$9,320,000
	Yes	Pressure Pipe: NGSO_15T	$1,780,000
	Yes	Pressure Pipe: NGSO_16	$5,690,000
	Yes	Pressure Pipe: NGSO_16T	$630,000
	Yes	Pressure Pipe: NGSO_17	$19,790,000
	Yes	Pressure Pipe: NGSO_17T	$4,370,000
SUBTOTAL - PROJECT COST			$168,590,000
ADDITIONAL PROJECT COSTS:			
Demolition	0%		$0
Overall Sitework	0%		$0
Plant Computer System	0%		$0

	A	B	C	D	E
57	Yard Electrical		0%		$0
58	Yard Piping		0%		$0
59	UD #1 Default Description		0%		$0
60	UD #2 Default Description		0%		$0
61	UD #3 Default Description		0%		$0
62	SUBTOTAL with Additional Project Costs				$168,590,000
63					
64	CONTRACTOR MARKUPS:				
65	Overhead		10%	$168,590,000	$16,860,000
66	Subtotal				$185,450,000
67	Profit		5%	$185,450,000	$9,280,000
68	Subtotal				$194,730,000
69	Mob/Bonds/Insurance		5%	$194,730,000	$9,740,000
70	Subtotal				$204,470,000
71	Contingency		30%	$204,470,000	$61,350,000
72	SUBTOTAL with Markups				$265,820,000
73					
74	ESCALATION (to Mid-Point of Construction)		4.6%	$265,820,000	$12,230,000
75	SUBTOTAL with Escalation				$278,050,000
76					
77	LOCATION ADJUSTMENT FACTOR		99.9	$278,050,000	$277,780,000
78	SUBTOTAL - with Local Adjustment Factor				$277,780,000
79					
112	MARKET ADJUSTMENT FACTOR		0%	$277,780,000	$0
113	SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor				$277,780,000
114	Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:				
115	Name of Process Reviewer			Price	Click for Reviewe
116	Name of Estimator Reviewer			Meyer	
117	MAXIMUM CONSTRUCTION COST				$277,780,000
118					
119	NON-CONSTRUCTION COSTS:				
120	Permitting		5%	$277,780,000	$13,890,000
121	Engineering		8%	$277,780,000	$22,230,000
122	Services During Construction		7%	$277,780,000	$19,450,000
123	Commissioning & Startup		3%	$277,780,000	$8,340,000
124	Land / ROW		3%	$277,780,000	$8,340,000
125	Legal / Admin		5%	$277,780,000	$13,890,000
126	Other Default Description		0%	$277,780,000	$0
127	SUBTOTAL - Non-Construction Costs				$86,140,000
128					
129	TOTAL - CAPITAL COST				$363,920,000
130					
131	Currency Conversion of TOTAL CAPITAL COST:				
132		Currency	Unit of Measure	Conversion Rate	Converted Amount
133		None	U.S.Dollar	1	363,920,000

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	NGSO-McCarthy Creek 80 MGD Booster Pumping Station
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	NGSO-Hillsboro
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2012
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2012

Roundup to the nearest: $10,000

☐ This Report is for INTERNAL Distributio

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Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT		Cost
	Yes	Vertical Turbine PS: MCCARTHY		$9,260,000
SUBTOTAL - PROJECT COST				$9,260,000
ADDITIONAL PROJECT COSTS:				
Demolition		0%		$0
Overall Sitework		1%		$100,000
Plant Computer System		1%		$100,000
Yard Electrical		2%		$190,000
Yard Piping		0%		$0
UD #1 Default Description		0%		$0
UD #2 Default Description		0%		$0
UD #3 Default Description		0%		$0
SUBTOTAL with Additional Project Costs				$9,650,000
CONTRACTOR MARKUPS:				
Overhead		10%	$9,650,000	$970,000
Subtotal				$10,620,000
Profit		5%	$10,620,000	$540,000
Subtotal				$11,160,000
Mob/Bonds/Insurance		5%	$11,160,000	$560,000
Subtotal				$11,720,000
Contingency		30%	$11,720,000	$3,520,000
SUBTOTAL with Markups				$15,240,000
ESCALATION (to Mid-Point of Construction)		4.6%	$15,240,000	$710,000
SUBTOTAL with Escalation				$15,950,000
LOCATION ADJUSTMENT FACTOR		99.9	$15,950,000	$15,940,000
SUBTOTAL - with Local Adjustment Factor				$15,940,000

	A	B	C	D	E
85	***MARKET ADJUSTMENT FACTOR***		**0%**	**$15,940,000**	**$0**
86	***SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor***				**$15,940,000**
87	***Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:***				
88	***Name of Process Reviewer***			**Gomez**	Click for Reviewe
89	***Name of Estimator Reviewer***			**Meyer**	
90	***MAXIMUM CONSTRUCTION COST***				**$15,940,000**
91					
92	***NON-CONSTRUCTION COSTS:***				
93	***Permitting***		**3%**	**$15,940,000**	**$480,000**
94	***Engineering***		**8%**	**$15,940,000**	**$1,280,000**
95	***Services During Construction***		**8%**	**$15,940,000**	**$1,280,000**
96	***Commissioning & Startup***		**3%**	**$15,940,000**	**$480,000**
97	***Land / ROW***		**3%**	**$15,940,000**	**$480,000**
98	***Legal / Admin***		**5%**	**$15,940,000**	**$800,000**
99	***Other Default Description***		**0%**	**$15,940,000**	**$0**
100	***SUBTOTAL - Non-Construction Costs***				**$4,800,000**
101					
102	***TOTAL - CAPITAL COST***				**$20,740,000**
103					
104	***Currency Conversion of TOTAL CAPITAL COST:***				
105		***Currency***	***Unit of Measure***	***Conversion Rate***	***Converted Amount***
106		**None**	**U.S.Dollar**	**1**	**20,740,000**

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 2/8/2011

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Hillsboro WTP
Project Number:	
Project Manager:	Brad Phelps
Estimator:	Joe Broberg
Project Description:	Hillsboro 36 MGD WTP
Project Location (City):	Portland OR
Project Location (State):	OREGON
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months):	12
Mid-Point of Construction:	Jul/2011

Roundup to the nearest: $10,000

This Report is for INTERNAL Distributio

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Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	Inline Rapid Mix: RPDMX	$980,000
	Yes	Actiflo: ACTIFLO	$4,710,000
	Yes	Filters: FILTERS	$12,070,000
	Yes	Ozone O-U: OZONE	$9,100,000
	Yes	Chlorine Gas: CL2GAS	$1,250,000
	Yes	Concrete Clearwell: CLRWLL	$1,850,000
	Yes	Liquid Chemical: COAGULANT	$480,000
	Yes	Sludge Drying Beds: RESIDUALS	$1,440,000
	Yes	Gravity Thickener: Thickener	$430,000
	Yes	Filter BW PS: BCKWSHPMP	$1,340,000
	Yes	Liquid Chemical: New_CAPoly	$220,000

SUBTOTAL - PROJECT COST				$33,870,000
ADDITIONAL PROJECT COSTS:				
Demolition	0%			$0
Overall Sitework	8%			$2,710,000
Plant Computer System	2%			$680,000
Yard Electrical	5%			$1,700,000
Yard Piping	5%			$1,700,000
UD #1 Default Description	0%			$0
UD #2 Default Description	0%			$0
UD #3 Default Description	0%			$0
SUBTOTAL with Additional Project Costs				$40,660,000
CONTRACTOR MARKUPS:				
Overhead	10%		$40,660,000	$4,070,000
Subtotal				$44,730,000
Profit	5%		$44,730,000	$2,240,000
Subtotal				$46,970,000
Mob/Bonds/Insurance	5%		$46,970,000	$2,350,000
Subtotal				$49,320,000

	A	B	C	D	E
54	***Contingency***		**30%**	**$49,320,000**	**$14,800,000**
55	***SUBTOTAL with Markups***				**$64,120,000**
56					
57	***ESCALATION (to Mid-Point of Construction)***		**1.5%**	**$64,120,000**	**$970,000**
58	***SUBTOTAL with Escalation***				**$65,090,000**
59					
60	***LOCATION ADJUSTMENT FACTOR***		**99.9**	**$65,090,000**	**$65,030,000**
61	***SUBTOTAL - with Local Adjustment Factor***				**$65,030,000**
62					
95	***MARKET ADJUSTMENT FACTOR***		**0%**	**$65,030,000**	**$0**
96	***SUBTOTAL - CONSTRUCTION COST with Market Adjustment Factor***				**$65,030,000**
97	***Your CPES Estimate MUST be reviewed by a Process person AND an Estimator:***				
98	***Name of Process Reviewer***			**Gomez**	Click for Reviewe
99	***Name of Estimator Reviewer***			**Meyer**	
100	***MAXIMUM CONSTRUCTION COST***				**$65,030,000**
101					
102	***NON-CONSTRUCTION COSTS:***				
103	***Permitting***		**3%**	**$65,030,000**	**$1,960,000**
104	***Engineering***		**8%**	**$65,030,000**	**$5,210,000**
105	***Services During Construction***		**9%**	**$65,030,000**	**$5,860,000**
106	***Commissioning & Startup***		**2%**	**$65,030,000**	**$1,310,000**
107	***Land / ROW***		**3%**	**$65,030,000**	**$1,960,000**
108	***Legal / Admin***		**5%**	**$65,030,000**	**$3,260,000**
109	***Other Default Description***		**0%**	**$65,030,000**	**$0**
110	***SUBTOTAL - Non-Construction Costs***				**$19,560,000**
111					
112	***TOTAL - CAPITAL COST***				**$84,590,000**
113					
114	***Currency Conversion of TOTAL CAPITAL COST:***				
115		***Currency***	***Unit of Measure***	***Conversion Rate***	***Converted Amount***
116		**None**	**U.S.Dollar**	**1**	**84,590,000**