



King County

Metropolitan King County Council
King County Auditor's Office
Cheryle A. Broom, *King County Auditor*
King County Courthouse
516 Third Avenue, Room W1033
Seattle, WA 98104-3272
206.296.1655 Fax 206.296.0159
TTY 296-1024
<http://www.kingcounty.gov/operations/auditor.aspx>

MEMORANDUM

DATE: April 13, 2009

TO: King County Council Government Accountability and Oversight Committee

FROM: Cheryle A. Broom, ^{CB} County Auditor

SUBJECT: Brightwater Project Quarterly Oversight Report

Attached is the seventh Brightwater Project Construction Phase Oversight Monitoring Consultant Report prepared by R.W. Beck, the Oversight Monitoring Consultant (OMC), issued under the Council-mandated Capital Projects Oversight Program. This report provides an updated review of the Brightwater Project cost, schedule, and risks based on the Wastewater Treatment Division's (WTD) progress as of December 2008. Emerging issues that have recently surfaced are also highlighted in the report along with implementation status of past OMC recommendations.

The OMC maintains their position that the Brightwater Project costs are more likely to be in the \$1.843 to \$1.849 billion range, or \$41 to \$47 million higher than the WTD 2008 trend report estimate. WTD plans to update its cost estimate in the 2009 Trend Report that will be available at the end of April. The OMC and the Brightwater Project Oversight Work Group have discussed several components of the estimate update during the past quarter.

The concerns about conveyance schedule delays continue since the last quarterly report. WTD's most recent schedule report (January 31, 2009) shows a 189-day delay in the overall critical path. This is 26 days longer than reported in the previous quarter, and extends the projected date for commencing wastewater treatment to September 12, 2011.

The critical path has shifted from the western segment, known as BT-3, of the Central Tunnel, to the eastern segment, BT-2. Oversight efforts will continue to be focused on WTD's mitigation strategies to address this delay on the primary critical path and efforts to quantify the risks and mitigate the impacts of schedule delay.

The OMC report also documents WTD's ongoing efforts to address previous recommendations made to better manage cost and schedule risks on the project. In addition, the OMC makes one new oversight recommendation:

WTD should make additional change order documentation available to the OMC per existing communication protocols. Documentation should show how change orders and issues likely to become change orders are categorized and should compare the contractor's original requested change order amount versus negotiated amount once change orders are executed.

No formal presentation of this quarterly report has been scheduled for the Government Oversight and Accountability Committee. We have tentatively scheduled a briefing of the committee on May 19 for the OMC report on WTD's upcoming 2009 Trend Report. Please contact Tina Rogers, the Capital Projects Oversight Manager, or me should you have questions or comments on the report.

CB:TR:SB:jl

Attachments: Brightwater Project Construction Phase Oversight Monitoring Consultant Report, R.W. Beck, (Quarter Ending December 31, 2008)

cc: Metropolitan King County Councilmembers
Ron Sims, County Executive
Theresa Jennings, Director, Department of Natural Resources and Parks (DNRP)
Christie True, Division Director, Wastewater Treatment Division, DNRP
Bob Cowan, Budget Director, Office of Management & Budget (OMB)
Dan Lawson, Internal Audit, Executive Audit Services, OMB
David Jochim, Vice President, R.W. Beck, Inc.
Tom Jacobs, Senior Management Consultant, R.W. Beck, Inc.
Saroja Reddy, King County Council Policy Staff Director
Mike Alvine, Principal Legislative Analyst, King County Council, Government
Accountability and Oversight Committee
Mark Melroy, Senior Principal Legislative Analyst, King County Council
Budget and Fiscal Management Committee
Beth Mountsier, Senior Principal Legislative Analyst, King County Council
Regional Water Quality Committee

Brightwater Project Construction Phase
Oversight Monitoring Consultant Report
(Quarter Ending December 31, 2008)

King County
Brightwater Project Oversight Services
Contract No. P43024



In association with:



Hatch Mott
MacDonald

Brightwater Project Construction Phase
Oversight Monitoring Consultant Report
(Quarter Ending December 31, 2008)

King County
Brightwater Project Oversight Services
Contract No. P43024



In association with:



Hatch Mott
MacDonald

Brightwater Project Construction Phase Oversight Monitoring Consultant Report Quarter Ending December 31, 2008

Final as of April 8, 2009

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This report has been prepared for the use of the client for the specific purposes identified in the report. The conclusions, observations and recommendations contained herein attributed to R. W. Beck, Inc. (R. W. Beck) constitute the opinions of R. W. Beck. To the extent that statements, information and opinions provided by the client or others have been used in the preparation of this report, R. W. Beck has relied upon the same to be accurate, and for which no assurances are intended and no representations or warranties are made. R. W. Beck makes no certification and gives no assurances except as explicitly set forth in this report.

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Brightwater Project Construction Phase
Oversight Monitoring Consultant Report
Quarter Ending December 31, 2008

Final as of April 8, 2009

Executive Summary

This Executive Summary presents highlights of the Oversight Monitoring Consultant's (OMC's) quarterly briefing on the Brightwater Project. This report is based on information through December 31, 2008, and is supplemented by more recent cost and schedule information where available.

OVERALL PROGRAM COSTS

We continue to be of the opinion, expressed in our previous quarterly reports¹ that project costs are more likely to be in the \$1.843 to \$1.849 billion range, or about \$41 to \$47 million higher than WTD's 2008 *Trend Report* estimate. (see Table ES-1, which is unchanged from our previous quarterly report). Our opinion in part reflected our concern that WTD's project contingencies² were low and had been reduced from projections WTD had made in 2007.

Table ES-1. Estimated Project Costs (nominal \$million)

	WTD 2004 Baseline 3% Infl. 5% Infl.	WTD 2007 Trend	WTD 2008 Trend	OMC Estimate Based on Review of 2007 Trend	OMC Estimate Based on Review of 2008 Trend
Conveyance	\$1,021 - \$1,106	\$928	\$927	\$946 - \$952	\$942 - \$944
Treatment Plant	\$640 - \$684	\$840	\$875	\$882 - \$911	\$901 - \$905
Total	\$1,660 - \$1,790	\$1,767	\$1,802	\$1,827 - \$1,862	\$1,843 - \$1,849

Our opinion continues to be reinforced by newer cost and schedule information. This newer cost information includes recent change order data and total 2008 construction

¹ Previous quarterly report is the Oversight Monitoring Consulting Report for the quarter ending September 30, 2008, prepared in December 2008.

² For the Brightwater project, WTD maintains both construction contingencies and project contingencies. The construction contingencies are applied to each construction contract and cover the typical risks associated with construction, such as changed subsurface contingencies. In our opinion, WTD's construction contingencies for Conveyance (\$68.6 million) and the Treatment Plant (\$33.1 million) are generally appropriate. However, we believe the project contingencies, which cover additional risks such as those associated with coordination of multiple construction contracts, are low.

management costs. Newer schedule information includes the lengthening delays (discussed below) which increase the likelihood of additional expenditures into 2011 or 2012.

WTD's 2009 Trend Report is expected to be published in April 2009. OMC will review WTD's 2009 Trend Report when it is available and will offer a revised estimate of total project cost in our next quarterly report.

SCHEDULE

WTD's most recent schedule report (dated January 31, 2009) shows the estimated hydraulic completion date for the project as June 13, 2011 and that the treatment system will start accepting wastewater for treatment on September 12, 2011. These dates represent a 189-day delay in the overall critical path (compared with the original contractor's baseline schedule), which is 108 days longer than the delay reported as of September 30, 2008. Events during February 2009 have increased the delay beyond 189 days, but the specific amount is not yet available from WTD.

The overall critical path runs through the Central Tunnel. As of December 2008, the critical path was through the BT-3 tunnel (mining starting at the North Kenmore portal and proceeding westerly to the Ballinger Way portal). In January 2009, the critical path had shifted to the BT-2 tunnel (mining starting at the North Kenmore portal and proceeding easterly to the North Creek portal). This shift in the critical path was the result of continued BT-3 mining progress while BT-2 mining was largely stopped to address significant maintenance needs.

OMC continues to await WTD's more detailed contingency and risk analysis associated with Central Tunnel, which continues to be under preparation.

Progress at the treatment plant remains on schedule. As of January 31, 2009, key substantial completion milestones for the liquids and solids contracts are in late January or early February 2011. This is approximately 14 weeks ahead of the conveyance system substantial completion, indicating the increasing risk of schedule divergence between the conveyance system and the treatment plant. WTD's startup planning will address this risk, and a significant interim startup planning work product is expected in the first quarter of 2009.

Additional developments since our previous quarterly report include substantial completion of the Marine Outfall project, the East Tunnel contractor's demobilization from the Influent Pump Station (IPS) site, beginning of construction work at the IPS by the IPS contractor, and continued progress at or ahead of schedule on the West Tunnel and at the treatment plant site.

RISKS

Looking forward, major risk issues include: unforeseen conditions during tunneling; delay risk associated with BT-2 and BT-3 mining; coordination at the IPS site between the East Tunnel, Central Tunnel, and IPS Contractors; coordination and integration of work under two different prime contractors at the Treatment Plant; and delays in Treatment Plant startup caused by Conveyance delays. There continues to be increasing optimism that the WTD's ongoing work on startup planning should help manage and mitigate some of the risk of schedule divergence between the Treatment Plant and Conveyance.

PROGRESS ON PREVIOUS OMC RECOMMENDATIONS

Outstanding OMC recommendations are related to revising contingencies in WTD's upcoming *2009 Trend Report*, the implications of a substantial Central Tunnel delay, and WTD's ongoing efforts to manage the impacts of potential delays.

In the past few months, WTD has aggressively worked to address Central Tunnel schedule delays, but OMC feels that WTD's schedule mitigation and contingency planning efforts could be more robust and should be completed earlier. In the next quarterly report, OMC will offer additional observations and recommendations about WTD's approach to risk management and OMC will comment on WTD's *2009 Trend Report*.

NEW OMC RECOMMENDATION

OMC offers one new recommendation.

1. WTD should make additional change order documentation available to the OMC per existing communication protocols. Documentation should show how change orders and issues likely to become change orders are categorized and should compare the contractor's original requested change order amount versus negotiated amount once change orders are executed.

Brightwater Quarterly Report

BACKGROUND

This report is a briefing on the Brightwater Project provided by the Project's Oversight Monitoring Consultant (OMC). Overall, this quarterly report relies on information provided through WTD's *January 2009 Monthly Report, Conveyance Construction, and Treatment Plant Construction Reports*. However, where available, we have used more recently available information to prepare this report. Specifically, this includes additional tunneling data through February 28, 2009, and information gathered through additional phone conversations and meetings with WTD.

The OMC's previous quarterly report was dated December 29, 2008, and covered the period through September 30, 2008. Since our previous quarterly report, work has progressed on both Conveyance and the Treatment Plant as described below.

Conveyance

- Work on the Marine Outfall contract is substantially complete.
- Mining for the West Tunnel (BT-4) continues to be on or slightly ahead of plan. As of March 14, 2009, approximately 29 percent of the mining is complete. In approximately one month, the tunnel boring machine (TBM) is expected to encounter high water pressures, which is expected to be the most challenging portion of the mining under this contract.
- The westbound Central Tunnel BT-3 mining remains behind plan. However, mining progress has improved substantially over the past few months as January and February production has approximately equaled plan. As of March 14, 2009, approximately 42 percent of the mining is complete. BT-3 is no longer the primary critical path, but remains a secondary critical path.
- The eastbound Central Tunnel BT-2 mining has been essentially stopped since mid-December 2008. BT-2 mining is now the primary critical path. After replacement of the TBM cutter heads and other maintenance, some mining has resumed as of mid-March. As of March 14, 2009, approximately 57 percent of the mining is complete.
- The East Tunnel contractor met a major contract milestone on January 13, 2009, when demobilization from the Influent Pump Station (IPS) site was complete. Currently, the East Tunnel contractor is beginning the installation of piping from the conveyance portal (Portal 46) located at the treatment plant site.
- Kiewit Pacific Company, the IPS contractor, has initiated construction on the IPS.

Treatment Plant

- Hoffman (liquids GC/CM contract) continues to perform concrete placement work on the head-works, grit removal system, primary treatment, and foundations for the aeration tanks and membranes. Work on pipe encasements and concrete

coatings is beginning. Also ductwork and cable tray installation has begun in the primary gallery area. Pipe installation has also begun in the Headworks, Grit and Primaries areas.

- Work by Kiewit Pacific (solids contract) continues including concrete work on the digesters, solids storage tank, and energy gallery, energy building walls, and foundations for the truck load out area. Pipe installation in the solids building continues. Cable tray and pipe supports are being installed in the Solids Building and HVAC duct is being installed in the Energy Gallery.

ANALYSIS AND FINDINGS

Cost

OMC Continues to Believe Project Costs Will be Higher than Projected by WTD

Table 1 summarizes OMC's most recent projection of project costs.

Table 1. Estimated Project Costs (nominal \$million)

	WTD 2004 Baseline 3% Infl. 5% Infl.	WTD 2007 Trend	WTD 2008 Trend	OMC Estimate Based on Review of 2007 Trend	OMC Estimate Based on Review of 2008 Trend
Conveyance	\$1,021 - \$1,106	\$928	\$927	\$946 - \$952	\$942 - \$944
Treatment Plant	\$640 - \$684	\$840	\$875	\$882 - \$911	\$901 - \$905
Total	\$1,660 - \$1,790	\$1,767	\$1,802	\$1,827 - \$1,862	\$1,843 - \$1,849

This projection was completed in our Quarterly Report for the quarter ending March 30, 2008. In that report, we provided an opinion that WTD's *Brightwater Cost Update, Current Conditions and Trends, January 2008 (2008 Trend Report)* likely underestimated costs by about \$41 to \$47 million.³ Based on ongoing developments since our previous quarterly report, we continue to believe that WTD's costs in its *2008 Trend Report* are understated.

Treatment Plant Buyout Savings Have Not Changed Substantially Since the Previous Quarterly Report

Buyout Savings are part of the GC/CM contract for the liquid stream at the treatment plant, and they represent the cumulative difference between the negotiated Maximum Allowable Construction Cost (MACC) and the actual bids awarded to subcontractors.

³ This in part reflected our concern that WTD had reduced project contingencies from the levels in its *2007 Trend Report* (i.e., for Conveyance the project contingency was reduced from \$18.2 to \$6.2 million and for the Treatment Plant the project contingency was reduced from \$4 million to \$2 million. Further, in our review of the 2007 Trend Report we also provided an opinion that we believed the \$4 million contingency for the Treatment Plant was low.) In addition, we stated our concern that some of WTD's cost projections (i.e. for Treatment Plant buyout savings and end of job "soft costs") were based on optimistic assumptions.

Thus, the amount of buyout savings can fluctuate up and down depending on the outcome of each subcontract bidding process. In addition, Buyout Savings can be used to cover certain items set forth in the GC/CM contract (described in our previous quarterly report.) WTD's GC/CM contract with Hoffman includes provisions for returning much of the buyout savings to WTD.

As of January 31, 2009, cumulative Buyout Savings were approximately \$24.9 million. This is only slightly less than the \$25.1 million value reported in our previous quarterly report (as of November 20, 2008).

Subcontractor bidding for the EECC and landscaping is expected to be completed in the second quarter of 2009.

Change Order Status

The most recent claim and change order data is from WTD's January 31, 2009 construction reports, and is as follows:

- Conveyance construction progress is approximately 56 percent, measured as percent of contract value earned by construction contractors, while executed Conveyance change orders are approximately 21 percent of WTD's conveyance construction contingency. Including pending (costs negotiated but not executed) and estimates of potential (costs not yet negotiated) change orders could increase this to a maximum of about 57 percent.

In the fourth quarter of 2008, several large potential change orders have surfaced. WTD is in discussions with the Central Tunnel contractor regarding issues related to ongoing tunneling difficulties. The West Tunnel contractor has submitted a significant change order request related to testing of the TBM prior to its delivery. WTD is currently evaluating this request.

- Treatment Plant construction progress is approximately 35 percent, measured as percent of contract value earned by construction contractors, while executed Treatment Plant change orders are approximately 7 percent of WTD's construction contingency. Including pending and estimates of potential change orders could increase this up to a maximum of about 13 percent.

Table 2 shows additional change order information through January 31, 2009, focusing on the amount of change order activity compared with construction progress to date. This data provides an early indication, should the current trends continue, of the change order activity at the end of each contract. The further along a contract is toward completion, the closer the fourth column is to the final change order record.

Table 2. Change Order Information for Major Construction Contracts (1/31/09)

Contract	Percent Construction Complete	Number of Executed and Pending Change Orders	No. of Pending Change Items (1)	Executed, Pending and Requested Change Orders As % of Amount Paid to Date	Most Significant Change Orders
East Tunnel	77%	19	15	7%	
Central Tunnel	57%	11	12	13%	Anticipated: Tunneling Conditions
West Tunnel	54%	8	6	18%	Executed: Hydraulic Changes; Requested: TBM Testing
Marine Outfall	97%	Not Available	Not Available	7%	
Influent Pump Station	5%	4	66	132%	Requested: Impact of Central Tunnel
Liquids Stream	37%	42	51	1%	
Solids Stream	17%	3	74	4%	

Note:

(1) Change items include requested change orders (contractor proposed) or request for change proposal (owner initiated). Pending change orders are those where the contractor and WTD have agreed on costs but the change order is not yet executed.

The amount of Treatment Plant change orders to date represents relatively low use of the construction contingency. The number of pending change items on the solids contract is high relative to construction completed to date.

Executed Conveyance change orders are still of a reasonable magnitude compared with construction progress to date. A recent trend, however, is an increasing number and dollar amount of pending change items compared with construction progress to date. In particular, OMC is tracking pending change item activity at the IPS, which is very high compared with construction progress to date. Implementation of our new recommendation will help verify the impact of WTD's early Notice to Proceed on the IPS, which could potentially result in an earlier submission of change orders. Central and West Tunnel contracts are also starting to display a trend that suggests change item activity is increasing.

As stated in the last OMC quarterly report, a significant amount of the tunneling remains to be completed, and thus WTD's exposure cannot yet be fully known. In general, for the overall Project progress to date, change order activity to date (measured as percent of construction contingency used) continues to support our opinion WTD's construction contingencies are generally reasonable. However, the possibility exists, and is increasing, that WTD's construction contingencies will be insufficient. OMC will reassess this opinion in our next quarterly report after WTD's *2009 Trend Report* is available.

The EECC and Landscaping MACC Has Been Negotiated

The MACC for the remaining phase of the treatment plant liquids stream was negotiated in January. This work includes the Environmental Education and Community Center (EECC) and landscaping work at the treatment plant site. Combined, the MACC for the EECC and landscaping is approximately \$15.2 million. This value is within two percent of WTD's projection in its 2008 Trend Report, provided that buyout savings for this work are approximately the historical average for the remainder of the liquids stream project.

