



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

www.metrokc.gov/auditor

MEMORANDUM

DATE: May 16, 2007

TO: King County Council Capital Budget Committee

FROM: Cheryle A. Broom, County Auditor

SUBJECT: Brightwater Project Quarterly Oversight Report

Consistent with one of the council-adopted priorities, *Earning Public Trust*, the King County Auditor's Office is pleased to transmit the attached R.W. Beck's Brightwater Project Oversight Report (Beck report). This report, the first issued under the mandated Capital Project Oversight Pilot Program established in the County Auditor's Office, responds to the County Council's goal of strengthening the Brightwater Project's performance and accountability through independent, expert oversight (see Attachment 1).

R.W. Beck's oversight report recognizes steps the Wastewater Treatment Division (WTD) is taking to successfully manage the Brightwater Project and deal with the changing construction environment. The report compares the 2004 Baseline Budget to WTD's 2005 and 2007 Trend Reports, alerting county policy-makers to a potential increase of total project costs of \$100 million (see Attachment 2). Beck's analysis indicates that this most recent estimate may be understated by approximately \$60 to \$95 million, and recommends additional actions that WTD can pursue to manage this challenging project and control costs during construction.

Interim Capital Project Oversight Initiatives

As you may recall, the King County Auditor's Office is implementing the Capital Project Oversight Pilot Program in two phases. Phase I, initiated in January 2007, focuses on reviewing current practices and establishing an independent capital project oversight model. PMA Consulting/Saybrook Associates, an international project and construction management firm, is leading this work. Phase I will culminate with the development of an implementation plan for the pilot, which will be executed in Phase II. A council briefing on the Phase I results is planned for September. Phase II will be initiated later this year. During Phase I, the auditor's office also instituted interim oversight measures for the four projects mandated for oversight: Brightwater, Harborview Ninth and Jefferson Building, Accountable Business Transformation, and Jail Integrated Security Project.¹

¹ These four major capital projects, which are in different stages, are currently being monitored by auditor's office staff. In addition, a process is underway to secure a consultant to immediately assist in the oversight of the Harborview Ninth and Jefferson Project.

R.W. Beck was initially selected as the council's Brightwater Project oversight management consultant in March 2005 based on their national reputation and expertise in water and wastewater program and construction management services. In early 2007, the auditor's office began collaborating with WTD, Capital Budget Committee, Regional Water Quality Committee, and Office of Management and Budget staff to craft an amendment to the original oversight contract for enhanced legislative oversight of the Brightwater Project. The amended contract includes the following provisions to strengthen the Brightwater Project oversight:

- Improved access to Brightwater Project management and information to ensure the accuracy and timeliness of reporting, and the identification of opportunities and recommendations to ensure the successful completion of the project.
- Increased onsite reviews and accelerated monthly project and construction reporting to provide independent and in-depth analysis to promote more accountable project performance and reporting.
- Scheduled monthly oversight meetings with R.W. Beck and executive, council, and auditor staff to better coordinate project updates (e.g., work accomplished and work in progress in relation to established project schedules and expenditure status in relation to project budgets and planned tasks) and to consider current risks and opportunities associated with managing the Brightwater Project.

The attached report reflects progress in achieving independent, expert oversight for the Brightwater Project and proactive coordination by WTD. Further oversight enhancements are expected, including the development of communication protocols that will allow critical but sensitive project status information to be shared with the consultant on a timelier basis.

R.W. Beck Brightwater Project Quarterly Oversight Report

The R.W. Beck report addresses the objectives identified in the budget legislation authorizing the major Capital Project Oversight Pilot Program. The report, divided into two sections, provides both a wrap-up assessment of the Brightwater Project cost and schedule status at the end of the design phase, and the results of an in-depth analysis of WTD's recently published *January 2007 Brightwater Cost Update: Current Conditions and Trends Report*.

The Beck report concludes that the Brightwater conveyance project has been generally well managed to date. The current project cost estimates have tracked closely with baseline estimates, and the project is on schedule.

The treatment plant has proved to be more challenging. The current treatment plant cost estimates are more than \$200 million above the baseline estimates. The scheduled construction start date has been delayed up to eight months for the solids portion of the treatment plant project, provided that the contract work is bid by August as planned. Although the expected completion date for construction remains unchanged, the delay has

reduced the amount of schedule "float" for certain work and resulted in additional cost escalation. Other factors contributing to the higher construction estimate are: dividing the General Contractor/Construction Manager contract into two separate contracts; bidding contract work under heated market conditions; expected and unexpected design and engineering actions; mitigation agreements; and other external factors.

Combining the revised conveyance and treatment plant projections, the total Brightwater Project cost estimate is currently approximately \$1.767 billion. The Baseline Budget transmitted to the County Council in 2004 was \$1.660 billion, the 2005 trend estimate was reported at \$1.753 billion, and the recently published 2007 trend estimate is \$1.767 billion. (The Baseline Budget and two trend total project cost estimates are based on a three-percent inflation factor.) However, R.W. Beck estimates the total project cost may increase to an amount between \$1.827 and \$1.862 billion by the end of construction due to current market conditions and other risk factors. R.W. Beck outlines several recommendations so WTD can be prepared to effectively manage these risks.

We sincerely appreciate the collaborative efforts of WTD, council staff, and R.W. Beck consultants in promoting effective oversight of the Brightwater Project consistent with council intent. Susan Baugh, Senior Principal Management Auditor, is coordinating this endeavor for the auditor's office.

CB:SB:jl

Attachments: 1. Oversight Consultant Quarterly Report, R.W. Beck, May 7, 2007
2. Brightwater Project Cost Comparative Summary

cc: Ron Sims, County Executive
Metropolitan King County Councilmembers
Pam Bissonnette, 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)
Dave Lawson, Internal Audit Supervisor, Executive Audit Services, OMB
David Jochim, Vice President, R.W. Beck, Inc.
Pat Tangora, Senior Director, R.W. Beck, Inc.
Shelley Sutton, King County Council Policy Staff Director
Mark Melroy, Senior Principal Legislative Analyst, King County Council
Capital Budget Committee
Beth Mountsier, Senior Principal Legislative Analyst, King County Council Regional
Water Quality Committee

Attachment 1
Oversight Consultant Quarterly Report
R.W. Beck, May 14, 2007

May 14, 2007



Cheryle A. Broom
County Auditor
King County Auditor's Office
516 Third Avenue, Room W-1-033
Seattle, WA 98104

Subject: **Brightwater Project Oversight Services (P43024)**
Transmittal of Brightwater Oversight Design Phase Report

Dear Ms. Broom:

This is to transmit our quarterly report on the above referenced project. The enclosed document contains a summary of our observations and findings following completion of the Brightwater Project design phase. The enclosed document also includes observations, opinions and recommendations based on our review of WTD's *Brightwater Cost Update, Current Conditions and Trends, January 2007 (2007 Trend Report)*, provided to us on April 19, 2007.

We are available to answer any questions that you may have, and will be available to answer questions at the Capital Budget Committee meeting on May 16, 2007.

Sincerely,

R. W. BECK, INC.

A handwritten signature in blue ink, appearing to read 'David A. Jochim'.

David A. Jochim, P.E.
Vice President

c w/encl: Susan Baugh
Maureen Welch

Brightwater Project Oversight Services, Contract No. P43024

Phase 1, Design Phase Oversight Wrap-Up Report

King County

May 2007



in association with



INTERNATIONAL

PTM Consulting LLC

Brightwater Oversight Design Phase Report

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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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EXECUTIVE SUMMARY

Current Status

This Executive Summary presents our key findings and recommendations at the end of the Design Phase for the Brightwater Project. The following table summarizes the status of various construction contracts, including provisions for sharing escalation risk.

Table ES-1: Status of Construction Contracts for the Brightwater Project

Element	Status	Contract Amount	Escalation Clauses ⁽¹⁾
Conveyance			
East Tunnel	Under contract. NTP: Jan 30, 2006	\$130.9M	Capped at \$1,000,000. Steel pipe, rebar, and some concrete
Central Tunnel	Under contract. NTP: Aug 28, 2006	\$211.1M	Capped at \$300,000. Steel pipe, rebar, and some concrete.
West Tunnel	Under contract. NTP: Feb 20, 2007	\$102.0M	Capped at \$1,000,000. Steel pipe, rebar and some concrete.
Influent Pump Station	In bid evaluation.	\$92.1M (apparent low bid)	Capped at \$300,000 for certain materials. Also allows additional increases for certain equipment if documented
Marine Outfall	Design-Build Proposals due June 2007	TBD	In RFP capped at \$500,000 for certain materials. Proposers to suggest specific methods for implementing and tracking.
Ancillary Facilities	Mostly under Contract	\$10.1 M	
Treatment Plant			
North Mitigation Area and EECC	Under Contract NTP: March 1, 2006	\$7.7M	No escalation clauses
Site Preparation	Under Contract NTP: March 30, 2006	\$23.8M	No escalation clauses
Earth Work	Under Contract NTP: April 5, 2007	\$41.8M	Capped at \$250,000. Only for diesel.
Liquids Package	In negotiation	TBD	Under negotiation
Solids Package	Planned to bid August 2007. NTP January 2008.	TBD	Under development

Notes:

1. Based on the percentage change in certain cost indices published by Engineering News Record, less five percent.
2. Original contract amount excluding subsequent change orders

Key Findings – Overall Management

- For the Conveyance Projects, we observed good implementation of QA/QC processes and open communication among various project participants, including open exchange and debate among designers and members of the expert panel that WTD periodically convened as part of its QA/QC process.
- WTD has faced a number of management challenges on the Treatment Plant, including SEPA, permitting, and mitigation costs, as well as unfavorable market conditions that have placed upward pressure on costs. In addition, the GC/CM contractor's (Hoffman) inability to bond the full value of construction has delayed some work, resulted in the need to "hard bid" the solids package, and makes site coordination / systems integration / assignment of performance responsibility more difficult. In spite of the difficulties surrounding the bonding issue with Hoffman, one advantage of WTD's decision to use GC/CM contracting was it allowed WTD to see the effect of escalating costs earlier (e.g. at the 60% design stage) than it likely would have if it had used traditional public works contracting.

Key Findings – Cost

The table on the following page compares WTD's current estimate of Brightwater costs against the 2004 Baseline Budget (nominal \$ assuming three percent general inflation) and 2005 Trend Report. It also summarizes our comments on specific cost items and indicates areas where we believe the 2007 Trend estimate is low.

- Overall, Conveyance has tracked very closely with the Baseline Budget (excluding contingencies). WTD did a good job of engaging the international tunneling market and fostering interest in the tunneling projects prior to bidding. The 2007 Trend Report reduces expected Conveyance Costs relative to both the Baseline Budget and 2005 Trend Report. In our opinion, some reduction is appropriate, but not by as much as projected by WTD.
- Overall, the Treatment Plant costs have increased substantially above the Baseline Budget. Several factors have contributed to cost increases, including construction escalation exceeding the assumed three percent inflation rate and the mitigation agreement with Snohomish County. These items were identified by the OMC and the WTD in its 2005 Trend Report and were discussed with the County Council. Other factors include design development, greater engineering effort associated with value engineering; and escalation associated with delay in the start of some work elements. The 2007 Trend Report increases expected Treatment Plant costs relative to the Baseline Budget and 2005 Trend Report. In our opinion, this increase should have been higher.

- For the Project as a whole, in our opinion costs will likely be \$60 to \$95 million higher than projected in the 2007 Trend Report and, therefore, likely exceed the Baseline Budget by \$168 to \$203 million.

Key Findings -- Schedule

- For Conveyance elements, target dates for design completion, bidding, and Notices to Proceed with construction were generally met, and if delayed it was generally by only a few months.
- For the Treatment Plant, the WTD's extensive 60 percent value engineering review and discussions related to Hoffman's project bonding capability delayed target dates for completing MACC negotiations and starting construction on some elements. WTD mitigated this delay somewhat by issuing separate MACC packages for Site Preparation and Earthwork. Nevertheless, the start of construction work on the Liquids package and Solids package has been delayed by two to eight months, respectively. While this has not delayed the expected completion date (i.e. the critical path) for the overall Project, it has reduced the amount of schedule float for certain types of work, and resulted in additional escalation.

Table ES-2: Brightwater Cost Summary

	2004 Baseline Budget (Nominal\$)	2005 Trend Report (1) (Nominal\$)	2007 Trend Report (Nominal\$)	OMC Comments
Conveyance				
Implementation / Construction	\$704.8M	\$660.9M	\$713.4	<ul style="list-style-type: none"> 2007 Trend low by \$18 to \$24M due to bid on IPS, change in Marine Outfall design criteria, and proportional increases in construction contingency and sales tax. 2007 Trend incorporates higher construction contingency percent (relative to Baseline), which we believe is prudent.
Non-Implementation	\$226.2M	\$206.6M	\$196.0M	<ul style="list-style-type: none"> 2007 Trend incorporates estimates for CM staffing and assistance that maybe somewhat low.
Project Contingency	\$ 89.5M	\$92.5M	\$18.2M	<ul style="list-style-type: none"> 2007 Trend is reasonable given expected levels of risk and uncertainty in CM needs. Would not cover certain extreme tunneling events.
Subtotals	\$1,020.6M	\$960.0M	\$927.5M	\$946M to \$952M OMC opinion
Treatment Plant				
Implementation / Construction	\$384.1M	\$478.8M	\$530.8M	<ul style="list-style-type: none"> 2007 Trend likely low by \$24 to \$53M. In our opinion, WTD's adjustments to 100% estimate are optimistic.
Non-Implementation	\$235.1M	\$295.8M	\$305.0M	<ul style="list-style-type: none"> Mitigation accounted for \$50 million of increase from Baseline to 2005 Trend; an additional \$5million mitigation was added between 2005 and 2007. 2007 Trend incorporates estimates for CM staffing and assistance that are likely low. Assumed escalation for non-construction costs is reasonable.
Project Contingency	\$31.2M	\$18.5M	\$4.0M	<ul style="list-style-type: none"> Likely low by about \$18M given site coordination and system integration risks, and potential for increase in CM and engineering costs with 2 contractors on site. Solids package bidding risk could be an outside risk not fully covered by this contingency.
Adjustment	-\$10.8M	\$0.0M	\$0.0M	
Subtotals	\$639.6M	\$793.1M	\$839.8M	\$882M to \$911M OMC opinion
Total Project Costs				
Total Project Costs	\$1,660M	\$1,753M	\$1,767M	\$1,827M to \$1,862M OMC opinion based on issues identified above.
Variances from Baseline	NA	\$93M	\$107M	\$168 to \$203M
Variance from 2005 Trend	NA	NA	\$14M	\$77M to \$110M

Notes:

- As reported in 2007 Trend Report. 2005 Trend Report nominal dollars estimates were reported at a more highly aggregated level.

Looking Forward / Recommendations

WTD is moving into construction for the Brightwater Project facing a very difficult construction climate, in part caused by increases / volatility in the cost of construction materials and in part caused by a local construction market where many projects are competing for a limited pool of contractor, subcontractor, and labor resources.

The Treatment Plant will likely face these pressures most directly because the competitive subcontractor “buyout” process is not complete and because the solids contract will be “hard bid.” Conveyance will not be immune to these market conditions; WTD should expect that contractors will aggressively press their requests for change orders and claims to avoid putting their profits at risk.

An additional element of risk is added because of the need to manage the inter-relationships of key milestones between the various construction contracts so that a delay on one does not cascade through to others. To better manage these challenges we recommend that WTD:

- Continue its aggressive outreach to the construction contracting community to foster interest in the solids package.
- For major areas of risk, conduct cost analysis of corrective action options in order to better manage and contain costs. A specific example of this would be to develop and cost out various “contingency plans” in advance of bidding the solids package so that corrective action could be implemented with minimal delay.
- Have Hoffman review scopes for the solids and liquids packages, once complete, to assure that there are not gaps in work between the two contracts.
- Diligently pursue development of an integrated schedule that allows the relationship of key milestones between the various construction contracts to be better tracked and managed.
- Restate the 2004 Baseline Budget into the cost categories that WTD wishes to track and manage moving forward so that cost information can be tracked and understood more quickly. This will be especially important as the pace of work increases during construction.
- “Delegate down” specific levels of change order authority to its Construction Managers and overall Brightwater Program Manager so that decisions can be made quickly during construction.

BRIGHTWATER OVERSIGHT DESIGN PHASE REPORT

Purpose and Scope

On March 14, 2005, King County Department of Natural Resources and Parks, Wastewater Treatment Division (WTD) authorized the R. W. Beck, Inc. (R. W. Beck) team to serve as the Brightwater Project Oversight Management Consultant (OMC) for the Design Phase.

R. W. Beck is a national consulting firm that frequently provides independent oversight and opinions regarding large utility projects. Typical clients include large public utilities, such as the San Francisco Public Utilities Commission, and financial institutions. R. W. Beck's team also includes the following key subconsultants:

- CRA International provides independent oversight, dispute resolution, and expert witness testimony on major infrastructure construction projects throughout the world.
- PTM Consulting (Pat Marchese) has 41 years experience including executive management of utilities developing large, complex public works projects. He served as the Executive Director of the Milwaukee Metropolitan Sewerage District.

During the Design Phase, our services focused on reviewing key Brightwater Project management processes and comparing them with industry standards and other pre-selected projects. Detailed checking of design and/or other technical project deliverables or engineering criteria was not the focus of our activities.

Specific Design Phase activities included:

- **Preparation of an Initial Project Oversight Report.** This initial work, conducted at about the 25 to 30 percent design, reviewed WTD's proposed baseline budget, schedule, organizational structure, and business practices.
- **Design Phase Submittal Reviews.** This work included a process review of major design phase submittals (e.g. 60 percent designs).
- **Monthly Report Review.** This included review of the Brightwater Monthly Project Reports issued by WTD

- **Periodic Attendance at Design-Phase Meetings.** We attended design phase meetings on a “spot check” basis to observe how the design teams and WTD personnel interfaced and how project information was recorded and tracked.
- **Periodic Site Visits.** Subconsultants visited the site periodically to observe WTD work.
- **As Requested Evaluations.** The oversight design phase contract included a pool of hours to address specific issues as requested by WTD and/or the County Council. For example, we provided input to Council staff on WTD’s accomplishment rate projections and, reviewed WTD’s draft plan for negotiating a Guaranteed Construction Cost Contract with Hoffman Construction Company (Hoffman) for the Treatment Plant.

During the Design Phase, we also made three presentations to the King County Council’s Regional Water Quality Committee, three reports to the Budget and Fiscal Management Committee, and one report to the Capital Budget Committee.

This report describes our key findings based on our work during the Design Phase¹. In addition, Appendix A includes our review of WTD’s recently published *Brightwater Cost Update Current Conditions and Trends, January 2007 (2007 Trend Report)*, which includes WTD’s updated estimates of the expected costs of major project components as WTD approached the end of design.² Our findings address the following issues:

- **WTD’s Management of Design Phase Work.** Did WTD generally conform to industry norms with respect to: QA/QC processes, value engineering, schedule management, risk management, project integration, communications, and reporting project information?
- **Projected Construction Costs.** At the end of the Design Phase, how did WTD’s construction cost estimates (including construction work under contract) relate to costs established in WTD’s Baseline Budget? Were estimated/bid construction contracts within the expected range? If not, what were the major causes of variances?

¹ Activities of the OMC were placed on-hold from the fall of 2006 through February 2007, while the Wastewater Treatment Division and the Council Auditor’s Office determined how best to implement the intent of the County Council’s budget goals as they related to establishing an independent capital project oversight function in the Council’s Auditor’s Office.

² One exception is the Marine Outfall, which is being procured using Design-Build contracting. This element was developed to approximately 30 percent design for the purpose of putting together the DB RFP in the fall of 2006.

- **Cost of Project Design.** How well did design costs (consultant and staffing) relate to costs established in WTD's Baseline Budget? Were they within budgeted ranges? How well did they conform to industry norms?
- **Conformance to Design Phase Schedule Goals.** How did the actual Design Phase schedule compare to WTD's assumed Baseline Schedule? What were the causes of any variances? Did those variances affect the Project Critical Path?
- **Lessons Learned from the Design Phase.** This includes "lessons learned" affecting the Brightwater Project going forward, "lessons learned" with respect to WTD's use of alternative construction contracting (i.e. GC/CM and Design-Build), as well as "lessons learned" that might affect oversight consultant contracts for future major capital projects.
- **Looking Forward.** Looking forward to construction, are the overall revised cost estimates, including revised construction and project contingencies, set forth in WTD's *2007 Trend Report* reasonable? What are some major areas of risk and project management that WTD will likely be faced with during construction?
- **Recommendations.** What should WTD do to prepare for and address challenges during construction?

Project Overview Report (POR)

The purpose of the POR (dated June 14, 2005) was to compare overall scope, schedule, budget and budget distribution, schedule, and management for the Brightwater Treatment Plant and Conveyance Project with industry norms and with two other pre-selected projects. The POR review occurred after the 25 to 30 percent design³ of the overall Project was completed.

At the time of the POR, we commented that the Project, overall, appeared to generally be well managed. At the overall program level, we recommended that Brightwater management should focus on: development of an integrated schedule showing the relationship of key milestones among the various construction projects; expanding and formalizing its risk assessment and risk management function; and continuing to clarify roles and responsibilities among staff and for contracted services. We also recommended that, given the scale of construction, that WTD should consider "delegating down" some level of change order approval authority in order to expedite decision making during construction.

³ Certain elements were less than 25 to 30 percent design. For example, the Marine Outfall was less than 10percent design.

For the Treatment Plant in particular, which WTD planned to procure using the General Contractor / Construction Manager (GC/CM) contracting method, we noted some specific issues. For example, we noted that WTD's practice of having the cost estimates developed by a separate engineering firm (at the time URS), rather than by the design engineer (CH2M Hill), tended to divorce the design engineer from a sense of responsibility for the ultimate cost of Treatment Plant construction. While the contract with CH2M Hill was not a "design to construction" budget type contract, its fixed price provisions also gave the designer little incentive to implement owner requests as part of its base contract services. (WTD has agreed that future projects should involve the design engineer in cost estimating.) We recommended that WTD should take steps to develop more of a collaborative "partnering" type relationship between its GC/CM contractor and its design engineer. We also noted that WTD's planned approach for hiring a separate Construction Management firm had the potential to duplicate services which were expected to be provided by the GC/CM contractor.

With respect to cost, we concluded that the overall Brightwater Budget (\$1.66 Million on a nominal dollar basis) was likely about five to six percent low overall due to, in our opinion, low contingences. We also noted that other factors could drive up costs such as: the conveyance design including one element, the Marine Outfall that was only at about 10 percent design; and the 30 percent estimate including a large number of allowances, rather than estimates based on quantities and unit prices. We did not, however, recommend modifying the Baseline Budget, at that time, because the budget was causing WTD to more closely manage Project costs than they might do otherwise.

Other OMC Design Phase Reviews

Since the POR was issued, Brightwater Project design has progressed so that most elements have been fully designed. Our findings regarding WTD's management processes based on submittal reviews and periodic meeting attendance are as follows:

- **Review of Key WTD Design Phase Plans.** WTD prepared a number of plans to set forth procedures and policies to guide the design development process and assure quality. Key plans included:
 - **"King County Brightwater Quality Assurance and Quality Control Process":** This document established overall standards and protocols for reviewing, tracking and resolving QA/QC issues on Brightwater Conveyance and Treatment projects.
 - **"Brightwater Conveyance System Quality Assurance/ Quality Control Plan":** This document provided additional detail and

delineation of required technical submittals at key project milestones (30, 60, 90, and 100 percent design submittals). It also identified objectives and expectations of QA/QC reviews by consultant design teams, WTD staff and external third party reviews.

- **“Brightwater Treatment Plant Quality Assurance/ Quality Control Plan”:** This document provided additional detail and delineation of required technical submittals at key project milestones (30, 60, 90, and 100 design submittals). It identified objectives and expectations of QA/QC reviews by consultant design teams, WTD staff and the external entities such as permit agencies and neighboring utilities. It also identifies anticipated points for GC/CM input on constructability and contract packaging, primarily based on the 60 and 90 design documents.

In our opinion, these plans established processes and protocols that were generally consistent with industry norms. Specifically, the Conveyance Projects included periodic reviews by a panel of outside experts in tunneling in addition to the QA/QC reviews by the designers and WTD staff. For the Treatment Plan, third party review was primarily provided by the GC/CM contractor and focused on constructability. It should also be noted that WTD’s QA/QC plans for the Treatment Plant allowed for simultaneous designer and WTD reviews. In our experience, this practice is becoming more common in the industry.

- **Submittal Reviews.** We conducted a process review of 60, 90, and 100 percent design documents for various Brightwater Conveyance and Treatment Facilities. As stated previously, these reviews were not focused on technical content or verification of correctness of design drawings or technical specifications, but rather on:
 - **Consistency of documents with industry “norms.”** Was the level of design set forth in the submittal generally consistent with type of information and level of detail normally expected at this design phase (e.g., was the type of information and level of detail included in a 60 percent submittal consistent with what would be expected at that stage of design?)
 - **QA/QC process compliance.** Was there evidence that the design submittals had been subject to the QA/QC reviews established in WTD’s QA/QC plans, including tracking and follow-up of design review comments?

Overall, we found that the design submittals generally conformed to industry norms with respect to the level of design / degree of detail provided with a

given submittal. One possible exception, based on our observations of the 90 percent design and constructability reviews, was a difference in understanding between the GC/CM Contractor and design engineer about what constitutes a 100 percent design in a GC/CM contracting environment and which party is responsible for developing certain design details. These differences were ultimately resolved but may have increased design costs.

Overall, we also found that WTD implemented the business processes established in its QA/QC plans. We also understand that WTD staff comments were extensive at the 60 percent stage, and subsequently observed that WTD project managers made efforts, by establishing internal review guidelines and holding workshops with WTD staff, to focus staff comments during future submittal reviews.

- **Additional Observations from Periodic Meeting Attendance.** During the Design Phase, WTD and the consultant design teams for each Conveyance project and for the Treatment Plant met on a minimum bi-monthly basis. Tasked with monitoring a “sampling” of these meetings, we attended a total of 20 Design Coordination Meetings between April 2005 and July 2006. At each meeting WTD made use of a written agenda that typically included a review of the previous meeting, project issues, scope and budget issues, schedule, QA/QC issues, change tracking, and risk/contingency issues. Meetings that the OMC monitored were businesslike, issues were discussed, assignments were made and results were documented.

Key Findings-Overall Management

The following summarizes our key findings from our oversight work during the Design Phase.

CONVEYANCE

Overall in our opinion, WTD has done an excellent job of managing the design for the Conveyance projects, including the East Tunnel, Central Tunnel, West Tunnel, Influent Pump Station, and various ancillary facilities. (The Marine Outfall will be procured using The Design – Build contracting method and was not subject to the same design process as the other Conveyance projects.) In particular:

- Target dates for design completion and bidding were generally met, and if delayed it was only by a few months.
- We observed good implementation of QA/QC processes and open communication among various project participants, including open exchange and debate among designers and members of the expert panel that WTD periodically convened as part of its QA/QC process.

- WTD did an excellent job of engaging the international tunneling market and fostering interest in the tunneling projects prior to bidding.
- Overall, Brightwater Conveyance has tracked very closely with the Baseline Budget (excluding contingencies). For those elements currently under contract (East, Central, and West Tunnels), the value of the construction contracts, in aggregate, has actually under-run the Baseline Budget (and under-run our expectations of costs associated with “design development.”)

TREATMENT PLANT

WTD has faced a number of management challenges during the Design Phase for the Treatment Plant. Some of these challenges include: 1) implementing GC/CM contracting on its first major capital project; 2) SEPA and permitting challenges including the need for extensive seismic work and supplemental seismic work, which resulted in more stringent design criteria and higher estimated construction costs; and 3) bonding limitations of its GC/CM contractor, necessitating a delay to work through the issue and ultimately a need to split out a “solids package” to be “hard bid.”

In addition to and compounding these challenges, were a number of unfavorable market conditions. Prices for many commodities have escalated well above the three percent rate assumed in the Baseline Budget. In addition, over the last few years, the level of local construction activity for both major public and private projects has increased. This has reduced the number of bidders on jobs and increased the fee expectations of construction contractors and sub-contractors. In addition, due to high demand for construction labor, we expect that there will be upward pressure on labor rates as union contracts for various trades come up for renegotiation this summer.

It is important to note that this was not the case at the time Hoffman initially proposed on the GC/CM work for the Treatment Plant. As a result WTD’s contract with Hoffman contains a number of terms that are favorable to the County. For example, Hoffman’s fee is limited to 1.98 percent. Furthermore, any remaining “buyout savings” and MACC contingency will ultimately return to the County. Nevertheless, because subcontractor work packages must be competitively bid, Hoffman is subject to the same competitive market pressures described above.

One advantage of WTD’s decision to use GC/CM contracting for the Treatment Plant was it allowed WTD to see the effect of escalating costs earlier (e.g. at the 60 percent design stage) than it likely would have if it had used traditional public works contracting. In a rapidly changing market, construction contractors are essentially “on the front line” and have a better understanding of emerging market prices than do engineering firms which often rely on published cost data. This led WTD to conduct an extensive value engineering process at the 60 percent design stage, to manage costs. While we believe this was a sound management decision, given the circumstances, it was disruptive, increased engineering costs, and forced WTD to

negotiate a separate MACC for Site Preparation work in order to keep the construction of the Treatment Plant moving forward.

Overall, these challenges have slipped the planned start of construction for certain work, especially the liquids and solids packages, where planned Notice to Proceed has been delayed by two and eight months, respectively. While this has not delayed the project completion date (i.e., the critical path), it has reduced the amount of float in certain activities.

PROJECT CONTROLS

Cost information reported by WTD in the *Brightwater Project Monthly Reports*, *2005 Trend Report*, and *2007 Trend Report* use somewhat different cost categories presented than those in the Baseline Budget. This, in part, reflects changes WTD made in how work is managed and categorized. In certain situations, it also reflects differences between how the work is categorized for construction contracting versus how it is budgeted. WTD has also reported cost expenditures and updated forecasts in various “dollars basis” in its reports. (For example, the Baseline Budget was established in constant 2004 dollars as well as in nominal dollars. The *2005 Trend Report* reported cost trends primarily in constant 2004 dollars and constant 2005 dollars while the *2007 Trend Report* uses nominal dollars.) These differences make it very difficult to track costs over time.

PROJECT OVERSIGHT BY THE OMC

The approach to our project oversight used during the Design Phase had certain limitations, including:

- **Reliance on Brightwater Project Monthly Reports as a primary source of information.** These reports were sometimes provided two to three months after the fact.
- **Oversight Consultant Observations.** WTD has expressed concern that the OMC presence at certain meetings could inhibit open discussion among WTD and its other consultants/contractors.
- **Timeliness in Obtaining Cost Information, Especially for the Treatment Plant.** It should be noted, however, that the Treatment Plant construction was subject to MACC negotiations and WTD considered this cost information to be sensitive given these ongoing negotiations.

WTD, the Council Auditor, and Council staff are working on ways to address the regular and timely flow of information by holding more frequent meetings together with the Oversight Consultant, relying more on regular Oversight Consultant interviews of WTD managers and staff, and accelerating the issuance time for monthly Project and monthly construction reports. In addition, WTD and the

Oversight Consultant are exploring ways that cost information can be shared on a more timely basis.

Key Findings - Cost

Appendix A sets forth our detailed review of WTD's report titled *Brightwater Cost Update, Current Conditions and Trends*, January 2007 (*2007 Trend Report*). Overall, in our opinion the *2007 Trend Report* likely under estimates costs by about \$60 to \$95 million, assuming reasonable bids are obtained on the solids package. The reasons are summarized below and explained in more detail in Appendix A.

CONVEYANCE

The following table is a summary comparison of the *2007 Trend Report* costs with the Baseline Budget (nominal \$) for Conveyance.

Table 1
Comparison of Baseline Budget with 2007 Trend Report - Conveyance

Conveyance Project Cost Categories	Baseline Budget (\$Nominal)	2007 Trend Report (\$Nominal)
Implementation/Construction Subtotal	\$704.8M	\$713.4M
<i>Variance from Baseline</i>		+\$8.6M (+1.2%)
Non-Implementation Subtotal	\$226.2M	\$196.0M
<i>Variance from Baseline</i>		-\$30.2M (-13.3%)
Project Contingency	\$89.5M	\$18.2M
<i>Variance from Baseline</i>		\$71.3M (-79.7%)
CONVEYANCE TOTAL	\$1,020.6M	\$927.5M
<i>Variance from Baseline</i>		-\$93.1M (-9.1%)

Notes:

1. Cost from categories reported in the *2007 Trend Report* have been reallocated to match cost categories in the 2004 Baseline Budget. Totals may not add up due to rounding.

Most of the increase in the *Implementation / Construction* results from WTD's increasing the percent contingency applied to the various Conveyance construction contracts relative to the percent used in the Baseline Budget. In our opinion, the percentages used in the *2007 Trend Report* are prudent, on an individual construction contract basis, and more closely reflect the expected level of risk. However, the *Implementation / Construction* estimate reflects values for two major elements – the Influent Pump Station and Marine Outfall – that were based on estimates rather than on construction contract amounts. Since then, the Influent Pump Station has been

bid, and changes have been made to assumed hydraulic conditions affecting the Marine Outfall design. Both of these events have increased costs above those forecast in the 2007 *Trend Report*.

Most of the reduction in *Non-Implementation* costs reflects reductions in costs for *Engineering, Professional, and Consulting Services*, including contracted Construction Management (CM) services. However, WTD has evaluated the level of contracted CM support and expects the actual contracted CM costs may be somewhat higher than those included in the 2007 *Trend Report*.

The 2007 *Trend Report* reduces the *Conveyance Project Contingency* from \$89.5 million to \$18.2 million. While many of the pre-construction risks for Conveyance (i.e. SEPA compliance, and most permitting / property acquisition) have been resolved, there are still remaining “project risks” going forward. Some of these include: price risk for Point Wells property where a final price has not yet been agreed upon; permitting risk for the Marine Outfall where design changes will be required to reflect a change in assumed hydraulic criteria, and risk associated with the integration of the various Conveyance construction projects. (The overall development strategy for Conveyance requires close integration of work among the various construction contracts to ensure that a delay by one contractor does not ripple through and delay another contractor.) Considering these remaining risks and the potential for some increase in required CM services, we believe the \$18.2 million *Project Contingency* is reasonable.

As a result of the issues identified above in our opinion, the 2007 *Trend Report* likely understates overall Conveyance costs by between \$18 to \$24 million.

TREATMENT PLANT

The following table is a summary comparison of the *2007 Trend Report* costs with the Baseline Budget (nominal \$) for the Treatment Plant.

Table 2
Comparison of Baseline Budget with 2007 Trend Report – Treatment Plant

Treatment Plant Project Component	Baseline Budget (\$Nominal)	2007 Trend Report (\$Nominal)
Implementation/Construction Subtotal	\$384.1M	\$530.8M
<i>Variance from Baseline</i>		\$146.7M (+38.2%)
Non-Implementation/Construction Subtotal	\$235.1M	\$305.0M
<i>Variance from Baseline</i>		+\$69.9M (+29.8%)
Project Contingency	\$31.2M	\$4.0M
<i>Variance from Baseline</i>		-\$27.2M (-87.2%)
Adjustment for Lease/Rental/Other Credits and Revenues	-\$10.8M	\$0.0M
TREATMENT PLANT TOTAL	\$639.6M	\$839.8M
<i>Variance from Baseline</i>		\$200.2M (+31.3%)

Notes:

1. Cost from categories reported in the *2007 Trend Report* have been reallocated to match cost categories in the 2007 Baseline Budget. Totals may not add up due to rounding.

It is important to note that WTD's estimate for *Implementation / Construction* makes a number of adjustments⁴ to Hoffman's 100 percent design estimate. Based on our review, we believe that, in aggregate, these adjustments are optimistic and likely understate costs for *Implementation / Construction* by about \$24 to \$53 million, assuming good bids are received for the "hard bid" solids package. The *2007 Trend Report* estimate for construction contingency, which is imbedded in the *Implementation / Construction* subtotal, is, in our opinion, reasonable.

Factors that have contributed to variance in *Implementation/Construction* costs from the Baseline Budget include design development costs (based on our experience, at the time we prepared the POR, we concluded that a 25 percent increase in cost associated with this design development process could be expected -- this was probably a low estimate.); construction escalation rates exceeding WTD's assumed three percent inflation rate; delay resulting in additional escalation, non-competitive

⁴ This is in addition to reallocating certain costs from Hoffman's 100 percent design estimate from *Construction Contracts* to *Mitigation* and *Sales Tax*, because WTD tracks these items in different cost categories.

market conditions, and other factors. (A more detailed discussion of this is included in Appendix A.)

Most of the increase in *Non-Implementation* costs relative to that Baseline Budget is associated with a \$16 million increase in *Engineering, Professional and Consulting Services* and a nearly \$60 million increase in *Permitting and Other Agency Support*, which primarily reflects the mitigation agreement with Snohomish County that was negotiated subsequent to development of the Baseline Budget, and identified in the *2005 Trend Report*. WTD reports that the 2007 Trend estimate for engineering and CM services during construction did not explicitly account for the “hard bid” of the solids work. As a result, we expect the cost of these services and of WTD’s CM staffing to have the potential to increase somewhat over that reported in the *2007 Trend Report*. WTD’s proposed staffing plans, illustrating roles and responsibilities of WTD staff, Hoffman staff, and contracted CM staff should be reviewed, once complete, to ensure there are no overlaps or gaps in function.

WTD’s *2007 Trend Report* also reduced the Project Contingency to \$4 million from the \$31.2 million included in the Baseline Budget. While many of the pre-construction risks at the Treatment Plant have been resolved (i.e., property acquisition, SEPA compliance, mitigation agreement with Snohomish County, resolution of seismic conditions questions), there are still remaining “project risks” going forward for the Treatment Plant. Some of these risks would remain even if all of the work was going to be assigned to a single contractor (for example, integration of the Treatment Plant and Conveyance systems). However, the necessity of splitting the construction work into liquids (GC/CM) and solids “hard bid” packages introduces a number of other risks including site coordination during construction and integration of the entire Treatment system. Given these risks, in our opinion, the Treatment Plant *Project Contingency* should be about \$18 million higher than the \$4 million forecast by WTD.

As a result of the issues identified above (WTD adjustments to the 100 percent design estimate, a Project Contingency that is low considering the coordination / integration risks associated with having two contractors responsible for Treatment Plant work, interfere risks with Conveyance, and some increases in the need for CM services and staffing) in our opinion, the *2007 Trend Report* likely underestimates overall Treatment Plant costs by between \$42 to \$71 million assuming reasonable bids are obtained on the solids package.

Looking Forward

WTD is moving into construction for the Brightwater Project facing a very difficult construction climate, in part caused by increases / volatility in the cost of construction materials and in part caused by a local construction market where many large public and private projects are competing for a limited pool of contractor, subcontractor, and labor resources. (As an example, WSDOT’s 2007-2009 budget request pointed out

that there are construction cost increases that are exceeding inflation rates. From 1990 to 2001, the WSDOT Construction Cost Index averaged 1.5 percent per year. From 2001 to 2004 it averaged 8 percent per year, and from 1Q 2004 to 1Q 2007 the CCI was up 49 percent, or nearly 16 percent per year).

The Treatment Plant will likely face these pressures most directly because of the competitive subcontractor “buyout” process that is not yet underway for much of the work and because of the need to split off the solids contract and “hard bid” the work. In fact, the difficulty in obtaining good competitive bids for this work is a major risk that would not necessarily be covered by Project Contingency, even with the adjustments recommended above.

Even though many of the Conveyance projects are under contract, Brightwater Conveyance will not be immune to these market conditions. At the very least, WTD should expect that contractors will aggressively press their requests for change orders and claims to avoid putting their profits at risk. While we believe WTD has established prudent construction contingencies for Conveyance, it is important to realize that there is always the risk of an extreme tunneling event that WTD has not explicitly budgeted for and that would not be covered by these contingencies.

WTD has taken some steps to address the challenges it will face during construction. For example, WTD has agreed to share some escalation risk with contractors to obtain lower prices, but has also capped its risk exposure. (For the three tunnel contracts, WTD’s potential escalation risk exposure is capped at about \$2.3 million.) We also understand that Brightwater Management’s organizational structure has been reorganized with the two construction managers (Treatment Plant and Conveyance) reporting directly to the overall Program Manager and with one manager assigned to integration and startup issues. In addition, WTD is developing detailed organization charts, flow charts, responsibility descriptions to help avoid overlaps and gaps in responsibility during construction.

In addition, we recommend that WTD should implement the following measures to better manage construction:

- WTD should continue its aggressive outreach to the construction contracting community to foster interest in the solids package.
- For major areas of risk, WTD should expand on its current risk management efforts to include cost analysis of various recovery strategies in order to better manage and contain costs. For example, for the solids package, WTD should develop and cost out contingency options in advance of bidding so that a recovery plan can be implemented, if needed, with minimal delay.
- Once the split between the “liquids package” and “solids package” for the Treatment Plant is complete, WTD should have Hoffman do a complete scope review to assure that there are not gaps in work between the two contracts.

- WTD should continue to diligently pursue development of an integrated schedule that rolls up information from each construction contract and allows the relationship of key milestones between the various construction contracts to be better tracked and understood.
- To facilitate future cost management and reviews of cost data, WTD should restate the 2004 Baseline Budget into the cost categories that WTD wishes to track and manage moving forward. An explanation of how the restated Baseline Budget “maps” to the original Baseline Budget should be provided for review.
- Because of the pace of construction and consistent with good industry practices, we strongly reiterate our previous recommendation that WTD “delegate down” specific levels of change order authority to its Construction Managers and overall Brightwater Program Manager.

APPENDIX A – OMC’S REVIEW OF BRIGHTWATER COST UPDATE CURRENT CONDITIONS AND TRENDS, 2007

Introduction

This appendix includes the OMC’s review of information presented in WTD’s report titled *Brightwater Cost Update, Current Conditions, and Trends*, January 2007 (*2007 Trend Report*). The *2007 Trend Report* was provided for our review on April 19, 2007. Our review focused on the following key questions:

- How well do the estimates for *Construction Contracts* at the end of the design phase correspond to the estimates that supported WTD’s Baseline Budget?
 - What factors explain any significant variances?
 - What degree of risk / uncertainty remains for any construction work that was not bid or under contract at the time the estimates for the *2007 Trend Report* were prepared?
- Given remaining risks and uncertainties, are WTD’s revised contingency estimates reasonable?
 - Are construction contingency percentages reasonable? Are the dollars allocated reasonable?
 - Are the Project contingencies reasonable?
- How did certain non-construction costs (design-related engineering and design phase staff labor) relate to Baseline Budget assumptions and industry norms?
- What other cost categories varied significantly from the Baseline Budget?

Our review considers the *2007 Trend Report’s* projections for Conveyance and Treatment separately as set forth below. First, we summarize background information related to WTD’s Baseline Budget, budget cost categories, and how cost information has been reported by WTD.

Background

BASELINE BUDGET

WTD's Baseline Budget was developed at an overall design stage of approximately 25 to 30 percent although certain components were at a lesser stage of design. The Baseline Budget was presented in two different forms:

- **2004 Constant Dollar Baseline (\$2004 Baseline).** In every year, annual expenditures were assumed to be priced as if they were occurring in 2004. This way of presenting engineering estimates for capital project construction is standard in the industry (i.e. estimates are prepared based on quantities and unit prices that are current at the time the estimates are prepared). However, actual construction bids typically include the contractor's allowance for escalation (roughly approximated by expected escalation to the mid point of construction), and certain other costs (i.e. staffing) are not typically reported in constant year dollars. As a result, the overall Brightwater Project Baseline Budget in \$2004 (\$1.48 billion) is not directly comparable to actual expenditures that will be incurred over time.
- **Nominal Dollar Baseline** (referred to as "2004 Baseline with Inflation" in WTD reports). To arrive at a baseline that more closely approximates what actual expected costs will be in the years incurred, WTD escalated its estimated cash flow in constant \$2004 by rates of three percent and five percent per year. The adopted Baseline Budget (nominal \$) was set based on a three percent escalation rate. This Baseline Budget (\$1.66 billion) corresponds to what WTD thought actual expenditures would total over time assuming three percent inflation. ***For the purposes of our review of WTD's 2007 Trend Report, we have used this Nominal \$ Baseline Budget.***

BASELINE BUDGET COST CATEGORIES

WTD's Baseline Budget consists of separate budgets for Conveyance and the Treatment Plant. Each budget is disaggregated into several categories, as follows:

- **Implementation / Construction.** This represents the direct cost of developing facilities. Major categories presented under *Implementation / Construction* include: *King County Construction Contracts*, *Owner Furnished Equipment and Materials*, *Outside Agency Implementation / Construction*, and *Other Capital Charges*. However, over 99 percent of the budgeted dollars fall under *King County Construction Contracts*, which was the focus of our review and includes the following sub-categories:
 - **Construction Contracts.** This represents the expected value of construction work (except for that associated with mitigation) at the time

of contract execution, based on either competitive bidding; competitive proposals (Marine Outfall), or, negotiated GC/CM contracts (Treatment Plant).

- **Construction Contracts Mitigation.** This represents the cost of mitigation directly tied to facility construction. Examples include construction of the North Mitigation Area and construction of the Environmental Education Community Center (EECC). It also includes WTD's estimate of extra mitigation installed at the construction sites. For example, at the Treatment Plant Site, WTD is installing more extensive landscaping and surface water management facilities than are required by building code. The costs above and beyond the costs estimated to meet code requirements are budgeted under *Construction Contracts Mitigation*.
- **Contingency (Construction).** This represents a percentage, applied to the estimated value for *Construction Contracts* to cover changes in scope during construction and owner-assumed risks. Based on industry "norms", this is typically in the 10 to 15 percent range, depending on the degree of construction risk. On a cash flow basis, WTD budgeted construction contingencies near the end of the project (assuming construction contingency dollars would be the "last spent.")
- **Sales Tax.** This was assumed to be 7.60 percent.
- **Non-Implementation / Construction.** This represents all of the supporting costs associated with development of the Brightwater Project. Major budget categories included: *Engineering, Professional, and Consulting Services; Permitting and Other Agency Support; Rights-of-Way; Miscellaneous Services and Materials, and Staff Labor*. Most of the non-implementation budget is associated with *Engineering, Professional, and Consulting Services, Permitting and Other Agency Support, and Staff Labor*.
- **Project Contingency.** This contingency is a separate budget category intended to cover unknowns and other undefined project contingencies (examples could include design development, additional regulatory requirements than originally anticipated, etc.). This contingency is also budgeted near the end of the project, again assuming contingency dollars would be the last spent.

WTD REPORTED COST INFORMATION

Cost information reported by WTD in the *Brightwater Project Monthly Reports*, *2005 Trend Report*, and *2007 Trend Report* vary somewhat from the cost categories presented in the Baseline Budget. This, in part, reflects changes WTD made in how

work is managed and categorized. In certain situations, it also reflects differences between how the work is categorized for construction contracting versus how it is budgeted. For example:

- **Mitigation Costs.** WTD's *Trend Reports* include tables summarizing mitigation costs at a high level while the *Brightwater Project Monthly Reports* provide a detailed list of specific mitigation elements. It is important to note that these tables incorporate three costs embedded in three different cost categories reported in the Baseline Budget: 1) *Construction Mitigation*, which is reported as an *Implementation / Construction* cost; 2) mitigation payments negotiated with other jurisdictions, which are rolled up into *Permitting and Other Agency Support*, under *Non-Implementation Costs*; and 3) land costs associated with mitigation facilities, which are rolled under *rights-of-way*, also a *non-implementation* cost.
- **Budgeted Construction Contracts versus Actual Construction Contracts.** Certain construction contracts and estimates aggregate cost information into different categories than used in the Baseline Budget. For example, Hoffman has prepared its 100 percent design estimate for the Treatment Plant construction. Embedded in this estimate are construction costs that WTD tracks and reports in two different categories for the Treatment Plant: 1) *Construction Contracts*; and 2) *Construction Mitigation*.
- **Sales Tax.** In the Baseline Budget, sales tax is reported as a sub-category under *Implementation / Construction* while in the *Trend Reports*, sales tax is reported as a *Non-Construction* cost.

WTD has also reported cost expenditures and updated forecasts in various "dollars basis" in its reports. As discussed above, the Baseline Budget was established in constant 2004 dollars as well as in nominal dollars. The *2005 Trend Report* reported cost trends in constant 2004 dollars and constant 2005 dollars; nominal dollars were only reported in one highly aggregated table -- Appendix A. The *2007 Trend Report* reports cost trends in nominal dollars (referred to in the report as "January 2007 Inflated"). The *2007 Trend Report* also includes detailed tabular information referenced as "2005 Trend Report Inflated;" however, this detailed tabular information was not actually presented in the *2005 Trend Report*. These differences, combined with the changes in cost categorization described above, make it very difficult to track costs from the 2004 Baseline Budget through the *2005 Trend Report* to the *2007 Trend Report*.

To facilitate future cost management and reviews of cost data, we strongly recommend that WTD report costs in categories that are consistent with the 2004 Baseline Budget (nominal \$). If this is not practical because of project changes, then the 2004 Baseline Budget should be restated into the cost categories that WTD

wishes to track, and an explanation of how the restated Baseline Budget “maps” to the original Baseline Budget should be provided for review.

Conveyance

The following table compares the Baseline Budget (nominal \$) for Conveyance against WTD’s updated estimates in the Trend Report. Cost categories reflect those provided in the Baseline Budget. Costs for the *2007 Trend Report* were presented in different categories with different levels of detailed breakdown. We have modified the *2007 Trend Report* information to conform to the Baseline Budget cost categories.

Table A-1
Comparison of Baseline Budget with 2007 Trend Report - Conveyance

Conveyance Project Cost Categories	Baseline Budget (\$Nominal)	2007 Trend Report (\$Nominal)
Implementation/Construction		
Construction Contracts	\$580.4M	\$578.7M
Construction Contracts Mitigation	\$4.8M	\$6.7M
Construction Contingency	\$61.9M	\$72.1M
Sales Tax	\$57.5M	\$55.9M
Other	\$0.1M	\$0.0M
Implementation/Construction Subtotal	\$704.8M	\$713.4M
Variance from Baseline		+\$8.6M (+1.2%)
Non-Implementation		
Engineering, Professional and Consulting Services ⁽¹⁾	\$147.7M	\$127.5M
Permitting and Other Agency Support ⁽²⁾	\$22.1M	\$13.3M
Right-of-Way	\$21.2M	\$18.9M
Miscellaneous Services and Materials	\$4.8M	\$5.3M
Staff Labor	\$30.4M	\$31.0M
Non-Implementation Subtotal	\$226.2M	\$196.0M
Variance from Baseline		-\$30.2M (-13.3%)
Project Contingency	\$89.5M	\$18.2M
Variance from Baseline		\$71.3M (-79.7%)
CONVEYANCE TOTAL	\$1,020.6M	\$927.5M⁽³⁾
Variance from Baseline		\$93.1M (-9.1%)

Notes:

1. In the *2007 Trend Report* this cost category was replaced with separate categories for Engineering Services and Planning and Management Services.
2. Included permitting, mitigation payments, and arts allowance in Baseline Budget. *2007 Trend Report* reports Arts Allowance as a separate cost category
3. Totals may not add up due to rounding. Equals the total of conveyance costs in Tables 8, 9, and 10 of the *2007 Trend Report*

Our review focused on the following cost categories:

- Construction Contracts
- Project Contingencies (Construction and Project)
- Engineering and Professional Services
- Staff Labor

In aggregate, these categories account for about 80 percent of the Baseline Budget.

CONSTRUCTION CONTRACTS COST ESTIMATES

With a few exceptions (the Marine Outfall, Influent Pump Station (IPS), and various ancillary facilities) most Conveyance elements were under contract or bid at the time the *2007 Trend Report* was prepared. As illustrated below, WTD's 2007 Trend Estimate for Conveyance *Construction Contracts* conforms well to the Baseline Budget (nominal \$).

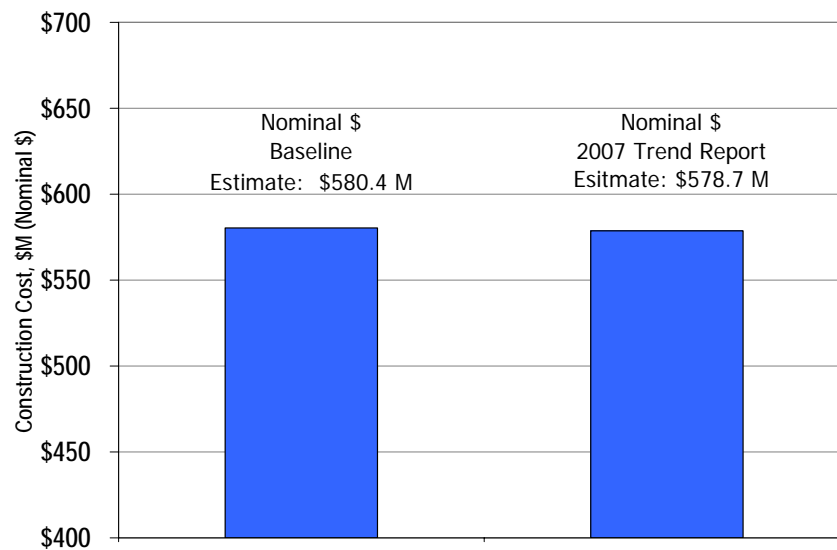


Figure A-1. Baseline Budget vs. 2007 Trend Report Estimate – Conveyance Contracts

For construction work that is actually under contract (East Tunnel, Central Tunnel, and West Tunnel), the contract amounts also conform well to cost assumptions underlying the Baseline Budget, as illustrated in Table A-2. For these three tunnels, individual contract amounts varied from the Baseline Budget by about -16 to +10 percent assuming “Owner Controlled Insurance” is pro-rated among the various conveyance projects.

Table A-2
2007 Trend Estimate vs. Baseline Budget (Nominal \$) –
Conveyance Construction Contracts⁽¹⁾

Conveyance Element	Baseline Budget ⁽²⁾	Current Status	Actual Construction Contract	WTD Adjustments	2007 Trend Estimate – Construction Contracts
East Tunnel	\$133.1 M	Under Contract	\$130.9 M	-\$0.6 ⁽³⁾	\$130.3 M
Central Tunnel	\$257.0 M	Under Contract	\$211.1 M	-\$2.9 ⁽⁴⁾	\$208.2 M
West Tunnel	\$95.6 M	Under Contract	\$102.0 M	+\$0.3 ⁽⁵⁾	\$102.3 M
IPS	\$55.8 M	In Bid Evaluation	N/A	N/A	\$71.5 M
Marine Outfall	\$22.9 M	In DB Proposal Preparation	N/A	N/A	\$33.5 M
Ancillary Facilities	\$16.0 M	Varies	N/A	N/A	\$15.7 M
Owner controlled Insurance	----		N/A	N/A	\$17.2 M
Totals	\$580.4 M				\$578.7 M

Notes:

1. Values are rounded to nearest \$100,000. Totals may not add up due to rounding.
2. Approximated by OMC based on underlying cost estimates and schedule
3. Contract amount less \$0.6M reallocated as mitigation
4. Contract amount less \$0.7M reallocated to mitigation and \$2.2M reallocated to other projects.
5. Contract amount less \$4.7M reallocated to mitigation and plus \$5M reserved to account for change in outfall hydraulics

There are, however, two principal Conveyance elements – the Influent Pump Station and the Marine Outfall – that were not bid or under contract at the time the cost information was developed for the *2007 Trend Report*. There is, therefore, greater uncertainty around what the value of these construction contracts will ultimately be. WTD's *2007 Trend Report* includes some adjustments for this uncertainty. Since the *2007 Trend Report* estimates were developed, the following changes have occurred:

- The IPS bids have been received. The apparent low bid exceeds WTD's *2007 Trend Report* estimate of \$71.5 million by about \$20.6 million.
- Assumed hydraulic conditions affecting the Marine Outfall design changed to better account for marine fouling and reflect a change in the available head at the West Tunnel outlet. These changes will result in the need for a larger diameter outfall or, possibly, two outfall pipelines and are therefore expected to

increase the assumed construction contract cost beyond what is reflected in the *2007 Trend Report*.

As a result, in our opinion, the *2007 Trend Report* is based on *Construction Contracts* values for these two elements, (including WTD's upward adjustments and proportional increases to *Construction Contracts* and *Sales Tax*) that likely underestimate overall construction costs by \$18 to \$24 million.

CONVEYANCE CONTINGENCIES

Conveyance Construction Contingency

In nominal dollars, the Baseline Budget for the Conveyance *Construction Contingency* was about \$61.9 million or 10.7 percent of the estimated amount for *Construction Contracts*.¹ To arrive at the *Construction Contingency* in the *2007 Trend Report*, WTD has applied different contingency percentages to the various pieces of construction work, reflecting WTD's estimation of the level of risk, as set forth in Table A-3, below:

Table A-3: Comparison of Baseline Budget and 2007 Trend Report Construction Contingencies -- Conveyance

Conveyance Element	Construction Contingency(ies)			
	Baseline Budget (Nominal \$)		2007 Trend Report (Nominal \$)	
	% of Estimated <i>Construction Contracts</i> n	\$	% of Estimated <i>Construction Contracts</i>	\$
East Tunnel	N/A ⁽¹⁾	N/A ⁽¹⁾	10.0%	\$13.0 M
Central Tunnel	N/A ⁽¹⁾	N/A ⁽¹⁾	15.0%	\$31.2 M
West Tunnel	N/A ⁽¹⁾	N/A ⁽¹⁾	12.5%	\$12.8 M
IPS	N/A ⁽¹⁾	N/A ⁽¹⁾	15.0%	\$10.7 M
Marine Outfall	N/A ⁽¹⁾	N/A ⁽¹⁾	10.0%	\$ 3.4 M
Ancillary Facilities	N/A ⁽¹⁾	N/A ⁽¹⁾	Various	\$ 1.0 M
Total	10.7%	\$61.9 M	12.8% ⁽²⁾	\$72.1 M

Notes:

1. At the time the Baseline Budget was developed, an overall construction contingency was used for Conveyance.
2. Calculated based on *2007 Trend Report* value for *Conveyance Contracts* minus Owner-controlled Insurance

¹ The Conveyance Baseline Budget *Construction Contingency* was developed based on 10 percent of the constant \$2004 Baseline Budget. The difference, between 10 and 10.7 percent, derives from the *Construction Contingency* being budgeted near the end of the project, and therefore subject to more years of escalation.

At the time we reviewed the Baseline Budget, we commented that a higher percent construction contingency (i.e. 15 percent) was appropriate for Conveyance as a whole because of the higher risk associated with tunneling. In our opinion, the *2007 Trend Report's* estimate of construction contingencies, on a percentage basis, more closely reflects the expected level of risk.²

Conveyance Project Contingency

There is also a *Project Contingency* for Conveyance. The Conveyance *Project Contingency* in the Baseline Budget was \$89.5 million; the *2007 Trend Report* reduces this to \$18.2 million. While many of the pre-construction risks for Conveyance (i.e. SEPA compliance, and most permitting / property acquisition) have been resolved, there are still remaining “project risks” going forward. Some of these include:

- **Price Risk for Point Wells Property.** While WTD has use and possession of this property, the final price has not been agreed to. WTD has reported to us that the property owner is attempting to rezone the property from an industrial to a residential zoning classification, which could adversely affect the price.
- **Permitting Risk for the Marine Outfall.** Because the design concept that had been previously reviewed by Ecology will have to be modified to accommodate changed hydraulic conditions, some permit risk remains for the outfall.
- **Construction Projects Schedule Integration.** The overall development strategy for Conveyance (and the Treatment Plant) requires close integration of work among the various construction contracts to ensure that a delay by one contractor does not ripple through and delay another contractor and possibly delay the overall Project critical path. If not managed well, this, in our opinion could be a significant project risk going forward that is above and beyond the *construction contingencies* applied to the individual Conveyance construction projects.
- **Additional Tunneling Risks.** While we believe WTD's Conveyance *construction contingencies* are reasonable on a percentage basis, extreme events may occur during tunneling that would not be covered by these *Construction Contingences*.

Considering these remaining risks and the CM staffing/CM services issues identified below, we believe the \$18.2 million *Project Contingency* is reasonable, but is not adequate to also cover the \$18 to \$24 million shortfall associated with construction for

² On a dollars basis, the contingency levels are likely low by about \$1 to \$2 million because the construction estimates for the IPS and Marine Outfall, to which the contingency percents were applied, are also low. Our conclusion that the Construction estimate for Conveyance is \$18 to \$24 million low already accounts for this and for sales tax.

the IPS and Marine Outfall. In addition, there are “outside risks” of an extreme tunneling event that might not be adequately covered by this contingency. Budgeting for these extreme events is not, however, normal industry practice.

STAFFING, ENGINEERING AND CM PROFESSIONAL SERVICES – CONVEYANCE

For the *2007 Trend Report*, WTD projected engineering services (excluding geotechnical work) to support Conveyance design³ at about \$29 million, with all of these services currently under contract. This is equivalent to less than six percent of expected *Construction Contracts* cost, excluding the Marine Outfall. With \$22 million in geotechnical costs, engineering related costs would total \$51 million or about nine percent of expected construction contracts.

For the *2007 Trend Report*, WTD projected engineering services to support Conveyance construction at about \$7.5 million with all of these services, except for the Marine Outfall, currently under contract. For contracted CM services, the *2007 Trend Report* is based on an estimate of \$35.3 million but only about \$14 million is currently under contract.

WTD indicates that no additional issues have been identified since the *2007 Trend Report* that would affect the estimates for engineering services; however, WTD has indicated that the forecast for CM services is likely to increase over the trend estimate and that CM staffing levels could increase somewhat.

CONCLUSIONS – CONVEYANCE

Overall, Brightwater Conveyance has tracked very closely with the Baseline Budget (excluding contingencies), and we believe a reduction in the *Project Contingency* from that in the Baseline Budget is appropriate. However, given that the *2007 Trend Report* likely under-estimates overall construction costs for the IPS and Marine Outfall, we currently believe the *2007 Trend Report* likely understates Conveyance costs by \$18 to \$24 million. With these adjustments, Conveyance as a whole is expected to under-run the Baseline Budget by about \$69 to \$75 million.

Treatment Plant

The following table compares the Baseline Budget (nominal \$) for the Treatment Plant against WTD's updated estimates in the Trend Report. Cost categories reflect those provided in the Baseline Budget. Costs for the *2007 Trend Report* were presented in different categories with different levels of detailed breakdown. We have

³ Excluding the Marine Outfall beyond about 30percent design because most final design work will be conducted by the Design-Build contractor and is included as a construction cost.

modified the 2007 Trend Report information to conform to the Baseline Budget cost categories.

Table A-4
Comparison of Baseline Budget with 2007 Trend Report – Treatment Plant

Treatment Plant Project Component	Baseline Budget (\$Nominal)	2007 Trend Report (\$Nominal)
Implementation/Construction		
Construction Contracts	\$296.5M	\$436.8M
Construction Contracts Mitigation	\$31.1M	\$27.3M
Construction Contingency	\$31.6M	\$36.5M
Sales Tax	\$24.9M	\$30.2M
Other	\$0.1M	\$0.0M
Subtotal, Implementation/Construction	\$384.1M	\$530.8M
Variance from Baseline		\$146.7M (+38.2%)
Non-Implementation/Construction		
Engineering, Professional and Consulting Services ⁽¹⁾	\$76.5M	\$92.5M
Permitting and Other Agency Support ⁽²⁾	\$24.7M	\$84.5M
Right-of-Way	\$103.3M	\$96.7M
Miscellaneous Services and Materials	\$4.7M	\$4.5M
King County Staff Labor	\$25.9M	\$26.8M
Subtotal, Non-Implementation/Construction	\$235.1M	\$305.0M
Variance from Baseline		+69.9M (+29.8%)
Project Contingency	\$31.2M	\$4.0M
Variance from Baseline		-\$27.2M (-87.2%)
Lease/Rental/Other Credits and Revenues	-\$10.8M	\$0.0M
Total⁽³⁾	\$639.6M	\$839.8M⁽³⁾
Variance from Baseline		\$200.2M (+31.3%)

Notes:

1. Includes allied costs associated with mitigation

2. Includes permitting, mitigation payments, and arts allowance

3. Totals may not add up due to rounding. Equals the total of conveyance costs in Tables 8, 9, and 10 of the 2007 Trend Report

Our review focused on the following cost categories:

- Construction Contracts
- Project Contingencies (Construction and Project)
- Engineering and Professional Services
- Staff Labor

In aggregate, these categories account for nearly 70 percent of the Baseline Budget.

CONSTRUCTION CONTRACTS

100 Percent Design Estimate from Hoffman versus 2007 Trend Report

WTD has completed the design of the Treatment Plant, has received a 100 percent cost estimate from its GC/CM Contractor (Hoffman) and has reviewed those estimates with input from CDM, its construction management consultant for the treatment plant. Subsequently, WTD determined that Hoffman would be unable to bond the full value of Treatment Plant construction. In response WTD is preparing to “hard bid” a package including solids, odor control, and energy facilities.

The *2007 Trend Report* reports Hoffman’s 100 percent estimate as \$557.3 million but WTD forecasts the construction cost for the Treatment Plant at \$436.8 million. However, these numbers are not directly comparable since Hoffman’s 100 percent estimate includes costs for certain types of work that WTD budgets and tracks as *Construction Mitigation* and because Hoffman’s estimate includes *Sales Tax*, which WTD also budgets and tracks in a separate cost category. Adjusting Hoffman’s estimate to account for these differences, results in the following comparable estimates for Treatment Plant *Construction Contracts*:

Table A-5
Treatment Plant *Construction Contracts* Estimates with Reallocations

	Hoffman 100% Estimate with Reallocations ⁽¹⁾	WTD 2007 Trend Report	Difference
Construction Contracts	\$491.0M	\$436.8M	\$54.2M

Notes:

1. North Mitigation Area Construction, mitigation component of Site Work, EECC Construction, and Sales Tax reallocated to different cost categories.

The difference reflects certain adjustments that WTD has made based on a number of factors including:

- Downward adjustments to Hoffman's direct construction estimates for certain categories of work based on input from CDM regarding Hoffman's assumed production rates and unit prices;
- A downward adjustments to Hoffman's assumed escalation rate to the mid-point of construction;
- A downward adjustment to exclude a market conditions risk factor;
- A downward adjustment to Hoffman's proposed MACC contingency;
- A downward adjustment to account for assumed differences in construction labor rates for earthwork and concrete between Snohomish and King counties;
- Downward adjustments associated with the removal or reduction of certain allowance items from Hoffman's estimate;
- An upward adjustment accounting for a substation that will be required for the Treatment Plant, but that is not being constructed by Hoffman; and
- An upward adjustment to reflect additional costs (primarily increased contractor fee) associated with "hard bidding" the solids stream work package.

Are these adjustments reasonable? To answer this question, it is first important to note some aspects of Hoffman's GC/CM Contract. For example, Hoffman's GC/CM contract includes the following commercial terms:

Table A-6
Selected Treatment Plant GC/CM Provisions

Contract Item	Basis for Pricing	Comments Regarding Hoffman's Contract
Maximum Allowable Construction Cost (MACC)	Negotiated for each work element (i.e. North Mitigation Area, Site Prep, Earth Work, and Liquids Stream), considering cost estimates prepared by Hoffman and reviewed by WTD The MACC represents the work that Hoffman will split into subcontractor work packages and competitively bid each package. The period of time over which all subcontractor work packages are bid is referred to as the "buyout" phase	Includes provisions returning the difference between the MACC and the actual dollars under contract at the end of buyout to WTD. This difference is referred to as the "buyout savings."
MACC Contingency	Negotiated as a percentage of the MACC.	Includes provisions returning any unused MACC contingency to The County at the end of the Treatment Plant construction.
Specified General Conditions	Negotiated based on pre-established labor and escalation rates	Pre-established labor and escalation rates were part of Hoffman's GC/CM proposal
Fee	Derived based on a percent of MACC (minus sales tax). The percent bid by GC/CM contractor at the time of selection	Hoffman's contract has a fee calculated based on 1.98%.
Guaranteed Construction Cost (GCC)	Sum of the above elements.	

As noted above, Hoffman's contract has several provisions that are very favorable to the County but that, in the short run, are likely to lead Hoffman to negotiate a MACC that protects its relatively small percent fee (given fees seen in the current market).

Hoffman is now nearing completion of work on the North Mitigation Area and Site Preparation / EDS and currently has a balance of about \$4 million (remaining MACC contingency plus current buyout savings.) This does not mean that \$4 million is guaranteed to return to the County⁴ but may indicate that Hoffman's estimates have been somewhat conservative.

⁴ Under the contract terms, the remaining MACC contingency remains until all construction work is completed while most of the buyout savings remain through completion of "buyout" for all of Hoffman's work. Thus "buyout savings" on site preparation could potentially be used if

Even taking this into account, in our opinion, WTD's adjustments to Hoffman's 100 percent estimate (after reallocations for mitigation and sales tax) in aggregate are optimistic. Based on our review, we believe WTD's adjustments likely understate construction costs by between \$24 to \$53 million⁵, assuming good bids are received for the "hard bid" solids package. This does not, however, take into account the specific risks associated with separating the construction and "hard bidding" the solids package (see discussion below, under "Project Contingency – Treatment Plant").

Current Estimates of Treatment Plant *Construction Contracts* versus Baseline Budget

The following table compares the Baseline Budget (nominal \$) against current estimates for the Treatment Plant *Construction Contracts*.

Table A-7
Comparison of Construction Contracts Estimate to Baseline Budget

	Baseline Budget, \$Nominal	WTD 2007 Trend Report			Hoffman 100% Estimate (after cost reallocations)(1)		
		Nominal \$ Estimate	Variance from Baseline		Nominal \$ Estimate	Variance from Baseline	
			\$	%		\$	%
Construction Contracts Cost	\$296.4M	\$436.8M	\$140.4M	+\$47.4%	\$491.0M	\$194.6M	+\$65.7%

Notes:

1. Excludes NMA, Mitigation component of Site Work, and EECC which are categorized as mitigation by WTD. Also excludes sales tax.

Some of the major factors leading to this variance from the Baseline Budget are discussed below:

- **Design Development.** In our initial review of the Baseline Budget, we commented that WTD's estimate did not explicitly account for design development – the process of filling in details and refining the project definition between 30 percent and 100 percent design. Based on our experience, we concluded that a 25 percent increase in cost associated with this design development process could be expected. This would account for about \$74 million of variance. In retrospect, it is likely that our 25 percent "design

subcontractor bidding of future packages (Earthwork and Liquids) exceeds Hoffman's MACC estimates.

⁵ Including a proportional increase to Sales Tax.

development” estimate was low given certain issues, such as additional seismic requirements that affected the construction quantities.

- **Construction Escalation Exceeding the Assumed Three Percent Inflation.** WTD’s Baseline Budget was based on three percent escalation. The Nationwide Engineering News Record Construction Cost Index indicates that general inflation for construction has averaged about five percent over the last three years, although the indices for specific materials have been much more volatile. Assuming five percent rather than three percent general escalation would account for about \$34 million of the increase. WSDOT’s estimate of construction cost inflation has been significantly higher than five percent annually over the last several years.
- **Delay.** The Treatment Plant contract award schedule has slipped some work, but not the critical path. With current general construction escalation rates, we estimate this delay could account for \$10 to \$12 million of the variance.
- **“Non-Competitive” Market Conditions.** The current bidding climate in the Puget Sound area is very difficult for owners. In addition to there being many public works projects planned or under construction, private sector construction work is very strong, and many contractors may be declining to bid on public sector work in favor of private sector contracting. As shown in the following table, the number of bidders on public infrastructure projects declined over the last two years.

Table A-8
Number of Bidders on Large Public Infrastructure Projects

	1994 - 2004	2005 - 2006
Median Number of Bidders	5	3
Average Number of Bidders	5.2	3.6
% of Projects with Three or Fewer Bidders	22%	56%
% of Projects with Two or Fewer Bidders	8%	30%

Source: Daily Journal of Commerce

While it is difficult to estimate the cost impact of this situation, it is likely, at best, that contractors and subcontractors are expecting higher percent fees. For example, an increase in subcontractor fees on subcontracted work from five to eight percent would increase the expected Treatment Plant costs by about \$5 to \$6 million.

- **Split Contracts.** Splitting contracts is a factor that is expected to increase the *Construction Contracts* cost above that assumed in the Baseline Budget. The split contract will have incremental General Conducting Costs and additional

risk since interface management and site logistics will need to be managed between two contractors rather than one.

Treatment Plant Construction Contingency

In nominal dollars, the Baseline Budget for the Treatment Plant *Construction Contingency* was about \$31.5 million or 10.6 percent of the Baseline Budget value for *Construction Contracts*. WTD's Trend Report increases this contingency to \$36.5 million, or about 8.3 percent of the *2007 Trend Report* estimate for *Construction Contracts*. (Using Hoffman's adjusted estimate, this would result in a construction contingency of about 7.4 percent.) Provided reasonable bids are obtained on the solids package, in our opinion, this construction contingency is reasonable overall (even considering that the "hard bid" work for the solids should carry a ten percent contingency). This is because, in addition to the *Construction Contingency*, Hoffman as the GC/CM will be carrying a contingency on much of the work.

Treatment Plant Project Contingency

The Treatment Plant *Project Contingency* was \$31.2 million in the Baseline Budget (nominal dollars.). WTD has reduced this to \$4.0 million in the *2007 Trend Report*. While many of the pre-construction risks at the Treatment Plant have been resolved (i.e., property acquisition, SEPA compliance, mitigation agreement with Snohomish County, resolution of seismic conditions questions), there are still remaining "project risks" going forward for the Treatment Plant. Some of these include:

- **Bidding Risk for Solids Package.** We believe there is considerable bidding risk associated with the solids package that is now planned to be "hard bid." This situation has been borne out in WTD's recent experience with the IPS, where the bids exceeded the assumed amount supporting the *2007 Trend Report* by about 30 percent.
- **Site Coordination Risk.** This includes access and laydown area management for two general contractors.
- **Systems Integration Risk.** Systems management and integration, including instrumentation and controls systems installation and programming, is an area where problems are often encountered during plant startup. The potential for such problems increases with two separate contractors responsible for liquids and solids packages. I&C, SCADA, Program.

Given these risks, likely contract provisions for escalation risk sharing, and CM issues identified below, we believe it would be prudent to increase the Project Contingency to about \$22 million and some need for increased consultant and staff support during construction (see below).

STAFFING , ENGINEERING AND CM PROFESSIONAL SERVICES – TREATMENT PLANT

For the *2007 Trend Report*, WTD projected engineering services to support Treatment Plant design (including predesign, additional efforts associated with value engineering, splitting the “liquids” and “solids” packages, and Instrumentation and Controls design) at about \$51.3 million, with all but about \$400,000 of these services currently under contract. This is equivalent to about 12 percent of WTD’s expected *Construction Contracts* cost, or about ten percent of Hoffman’s 100 percent estimate.

For the *2007 Trend Report*, WTD projected engineering and CM services to support Treatment Plant construction at about \$21 million, of which about \$4 million is currently under contract. WTD has indicated that the forecasts for engineering and CM services during construction are under negotiation and do not reflect the additional costs that will likely arise from managing two separate construction contractors on the site.

WTD is currently developing detailed staffing plans showing roles and responsibilities among its staff and various contractors/engineering firms providing support during construction. These plans should be reviewed to ensure there are no overlaps or gaps in function and to assure expected review process during construction.

CONCLUSIONS – TREATMENT PLANT

Overall, the Brightwater Treatment Plant costs have increased well above the Baseline Budget. In addition, in our opinion, the *2007 Trend Report* likely understates Treatment Plant costs by \$42 to \$71 million.

Attachment 2
Capital Budget Committee
R.W. Beck Brightwater Project Oversight Report
May 16, 2007

Brightwater Project Cost Comparative Summary (Nominal \$ in Millions)				
	Council Adopted 2004 Baseline Budget	2005 WTD Trend Report	2007 WTD Trend Report	R.W. Beck's Estimated Changes to 2007 Trend Report
<i>Conveyance</i>				
Implementation/Construction	\$704.8	\$660.9	\$713.4	Increase by \$18 to \$24
Non-Implementation ⁽¹⁾	\$226.2	\$206.6	\$196.0	
Project Contingency	\$ 89.5	\$92.5	\$18.2	
Subtotals	\$1,020.6	\$960.0	\$927.5	\$946 to \$952
<i>Treatment Plant</i>				
Implementation/Construction	\$384.1	\$478.8	\$530.8	Increase by \$24 to \$53
Non-Implementation	\$235.1	\$295.8	\$305.0	
Project Contingency	\$31.2	\$18.5	\$4.0	Increase by \$18
Adjustment	(\$10.8)	\$0.0	\$0.0	
Subtotals	\$639.6	\$793.1	\$839.8	\$882 to \$911
<i>Total Project Costs</i>				
Total Project Costs	\$1,660	\$1,753	\$1,767	\$1,827 to \$1,862
Variances from Baseline	NA	\$93	\$107	\$168 to \$203
Variance from 2005 Trend	NA	NA	\$14	\$77 to \$110
⁽¹⁾ Non-implementation costs include all allied costs (design engineering, project and construction management services, etc.), permitting expenses, land acquisition expenses, and sales tax. Notes: WTD = Wastewater Treatment Division; R.W. Beck = Council's Oversight Management Consultant Nominal Dollars = Calculation of nominal dollars referenced above in 2004 Baseline Budget, WTD 2005 and 2007 trend reports and R.W. Beck's estimated changes were based on three percent (3%) inflation factor. Estimated changes shown in the right-hand column include additional inflationary adjustments identified in the R.W. Beck oversight report.				