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25 August 2008

Mr. Rob Cozzi, P.E.
Project Manager / Civil Engineer
City of Portland
Bureau of Environmental Services
1120 SW Fifth Avenue, Room 1000
Portland, Oregon 97204-1972

Subject: Proposal for Services – Balch Consolidation Conduit – Design/Final Design of Northwest Neighborhood Elements, Services during Pre-Construction Phase and Engineering Support during Construction Phase, K/J Proposal No. P08098
City of Portland – Balch Consolidation Conduit Project
K/J Project No. 0691028*00, City of Portland Contract No. 37121

Dear Rob:

Kennedy/Jenks Consultants (Kennedy/Jenks) has prepared this proposed scope and budget information for Amendment No. 3 to the BCC Project Scope and Budget.

Objective

The objective of the work is primarily to provide services necessary to support Design and Final Design phases of the Northwest Neighborhood Project elements, to participate in the Pre-Construction Services Agreement phase with BES and the construction contractor, and to provide engineering services during construction. As indicated in our summary memo of May 12, 2008 for Amendment No. 2, it was anticipated this Amendment No. 3 would be prepared at a later date.

Scope of Services

The scope of services generally consists of:

- Northwest Neighborhood Project Elements and Yeon Alignment Design and Final Design Phase Services, including Alternative Contracting considerations
- Extension of Task 100 – Project Management Services for five months (February 2009 through June 2009 - end of contractor's Pre-Construction Services Agreement period)
- Extension of Task 100 – Project Management Services for 26 months (July 2009 – contractor's NTP through August 2011 - end of contractor's construction period)
- Evaluation of additional Yeon Avenue/Oregonian property alignment alternatives (Subtask 370)

- Microtunneling boring machine alternatives technical memorandum and meeting (Subtask 160AC)
- Jacking pipe design meetings (Subtask 435)
- Engineering Support During Construction (Task 1000)
- Annual Hourly Rate Adjustments

Please note the following relative to this proposed Amendment:

TASK 100 – PROJECT MANAGEMENT SERVICES

Subtasks 120 – Project Schedule, 130 – Meetings and Updates and 140 – Status Reports: Duration of scope of services was extended for the 5-month period of February through June, 2009 to account for addition of services during contractor's Pre-Construction Services Agreement period.

Subtask 160 – MTBM Alternatives: Subtask added to aid BES in evaluating contractors' proposals relative to microtunneling machine features and procurement.

TASK 300 – PREDESIGN PHASE SERVICES

Additional scope and budget was added to most Task 300 Predesign subtasks for inclusion of the Yeon Avenue pipeline alignment alternative. However, because budget was still available from Subtask 322 – Geotechnical Explorations, a budget increase for additional Yeon Avenue alignment geotechnical explorations is not required.

Subtask 380 – 30% Preliminary Design Report: Budget was added to incorporate the Northwest Neighborhood Project elements and Yeon Avenue alignment alternative into the previously prepared 30% Preliminary Design Report.

TASK 400 – DESIGN PHASE SERVICES

Scope and budget were added to Design Phase Service subtasks primarily related to the Northwest Neighborhood Project elements and the Yeon Avenue alignment alternative, including:

- Preparation of Geotechnical Design Tech Memo and Environmental Tech Memo
- Additions to Geotechnical Data Report (GDR), Environmental Data Report (EDR) and Geotechnical Baseline Report (GBR)
- Other subtasks including easements, permits, existing utilities verification, traffic control, and operation and maintenance
- Design including 60%, 90% and 100% contract documents, costs estimates, and construction schedules

Scope and budget were also added for coordination with and response to BES and the construction contractor during the Pre-Construction Services Agreement period related to:

- BES-approved additional geotechnical and environmental exploration requests of the construction contractor and incorporating additional data into the GDR, EDR and GBR, as required
- Design review meetings with BES and the construction contractor
- Modifications to the contract documents (drawings and specifications) as a result of construction contractor suggested and BES-approved design changes

TASK 500 – FINAL DESIGN PHASE SERVICES

Scope and budget were added to Final Design Phase Service subtasks primarily related to:

- Incorporation of Northwest Neighborhood Project elements
- Incorporation of construction contractor suggested and BES-approved design changes

TASK 1000 – ENGINEERING SUPPORT DURING CONSTRUCTION

Please note that the scope and budget for Task 1000 – Engineering Support During Construction was not included in the original Agreement for PTE Services, but was identified in the Agreement to be added by Agreement amendment at a later date. The Task 1000 services consist of:

- Subtask 1001 – Preconstruction Conference
- Subtask 1002 – Submittals Review
- Subtask 1003 – Clarification of Contract Documents
- Subtask 1004 – Major Change Evaluation During Contractor's Construction Period
- Subtask 1005 – Geology, Geotechnical, Environmental and Microtunneling Support
- Subtask 1006 – Pre- and Post-Construction Surveys of Buildings and Structures
- Subtask 1007 – Settlement and Building Instrumentation Monitoring
- Subtask 1008 – Construction Progress Meetings
- Subtask 1009 – Pre-Final and Final Inspection Walks-Through
- Subtask 1010 – Construction Phase Progress Reports
- Subtask 1011 – Update Project Management Plan - Construction

TASK 1100 – ANNUAL HOURLY RATE ADJUSTMENTS

A budget adjustment was incorporated for estimated hourly labor billing rate adjustments from July, 2009 through Project completion.

Amendment No. 3 Budget Increase

The total Budget increase request for Amendment No. 3 is $2,146,730 broken down by task as follows:

Task 100	$116,203
Task 300	$143,341
Task 400	$1,018,905
Task 500	$58,228
Task 900	$8,481
Task 1000	$688,194
Task 1100	$113,378
Total	$2,146,730

Attachments

We have included scope of work and fee estimate documents as attachments to this proposal.

Terms & Conditions

This proposal is based on current project conditions and possible pipeline alignments, and therefore is valid for 30 days following the date of this letter. It is proposed that the Terms and Conditions of the professional services agreement between the City of Portland and Kennedy/Jenks Consultants, Contract 37121 dated 18 December 2006 also apply to this Agreement.

If you have any questions about our comments or need additional information, please contact me at 503-295-4911.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Brad R. Moore, P.E.
Technical Director

Travis Tormanen
Vice President

AMENDMENT NO. 3
DESIGN OF BALCH CONSOLIDATION CONDUIT
BES PROJECT NO. 5510
MODIFIED SCOPE-OF-WORK

Note: ***Amendment No. 3 modifications are shown in bold italics.*** *Previous Amendment No. 2 modifications are shown in italics.*

Amendment No. 3 modifications provide for inclusion of:

- ***Northwest Neighborhood Project Elements and Yeon Alignment Design and Final Design Phase Services, including Alternative Contracting considerations***
- ***Extension of Task 100 – Project Management Services for five months (February 2009 through June 2009 - end of contractor's Pre-Construction Services Agreement period)***
- ***Extension of Task 100 – Project Management Services for 26 months (July 2009 – contractor's NTP through August 2011 - end of contractor's construction period)***
- ***Evaluation of additional Yeon Avenue/Oregonian property alignment alternatives (Subtask 370)***
- ***Microtunneling boring machine alternatives technical memorandum and meeting (Subtask 160AC)***
- ***Jacking pipe design meetings (Subtask 435)***
- ***Engineering Support During Construction (Task 1000)***
- ***Annual Hourly Rate Adjustments***

Modifications also provide for deletion of some Tasks and Subtasks in the original Scope-of-Work that will no longer be completed. Such deleted Tasks and Subtasks are indicated in the Scope-of-Work.

The Bureau of Environmental Services (BES) serves the Portland community by protecting public health, water quality and the environment. BES provides sewage and stormwater collection and treatment services to accommodate Portland's current and future needs. The Balch Consolidation Conduit is a key component to the City's Combined Sewer Overflow (CSO) Management Program.

The Project is needed to comply with the mandated Amended Stipulated and Final Order (ASFO) administered by the Oregon Department of Environmental Quality. The ASFO requires that the City construct facilities to control CSOs to the Willamette River to a level commensurate with four winter overflows annually and one summer overflow every three years. Control of 16 outfalls along the west side of the Willamette River must be completed by December 2006, and full control to the stipulated level, by December 2011. The Balch Consolidation Conduit must be in place and operational by the December 2011 deadline to meet requirements of ASFO.

The scope of services in this contract provides for technical and design services in civil engineering, structural engineering, geotechnical and environmental engineering to complete the Preliminary Design and Final Design for the Balch Consolidation Conduit (BCC), *and Preliminary Design* ***and Final Design*** *of elements of the associated Northwest Neighborhood (NWN) Projects.*

The scope of services also includes support to BES in implementation of the alternative contracting process (i.e., qualifications-based selection of contractor for a reimbursable cost plus fixed fee contract). The support

includes assistance in development of a contractor Request for Qualifications (RFQ) and Request for Proposal (RFP), and technical support in the RFQ and RFP processes.

The scope of services also includes Engineering Support During Construction for the Balch Consolidation Conduit and the associated Northwest Neighborhood (NWN) Projects.

The Balch Consolidation Conduit Project will convey combined sewer overflows from the Balch Drainage Basin in Northwest Portland. The area is bounded by the Willamette River to the north and the Tualatin Mountains to the south. The BCC Project will include approximately 5000 feet of 84-inch diameter sewer main, which will convey up to 380 cfs of combined sewage from the Balch Basin to the existing Nicolai drop shaft on the Westside Combined Sewage Overflow tunnel. *The Preliminary Design and Final Design of elements of the NWN Projects includes projects as shown on the attached Balch Consolidation Conduit Support Package (Sheet 1 of 1 dated 03/05/08 for RP02MIN, RP02MID AND RP02ALL projects):*

- *29 Yeon S Line (2,100 lineal feet of 21-inch diameter pipe)*
- *29 31 Line (1,100 lineal feet of 12-inch diameter pipe)*
- *Nela 29 Line (1,150 lineal feet of 36-inch diameter pipe)*
- *54in Redirect Line (1,350 lineal feet of 18-24-36-inch diameter pipe)*
- *Yeon 29W Line (900 lineal feet of 30-inch diameter pipe)*
- *Industrial 29B, 29G and Yeon 29E lines (200 lineal feet of 15-36-48-inch diameter pipe)*
- *31 29, 54in Redirect Yeon and Front Lines (600 lineal feet of 24-36-inch diameter pipe)*
- *Industrial 29E Line (900 lineal feet of 18-24-inch diameter pipe)*
- *Industrial 29F Line (1,000 lineal feet of 30-36-inch diameter pipe)*
- *Industrial 29C Line (1,500 lineal feet of 24-48-inch diameter pipe)*
- *30 Industrial Line (1,000 lineal feet of 18-24-inch diameter pipe)*
- *Diversion structure at 29th/Industrial*
- *Diversion structure at 29th/31st*

A detailed Scope-of-Work supporting the design of these Projects is provided below.

100 PROJECT MANAGEMENT SERVICES

Objective: Meet the project objectives and to plan, organize, direct, control and report activities necessary to provide the respective products and deliverables on time and within budget.

110 Project Management Plan

Prepare a Draft and Final Project Management Plan (PMP) that will be maintained and updated throughout the Project. Obtain BES Project Manager (PM) approval of initial Plan and updates. The PMP will include, but not be limited to the following:

- Introduction including Project description, overall Project approach and Project goals – ***update for Engineering Support During Construction***
- Project organization including Kennedy/Jenks Project Team with roles and responsibilities defined; BES organization with roles and responsibilities defined; and contact lists with names, organization, address, e-mail, and phone and fax numbers – ***update for Engineering Support During Construction***
- Scope of Work and individual work task plans (including templates for task plans), as required, and including overall work breakdown structure with tasks, subtasks, schedule, budget and deliverables – ***update for Engineering Support During Construction***

- Task management description and process including protocols and procedures- *update for Engineering Support During Construction*
- Report and technical memoranda formatting including templates
- Project schedule and control procedures – *update for Engineering Support During Construction*
- Project budget and control procedures- *update for Engineering Support During Construction*
- Project coordination, monitoring, communication (including BES authorization for moving forward with work) and progress reporting procedures – *update for Engineering Support During Construction*
- Decision-making protocol and documentation systems for recording decisions – *update for Engineering Support During Construction*
- Change management procedures
- QA/QC procedures including design control procedures; procedures for incorporating utility information; drawing preparation; specification preparation; calculation preparation; technical memorandum preparation; report preparation; checking procedures; and design milestone reviews
- Performance measurement criteria – *update for Engineering Support During Construction*
- Contract administration procedures – *update for Engineering Support During Construction*
- Invoicing and billing procedures
- File documentation procedures

110NW/AC Update Project Management Plan

Prepare an initial update (see above) of the PMP based on incorporation of elements of the NWN Projects; alternative contracting approach; Project organization including BES-K/J Design Team and construction contractor; K/J coordination with and response to BES and the construction contractor in finalization of the design during the contractor's Pre-construction Services Agreement phase. Update the above PMP sections as indicated to reflect the incorporation of elements of the NWN Projects and alternative contracting approach into the overall BCC Projects. Implement the use of Constructware software for Project information and data filing and documentation. Complete training to be provided by BES for use of Constructware software.

120 Project Schedule

Develop and maintain the design schedule and preliminary construction schedule for the Project in a format compatible with MS Project, Primavera or SureTrak. The schedule will outline all tasks required of the Consultant to develop, program and design the project. Activities performed by BES, the Consultant, and other parties will be shown. Activity data shall, as a minimum, include a description, duration, and activity links, and will be prepared at the task and subtask level of detail. Monthly schedule updates will be provided for both the design and construction schedules.

120NW/AC Update Project Schedule

Update Project Schedule to include alternative contracting approach (RFQ, RFP and contractor's Pre-construction Services Agreement [PSA] phase), easement and rights-of-way acquisition process, Contaminated Media Management Plan (CMMP) schedule, elements of NWN projects, and BES Staff/Management design decision-making process. Extend Project Schedule updates for period of February through June 2009 until contractor construction notice-to-proceed (NTP). See Subtask 445 for Project Schedule updates after 60% Submittal.

130 Meetings and Updates

Participate in monthly meetings of the Consultant project team and bi-weekly meetings with the BES Project Manager and prepare agendas, necessary visual aids to facilitate meeting presentations and discussion, and

written summaries for these meetings. Bi-weekly meetings with the BES PM shall be held throughout the preliminary and final design phases to update and track status on project activities, interagency coordination requirements, BES coordination requirements, review progress of decision-making strategy, identify upcoming activities and issues that need to be addressed, potential hurdles, and proposed corrective actions.

Attendance at monthly project team meetings will be on as as-needed basis. Attend meetings with City staff and Oregon DEQ to inform DEQ of Project status and gain DEQ concurrence with Project decision-making.

130NW/AC Meetings and Updates
Extend bi-weekly meetings for period of February through June 2009 until contractor construction NTP. See Subtask 1008 for bi-weekly meetings during construction phase of Project.

140 Status Reports
Provide monthly status reports in a BES-prescribed format, including a budget spreadsheet and schedule updates and such other reports as required by the BES Project Manager throughout the Project. Status reports shall summarize the work completed during the billing period, status of deliverables, updated schedules, hours and costs spent to-date by task.

Monthly status reports shall include Earned Value Management (EVM) reporting at the major task level (i.e., Task 100, 200, 300, etc.) including BCWS, ACWP and BCWP. Major task level evaluation and reporting will include consideration completion status of individual subtasks within the major task levels.

140NW/AC Status Reports
Extend status reporting for period of February through June 2009 until contractor construction NTP. See Subtask 1010 for progress reports during construction phase of Project.

150 Design Decision and Change Log
Prepare and maintain a Design Decision and Change Log that will be updated as decisions are made and changes proposed. Maintain in electronic format to facilitate distribution and information exchange between Consultant and the BES Project Manager. Provide monthly updates with focus on development or proposed changes that could impact design or construction costs and/or schedule.

Project Management Deliverables:

- Draft and Final Project Management Plan *and updates*
- Project schedule and monthly updates
- Project budget and monthly updates
- Monthly invoices and progress reports, including monthly Subcontractor Payment/Utilization Report
- Meeting agendas, summaries and follow-up action plans
- Monthly status reports
- QA/QC Documentation
- Design Decision and Change Log and monthly updates

160 Risk Assessment
In a workshop with BES, develop an initial Risk Assessment for the BCC project identifying risks associated with key elements of the project. As the Project progresses, update BCC project risks and add elements of NWN project risks. In conjunction with BES, develop a risk evaluation process and an assessment of risk frequencies and impacts. Based on the resultant risk evaluation:

- *Drop risks of very low frequencies and insignificant impact from further consideration,*
- *Include risk mitigation features into the plans and/or specifications as practical and economical, or*
- *Incorporate a risk contingency in the contractor's Estimated Reimbursable Cost for unmitigated risks*

160AC Microtunnel Boring Machine Alternatives Technical Memorandum
To assist in the evaluation of Proposals relative to proposed microtunneling machines, prepare a Draft and Final technical memorandum on Microtunneling Boring Machine features, risks/benefits and availability. The tech memo will include:

- *Machine type*
- *Machine manufacturers*
- *Machine attributes*
- *Incorporation of an airlock*
- *New vs. used machines*

200 PUBLIC INVOLVEMENT

Objective: *Develop and implement a Public Involvement Plan that provides citizens, businesses and neighborhood groups with Project information, responds to requests, and offers opportunities to give input on Project decisions, especially construction impact mitigation measures, and to gain public understanding and support.*

210 Public Involvement Plan Development

Consultant will work in a joint staff relationship with the BES community relations staff to develop a Public Involvement Plan (PIP), timeline and actual Consultant scope-of-work. Take into consideration results of the Northwest Basement Flooding design evaluations in the Plan development. The following tasks anticipate the work that will be assigned to Consultant. The scope and budget may need to be adjusted based on the final approved Plan.

210NW Prepare PIP Update for NWN Project Elements
Prepare an update of the PIP based on incorporation of elements of the NWN Projects and inclusion of contractor input during the PSA phase.

220 Stakeholder Interviews & Contact Database

Develop, maintain and update a stakeholder database. The database will be formatted to store contact information, produce mailing lists, and track comments and response. Maintenance of this database will highlight both individuals and groups that may need more intensive interaction with the project. Conduct up to twenty (20) stakeholder interviews with key parties identified jointly with BES. Update database after each public contact event. Survey instrument development, scheduling and findings report included.

230 Project Information Pieces

Prepare up to four (4) informational pieces for distribution by BES scheduled to match Project benchmarks and to provide progress updates. Pieces are assumed to be single color, 8.5X11 double-sided sheets, using readily available logos and mastheads. Materials will be made available in web-ready formats for uploading to the BES web site and include a comment card to track comments. Develop summary reports for the comments received. Draft up to four (4) media releases for BES distribution. Prepare up to two(2) large-scale aerial photography boards of the project area for presentations. Utilize existing BES photography if current; if not, provide new photography.

240 Community Meetings

Assist BES in developing strategy and preparation for up to three (3) community presentations/briefings as needed or requested.

250 Public Meetings

Develop agendas, text materials, and comment forms; arrange meeting locations and logistics; provide notification; facilitate and complete meeting summaries for two (2) sounding board meetings. These meetings will be small group work sessions with invited key interests and stakeholders to provide detailed input on alignment design and construction mitigation measures.

Develop agendas, text materials, and comment forms; arrange meeting locations and logistics; provide notification; facilitate and complete meeting summaries for two (2) informational public open houses.

260 Site Visits

Develop strategy, text materials, and comment forms; arrange meeting locations and logistics; provide notification; facilitate and complete meeting summaries for up to twenty (20) site visits with key stakeholders.

260NW Site Visits

Conduct site visits with key stakeholders for elements of NWN projects.

Public Involvement Deliverables:

- Public Involvement Work Plan
- Stakeholder interview instruments
- Stakeholder database
- Public information fact sheets and media releases
- Materials for community and sounding board meetings and public open houses
- Key stakeholder meeting summaries

300 PREDESIGN PHASE SERVICES

Objective: Collect and review data pertinent to the Project; identify issues/challenges requiring predesign level evaluations; define design, construction and operational criteria, and apply the criteria for decision-making on the pipeline alignment, materials and construction methods. This will include geotechnical, hydrogeological and environmental investigations; operation & maintenance considerations; hydraulics; permit and easement requirements; risk assessment; and other considerations.

310 Kickoff and Issues/Risks Identification Meeting and Follow-up Workshop

A project kickoff meeting will be held with Consultant's key design team leaders, geotechnical and environmental lead staff and public involvement staff, and BES's project management team to review the project approach, issues and constraints, schedule and milestones, communication channels and methods, deliverables, other pertinent information desired by BES, and confirm what activities will be self-performed by the BES. The kickoff meeting will also include an initial discussion of five alternative pipeline alignments as shown on Exhibit A.

After the project kickoff meeting, attend meeting(s) with BES PM and key kickoff meeting participants to review alternative alignments screening criteria and preliminary design decision strategy. The focus of discussion will be on potential fatal flaws, other known key issues/risks/constraints and screening criteria that may lead to

elimination of one or more of the alternative alignments from further Predesign Phase considerations. The identification of potential fatal flaws and other known key issues/risks/constraints will be based on BES's working knowledge of the alternative alignments area and Consultant's initial review of available data (e.g., geotechnical, environmental, hydrogeology, utilities, etc) and other considerations (e.g., permits, easements, rights-of-way, etc.)

A follow-up workshop is anticipated prior to undertaking subsequent Predesign Phase tasks focusing on further identification of issues/risks, information needed to evaluate the issues/risks, and information gathering scope and schedule. Subsequent evaluation of the key issues/risks will be through preparation of technical memoranda. Technical memoranda will remain as drafts until issues have been resolved or appropriately avoided or mitigated.

Prepare necessary visual aids to facilitate meeting presentations and discussions.

Develop a preliminary Risk/Issue Log as part of the kickoff meeting, additional BES meetings, and follow-up workshop to document risks/issues associated with the alternative pipeline alignments. Include the specific description of the risk or issue being considered including but not limited to cost risks, environmental risks, construction risks, operational risks, schedule risks, site safety, traffic safety, definition of subjective risk criteria, and definition of objective risk criteria. Provide monthly updates along with Task 150 – Design Decision and Change Log with focus on actions required or taken to resolve and/or mitigate risks/issues.

310NW NWN Project Elements Discussion Meeting
As part of a regularly scheduled BCC bi-weekly Project Management meeting attended by applicable BES and Consultant representatives, include a discussion of the NWN project elements to be completed as elements of the BCC Project. Focus discussion on issues, constraints, requirements and information needs of incorporating elements of the NWN projects into the BCC Project. Alignments will be as per the attached BCC Support Projects – Sheet 1 of 1.

320 Geotechnical and Environmental Data Review and Field Reconnaissance

Available published and unpublished geotechnical- and environmental-related information and data will be obtained, reviewed and evaluated for each alternative alignment. Information sources will include:

- Geologic and geotechnical reports, surface mapping, and subsurface data (boring logs and geologic profiles) from BES, ODOT, PDOT, OWRD, DEQ and other sources
- Historic photographs that will aid in the delineation of the former Guild Lake, the limits of hydraulic fill, and the location and limits of the former Guilds Lake garbage incinerator and landfill
- Bureau of Buildings files for geotechnical investigations and foundation reports completed for buildings and structures adjacent to the alternative Balch Consolidation Conduit alignments
- Oregon DEQ files and databases of environmental conditions
- Review of historic Sanborn maps
- Consultant in-house files of environmental and geotechnical investigations

Using information obtained in the Geotechnical and Environmental Data Review, Consultant's lead engineering geologist and lead environmental specialist will conduct a Field Reconnaissance of the alternative alignments, known intercept points and potential intermediate construction shafts. The reconnaissance will include an assessment of potential geotechnical issues along the alignments, including evidence of building & utility settlement, constraints to field explorations (traffic flow, concentrated existing utilities, railroad spurs,

etc.), and other observable geologic and environmental features. Using these key features and other subsurface geologic and environmental data, geologic/geotechnical/environmental constraints and/or opportunities for the alternative pipeline alignments will be identified and documented.

The information from the Geotechnical and Environmental Data Review and Field Reconnaissance will be compiled on maps and in tables for use during subsequent phases of work. The geotechnical and environmental risks associated with the three alignment alternatives will be quantified and evaluated. A comparison of the risks (e.g., construction issues and cost, safety and encountering unforeseen adverse conditions) associated with each of the alternative alignments will be summarized. The information will be used to fine-tune the exploration program described later, including defining data gaps, drilling techniques and locations, sampling intervals, and observation well locations.

320NW Geotechnical and Environmental Data Review and Field Reconnaissance
For the defined NWN project elements alignments, conduct a data review and field reconnaissance similar to Subtask 320 above. Utilize the information to develop a predesign phase (Stage 1) geotechnical and environmental exploration program.

320Yeon Geotechnical and Environmental Data Review and Field Reconnaissance
For the defined Yeon Avenue project alignment, conduct a data review and field reconnaissance similar to Subtask 320 above. Utilize the information to develop a predesign and design phases (Stage 1 & 2) geotechnical and environmental exploration program.

321 Stage 1 - Predesign Geotechnical and Environmental Exploration Work Plan
Geotechnical field explorations will be performed in a staged approach, considering the current design phase, known data and key issues at hand. Stage 1 explorations will support predesign and alignment selection and Stage 2 will be completed during design activities for the preferred alignment. The Stage 1 - Predesign Exploration Work Plan will consist of additional geotechnical, hydrogeological, and environmental data collection to support alignment selection and preliminary engineering for the selected alignment. The borings will be made using a combination of hollow-stem auger, mud-rotary and sonic-core drilling and Geoprobe direct-push sampling techniques.

Based upon the Subtask 320 – Geotechnical and Environmental Data Review and Field Reconnaissance, the Exploration Work Plan will focus on identifying features, geology or potential contaminates to differentiate risks associated with the alternative alignments. This initial stage of explorations will focus on known common sites for construction, such as shaft intercepts, and on comparative data for alternative alignments. Geotechnical and environmental explorations will be planned and executed for mutual benefit – i.e., exploration methods selected that will provide appropriate sampling for geotechnical classification as well as to provide environmental characterization of soil and ground water conditions. The Exploration Work Plan will provide a field reference consisting of a variety of topic areas, including:

- Team and individual roles and responsibilities and contact information
- Target exploration sites
- Specific borehole instructions, including drilling and sampling techniques, instrument installations and completion details
- Laboratory testing procedures
- Utility locate and protection, potholing and relocation plans
- Environmental site health and safety plans

- Private and public property access procedures
- Traffic control requirements and procedures
- Borehole and monitoring well selection and permitting requirements
- Management plan for investigation derived wastes (IDW)
- Response organization for field issues and concerns that may develop
- Emergency response protocols

321NW Stages 1 & 2 - Predesign and Design Geotechnical and Environmental Exploration Work Plan
Based on Subtask 320NW and the field reference developed for Subtask 321 above, develop a NWN project elements Stages 1 & 2 Exploration Work Plan.

321Yeon Stages 1 & 2 - Predesign and Design Geotechnical and Environmental Exploration Work Plan
Based on Subtask 320Yeon and the field reference developed for Subtask 321 above, develop a Yeon Avenue project alignment Stages 1 & 2 Exploration Work Plan.

322 Stage 1 - Geotechnical Explorations

Stage 1 - Geotechnical Explorations have been laid out to investigate BES's three previously identified alignments as shown on Exhibit B. The following table presents the program, and is followed by a description of the details and benefits of each exploration method in the program.

Stage 1 (PreDesign) Exploration Program

PreDesign Explorations (for alignment selection)	RotoSonic Boreholes	Auger/Mud Rotary Borings	GeoProbe Holes	Monitoring Wells
Intercept Shafts--Common to Alignments		3	4	2 at known shafts
South Alignment	2	4	3	2 in gravel segments
Mid Alignment		2	4	
North Alignment		2	3	
Total Borings	2	11	14	4

- Sonic Boreholes. These borings provide a continuous core sample of both fine and coarse grained soils underlying a site, and therefore are selected for use at known or likely shaft locations where thick layers of gravel and cobble deposits are anticipated. In addition, this drilling method has been proven as highly effective in both fine-grained soils, mixed fill materials and in coarse gravel and cobble deposits. No standard penetration test, N-values will be obtained in these borings.
- Auger/Mud Rotary Borings. These conventional geotechnical borings provide samples suitable for geotechnical characterization and analysis for contaminants. Important geotechnical design parameters can be determined, and can then be stratigraphically correlated to other borings in which in situ tests cannot be performed (geoprobe and sonic boreholes). Mud rotary drilling will be used where site specific liquefaction analysis is required. Geotechnical sampling using the Standard Penetration Test (SPT) will be conducted at 5-foot intervals in the hollow-stem and mud-rotary borings. At selected depths and locations, three-inch diameter undisturbed (Shelby) tube samples will be obtained for in-place density, strength, and consolidation testing.
- GeoProbe Borings. Direct push probes (Geo-Probe®) will be used to investigate areas where dredged fill and fine grained alluvium is anticipated through the alignment depth. Like sonic

boreholes, but much smaller, Geoprobes are ideal for providing a complete sample of subsurface conditions, where only fine-grained soils are present. Geoprobes allow ground water level monitoring, and produce limited IDW when soil or groundwater contamination is a concern. In addition, Geoprobes provide a very cost effective method of obtaining valuable data for microtunneling.

- Field Screening. Soil samples obtained from above the ground water interface in all sonic, auger, mud rotary and geoprobe borings will be field screened with a photoionization detector (PID) for the presence of volatile organic compounds (VOCs). Soil samples suitable for analytical testing will be collected at a maximum of 5-foot depth intervals. Samples may be collected on a closer spacing through the tunnel zone, or where contamination is suspected. A groundwater sample will be collected from each sonic, auger and geoprobe boring that encounters groundwater.
- Monitoring Wells. Four ground water monitoring or observation wells will be installed in the sonic boreholes and the auger boreholes to augment current groundwater monitoring data. The wells will be standpipe piezometers, 2-inch diameter PVC pipes. These wells may serve multiple purposes, such as confirming ground water levels, sampling ground water for environmental analysis, and to allow hydraulic conductivity (slug) tests. In addition, the monitoring wells can serve as sampling sites, construction monitoring, or as part of pump tests. Groundwater levels in the monitoring wells will be measured monthly during final design.
- In Place Permeability Tests. Carefully planned and executed slug tests will be performed in each monitoring well. A slug test provides both falling head and recovery testing in a monitoring well by displacing the water in the well rapidly with a slug. An automated datalogger and piezometer (pressure transducer) will record the tests, and the resulting data will be analyzed to estimate the soil permeability (hydraulic conductivity). In areas of high permeability such as the Gravel Alluvium, in-place falling head permeability tests will be completed in monitoring wells placed in RotoSonic or auger holes, provided contamination issues do not preclude this type testing.

Borings are planned to extend 15 feet below the anticipated deep pipeline invert elevation, and 20 feet below the anticipated bottom of shafts. The total budgeted linear footage of all the exploration methods is 2,160 linear feet, based on an average depth of 80 feet per boring. Environmental screening and collection of samples for analytical testing will be performed during all explorations as described below. Sketches of the borehole locations will be provided to BES for completing the borehole surveys. Decontamination of the drilling equipment will be done between boreholes. The drill cuttings and decontamination water will be contained in drums, inventoried, and removed from the site to temporary storage area for screening analytical testing prior to disposal. It is assumed that after the screening tests, Shannon & Wilson will haul and dispose of Investigation Derived Waste (IDW) at the Hillsboro, Oregon Landfill.

322NW Stages 1 & 2 - Geotechnical Explorations

Stages 1 and 2 - Geotechnical Explorations have been laid out to investigate the NWN project elements alignments as per the attached BCC Support Projects – Sheet 1 of 1. The following table presents the combined Stages 1 and 2 program.

Combined Stages 1&2 (NWN Project Elements) Exploration Program

PreDesign/Design Explorations	*RotoSonic Boreholes*	*Auger/Mud Rotary Borings*	*GeoProbe Holes*	*Monitoring Wells*
54 in Redirect		*8*		*2*
Industrial 29C		*7*	*7*	*5*
30 Industrial		*3*	*2*	
Total Borings		*18*	*9*	*7*

322Yeon Stages 1 & 2 - Geotechnical Explorations

Stages 1 and 2 - Geotechnical Explorations have been laid out to investigate the Yeon Avenue alignment (Shaft D' to Shaft L'). The following table presents the combined Stages 1 and 2 program.

Combined Stages 1&2 Yeon Avenue Exploration Program

PreDesign and Design Explorations	*RotoSonic Boreholes*	*Auger/Mud Rotary Borings*	*GeoProbe Holes*	*Monitoring Wells*
Total Borings	*4*	*0*	*0*	*2*

Note: This 322Yeon subtask is not considered an additional scope-of-work as it is an extension of geotechnical investigations required for alternative alignment evaluations. The 322Yeon description and Exploration Program table is provided to document the extent of Yeon Avenue explorations.

323 Stage 1 - Environmental Sampling and Testing

Stage 1 – Environmental Sampling and Testing has been laid out to investigate BES's three previously identified alignments as shown on Exhibit B. Stage 1 – Environmental Sampling and Testing boring and probe hole locations will be at relatively wide spacings, and specifically targeted to evaluate identified Environmental Features of Concern (EFOCs). Soil samples will be screened using photo ionization detectors (PIDs), and selected samples will be collected for additional analysis to be performed by BES. Groundwater samples will be obtained and analytical samples tested by BES for potential contaminants with a focus on the tunneling depth interval and at shaft locations. Samples from shallower depths with obvious contamination that could affect the alignment will be identified. Contaminant analysis will include gasoline-, diesel-, and oil-range petroleum hydrocarbons (NWTPH-Gx, and -Dx), volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and RCRA-8 metals. Additionally, some samples may require Toxicity Characteristic Leachate Procedure (TCLP) analysis to determine the material waste designation.

Where the above field screening indicates the presence of possible soil or groundwater contamination, and in areas of anticipated EFOCs, we will request that certain additional laboratory screening tests be conducted by BES. Up to four soil samples from each probe hole will be analyzed: 2.5-foot depth, 5-foot depth, the soil/ground water interface, and the mid-depth soil sample of the pipe zone. Shannon & Wilson's field

personnel will collect the soil and ground water samples, place them in appropriate containers provided by BES, label the samples, pack them in coolers with ice, and deliver them under a chain-of-custody to BES' Water Pollution Control Laboratory (WPCL) in St. Johns for analytical testing. Samples will generally be delivered on the day of collection or the following morning. If kept overnight, the samples will either remain on ice or be place in a refrigerator. Prior to field work, Shannon & Wilson will coordinate and consult with BES' WPCL personnel to establish procedures and protocols for all sample handling and delivery. These procedures will be documented in the exploration work plan. Within one week following completion of each batch of analytical testing, the WPCL will transmit by fax or e-mail a copy of the analytical findings to Shannon & Wilson.

323NW Stages 1 and 2 - Environmental Sampling and Testing
For the defined NWN project elements alignments, conduct environmental sampling and testing similar to Subtask 323 above. Testing to be conducted by BES's WPCL.

323Yeon Stages 1 and 2 - Environmental Sampling and Testing
For the defined Yeon Avenue project alignment, conduct environmental sampling and testing similar to Subtask 323 above. Testing to be conducted by BES's WPCL.

323A Stage 1 - Environmental Lab Work (This task has been deleted)

324 Groundwater Evaluation / Monitoring
Monitoring wells will be measured every 2 months during the Predesign and Design phases. Hydraulic conductivity estimates from slug tests will be evaluated to consider shaft excavation needs – particularly the need and practicality of dewatering.

325 Seismic Evaluations
For critical and representative sections, preliminary site specific liquefaction potential analysis will be made using Seed-Idriss procedures. Maximum credible earthquake accelerations and shear wave velocity estimates will be prepared for the proposed alignment as well as maximum ground velocities. The information developed will be used to evaluate and define final project goals, objectives, and data needs, including an identification of the seismic risk(s) to the proposed alignments. Results of the analysis will be incorporated into the Task 326 Geotechnical Alternatives Analysis Technical Memorandum.

326 Geotechnical Alternatives Analysis Technical Memorandum
To support the Task 365 - Alignment Alternatives Workshop and to document geotechnical issues and reasoning leading to opinions on the various alignment alternatives, a technical memorandum will be provided. Included will be an interpretive geotechnical characterization with profiles of each of the alternatives. Preliminary site engineering geology and ground water issues that impact design and construction will be identified. For the permanent shafts (intercept points), microtunneled pipelines, and any open-excavation pipeline portions, geotechnical engineering and hydrogeology will support alternatives evaluation, constructability and risk management issues. For the shafts, geotechnical issues will be identified as related to alternative methods of construction such as caisson, shored/cast-in-place, and segmental and secant shored systems, and the associated issues and alternatives for control of the ground water that could affect alignment alternatives.

326NW Geotechnical Analysis Technical Memorandum
For the defined NWN project element alignments, prepare a technical memorandum similar to Subtask 326 above as the basis for any additional geotechnical explorations and for design-related purposes. Prepare as an appendix to the Subtask 326 tech memo for NWN project elements tunneling and open-excavation.

326Yeon Geotechnical Analysis Technical Memorandum
For the defined Yeon Avenue project alignment, prepare a technical memorandum similar to Subtask 326 above as the basis for any additional geotechnical explorations and for design-related purposes. Combine with Subtask 326NW technical memorandum. The tech memo will be an update of the Subtask 326 tech memo replacing tunneling segment D-L with D'-L'.

327 Environmental Alternatives Analysis Technical Memorandum
Similar to the Geotechnical Alternatives Analysis Technical Memorandum, this technical memorandum will compare and contrast the known and reasonably anticipated environmental conditions for the various alignment alternatives.

327NW Environmental Analysis Technical Memorandum
For the defined NWN project elements alignments, prepare a technical memorandum similar to Subtask 327 above as the basis for any additional environmental explorations and for design-related purposes. Prepare as an appendix to the Subtask 327 tech memo for NWN project elements tunneling and open-excavation.

328 Predesign (30%) Geotechnical Data Report (GDR)
Results of the Geotechnical and Environmental Data Review, Field Reconnaissance and Stage 1 - Geotechnical Explorations program will be summarized and presented initially in a 30% Geotechnical Data Report (GDR) that will support the design team in providing a geologic characterization and subsurface understanding of the proposed alternative alignments. The GDR will consist of written and graphical descriptions of the geology, hydrogeology, and geotechnical setting, including field logs, field observation notes and photos of the RotoSonic cores. The 30% GDR will also assimilate preliminary information collected by BES, Oregon Department of Geology and Mineral Industries (DOGAMI) geotechnical data base information, Consultant internal file data, historic photographs, and other sources of information.

328NW Predesign (30%) Geotechnical Data Report (GDR)
Update the Subtask 328 GDR with data from the NWN project elements Geotechnical and Environmental Data Review, Field Reconnaissance and Stages 1 & 2 - Geotechnical Explorations program.

328Yeon Predesign (30%) Geotechnical Data Report (GDR)
Update the Subtask 328 GDR with data from the Yeon Avenue project alignment Geotechnical and Environmental Data Review, Field Reconnaissance and Stages 1 & 2 - Geotechnical Explorations program. Provide a summary evaluation of additional NW and Yeon geotechnical data from Subtask 322.

329 Predesign (30%) Environmental Data Report (EDR)
Results of the Geotechnical and Environmental Data Review, Field Reconnaissance and Stage 1 – Environmental Sampling and Testing program will be summarized and presented initially in a 30% Environmental Data Report (EDR) that will support the design team in providing an environmental characterization of the proposed alternative alignments. Field data and laboratory test results will be evaluated and summarized. The analytical test results will be summarized in tables, along with published

DEQ and U.S. Environmental Protection Agency (EPA) regulatory action levels, screening guidelines, and laboratory detection limits. A 30% EDR containing field explorations, laboratory testing, evaluations, statistical studies and findings, along with recommendations, as needed, for additional sampling and statistical analysis will be prepared. Applicable information from the Level 1 Environmental Assessment prepared by BES will also be included in the 30% EDR.

329NW Predesign (30%) Environmental Data Report (EDR)
Update the Subtask 329 EDR with data from the NWN projects elements Geotechnical and Environmental Data Review, Field Reconnaissance and Stage 1 & 2 – Environmental Sampling and Testing program.

329Yeon Predesign (30%) Environmental Data Report (EDR)
Update the Subtask 329 EDR with data from the Yeon Avenue project alignment Geotechnical and Environmental Data Review, Field Reconnaissance and Stages 1 & 2 – Environmental Sampling and Testing program. Provide a summary evaluation of additional NW and Yeon environmental data from Subtask 323.

330 Preliminary Identification of Existing Utilities
Research of existing information on file will be conducted to determine types and locations of existing utilities that may impact alignment alternative decision-making. This will include contacting all utility companies with utilities potentially in the area of the alternative alignments to obtain utility line mapping and/or field locates. The information will be included on base mapping of the alternative alignments. Task will include:

- Acquire preliminary information on major utilities along the alternative pipeline alignments. Collect utility maps and easement information regarding abandoned, existing, and proposed utilities, including abandoned wells, corresponding to the alternative pipeline alignments.
- Review information for use in evaluation of alternative alignments and to determine potential conflicts with the alternative pipeline/tunnel alignments and shaft locations.
- Prepare Utility Records Log and enter acquired utility information into log. The Utility Records Log will be used to identify utility records obtained, assess the quality of information/significance of utility, and record the status of the information being incorporated into the documents. The results of BES-provided surveying (Task 820) will be checked against the Utilities Record Log and discrepancies will be flagged for resolution.

The results of the preliminary identification of existing utilities will be summarized in a technical memorandum.

330NW Preliminary Identification of Existing Utilities
For the defined NWN project elements alignments, conduct a preliminary identification of existing utilities similar to Subtask 330 above.

330Yeon Preliminary Identification of Existing Utilities
For the defined Yeon Avenue project alignment, conduct a preliminary identification of existing utilities similar to Subtask 330 above.

Base Map Preparation

Collect available existing base mapping files from City and prepare preliminary base map files for use in evaluation of alternatives pipeline alignments in the Predesign Phase and for Design Phase plans. Task will include:

- Prepare map(s) that defines the proposed centerline and right-of-way boundaries for the alternative pipeline alignments and shaft locations. This map shall be based on existing mapping. Existing mapping includes BES GIS and quarter-section base map files. BES to provide GIS and existing mapping coverage of project area.
- Identify and plot on base mapping the locations of each known above and below ground utilities, and significant features and facilities in the alternative pipeline alignment corridors. Update base mapping during Predesign and Design Phases to incorporate utility and other information as it becomes available.
- Recommend locations for potholing of utilities having a critical relationship to the evaluation of alternative pipeline alignments based on review of utility information compiled under Task 330. Coordinate with BES to arrange for mark-outs, survey lines, establishing grade of existing utilities, and potholing with the various utilities. *BES responsible for potholing.*

335NW Base Map Preparation

For the defined NWN project elements alignments, complete base mapping similar to Subtask 335 above.

335Yeon Base Map Preparation

For the defined Yeon Avenue project alignment, complete base mapping similar to Subtask 335 above.

340 Review of Operation and Maintenance Records

BES operation and maintenance (O&M) records will be reviewed to determine the condition of the existing sewer system to be replaced within the Balch drainage basin and identify O&M considerations that might impact alternative alignment evaluation and preferred alignment selection.

340NW Establish BCC/NWN Operation and Maintenance Requirements

Determine the required construction sequencing, and operation and maintenance functions and strategies required for the combined BCC and NWN project elements, and incorporation into the WSCSO Nicolai Shaft and Tunnel. This would include, but not be limited to:

- *Yeon Pumping Station*
- *Diversion structure at 29th/Industrial*
- *Diversion structure at 29th/31st*
- *Overflow control*
- *Backflow prevention*
- *Hydraulics requirements (vortex system)*

345 Trenchless Construction Methods Technical Memorandum

A technical memorandum will be prepared describing alternative and applicable trenchless construction methods and materials including:

- Description of alternative trenchless construction methods and their applicability to the BCC
- Description of alternative shaft construction methods, their applicability to the BCC and staging area requirements

- Description of alternative jacking pipe materials and their applicability to the BCC
- Estimated rates of tunneling production and shaft construction durations
- Comparative estimated costs of alternative trenchless and shaft construction methods
- Risks associated with anticipated subsurface conditions (geotechnical and environmental (e.g., contaminated media)), probability of risks' occurrence, and potential impact on construction production rates and costs

Prior to preparation of the technical memorandum, Consultant and BES will meet to discuss the alternative trenchless construction methods, pipe materials and other trenchless construction related considerations to address in the technical memorandum. The focus will be to limit the technical memorandum to only trenchless construction applicable to the BCC project based on BES and Consultant experience and as acceptable to BES. A review meeting will be held with BES upon completion of the draft technical memorandum.

345NW Construction Methods Technical Memorandum
For the defined NWN project elements alignments, prepare a technical memorandum similar to Subtask 345 above describing alternative trenchless and open-excavation construction methods and materials as applicable for each NWN project. Prepare as an appendix to the Subtask 345 tech memo.

345Yeon Construction Methods Technical Memorandum
For the defined Yeon Avenue project alignment, prepare a technical memorandum similar to Subtask 345 above of alternative and applicable trenchless construction methods and materials. The tech memo will be an update of the Subtask 345 tech memo replacing tunneling segment D-L with D'-L'.

350 Hydraulic Analysis
Hydraulic analysis of the BCC will be performed to determine appropriate sizing, connections, hydraulic profiles, velocities and capacity based on design flows provided by BES. A summary narrative with tables as appropriate will be provided at each design level (i.e., 30%, 60%, 90%, 100% and Final) to match plan and profile sheets based on initial and updated design flows provided by BES.

350NW Hydraulic Analysis
Hydraulic analysis will consist of evaluating the Balch basin performance during free outfall and full WSCSO tunnel conditions including verification and refinement of the BCC project and NWN support projects. Based on a frequency analysis performed by BES to establish a design storm hyetograph with a 4% chance (1-in-25 years) of occurring following a storm event that has filled the WSCSO tunnel, the following evaluation will be conducted:

- *Build the Balch basin collection system existing condition model using the BES EMGAATS model builder. Modify the existing model using the Alternatives Toolkit to represent the full implementation of the NWN Recommended Plan for the Balch basin, including the current BCC with modifications as directed by BES. Modifications to the NWN Recommended Plan may include consolidation of multiple conduits into a single conduit south of NW 29th and Industrial.*
- *Simulate full WSCSO tunnel and free outfall scenarios and evaluate the basin for risk of basement sewer backup and surface flooding.*
- *Evaluate the effects of maximum hydraulic grade line at the Yeon Pumping Station.*
- *Provide hydraulic analysis as required to assist in design refinement of pipeline sizing and profile and diversion structure sizing and design.*

- *Build and EMGAATS GIS-based model representing the 30% BCC plans plus additional Balch basin projects included in the NWN recommended plan but not including BCC Support Projects. Conduct quality control checks of BES-provided information to verify all impervious area is connected to the collection system or otherwise accounted for. Make recommendations to resolve design-related hydraulic deficiencies.*
- *Provide continued hydraulic analysis as described above at the 60% and 90% Design*

Provide technical memoranda of findings and recommendations.

355 Permits, Easements, Rights-of-Way and Property Impacts

Permits, easements and rights-of-way that may be necessary for construction of the alternative alignments and property impacts will be identified and summarized in a matrix format, including:

- Agency
- Properties impacted (including ownership, address and/or legal description) including potential relocation requirements
- Size and types
- Triggers
- Linkages
- Level of design needed for application submittals
- Processing times including appeal processes and time for appeals
- Overall schedule estimates
- Estimated fees and costs
- Potential obstacles for acquisition

The matrix format will serve as a Permit, Easement and Right-of-Way Implementation Plan to coordinate, schedule and prioritize permit submittals and easement/rights-of-way document preparation with design development. As needed, the matrix format information will be accompanied with a Property Impacts technical memorandum.

355NW Permits, Easements, Rights-of-Way and Property Impacts

For the defined NWN project elements alignments, identify and summarize required permits, easements and rights-of-way requirements similar to Subtask 355 above.

355Yeon Permits, Easements, Rights-of-Way and Property Impacts

For the defined Yeon Avenue project alignment, identify and summarize required permits, easements and rights-of-way requirements similar to Subtask 355 above.

360 Traffic Impacts

Evaluate impacts from construction related to traffic. Includes meeting with PDOT, ODOT and other key transportation stakeholders in the project corridor. Summarize findings in a Preliminary Traffic Impacts technical memorandum.

360NW Traffic Impacts

For the defined NWN project elements alignments, identify and evaluate traffic-related impacts similar to Subtask 360 above.

360Yeon Traffic Impacts

For the defined Yeon Avenue project alignment, identify and evaluate traffic-related impacts similar to Subtask 360 above.

365 Cultural and Historical Resources

Potential impacts to archaeological and historic resources will be assessed, and options for avoidance or mitigation of adverse effects will be identified. Assessment efforts will include a records search and surface survey to locate both surface and subsurface resources. Assessment efforts will be directed toward meeting federal and state compliance requirements, as well as providing information on structural remains and materials likely to be encountered during construction of pipelines and shafts. Work tasks will consist of:

- Consult and coordinate with the Oregon State Historic Preservation Office (SHPO) and other interested parties (e.g., Tribal representatives of the Confederated Tribes of Grand Ronde, Confederated Tribes of Warm Spring Indians and Confederated Tribes of Siletz Indians) during the investigation.
- Review available literature and documentary sources pertaining to archaeological, ethnographic and historic resources in the specific areas of impact.

Conduct a field survey of the project area. Because of the developed nature of much of the project alignment, it is not likely to locate prehistoric sites but it will help in identifying standing structures on or eligible for listing on the National Register of Historic Places. Prepare a technical memorandum of findings and recommendations.

365NW Cultural and Historical Resources

For the defined NWN project elements alignments, conduct an archaeological and historic resources assessment similar to Subtask 365 above.

370 Alignment Alternatives Evaluation Workshop

Based on results of previous tasks, conduct an alignment alternatives evaluation workshop with key members of Consultant and BES project teams. Included will be a comparative presentation of risks and issues, constraints and opportunities, advantages and disadvantages, and preliminary construction costs for the various alignments. The workshop will also include consideration of a preliminary constructability review technical memorandum prepared by Consultant including an evaluation of construction methods for each alignment and an assessment of impacts to traffic and adjacent properties. The focus of the workshop will be to select the preferred alignment for Design and Final Design phases. Prepare workshop meeting notes.

Prepare conceptual and schematic designs of the three pipeline alignment alternatives to be considered in the Alignment Alternatives Evaluation Workshop. Develop preliminary plans and profiles for alignment alternatives using available GIS and existing mapping provided by BES. Plans will be developed at a relatively large scale for preliminary design evaluations. Additional enlarged areas will be provided as needed for limited areas. Prepare plans in sufficient detail to define layouts for shaft locations, contractor staging areas, tunnel and pipeline alignments, interfaces with other City projects, significant utilities overlying the alignments, and other major project features.

Update preliminary Risk/Issue Registry completed in Task 310.

370NW NWN Projects Conceptual Design and Operation
For the defined NWN project elements alignments and appurtenant facilities, prepare technical memoranda and conduct meetings with BES with the focus on presentation and review of design criteria, conceptual designs and preliminary plan/profiles and including:

- *Results of modeling and hydraulic design criteria, and resultant pipelines sizing*
- *Selection of open-excavation and tunneling for pipeline segments*
- *Tunneling and open-excavation pipeline materials*
- *Predesign and operational requirements for 29th/Industrial and 29th/31st diversion structures, and Yeon Pumping Station coordination*
- *Construction sequencing of pipeline segments and structures with BCC project*
- *Other applicable consideration for coordination of the BCC, NWN project elements and WSCSO project (e.g., Balch Shaft remediation)*

370Yeon Evaluation of Additional Yeon Avenue/Oregonian Property Alignment Alternatives
Prepare an evaluation of an alternative alignment (i.e., Shafts C – D' – L' – M) to the selected alignment (i.e., Shafts C – D – G – L – M) in the area of Yeon Avenue and the Oregonian property. The evaluation and report preparation would include:

- *Summary of advantages and disadvantages of the alternative alignment versus the selected alignment*
- *Graphic showing alignment alternatives*
- *Cost comparison of the alternative alignments*

375 Project Design Criteria
Prepare a technical memorandum that will serve as the basis for completion of subsequent design phases of the Project, including:

- Hydraulic pipeline capacity requirements
- Minimum pipeline slopes
- Alternative acceptable pipeline materials
- Alternative acceptable tunneling methods
- Alternative acceptable shaft construction methods and shoring design criteria
- Operation and maintenance considerations and requirements

380 30% Preliminary Design Report
Prepare a 30% Preliminary Design Report summarizing Predesign activities and conclusions reached and including:

- Description and history of the Balch drainage basin
- Summary of the geological and geotechnical conditions
- Summary of environmental conditions
- Summary of hydraulic and associated design criteria
- Selected project configuration including location of tunneling and open-excavation reaches, and shaft locations (including preliminary plan/profile drawings)
- Anticipated construction means and methods
- Summary of constructability review comments and resolution status
- Summary of issues to be addressed in the Geotechnical Baseline Report
- Operations strategy

- Utility impacts
- Permitting and property acquisition (easements and rights-of-way) requirements
- Public Involvement Plan
- Risk identification, mitigation and management
- Issues that need to be resolved during design and/or construction
- Construction contracting strategy and M/W/ESB contractor opportunities
- Project schedule
- Budget level cost estimate

380NW/Yeon 30% Preliminary Design Report
For the defined NWN project elements alignments and Yeon Avenue alignment, complete an update of the 30% Preliminary Design Report (Subtask 380 above) and including applicable Design Criteria as identified in Subtask 375 above.

385 Value Engineering Workshop
Participate in Value Engineering (VE) Workshop including:

- Provide 30% Predesign materials to VE Team
- Make initial Project presentation to VE Team
- Meet with VE Team for Team's presentation of VE Recommendations
- Provide written responses to VE Team Recommendations
- Meet with VE Team to present and discuss responses to VE Team Recommendations

In-depth evaluation of VE Team Recommendations is not included in the scope or budget.

Predesign Phase Deliverables:

- Technical Memoranda (all as draft and final):
  - Kickoff and Issues/Risk Identification Meeting Notes *(also for NWN)*
  - Issues/Risks Assessment/Evaluation *(include NWN)*
  - Geotechnical and Environmental Data Review *(also for NWN and Yeon)*
  - Stage 1 – Predesign Geotechnical and Environmental Exploration Work Plan *(also for NWN and Yeon)*
  - Geotechnical Alternatives Analysis *(appendix for NWN and update for Yeon)*
  - Environmental Alternatives Analysis *(appendix for NWN and update for Yeon)*
  - Cultural and Historical Investigations *(also for NWN)*
  - Permit, Easement, Rights-of-Way and Regulatory Requirements (matrix format *(also for NWN and Yeon))*
  - Hydraulic Analysis and Modeling Results *(update for NWN)*
  - Trenchless Construction Methods *(appendix for NWN and update for Yeon)*
  - Preliminary Constructability Review
  - Alternative Alignment Evaluation Workshop Meeting Notes *(Conceptual Design and Operation Meeting Notes for NWN)*
  - Project Design Criteria
  - Potential M/W/ESB Sheltered Market Program construction projects
- Predesign (30%) Geotechnical Data Report *(update for NWN and Yeon)*
- Predesign (30%) Environmental Data Report *(update for NWN and Yeon)*

- 30% Preliminary Design Report, including recommended Project configuration and 30% plan/profiles, shaft layouts, diversion structures and major appurtenant facilities; outline specifications; and preliminary construction cost estimate and schedule *(also for NWN and Yeon)*
- Written responses to VE Team Recommendations
- Meeting agendas and notes

400 DESIGN PHASE SERVICES

Objective: To conduct activities that will develop a basis for completion of 60% and 90% Contract Documents (plans, specifications and other support documents), cost estimates and construction schedule.

410 Stage 2 - Geotechnical Investigations, Testing, Evaluations and Engineering and Environmental Analyses

This phase of the geotechnical and environmental investigations/evaluations is to obtain and analyze the necessary geotechnical and environmental information, including supplemental explorations for Design phase tasks and as required for GBR preparation. *The supplemental explorations also include those requested by the construction contractor and as approved by BES for completion.*

411 Stage 2 - Exploration Work Plan

Based upon the alignment selection, Value Engineering workshop, and design team needs, a Stage 2 - Exploration Work Plan will be prepared. The Exploration Work Plan will provide a field reference consisting of a variety of topic areas similar to the Stage 1 – Exploration Work Plan. Included will be planned explorations, and any recommendations and costs for optional work tasks that have distinct advantages.

411NW Stage 2 - Exploration Work Plan

Prepare a Stage 2 – Exploration Work Plan similar to Subtask 411 above for NWN project elements.

412 Field Explorations in Support of Design Engineering

As a basis for budgeting, it is anticipated six additional borings as shown below will be drilled and eight geoprobes pushed to obtain geotechnical, hydrogeological, and environmental data to support Design phase tasks. The programmed boring depth (average) is a maximum of fifteen feet beneath the proposed pipeline grade. The total budgeted linear footage for the borings is 480 linear feet based on an average depth of 80 feet per boring. For the GeoProbes, the budgeted depth is up to 80 feet or refusal per each probe. The drilling methods, sample intervals, well installations, environmental sampling, field screening, laboratory testing, and handling of IDW waste will be as described in Tasks 322, 323 and 840.

Stage 2 (Design) Exploration Program

Final Design Explorations	Rotosonic Boreholes	Auger/Mud Rotary Borings	GeoProbe Soundings	Monitoring Wells
Preferred Alignment	2	4	8	6

412AC Field Explorations in Support of Contractor Supplemental Exploration Requests

Once the Contractor has reviewed geotechnical and environmental related investigation documents, the Contractor, Consultant or BES may request additional subsurface explorations. As requested by

BES, respond to Contractor's proposed additional subsurface exploration requests including assistance in evaluating the merits, costs and schedule impacts of the requests.

As directed by the BES, Consultant will develop an exploration plan and conduct additional explorations to address the request(s) including preparatory permitting and traffic control plans. A brief exploration plan with objectives will be written and submitted to BES for approval. Evaluate the findings and include the data in the previously completed GDR or EDR, as applicable.

As a basis for establishing a budget allowance, it is anticipated six additional borings as shown below will be drilled, six geoprobes pushed, two backhoe test pits will be excavated, and two aquifer pumping tests will be completed to obtain geotechnical, hydrogeological and environmental data to support contractor's supplemental exploration requests.

Contractor Supplemental Exploration Program

Contractor Supplemental Explorations	*Rotosonic Boreholes*	*Auger/Mud Rotary Borings*	*GeoProbe Soundings*	*Backhoe Test Pits*	*Monitoring Wells*	*Aquifer Pumping Tests*
Selected Alignment	*2*	*4*	*6*	*2*	*2*	*2*

412A Stage 2 - Environmental Lab Work (This task has been deleted)

412B Stage 2 – Geophysical Survey (This task has been deleted)

413 Groundwater Evaluation/Monitoring

Monitor groundwater elevations during the design period extending throughout the year 2008. The Willamette River level will be monitored at the gaging station closest to the alignment. A transmittal will be prepared that summarizes the groundwater elevation measured in each of the monitoring wells and piezometers.

413NW Groundwater Evaluation/Monitoring

For the defined NWN project elements provide an assessment of groundwater and trench dewatering impacts on adjacent structures.

414 Laboratory Analysis of Samples for Physical Properties for Final Engineering Design

The geotechnical laboratory program will provide specific data on the important physical characteristics of the soils within the tunnel zone and at shaft locations for design of tunnel and appurtenant structures, shoring and underpinning design considerations, and groundwater control. The laboratory testing program will include standard classification tests such as natural water contents, pocket penetrometer and torvane tests, organic materials content, mechanical grain-size analyses, hydrometer analysis of clay-size particles, unit weight determinations (wet and dry), Atterberg limits, consolidation tests for settlement analysis, and appropriate direct shear strength testing. Collection, handling, tracking, laboratory screening and analytical testing, documentation, and disposal of environmental samples will be as described in Tasks 323 and 840.

Field and laboratory data will be analyzed. Field logs, reports, and pump test data recorded during field investigations will be entered into the project gINT© database. Geostatistical evaluations will be accomplished to model the probability of encountering various types of earth materials, deposits, and contaminated media along the pipeline alignment. Design analyses will be accomplished, including refinement of the geologic and hydrogeologic model and alignment geotechnical profile. Geologic sections and geologic maps of the project will be developed and/or adjusted and refined.

414NW Laboratory Analysis of Samples for Physical Properties for Final Engineering Design
For the defined NWN project elements alignments explorations, complete lab analysis similar to Subtask 414 above.

414Yeon Laboratory Analysis of Samples for Physical Properties for Final Engineering Design
For the defined Yeon Avenue project alignment explorations, complete lab analysis similar to Subtask 414 above.

414AC Laboratory Analysis of Samples for Physical Properties for Final Engineering Design
For the Contractor's approved supplemental explorations, complete lab analysis similar to Subtask 414 above.

415 Geotechnical Design Technical Memoranda

During the Design Phase, geotechnical design memoranda will be prepared for the selected alignment that address:

- Site engineering geology as encountered along the selected alignment, including surficial deposits, fill materials, and presentation of geologic plan and subsurface profiles
- Engineering characteristics of the ground to be encountered along the selected alignment, including strength, unit weight, potential for encountering site fill and waste, piles, and rock excavation, degree of weathering, and in situ stress conditions, if relevant
- Engineering characteristics of ground conditions expected to be encountered at structures
- Mass classification of ground expected to be encountered along the microtunnel alignment, using systems specifically developed for tunneling purposes, if appropriate
- Expected groundwater conditions along the selected alignment, including mass permeability, geologic features with potential for significant permeability changes, estimates of relative groundwater inflow volumes for excavations, and type of groundwater-induced ground behavior expected
- Engineering parameters to characterize soil in the vicinity of temporary excavation support systems, including: soil strength parameters, unit weights, lateral earth pressure coefficients, groundwater levels, and existing adjacent structures foundation settlement analysis. For the shafts, geotechnical issues will be identified as related to alternative methods of construction such as caisson, shored/cast-in-place, and segmental and secant shored systems, and the associated issues and alternatives for control of the ground water

Up to seven technical memoranda will be prepared to support the Design Phase.

415NW Geotechnical Design Technical Memoranda
For the defined NWN project elements alignments, complete Geotechnical Design Technical Memoranda similar to and combine with Subtask 415 above.

415Yeon Geotechnical Design Technical Memoranda
For the defined Yeon Avenue project alignment, complete Geotechnical Design Technical Memoranda similar to and combine with Subtask 415 above.

416 Environmental Technical Memoranda
During the Design Phase, environmental memoranda based on the environmental field and chemical laboratory work tasks will be prepared for the selected alignment that address:

- Conceptual site models depicting the relationship between a source of contamination and its associated release mechanisms with pathways and potential receptors of the contaminant type and the vertical and lateral extent of contamination along the tunnel alignment
- Approximate volume estimations of contaminant plumes
- Risk-based clean-up levels along the alignment
- Apparent vertical and lateral extent of soil and groundwater contamination that will be the basis for the BES-developed, project-specific Contaminated Media Management Plan
- Mitigation alternative recommendations along the alignment based upon site-specific clean-up requirements
- Recommendations for possible treatment of contaminated soil and groundwater generated during the construction phase
- Recommendations for in situ control of contaminant migration during and after construction

Up to seven technical memoranda will be prepared to support the Design Phase.

416NW Environmental Technical Memoranda
For the defined NWN project elements alignments, complete Environmental Technical Memoranda similar to and combine with Subtask 416 above.

416Yeon Environmental Technical Memoranda
For the defined Yeon Avenue project alignment, complete Environmental Technical Memoranda similar to and combine with Subtask 416 above.

417 60%, 90% and 100% Geotechnical Data Report (GDR)
After the completion of the Stage 2 – Exploration Work Plan, a 60% GDR will be prepared with the following information included:

- Regional geology, surficial deposits, and stratigraphy
- Regional seismicity, including local earthquake history
- Description of field exploration program, including field procedures used
- Geologic Logs of borings
- Location data for borings obtained by survey (coordinates and collar elevations provided by BES)
- Data for field in situ permeability tests, calculated permeability and explanation of method used for calculation
- Data for point-load tests run on coarse-grained samples and correlation with aggregate hardness, if tests conducted
- Data from other field tests, including pocket penetrometer and torvane tests
- Installation logs for piezometers and monitoring wells
- Tabulation of groundwater readings for installed piezometers and monitoring wells

- Description of laboratory testing program, including test procedures used and summary of samples selected and tests performed on them based on analytical reports provided by BES' WPCL
- Data sheets for laboratory tests, and summary of parameter values obtained by analysis of data

Upon BES review of the 60% and 90% GDR submittals and Consultant written responses to BES comments, 90% and 100% GDR submittals, respectively, will be prepared.

417NW/Yeon 60%, 90% and 100% Geotechnical Data Report (GDR)
After the completion of the NWN project elements and Yeon Avenue Combined Stages 1&2 – Exploration Work Plans (see Subtasks 322NW and 322Yeon) prepare a 60% GDR similar to Subtask 417 above. Upon BES and contractor review of the 60% and 90% GDR submittals and Consultant written responses to BES and contractor comments, 90% and 100% GDR submittals, respectively, will be prepared.

417AC 60%, 90% and 100% Geotechnical Data Report (GDR)
After completion of Contractor's supplemental explorations, update the 60%, 90% and 100% GDRs as applicable.

418 60%, 90% and 100% Geotechnical Interpretive Report (GIR) (This task has been deleted)

419 60%, 90% and 100% Environmental Data Report (EDR)
If contaminated soil and groundwater are encountered, approximations of the volume of these media will be estimated. Appropriate technologies and methodologies will be screened and evaluated for effectiveness and cost to manage contaminated soil and groundwater prior to or during construction of the pipeline, connections, and appurtenant structures. Technologies/methods will be evaluated to mitigate the vertical and lateral spread of contamination during and after the pipeline is in place.

Contaminate cleanup levels will be determined based on a comparison of values from the Environmental Protection Agency Preliminary Remediation Goals (PRGs) and DEQ Risk-Based Concentrations (RBCs) for allowable soil and groundwater concentrations.

After the completion of the Stage 2 – Exploration Work Plan, a 60% Environmental Data Report (EDR) will be prepared with the following information included:

- Description of environmental field exploration program, including field procedures used
- Logs of environmental borings
- Tabulation of groundwater readings from monitoring wells and piezometers
- Location data for environmental borings obtained by survey provided by BES (coordinates and collar elevations)
- Types and concentrations of soil and groundwater contaminants
- Data from the analytical chemical laboratory, including QA/QC samples
- Data from other field tests, including PID readings of soil samples
- Data sheets for chemical laboratory tests and summary of parameter values

Upon BES review of the 60% and 90% EDR submittals and Consultant written responses to BES comments, 90% and 100% EDR submittals, respectively, will be prepared.

419NW/Yeon 60%, 90% and 100% Environmental Data Report (EDR)
After the completion of the NWN project elements and Yeon Avenue Combined Stages 1&2 – Exploration Work Plans (see Subtasks 322NW and 322Yeon) prepare a 60% EDR similar to Subtask 419 above. Upon BES and Contractor review of the 60% and 90% EDR submittals and Consultant written responses to BES and Contractor comments, 90% and 100% EDR submittals, respectively, will be prepared.

419AC 60%, 90% and 100% Environmental Data Report (EDR)
After completion of Contractor's supplemental explorations, update the 60%, 90% and 100% EDRs as applicable.

420 60%, 90% and 100% Geotechnical Baseline Report (GBR)
A 60% Geotechnical Baseline Report (GBR) will be prepared which establishes the contractual statements of the geotechnical and construction conditions that formed the basis of design on the underground components of the project. The GBR will be prepared following the Guidelines *Geotechnical Baseline Reports for Underground Construction*, published by ASCE, 1997. The risks associated with conditions consistent with or less adverse than the baseline established in the GBR are allocated to the contractor, and the owner accepts those risks more adverse than established in the baseline report. The GBR will also describe the geotechnical and construction conditions that formed the basis of design of the underground project components. The GBR will be the sole location for geotechnical interpretations of the available data and information upon which the contractor may rely. It will be limited to interpretive discussion and baseline statements, and will refer to, rather than repeat or paraphrase, information contained in the GDR, drawings, or specifications. It will provide interpretations and recommendations pertinent to the design and construction of the various BCC structures.

Upon BES review of the 60% and 90% GBR submittals and Consultant written responses to BES comments, 90% and 100% GBR submittals, respectively, will be prepared.

420NW/Yeon 60%, 90% and 100% Geotechnical Baseline Report (GBR)
Complete GBR elements of the defined NWN project elements alignments and Yeon Avenue alignment similar to Subtask 420 above. Combine into one BCC/NWN/Yeon elements GBR document. Upon BES and Contractor review of the 60% and 90% GBR submittals and Consultant written responses to BES and Contractor comments, 90% and 100% GBR submittals, respectively, will be prepared.

420AC 60%, 90% and 100% Geotechnical Baseline Report (GBR)
After completion of Contractor's supplemental explorations, update the 60%, 90% and 100% GBRs as applicable.

421 Easement and Rights-of-Way Services
For up to ten sites, Consultant will prepare legal descriptions and maps of permanent or temporary construction easement requirements and provide for initial contact of property owners to explain the project and provide background for the BES's right-of-way acquisition process. Consultant will provide the following services:

- Identify key issues related to right-of-way impacts
- Obtain property owner and tax assessor information for parcels along the preferred and alternative alignments

- Produce alternative site or route alignment cost studies, and estimate costs for acquiring property rights, appraisal, acquisition negotiations, and relocation services and benefits
- Analyze access issues at each parcel
- Identify prospective relocation issues
- Provide up to four property appraisals and one business relocation as authorized by the City
- Provide appraisal management services to obtain up to four reports. One appraisal of a commercial property including a fixture appraisal. Three appraisals of permanent easements. Negotiation services for one commercial property. Business relocation services required as the result of one purchase.
- Prepare a Right-of-Way Technical Report

Consultant will also provide the following rights-of-way and easement surveying services will also be provided:

Approach
Obtain all available recorded surveys along the projects alignment. Review and determine which monuments should be researched for and used to control the property lines and rights-of-way lines. Coordinate with PDOT and survey from PDOT control points to tie the existing monuments. From this data, calculate and draft the property lines and rights-of-way lines on a base map.

Scope
- *Research and review existing recorded surveys*
- *Recover existing property corners necessary to establish property lines*
- *Traverse and tie existing monuments, close and adjust*
- *Obtain and review existing deeds of record for areas requiring easements*
- *Calculate and draft property lines and rights-of-way lines*
- *Draft line work on drawings and manipulate tax map line work into surveyed map for a complete property base map*

Assumptions
- *The resolution of property lines will be based on record surveys and deed data and will be as accurate as needed for the purpose intended. The resolution may vary slightly from the results of a formal Boundary Survey.*
- *Coordinates will be LDP as per PDOT coordinate system*
- *No monuments or staking of easements or property lines is included.*
- *No formal survey will be prepared or recorded.*

421NW Easement and Rights-of-Way Services
For up to two NWN project elements-related sites, conduct easement and rights-of-way services similar to Subtask 421 above.

425 Permits
Prepare applications in applicable agency format for permits and any other required regulatory approvals, and prepare follow-up information as required and track the applications, insuring that all permits and approvals are secured in advance of advertising for bids.

425NW/Yeon Permits
For the defined NWN project elements alignments and Yeon Avenue alignment, complete permit and land use review applications similar to Subtask 425 above.

430 Verify Utilities
Field verify the location of all utilities and facilities within the project alignment both above and below ground and coordinate with other utilities and facility owners in the project area to ensure that the pipeline route and construction area are free of encumbrances.

430NW/Yeon Verify Utilities
For the defined NWN project elements alignments and Yeon Avenue alignment, complete field verification of utilities and facilities similar to Subtask 430 above.

435 60%, 90% and 100% Contract Documents
Based on BES review of 30%, 60% and 90% submittals and Consultant written responses to BES comments, 60%, 90% and 100% contract documents (plans, specifications and other support documents), respectively, will be prepared and submitted. The contract documents will include a project-specific Contaminated Media Management Plan (CMMP) to be provided by BES's Special Waste Group. The 60% submittal will also include a proposed settlement monitoring plan. For the 90% and 100% submittals, the settlement monitoring plan will be incorporated into the contract documents plans and specs. Consultant will respond to BES's comments, in prescribed BES format, and incorporate the comments into the design, as agreed with BES's Project Manager. Specifications shall be in CSI format and based on contract documents and specifications prepared for recent BES tunneling-related projects. Plans shall be prepared using the current version of the City of Portland Bureau of Environmental Services CAD standards. Electronic copies of the plans will be submitted at each design level for a check on appropriate application of CAD standards. *Provide information for and participate in BES meetings for consideration of jacking pipe alternative materials, design criteria/requirements, manufacturing constraints and installation procedures.*

435NW/Yeon 60%, 90% and 100% Contract Documents
For the defined NWN project elements alignments and Yeon Avenue alignment, prepare and submit 60%, 90% and 100% contract documents in accordance with Subtask 435 above.

435AC 60%, 90% and 100% Contract Documents
Provide day-to-day communication and coordination with Contractor during its Pre-Construction Services Agreement period. Incorporate minor design or specifications into the Contract Documents as agreed among Consultant, Contractor and BES. Related CAD effort is assumed to average 20 hours per week for 24 weeks = 480 hours (October 2008 through March 2009).

440 60%, 90% and 100% Construction Cost Estimates *(modified for NWN project elements and alternative contracting)*
At the 60% level of completion, the *BCC and NWN project elements* estimate will be based on a review of the plans and specifications, which are available at the time *and unit pricing*. The estimates will also include handling and disposal of contaminated media. *For 90% and 100% estimates, continue to prepare unit pricing construction cost estimates as a basis of comparison to contractor's and BES independent cost estimator's detailed estimate.*

445 60%, 90% and 100% Construction Schedules *(modified for NWN project elements and alternative contracting)*

At the 60% completion level, prepare a Construction Schedule including NWN project elements and BCC projects. The schedule will include work task descriptions, durations, sequencing and interim milestone requirements. *For 90% and 100% Schedules, continue to prepare schedules as a basis of comparison to contractor's and BES independent scheduler's detailed Schedules.*

450 BES/Consultant Design Review Meetings *(modified for alternative contracting)*

Upon completion of 60%, 90% and 100% Designs, meet with BES and Contractor project team members to discuss their comments on the Contract Documents. After each review meeting or after consideration of each individual review comment if submitted subsequent to review meetings, Consultant will provide written responses to all BES and contractor review comments in the form of:

- *Review comment accepted and will be incorporated*
- *Review comment needs clarification or further discussion*
- *Review comment not accepted and why*

The Design Reviews will also specifically consist of a coordinated review of the GBR with the plans and specifications to ensure consistency among these Contract Documents. Review and coordination between Consultant team members, BES project team *and Contractor project team* will be a priority so there is concurrence with the baseline conditions set forth in the GBR and the sharing of risks between BES and construction contractor as anticipated in the Contract Documents.

455 Predesign and Traffic Control Planning

During the design phase of the project there may be a need for geotechnical or other Consultant crews to work within roadways. For those situations, standard drawings showing typical traffic control features may be required. To the extent feasible, ODOT standard drawings will be specified for this purpose. This will assure that the traffic control is consistent with both the *Manual on Uniform Traffic Control Devices* and current ODOT practices.

A conference will be held with Consultant team members to review the conduit routing and the likely conduit construction techniques and haul road requirements. This will allow a determination of the amount of roadway space that will be required for construction purposes for each street. This will provide an indication as to the amount of remaining roadway that can be used for traffic during construction. In some cases a full closure of the roadway will be required, and in other cases it may be possible to keep some lanes open. At intersections, the need for partial or full closure of the cross street will be determined.

When the street closure requirements have been determined, traffic volume data will be obtained. It is expected that traffic volume measurements or estimates can be obtained from the City of Portland. The traffic volumes will determine the extent to which detours are needed and whether lane and road closures must be limited to certain hours or certain days. The critical locations are likely to be the crossings of Yeon Avenue (US 30), Naito Parkway, and Nicolai Street. Information on Tri-Met bus routes that will be affected by construction will also be obtained.

Conceptual traffic control plans, requirements, constraints and conditions will be provided for the construction phase. Consultant will work with Tri-Met as necessary to assure that buses are accommodated in a reasonable manner if detours are necessary. The conceptual plans will be submitted to the City of Portland for

their review. To the extent (if any) that traffic on US 30 is affected, the plans will also be submitted to ODOT for their review. The plans will then be revised to reflect City and State comments, and, if necessary, resubmitted to Portland and ODOT. At subsequent design milestones, specifications will also be written. Requirements for expediting the movement of Tri-Met buses will be included in the specifications related to flagging operations.

Traffic control plans and specifications will focus on development of traffic control requirements, constraints and conditions. Detailed traffic and work zone control plans will be a submittal requirement of the construction contractor.

455NW/Yeon Predesign and Traffic Control Planning
For the defined NWN project elements and Yeon Avenue alignments and structure locations, prepare conceptual traffic control plans, requirements, constraints and conditions for the construction phase in accordance with Subtask 455 above.

460 O&M Manual Preparation
Prepare an O&M Manual with procedures specific to the BCC and shaft/drop structures. Procedures shall be developed consistent with and for incorporation into BES's overall CSO system operations plan.

Design Phase Deliverables:

- Technical Memoranda (all as drafts and final) *(also for NWN and Yeon)*
  - Geotechnical Design (up to 7)
  - Environmental (up to 7)
- Responses to BES 60%, 90% and 100% Review Comments *(also for NWN)*
- Easement and Rights-of-Way legal descriptions and maps *(also for NWN and Yeon)*
- Permit applications *(also for NWN and Yeon)*
- Stage 2 – Exploration Work Plan *(also for NWN and Yeon)*
- *Field Exploration Work Plans in Support of Contractor Supplemental Exploration Requests*
- 60%, 90% and 100% GDR *(include NWN and Yeon)*
- 60%, 90% and 100% GBR *(include NWN and Yeon)*
- 60%, 90% and 100% EDR *(include NWN and Yeon)*
- 60%, 90% and 100% Contract Documents *(also for NWN)*
- 60%, 90% and 100% Construction Cost Estimate *(also for NWN and Yeon and as modified for alternative contracting)*
- 60%, 90% and 100% Construction Schedule *(also for NWN and Yeon and as modified for alternative contracting))*

500 FINAL DESIGN PHASE SERVICES

Objective: To produce and deliver Final Contract Documents (plans, specifications and other support documents, cost estimates and construction schedule. (Modified for NWN project elements, Yeon and alternative contracting)

510 Final Contract Documents
Based on BES review of 100% submittals and Consultant written responses to BES *and Contractor* comments, Final Contract Documents (plans, specifications and other support documents) will be prepared

and submitted. Consultant will respond to BES's *and Contractor's* comments, in prescribed BES format, and incorporate the comments into the design, as agreed with BES's project manager.

510NW/AC Final Contract Documents
For the defined NWN project elements alignments and Yeon alignment, and incorporation of accepted Contractor design modifications, prepare and submit Final contract documents in accordance with Subtask 510 above.

520 Final Construction Cost Estimate
For Final estimate, prepare unit pricing construction cost estimate as a basis of comparison to contractor's and BES independent cost estimator's detailed estimate.

530 Final Construction Schedules
For Final Schedule, prepare a schedule as a basis of comparison to contractor's and BES independent scheduler's detailed Schedule.

540 Final Geotechnical Data Report, Geotechnical Baseline Report and Environmental Data Report
Upon BES review of the 100% GDR, ~~GIR,~~ GBR and EDR and Consultant written responses to BES comments, a Final GDR, GIR, GBR and EDR will be prepared.

540NW/AC Final Geotechnical Data Report, Geotechnical Baseline Report and Environmental Data Report
For the defined NWN project element alignments and Yeon alignment, and incorporation of additional Contractor accepted explorations, prepare and submit Final GDR, GBR and EDR.

550 Final Design Report
The Final Design Report will include:

- Summary of key issues
- Final project scope and objectives
- Final engineer's estimate
- Final construction schedule
- Summary of budget and schedule review discussions
- Report on permit, right-of-way and easement acquisition
- Report on resolution of utility conflicts
- M/W/ESB plan for construction activities
- Value Engineering summary
- Summary of constructability review comments
- Unresolved construction-related issues, if any
- Recap of the construction contract package strategy
- Elements to be developed with the assistance of BES Project Manager (PM)
  - Overall Project Budget
  - Overall Project Schedule
  - Public Involvement Plan during construction phase
  - Update on PTE contracts including M/W/ESB utilization summary report
  - BES PM Updated Work Plan (Bid Phase)
  - BES Construction Manager Updated Work Plan (Construction Phase)

550NW/AC Final Design Report
For the Final Design Report, include defined NWN project elements alignments and Yeon alignment, and alternative contracting considerations, and modify the Final Design Report contents accordingly.

Final Design Phase Deliverable *(modified for alternative contracting):*

- Final Contract Documents (camera-ready)
- Final GDR (camera-ready)
- Final GBR (camera-ready)
- Final EDR (camera-ready)
- Final Design Report
- Design calculations

600 BIDDER PREQUALIFICATION PHASE SERVICES (This task has been deleted)

610 Bidder Prequalification Package Preparation (This task has been deleted)

620 Respond to Prospective Bidders' Questions (This task has been deleted)

630 Evaluation of Prequalification Submittals (This task has been deleted)

700 BID PHASE SERVICES (This task has been deleted)

710 Pre-Bid Conference (This task has been deleted)

720 Bidders Questions and Design Clarifications (This task has been deleted)

730 Bid Tabulation Translation Services (This task has been deleted)

740 Technical Assistance (This task has been deleted)

750 Submittals (This task has been deleted)

760 Conformed Contract Documents (This task has been deleted)

800 CITY-PROVIDED SERVICES
Objective: To make best use of existing City resources and existing information.

810 Review of Consultant Work Products
Provide written review comments on Consultant Deliverables in a format that will expedite Consultant's written responses to the comments. As required, attend meetings to review Consultant responses to BES comments.

820 Surveying and Base Mapping
Provide surveying information as required to support predesign, design and final design including:

- Horizontal and vertical control points to be used for field investigations and construction.
- Conduct physical site survey(s) of physical feature locations such as curb lines, sidewalks, edges of asphalt, break lines, tips and toes of banks, edges of water, buildings, underground utilities, vaults and

manholes, bridges, signs, miscellaneous structures, railroad tracks, trees, shrubs, landscaping and sufficient ground elevations to produce 2-foot contour map(s).

- Monitoring well and boring locations, and vertical elevations to City of Portland datum, not later than 2 weeks prior to submittal of Draft Predesign (30%) Geotechnical Data Report (GDR).
- Establish property lines from located monuments, maps and legal descriptions.
- Provide property maps and computations for writing of easements and/or property purchases or leases.
- Provide a DXF or DWG file and ASCII file for all survey data including northing, easting and elevations in project coordinate system.
- *Building/structures inspector for Pre- and Post-Construction Building and Structures Surveys*

830 Public involvement/information coordination and graphic design services for information materials. Provide support to the Public Involvement Program including:

- Assistance in development of Public Involvement Program and schedule
- Current BCC stakeholders lists
- Identification of stakeholder interviewees
- Distribution of information fact sheets and media releases

840 Geotechnical and Environmental Related

- Exploration samples and Investigation Derived Waste designated as hazardous waste or not accepted by the Hillsboro, Oregon landfill, becomes the responsibility of the City for handling, testing and dispose of materials
- Supply environmental sample containers and conduct environmental laboratory screening and analytical testing of selected soil and water samples, including preparation of laboratory testing reports and disposal of laboratory samples
- Abandonment of monitoring and observation wells
- All potholing of utilities
- Acquisition of street opening permits for boring and monitoring well locations within public rights-of-way
- Project-specific Contaminated Media Management Plan based on the results of the Consultant-developed Environmental Technical Memoranda and Environmental Data Report

850 Hydrologic and Hydraulic Modeling, and Design Flows Rates

860 Copies of all documentation related to the past and current BCC evaluation process including sewer facilities maps and as-built drawings.

870 Conduct City review and approvals of land acquisition and obtain rights of entry as required for field investigations.

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880 Provide sample storage area through completion of construction.

890 Provide Value Engineering by an independent VE third-party.

900 INCORPORATION OF ELEMENTS OF NWN PROJECTS SCOPE AND ALTERNATIVE CONTRACTOR PROCUREMENT PROCESS SCOPE

Objective: To include scope for elements of NWN Projects and the Alternative Contractor Procurement process, and provide assistance to BES in the Alternative Contractor Procurement process.

910 Alternative Contractor Procurement Process – Request for Qualifications (RFQ)

Assist BES in the development of the RFQ including draft RFQ review and attendance at contractors' information meeting.

921 Alternative Contractor Procurement Process – Request for Proposals (RFP)

Assist BES in the development of the RFP including draft RFP review, General Conditions review, PSA agreement review, construction contract review, attendance at pre-Proposal meetings with BES and individual Proposers, attendance at interviews with Proposers, and other technical input support to BES in the Proposal evaluation process.

930 Development of Design Team Scope-of-Work for elements of NWN projects and Contractor Procurement Process

1000 ENGINEERING SUPPORT DURING CONSTRUCTION

Objective: To provide office and field engineering support to the BES design and construction staff in the implementation and administration of the construction contract. Construction contract administration support would include the use of Constructware software for information and data processing, filing and documentation.

1001 Preconstruction Conference

Attend a pre-conference meeting with BES and Contractor to establish agenda for the Preconstruction Conference. Attend Preconstruction Conference.

1002 Submittals Review

As requested by BES, review submittals including but not limited to shop drawings of microtunnel boring machine related equipment, materials, and proposed work sequences and means (e.g., shafts, trench support, ground improvement, Balch shaft rehabilitation, etc.) submitted by the Contractor for substantial conformity with the intent of the contract drawings and specifications.

As requested by BES, evaluate substitution(s) and "or equal(s)" proposed by the Contractor during construction.

1003 Clarification of Contract Documents

As requested by BES, respond to Contractor's Requests for Information (RFIs) and Requests for Clarification (RFCs) in the interpretation of drawings and specifications, including the preparation of elementary sketches, if required, to clarify the design details or to make minor revisions. As requested by BES, provide assistance in the cost and schedule evaluation of RFIs/RFCs that may result in minor change orders. (Note: Major changes are addressed in Subtask 1004).

For RFIs and RFCs, Constructware will be used to document the date of Contractor's request, description of issue or request, narrative of evaluation performed and recommended action.

1004 Major Change Evaluation During Contractor's Construction Period
As requested by BES, respond to Contractor's proposed major design changes (e.g., tunneling means, alignments, shaft locations and type, etc.) including preparation of design changes to specifications and/or drawings. For major design changes approved by BES, prepare design work plans (scope, budget and schedule) for BES approval prior to initiating work on design changes. Prepare and submit revised design drawings and specifications, as required including engineer's sealing and signing.

1005 Geology, Geotechnical, Environmental and Microtunneling Support
As requested by BES, provide assistance in interpretation and documentation of geology/geotechnical/environmental conditions found during construction of shafts, tunnels and pipeline open-excavations. Conduct site visits to observe such conditions at all shafts and representative segments of pipeline open-excavations. Report on findings and assist in troubleshooting construction issues. (Note: Additional field explorations are addressed in Subtask 412AC).

Provide assistance in microtunneling machine performance monitoring/evaluation and training of BES inspectors.

1006 Pre- and Post-Construction Surveys of Buildings and Structures
Provide surveys to document pre-construction existing conditions and post-construction conditions of select buildings and structures along the construction alignment. The surveys will be used by BES to assist in determining if construction activities caused damage to existing buildings and structures. It is anticipated surveys will be completed for six to ten select buildings and structure.
Prepare design of survey program including protocols and templates for review and approval of BES.

Assist BES in the evaluation of building/structure pre- and post-construction conditions and provide determinations for changes in conditions identified by the surveys.

Notify BES at least one week prior to conducting a survey. BES may be present for both the pre- and post-construction surveys. BES will obtain permission from the owner of the facility being surveyed prior to surveys being conducted.

Pre-Construction Survey: Record pre-construction conditions in a field notebook, take photographs, make sketches and videotape the facility. Photos and video are to be date and time stamped. (Note: Personnel for building survey inspections and logging of building conditions will be provided by BES. Videotaping will be provided by the Kennedy/Jenks project team). Pre-construction surveys will consist of the following:

- *Take digital photos and videotapes showing exteriors of existing buildings and structures (and interiors, if possible) showing their general appearance and noting where cracks, existing distress or damage is present. Narrate the digital videotapes to describe the features being shown.*
- *Provide a copy of digital photos and videotapes to BES. Include a log describing the address, date and viewing orientation of the photos/videos.*
- *Provide field notebooks, photos, videos and logs to BES for review at least two weeks prior to beginning construction in the vicinity of the facility.*

- *Compile results of Pre-Construction Survey in a report and submit to BES.*

Post-Construction Survey: As requested by BES, after completion of construction in the vicinity of the facility, complete a post-construction survey to verify the condition of the facility and noting damage that may have been a result of construction activities. The content of the post-construction surveys will be the same as pre-construction surveys described above.

1007 Settlement and Building Instrumentation Monitoring
Provide analysis and interpretation of settlement monitoring (shafts, tunneling and open-excavation) and building monitoring (inclinometers and crack width gauges) information and data. Data will be provided by BES and/or the Contractor and compiled/processed by BES. Data will be reviewed to determine the conformance of ground behavior resulting from construction activities to the anticipated behavior described in the GBR and in accordance with professional expertise. Where geotechnical data indicates that construction activities are adversely impacting or are likely to adversely impact the performance of existing facilities and/or the construction itself, the conditions will be evaluated and a determination regarding recommendation for actions that may include design changes or modifications in construction procedures will be provided to BES.

1008 Construction Progress Meetings
Participate in regularly scheduled (assume bi-weekly) construction progress meetings with BES and Contractor.

1009 Pre-Final and Final Inspection Walks-Through
Participate in Pre-Final (initial punch-list development) and Final project walks-through with BES and Contractor.

1010 Construction Phase Progress Reports
Prepare and submit monthly Progress Reports during construction consisting primarily of Consultant invoicing and brief (one or two page) summary of Consultant activities.

1011 Update Project Management Plan - Construction
Provide updates to reflect the construction phase of the Project and Task 1000 - Engineering Support During Construction.

1100 ANNUAL HOURLY RATE ADJUSTMENTS

1101 July 2007 through June 2009

1102 July 2009 through June 2011 – 7.0%

Tabulation of Professional Fees

Kennedy/Jenks Consultants

Job Name: Portland Bureau of Environmental Services
Job Description: Balch Consolidation Conduit
Proposal/Job Number:

Original Contract shown in unshaded cells (spreadsheet values)
Amendment 2 Changes shown in yellow (spreadsheet values)
Amendment 3 Changes shown in green (spreadsheet equations)

	Al Shewey	Ron Bard							Stan Lasselle								
	Dick Guglomo	Brad Moore	Aaron Eder	Mike Flanigan		Michael Humm			Stephanie Dodge							1.05	1.05
Direct Rate	$67.42	$55.81	$49.35	$41.94	$38.06	$33.87	$27.74	$32.26	$31.61	$24.19	$29.68	$22.26	$18.71				
Multiplier	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10				
Custom Rates Classification:	Eng-Sci-Spec 8	Eng-Sci-Spec 7	Eng-Sci-Spec 6	Eng-Sci-Spec 5	Eng-Sci-Spec 4	Eng-Sci-Spec 3	Eng-Sci-Spec 2	Eng-Sci-Spec 1	Designer-Sr Tech (CAD)	CAD Tech	Project Admin	Admin Asstnt	Aide	KJ Total Hours	Total Labor Costs	K/J Internal Costs	K/J Direct Costs	Sub-contractor Costs	Total Cost
Hourly Rate:	$209.00	$173.00	$153.00	$130.00	$118.00	$105.00	$86.00	$100.00	$98.00	$75.00	$92.00	$69.00	$58.00						
TASK 100 PROJECT MANAGEMENT SERVICES																			
110 Project Management Plan	8	16	32									8		64	$9,352		$236	$8,127	$17,715
110NWAC Update Project Management Plan (NWN & Alt Contract)	*4*	*8*	*16*									*4*		*32*	*$4,860*			*$4,643*	*$9,503*
120 Project Schedule		16	28	20										64	$9,128			$2,016	$11,144
120NWAC Update Project Schedule (Feb-Mar-Apr-May-June 2009)		*16*	*20*	*16*										*52*	*$7,908*			*$5,061*	*$12,969*
130 Meetings and Updates	24	232	200											456	$71,544		$79	$124,287	$195,910
130NWAC Meetings and Updates (Feb-Mar-Apr-May-June 2009)		*80*	*40*											*120*	*$19,960*			*$36,311*	*$56,271*
140 Status Reports		104	28									96		228	$27,348		$189	$40,619	$68,156
140NWAC Status Reports (Feb-Mar-Apr-May-June 2009)		*48*	*20*									*40*		*108*	*$14,124*			*$14,895*	*$29,019*
150 Design Decision and Change Log		48												48	$7,824			$6,048	$13,872
160 Risk Assessment		*80*	*24*								*12*	*12*		*128*	*$19,024*			*$27,146*	*$46,170*
160AC MTBM Alternatives TM		*16*										*4*		*20*	*$3,044*			*$14,900*	*$17,944*
Task 100 - Subtotal	**36**	**664**	**408**	**36**							**12**	**164**			**$194,116**		**$504**	**$284,054**	**$478,674**
TASK 200 PUBLIC INVOLVEMENT																			
210 Public Involvement Plan Development		4												4	$652		$110	$9,452	$10,215
210NW Prepare Public Involvement Plan Update for NWN Elements																		*$982*	*$982*
220 Stakeholder Interviews and Contact Database		8												8	$1,304			$18,220	$19,524
230 Project Information Pieces		16							40					56	$6,328		$79	$13,125	$19,532
240 Community Meetings		8												8	$1,304		$79	$4,523	$5,906
250 Public Meetings		48	48											96	$14,784		$79	$18,642	$33,505
260 Site Visits		8												8	$1,304		$79	$11,117	$12,500
260NW Site Visits		*16*												*16*	*$2,672*			*$6,296*	*$8,968*
Task 200- Subtotal		**108**	**48**						**40**					**196**	**$28,348**		**$425**	**$82,357**	**$111,130**

Tabulation of Professional Fees

Kennedy/Jenks Consultants

Job Name: Portland Bureau of Environmental Services
Job Description: Balch Consolidation Conduit
Proposal/Job Number:

Original Contract shown in unshaded cells (spreadsheet values)
Amendment 2 Changes shown in yellow (spreadsheet values)
Amendment 3 Changes shown in green (spreadsheet equations)

	Al Shewey / Dick Guglomo	Ron Bard / Brad Moore	Aaron Eder	Mike Flanigan		Michael Humm			Stan Lasselle / Stephanie Dodge								
																1.05	1.05
Direct Rate	$67.42	$55.81	$49.35	$41.94	$38.06	$33.87	$27.74	$32.26	$31.61	$24.19	$29.68	$22.26	$18.71				
Multiplier	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10				
Custom Rates																	
Classification:	Eng-Sci-Spec 8	Eng-Sci-Spec 7	Eng-Sci-Spec 6	Eng-Sci-Spec 5	Eng-Sci-Spec 4	Eng-Sci-Spec 3	Eng-Sci-Spec 2	Eng-Sci-Spec 1	Designer-Sr Tech (CAD)	CAD Tech	Project Admin	Admin Asstnt	Aide	KJ Total Hours	Total Labor Costs	K/J Internal Costs	K/J Direct Costs	Sub-contractor Costs	Total Cost
Hourly Rate:	$209.00	$173.00	$153.00	$130.00	$118.00	$105.00	$86.00	$100.00	$98.00	$75.00	$92.00	$69.00	$58.00						
TASK 300 PREDESIGN PHASE SERVICES																			
310 Kickoff and Issues/Risks Meeting and Follow-up Workshop	8	24	8											40	$6,648		$79	$17,430	$24,157
310NW NWN Project Elements Discussion Meeting		*8*	*8*											*16*	*$2,520*			*$7,790*	*$10,310*
320 Geotech/Env Data Review and Field Reconn		12												12	$1,956			$21,429	$23,385
320NW Geotech/Env Data Review and Field Reconnaissance		*12*												*12*	*$2,004*			*$9,672*	*$11,676*
320Yeon Geotech/Env Data Review and Field Reconnaissance		*4*												*4*	*$692*			*$1,343*	*$2,035*
321 Stage 1 - Predesign Geotech/Env Exploration Work Plan		4												4	$652		$110	$19,930	$20,692
321NW Stage 1 - Predesign Geotech/Env Exploration Work Plan		*4*												*4*	*$668*			*$16,334*	*$17,002*
321Yeon Stages 1&2 - Predesign & Design Geo/Env Expl Work Plan		*4*												*4*	*$692*			*$3,157*	*$3,849*
322 Stage 1 - Geotechnical Explorations		4												4	$652			$167,656	$168,308
322NW Stages 1&2 - Geotechnical Explorations		*4*												*4*	*$668*			*$129,944*	*$130,612*
322Yeon Stages 1&2 - Geotechnical Explorations																			
323 Stage 1 - Environmental Sampling & Testing		4												4	$652			$5,681	$6,333
323NW Stage 1 - Environmental Sampling & Testing		*4*												*4*	*$668*			*$6,879*	*$7,547*
323Yeon Stages 1&2 - Environmental Sampling & Testing		*4*												*4*	*$692*			*$1,123*	*$1,815*
323A Stage 1 - Enviro Lab Work																		$52,500	$52,500
324 Groundwater Evaluation / Monitoring		4												4	$652			$5,030	$5,682
325 Seismic Evaluations		4												4	$652			$9,576	$10,228
326 Geotechnical Alternatives Analysis TM	4	8		8										20	$3,076		$79	$15,399	$18,554
326NW Geotechnical Analysis TM	*4*	*4*		*4*										*12*	*$1,980*			*$17,717*	*$19,697*
326Yeon Geotechnical Analysis TM	*2*	*4*	*4*											*10*	*$1,722*			*$12,536*	*$14,258*
327 Environmental Alternatives Analysis TM	4	4		4										12	$1,932		$79	$4,620	$6,631
327NW Environmental Analysis TM	*4*	*4*		*4*										*12*	*$1,980*			*$10,794*	*$12,774*
328 Predesign (30%) Geotechnical Data Report (GDR)	4	4		4										12	$1,932		$315	$21,601	$23,848
328NW Update Predesign (30%) Geotechnical Data Report (GDR)	*4*	*4*		*4*										*12*	*$1,980*			*$18,901*	*$20,881*
328Yeon Predesign (30%) Geotechnical Data Report (GDR)	*2*	*4*	*4*											*10*	*$1,722*			*$5,529*	*$7,251*
329 Predesign (30%) Environmental Data Report (EDR)	4	4		4										12	$1,932		$315	$5,351	$7,598
329NW Update Predesign (30%) Environmental Data Report (EDR)	*4*	*4*		*4*										*12*	*$1,980*			*$7,433*	*$9,413*
329Yeon Predesign (30%) Environmental Data Report (EDR)	*2*	*4*	*4*											*10*	*$1,722*			*$3,069*	*$4,791*
330 Preliminary Identification of Existing Utilities		4	8	40					40					92	$10,452			$1,008	$11,460
330NW Preliminary Identification of Existing Utilities		*4*	*8*	*40*					*40*					*92*	*$10,692*				*$10,692*
330Yeon Preliminary Identification of Existing Utilities		*2*	*4*	*8*					*8*					*22*	*$2,782*				*$2,782*
335 Base Map Preparation		8	16			40			80					144	$15,064		$53		$15,117
335NW Base Map Preparation		*8*	*16*			*40*			*80*					*144*	*$15,384*				*$15,384*
335Yeon Base Map Preparation		*4*	*8*						*16*					*28*	*$3,484*				*$3,484*
340 Review of Operation and Maintenance Records		8	16											24	$3,624			$504	$4,128
340NW BCC/NWN Operation and Maintenance Requirements		*16*	*24*											*40*	*$6,224*			*$517*	*$6,741*
345 Trenchless Construction Methods TM	8	16												24	$4,184		$79	$16,932	$21,195
345NW Construction Methods Technical Memorandum	*8*	*16*												*24*	*$4,288*			*$16,945*	*$21,233*
345Yeon Construction Methods Technical Memorandum	*2*	*4*												*6*	*$1,110*			*$8,702*	*$9,812*
350 Hydraulic Analysis		8												8	$1,304			$19,341	$20,645
350NW Hydraulic Analysis		*8*												*8*	*$1,336*			*$26,473*	*$27,809*
355 Permits, Easements, R/W and Property Impacts		8												8	$1,304			$10,806	$12,110
355NW Permits, Easements, R/W and Property Impacts		*8*												*8*	*$1,336*			*$6,129*	*$7,465*
355Yeon Permits, Easements, R/W and Property Impacts		*8*												*8*	*$1,384*			*$1,972*	*$3,356*
360 Traffic Impacts		4												4	$652			$2,898	$3,550
360NW Traffic Impacts		*4*												*4*	*$668*			*$3,465*	*$4,133*
360Yeon Traffic Impacts		*4*												*4*	*$692*			*$2,686*	*$3,378*
365 Cultural and Historical Resources		8												8	$1,304			$32,183	$33,487
365NW Cultural and Historical Resources		*6*												*6*	*$1,002*			*$5,851*	*$6,853*
370 Alignment Alternatives Evaluation Workshop	8	24	24	120		80			120					376	$42,888		$263	$25,849	$68,999
370NW NWN Projects Conceptual Design and Operation	*8*	*24*	*24*	*100*		*60*			*100*					*316*	*$37,396*			*$13,211*	*$50,607*
370Yeon Evaluation of Additional Yeon Alignment Alternatives		*24*							*12*					*36*	*$5,328*			*$7,079*	*$12,407*
375 Project Design Criteria	4	8	8	8										28	$4,236			$21,731	$25,967
380 30% Preliminary Design Report	8	32	64	80		120			120					424	$49,072		$788	$46,693	$96,552
380NW 30% Preliminary Design Report	*4*	*16*	*32*	*40*		*60*			*60*					*212*	*$25,880*			*$27,962*	*$53,842*
380Yeon 30% Preliminary Design Report	*2*	*8*	*16*	*20*		*20*			*24*					*90*	*$11,302*			*$8,979*	*$20,281*
385 Value Engineering Workshop	8	32	16											56	$9,112		$105	$21,027	$30,244
390 Balch Shaft Evaluation																			
Task 300 - Subtotal	**106**	**472**	**312**	**492**		**420**			**700**					**2502**	**$315,910**		**$2,263**	**$927,364**	**$1,245,537**

Tabulation of Professional Fees

Kennedy/Jenks Consultants

Job Name: Portland Bureau of Environmental Services
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Amendment 3 Changes shown in green (spreadsheet equations)

	Al Shewey / Dick Guglomo	Ron Bard / Brad Moore	Aaron Eder	Mike Flanigan		Michael Humm			Stan Lasselle / Stephanie Dodge								
																1.05	1.05
Direct Rate	$67.42	$55.81	$49.35	$41.94	$38.06	$33.87	$27.74	$32.26	$31.61	$24.19	$29.68	$22.26	$18.71				
Multiplier	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10				
Custom Rates Classification: Hourly Rate:	Eng-Sci-Spec 8 $209.00	Eng-Sci-Spec 7 $173.00	Eng-Sci-Spec 6 $153.00	Eng-Sci-Spec 5 $130.00	Eng-Sci-Spec 4 $118.00	Eng-Sci-Spec 3 $105.00	Eng-Sci-Spec 2 $86.00	Eng-Sci-Spec 1 $100.00	Designer-Sr Tech (CAD) $98.00	CAD Tech $75.00	Project Admin $92.00	Admin Asstnt $69.00	Aide $58.00	KJ Total Hours	Total Labor Costs	K/J Internal Costs	K/J Direct Costs	Sub-contractor Costs	Total Cost
TASK 400 DESIGN PHASE SERVICES																			
410 Stage 2 - Geo Inv, Testing, Eval, Eng, Env Analyses																			
411 Stage 2 - Exploration Work Plan		4												4	$652		$110	$5,622	$6,384
411NW Stage 2 - Exploration Work Plan		*4*												*4*	*$692*			*$1,066*	*$1,758*
412 Field Explorations in Support of Design Engineering		8												8	$1,304			$107,451	$108,755
412 additional exploratory work																		*$103,788*	*$103,788*
412A - Stage 2 Enviro Lab Work																		$31,500	$31,500
412B - Stage 2 Geophysical Surveys																		$21,000	$21,000
412AC Field Explorations in Support of Contractor Suppl Explorations		*8*												*8*	*$1,384*			*$322,094*	*$323,478*
413 Groundwater Evaluation / Monitoring		4												4	$652			$5,481	$6,133
413NW Groundwater / Dewatering Evaluation		*4*												*4*	*$692*			*$536*	*$1,228*
414 Lab Analysis of Samples for Phys PropFinal Eng Design		4												4	$652			$3,788	$4,440
414NW Lab Analysis of Samples for Phys PropFinal Eng Design		*2*												*2*	*$346*			*$5,686*	*$6,032*
414Yeon Lab Analysis of Samples for Phys PropFinal Eng Design		*1*												*1*	*$173*			*$4,788*	*$4,961*
414AC Lab Analysis of Samples for Phys PropFinal Eng Design		*1*												*1*	*$173*			*$134*	*$307*
415 Geotechnical Design Technical Memoranda	8	16												24	$4,184		$331	$49,772	$54,286
415NW Geotechnical Design Technical Memoranda	*8*	*16*												*24*	*$4,440*			*$16,330*	*$20,770*
415Yeon Geotechnical Design Technical Memoranda	*4*	*8*												*12*	*$2,220*			*$7,008*	*$9,228*
416 Environmental Technical Memoranda	4	8												12	$2,092		$331	$4,547	$6,969
416NW Environmental Technical Memoranda	*4*	*8*												*12*	*$2,220*			*$21,627*	*$23,847*
416Yeon Environmental Technical Memoranda	*2*	*4*												*6*	*$1,110*			*$3,172*	*$4,282*
417 60%, 90% and 100% Geotechnical Data Report (GDR)		8												8	$1,304		$945	$11,876	$14,125
417NW/Yeon 60%, 90% and 100% Geotechnical Data Report (GDR)		*4*												*4*	*$692*			*$12,283*	*$12,975*
417AC 60%, 90% and 100% Geotechnical Data Report (GDR)		*8*												*8*	*$1,384*			*$7,413*	*$8,797*
418 60%, 90% and 100% Geotechnical Interpretive Report (GIR)	4	8												12	$2,092		$473	$13,087	$15,652
419 60%, 90% and 100% Environmental Data Report (EDR)	4	4												8	$1,440		$473	$8,694	$10,607
419NW/Yeon 60%, 90% and 100% Environmental Data Report (EDR)	*2*	*2*												*4*	*$764*			*$7,981*	*$8,745*
419AC 60%, 90% and 100% Environmental Data Report (EDR)	*4*	*4*												*8*	*$1,528*			*$4,547*	*$6,075*
420 60%, 90% and 100% Geotechnical Baseline Report (GBR)	8	8												16	$2,880		$473	$50,762	$54,114
420NW 60%, 90% and 100% Geotechnical Baseline Report (GBR)	*8*	*8*												*16*	*$3,056*			*$25,499*	*$28,555*
420AC 60%, 90% and 100% Geotechnical Baseline Report (GBR)	*8*	*8*												*16*	*$3,056*			*$13,613*	*$16,669*
421 Easement and Rights-of-Way Services		8												8	$1,304			$75,651	$76,955
421 Easement and Rights-of-Way Services		*8*												*8*	*$1,384*			*$8,411*	*$9,795*
421NW Easement and Rights-of-Way Services		*8*												*8*	*$1,384*			*$19,692*	*$21,076*
425 Permits		16	32											48	$7,248			$12,306	$19,554
425NW/Yeon Permits		*16*	*32*											*48*	*$7,664*			*$6,603*	*$14,267*
430 Verify Utilities		8	16	40					80					144	$15,984		$79		$16,063
430NW/Yeon Verify Utilities		*8*	*16*	*40*					*80*					*144*	*$16,872*				*$16,872*
435 60%, 90% and 100% Contract Documents	32	148	192	380		260			980		40			2032	$225,628		$2,100	$82,850	$310,578
435NW/Yeon 60%, 90% and 100% Contract Documents	*24*	*120*	*360*						*480*		*40*			*1024*	*$131,576*			*$48,077*	*$179,653*
435AC 60%, 90% and 100% Contract Documents		*240*	*240*						*480*					*960*	*$125,280*			*$58,733*	*$184,013*
440 60%, 90% and 100% Construction Cost Estimates	8	16	16	112					40					192	$24,000			$6,883	$30,883
440NW 60%, 90% and 100% Construction Cost Estimates	*4*	*8*	*8*	*40*					*16*					*76*	*$10,212*			*$10,259*	*$20,471*
445 60%, 90% and 100% Construction Schedules	4	8	8	8										28	$4,236			$3,071	$7,307
445NW 60%, 90% and 100% Construction Schedules	*2*	*4*	*4*	*4*										*14*	*$2,242*			*$5,112*	*$7,354*
450 BES /Consultant Design Review Meetings	12	24	24								8			68	$10,452		$79	$20,606	$31,137
450AC BES /Consultant/Contractor Design Review Meetings		*72*	*72*											*144*	*$23,472*			*$57,053*	*$80,525*
455 Predesign Traffic Control Planning		8												8	$1,304			$5,208	$6,512
455NW/Yeon Predesign Traffic Control Planning		*8*												*8*	*$1,384*			*$5,788*	*$7,172*
460 Operations and Maintenance Manual Preparation		8		40	40						16			104	$12,096		$105	$504	$12,705
460NW Operations and Maintenance Manual Preparation																			
Task 400 - Subtotal	**154**	**898**	**1020**	**664**	**40**	**260**			**2156**		**104**			**5296**	**$664,904**		**$5,497**	**$1,297,950**	**$1,968,351**

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Kennedy/Jenks Consultants

Job Name: Portland Bureau of Environmental Services
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Original Contract shown in unshaded cells (spreadsheet values)	Al Shewey	Ron Bard							Stan Lasselle										
Amendment 2 Changes shown in yellow (spreadsheet values)	Dick Guglomo	Brad Moore	Aaron Eder	Mike Flanigan		Michael Humm			Stephanie Dodge								1.05	1.05	
Amendment 3 Changes shown in green (spreadsheet equations)																			
Direct Rate	$67.42	$55.81	$49.35	$41.94	$38.06	$33.87	$27.74	$32.26	$31.61	$24.19	$29.68	$22.26	$18.71						
Multiplier	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10						
Custom Rates	Eng-Sci-Spec 8	Eng-Sci-Spec 7	Eng-Sci-Spec 6	Eng-Sci-Spec 5	Eng-Sci-Spec 4	Eng-Sci-Spec 3	Eng-Sci-Spec 2	Eng-Sci-Spec 1	Designer-Sr Tech (CAD)	CAD Tech	Project Admin	Admin Asstnt	Aide	KJ Total Hours	Total Labor Costs	K/J Internal Costs	K/J Direct Costs	Sub-contractor Costs	Total Cost
Classification:																			
Hourly Rate:	$209.00	$173.00	$153.00	$130.00	$118.00	$105.00	$86.00	$100.00	$98.00	$75.00	$92.00	$69.00	$58.00						
TASK 500 FINAL DESIGN PHASE SERVICES																			
510 Final Contract Documents	4	20	80	64		40			80		16			304	$36,352		$105	$9,183	$45,640
510NWAC Final Contract Documents	*2*	*10*	*40*	*32*		*20*			*40*		*8*			*152*	*$19,184*			*$5,094*	*$24,278*
520 Final Construction Cost Estimate		4	16	16	64									100	$12,108			$2,665	$14,773
530 Final Construction Schedules		4		8										12	$1,636			$1,276	$2,912
540 Final GDR, GIR, GBR and EDR Submittals	4	8	8								16			36	$4,644		$105	$21,015	$25,764
540NWAC Final GDR, GBR and EDR Submittals	*2*	*4*	*4*								*8*			*18*	*$2,458*			*$5,934*	*$8,392*
550 Final Design Report		4	40	32							16			92	$11,780		$394	$6,048	$18,222
550NWAC Final Design Report		*2*	*20*	*16*							*8*			*46*	*$6,222*			*$19,337*	*$25,559*
Task 500 - Subtotal	**12**	**56**	**208**	**168**	**64**	**60**			**120**		**72**			**760**	**$94,384**		**$604**	**$70,551**	**$165,539**
TASK 600 BIDDER PREQUALIFICATION SERVICES																			
610 Bidder Prequalification Package Preparation	4	8									16			28	$3,484		$25	$5,576	$9,085
620 Respond to Prospective Bidders' Questions		8												8	$1,304			$1,512	$2,816
630 Evaluation of Prequalification Submittals		24												24	$3,912			$3,560	$7,472
Task 600 - Subtotal	**4**	**40**									**16**			**60**	**$8,700**		**$25**	**$10,647**	**$19,372**
TASK 700 BID PHASE SERVICES																			
710 Pre-Bid Conference		16	8											24	$3,768			$2,855	$6,623
720 Bidders Questions and Design Clarifications		8	12	8										28	$4,028			$7,395	$11,423
730 Bid Tabulation Translation Services		12												12	$1,956			$1,512	$3,468
740 Technical Assistance		12	16	8										36	$5,260			$8,338	$13,598
750 Submittals		8	16	8										32	$4,608			$6,632	$11,240
760 Conformed Plans and Specifications		8	16						40		16			80	$8,736		$210	$504	$9,450
Task 700 - Subtotal		**64**	**68**	**24**					**40**		**16**			**212**	**$28,356**		**$210**	**$27,236**	**$55,802**
TASK 900 INCORPORATION OF NWN AND AC PROCUREMENT																			
910 CM/GC RFQ Development, Assistance and Review		*12*												*12*	*$2,004*			*$17,177*	*$19,181*
920 CM/GC RFP Development, Assistance and Review		*40*												*40*	*$6,680*			*$20,009*	*$26,689*
920		*16*												*16*	*$2,768*		*$2,500*	*$3,213*	*$8,481*
930 CM/GC & NWN Scope of Work Development		*72*												*72*	*$12,024*			*$18,692*	*$30,716*
930																			
Task 900 - Subtotal		**140**												**140**	**$23,476**		**$2,500**	**$59,091**	**$85,067**
TASK 1000 ENGINEERING SUPPORT DURING CONSTRUCTION																			
1001 Preconstruction Conference		*6*	*6*								*4*			*16*	*$2,324*			*$5,249*	*$7,573*
1002 Submittals Review		*16*	*80*								*80*			*176*	*$22,368*			*$34,469*	*$56,837*
1003 Clarification of Contract Documents		*40*	*80*								*40*			*160*	*$22,840*			*$23,790*	*$46,630*
1004 Major Change Evaluation During Contractor's Construction Period		*128*	*504*						*760*		*48*	*88*		*1528*	*$184,224*			*$46,947*	*$231,171*
1005 Geology, Geotechnical, Environmental & Microtunneling Support		*8*	*32*											*40*	*$6,280*			*$72,410*	*$78,690*
1006 Pre- and Post-Construction Surveys of Buildings and Structures	*40*	*16*	*160*	*160*										*376*	*$56,408*			*$2,142*	*$58,550*
1007 Settlement and Building Instrumentation Monitoring		*8*	*16*											*24*	*$3,832*			*$20,672*	*$24,504*
1008 Construction Progress Meetings		*192*	*192*								*96*			*480*	*$71,424*			*$65,169*	*$136,593*
1009 Pre-Final and Final Inspection Walks-Through		*8*	*24*											*32*	*$5,056*			*$536*	*$5,592*
1010 Construction Phase Progress Reports		*56*	*28*									*56*		*140*	*$17,836*			*$12,870*	*$30,706*
1011 Update Project Management Plan (Construction)	*4*	*8*	*16*									*4*		*32*	*$4,944*			*$6,405*	*$11,349*
Task 1000 - Subtotal	***44***	***486***	***1138***	***160***					***760***		***268***	***148***		***3004***	***$397,536***			***$290,658***	***$688,194***
TASK 1100 ANNUAL HOURLY RATE ADJUSTMENTS																			
1101 July 2007 through June 2009																			
1102 July 2009 through June 2011 (assume 7% on Task 1000)															*$27,828*			*$15,550*	*$43,378*
7%																			
Task 1100 - Subtotal															***$27,828***			***$15,550***	***$43,378***
All Tasks Total	**356**	**2928**	**3202**	**1544**	**104**	**740**			**3816**		**488**	**312**		**13490**	**$1,783,558**		**$12,028**	**$3,065,458**	**$4,861,043**

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	ESB	DBE/WBE							OTHER								
Direct Rate	**$60.71**																
Multiplier	**2.10**	ESB	ESB	ESB	DBE/WBE	DBE/WBE	DBE/WBE										
Custom Rates Classification: Hourly Rate:	**Bob Jossis $127.50**	**Crawford Eng Assoc.**	**David Mills Consulting**	**Lancaster Eng**	**Adolfson Assoc.**	**Heritage Research**	**Jeanne Lawson**	**NW Geotech**	**Staheli Trenchless**	**Shannon & Wilson**	**Right-of Way Assoc.**	**Richard Scheumann**	**ESB**	**DBE/ WBE**	**ESB + DBE/WBE**	**OTHER**	**TOTAL SUB**
TASK 100 PROJECT MANAGEMENT SERVICES																	
110 Project Management Plan	$4,800								$2,940				$4,800		$4,800	$2,940	$7,740
110NWAC Update Project Management Plan (NWN & Alt Contract)	*$2,952*								*$1,470*				*$2,952*		*$2,952*	*$1,470*	*$4,422*
120 Project Schedule	$1,920												$1,920		$1,920		$1,920
120NWAC Update Project Schedule (Feb-Mar-Apr-May-June 2009)	*$1,020*								*$3,800*				*$1,020*		*$1,020*	*$3,800*	*$4,820*
130 Meetings and Updates	$59,520	$1,840	$840	$1,840	$1,784	$840	$2,238		$22,813	$25,854	$800		$64,040	$4,862	$68,902	$49,467	$118,369
130NWAC Meetings and Updates (Feb-Mar-Apr-May-June 2009)	*$15,300*		*$840*	*$968*	*$949*	*$420*	*$1,148*		*$7,040*	*$7,517*	*$400*		*$17,108*	*$2,517*	*$19,625*	*$14,957*	*$34,582*
140 Status Reports	$36,480								$2,205				$36,480		$36,480	$2,205	$38,685
140NWAC Status Reports (Feb-Mar-Apr-May-June 2009)	*$10,200*								*$3,040*	*$946*			*$10,200*		*$10,200*	*$3,986*	*$14,186*
150 Design Decision and Change Log	$5,760												$5,760		$5,760		$5,760
160 Risk Assessment	*$2,952*								*$11,466*	*$11,436*			*$2,952*		*$2,952*	*$22,902*	*$25,854*
160AC MTBM Alternatives TM	*$510*								*$13,680*				*$510*		*$510*	*$13,680*	*$14,190*
Task 100 - Subtotal	**$141,414**	**$1,840**	**$1,680**	**$2,808**	**$2,733**	**$1,260**	**$3,386**		**$68,454**	**$45,752**	**$1,200**		**$147,742**	**$7,380**	**$155,122**	**$115,406**	**$270,528**
TASK 200 PUBLIC INVOLVEMENT																	
210 Public Involvement Plan Development	$1,200						$7,802						$1,200	$7,802	$9,002		$9,002
210NW Prepare Public Involvement Plan Update for NWN Elements							*$935*							*$935*	*$935*		*$935*
220 Stakeholder Interviews and Contact Database	$1,440						$15,912						$1,440	$15,912	$17,352		$17,352
230 Project Information Pieces	$1,920						$9,478		$1,103				$1,920	$9,478	$11,398	$1,103	$12,500
240 Community Meetings	$1,440						$2,868						$1,440	$2,868	$4,308		$4,308
250 Public Meetings	$7,680						$10,074						$7,680	$10,074	$17,754		$17,754
260 Site Visits	$960						$9,627						$960	$9,627	$10,587		$10,587
260NW Site Visits	*$984*						*$2,437*			*$2,575*			*$984*	*$2,437*	*$3,421*	*$2,575*	*$5,997*
Task 200- Subtotal	**$15,624**						**$59,134**		**$1,103**	**$2,575**			**$15,624**	**$59,134**	**$74,758**	**$3,678**	**$78,435**

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Direct Rate	**$60.71**																	
Multiplier	**2.10**	ESB	ESB	ESB	DBE/WBE	DBE/WBE	DBE/WBE											
Custom Rates **Classification:** **Hourly Rate:**	**Bob Jossis $127.50**	**Crawford Eng Assoc.**	**David Mills Consulting**	**Lancaster Eng**	**Adolfson Assoc.**	**Heritage Research**	**Jeanne Lawson**	**NW Geotech**	**Staheli Trenchless**	**Shannon & Wilson**	**Right-of Way Assoc.**	**Richard Scheumann**	**ESB**	**DBE/ WBE**	**ESB + DBE/WBE**	**OTHER**	**TOTAL SUB**
TASK 300 PREDESIGN PHASE SERVICES																	
310 Kickoff and Issues/Risks Meeting and Follow-up Workshop	$5,760	$920		$920	$892		$1,119		$2,940	$4,049			$7,600	$2,011	$9,611	$6,989	$16,600
310NW NWN Project Elements Discussion Meeting	*$984*		*$420*	*$468*	*$458*		*$574*		*$1,470*	*$2,245*	*$800*		*$1,872*	*$1,032*	*$2,904*	*$4,515*	*$7,419*
320 Geotech/Env Data Review and Field Reconn	$960								$5,880	$13,569			$960		$960	$19,449	$20,409
320NW Geotech/Env Data Review and Field Reconnaissance	*$492*								*$1,103*	*$7,617*			*$492*		*$492*	*$8,720*	*$9,212*
320Yeon Geotech/Env Data Review and Field Reconnaissance										*$1,279*						*$1,279*	*$1,279*
321 Stage 1 - Predesign Geotech/Env Exploration Work Plan	$1,440								$3,969	$13,572			$1,440		$1,440	$17,541	$18,981
321NW Stage 1 - Predesign Geotech/Env Exploration Work Plan	*$492*								*$735*	*$14,329*			*$492*		*$492*	*$15,064*	*$15,556*
321Yeon Stages 1&2 - Predesign & Design Geo/Env Expl Work Plan	*$255*								*$760*	*$1,992*			*$255*		*$255*	*$2,752*	*$3,007*
322 Stage 1 - Geotechnical Explorations	$960									$158,712			$960		$960	$158,712	$159,672
322NW Stages 1&2 - Geotechnical Explorations	*$246*								*$735*	*$122,775*			*$246*		*$246*	*$123,510*	*$123,756*
322Yeon Stages 1&2 - Geotechnical Explorations																	
323 Stage 1 - Environmental Sampling & Testing	$960									$4,450			$960		$960	$4,450	$5,410
323NW Stage 1 - Environmental Sampling & Testing										*$6,551*						*$6,551*	*$6,551*
323Yeon Stages 1&2 - Environmental Sampling & Testing										*$1,069*						*$1,069*	*$1,069*
323A Stage 1 - Enviro Lab Work										$50,000						$50,000	$50,000
324 Groundwater Evaluation / Monitoring										$4,790						$4,790	$4,790
325 Seismic Evaluations										$9,120						$9,120	$9,120
326 Geotechnical Alternatives Analysis TM	$1,920								$5,292	$7,454			$1,920		$1,920	$12,746	$14,666
326NW Geotechnical Analysis TM	*$492*								*$2,940*	*$13,441*			*$492*		*$492*	*$16,381*	*$16,873*
326Yeon Geotechnical Analysis TM									*$1,520*	*$10,419*						*$11,939*	*$11,939*
327 Environmental Alternatives Analysis TM	$960									$3,440			$960		$960	$3,440	$4,400
327NW Environmental Analysis TM	*$246*									*$10,034*			*$246*		*$246*	*$10,034*	*$10,280*
328 Predesign (30%) Geotechnical Data Report (GDR)	$1,920								$9,408	$9,244			$1,920		$1,920	$18,652	$20,572
328NW Update Predesign (30%) Geotechnical Data Report (GDR)	*$246*								*$6,762*	*$10,993*			*$246*		*$246*	*$17,755*	*$18,001*
328Yeon Predesign (30%) Geotechnical Data Report (GDR)	*$255*								*$760*	*$4,251*			*$255*		*$255*	*$5,011*	*$5,266*
329 Predesign (30%) Environmental Data Report (EDR)	$960									$4,136			$960		$960	$4,136	$5,096
329NW Update Predesign (30%) Environmental Data Report (EDR)	*$246*									*$6,833*			*$246*		*$246*	*$6,833*	*$7,079*
329Yeon Predesign (30%) Environmental Data Report (EDR)	*$255*									*$2,668*			*$255*		*$255*	*$2,668*	*$2,923*
330 Preliminary Identification of Existing Utilities	$960												$960		$960		$960
330NW Preliminary Identification of Existing Utilities																	
330Yeon Preliminary Identification of Existing Utilities																	
335 Base Map Preparation																	
335NW Base Map Preparation																	
335Yeon Base Map Preparation																	
340 Review of Operation and Maintenance Records	$480												$480		$480		$480
340NW BCC/NWN Operation and Maintenance Requirements	*$492*												*$492*		*$492*		*$492*
345 Trenchless Construction Methods TM	$2,880								$13,246				$2,880		$2,880	$13,246	$16,126
345NW Construction Methods Technical Memorandum	*$984*								*$8,820*	*$6,334*			*$984*		*$984*	*$15,154*	*$16,138*
345Yeon Construction Methods Technical Memorandum	*$1,020*								*$3,192*	*$4,076*			*$1,020*		*$1,020*	*$7,268*	*$8,288*
350 Hydraulic Analysis	$480	$17,940											$18,420		$18,420		$18,420
350NW Hydraulic Analysis	*$492*	*$24,720*											*$25,212*		*$25,212*		*$25,212*
355 Permits, Easements, R/W and Property Impacts	$2,880				$5,500				$1,911				$2,880	$5,500	$8,380	$1,911	$10,291
355NW Permits, Easements, R/W and Property Impacts	*$984*				*$2,796*				*$2,058*				*$984*	*$2,796*	*$3,780*	*$2,058*	*$5,838*
355Yeon Permits, Easements, R/W and Property Impacts	*$510*								*$1,368*				*$510*		*$510*	*$1,368*	*$1,878*
360 Traffic Impacts				$2,760									$2,760		$2,760		$2,760
360NW Traffic Impacts	*$492*			*$2,808*									*$3,300*		*$3,300*		*$3,300*
360Yeon Traffic Impacts	*$1,020*			*$1,538*									*$2,558*		*$2,558*		*$2,558*
365 Cultural and Historical Resources	$960					$29,690							$960	$29,690	$30,650		$30,650
365NW Cultural and Historical Resources	*$492*					*$5,080*							*$492*	*$5,080*	*$5,572*		*$5,572*
370 Alignment Alternatives Evaluation Workshop	$4,800			$460	$892				$8,794	$6,472	$800	$2,400	$5,260	$892	$6,152	$18,466	$24,618
370NW NWN Projects Conceptual Design and Operation	*$2,952*			*$468*					*$7,938*			*$1,224*	*$3,420*		*$3,420*	*$9,162*	*$12,582*
370Yeon Evaluation of Additional Yeon Alignment Alternatives	*$510*								*$6,232*				*$510*		*$510*	*$6,232*	*$6,742*
375 Project Design Criteria	$960	$920							$18,816				$1,880		$1,880	$18,816	$20,696
380 30% Preliminary Design Report	$9,600			$460	$446				$33,563		$400		$10,060	$446	$10,506	$33,963	$44,469
380NW 30% Preliminary Design Report	*$5,100*			*$968*					*$16,976*	*$3,587*			*$6,068*		*$6,068*	*$20,563*	*$26,631*
380Yeon 30% Preliminary Design Report	*$3,060*								*$4,104*	*$1,387*			*$3,060*		*$3,060*	*$5,491*	*$8,551*
385 Value Engineering Workshop	$9,600								$5,602	$4,824			$9,600		$9,600	$10,426	$20,026
390 Balch Shaft Evaluation																	
Task 300 - Subtotal	**$71,757**	**$44,500**	**$420**	**$10,850**	**$10,983**	**$34,770**	**$1,693**		**$176,893**	**$525,713**	**$2,000**	**$3,624**	**$127,527**	**$47,446**	**$174,973**	**$708,230**	**$883,204**

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Custom Rates Classification: Hourly Rate:	**Bob Jossis $127.50**	**Crawford Eng Assoc.**	**David Mills Consulting**	**Lancaster Eng**	**Adolfson Assoc.**	**Heritage Research**	**Jeanne Lawson**	**NW Geotech**	**Staheli Trenchless**	**Shannon & Wilson**	**Right-of Way Assoc.**	**Richard Scheumann**	**ESB**	**DBE/ WBE**	**ESB + DBE/WBE**	**OTHER**	**TOTAL SUB**
TASK 400 DESIGN PHASE SERVICES																	
410 Stage 2 - Geo Inv, Testing, Eval, Eng, Env Analyses																	
411 Stage 2 - Exploration Work Plan	$1,440								$1,470	$2,444			$1,440		$1,440	$3,914	$5,354
411NW Stage 2 - Exploration Work Plan	*$255*								*$760*				*$255*		*$255*	*$760*	*$1,015*
412 Field Explorations in Support of Design Engineering	$960									$101,374			$960		$960	$101,374	$102,334
412 additional exploratory work										*$98,846*						*$98,846*	*$98,846*
412A - Stage 2 Enviro Lab Work										$30,000						$30,000	$30,000
412B - Stage 2 Geophysical Surveys										$20,000						$20,000	$20,000
412AC Field Explorations in Support of Contractor Suppl Explorations	*$1,020*								*$10,032*	*$295,704*			*$1,020*		*$1,020*	*$305,736*	*$306,756*
413 Groundwater Evaluation / Monitoring										$5,220						$5,220	$5,220
413NW Groundwater / Dewatering Evaluation	*$510*												*$510*		*$510*		*$510*
414 Lab Analysis of Samples for Phys PropFinal Eng Design	$960									$2,648			$960		$960	$2,648	$3,608
414NW Lab Analysis of Samples for Phys PropFinal Eng Design	*$255*									*$5,161*			*$255*		*$255*	*$5,161*	*$5,416*
414Yeon Lab Analysis of Samples for Phys PropFinal Eng Design	*$128*									*$4,433*			*$128*		*$128*	*$4,433*	*$4,560*
414AC Lab Analysis of Samples for Phys PropFinal Eng Design	*$128*												*$128*		*$128*		*$128*
415 Geotechnical Design Technical Memoranda	$1,920								$2,058	$43,424			$1,920		$1,920	$45,482	$47,402
415NW Geotechnical Design Technical Memoranda	*$1,020*								*$1,520*	*$13,012*			*$1,020*		*$1,020*	*$14,532*	*$15,552*
415Yeon Geotechnical Design Technical Memoranda	*$510*								*$1,520*	*$4,644*			*$510*		*$510*	*$6,164*	*$6,674*
416 Environmental Technical Memoranda	$960									$3,370			$960		$960	$3,370	$4,330
416NW Environmental Technical Memoranda	*$510*									*$20,088*			*$510*		*$510*	*$20,088*	*$20,598*
416Yeon Environmental Technical Memoranda	*$255*									*$2,766*			*$255*		*$255*	*$2,766*	*$3,021*
417 60%, 90% and 100% Geotechnical Data Report (GDR)	$1,200									$10,110			$1,200		$1,200	$10,110	$11,310
417NW/Yeon 60%, 90% and 100% Geotechnical Data Report (GDR)	*$765*								*$1,140*	*$9,793*			*$765*		*$765*	*$10,933*	*$11,698*
417AC 60%, 90% and 100% Geotechnical Data Report (GDR)	*$510*								*$2,280*	*$4,270*			*$510*		*$510*	*$6,550*	*$7,060*
418 60%, 90% and 100% Geotechnical Interpretive Report (GIR)	$960								$1,470	$10,034			$960		$960	$11,504	$12,464
419 60%, 90% and 100% Environmental Data Report (EDR)	$1,440									$6,840			$1,440		$1,440	$6,840	$8,280
419NW/Yeon 60%, 90% and 100% Environmental Data Report (EDR)	*$510*									*$7,091*			*$510*		*$510*	*$7,091*	*$7,601*
419AC 60%, 90% and 100% Environmental Data Report (EDR)	*$255*									*$4,075*			*$255*		*$255*	*$4,075*	*$4,330*
420 60%, 90% and 100% Geotechnical Baseline Report (GBR)	$2,880								$24,917	$20,548			$2,880		$2,880	$45,465	$48,345
420NW 60%, 90% and 100% Geotechnical Baseline Report (GBR)	*$1,530*								*$7,804*	*$14,951*			*$1,530*		*$1,530*	*$22,755*	*$24,285*
420AC 60%, 90% and 100% Geotechnical Baseline Report (GBR)	*$510*								*$5,904*	*$6,551*			*$510*		*$510*	*$12,455*	*$12,965*
421 Easement and Rights-of-Way Services	$960		$15,000								$56,088		$15,960		$15,960	$56,088	$72,048
421 Easement and Rights-of-Way Services	*$510*		*$7,500*										*$8,010*		*$8,010*		*$8,010*
421NW Easement and Rights-of-Way Services	*$510*		*$4,200*								*$14,045*		*$4,710*		*$4,710*	*$14,045*	*$18,755*
425 Permits	$1,920				$9,800								$1,920	$9,800	$11,720		$11,720
425NW/Yeon Permits	*$1,020*				*$5,268*								*$1,020*	*$5,268*	*$6,288*		*$6,288*
430 Verify Utilities																	
430NW/Yeon Verify Utilities																	
435 60%, 90% and 100% Contract Documents	$24,480								$40,068	$14,357			$24,480		$24,480	$54,425	$78,905
435NW/Yeon 60%, 90% and 100% Contract Documents	*$12,240*								*$19,508*	*$14,040*			*$12,240*		*$12,240*	*$33,548*	*$45,788*
435AC 60%, 90% and 100% Contract Documents	*$11,730*								*$22,040*	*$22,166*			*$11,730*		*$11,730*	*$44,206*	*$55,936*
440 60%, 90% and 100% Construction Cost Estimates	$2,880								$3,675				$2,880		$2,880	$3,675	$6,555
440NW 60%, 90% and 100% Construction Cost Estimates	*$1,020*								*$4,256*	*$4,494*			*$1,020*		*$1,020*	*$8,750*	*$9,770*
445 60%, 90% and 100% Construction Schedules	$720								$2,205				$720		$720	$2,205	$2,925
445NW 60%, 90% and 100% Construction Schedules	*$765*								*$4,104*				*$765*		*$765*	*$4,104*	*$4,869*
450 BES /Consultant Design Review Meetings	$11,040								$7,970	$615			$11,040		$11,040	$8,585	$19,625
450AC BES /Consultant/Contractor Design Review Meetings	*$15,300*								*$18,848*	*$20,188*			*$15,300*		*$15,300*	*$39,036*	*$54,336*
455 Predesign Traffic Control Planning	$1,920			$3,040									$4,960		$4,960		$4,960
455NW/Yeon Predesign Traffic Control Planning	*$510*			*$5,002*									*$5,512*		*$5,512*		*$5,512*
460 Operations and Maintenance Manual Preparation	$480												$480		$480		$480
460NW Operations and Maintenance Manual Preparation																	
Task 400 - Subtotal	**$109,395**		**$26,700**	**$8,042**	**$15,068**				**$183,548**	**$823,257**	**$70,133**		**$144,137**	**$15,068**	**$159,205**	**$1,076,938**	**$1,236,143**

Tabulation of Professional Fees

Job Name:
Job Description:
Proposal/Job Number:

Original Contract shown in unshaded cells (spreadsheet values)
Amendment 2 Changes shown in yellow (spreadsheet values)
Amendment 3 Changes shown in green (spreadsheet equations)

	ESB	DBE/WBE							OTHER								
Direct Rate	**$60.71**																
Multiplier	**2.10**	ESB	ESB	ESB	DBE/WBE	DBE/WBE	DBE/WBE										
Custom Rates	**Bob**	**Crawford**	**David**	**Lancaster**	**Adolfson**	**Heritage**	**Jeanne**	**NW**	**Staheli**	**Shannon**	**Right-of**	**Richard**	**ESB**	**DBE/**	**ESB +**	**OTHER**	**TOTAL**
Classification:	**Jossis**	**Eng**	**Mills**	**Eng**	**Assoc.**	**Research**	**Lawson**	**Geotech**	**Trenchless**	**& Wilson**	**Way**	**Scheumann**		**WBE**	**DBE/WBE**		**SUB**
Hourly Rate:	**$127.50**	**Assoc.**	**Consulting**								**Assoc.**						
TASK 500 FINAL DESIGN PHASE SERVICES																	
510 Final Contract Documents	$4,320								$4,426				$4,320		$4,320	$4,426	$8,746
510NWAC Final Contract Documents	*$1,020*								*$1,064*	*$2,767*			*$1,020*		*$1,020*	*$3,831*	*$4,851*
520 Final Construction Cost Estimate	$480								$2,058				$480		$480	$2,058	$2,538
530 Final Construction Schedules	$480								$735				$480		$480	$735	$1,215
540 Final GDR, GIR, GBR and EDR Submittals	$2,880								$4,426	$12,708			$2,880		$2,880	$17,134	$20,014
540NWAC Final GDR, GBR and EDR Submittals	*$1,020*								*$1,064*	*$3,568*			*$1,020*		*$1,020*	*$4,632*	*$5,652*
550 Final Design Report	$5,760												$5,760		$5,760		$5,760
550NWAC Final Design Report	*$3,060*								*$9,728*	*$5,628*			*$3,060*		*$3,060*	*$15,356*	*$18,416*
Task 500 - Subtotal	**$19,020**								**$23,501**	**$24,671**			**$19,020**		**$19,020**	**$48,171**	**$67,191**
TASK 600 BIDDER PREQUALIFICATION SERVICES																	
610 Bidder Prequalification Package Preparation	$3,840								$1,470				$3,840		$3,840	$1,470	$5,310
620 Respond to Prospective Bidders' Questions	$1,440												$1,440		$1,440		$1,440
630 Evaluation of Prequalification Submittals	$1,920								$1,470				$1,920		$1,920	$1,470	$3,390
Task 600 - Subtotal	**$7,200**								**$2,940**				**$7,200**		**$7,200**	**$2,940**	**$10,140**
TASK 700 BID PHASE SERVICES																	
710 Pre-Bid Conference	$960								$1,470	$289			$960		$960	$1,759	$2,719
720 Bidders Questions and Design Clarifications	$1,440								$4,704	$899			$1,440		$1,440	$5,603	$7,043
730 Bid Tabulation Translation Services	$1,440												$1,440		$1,440		$1,440
740 Technical Assistance	$1,440								$5,602	$899			$1,440		$1,440	$6,501	$7,941
750 Submittals	$960								$4,557	$799			$960		$960	$5,356	$6,316
760 Conformed Plans and Specifications	$480												$480		$480		$480
Task 700 - Subtotal	**$6,720**								**$16,333**	**$2,886**			**$6,720**		**$6,720**	**$19,219**	**$25,939**
TASK 900 INCORPORATION OF NWN AND AC PROCUREMENT																	
910 CM/GC RFQ Development, Assistance and Review	*$861*								*$5,678*	*$9,820*			*$861*		*$861*	*$15,498*	*$16,359*
920 CM/GC RFP Development, Assistance and Review	*$6,089*								*$7,788*	*$5,180*			*$6,089*		*$6,089*	*$12,968*	*$19,057*
920	*$3,060*												*$3,060*		*$3,060*		*$3,060*
930 CM/GC & NWN Scope of Work Development	*$5,228*								*$2,672*	*$9,902*			*$5,228*		*$5,228*	*$12,574*	*$17,802*
930																	
Task 900 - Subtotal	**$15,237**								**$16,138**	**$24,902**			**$15,237**		**$15,237**	**$41,040**	**$56,277**
TASK 1000 ENGINEERING SUPPORT DURING CONSTRUCTION																	
1001 Preconstruction Conference	*$1,020*								*$1,520*	*$2,459*			*$1,020*		*$1,020*	*$3,979*	*$4,999*
1002 Submittals Review	*$2,040*			*$1,296*					*$12,768*	*$16,723*			*$3,336*		*$3,336*	*$29,491*	*$32,827*
1003 Clarification of Contract Documents	*$3,060*								*$7,600*	*$11,997*			*$3,060*		*$3,060*	*$19,597*	*$22,657*
1004 Major Change Evaluation During Contractor's Construction Period	*$18,105*								*$13,300*	*$13,306*			*$18,105*		*$18,105*	*$26,606*	*$44,711*
1005 Geology, Geotechnical, Environmental & Microtunneling Support	*$2,040*								*$38,000*	*$28,922*			*$2,040*		*$2,040*	*$66,922*	*$68,962*
1006 Pre- and Post-Construction Surveys of Buildings and Structures	*$2,040*												*$2,040*		*$2,040*		*$2,040*
1007 Settlement and Building Instrumentation Monitoring	*$1,020*								*$3,040*	*$15,628*			*$1,020*		*$1,020*	*$18,668*	*$19,688*
1008 Construction Progress Meetings	*$21,420*								*$15,200*	*$25,446*			*$21,420*		*$21,420*	*$40,646*	*$62,066*
1009 Pre-Final and Final Inspection Walks-Through	*$510*												*$510*		*$510*		*$510*
1010 Construction Phase Progress Reports	*$9,435*								*$1,900*	*$922*			*$9,435*		*$9,435*	*$2,822*	*$12,257*
1011 Update Project Management Plan (Construction)	*$3,060*								*$3,040*				*$3,060*		*$3,060*	*$3,040*	*$6,100*
Task 1000 - Subtotal	***$63,750***			***$1,296***					***$96,368***	***$115,403***			***$65,046***		***$65,046***	***$211,771***	***$276,817***
TASK 1100 ANNUAL HOURLY RATE ADJUSTMENTS																	
1101 July 2007 through June 2009																	
1102 July 2009 through June 2011 (assume 7% on Task 1000)									*$6,746*	*$8,064*						*$14,810*	*$14,810*
7%																	
Task 1100 - Subtotal									***$6,746***	***$8,064***						***$14,810***	***$14,810***
All Tasks Total	**$450,117**	**$46,340**	**$28,800**	**$22,996**	**$28,785**	**$36,030**	**$64,213**		**$592,023**	**$1,573,223**	**$73,333**	**$3,624**	**$548,253**	**$129,028**	**$677,281**	**$2,242,203**	**$2,919,484**

Tabulation of Professional Fees

Job Name: Job Description: Proposal/Job Number: *Original Contract shown in unshaded cells (spreadsheet values)* *Amendment 2 Changes shown in yellow (spreadsheet values)* *Amendment 3 Changes shown in green (spreadsheet equations)* Direct Rate Multiplier		EQUATION	Subtask 322 - CPTs A' to D Subtask 390 - Shaft M Subtasks 355 and 421 - Right of Way	Alternate Contracting & Elements of NW Neighborhoods Phases 100, 200 & 300 Task 412 - BCC Phase 900 *deduct Tasks 323A, 412A&B* *deduct Phases 600, 700*	Alternate Contracting & Elements of NWN Design Services Construction Services Phase 100 Phase 200 Phase 400 Phase 500 Phase 1000	Total Original plus Amendment No.1 plus Amendment No. 2	Total Original plus Amend 1 plus Amendment No.2 plus Amendment No. 3
Custom Rates Classification: Hourly Rate:	**Original Total Cost**	**Amendment Nos. 2 and 3 Total Cost**	**Amendment No.1 - Total Cost**	**Amendment No.2 - Total Cost**	**Amendment No. 3 Total Cost**	**Total Cost**	**Amendment Total Cost**
TASK 100 PROJECT MANAGEMENT SERVICES							
110 Project Management Plan	$17,715					$17,715	$17,715
110NWAC Update Project Management Plan (NWN & Alt Contract)		*$9,503*		*$9,503*		*$9,503*	*$9,503*
120 Project Schedule	$11,144					$11,144	$11,144
120NWAC Update Project Schedule (Feb-Mar-Apr-May-June 2009)		*$12,969*			*$12,969*		*$12,969*
130 Meetings and Updates	$195,910					$195,910	$195,910
130NWAC Meetings and Updates (Feb-Mar-Apr-May-June 2009)		*$56,271*			*$56,271*		*$56,271*
140 Status Reports	$68,156					$68,156	$68,156
140NWAC Status Reports (Feb-Mar-Apr-May-June 2009)		*$29,019*			*$29,019*		*$29,019*
150 Design Decision and Change Log	$13,872					$13,872	$13,872
160 Risk Assessment		*$46,170*		*$46,170*		*$46,170*	*$46,170*
160AC MTBM Alternatives TM		*$17,944*			*$17,944*		*$17,944*
Task 100 - Subtotal	**$306,798**	**$171,877**		**$55,674**	**$116,203**	**$362,471**	**$478,674**
TASK 200 PUBLIC INVOLVEMENT							
210 Public Involvement Plan Development	$10,215					$10,215	$10,215
210NW Prepare Public Involvement Plan Update for NWN Elements		*$982*		*$982*		*$982*	*$982*
220 Stakeholder Interviews and Contact Database	$19,524					$19,524	$19,524
230 Project Information Pieces	$19,532					$19,532	$19,532
240 Community Meetings	$5,906					$5,906	$5,906
250 Public Meetings	$33,505					$33,505	$33,505
260 Site Visits	$12,500					$12,500	$12,500
260NW Site Visits		*$8,968*		*$8,968*		*$8,968*	*$8,968*
Task 200- Subtotal	**$101,180**	**$9,950**		**$9,950**		**$111,130**	**$111,130**

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Custom Rates **Classification:** **Hourly Rate:**	**Original Total Cost**	**Amendment Nos. 2 and 3 Total Cost**	**Amendment No.1 - Total Cost**	**Amendment No.2 - Total Cost**	**Amendment No. 3 Total Cost**	**Total Cost**	**Amendment Total Cost**
TASK 300 PREDESIGN PHASE SERVICES							
310 Kickoff and Issues/Risks Meeting and Follow-up Workshop	$24,157					$24,157	$24,157
310NW NWN Project Elements Discussion Meeting		*$10,310*		*$10,310*		*$10,310*	*$10,310*
320 Geotech/Env Data Review and Field Reconn	$23,385					$23,385	$23,385
320NW Geotech/Env Data Review and Field Reconnaissance		*$11,676*		*$11,676*		*$11,676*	*$11,676*
320Yeon Geotech/Env Data Review and Field Reconnaissance		*$2,035*			*$2,035*		*$2,035*
321 Stage 1 - Predesign Geotech/Env Exploration Work Plan	$20,692					$20,692	$20,692
321NW Stage 1 - Predesign Geotech/Env Exploration Work Plan		*$17,002*		*$17,002*		*$17,002*	*$17,002*
321Yeon Stages 1&2 - Predesign & Design Geo/Env Expl Work Plan		*$3,849*			*$3,849*		*$3,849*
322 Stage 1 - Geotechnical Explorations	$168,308		$8,363			$176,671	$176,671
322NW Stages 1&2 - Geotechnical Explorations		*$130,612*		*$130,612*		*$130,612*	*$130,612*
322Yeon Stages 1&2 - Geotechnical Explorations							
323 Stage 1 - Environmental Sampling & Testing	$6,333					$6,333	$6,333
323NW Stage 1 - Environmental Sampling & Testing		*$7,547*		*$7,547*		*$7,547*	*$7,547*
323Yeon Stages 1&2 - Environmental Sampling & Testing		*$1,815*			*$1,815*		*$1,815*
323A Stage 1 - Enviro Lab Work	$52,500	($52,500)		($52,500)			
324 Groundwater Evaluation / Monitoring	$5,682					$5,682	$5,682
325 Seismic Evaluations	$10,228					$10,228	$10,228
326 Geotechnical Alternatives Analysis TM	$18,554					$18,554	$18,554
326NW Geotechnical Analysis TM		*$19,697*		*$19,697*		*$19,697*	*$19,697*
326Yeon Geotechnical Analysis TM		*$14,258*			*$14,258*		*$14,258*
327 Environmental Alternatives Analysis TM	$6,631					$6,631	$6,631
327NW Environmental Analysis TM		*$12,774*		*$12,774*		*$12,774*	*$12,774*
328 Predesign (30%) Geotechnical Data Report (GDR)	$23,848					$23,848	$23,848
328NW Update Predesign (30%) Geotechnical Data Report (GDR)		*$20,881*		*$20,881*		*$20,881*	*$20,881*
328Yeon Predesign (30%) Geotechnical Data Report (GDR)		*$7,251*			*$7,251*		*$7,251*
329 Predesign (30%) Environmental Data Report (EDR)	$7,598					$7,598	$7,598
329NW Update Predesign (30%) Environmental Data Report (EDR)		*$9,413*		*$9,413*		*$9,413*	*$9,413*
329Yeon Predesign (30%) Environmental Data Report (EDR)		*$4,791*			*$4,791*		*$4,791*
330 Preliminary Identification of Existing Utilities	$11,460					$11,460	$11,460
330NW Preliminary Identification of Existing Utilities		*$10,692*		*$10,692*		*$10,692*	*$10,692*
330Yeon Preliminary Identification of Existing Utilities		*$2,782*			*$2,782*		*$2,782*
335 Base Map Preparation	$15,117					$15,117	$15,117
335NW Base Map Preparation		*$15,384*		*$15,384*		*$15,384*	*$15,384*
335Yeon Base Map Preparation		*$3,484*			*$3,484*		*$3,484*
340 Review of Operation and Maintenance Records	$4,128					$4,128	$4,128
340NW BCC/NWN Operation and Maintenance Requirements		*$6,741*		*$6,741*		*$6,741*	*$6,741*
345 Trenchless Construction Methods TM	$21,195					$21,195	$21,195
345NW Construction Methods Technical Memorandum		*$21,233*		*$21,233*		*$21,233*	*$21,233*
345Yeon Construction Methods Technical Memorandum		*$9,812*			*$9,812*		*$9,812*
350 Hydraulic Analysis	$20,645					$20,645	$20,645
350NW Hydraulic Analysis		*$27,809*		*$27,809*		*$27,809*	*$27,809*
355 Permits, Easements, R/W and Property Impacts	$12,110		$6,905			$19,015	$19,015
355NW Permits, Easements, R/W and Property Impacts		*$7,465*		*$7,465*		*$7,465*	*$7,465*
355Yeon Permits, Easements, R/W and Property Impacts		*$3,356*			*$3,356*		*$3,356*
360 Traffic Impacts	$3,550					$3,550	$3,550
360NW Traffic Impacts		*$4,133*		*$4,133*		*$4,133*	*$4,133*
360Yeon Traffic Impacts		*$3,378*			*$3,378*		*$3,378*
365 Cultural and Historical Resources	$33,487					$33,487	$33,487
365NW Cultural and Historical Resources		*$6,853*		*$6,853*		*$6,853*	*$6,853*
370 Alignment Alternatives Evaluation Workshop	$68,999					$68,999	$68,999
370NW NWN Projects Conceptual Design and Operation		*$50,607*		*$50,607*		*$50,607*	*$50,607*
370Yeon Evaluation of Additional Yeon Alignment Alternatives		*$12,407*			*$12,407*		*$12,407*
375 Project Design Criteria	$25,967					$25,967	$25,967
380 30% Preliminary Design Report	$96,552					$96,552	$96,552
380NW 30% Preliminary Design Report		*$53,842*			*$53,842*		*$53,842*
380Yeon 30% Preliminary Design Report		*$20,281*			*$20,281*		*$20,281*
385 Value Engineering Workshop	$30,244					$30,244	$30,244
390 Balch Shaft Evaluation			$27,576			$27,576	$27,576
Task 300 - Subtotal	**$711,367**	**$481,669**	**$42,844**	**$338,328**	**$143,341**	**$1,092,539**	**$1,235,881**

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Custom Rates Classification: Hourly Rate:	**Original Total Cost**	**Amendment Nos. 2 and 3 Total Cost**	**Amendment No.1 - Total Cost**	**Amendment No.2 - Total Cost**	**Amendment No. 3 Total Cost**	**Total Cost**	**Amendment Total Cost**
TASK 400 DESIGN PHASE SERVICES							
410 Stage 2 - Geo Inv, Testing, Eval, Eng, Env Analyses							
411 Stage 2 - Exploration Work Plan	$6,384					$6,384	$6,384
411NW Stage 2 - Exploration Work Plan		*$1,758*			*$1,758*		*$1,758*
412 Field Explorations in Support of Design Engineering	$108,755			*$103,788*		$212,543	$212,543
412 additional exploratory work		*$103,788*					
412A - Stage 2 Enviro Lab Work	$31,500			($31,500)			
412B - Stage 2 Geophysical Surveys	$21,000			($21,000)			
412AC Field Explorations in Support of Contractor Suppl Explorations		*$323,478*			*$323,478*		*$323,478*
413 Groundwater Evaluation / Monitoring	$6,133					$6,133	$6,133
413NW Groundwater / Dewatering Evaluation		*$1,228*			*$1,228*		*$1,228*
414 Lab Analysis of Samples for Phys PropFinal Eng Design	$4,440					$4,440	$4,440
414NW Lab Analysis of Samples for Phys PropFinal Eng Design		*$6,032*			*$6,032*		*$6,032*
414Yeon Lab Analysis of Samples for Phys PropFinal Eng Design		*$4,961*			*$4,961*		*$4,961*
414AC Lab Analysis of Samples for Phys PropFinal Eng Design		*$307*			*$307*		*$307*
415 Geotechnical Design Technical Memoranda	$54,286					$54,286	$54,286
415NW Geotechnical Design Technical Memoranda		*$20,770*			*$20,770*		*$20,770*
415Yeon Geotechnical Design Technical Memoranda		*$9,228*			*$9,228*		*$9,228*
416 Environmental Technical Memoranda	$6,969					$6,969	$6,969
416NW Environmental Technical Memoranda		*$23,847*			*$23,847*		*$23,847*
416Yeon Environmental Technical Memoranda		*$4,282*			*$4,282*		*$4,282*
417 60%, 90% and 100% Geotechnical Data Report (GDR)	$14,125					$14,125	$14,125
417NW/Yeon 60%, 90% and 100% Geotechnical Data Report (GDR)		*$12,975*			*$12,975*		*$12,975*
417AC 60%, 90% and 100% Geotechnical Data Report (GDR)		*$8,797*			*$8,797*		*$8,797*
418 60%, 90% and 100% Geotechnical Interpretive Report (GIR)	$15,652					$15,652	$15,652
419 60%, 90% and 100% Environmental Data Report (EDR)	$10,607					$10,607	$10,607
419NW/Yeon 60%, 90% and 100% Environmental Data Report (EDR)		*$8,745*			*$8,745*		*$8,745*
419AC 60%, 90% and 100% Environmental Data Report (EDR)		*$6,075*			*$6,075*		*$6,075*
420 60%, 90% and 100% Geotechnical Baseline Report (GBR)	$54,114					$54,114	$54,114
420NW 60%, 90% and 100% Geotechnical Baseline Report (GBR)		*$28,555*			*$28,555*		*$28,555*
420AC 60%, 90% and 100% Geotechnical Baseline Report (GBR)		*$16,669*			*$16,669*		*$16,669*
421 Easement and Rights-of-Way Services	$76,955		$9,450			$86,405	$86,405
421 Easement and Rights-of-Way Services		*$9,795*			*$9,795*		*$9,795*
421NW Easement and Rights-of-Way Services		*$21,076*			*$21,076*		*$21,076*
425 Permits	$19,554					$19,554	$19,554
425NW/Yeon Permits		*$14,267*			*$14,267*		*$14,267*
430 Verify Utilities	$16,063					$16,063	$16,063
430NW/Yeon Verify Utilities		*$16,872*			*$16,872*		*$16,872*
435 60%, 90% and 100% Contract Documents	$310,578					$310,578	$310,578
435NW/Yeon 60%, 90% and 100% Contract Documents		*$179,653*			*$179,653*		*$179,653*
435AC 60%, 90% and 100% Contract Documents		*$184,013*			*$184,013*		*$184,013*
440 60%, 90% and 100% Construction Cost Estimates	$30,883					$30,883	$30,883
440NW 60%, 90% and 100% Construction Cost Estimates		*$20,471*			*$20,471*		*$20,471*
445 60%, 90% and 100% Construction Schedules	$7,307					$7,307	$7,307
445NW 60%, 90% and 100% Construction Schedules		*$7,354*			*$7,354*		*$7,354*
450 BES /Consultant Design Review Meetings	$31,137					$31,137	$31,137
450AC BES /Consultant/Contractor Design Review Meetings		*$80,525*			*$80,525*		*$80,525*
455 Predesign Traffic Control Planning	$6,512					$6,512	$6,512
455NW/Yeon Predesign Traffic Control Planning		*$7,172*			*$7,172*		*$7,172*
460 Operations and Maintenance Manual Preparation	$12,705					$12,705	$12,705
460NW Operations and Maintenance Manual Preparation							
Task 400 - Subtotal	**$845,658**	**$1,122,693**	**$9,450**	**$51,288**	**$1,018,905**	**$906,396**	**$1,925,301**

Tabulation of Professional Fees

Job Name: Job Description: Proposal/Job Number: *Original Contract shown in unshaded cells (spreadsheet values)* *Amendment 2 Changes shown in yellow (spreadsheet values)* *Amendment 3 Changes shown in green (spreadsheet equations)* Direct Rate Multiplier		EQUATION	Subtask 322 - CPTs A' to D Subtask 390 - Shaft M Subtasks 355 and 421 - Right of Way	Alternate Contracting & Elements of NW Neighborhoods Phases 100, 200 & 300 Task 412 - BCC Phase 900 *deduct Tasks 323A, 412A&B* *deduct Phases 600, 700*	Alternate Contracting & Elements of NWN Design Services Construction Services Phase 100 Phase 200 Phase 400 Phase 500 Phase 1000	Total Original plus Amendment No.1 plus Amendment No. 2	Total Original plus Amend 1 plus Amendment No.2 plus Amendment No. 3
Custom Rates Classification: Hourly Rate:	Original Total Cost	Amendment Nos. 2 and 3 Total Cost	Amendment No.1 - Total Cost	Amendment No.2 - Total Cost	Amendment No. 3 Total Cost	Total Cost	Amendment Total Cost
TASK 500 FINAL DESIGN PHASE SERVICES							
510 Final Contract Documents	$45,640					$45,640	$45,640
510NWAC Final Contract Documents		*$24,278*			*$24,278*		*$24,278*
520 Final Construction Cost Estimate	$14,773					$14,773	$14,773
530 Final Construction Schedules	$2,912					$2,912	$2,912
540 Final GDR, GIR, GBR and EDR Submittals	$25,764					$25,764	$25,764
540NWAC Final GDR, GBR and EDR Submittals		*$8,392*			*$8,392*		*$8,392*
550 Final Design Report	$18,222					$18,222	$18,222
550NWAC Final Design Report		*$25,559*			*$25,559*		*$25,559*
Task 500 - Subtotal	**$107,310**	**$58,228**			**$58,228**	**$107,310**	**$165,539**
TASK 600 BIDDER PREQUALIFICATION SERVICES							
610 Bidder Prequalification Package Preparation	$9,085	($9,085)		($9,085)			
620 Respond to Prospective Bidders' Questions	$2,816	($2,816)		($2,816)			
630 Evaluation of Prequalification Submittals	$7,472	($7,472)		($7,472)			
Task 600 - Subtotal	**$19,372**	**($19,372)**		**($19,372)**			
TASK 700 BID PHASE SERVICES							
710 Pre-Bid Conference	$6,623	($6,623)		($6,623)			
720 Bidders Questions and Design Clarifications	$11,423	($11,423)		($11,423)			
730 Bid Tabulation Translation Services	$3,468	($3,468)		($3,468)			
740 Technical Assistance	$13,598	($13,598)		($13,598)			
750 Submittals	$11,240	($11,240)		($11,240)			
760 Conformed Plans and Specifications	$9,450	($9,450)		($9,450)			
Task 700 - Subtotal	**$55,802**	**($55,802)**		**($55,802)**			
TASK 900 INCORPORATION OF NWN AND AC PROCUREMENT							
910 CM/GC RFQ Development, Assistance and Review		*$19,181*		*$19,181*		*$19,181*	*$19,181*
920 CM/GC RFP Development, Assistance and Review		*$26,689*		*$26,689*		*$26,689*	*$26,689*
920		*$8,481*			*$8,481*		*$8,481*
930 CM/GC & NWN Scope of Work Development		*$30,716*		*$30,716*		*$30,716*	*$30,716*
930							
Task 900 - Subtotal		**$85,067**		**$76,586**	**$8,481**	**$76,586**	**$85,067**
TASK 1000 ENGINEERING SUPPORT DURING CONSTRUCTION							
1001 Preconstruction Conference		*$7,573*			*$7,573*		*$7,573*
1002 Submittals Review		*$56,837*			*$56,837*		*$56,837*
1003 Clarification of Contract Documents		*$46,630*			*$46,630*		*$46,630*
1004 Major Change Evaluation During Contractor's Construction Period		*$231,171*			*$231,171*		*$231,171*
1005 Geology, Geotechnical, Environmental & Microtunneling Support		*$78,690*			*$78,690*		*$78,690*
1006 Pre- and Post-Construction Surveys of Buildings and Structures		*$58,550*			*$58,550*		*$58,550*
1007 Settlement and Building Instrumentation Monitoring		*$24,504*			*$24,504*		*$24,504*
1008 Construction Progress Meetings		*$136,593*			*$136,593*		*$136,593*
1009 Pre-Final and Final Inspection Walks-Through		*$5,592*			*$5,592*		*$5,592*
1010 Construction Phase Progress Reports		*$30,706*			*$30,706*		*$30,706*
1011 Update Project Management Plan (Construction)		*$11,349*			*$11,349*		*$11,349*
Task 1000 - Subtotal		***$688,194***			***$688,194***		***$688,194***
TASK 1100 ANNUAL HOURLY RATE ADJUSTMENTS							
1101 July 2007 through June 2009		*$70,000*			*$70,000*		*$70,000*
1102 July 2009 through June 2011 (assume 7% on Task 1000)		*$43,378*			*$43,378*		*$43,378*
7%							
Task 1100 - Subtotal		*$113,378*			*$113,378*		*$113,378*
All Tasks Total	**$2,147,487**	**$2,655,882**	**$52,294**	**$456,652**	**$2,146,730**	**$2,656,433**	**$4,803,164**
	$ -		$ -	$ -	$ -	$ -	$ -
	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	$ 2,147,487	**$ 2,655,882**	**$ 52,294**	**$ 456,652**	**$ 2,146,730**	**$ 2,656,433**	**$ 4,803,164**