

ATTACHMENT A SCOPE OF WORK MT. TABOR RESERVOIR REPLACEMENT PROJECT

PROJECT DESCRIPTION

The Portland Water Bureau (PWB) is planning to protect the drinking water currently stored in the three open reservoirs at Mt. Tabor Park. Preliminary planning work completed in Phase II of the Open Reservoir Study has recommended construction of new buried tanks within approximately the existing footprints of Reservoir 5 and the north side of Reservoir 6. The plan recommends abandoning Reservoir 1 and the south side of Reservoir 6 as sites for water storage. In addition, much of the underground piping in Mt Tabor Park that transfers the water supply into and out of the facilities will be replaced at the same time. Much of the piping is of the same vintage as the reservoirs and requires replacement while other piping cannot be integrated with the proposed reservoir configurations. The new yard piping will serve as the influent piping to the proposed new buried facilities and the outlet piping to connect into the existing distribution system service areas. Major design elements of the project include:

- 45 to 50 million gallons (MG) dual-celled, buried tank at the Reservoir 5 site and associated facilities
- 20 MG single or dual-celled, buried tank at the Reservoir 6 site and associated facilities
- New yard piping to supply and distribute the flows to and from the new reservoirs and the associated accessories and vaults
- Temporary construction roads
- Permanent roads (Replacement of impacted roads)
- Park mitigation measures during construction
- Renovation of historic structures that shall remain as part of the PWB facilities
- Public information and involvement (PI) program

Replacing Reservoirs 5 and 6 will open up additional park space above the buried reservoirs. Development of the space above the reservoirs will be part of a separate Landscape Design contract to be administered by Portland Parks and Recreation (PPR) and is not included in this scope of work. However, there will be a need to coordinate the designs of the above ground park amenities and the below ground structures and piping.

SCOPE OF WORK ORGANIZATION AND APPROACH

This scope of work for the Mt. Tabor Reservoir Replacement project has been organized into six elements with each element having multiple tasks and in some cases, subtasks, to facilitate documentation and management of the work. The elements of the work include:

Element I Project Management. The objective of this element is to provide oversight of the design team and the subconsultants, to manage the quality of the work products, and to provide progress reporting to the PWB.

Element II CM/GC Support and Coordination. The objective of this element is to provide support to PWB in the selection of the CM/GC contractor and to provide coordination during the design and construction management phases of the project.

Element III Preliminary Design and Value Engineering. The objective of this element is to finalize all major design decisions and will include value engineering and development of a Pre-design Report.

Element IV Detailed Design. The objective of the detailed design element is to prepare contract drawings and specifications for bidding and construction of the project.

Element V Bid Phase Services. The objective of this element is to provide technical support to PWB during the bidding and award of construction contracts.

Element VI Engineering Services During Construction. The objective of this element is to provide engineering services support to PWB during the construction phase of the project.

Element VII Public Information and Involvement. The objective of this element is to provide general support and oversight of the project public involvement.

Definitions:

Project Team – Includes City, Prime Consultant (MWH), and Subconsultant staff.

Design Team – Includes Prime Consultant (MWH) and Subconsultant staff

ELEMENT I PROJECT MANAGEMENT

Objective: MWH will provide project management services through the preliminary design, design, and construction phases of the project to plan, monitor, and control the technical, cost, schedule and communication objectives of the engineering services. It is anticipated that the project will begin in August 2003 and design services will continue through July 2004 and engineering services during construction will extend from the summer of 2004 through the summer of 2007. Hours required for project management are based on this estimated schedule. Tasks within this element include:

- Project Management Plan
- Work Breakdown Structure and Schedule Updates
- Subcontract Development and Administration
- Project Monitoring and Monthly Summary Reports
- Project Management Meetings
- QA/QC Program

TASK I.1 PROJECT MANAGEMENT PLAN

MWH will prepare a Project Management Plan before the start of the project work. The Project Management Plan for the Mt. Tabor Reservoir Replacement Project will include:

- Project team members (names, roles, addresses, phone and fax numbers, E-mail addresses, etc. for owner staff and all consultants participating in the project)
- Communication protocols (written and verbal)
- Project Management Procedures (individual roles, meetings and progress reporting, schedule and budget tracking, methods for resolving problems)
- Scope-of-Work
- List of Project Deliverables
- Work Breakdown Structure
- Project Schedule
- Project Budget
- Task, Product, Review and Approval Matrix
- Filing System
- Report and Graphics Standards
- Quality Assurance/Quality Control Program
- Review Process for all Tasks and Deliverables

Submit 10 copies of Draft Project Management Plan to PWB within three weeks of Notice To Proceed. Submit 10 copies of Final Project Management Plan to PWB within two weeks of receiving PWB Draft Plan comments. Update the Plan as required throughout the project and distribute updated sections to Project Team members.

Products: Project Management Plan for use by the consulting and PWB team members.

TASK I.2 WORK BREAKDOWN STRUCTURE (WBS) AND SCHEDULE UPDATES

Develop detailed WBS and completion schedule for the engineering services. The WBS shall consist of tasks and subtasks contained in this narrative Scope of Work. A schedule (MS Project) will be prepared to identify the sequence and duration of each task and subtask, including permitting. The schedule will be prepared in weekly increments of time, updated monthly, and included in the monthly status reports. The WBS will have direct relationship to cost loading schedule by element versus time.

Products: WBS and schedule (Included in Project Management Plan) and updated as needed as schedule is modified

TASK I.3 SUBCONTRACT DEVELOPMENT AND ADMINISTRATION

Develop and execute subcontract agreements with each of the subconsultants on the Project Team. Administer the subcontracts and assist in managing the subconsultants' work throughout the project. Schedule subconsultants in project schedule based on primary WBS. Authorize the subconsultants for specific tasks, subtasks, and products.

Products: Maintain file of subcontract agreements and authorizations to each subconsultant. Provide copy of subcontract agreements to PWB.

TASK I.4 PROJECT MONITORING AND MONTHLY SUMMARY REPORTS

The Integrated Scheduling and Budget Method (ISBM) will be used to monitor work and budget performance. The ISBM method will track the proposed expenditure and progress curve against the actual. The ISBM will be developed for each Element of the Scope of Work. Each month, the Project Manager will review the project progress and assign a completion percentage for each task or work breakdown structure element. This information, once input into the spreadsheet program, generates the project progress curve. The MWH Optimal system weekly project cost reports will be broken down by task or work breakdown structure element. The cost reports include labor hours and costs, other direct costs and subconsultant costs. This cost data input into the ISBM program to generate the actual progress curve. MWH will prepare a monthly project status report included with each invoice.

Products: Monthly Invoice and Project Status Report including Project Progress Curves

TASK I.5 PROJECT MANAGEMENT MEETINGS

MWH will attend weekly project management meetings with the key PWB staff. Meetings will be used to discuss project progress, review invoices, review action items, and plan for upcoming milestones. It is assumed that each meeting will be 2 hours and MWH will be responsible for meeting minutes.

Products: Weekly meeting minutes

TASK I.6 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

Subtask I.6.a Technical Advisory Committee (TAC) Meetings

MWH will conduct three TAC Meetings for the Mt. Tabor Reservoir Replacement Project. These meetings are part of MWH's internal QA/QC procedures; however, the Bureau Project Manager may desire to attend each of these sessions. TAC members include Ash Dhingra, Ken Ferguson, Phil Gatsoulis and Martin Dirks. The TAC will provide review of key project concepts, design criteria, evaluation of alternatives, cost estimates, and plans and specifications. The first meeting will occur after the preliminary design is completed and will provide review of all documents prior to initiating detail design. The second meeting will occur at the 50% design phase and will be conducted in coordination with the CM/GC contract documents review. The final TAC meeting will occur after the 90% submittal. During the final TAC meeting, two construction management staff members will be added to the TAC to provide constructability and bidability reviews. One member will be from the design consultant and the second will be from the CM/GC.

Products: Meeting minutes of all TAC meetings. Copies of written comments on preliminary design and 50 and 90% design documents.

Subtask I.6.b Client Design Review Coordination

MWH will perform a formal client review at each design submittal (Pre-Design, 50% and 90%). MWH will provide an electronic comment form on which comments are provided. PWB will be responsible for reviewing and resolving any conflicts for all internal comments prior to submittal to MWH and forwarding all comments for MWH response on the electronic comment form. MWH will prepare a preliminary response to each comment in one of three ways: 1. Agree, change will be made; 2. Disagree and why; or 3. Discussion with PWB required for decision-making prior to making changes. Following each design submittal, MWH will hold a meeting with PWB and CM/GC to review preliminary response. Following input from the meeting, MWH will prepare a final response comment form based on the decisions made at the design submittal review meeting. MWH will provide meeting minutes to document all decisions made at the design submittal review meetings.

Products: Meeting minutes of design submittal review meetings. Preparation of preliminary and final response comment forms.

ELEMENT II CM/GC SUPPORT AND COORDINATION

PWB will be utilizing a CM/GC project delivery method for construction and construction management services for the project. This delivery method will require additional coordination between the consultant team and CM/GC during design services than a traditional Design Bid Build delivery system. Under this Element, the consultant team will provide support to PWB in the CM/GC selection process and provide coordination services during design.

TASK II.1 ASSISTANCE IN CM/GC SELECTION PROCESS

It is assumed that the PWB either independently, or with support of a separate consultant, will be responsible for developing the RFP and coordinating the CM/GC selection process. MWH will provide support to this selection process based on its interest as one of the project team members that will be required to work closely with the CM/GC throughout the design and construction phase.

- MWH will provide written review comments to the Draft Request for Qualifications and Request for Proposals for the CM/GC contractor.
- MWH will review pre-qualification documents of potential CM/GC bidders and provide written comment of the quality of the submittal and a recommendation for further consideration based on the criteria or scoring procedure developed by PWB.
- MWH will provide one representative for the selection committee to review CM/GC written proposals and participate in the CM/GC interviews. MWH will and provide written comments and scoring as required by PWB for both the proposal and interview.

Products: Written comments on RFP, qualification submittals, and proposal.

TASK II.2 COORDINATION WITH CM/GC CONTRACTOR DURING DESIGN

- MWH will meet approximately bi-weekly with the PWB and CM/GC Project Manager to review design progress, resolve technical issues, and coordinate construction impacts issues with the Public Involvement program. It is assumed that these meetings will be initiated after the preliminary design is completed.
- It is anticipated that the CM/GC Contractor will be selected and provided notice-to-proceed as the design team is completing the Preliminary Design Package. MWH will provide CM/GC with 50% design documents for an initial constructability review and level-of-detail review for the purpose of developing the Guaranteed Maximum Price (GMP). MWH will review comments with the CM/GC and PWB to resolve changes. All comments will be documented and identified as accepted, rejected or modified.
- Prepare documents for CM/GC Contractor to prepare the GMP for the project. The GMP documents will be based on the revised 50% drawings following CM/GC constructability and additional comments and informational requests. MWH will hold a 4 hour workshop with CM/GC and PWB to clearly identify what is included in the GMP.

Products: Meeting minutes; documentation of all CM/GC comments to 50% design documents

TASK II.3 CONSTRUCTION COST ESTIMATES

- MWH will coordinate with the CM/GC and PWB to develop a cost estimating template that will be used by both the CM/GC and MWH to develop construction cost estimates.
- MWH will provide a detailed cost estimate of the GMP Contract Documents to facilitate negotiations with the CM/GC in developing the contractual GMP.
- MWH will review the CM/GC's GMP cost estimate and prepare written comments including identification of significant deviations from the engineer's estimate.
- MWH will provide an independent cost estimate for up to three change orders to the GMP after it has been established.
- MWH will attend up to three meetings to finalize the GMP and up to three additional meetings for change order negotiations to the GMP during the design phase (i.e. change orders stemming from scope changes between the GMP and 100% documents).

Products: Meeting minutes; Cost estimate format template; GMP cost estimate; Cost estimates for up to three change orders during design.

ELEMENT III PRELIMINARY DESIGN AND VALUE ENGINEERING

MWH and its subconsultants will prepare a Predesign Report to document all decisions made during the preliminary design phase of the project. The final report, incorporating comments to all draft technical memorandum, will be delivered as described in Task III.16 – Final Predesign Report of this Element. The report will establish all of recommended design criteria for the major project components (concrete, piping, pipe accessories, valves), the tank configuration, piping layout, and preliminary plans for landscaping, architectural, electrical and instrumentation and controls. The report will represent about a 20% design level and is intended to serve as the subject of the Value Engineering process. The report will consist of a compilation of individual technical memorandum and plans as outlined below. Draft technical memoranda will be submitted for review and comments will be incorporated into final Predesign Report submittal. MWH will provide 15 hard copies of each draft technical submittal. MWH will provide meeting minutes for all meetings held during the preliminary design phase.

TASK III.1 PERMITTING REQUIREMENTS

MWH will prepare a technical memorandum identifying the permits required for compliance with applicable local, state and federal regulations for construction of the Mt. Tabor Reservoir Replacement Project. The memo will identify key issues, constraints and timeframes required for obtaining each permit. It is assumed that up to three meetings with various agencies will be required to identify the permitting requirements. The permitting requirements will be incorporated into the overall project schedule.

Product: Draft Technical Memorandum

TASK III.2 SURVEYING

MWH's survey subconsultant will conduct an independent survey of the surrounding areas of the reservoirs, the reservoir interiors, gatehouse elevations, environmental zone boundaries, tree lines, pipe alignments, haul routes, and impacted roads. It is assumed that the PWB will provide a seed file and design standards for survey data file set-up. The survey be based on Multnomah County PLS control monuments (based on NAD 83/91 grid coordinates) for horizontal control and City of Portland benchmark values for vertical datum. Specific tasks include:

- Hold survey kick-off meeting with PWB to coordinate schedule and format of vertical and horizontal datums and survey information.
- Attend one meeting with City of Portland Bureau of Development Services to identify intent of environmental conservation zone boundaries. (Note: BDS creates the boundaries but they are not tied to any benchmarks and therefore, a meeting with BDS to understand the intent of the boundary is helpful in accurately depicting the boundary on the survey maps.) Locate C-Zone on base maps based on City's zoning maps. Tree canopy and roads and structures will be surveyed to provide justification for adjustment of the C zone through established City Process if necessary. The C zone will be established along its entire boundary between Reservoir 5 and the hilltop 300 feet to the south including the area near the Reservoir 1 Gatehouse.

- Additional C-Zone location will be identified on the east side of Reservoir Loop Road from the north side of Reservoir 1 to Pipe Segment 11 (See Piping Alternatives Analysis, 2003 for location of Pipe Segment designations). The roadway and Reservoir 1 Weir Building including trees 30 feet west along road will be included in survey.
- The entire area between the east side of Reservoir 5 and the tree line east of the Reservoir Loop Road will be surveyed. Individual trees on the east side of Reservoir 5 that are in the construction impact area will be located in the survey.
- Provide topographical data of the interior and surrounding areas of Reservoir 5 and 6 after each reservoir is drained by City personnel. Topographic information will be collected from the top of curb on SE 60th and to the toe of slope on the remainder of Reservoir 6 and in and around the perimeter of Reservoir 5. Topography will be shown with 1 foot intervals.
- Locate top of gatehouses and corners to allow 3-D rendering
- Topographic survey of the proposed access at the intersection of SE 64th and SE Division northerly to gate of the existing park entrance road. Survey will include 50 ft wide swath along the centerline of the proposed access road. It is assumed the City will be responsible for receiving permission to enter all property for the surveying.
- Survey connecting points and pipe runs following a preliminary alignment as follows:
 - Segment 1 between existing buildings to connection to the east
 - Segment 2 and 3 – 15 feet on each side to include edge of pavement
 - Segments 5 and 6 - 15 feet on each side to include edge of pavement
 - Segment 9 – Reservoir 5 Gatehouse to Reservoir 6 Inlet Gatehouse. (includes points inside tunnel on both ends.)
 - Segment 11 - 30 ft swath adjoining tree line
- Survey all existing vaults, manholes, valves and associated structures in the above areas.
- Survey existing pipe inverts and other critical information inside the Reservoir 5 Gatehouse and Reservoir 6 Inlet Gatehouse where new piping will be routed or connected to existing piping.
- Survey existing PPR Parks Maintenance Yard including all developed areas (roads, etc.), building corners, and planting area boundaries.
- Establish property boundaries of park within the area of impact as described above.
- Up to 3 days of return trips to acquire additional information as needed is included in fee.

Products: Survey base map of Mt. Tabor Park Reservoir and associated areas in Microstation format.

TASK III.3 SITE SECURITY PLAN

Prepare Site Security Plan identifying recommended security measures for the Mt. Tabor Reservoir project as follows:

- Review of site piping modifications relative to redundancy improvements
- Review of piping and piping appurtenance layout relative to impacts of explosives
- Development of electronic surveillance plan including camera placement, controls strategy and general camera features
- Develop security site lighting or infrared illumination plan

- Develop recommendations for securing tank vents and access hatches
- Develop access control measures for berms that may be retained as water bearing
- Coordinate w/ Bureau selection of card reader technology

It is assumed that the consultant team will attend two workshops with PWB to discuss security alternatives and to coordinate comments on draft technical memorandum.

Product: Draft Technical Memorandum

TASK III.4 TRAFFIC CONTROL PLANNING

Identify construction related traffic impacts in the Mt. Tabor area related to construction of the Mt. Tabor Reservoir Replacement Project and evaluate methods of mitigation. It is assumed that additional traffic impacts related to Park Development construction will be provided by the Park Design team for incorporation in the overall planning. The primary focus will be on identifying the local traffic impacts near Mt. Tabor Park and what mitigation measures will be necessary to accommodate the anticipated traffic volume. Development of the traffic control plan will be coordinated with the PI program.

Subtask III.4.a Initial Traffic Impact Data Analysis

- Review background traffic volumes. MWH's traffic consultant will obtain existing traffic volumes for the surrounding street network from PDOT. Counts will include daily, AM and PM peak hour turning movement counts at the critical intersections on Division Street. Additional counts will be collected as necessary.
- Review existing traffic data. MWH's traffic consultant will review existing project related traffic data in terms of anticipated truck traffic, construction worker traffic, parking requirements for construction workers, traffic routing, and construction and ground borne vibration and noise issues

Subtask III.4.b Meeting with PDOT and Parks

- MWH's traffic consultant will meet with PDOT to identify concerns, specific local constraints such as preference for parks access for temporary construction and/or permanent park users, and future development plans.
- MWH's traffic consultant will work with PDOT to identify traffic impact analysis requirements to address concerns; identify data availability and assess need for supplemental data; and identify traffic control requirements during construction.
- MWH's traffic consultant will meet with PWB and PPR to identify concerns and specific local constraints, regarding traffic circulation and access.

Subtask III.4.c Design Team/Contractor/Public Involvement Coordination

- MWH's traffic consultant will attend up to six (6) meetings with the Project Team to discuss and address project related traffic issues.

- MWH’s traffic consultant will be available to address construction related traffic issues as it impacts the adjacent residential and business community as well as impact on adjacent streets.

Subtask III.4.d Evaluate Traffic Impacts and Develop Mitigation Plan

- MWH’s traffic consultant will evaluate project related traffic impacts at the following locations:
 - SE Division Street/SE 64th Avenue intersection as it relates to construction access
 - Construction related parking impacts and the need for parking other than on-site
 - Other intersections where extensive construction related truck traffic is anticipated (assume maximum of 4 additional)
 - Evaluate access/haul road geometric constraints and construction traffic noise impacts. Evaluation limited to Division and 64th Avenue
 - Evaluate capacity constraints on truck routes to the site from major regional corridors to identify preferred routing.
- MWH’s traffic consultant will formulate a mitigation plan to address the various construction related impacts identified above. For the SE Division Street/SE 64th Avenue impacts, proposed mitigation could range from channelization modifications to intersection signalization.

Product: Draft Technical Memorandum summarizing traffic data, impacts and recommended mitigation plan.

TASK III.5 GEOTECHNICAL

Cornforth Consulting Inc. (CCI) will conduct on-site geotechnical investigations and prepare a geotechnical report needed to complete the structural and civil design elements of the project. The scope of services is described below.

Subtask III.5.a. Prepare Investigation Plan

CCI will prepare a plan identifying all proposed investigatory work, site safety protocols and mitigation measures for impacted facilities in preparation for the field exploration program. Preparation will include two meetings with Project Team and two on-site meetings with PWB personnel to coordinate the field exploration work. The meetings will be used to coordinate public safety, public involvement, access, drilling plan, site mitigation, and environmental considerations.

Products: Draft and Final Investigation Plan

Subtask III.5.b Geotechnical Investigations

CCI will perform the following geotechnical investigations to develop the necessary information for the structural design of the reservoirs, yard piping and civil works.

Reservoir No. 5 Limits of Clayey Silt Subgrade. Boring CC-3 from the 2002 Phase II exploration program encountered soft to medium stiff, clayey silt near the proposed tank subgrade elevation. In addition, the original ground topography from 1909, prior to reservoir construction, indicated the presence of a spring approximately 100 feet west of CC-3, as well as an old swale dropping to the west.

To determine the presence or extent of clayey silt near the proposed subgrade elevation for the new tank(s), a Geo-Probe will be used to obtain a near-continuous core of soil sample. Ten to 12 probe holes will be performed. Reservoir No. 5 is currently covered with a Hypalon liner. It is anticipated that the exploration work will require the liner to be repaired following the drill program. It is assumed that the rig would be crane-lifted onto the reservoir floor.

Reservoir No. 6 Site Investigations. The proposed Reservoir No. 6 tank may be relocated to a more centralized position within the existing reservoir footprint. Previous geotechnical studies indicate that the subsurface materials in the southern portion of Reservoir No. 6 contain pockets of loose, foundation sand. If the tank is relocated, 3 exploratory borings in the southern half of Reservoir No. 6 will be done. These borings would be drilled using mud-rotary technique, with standard penetration tests at 2½-foot intervals to a maximum depth of 30 feet per boring.

Yard Piping and Vaults Investigations (to be completed once vault locations have been identified):

1. CCI will drill 2 exploratory borings along the proposed tunnel alignment (Segment 12B). Each boring would extend to a depth of 10 feet below the tunnel invert level.
2. Vault Between Reservoirs No. 5 and No. 6. CCI will drill and install a piezometer to 25 feet to monitor water levels in area.
3. CCI will drill shallow borings at 500-foot spacing along the major supply and distribution pipe into and out of the Mt. Tabor Reservoir Complex (Segments 5, 13, and 6). A total of 5 shallow borings (around 15 feet deep) will be completed. Based on the data collected, design recommendations would be provided for pipeline excavation, shoring, dewatering, bedding, and backfill.

Subtask III.5.c Geotechnical Basis of Design Report

A draft and final Geotechnical Basis of Design Report will be prepared summarizing the results of the field investigations and providing design criteria and construction recommendations as described below. As part of the development of the Basis of Design Report, CCI will attend two meetings with PWB to discuss geotechnical results. One meeting will be held as the draft report is submitted to review findings. A second meeting will be held prior to submittal of the final report to review PWB and Design Team comments and how they are incorporated.

Reservoir 5 General Geotechnical Design Issues. Provide geotechnical recommendations for various issues including: seismic ground motions; lateral earth pressures; backfill recommendations against the upstream face of the existing Reservoir No. 5 dam; site grading; temporary cut slope stability; and foundation recommendations incorporating results from reservoir floor explorations.

Reservoir 6 General Geotechnical Design Issues. Provide geotechnical recommendations for design issues including potential construction dewatering and long-term underdrain system, footing design, site grading, fill placement, lateral earth pressures, and review of proposed landscape changes on geotechnical loading.

Reservoir 6 Seismic Evaluation. Based on the results of the exploratory borings, the liquefaction potential of the underlying deposits will be evaluated. Related tasks would include gradation analyses and Atterberg limits laboratory testing, selection of appropriate bedrock acceleration time histories, evaluation of ground response to bedrock motions, and calculation of factor of safety against liquefaction. If the ground is potentially liquefiable, treatment options would be developed to mitigate this hazard. If ground is not potentially liquefiable, response spectra and linear elastic parameters would be provided for structural design.

Site Specific Seismic Design Criteria for Reservoirs 5 and 6. Develop response spectra for critical damping of 0.5, 2, 5, and 10 percent on a plot relating period, velocity, displacement, and acceleration, based on UBC-97 Seismic Zone 4. The period scale shall extend to 15 seconds.

Additional Specific Design Recommendations for Structures

1. Effects of surcharge load on lateral soil pressures on walls due to adjacent foundations and traffic (H20).
2. Passive soil pressures resisting lateral forces. Indicate ultimate value or allowable (working) value with assumed safety factor.
3. Friction value between soil and footings. Indicate ultimate value or allowable (working) value with assumed safety factor.
4. General foundation recommendations:
 - a. Minimum plan dimensions for wall and spread footings.
 - b. Depth of embedment below finished grade.
 - c. Special conditions such as change in soil conditions across a structure, large differences in foundation elevations (need for stepped footings), etc.
5. Unit weight of compacted backfill.
6. Foundation treatment recommendations for soft or liquefiable soils measures.

Vaults. Provide design recommendations for excavation, temporary shoring, construction dewatering, foundation support, lateral earth pressures, and resistance to uplift at up to three valve vault locations. (It is assumed that sufficient geotechnical data exists from previous drilling work for all vault locations and that if no data exists for a specific location, one or more of the pipeline borings will be used to provide information.)

Recommendations for Pipeline Design Considerations:

- Trench shoring.
- Temporary excavation slopes.
- Pipe bedding and pipe zone backfill; materials and compaction.
- Trench backfill; materials and compaction.
- Settlements necessary for the calculation of the settlement ratio, as defined in ASCE Manual 37, for pipelines placed in embankment conditions.
- Recommended pipe support through unstable soil areas.

- Friction value between soil and pipe, as means to mitigate thrust forces.
- Passive soil lateral bearing values for thrust blocks.

Recommendations for Pavement Design Considerations:

- California Bearing Ratio, or other suitable pavement design parameters.
- Pavement section recommendations.

Products: Draft Geotechnical Basis of Design Report, including boring logs and figures.

TASK III.6 STRUCTURAL

Subtask III.6.a Structural Design Recommendations Technical Memoranda

Under this task, MWH will prepare preliminary design Technical Memoranda that will establish the criteria for the remainder of detailed design. TMs will consist of the following:

- Reservoir Construction Type (circular prestressed vs. cast-in-place)
- Concrete Mix Design
- Structural and Seismic Design Criteria
- Backfill Design
- Reservoir 5 Size Optimization (Footprint, Depth, Overflow Elevation)
- Reservoir 5 Foundation Alternatives Analysis and Recommendation
- Reservoir 6 Foundation Alternatives and Recommendation
- Reservoir 5 Cover Loading Alternatives Analysis
- Reservoir 6 Cover Loading Alternatives Analysis
- Reservoir 5 Appurtenances and Access Layouts (coatings/linings, underdrains, hatches, overflow, drain, valves, inlet, outlet)
- Reservoir 6 Appurtenances and Access Layouts (coatings/linings, underdrains, hatches, overflow, drain, valves, inlet, outlet)
- Overflow facility design recommendation (May be delayed until Park Design is sufficiently developed)
- Impact and Mitigation Plan to Protect Existing Structures and Facilities (fence, parapet wall).

Subtask III.6.b Technical Support on Tank Style

MWH will provide technical support as needed to support the tank style decision. This will include preparation of a technical response of up to three inquiries and attendance at one meeting with PWB and one City Council meeting if required.

Subtask III.6.c Structural Design Workshops

MWH will hold up to 4 structural design workshops during the preliminary design phase to present recommendations of Subtask III.6.a technical memoranda and to review comments and responses to draft submittals.

Subtask III.6.d Seismic Review of Existing Facilities

Most of the buildings associated with the reservoirs are close to or over 100 years of age. MWH's seismic consultant will conduct a seismic inspection of each of the six buildings located in the Park including the three that will remain in service as part of the water system and the three that will be abandoned from the water system. The review will conform to procedures outlined in the FEMA 310 Handbook per City seismic design ordinance (PCC Chapter 24) for the above ground portions of the buildings and the current 1997 UBC for the below ground portions of the buildings. The review will identify needed improvements and additional investigatory work needed to identify additional improvements. It is assumed that PWB will provide full-size "as-built" structural drawings of each of the buildings. It is further assumed that completion of this work will require two meetings with PWB staff and four days of on-site inspection work.

Products: Draft Technical Memoranda for each item in Subtask III.6.a, III.6.b (as required) and II.6.d.

TASK III.7 COMPUTATIONAL FLUID DYNAMIC (CFD) ANALYSIS

Flow Science will prepare a CFD model of three inlet and outlet piping configurations and make recommendations on the optimum design to minimize short-circuiting and areas of stagnation. The following tasks will be completed:

- Discuss inlet/outlet locations and geometry for each reservoir. Identify a base reservoir design.
- Set-up three-dimensional CFD grid for simulating the flow in each reservoir. Establish, in conjunction with PWB, a flow scenario (inflow/outflow rates and duration) and water surface elevation for the modeling.
- Perform CFD analysis for base case as determined by design drawings. The simulation will be performed for a single flow scenario as defined in bullet 1 above.
- Perform CFD analysis for two additional cases that include different inflow/outflow geometries and rates and water surface elevations.
- Provide detailed report describing methods of analysis and results, including color pictures and movies depicting the motion of a conservative tracer in the reservoir, water age, and streamlines.

Product: Draft Technical Memorandum and CD of test results.

TASK III.8 YARD PIPING

Subtask III.8.a Yard Piping Preliminary Design Memorandum

A preliminary design memorandum for the yard piping work will be prepared. The yard piping preliminary design will build on the previous work completed in Phase I and will include the following information:

- Summary of previous work
- Yard piping design criteria
- Recommended pipe design for all new piping including pipe material, pressure class, wall thickness, pipe joints.
- Recommended piping plan including pipe size, and location of all valves, vaults, and meters.
- Identification of all automated valves.
- Recommended tunneling method (if included in design).
- Operational analysis identifying construction phasing required to maintain water supply during construction.
- Cost estimates of piping alternatives and recommended piping configuration
- Recommended Cathodic Protection including sections of pipe to be isolated and protected, method of protection including cathodic protection and lining and coatings.
- Pipe condition analysis (to be prepared by PWB and presented at a decision workshop) identifying all additional piping segments that should be replaced as part of the Mt. Tabor Reservoir Replacement Project.

It is assumed that a yard piping sub-committee will be formed which will include members of MWH's yard piping design team and four members of the PWB representing project management, hydraulic modeling, operations and pipeline engineering. The sub-committee will meet bi-weekly during development of the design memorandum (8 total meetings). It is assumed that PWB will be responsible for communicating information internally to the broader stakeholder group between bi-weekly meetings.

Subtask II.8.b Yard Piping Workshops

The MWH consultant staff will attend up to three yard piping workshops with the PWB during the preliminary design phase to present recommendations of technical memorandum and to review comments and responses to the draft submittal. It is assumed that the workshops will be attended by the entire PWB stakeholder group.

Products: Draft Technical Memorandum (Cathodic Protection and Pipe Condition sections to be provided by PWB).

TASK III.9 SITE CIVIL

The general civil work for this project focuses primarily on the road design and stormwater management requirements. For the preliminary design, the following technical memoranda will be produced:

- Preliminary Road Design Technical Memorandum summarizing the geotechnical information and recommended road cross sections and alignments for the haul routes and park roads impacted by pipe installation or other construction activities. It is assumed that final design of a new park entrance will be done by others. Road design criteria will be based on City standards with input from both PWB and PPR.

- Preliminary Stormwater Management Design Memorandum summarizing the stormwater requirements to meet City standards, alternatives analysis of various options, and a recommended alternative. It is assumed that stormwater management will be provided for all new permanent or rehabilitated roads added as part of this project but does not include stormwater requirements for any park development above the buried tanks. The stormwater requirements for park development will be addressed separately by the Park Design Consultant. It is assumed that the City will provide as-built drawings of all existing stormwater collection and conveyance facilities at the site.

Products: Draft Road Design Technical Memorandum
Draft Stormwater Management Technical Memorandum

TASK III.10 LANDSCAPE ARCHITECTURE

Landscape architecture work at the site will focus primarily on site mitigation of areas impacted by construction. It is assumed that the Park Design Consultant will provide all other landscape design services. During preliminary design, MWH's consultant will provide a technical memorandum summarizing the following issues:

- Site analysis for construction abatement (e.g. visitor park access and parking, visual screening, etc.)
- Preliminary mitigation planting plans
- Temporary trail systems plan
- Preliminary tree protection plan
- Permit requirements for landscape activities

In completing this task, it is assumed that PPR and PWB will conduct a 4 hour long site tour to identify desired mitigation measures. It is also assumed that the Landscape Architect will attend up to three meetings with PWB and PPR to discuss alternatives and three public meetings to identify public issues concerning park use, present alternatives, and present final recommendations.

Product: Draft Technical Memorandum

TASK III.11 ELECTRICAL/INSTRUMENTATION AND CONTROLS (E&IC)

MWH will identify the E & IC needs of the project including a summary of power requirements, list of equipment and instruments, and all demolition and relocation requirements. The needs will be summarized in a technical memorandum. The memo will also coordinate all the electrical and instrumentation needs identified in the Site Security Technical Memorandum. It is anticipated that MWH will hold three meetings with PWB staff to identify all E&IC elements of the project and establish all standards for design. It is assumed that one of these meetings will be held on-site to identify all key facilities impacted by the project. It is assumed that PWB will provide all as-built drawings of electrical and instrumentation facilities at the Mt. Tabor site.

Product: Draft Technical Memorandum

TASK III.12 HISTORICAL ARCHITECTURE

The historical architect will prepare a memorandum identifying recommended improvements to each of the six buildings on site (Reservoir 5 Gatehouse and Weir Building, Reservoir 6 Inlet and Outlet Gatehouses, and the Reservoir 1 Gatehouse and Screenhouse), to return the facilities to their original historic design. The recommendations will consider the functional and security needs of the Water Bureau. It is assumed that only the building exteriors will be modified and that the interiors will remain in their existing condition. The technical memorandum will also include recommendations for temporary storage and preservation of other historical facilities such as the parapet wall and fencing that will be impacted during construction and replaced upon completion. It is assumed that any historical preservation related to buildings that will not remain in operation by the Bureau will be done by others. It is assumed that preparation of the memo will require attendance at four meetings with PWB and PPR staff to discuss alternatives and recommendations, participation in one presentation to the City Landmark's Commission and one meeting with SHPO.

Product: Draft Technical Memorandum

TASK III.13 INTERPRETIVE DISPLAYS

Interpretive displays will be designed and constructed to provide educational material to the public on the history of the water supply, the Mt. Tabor site, and on modern construction techniques of the new reservoirs and piping. MWH's consultant will prepare concept plans for up to three interpretive display locations in Mt. Tabor Park. The concept plans will include general layouts of the display stations, the key themes of the interpretive display experience, text concepts for each station, and general graphical layouts. It is assumed that the consultant team will attend up to three meetings with PWB and PPR and three public meetings/workshops to develop desired concepts for interpretive displays.

Product: Draft Conceptual Design Memorandum

TASK III.14 SITE DEMOLITION

MWH will prepare a memorandum identifying all of the facilities that will require demolition during construction. This memorandum will focus primarily on the following: existing piping and vaults that will be removed as part of the project, relocation of existing facilities (e.g. electrical equipment), pipe decommissioning, and facilities associated directly with the reservoirs (interior concrete slabs, parapet walls, equipment inside gatehouses, etc.). It is assumed that PWB staff will conduct about a four hour tour of the site to identify all facilities that will no longer be required to be in service and those facilities that must be relocated as part of the project.

Product: Draft Technical Memorandum

TASK III.15 COST ESTIMATE AND CONSTRUCTION SCHEDULE

MWH will prepare a construction cost estimate and anticipated construction schedule based on recommendations of the Preliminary Design tasks. The cost estimate will be prepared in construction format (materials, labor, etc.) and the schedule will be prepared in MS Project (software). The cost and schedule will be used as a baseline for the VE Study.

Product: Draft Cost Estimate and Construction Schedule

TASK III.16 PREPARE FINAL PREDESIGN REPORT

MWH will compile all technical memoranda prepared as part of the Preliminary Design Element into a final Predesign Report. All comments on the draft TMs will be incorporated into the final versions, which will be included in the Final Predesign Report.

Product: Three-Ring notebook compilation of Final Technical Memoranda (5 hard copies to PWB; two PDF CDs)

TASK III.17 VALUE ENGINEERING SESSION

A VE Session will be conducted following completion of the Preliminary Design. It is anticipated that the VE Session will be over a five day period and will include the following discipline specialties:

- Structural engineering
- Water System Operations Specialist
- Pipeline design
- Geotechnical
- Parks design/Landscape architect
- Cost estimating
- Contractor/Constructability specialist
- PWB staff (not directly involved in project)
- PPR staff (both design and operations)

Subtask III.17.a VE Team Members

VE Consultant will work with PWB to identify appropriate VE team member disciplines and coordinate approval with PWB of actual team members. VE Consultant will be responsible for compensating all VE team members that are not employed by the City. All other VE team members will be provided by the City, at no cost to VE Consultant. VE Consultant will communicate directly with all team members relative to scheduling, pre-workshop, workshop and post workshop activities.

Subtask III.17.b Pre-Workshop Activities

VE Consultant will perform pre-workshop activities to include those tasks which must be accomplished in order for the VE team to be able to efficiently and effectively perform in the workshop. These activities will consist of:

- scheduling study tasks
- scheduling and coordination with VE team members
- coordination of the necessary project documentation on the project for distribution to the VE team members

All VE team members except the cost estimator are to spend four hours reviewing the project documents and materials prior to the start of the workshop. The cost estimator will spend 12 hours reviewing the documents and validating the cost estimate.

Subtask III.17.c VE Workshop

VE consultant will conduct a 40-hour value engineering workshop using a job plan that is consistent with the practices and procedures recognized by SAVE International. The workshop will include an Information Phase, a Function Analysis Phase, a Creative Phase, a Judgment Phase, a Development Phase, and a Presentation Phase. A site visit for the VE team members will be conducted on the first day of the VE workshop.

The workshop will be initiated by presentations from PWB and MWH who will describe the objectives of the project and any constraints that will be placed on the VE study. The project design team will explain specifically how the design accomplishes PWB's objectives and the details of that design. The workshop will include a complete function analysis of the major project elements. The team will generate a list of ideas for project improvement followed by an evaluation of those ideas. This evaluation will include input from key PWB decision makers and design team discipline leads before proceeding with development of recommendations. On the last day of the workshop, a presentation of the recommendations will be provided to PWB and the design team.

The workshop will be held at a location to be provided by PWB in Portland, OR. The cost of meeting facilities, including telephone, photocopying, and faxing will be borne by PWB while all other operating expenses will be borne by MWH.

To make sure the VE team has complete information about the project criteria, the City will provide at a minimum, the PWB and Design Team Project Managers and appropriate key members of the project team for the first day and last day presentations as well as the mid-point review meeting.

Subtask III.17.d Post VE Session Workshop

VE Consultant will conduct a four-hour post-workshop VE Implementation Meeting at a location in the Portland, OR area following receipt by the VE team leader of the written designer responses to the Preliminary VE Report. The purpose of this Implementation Meeting is to assist PWB in making decisions regarding acceptance or rejection of the individual VE recommendations. Attendees will consist of key PWB, key design team staff and the VE team leader.

Subtask III.17.e VE Support

- MWH will be responsible for preparing the project documents and materials to be distributed to all VE Team Members prior to the session. The packets will be delivered at least one week prior to the VE start date.
- MWH and key subconsultants will make a presentation to the VE team and attend the mid-point and post-session meeting to review recommendations.
- MWH will prepare a written response to the VE recommendations identifying position on recommended changes and hold workshop with PWB to review response.
- MWH will attend a follow-up meeting with the VE team leader to review recommendations.

Products: This VE study effort will include the following deliverables, all of which are related to the results of the workshop.

VE Consultant:

- Preliminary VE Study Report - This report will be prepared in the VE Consultant's report format, and will be a compilation of the handwritten products developed in the workshop (3 hard copies).
- Draft of the Final VE Study Report - The purpose of this draft report is to give PWB and other appropriate reviewers the opportunity to check the final VE Study Report prior to its final issuance (5 hard copies).
- Final VE Study Report - The Final VE Study Report is the final documentation of the VE study. The report is a finalized version of the Draft Report including the incorporation of PWB's and MWH's comments. The submittal of the final report concludes the VE study effort (10 hard copies).

MWH:

- VE Team Presentation Handout – Package of materials to be reviewed during the VE session including clear direction on areas of focus (12 copies to VE Leader – 3 copies to PWB).
- Written response to Preliminary VE Study Report

ELEMENT RESPONSIBILITIES OF PWB:

- Compile all internal comments and resolve all conflicting comments on Draft Technical Memorandum prior to submittal to MWH. PWB will provide review comments on draft memorandum within 3 weeks of receipt

- As-built drawings for existing underground utilities and above ground facilities including drain lines that may be impacted during exploratory drilling.
- CADD standards, seed file and border file
- Potholing services to determine pipe locations where all new pipe will tie to existing pipe and where there is limited information where new and existing piping will cross
- Conditions analysis of piping identified for re-use in Phase I Piping Alternatives Analysis.
- Cathodic protection preliminary design information (to be included in yard piping preliminary design memo)
- Coordinate activities for the VE Session as identified previously
- Hypalon repair as a result of damage incurred during geoprobe drilling
- On-site oversight during geotechnical exploratory work
- All public and other required notification for on-site preliminary work such as surveying, geotechnical drilling, and site visits
- Photocopying of additional copies beyond what is identified

ELEMENT IV DETAILED DESIGN

The project design will be a fully integrated multi-disciplinary effort including civil, structural, architectural, landscape, electrical and instrumentation work. The design will incorporate all applicable codes and regulations of governing agencies.

The construction drawings will be prepared on D sized sheets (22 inches by 34 inches). All drawing text fonts and details will be drawn at a scale that is legible if the drawings are reduced to one-half size (11 inches by 17 inches). Microstation, Version J, will be used to produce the construction drawings in an electronic format.

The project design will undergo the review and checking procedure described in the Project Management Plan. The detailed design will include the following project components:

- Structural and Civil design of new buried Reservoir 5 and associated appurtenances (ladders, drains, underdrains, inlet/outlet piping)
- Structural and Civil design of new buried Reservoir 6 and associated appurtenances (hatches, overflow, etc.)
- Civil design of all yard piping modifications
- Civil and structural design of all vaults (valves, meters, etc.) associated with yard piping
- Civil design of temporary haul roads and final design of roads impacted by pipe installation or other construction
- Demolition drawings of existing yard piping, vaults and associated appurtenances
- Stormwater management design for impervious areas created by new roads and other project elements
- Landscape mitigation of impacted areas
- Interpretive displays
- Architectural design to restore exterior of Reservoir 5 Gatehouse and Weir Building and Reservoir 6 Inlet Gatehouse to their original design
- Electrical design to meet needs of PWB facilities added as part of the project (e.g. valves, meters, vault lights and ventilation, instruments)
- Instrumentation and control design of all new site instruments including all transmitting devices
- Civil, Electrical and Instrumentation design of all site security improvements
- Design services for demolition and potential relocation of existing electrical and instrumentation equipment located in the three buildings to be abandoned from the water system
- Demolition plan for abandoned facilities that are not included in historical preservation or park development plan (e.g. abandoned meter buildings, exposed valve vaults, infill of abandoned piping, etc.)
- Permitting support (SHPO, erosion control, building, plumbing, etc.)
- Traffic Control Plan

It is assumed that the following elements are contained in the Park Design Scope of Work and are excluded from this scope of work:

- Design of all above ground park development including parapet walls, sidewalks, new park trails, etc.
- Design modifications to all historic buildings that will no longer be a part of the operation of the water system
- Design details of exposed PWB facilities that require enhancement for park integration. For example, hatches converted to checker boards, ornate vents, etc.
- Architectural design of exposed areas of partially buried vaults
- Site grading and paving plans for area above buried tanks including access roads to hatches.
- Site stormwater design of area above buried tanks
- Final design of new park entrance road along SE Division (if constructed)
- Overflow structure if landscaped feature or other park amenity is selected for design
- Electrical and instrumentation design for facilities in Park design (perimeter lighting, recirculation pumps, filtration system, etc.)
- Permanent interpretive displays or park signage

TASK IV.1 COORDINATION WITH PARK DESIGN

MWH will continue to coordinate design of the below ground structures with the Park design team throughout the design phase of the project. It is anticipated that MWH will attend up to 6 meetings with the Park Design team during the detailed design phase to coordinate various components of design including distribution of dead and live loads, location and design of appurtenances, and location and design of buried or partially buried vaults. The budget estimate assumes that a reasonable level of redesign will be required to accommodate the needs of the park development.

TASK IV.2 SECURITY DESIGN REVIEW

The security consultant will provide review of 50% and 90% drawings and specifications for conformance with security recommendations developed in Preliminary Design Phase. Written comments will be provided to design team and PWB.

TASK IV.3 TRAFFIC CONTROL PLAN & PLANS AND SPECIFICATIONS

MWH's traffic consultant will develop a traffic control plan for inclusion in the project specifications based on input from PWB, CM/GC, PDOT, Parks, and local residents/businesses. Traffic control plan will focus on the SE Division Street/SE 64th Avenue. The traffic consultant will prepare 50, 90 and 100% plans and specifications reflecting improvements needed to implement the traffic control plan.

TASK IV.4 GEOTECHNICAL DESIGN SUPPORT

Provide geotechnical support to the design team as requested including review of plans and specifications related to excavation and shoring, control of subsurface water, foundation support, fill and backfill material, and tunneling.

TASK IV.5 STRUCTURAL DESIGN (AND ASSOCIATED APPURTENANCES)

Prepare detailed design drawings and specifications for the design of one, 45 to 50 MG dual cell conventionally reinforced concrete tank and one, 20 MG single or dual cell conventionally reinforced concrete tank. Each tank will include the following components:

- water proofing
- hatches
- vents
- underdrains with observation manholes
- inlet/outlet piping w/ valve vaults if required
- drain piping and sump
- overflow weir and overflow piping
- washdown piping
- sampling ports and sample pumps
- level sensors
- staff gauges

MWH will also provide structural design of up to three conventionally reinforced buried or partially buried vaults for electric valves, meters, or other piping accessories as required in the recommended yard piping plan.

Optional Services (Not included in budget):

1. MWH will provide structural and civil design services for a new buried overflow structure. It is assumed that the basin will be approximately 3 MG and will be constructed of conventionally reinforced concrete. The tank will be designed with the same accessories as mentioned above.
2. MWH will provide structural design services for structural and seismic upgrades to the three existing buildings that will remain in service by the PWB. These buildings include the Reservoir 5 Gatehouse and Weir Buildings and the Reservoir 6 Inlet Gatehouse.

TASK IV.6 CIVIL AND YARD PIPING

Provide final design and specifications of the yard piping and site civil work. It is assumed that the piping to be replaced is approximately similar to that shown in the Recommended Yard Piping Plan developed in the previous phase. Further, it is assumed that all drainage, grading and site development associated with the above ground park development will be done by others.

- Prepare Civil Drawings, including standard details, special details, piping plans, piping profiles, valve vault layouts, temporary access and fencing plans, and final paving, grading and drainage.
- Prepare demolition plan of vaults and yard piping to be abandoned with the new yard piping configuration.
- Prepare Technical Specifications for the piping and civil construction using PWB standards and based on recent PWB large piping projects.

- Prepare Tunnel Design and Specifications – Prepare design drawings and specifications for a trenchless conduit to Reservoir 5, (microtunnel or other appropriate technology), assuming 60-inch diameter casing and 400-foot length approximately.

Optional Design Tasks (Not included in budget)

- Cathodic Protection Design
- Design of additional piping requiring replacement based on the piping conditions analysis completed by the PWB.

TASK IV.7 HISTORICAL ARCHITECTURE

Provide detailed drawings and specifications for the restoration of the three buildings that will remain as part of the PWB system. These three buildings include the Reservoir 5 gatehouse, Reservoir 5 Weir Building and the Reservoir 6 Inlet Gatehouse. It is assumed that the drawings will focus exclusively on the exterior elevations and that no internal restoration will be done as part of this project. It is assumed that preparation of the drawings and specifications will require attendance at four meetings with PWB and PPR staff to discuss alternatives and recommendations, participation in one presentation to the City Landmark’s Commission and one meeting with SHPO. These drawings will also be used to obtain required City permits for modification to a historical resource.

TASK IV.8 LANDSCAPE ARCHITECTURE

Provide landscape drawings and specifications for the following items:

- Construction abatement plans
- Tree protection plan
- Trail layout and grading plans
- Mitigation planting plans
- Temporary irrigation plans
- Landscape details
- Site sign plan

It is assumed that the landscape architect will attend up to four meetings with PWB and PPR in developing the plans and specifications. The tree protection plan will include both general site requirements (e.g. along roadways, etc.) as well as specific protection plans for the two heritage trees in the park (linden and giant sequoia).

TASK IV.9 INTERPRETIVE DISPLAYS

Prepare drawings and specifications for the construction of up to three interpretive display stations. Prepare specifications for panel layouts including, materials, methods of construction, and all text and graphics. It is assumed that preparation of the panels will require up to 6 meetings with Project Team to discuss desired text, and review draft and final panel layout alternatives. It is further assumed that at least one of these panels will be modified approximately every 6 months as construction progresses.

TASK IV.10 ELECTRICAL AND I&C

MWH will provide detailed design drawings and specifications for the electrical and instrumentation and control components of the project. All control systems will comply and be incorporated into the PWB's existing SCADA system. It is assumed that all electrical and I&C components of the park development design will be done by others. Tasks to be completed include:

- Demolition and relocation plans as needed of all electrical, instrumentation, conduits, and remote transmitting units (RTU) equipment located in the buildings to be abandoned by PWB.
- Electrical Site Plan for all new and relocated equipment
- Single Line Drawings
- Electrical Control Diagram
- Electrical Panel Schedule

TASK IV.11 PERMITTING

This section identifies the tasks that will be needed to gain permit approval for the project. For all permits, it is assumed that PWB will be responsible for completing the permit application forms and paying all permit application fees. MWH will provide the supplemental information required in the permit application (e.g. text, drawings, etc.) per the respective City, State or Federal Code.

Subtask IV.11.a Permitting Strategy

MWH will attend permitting strategy meetings with City staff as necessary to establish direction on the permitting process. Specific areas of strategy discussions will include the FERC (includes SHPO and NEPA requirements), Land Use and City Historic Resource permitting processes. MWH will prepare meeting minutes as required. It is assumed that MWH will attend up to 24 meetings with City agency staff.

Subtask IV.11.b City of Portland, Environmental Review

MWH will prepare a Type II Environmental Review application required for construction in the environmental zones in Mt. Tabor Park. It is assumed that the review will specifically address the following construction impacts in the "c" overlay: 1) adjustment of the existing roadway near the Reservoir 1 Screenhouse to accommodate truck traffic, 2) potential addition of turnouts along the roadway, and 3) construction of a section of 48-inch pipeline in an existing roadway.

Subtask IV.11.c City of Portland, Land Use Review

MWH will provide information to PPR related to the underground tank structures and associated work as required for any Conditional Use permit for development in the Open Space zone. It is assumed that PPR will take the lead on the conditional use permit if triggered by the selected park design.

Subtask IV.11.d City of Portland, Historic Review

MWH will provide support to PWB in preparing the applications required to comply with Chapter 33.846 of the City Code regarding Historic Review. It is assumed that the Mt. Tabor Reservoir Project will constitute a “Major Alteration” to a National Resgistered Building and as such, the project will require Historic Design Review under a Type III process.

- The consultant and the Historic Architect shall attend the required neighborhood association meeting to present the proposed modifications.
- The consultant shall prepare the application for Historic Review as outlined in Chapter 33.846.060.G “Approval Criteria Based on the Standards of the Secretary of the Interior”.
- The consultant shall attend the Review hearing before the City’s Landmark’s Commission
- The consultant shall attend one meeting before City Council.

Subtask IV.11.e City of Portland General Permits

MWH will provide the necessary technical documents to support the following City of Portland permit application submittals.

- Erosion Control
- Building (includes plumbing, electrical)
- Stormwater (Detention & TSS Removal)
- Tree Protection and Removal
- Grading

It is assumed that any permitting requirements for Scenic Resource Protection will be done under the Park Design project.

Subtask IV.11.f State Historical Preservation Office (SHPO), Section 106 Permit Support

MWH’s Historical Architect will provide specialty support for the following efforts required to complete the SHPO Section 106 process and prepare the Memorandum of Agreement (MOA):

- Research of extant data and review of adequacy bibliography including historical context development of nation-wide open reservoir systems and status.
- Review Section 106 documentation and coordination process with SHPO.
- Refinement and definition of contributing and non-contributing historic properties in National Register Nomination and area of potential impact (APE) with Nation Register boundaries with City of Portland.
- Participate in park development public involvement program to provide information on the impact of various alternatives on historic resources at the site as required by the Section 106 process.
- Determination of effect and resolution of adverse effects coordination
- Coordination of MOA with SHPO and effected parties.
- Document and negotiate Draft and Final MOA.

- Prepare recordation of the site as required under the MOA. The level of recordation will be based on the National Park Service's HABS/HAER/HALS standards for Section 106 compliance and the level of property significance and the level of the undertaking. This will include, but not be limited to: drawings, elevations, sections, details as appropriate and large format black and white archival photography and, color slides.
- Post-review coordination and documentation during Mt. Tabor Buried Reservoirs construction.
- Coordination and production of Programmatic Agreement / Historic Property Maintenance Plan (PA/HPMP)
- Closure to Section 106 process and Final Summary Report to City of Portland

Subtask IV.11.g Federal Energy and Regulatory Commission (FERC) Amendment to Exemption

MWH will prepare a draft and final FERC Amendment to the existing Exemption. The Amendment will include preparation of Exhibits A, B, E and G. It is assumed that Exhibit E of the final Amendment will meet the requirements of an Environmental Assessment (EA) and will comply with NEPA requirements. It is assumed that information required in Exhibit E can be obtained from existing documents or documents that will be prepared as part of other scope tasks and that no significant additional field work such as wildlife habitat studies will be needed to complete Exhibit E.

Subtask IV.11.h NPDES Stormwater and Erosion Control Permit for Construction Activities (Administered through DEQ)

Construction in Mt. Tabor Park will require meeting all federal erosion control standards including approval of an NPDES permit. Under this task, the Project Team will complete the following tasks:

- Prepare Erosion Control Plans in accordance with DEQ Standards.
- Prepare Erosion hydrology report as required by DEQ
- Prepare DEQ 1200C Permit
- Prepare Erosion Control specifications for inclusion in design documents

Subtask IV.11.i Oregon Health Division

MWH will submit the Preliminary Design report and 90% Design Drawing sets to OHD for review and approval. All supplemental information required for the permit will be included in the submittal.

TASK IV.12 DESIGN PHASE SUBMITTALS

The design team will prepare 50%, 50% GMP, 90% and 100% drawing sets. The 50% drawings and specification will incorporate VE comments from the preliminary design report and the 50% GMP documents will include updated drawings and specifications incorporating CM/GC comments to the initial 50% submittal. Each submittal will include a progress set of drawings,

specifications, and calculations. It is assumed that the CM/GC will be responsible for maintaining the updated schedule and cost estimate for the 90% and 100% submittals.

TASK IV.13 EARLY BID PACKAGE PREPARATION

The design team will prepare up to four early bid packages for the CM/GC prior to completion of the 100% design documents. Once the 100% documents are complete, it is assumed that the CM/GC will be responsible for all additional bid package preparation. The four early bid packages will likely include the following:

- 1) Construction Access and associated civil work;
- 2) Pipe and Accessory Procurement,
- 3) Phase I Pipe; and
- 4) Demolition.

TASK IV.14 DESIGN PHASE WORKSHOPS

It is anticipated that up to 12 design workshops will be held with the design team and PWB and PPB staff during the period of detailed design. Workshops will be held on individual design topics including pipeline construction sequencing, park mitigation, historical restoration, reservoir accessories, etc.

ELEMENT PRODUCTS:

Element Responsibilities of Consultant: MWH will be responsible for providing 15 copies of half-size bound drawings and specifications of the items listed below. PWB will be responsible for additional reproduction printing if required. All drawings provided to PWB shall be done in MicroStation J (Version 7). Electronic files shall be supplied to PWB on CD.

- 50% design submittal
- 50% GMP design submittal
- 90% design submittal
- 100% design submittal (plus one camera ready half-size and full-size drawing set)
- Final Design notebook including all design assumptions and calculations. Submittal shall also include a written checklist on how PWB and CM/GC contractor comments were included or addressed in the design.
- Early Bid Package for: 1) Construction Access and associated civil work; 2) Pipe and Accessory Procurement, 3) Phase I Pipe; and 4) Demolition
- Information and Design packages for permit application submittals
- Minutes for all meetings

Element Responsibilities of PWB:

- One copy of the City of Portland's Standard Specifications
- Two CADD files containing standard construction drawings, legend (with symbols) and general notes in a MicroStation format.
- Copies of the City's street and utility maps as needed.

- Written comments 3 weeks after receipt of 50% and 90% design submittals in the designated comments format.
- Provide all available as-built drawings of the site to identify existing utilities, structures and encroachments.
- Provide additional pothole information at all connections to existing pipes as needed.
- Provide yard piping corrosion design and design details.
- All public notification required for any on-site investigatory work required during the detailed design phase.

ELEMENT V BID PHASE SERVICES

The needed Bid Phase services will depend in part on the structure of the contract with the CM/GC, the number of bid packages and the schedule of the bidding. For the purposes of this scope of work, MWH will provide complete bid phase services as described in the tasks below for up to six major bid packages. It is assumed that the other bid packages will be managed by the CM/GC.

Subtask V.1 Attend Pre-Bid Conference with Prospective Bidders

The MWH Project Manager and key subconsultant(s) shall attend up to six Pre-Bid Meetings with prospective bidders. It is assumed that each pre-bid meeting will last 4 hours and include a site walkthrough.

Subtask V.2 Respond to Bidder's Questions and Inquiries

Receive inquiries from PWB when assistance is needed to respond to bidders' technical questions. It is assumed that we will receive 10 bidder questions per bid package, each requiring 3 hours to address.

Products: Written response to bidder questions

Subtask V.3 Prepare Addenda

Prepare responses to bidders' questions, including any required sketches or updated drawings, to address questions and inquiries received. Submit to PWB for inclusion in Addenda issuances. It is assumed that two addenda will be issued with each bid package.

Products: Written text and drawings as required for 12 addendum packages

Subtask V.4 Review of Bids

Review bids as received and provide PWB with a summary of bidders' irregularities (if any). Review Contractor references and experiences, and discuss with PWB. Provide PWB with a Bid Evaluation Summary. Assist PWB with review of selected Contractor's required submittals prior to award of the construction contract, if requested.

Products: Bid Evaluation Summaries

Subtask V.5 Conformed Plans

Provide PWB with five half-size, five full-size, and one Microstation and .pdf version CD of the Master Plans and Specifications conformed with addenda after each major bid phase.

Products: Seven sets of Conformed Plans (Conformed Plans of six Individual Bid Packages + Conformed Plans following final bid and award)

ELEMENT VI ENGINEERING SERVICES DURING CONSTRUCTION

The objective of this element is to provide engineering services during construction of the Mt. Tabor Reservoir Replacement Project. This scope of work assumes that construction management services will be provided by the selected CM/GC and that the consultant's responsibilities focus on field and office engineering support. As such, all submittals, RFIs, Design Clarifications, schedules, change orders, etc. will be administered by PWB and the CM/GC. It is assumed that the total construction period will extend 36 months and that all services will pertain exclusively to the design elements defined in this scope of work. All construction phase services for park development shall be done by others.

TASK VI.1 ATTEND BI-WEEKLY PROJECT MEETING

The MWH Project Manager will attend bi-weekly on-site project meetings. It is assumed that the CM/GC will be responsible for preparation of all meeting minutes.

TASK VI.2 ON-SITE ENGINEERING SERVICES

MWH will provide a field engineer that will remain on-site for the duration of construction of the reservoirs and associated facilities. The engineer will provide technical support to PWB and the CM/GC and manage all engineering services during construction. It is assumed that typical construction management services will be performed by others. The field engineer will be responsible for the following field engineering services tasks:

- Attend Pre-construction conferences (hosted by CM/GC)
- Attend on-site project meetings
- Review Monthly Progress Reports, Progress Payments and Schedule Updates
- Review certified payrolls
- Prepare daily inspection reports
- Respond to Requests for Information
- Prepare Design Clarifications
- Review shop drawing submittals
- Review change orders
- Provide technical advice to PWB and CM as requested
- Coordinate Punch List development
- Review start-up plans and support PWB and CM/GC in start-up of facilities
- Review construction schedule

It is assumed that the field engineer will be on site full-time for a maximum of 3 years. It is assumed that all field administrative services (copying, mailing, etc.), field office space and supplies, etc. will be provided by the CM/GC or PWB.

TASK VI.3 ROUTINE AND SPECIALTY DISCIPLINE SITE VISITS:

MWH will visit the site depending on work type and progress to ensure that work is progressing as designed. It is assumed that visits will occur at least weekly and will require 2 to 4 hours of site investigation. Additional specialty site visits include:

- Bi-weekly Structural Inspections as required under UBC Section 1702 – Structural Observation.
- Geotechnical inspection during excavation to verify that soils conditions are similar to the expected conditions identified in the Geotechnical Basis of Design Report. Additional geotechnical site visits as needed.

Products: Notes of site visits with signed engineer’s stamp

TASK VI.4 REQUEST FOR INFORMATION AND DESIGN CLARIFICATION PREPARATION

Respond to CM/GC’s Requests for Information and issue Design Clarifications including preparation of elementary sketches to revised electronic drawings as appropriate. The proposed budget assumes response to up to 200 RFIs and preparation of 100 Design Clarifications

Products: Response to RFIs and preparation of Design Clarifications for submittal to CM/GC.

TASK VI.5 REVIEW SHOP DRAWINGS & SUBMITTALS

Review submittals for substantial conformity with the intent of the contract drawings and specifications. Evaluate substitutions and “or equals” proposed by the CM/GC during construction. It is assumed that MWH will be requested to review up to 200 submittals each requiring approximately 2 hours of review time.

Products: 1 copy of submittals with review comments written directly on submittal

TASK VI.6 CHANGE ORDER SUPPORT

The design team shall provide support to PWB and the CM/GC as needed in the form of change order review and independent cost estimating services. It is assumed that MWH will be requested to review up to 25 change orders.

Products: Cost estimates and written comments for up to 25 change orders

TASK VI.7 SPECIALTY INSPECTION

PSI will be responsible for providing all on-site specialty inspection requirements to meet governing City, State and Federal Building codes. Testing will include but not be limited to rebar inspection, concrete testing, compaction testing, aggregate analysis, and certified welding inspection. PSI will provide an on-site inspector with ICBO certification to provide the rebar,

concrete and compaction testing. Inspector will also be responsible for coordinating laboratory testing services.

Products: Results of all testing in format used by PSI

TASK VI.8 PREPARE PUNCHLIST

MWH will conduct a preliminary site walkthrough with PWB personnel and develop a punch list. It is assumed that two follow-up site inspections will be conducted to verify satisfaction with punch list completion.

Product: Punch lists and site visit notes of follow-up site inspections.

TASK VI.9 START-UP AND TESTING ASSISTANCE

It is assumed that the CM will be responsible for preparing start-up and testing plans. MWH will review all start-up and testing plans and provide comments. MWH will also attend up to 8 on-site meetings dedicated to coordination of start-up and testing program with the CM/GC and PWB. It is further assumed that up to 8 individual start-up and testing plans will be developed including; one for each reservoir, at three stages of pipe installation, and electrical coordination.

Products: Written comments to draft start-up and testing plans.

TASK VI.10 PREPARE O&M MANUAL

O&M Manual will include schematics in a format similar to that used by PWB at other Bureau facilities. Manual will include reservoir maintenance procedures, frequency, and maintenance of equipment including hoses, drains, screens, etc. MWH will also assist the CM/GC in preparation of a complete maintenance manual for the project. Manual shall include schematics, maintenance schedules, trouble-shooting data and overhaul procedures for any equipment installed.

Products: 5 copies of draft O&M manuals and 5 copies of final O&M manuals.

TASK VI.11 RECORD DRAWINGS.

Produce one full size set of record drawings on mylar, 5 half-size sets of record drawings (bound), one unbound half-size set, and one CD of Microstation and PDF drawing files. Record drawings shall be signed by the CM/GC, MWH, and PWB inspector. It is assumed that the CM/GC will be responsible for providing handwritten mark-ups to the Conformed Plans.

Element Responsibilities of PWB or the CM/GC:

- Written comments 20 working days after receipt of draft O&M manuals
- All handmarked field changes to Conformed Plans
- All submittal, RFI, DC, and CO document tracking system forms

- 3 copies of all submittals requiring engineering review
- Monthly construction Progress Status Reports and Schedule Updates
- Provide all vendor O&M manuals required in submittal review process

ELEMENT VII PUBLIC INFORMATION AND INVOLVEMENT

This element contains tasks related to the public information and involvement efforts of the project. This task also includes coordination efforts with PPR during the park design concept development phase to ensure coordination between the two design projects. Norton-Arnold & Company (NA&C), as a member of the MWH team, will assist with the public involvement program to support the Mt. Tabor project. The firm will provide overall strategic advice, facilitate meetings, develop public informational materials, and provide other general assistance throughout the design and construction of both the new reservoirs and the new park space that will be created on top of those reservoirs.

These efforts are scheduled to begin in August 2003 with construction set for completion in 2007. NAC's work will occur primarily in the first two years of the project, during the time period that is apt to be the focus of the most public attention and possible controversy. As construction proceeds and as the project becomes more familiar to both residents and park users, NAC's role will diminish and city staff will assume full control of the program.

TASK VII.1 FACILITATE DEVELOPMENT OF PUBLIC INVOLVEMENT PLAN

NAC will assist PWB and PPR in developing a comprehensive plan that will delineate all of the public involvement strategies used to support the Mt. Tabor project. A draft of this plan was created in early April 2003, and is currently under review by City staff. The plan will be reviewed, edited, and revised by the inter-departmental public involvement team that has been assembled for this project, and will be finalized within two weeks of the Notice to Proceed. The plan will be updated periodically (no less than annually) to ensure that it is still relevant to the needs of the project and that it is being carried out as efficiently and effectively as possible between various public involvement staff and consultant team members. NAC will make recommendations on tools, techniques, and strategies that should be implemented to address ongoing and emerging issues.

Deliverables: Strategic support and review and input on the final public involvement plan and updates.

TASK VII. 2 PROJECT COORDINATION MEETINGS

NAC will attend up to 30 coordination meetings throughout the first two years of the project. It is anticipated that these meetings will be approximately three hours in length and will be used to identify critical path issues, report project progress on active tasks, and identify project challenges and strategic responses in the coming month.

Deliverables: Attendance at up to 30 project coordination meetings with planning and follow-up as needed. NAC will provide staff as appropriate and participate in preparation of products as assigned.

TASK VII.3 PUBLIC INVOLVEMENT SCHEDULE

NAC will participate in the creation of a master schedule of all public involvement activities associated with the Mt. Tabor project. This schedule will be updated on a quarterly basis throughout design and construction of the project.

Deliverables: Updates and recommendations to public involvement schedule.

TASK VII.4 INFORMATIONAL MATERIALS

NAC will provide review, comment and editing (as needed) for all informational materials, including website content, associated with the project. NAC will coordinate with PWB and PPR staff to provide strategic input to plan the content, graphic design and audience needs that will be met by the publication.

Deliverables: Review comment and editing of all information materials.

TASK VII.5 FACILITATION OF PAC MEETINGS

NAC will facilitate and document up to twelve meetings of the Public Advisory Committee (PAC). NAC will provide strategic planning and coordination for all PAC meeting preparation and planning, including PAC agenda and issue planning, PAC communications, and work with the PAC members between meetings to ensure productive use of PAC time. NAC staff will coordinate on meeting agendas, goals, and intended outcomes for each meeting. Margaret Norton-Arnold will facilitate all of these meetings. Kristin Anderson will attend each meeting to take notes, document the results, and draft a meeting summary. This summary will be finalized by Margaret and submitted to the city for review and distribution. Margaret and Brad will assist with pre-meeting strategic support.

Deliverables: Strategic planning and facilitation and documentation of 12 PAC meetings.

TASK VII.6 FACILITATION OF FOCUS GROUP MEETINGS

NAC will facilitate and document up to 10 focus group meetings on topics to be defined during the development of the detailed public involvement program. The purpose of the meetings is to provide specialized community input to the project as needed. Brad Shinn will facilitate these meetings. Kristin Anderson will attend each meeting to take notes, document the results, and draft a meeting summary. This summary will be finalized by Brad and submitted to the city for review and distribution.

Deliverables: Facilitation and documentation of 10 focus groups.

TASK VII.7 FACILITATION AND STAFF SUPPORT OF PUBLIC WORKSHOPS

NAC will plan for, facilitate and provide staff support for up to four public workshops associated with the project. These meetings may be focused on park design, construction impacts, or other

issues associated with the project. NAC will provide strategic advice and planning for the meetings, facilitate as appropriate, and provide any staff support required for the meetings.

Deliverables: Strategic planning, meeting planning and logistics, facilitation, documentation and staff assistance at up to four public workshops.

TASK VII.8 SMALL GROUP MEETINGS AND COMMUNITY IMPACTS CHECKLISTS

NAC will plan and facilitate smaller, neighborhood-focused meetings related to the specific construction impacts of the project. These meetings will be designed to present summaries of the impacts information gathered through focus groups and the public workshops. They will also be an opportunity to brainstorm community-based solutions to the anticipated impacts of construction; especially how the City can work collaboratively with neighbors to avoid, reduce, or mitigate impacts in and around the park. In association with these meetings, NAC will develop community checklists. These checklists are a user-friendly mechanism that allows all parties associated with the project to be fully aware of the possible impacts, and the way in which those impacts can most appropriately be mitigated throughout construction of the project.

Deliverables: Strategic planning and implementation, facilitation and staffing for up to six neighborhood meetings and the development of six community checklists.

TASK VII.9 STRATEGIC PLANNING FOR PUBLIC INFORMATION DURING CONSTRUCTION

NAC will use community checklists and other available information to develop public information tools and community activities that will be implemented during the construction of the project. As part of construction planning, NAC will facilitate an internal planning workgroup to prepare a coordinated construction outreach plan to determine how this work can best be carried out, not only at the beginning of construction, but throughout the project.

Deliverables: Development of a plan related to public information during construction.

TASK VII. 10 MEDIA PLAN AND STRATEGY

NAC will assist the PWB and PPR in developing a detailed media strategy that will include key reporters from all relevant media outlets, opportunities for feature stories related to the project, key media messages, and a schedule for press releases, feature story information, and interviews with key project staff. NAC will assist PWB and PPR in implementing the plan by providing strategic support, recommending potential stories and support in preparing media briefing packets and other materials.

Deliverables: Assistance with plan implementation and other products as assigned.

TASK VII.11 PUBLIC INVOLVEMENT SUPPORT

MWH and other key subconsultants (as needed) will attend public meetings as required to provide technical information regarding the project. MWH will also provide written information and graphic material as needed for Public Informational Materials created as part of the PI Program or other public meetings (e.g. Landmarks Commission).

Deliverables: Written and graphic material as requested

TASK VII.12 STRATEGY MEETINGS

MWH will attend meetings with the Bureau Administrator, City Council staff, or other City officials as needed during the project to discuss project strategy or other project related issues.

TASK VII.13 COORDINATION WITH PARK CONCEPT DESIGN DEVELOPMENT

The reservoir and piping design team will need to coordinate closely with the park design team to ensure that the facility and operational needs of both the above ground and below ground facilities can be accommodated without conflict.

Subtask VII.13.a. Attend Park Design PAC Meetings

The MWH Project Manager will attend up to four Park Design PAC Meetings to provide information regarding the “below ground” design in support of the park design process.

Subtask VII.13.b. Historic Architectural Advice

William Hawkins will provide advice to PWB, PPR and the design consultants as needed regarding historical preservation of facilities in Mt. Tabor Park and in preparation of permitting documents including the City Historical Resource Review, FERC Exhibit E and the SHPO Section 106 process documents.

Subtask VII.13.c. Structural and Park Design Coordination

It is assumed that the park design will require review of various structural design modifications to accommodate above ground alternatives. It is assumed that MWH and the park design team will hold three separate meetings to discuss constraints and review alternative proposals for park design. MWH will prepare minutes of these meetings and provide cost estimates for any impacts to the reservoir design.

Subtask VII.13.d. Yard Piping and Park Design Coordination

It is assumed that the park design will require review of various yard piping alignment modifications to facilitate park design alternatives. MWH will review up to four different piping layout alternatives to facilitate park design concepts. The review will include identification of any construction cost impacts.