

POST CONCEPTUAL ENGINEERING STUDIES

3.19.1. BATTERY STREET TUNNEL (BST)

3.19.1.1. Seismic Evaluation of the BST

The BST, a four-lane cut-and-cover facility built in 1953, connects the Alaskan Way Viaduct along the Seattle waterfront to Aurora Avenue in the South Lake Union area. The tunnel is a common component to all five conceptual design plans for the replacement of the Alaskan Way Viaduct and Seawall.

Visual inspections of the tunnel were made in March of 2002 and a report prepared and submitted dated July 2002. The report recommended that a detailed seismic analysis for the overall condition of the tunnel be performed. This was due in part to the deterioration observed of the 50 year old tunnel as well as the critical link it forms along SR 99.

This item will perform a detailed seismic analysis of the BST using both recently observed conditions of the structural systems of the facility and sophisticated non-linear analysis software to estimate behavior of the facility when subjected to a two-level design earthquake with a return period of 100 and 2,500 years – the same criteria used for the conceptual design of Viaduct replacements. Based on the results of the analysis, conceptual level measures will be developed to address any deficiencies.

The CONSULTANT shall perform the following:

(A) **Review Existing Data:** A literature search will be performed to review and catalog data from previous inspections. Geotechnical data collected during the EIS phase will be reviewed. These data will help focus a condition assessment that will follow.

(B) **Field Inspection:** A field inspection will be performed utilizing non-destructive testing methods to determine the current structural integrity of the individual structural members

(C) **Existing Condition Assessment Drawings:** Based on the findings of the literature search and field inspection, drawings will be prepared to document current configuration, approximate dimensions, and other information necessary to develop a computer model and provide conceptual seismic retrofit designs.

(D) **Develop Soil Properties:** Geotechnical properties required for the computer model of the ground surrounding the BST will be developed from existing data as available.

(E) **Computer Analysis:** A computer model representing the actual configuration and condition of the structural elements will be created for cross-sections of the tunnel at up to four locations. The reaction of the tunnel to anticipated 100 and 2,500 year earthquake forces will be analyzed.

(F) **Summary Report:** Results of subitems A thru E will be compiled in a summary report that includes conceptual level recommendations to address the seismic deficiencies identified. Conceptual level drawings of remedial measures and cost estimates will also be included in the summary report.

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ASSUMPTIONS:

- Up to two (2) additional borings, 90 feet deep, will be needed to supplement existing geotechnical data.
- Seismic Design Criteria previously developed will be used as reference to determine structural adequacy of facility.
- Existing Condition Assessment drawings and conceptual seismic retrofit drawings will be developed to the same conceptual level as previously submitted design plan drawings.
- Conceptual level cost estimates will be performed.

PRODUCTS:

- Conceptual civil, structural, and mechanical drawings for one seismic retrofit approach.
- Electronic copies of a Draft Summary report and six (6) hard copies and electronic copies of the Final Summary report. This report will outline findings of inspection, results of analysis, and remedial measures recommended. The summary report will include conceptual cost estimates.

3.19.1.2. Battery Street Tunnel Emergency Egress Study & Updates

Visual inspections of the structural, electrical, and mechanical systems of the tunnel were made in 2002 with subsequent reports prepared and submitted. The present emergency egress system for the tunnel uses counterweighted sliding doors along the center wall. This door system does not fully function at this time and the system does not comply with the present code.

This task will perform a detailed emergency egress analysis for the Battery Street Tunnel using NFPA 502 guidelines. Based on the results of the analysis, conceptual level designs will be further developed.

The CONSULTANT shall perform the following:

(A) **Review Existing Data and Future Developments:** A literature search will be performed to review and catalog data from previous inspections. A search of the proposed developments along Battery Street at potential Emergency Egress locations will be done and data collected. These data will be used in the identification of potential Emergency Egress location sites.

(B) **Perform Field Inspection:** A field inspection will be performed after the existing data and future development review to assist in the assessment of the potential Emergency Egress location sites.

(C) **Prepare Existing Condition Assessment Drawings:** Based on the findings of the library search and field inspection, drawings will be prepared to document current configuration, approximate dimensions, and other information necessary to develop conceptual designs for the Emergency Egress location evaluation.

(D) **Potential Emergency Egress Location Evaluation:** Based upon the NFPA 502 guidelines, the existing data search and field inspections, an evaluation will be made of all potential Emergency Egress location sites will be made. Each site or combination of

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sites will be evaluated noting the advantages and disadvantages of each. A selection of configurations will be agreed to by WSDOT and the City based upon this information.

(E) **Identify Existing BST Modifications:** Upon selection of the Emergency Egress configurations to be further evaluated, the modifications to the BST will be identified. These modifications included, structural, mechanical, utility, and electrical changes required for the Emergency Egress concepts. Conceptual level cost estimates will be prepared for the modifications.

(F) **Prepare Conceptual Design Drawings:** Conceptual drawings will be developed for the Emergency Egress locations and associated BST modifications.

(G) **Summary Report:** Results of subtasks A thru E will be compiled in a summary report that includes the Emergency Egress conceptual design recommendations to address the deficiencies. The Conceptual level drawings, subtask F, will also be included in the summary report.

ASSUMPTIONS:

- The Mechanical / Electrical and Structural studies previously developed will be used as reference to assist in the evaluation.
- Existing Condition Assessment drawings and conceptual design measure drawings will be developed to the same conceptual level as previously submitted design plan drawings.
- Conceptual level cost estimates will be performed per Task 19.75: 6.1

DELIVERABLES:

- Summary report, including conceptual drawings, outlining findings of inspection, identified deficiencies, results of evaluation and remedial measures with conceptual level cost estimates.

3.19.1.3. Battery Street Tunnel Fire/Life Safety Upgrade

This task will perform further analysis of fire/life safety systems for the Battery Street Tunnel using detailed information on tunnel as-builts, the superelevated tunnel cross-sections, and detailed overhead structural design to establish general parameters for routing piping and conduit at the conceptual design level. Ventilation modeling will be performed to determine potential impacts with the existing structure and to confirm acceptability of the conceptual ventilation plan for normal and emergency operations. These efforts are intended to provide structural input regarding the mechanical and electrical design and provide more-realistic cost factors on the existing tunnel modifications. Based on the results of the analysis, conceptual level measures will be developed to address any deficiencies.

The CONSULTANT shall perform the following:

(A) **Review Existing Data:** Review the data prepared by the structural group on the existing tunnel drawings and the seismic evaluation. The data shall include (1) seismic considerations, (2) penetrations and (3) constraints for application of the fire-proof membrane.

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(B) **Water Supply and Foam Deluge:** This includes review of both the tunnel standpipe system and foam deluge system.

1. The proposed tunnel standpipe system compliments the existing standpipe system. The system interfaces should be reviewed to determine modifications to the tunnel and center wall. At present there is no 2-hour rated wall at these locations. The same standpipe connection is accessible from either tunnel bore.
2. The proposed foam deluge system compliments the existing water deluge system. The design should be reviewed to determine modifications to the sidewalk vaults with the integration of foam at each vault location. At present there is limited space at each vault. The addition of the foam piping will require additional piping, valves, and controls and potentially new vault areas to insure the system operates as intended.
3. This task will perform a preliminary layout showing how water and foam are routed throughout the tunnel, together with any structural impacts at the tunnel ceiling, sidewall, and invert, and any routing of piping outside the tunnel structure.

(C) **Systems Integration:** This includes review of tunnel traffic systems, tunnel electrical systems, and tunnel lighting systems. This task will perform a preliminary layout showing system integration and (typical lighting layout for the tunnel, together with any structural impacts at the tunnel ceiling, sidewall, and invert, and any routing of conduit outside the tunnel structure.

1. The tunnel traffic system includes traffic and ITS elements to be surface mounted. These should be reviewed to determine probable fit and the likelihood of maximizing the traffic clearance envelope in the tunnel.
2. The tunnel electrical system includes new electrical feeds to serve equipment loads throughout the tunnel. These will be surface mounted in rated enclosure(s) and need to interface with panels and other equipment including the ventilation fans at sidewalk level. These should be reviewed to determine probable fit and the likelihood of maximizing the traffic clearance particularly at super-elevated sections of roadway. Alternative power may be provided from the surface street level if duct banks can be installed in the right-of-way or buried in the roadway with the drainage system.
3. The tunnel lighting system includes lighting fixtures for tunnel illumination. These will be mounted flush with the ceiling. These should be reviewed to determine probable fit with ceiling system and the application/integration of fire protective membrane necessary for tunnel fire protection.

(D) **Post-Conceptual Ventilation Design and CFD Analysis:** This includes review of (1) existing supply fans at surface street level and (2) new jet fans at the portals. This task will provide preliminary layout and details showing the ventilation system. The layout shall be sufficient for modeling system performance using computational fluid dynamic (CFD) analysis. Refer to computer analysis identified below.

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1. The ventilation system for the Battery Street Tunnel utilizes a series of existing supply fans at surface street level to deliver air to the tunnel and a series of street openings (via street grates) to relieve air to atmosphere. We have not analyzed how effective this system is for normal traffic conditions and how compatible the system is for jet fan operation (emergency operation). The present thinking is that the ventilation system will operate in conjunction with the jet fan system should it be desirable to do so for pollution issues.

2. The ventilation system for the Battery Street Tunnel utilizes a bank of jet fans at the portal of the northbound and southbound traffic lanes for smoke control. We have not analyzed how effective this system is for fire emergency operations. The present thinking is that the individual fan units can be increased in horsepower to the level that meets the design criteria. Conceptual estimates suggest that 3 (three) fans are necessary with flexibility for increasing airflow and horsepower. However additional investigation is required based on air/noise factors, constrained tunnel and portal conditions, and system losses from street grates and other factors.

3. CFD Computer Analysis: A computer model will be created for ventilation analysis of the Battery Street Tunnel using computational fluid dynamics (CFD) techniques. The analysis will include (1) normal ventilation using supply fans at surface street level, (2) normal ventilation and jet fan operation combined, and (3) jet fan operation during worst-case events. The analysis will provide validation of ventilation assumptions regarding number and size of jet fans, configuration of portals, and blockage ratios as determined by the traffic control group.

(E) **Summary Report**: Results of subtasks A thru E will be compiled in a summary report that includes conceptual level recommendations on fire/life safety to address any deficiencies identified. Conceptual level drawings of remedial measures will also be included in the summary report.

ASSUMPTIONS:

- Civil/structural concept drawings shall be prepared to show plan and profiles for the Battery Street Tunnel including typical cross-sections and new portal structures. This is necessary for modeling purposes.
- Structural design criteria shall be prepared identifying the set of standards to be applied to the Battery Street Tunnel.
- Traffic design criteria shall be prepared identifying the traffic mix that is unique to the Battery Street Tunnel. This is necessary for ventilation modeling purposes.
- Structural design shall be prepared to show the application of fire protective membrane to the tunnel.
- The air pollution and noise parameters established during the EIS process can be used as input into the post-conceptual design.
- Drainage and utility design shall be prepared
- Conceptual level cost estimates will be performed per Task 19.7.5.

DELIVERABLES:

- Summary report outlining findings of fire/life safety investigations including conceptual drawings and cost estimate.

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3.19.2. GEOTECHNICAL SUPPORT

3.19.2.1. Develop Site-Specific Seismic Design Criteria

Ground motions will be computed at four locations along the length of the Alaskan Way Viaduct alignment. Over the length of the alignment, the ground motions may change by a factor of 2. These rock ground motions will be on the order of 0.9 to 1.0g on the south end primarily because the south end of the alignment is on top of the Seattle Fault. At the south end of the alignment, ground motions at the top of the soil may be lower, but the actual amount of de-amplification depends upon modeling of the deep, soft, low plasticity silt soil layer.

The CONSULTANT shall perform the following:

- (A) **Perform site specific Probabilistic Seismic Hazard Analysis (PSHA):** Perform a PSHA analysis for the 100-year and 2,500-year ground motions. Develop a logic tree to consider crustal sources (including Seattle Fault geometry), Cascadia Subduction Zone location, and Interpolate modeling alternatives. Compute ground motions at four locations along the alignment.
- (B) **Develop Synthetic Rock Motions:** Develop three 2-component sets of synthetic rock ground motions for matching to the 100-year (shallow crustal), and 2,500-year (contributions from Seattle Fault and Cascadia Subduction Zone) uniform hazard spectra (six time history sets).
- (C) **Rotate Components:** Rotate components of the time histories to fault normal and fault parallel directions and incorporate relevant near fault effects including directivity and fling.
- (D) **Conduct Equivalent-Linear Site Response Analysis:** Equivalent-linear site response analyses will be performed at four locations using the computer program Shake/Proshake considering uncertainty in soil profile measurements.
- (E) **Conduct Non-Linear Effective Stress Ground Response Analysis:** Use the computer program WAVE to compare the results of the site response considering the effects of pore pressure generation and dissipation of the upper 250 feet of very loose to loose slightly silty sands and the equivalent-linear site response analysis. The structures will be designed by the response spectrum method; however, response of pile foundations will vary depending on stiffness of soils and therefore point of application of ground motion. WAVE will be able to consider ground improvements by creating "large diameter" piles in the deep foundation model. The response of a "ground improved" pile foundation can be obtained directly from wave.
- (F) **Seattle Basin:** Incorporate effects of Seattle basin in site response analysis.
- (G) **Ground Response Spectra and Time Histories:** Compute ground surface response spectra at four locations along the alignment. One set of spectrum-compatible, three-component, time histories that correspond to the 100- and 2,500-year ground motions will be provided for each of the four locations.

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(H) **Prepare Geotechnical Report/Memoranda:** Results of subtasks A thru G will be compiled in a geotechnical report presenting the results of the field explorations and laboratory testing performed under Task 2.2, generalized subsurface profile, and the results of the earthquake engineering studies including site-specific response spectra at four typical sites. Technical memoranda, as needed, can be submitted prior to the submission of the report. The geotechnical report will be submitted as draft for review and will be finalized following receipt of comments from the Project Team.

ASSUMPTIONS:

- Additional field explorations, seismic testing, and laboratory testing will be required to supplement the existing information and provide sufficient subsurface information for the site-specific seismic studies (see Task 2.2)
- The Project Team will provide alignment and structural information needed for geotechnical design studies.
- All structures will be designed by the response spectrum method.

DELIVERABLES:

- Technical Memoranda, as needed, outlining the results and findings of the analysis.

3.19.2.2. Additional Field Explorations and Testing

Additional field explorations and testing are required to supplement existing data for the seismic evaluation of the Battery Street Tunnel (Task 19.1.1), and the development of site-specific seismic design criteria (Task 19.2.1). This task includes these explorations and associated field and laboratory testing.

The CONSULTANT shall perform the following:

(A) **Obtain Permits:** Obtain permits for field activities from City of Seattle and BNSF. A Shoreline Exemption letter for approval by the City of Seattle will be prepared for borings that are located within 200 feet of Elliott Bay.

(B) **Site Visit/Utility Check:** Make site visit to locate and mark borings and evaluate site access, utilities, and traffic control needs. Perform utility check.

(C) **Field Explorations and Testing for Battery Street Tunnel:** Field explorations and testing will be performed to evaluate the subsurface conditions and soil properties along the tunnel alignment. Two borings are proposed. Field tasks will include the following:

1. Drill 2 borings to depths of about 90 feet each. Borings will be drilled using mud-rotary drilling techniques.
2. Obtain geotechnical soil samples generally at 2.5-foot intervals in the depth corresponding to the tunnel zone, and at 5-foot intervals thereafter using the Standard Penetration Test (SPT). An experienced engineer/geologist will record the drilling and sampling information and prepare a field log of the boring.
3. Perform environmental screening during drilling by using a Photo-Ionization Detector (PID) on each soil sample and the air space around the drilling operation to check for potential hazards and contamination. If contaminated soil

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is encountered, drilling will be halted and WSDOT and the City and Project Team will be contacted for direction as to whether or not to continue drilling and sampling.

4. Install observation wells in each boring to observe groundwater levels.
5. Review field exploration data and enter into a geotechnical database. Drafted boring logs will be generated based on the database.
6. All geotechnical samples will be reviewed and a laboratory test program developed. The laboratory test program will include index testing on soil samples obtained from the borings. Water content determinations will be performed on all non-gravel samples. Grain size analyses (some with hydrometer) and Atterberg Limits determinations will be conducted on selected samples.
7. Data results will be compiled in a geotechnical data memorandum presenting the results of the field explorations and laboratory testing.

(D) Field Explorations and Testing for Site Specific Seismic Design: Field explorations and testing will be performed to evaluate the subsurface conditions and soil properties for use in the site-specific seismic design studies. Field tasks will include the following:

1. Drill 4 borings along the proposed alignment to depths of about 100 to 300 feet. Two seismic cone penetration tests (SCPT) probes will be advanced adjacent to two of these borings. Borings will be drilled using mud-rotary drilling techniques.
2. Obtain geotechnical soil samples generally at 2.5-foot intervals in the upper 20 feet of each borehole and at 5-foot intervals thereafter using the Standard Penetration Test (SPT). An experienced engineer/geologist will record the drilling and sampling information and prepare a field log of the boring.
3. Perform environmental screening during drilling by using a Photo-Ionization Detector (PID) on each soil sample and the air space around the drilling operation to check for potential hazards and contamination.
4. Install seismic casing (blank PVC) in each boring to provide for testing to determine the shear wave velocity profile. Shear wave velocity measurements are required for the site response analyses will be performed at each of the four boring locations.
5. Measure energy transferred and energy differences between the rod and samplers at two boring locations. Energy measurements will be used to calibrate the in-situ soil strengths estimated from the SPT.
6. Review field exploration data and enter into a geotechnical database. Drafted boring logs will be generated based on the database.
7. All geotechnical samples will be reviewed and laboratory test program developed. The laboratory test program will include index testing on soil samples obtained from the borings. Water content determinations will be performed on all non-gravel samples. Grain size analyses (some with hydrometer) and Atterberg Limits determinations will be conducted on selected samples. Resonant column and cyclic triaxial tests will be performed on a total of four selected samples of very soft silt soils obtained from deep estuarine deposits. The details of the testing will be developed after the samples are collected.

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Data results will be compiled in a geotechnical data memorandum presenting the results of the field explorations and field and laboratory testing.

ASSUMPTIONS:

- The Project Team will provide preliminary design information (including maps, alignments, proposed project features, structural information, etc.) to Shannon & Wilson.
- The City of Seattle and Project Team will assist with obtaining rights-of-entry and permits required for the field explorations.
- The borings will be performed during normal daylight hours in open areas, parking areas or shoulders of the existing streets. No railroad flaggers will be required to perform borings. Traffic control will consist of cones and signs only.
- The right-of-entry permit from the BNSF may take several months to obtain. The City of Seattle and Project Team should be aware of this time constraint.
- For borings where contamination was not encountered, drilling mud, cuttings or excavated soil will be containerized in drums, labeled, and removed from the site if no contaminants are observed. If contaminated soil is observed, the drill rig and equipment will be steam cleaned prior to moving to another borehole. Mud and cuttings within the potentially contaminated zone will be drummed separately from the mud and cuttings obtained from outside the contaminated zone. The drums containing the segregated contaminated soils will be tested and left on site until laboratory tests results are available and the spoils can be properly disposed of. Analytical testing and disposal of contaminated spoils will be performed assuming that the test results indicate that the contaminated spoils are non-hazardous. If hazardous materials are encountered, additional costs will be incurred and are these costs are not included in the cost estimate.
- The locations of the borings will be measured from existing site features using a cloth tape and will therefore be approximate. Surveying shall be performed as per Task 19.3.4.

DELIVERABLES:

- Geotechnical Data Memoranda documenting the results of the explorations.

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3.19.3. RIGHT OF WAY SUPPORT

3.19.3.1. Locate Existing AWW Pile Caps and Foundations

It is necessary to locate more precisely the existing pile caps of the existing Alaskan Way Viaduct in order to place the tunnels, proposed in the Tunnel and Bypass Tunnel Plans, as close to the Viaduct as possible. Therefore, CONSULTANT shall perform a series of test holes using a vacuum extraction truck. These holes will be located near the western edge of the existing pile caps. The test holes will only be performed at pile caps that are readily accessible by the vacuum truck.

Once the test holes have identified foundation features, the probe locations will be field surveyed and their location imported into the project topographic basemap. The holes will be backfilled with lean mix and the asphalt patched.

ASSUMPTIONS:

- For budgetary purposes, it is assumed that the test holes will be performed at thirteen (13) locations, including six (6) caps located at a depth of about 8 feet and seven (7) caps located at a depth of about 5 feet.

DELIVERABLES:

- x, y and z coordinates of pile cap and foundation locations imported into the project basemap.

3.19.3.2. Right of Way Plans for Existing ROW

All alternatives regarding future Viaduct replacement situate within existing street rights of way. These existing rights of way were originally established by platting actions or by City Ordinances at "different points in time" using different "basis of bearings" or other local information existing at that time.

This task compiles all pertinent field located right of way monumentation throughout the AWW corridor into a single drawing and onto the project horizontal basis of bearing.

The CONSULTANT understands that all street rights of way are "governed" by the City of Seattle. The Viaduct itself, even though the STATE holds operation and maintenance rights situates within City right of way. Please note that STATE right of plans for this corridor do not exist.

Therefore the CONSULTANT shall prepare a Record of Survey of existing right of way intended to show street centerline and right of way margin of the AWW corridor beginning at Highland Drive on the north and S Dakota Street on the south. Said survey will be recorded at the King County Recorder's Office.

Specific Record of Survey limits is more particularly described as follows:

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- for SR 99 between Highland Drive and Denny Way; to and including 6th Avenue N. on the west and 8th Avenue N. on the East, (each route includes all intersection cross streets),
- for Mercer and Broad Streets; to 5th Avenue on the west and 8th Avenue N. on the east,
- for Battery Street (tunnel) between Denny Way and Alaskan Way; to and including Wall Street to the northwest and Bell Street to the southeast,
- for Alaskan Way northwesterly of Battery Street; all of Alaskan Way to its unbuilt terminus in Myrtle Edwards Park, all of Western Avenue to its intersection with Elliott Avenue, all of Elliott Avenue to its intersection with Western Avenue;
- for Alaskan Way between the tunnel and Yesler Street; to and including the westerly margin of Alaskan Way on the west and Western Avenue on the east, University, Seneca, Spring, Marion and Columbia Streets extended easterly to 1st Avenue,
- for Alaskan Way (E. Marginal Way S.) between Yesler Street and S. Holgate Street; to and including the westerly right of way margin of Alaskan Way on the west and First Avenue on the east,
- for Alaskan Way (E. Marginal Way S.) between S. Holgate Street and S. Dakota Street; to and including the westerly right of way margin of Alaskan Way on the west and Colorado Avenue S. on the east, S. Spokane Street extended easterly and westerly to the East Waterway on the west and 1st Avenue S. on the east,
- for SR 519, between Alaskan Way and 1st Avenue S.

The intent of the Record of Survey is to allow all subsequent parties to derive the same centerlines and margins and to delineate all controlling monumentation, both street centerlines and adjoining private ownership property corners. A Record of Survey is easier utilized by the project team for spatial relationships and proposed property "takes" and alternative centerlines can easily be imported for analysis; The Record of Survey will contain all survey information required to prepare "Right of Way Plans for Acquisition" and is now the "vehicle" of choice for the representation of right of way as determined by WSDOT Professional Land Surveyors located at STATE Headquarters.

Existing rights of way may also be required at extension of ramps and at intersection of streets outside the corridor area. An equation station will be established at both the northerly and southerly ends to correlate with any stationing delineated on AWV construction plans. All stationing and Survey information will be prepared in English units. State Plane Coordinates for two (2) monuments tied to centerline (or a new L alignment) will be shown on each sheet along with the combined scale factor used. Unless otherwise requested by the STATE, only existing centerline and margin data will be shown on the Survey that will be recorded.

DELIVERABLES:

- The CONSULTANT shall submit three (3) full size (18" by 24", the size of a survey to be recorded governed by the Washington Administrative Code) sets of prints at a one inch equals 50 feet scale to the STATE for review and approval.
- Following review, the CONSULTANT shall address and incorporate the comments and deliver one (1) full size of reproducible drawings, one (1) half size set of reproducible drawings (11" by 17") and two (2) sets of electronic files, one (1) in AutoCAD format and one (1) in MicroStation .dgn format.

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3.19.3.3. Upgrade Base Mapping

As long as future detailed field mapping is conducted, this task will exist. Originally, this project, for the EIS-level planning effort, has utilized the City of Seattle GIS aerial topographical mapping layer, which shows two-foot contour intervals. This aerial map is well within mapping standards, defined as "any given point picked for "true" elevation is within one half the difference between contour intervals."

When topographic mapping of greater detail is needed for alternative definition, data will be collected by the Consultant on a site specific basis as described herein. This supplemental topographic data shall represent one foot (1) contour accuracy with "spot shots" accurate to the one-tenth of a foot vertically (true measurement), although said "spot" will delineate elevation to the one one-hundredths (0.00).

Upon additional data collection, the x, y and z coordinates will be merged into the CaiCE project electronic surface and MicroStation base map. The CaiCE surface and MicroStation base map will be maintained on a continual basis throughout the project.

Base mapping maintenance for supplemental survey data will be completed within 48 hours of receipt of said data on a continual basis.

ASSUMPTIONS:

Until the start of preliminary engineering design, all deliverables will be AutoCAD based.

DELIVERABLES:

- CaiCE format .srv and .kcm electronic files containing the additional survey points and survey chains, checked for elevation and chain errors. All data attributes will be per WSDOT Standard Codes and Zones.
- Worksheet hardcopy plot of supplemental survey points and chains in tabular form.
- MicroStation 2D electronic file with attribute conventions per WSDOT Plans Preparation Manual.

3.19.3.4. Additional Surveying Services (On Call)

The CONSULTANT shall respond within a 24-hour notice of a survey request. All survey requests the project team may have shall be routed through one person the project team leader designates responsible for conveying said requests.

Site specific data collection could include horizontal and vertical position (potholing) of utilities (and inverts) as marked on the surface by others, geotechnical bore hole locations, hazardous waste material sites, existing structures and bridge as-builts, railroad tracks and switching yards, trolley system, roadway centerline and crown, columns, rockeries, traffic barriers, top of curbs and flowlines, adjoining buildings and improvements (to include building position at surface grade, at top of building and elevation of lowest level, location of adjoining building foundations as either potholed, geoprobed or marked by ground penetration radar, vertical clearances from roadway to overhead structures or utilities, etc.

Said mapping will be conducted using a variety of methods that could include traditional terrestrial ground mapping, 3D scanning system and/or Low Level Altitude Aerial Mapping

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(LAMP). The CONSULTANT shall determine usage of the proper tool needed job efficiency's and cost effectiveness.

Rights of Entry onto private lands shall first be pursued by the Consultant. If the CONSULTANT is unsuccessful, the STATE will assume responsibility to obtain Right of Entry permission.

ASSUMPTIONS:

- Assumption: until the start of preliminary engineering design, all deliverables will be AutoCAD based.
- CONSULTANT field crew(s) will respond within 24 hours upon receipt of a site specific supplemental survey request and will continue in a diligent manner until complete.

DELIVERABLES:

- CaiCE format .srv and .kcm electronic files containing the additional survey points and survey chains, checked for elevation and chain errors. All data attributes will be per WSDOT Standard Codes and Zones.
- Worksheet hardcopy plot of supplemental survey points and chains in tabular form.
- MicroStation 2D electronic file with attribute conventions per WSDOT Plans Preparation Manual.

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3.19.4. DESIGN PLAN UPDATE

3.19.4.1. Design Plan Update

Prior to the June 2003 CEVP, five Conceptual Design Plans in Support of the Draft Environmental Impact Statement were issued in four separate volumes. These plans are:

Rebuild Plan	March 07, 2003	Volume 1
Aerial Plan	March 18, 2003	Volume 2
Tunnel Plan	April 11, 2003	Volume 3
Bypass Plan	May 09, 2003	Volume 4
Surface Plan	May 09, 2003	Volume 4

As a result of the CEVP process, a decision was made to alter the proposed plans as issued. In the final review of each plan, it was determined that to proceed forward the plans as issued would be modified through the Configuration Change Control Document to reflect the current most likely approach. This task will perform the designs needed to reflect the area changes and the associated transitions to change the concepts. Also included in this task is the redesign of the SR 519 / SR 99 interchange for the Rebuild and Aerial plans. This change was necessitated by the decision to forgo the SR 519 Phase II project that was assumed as the existing condition for these two plans.

The CONSULTANT shall perform the following:

(A) **Rebuild Plan** Prepare Configuration Change Control Documents to assess the impacts for the following revised plan elements:

Holgate to King	SR 99 at-grade SR 519 full access elevated
Tail Track	Relocated east of SR 99 to King
Ferry Holding	East of SR 99 (T-46)
Battery St. Tunnel	Defer upgrades

(B) **Aerial Plan** Prepare Configuration Change Control Documents to assess the impacts for the following revised plan elements:

North of BST	Widened Mercer underpass
Detour	Detour using Broad St. & Alaskan Way
Seawall	Rebuild option for the entire length

Options to the plan configuration to be developed include:

Holgate to King	SR 99 at-grade SR 519 full access elevated
Tail Track	Relocated east of SR 99 to King

(C) **Tunnel Plan** Prepare Configuration Change Control Documents to assess the impacts for the following revised plan elements:

Holgate to King	SR 99 at-grade SR 519 full access elevated
Tail Track	Relocated east of SR 99 to King
Seawall	Rebuild option Virginia to Battery

Options to the plan configuration to be developed include:

Detour	Temporary aerial over Art Institute
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(D) **Bypass Plan** Prepare Configuration Change Control Documents to assess the impacts for the following revised plan elements:

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Pike to BST	Side by side aerial
Detour	Detour using Broad St. & Alaskan Way
Seawall	Rebuild option Virginia to Battery

(E) **Surface Plan** Prepare Configuration Change Control Documents to assess the impacts for the following revised plan elements:

Holgate to King	SR 99 at-grade SR 519 full access elevated
North of BST	Widened Mercer Underpass
Tail Track	Relocated east of SR 99 to King

ASSUMPTIONS:

- Revised plan sets will not be issued.
- Construction Sequencing drawings are for general reference only. Flow charts from the June 2003 CEVP will be used for overall construction sequence and duration for each design plan.

DELIVERABLES:

- Configuration Change Control Documents for all five design plans will be issued.
- A revised conceptual engineering plan set for each of the five design plans will be developed to support the DEIS. These plan sets will be created to provide a high level overview of each plan with representative information taken from the previously issued plan sets.
- A plan set for the preferred alternative will be developed to the same level as the five conceptual design plans issued in the Spring of 2003.

POST CONCEPTUAL ENGINEERING STUDIES

3.19.5. CONSTRUCTION PROJECT DELIVERY PLAN AND SEQUENCING IMPACTS

3.19.5.1. Construction Contract Planning

A project the size of the Alaskan Way Viaduct and Seawall Project must be divided into manageable parts. Packaging a very large project into discrete elements enables better project management. The amount of cityscape and number of construction vehicles in the city can be controlled. Funding streams from federal, state and city sources can be set to meet contract needs. Impacts due to traffic disruptions can be minimized. Competing resources can be better balanced among simultaneous projects.

This task will perform an analysis of one of the Alaskan Way Viaduct and Seawall Replacement project design plans to develop a methodology for allocating construction and contract packages. The first step in the methodology will be to identify which parts of the project are best supported by design-build vs. design-bid-build contracts. The next step will be to analyze potential contract packages by location (e.g. all work north of the Battery Street Tunnel), by type of work (e.g. tunnel vs. aerial construction), by priority (e.g. the BNSF underpass at Sculpture Park) and by discipline (e.g. seawall vs. utility vs. mainline work). Further division by size, as measured in dollars or workers will be done.

The CONSULTANT shall perform the following:

- (A) **Review Existing Data:** A literature search will be performed to review and catalog data from previous projects in the region as well as national projects of comparable scope and complexity. This data will help focus on existing practices and procedures that are currently accepted by the City and State.
- (B) **Perform Field Inspection:** A field inspection will be performed to determine possible geographic packages.
- (C) **Prepare Draft Construction and Contract Packages:** Based on the findings of the literature search and field inspection, a draft grouping of construction and contract packages will be prepared. Project delivery methods will be recommended.
- (D) **Review Draft Packages with City and State:** Because many of the decision points influencing the selection of the construction and contract packages are political in nature, a thorough review of the process should be conducted through workshops with the clients, consultants, and other outside experts, as required.
- (E) **Summary Report:** Results of subtasks A thru D will be compiled in a summary report that includes conceptual level recommendations for construction and contract packaging.

POST CONCEPTUAL ENGINEERING STUDIES

ASSUMPTIONS:

- The project is fully funded, or otherwise unconstrained by available funds.
- Only one alternative will be analyzed, as selected by WSDOT and the City of Seattle.
- Right of Way (ROW) acquisition will be conducted up front in the process, so as not to interfere with the construction packages.
- High level conceptual drawings will be developed for the summary report. These will provide an overview and will not be done to the same level as the current design plan drawings.

DELIVERABLES:

- Summary report outlining the findings and recommendations.
- Workshop notes.

3.19.5.2. Construction Impacts

In this high-traffic, high population urban area it is critical to develop a feasible construction sequencing and staging plan, complete with traffic management, to control movement of pedestrians, construction workers, construction equipment, truck traffic and general street traffic through and around the project area. Road closures and detours should weigh the needs of emergency service vehicles (i.e. police, medical and fire), passenger vehicles, trucks, and construction equipment.

This task will perform an analysis of the Alaskan Way Viaduct and Seawall project design plans and define a construction sequencing and traffic management plan for one design plan as directed by WSDOT and the City of Seattle. Minimum mobility standards should be established for SR 99 and for surface street traffic performance during construction. Each plan should include incident management system (IMS) components and maintenance and protection of traffic (MPT) components. Construction staging areas should be identified along with constructibility methods.

The CONSULTANT shall perform the following:

- (A) **Review Existing Data:** A literature search will be performed to review and catalog data from previous projects in the region. This data will help focus on existing practices and procedures that are currently accepted by the City and State.
- (B) **Perform Field Inspection:** A field inspection will be performed to determine the feasibility and availability of construction staging areas and traffic detours.
- (C) **Prepare Traffic Management Plan:** Based on the findings of the literature search, field inspection, and project-level traffic analysis, a traffic management plan will be prepared for one design plan describing measures to minimize disruptions for all modes of transportation currently in use in the project corridor.
- (D) **Develop Construction Sequencing Plan:** A construction sequencing plan will be developed for one design plan describing impacts on the Right of Way, adjacent facilities, and businesses. The plan shall include a discussion of site accessibility, utility relocations, and temporary utilities.

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(E) **Summary Report:** Results of subtasks A thru D will be compiled in a summary report that includes conceptual level recommendations to address potential risk areas identified. Conceptual level drawings will also be included where necessary in the summary report.

ASSUMPTIONS:

- Constructibility and Mobility Criteria previously developed will be used as reference.
- Only one (1) alternative will be analyzed, as selected by WSDOT and the City of Seattle.

DELIVERABLES:

- Summary report outlining the findings and recommendations.

POST CONCEPTUAL ENGINEERING STUDIES

3.19.6. PROJECT SUPPORT

3.19.6.1. Ongoing Project Coordination with Stakeholders

The CONSULTANT shall meet with interested third parties, including but not limited to, Federal Agencies, State Agencies, County Agencies, City Agencies, the Port of Seattle, BNSF and UP Railroads, public and private utilities, citizen interest groups, business interest groups, neighborhood interest groups, and other special interest groups as directed by the State.

ASSUMPTIONS:

- Up to two (2) such meetings per week with each meeting being three (3) hours long for up to four (4) CONSULTANT staff (on average) shall be held. An allowance of approximately 2500 hours is assumed for this task over the next 12 months.
- Each meeting will also require 3 hours of preparation time for each attendee (on average).
- Meetings will be held in a downtown Seattle location.

DELIVERABLES:

- Technical products required to support the meetings.
- Meeting notes will be prepared and distributed to WSDOT and City.

3.19.6.2 Urban Design Workshops

Up to three focused community workshops on urban design considerations for surface improvements will be undertaken over a three month period in the Fall of 2003. It is anticipated that the first workshop would be for the purpose of discussing opportunities and constraints and reviewing alternatives and options relative to the layout of surface improvements for the five build plans. The second workshop would address materials and treatments for the surface improvements, including discussion of options related to the vocabulary for landscape, lighting, and paving. The third and final workshop would summarize the input from the community workshops.

It is anticipated that the workshops would include an open house format, displays of current work efforts, a PowerPoint presentation of the development of the concepts and options, break-out discussions at individual tables on specific topics, group discussion and review of the input from individual table discussions and further comments from the participants.

ASSUMPTIONS:

- Each workshop will be held on a Saturday and last approximately 4 hours with approximately one month between workshops.
- Logistics in terms of procuring, setting up and organizing the space for the meeting, advertising the meeting or providing public noticing, providing audiovisual equipment, documenting the attendance at the workshop, and providing refreshments are not included and will be done by others.
- Meetings will be held in a downtown Seattle location.

DELIVERABLES:

- Summary report that describes the general themes of the community input.

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3.19.6.3 Surface Improvement Options

This task involves the preparation of conceptual sub-options for surface street improvements along the harborfront related to the Tunnel, Bypass and Surface Plans.

The CONSULTANT shall perform the following:

- (A) Meet and work closely with the City and State representatives in establishing the range of surface street improvement options that will both bracket the environmental analysis and provide flexibility for future design efforts.
- (B) Prepare conceptual plans for up to three sub-options for the Tunnel, Bypass and Surface Plans.
- (C) Prepare prototypical sections and prototypical illustrated plans for three selected sub-options.
- (D) Prepare a text description of the sub-options for the Tunnel, Bypass and Surface Plans as input into the environmental process.

ASSUMPTIONS:

- Current urban design concepts for surface street improvements related to the five conceptual design plans will be updated to incorporate changes resulting from the CEVP process as part of Task 3.19.4, Design Plan Update.
- Studies of how the elevated portion of the Tunnel, Bypass and Surface Plans adjacent to the Pike Place Market area and how the potential for Elliott and Western ramps can be integrated with open space development and pedestrian improvements will be undertaken, also as part of Task 3.19.4, Design Plan Update.
- Any additional community input into the preparation of surface street improvement options will be provided as part of the Urban Design workshops under separate Task 3.19.6.2, Urban Design Workshops.
- Colored illustrations of the end-to-end plans for each sub-option for presentation purposes are not included in this task. They are included in Task 3.19.6.2, Urban Design Workshops.

DELIVERABLES:

- A CD containing Autocadd Release 14 files showing conceptual plans for up to three sub-options for surface street improvements related to the Tunnel, Bypass and Surface Plans.
- One (1) draft and final hard copy of the plans in reproducible format similar to the current version of the previously prepared Design Plans.
- Two (2) prototypical sections and two (2) prototypical illustrated plans of the three selected sub-options in electronic JPEG format.
- One hard copy (xerox) text description for each of the surface improvement sub-options related to the Tunnel, Bypass and Surface Plans.

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3.19.6.4. Utility Workshops with Public and Private Utilities

The as-built conditions of both public and private utilities have been researched and incorporated into the project documentation. Conceptual utility relocation configurations and strategies have been developed to establish feasibility and to support the establishment of cost opinions for utility work associated with 5 build Design Plans. Specific requirements for the protection of existing facilities, the preliminary design of relocated facilities, and the maintenance of continuous utility services to adjacent properties during construction need to be established.

This task will prepare for, and facilitate, three workshops with the utility purveyors. The purpose of the workshops will be to identify specific utility issues impacting the design and construction of the 5 build Design Plans, to identify design procedures and criteria including applicable modeling procedures, and to establish the procedures and protocols for design review and acceptance by the utility purveyors.

One workshop will be scheduled with the public utility agencies (Seattle Public Utilities – water, sewer, and drainage, Seattle Fire Department – fire protection, Seattle City Light - power, and King County DNR - sewer). A second workshop will be held with the private utility companies (Puget Sound Energy – Natural Gas, Seattle Steam Company, and the petroleum company). A third workshop will be held with agencies and companies operating communications utilities (City of Seattle, Qwest Telephone, Millennium Digital, AT&T Broadband, Tel/AT&T, Sprint, XO Communications, Electronic Lightwave, LDDS Worldcom, Time Warner, Level 3, Millennium Cable, Global Crossings, MES Associates, Metromedia Fiber Network Services, 360 Networks, Looking Glass Networks)

The CONSULTANT shall perform the following:

- (A) **Prepare Preliminary Workshop Agendas:** Review known issues and establish a draft agenda and presentation materials for each workshop.
- (B) **Identify Key Workshop Issues/Attendees:** Confer with each utility agency and company to review the draft agenda, to explain the purpose and intent of the workshops, to identify appropriate attendees, and to identify key areas of concern to include in the agenda.
- (C) **Utility Workshops:** Prepare and present workshop materials. Facilitate discussion and identification of design issues, processes, protocols, and design criteria.
- (D) **Ongoing Coordination with Utilities:** Further develop utility relocation protocols, procedures, and design criteria as may be appropriate based on the findings of the workshops. Items potentially requiring follow-up include: modeling of drainage systems and combined sewage regulators; maintenance of continuous utility services including all utilities and fire protection throughout the construction period; development of feasible and practical approaches for relocation of fiber optics including the potential for shared facilities among private FO purveyors; and other items identified during the workshops.
- (E) **Summary Report:** Results of subtasks A thru D will be compiled in a summary report that includes conceptual level recommendations to address the design criteria, identified major issues, and proposed solutions.

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ASSUMPTIONS:

- Impacted utility agencies and companies will agree to participate and will be available at common times for the planned workshops
- WSDOT and City of Seattle representatives will participate in all three workshops
- The workshops will be ½ day sessions.

DELIVERABLES:

- Materials required for each workshop including agendas, handouts, displays, and a summary report outlining results of workshops and ongoing coordination with utilities.

3.19.6.5. EIS Support for Current Design Plans

The CONSULTANT shall provide advice and assistance regarding technical questions related to the five build Design Plans and the Do Nothing (No Action) Plan in support of the production of the Environmental Impact Statement (EIS) including the Preliminary Draft EIS (PDEIS) the Draft EIS (DEIS), the Final EIS (FEIS), and the Record of Decision (ROD).

ASSUMPTIONS:

- Up to five build Design Plans will continue to be evaluated in the EIS.
- The level of effort for this task is unknown. An allowance of 20,000 hours has been included to respond to requests for information regarding the Design Plans. This may not be sufficient.

DELIVERABLES:

- Technical clarification for the team writing the EIS regarding the intent, function, purpose, or assumptions of the Design Plans. Responses may be written or oral.
- Written responses to comments on the PDEIS, DEIS, FEIS, or ROD will be prepared as required.

3.19.6.6. General Engineering Support Activities

General engineering support activities include peer reviews, value engineering, continued risk analysis, and conceptual cost estimation.

Technical peer reviews and value engineering activities will be performed periodically throughout the post-conceptual design of the project. Depending upon the issue under consideration either internal team and/or external subject matter experts may be called upon to provide these services. The specific assignments, team composition, and duration will be agreed to by WSDOT and the City of Seattle.

The project risk registers previously developed will be maintained during the conceptual engineering process. They will be used to assist in minimizing, avoiding and/or mitigating the project risks. Risks will continue to be captured in a format that is compatible with the WSDOT Cost Estimate Validation Process (CEVP). Risk mitigation plans may also be developed to address specific risks as agreed to by WSDOT and the City of Seattle.

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Conceptual estimates of cost shall be developed to support the continued engineering activities for the five design plans and options. Project costs developed will be estimated using the June 2003 CEVP.

ASSUMPTIONS:

- This is a level of effort activity and will be provided upon approval by WSDOT and the City of Seattle.
- The deliverables will be determined jointly by the Consultant, WSDOT and the City of Seattle.
- The project Risk Registers will continue using the same format.
- The opinions of cost shall be provided to the same level and on the same basis and previous project cost estimates. It is assumed that one CEVP will be conducted on a single design plan.
- It is assumed that one value engineering study will be conducted on a single design plan.

DELIVERABLES:

- The deliverables may vary from meeting minutes to Technical Memorandums.
- Updated Project Risk Registers for each of the five design plans.
- Risk mitigation plans.
- Conceptual level cost estimates.

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6.23. ENVIRONMENTAL DOCUMENTATION

Environmental documentation for the Alaskan Way Viaduct and Seawall Replacement Project is required to meet a variety of regulatory requirements while being understandable by the general public. The primary document, a NEPA/SEPA environmental impact statement, will be written for a broad public audience with more detailed technical information provided by a collection of technical memoranda and discipline reports.

Previously Items 6.20 and 6.21 required preparation of the Draft EIS and Final EIS following WSDOT procedures and guidance. These tasks are essentially unchanged; although the products will now be a series of technical memoranda and discipline reports. The same guidance will still be used for preparation of these products, so there is no substantial change to the items and associated effort even though these materials will now be presented as supporting documentation. New technical memoranda are also needed to describe the alternatives and construction process in support of the subject-specific technical memoranda and discipline reports.

Additionally the analysis would be for four build alternatives and the Do Nothing (No Action) Alternative. At the direction of the lead agencies, an additional alternative has been added. This change affects the analysis to be conducted for each element of the environment in discipline reports, technical memoranda, and the EIS. The alternatives and options are described in Concurrence Point 2, dated July 2003.

6.23.1. WILDLIFE, FISH, AND VEGETATION

The approach and content for this item remains largely unchanged, except the level of detail and analysis will be increased to support preparation of a discipline report based on WSDOT guidance. Previously this item was to produce an EIS section only.

PRODUCTS:

- Draft wildlife, fish, and vegetation discipline report – 10 copies.
- Final wildlife, fish, and vegetation discipline report – 50 copies.

6.23.2. CULTURAL AND ARCHAEOLOGICAL RESOURCES

6.23.2.1. Programmatic Agreement

The CONSULTANT shall work with the STATE, CITY, and the Washington Office of Archaeology and Historic Preservation (OAHP) to develop a Programmatic Agreement in support of the Section 106 Review process. The purpose of this effort will be to assist in the development of appropriate language for the Programmatic Agreement that clearly identifies cultural and historic resource mitigation measures that shall be implemented during the planned construction of the preferred project alternative. This effort will be based on prior efforts involved in the preparation of the Archaeology and Historic Resources technical memos supporting the EIS as well as the Archaeology Treatment and Monitoring Plan.

The CONSULTANT shall attend up to twelve (12) coordination meetings with up to four (4) attendees per meeting as directed by the STATE and CITY. The CONSULTANT will help to

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facilitate these meetings, including setting meeting dates, reserving meeting rooms, extending meeting invitations to all appropriate parties, and coordinating with meeting participants to set meeting agendas. Summary notes will be taken at every meeting attended and will be distributed in draft and final copy. The CONSULTANT will provide opinions and recommendations to assist in the development of the specific language to be included in the Programmatic Agreement. Additionally, the CONSULTANT shall prepare the draft and final versions of the Programmatic Agreement in preparation for agency signature prior to the finalization of the EIS ROD.

PRODUCTS:

- Twelve (12) sets of coordination meeting notes – 15 copies.
- Draft Programmatic Agreement – 15 copies.
- Final Programmatic Agreement – 25 copies.

6.23.2.2. Archaeological Treatment and Monitoring Plans

The CONSULTANT shall prepare a combined Treatment and Monitoring Plan document for the preferred alternative. This will address archeological resources that may be significant and that may be encountered during construction excavation for the project.

The Treatment Plan would incorporate federal and state guidelines and regulations and include:

- a research design that outlines pertinent research questions with field and laboratory techniques with an explanation of their relevance and importance;
- methods to be used in data analysis, management, curation, and dissemination of project data, including a schedule;
- measures which will be used for the recovery, analysis, treatment, and disposition of human remains and which reflect the preferences of the affected Tribes;
- appropriate courses of treatment and data recovery techniques for different kinds of archaeological resources;
- identification of a curation repository;
- qualifications of the professional archaeologists employed to implement the treatment plan.

The Monitoring Plan will designate a construction monitoring plan that indicates that archaeologists are involved in construction planning and scheduling to protect undiscovered archaeological resources. The monitoring plan shall include:

- a discussion of construction techniques;
- an outline of monitoring procedures;
- a discussion of communication protocol between professional archaeologists, inspectors, and construction personnel;
- a description of monitoring techniques, including identification of resources and procedures to stop construction and evaluate resources;
- reporting requirements to document construction monitoring.

Development of the Draft Treatment and Monitoring Plans would require coordination with the STATE, OAHP, and the affected Tribes and production of a document for review by the STATE, OAHP, and the affected Tribes.

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PRODUCTS:

- Draft Treatment and Monitoring Plan - 15 copies.
- Final Treatment and Monitoring Plan - 25 copies.

6.23.3. USER-FRIENDLY EIS

The CONSULTANT shall prepare a user-friendly EIS that will contain all sections required by FHWA, WSDOT, and City of Seattle NEPA/SEPA regulations and guidance as originally scoped following WSDOT procedures and guidance. This is an entirely new product in addition to the technical studies and documentation.

The new user-friendly EIS is necessary to meet the Secretary of Transportation's direction that these documents are to be useful to both the general public and decision makers. In order to make the document more understandable to the general public, it will be written in the form of a series of questions and answers. For example, "What alternatives were considered for the EIS?" and "What alternatives were selected for further study?" Answers to these questions will be written in simple language using minimal technical jargon and will be well-supported by graphics. Discussion of project impacts, mitigation and benefits will be merged to make the project's net effect as clear as possible. The user-friendly documents will be supported by a parallel set of detailed technical reports. The technical reports will resemble in substance the traditional WSDOT EIS. This approach will be applied to both the Draft and Final EIS. The Final EIS will also include responses to comments received on the Draft EIS, as previously described in Item 6.20.

The CONSULTANT shall perform the following:

(A) **Prepare Text of the EIS:** In the original scope of work, the majority of the technical authors were to prepare text that would be directly incorporated into the EIS. To produce the user-friendly EIS, the CONSULTANT shall completely re-write the more detailed information in the discipline reports and technical memoranda. Where needed, we will coordinate with the technical authors to make sure the technical analysis is accurately presented in the EIS document. We will write the text consistent with the guidelines provided by the lead agencies to produce a user-friendly EIS and will ensure the text reflects a single voice and style and is consistent throughout the document. Graphics (maps, charts, and figures) will be used throughout the user-friendly EIS.

(B) **Prepare Preliminary and Camera-Ready EIS:** The CONSULTANT shall prepare the Preliminary EIS for review by the lead agencies. The technical writers will then make revisions to the document to produce the Camera-Ready EIS.

(C) **Prepare Record of Decision:** After the Final EIS is issued, the consultant will prepare the Record of Decision as previously described in Item 6.22.

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ASSUMPTIONS:

- The lead agencies will review and approve an outline for the user-friendly EIS in advance of the Preliminary EIS.
- The user-friendly EIS will incorporate graphics in addition to those specified by WSDOT guidance.
- Technical memoranda and discipline reports will be produced as supporting materials for the EIS. These will include all sections previously planned as EIS text.
- Review process and number of copies described in the current scope of work is unchanged.

PRODUCTS:

- Draft User-friendly EIS outline - 10 copies.
- Final User-friendly EIS outline - 25 copies.
- Preliminary DEIS, version 1 - 50 copies.
- Revised preliminary DEIS, revised to respond to comments on version 1 - 50 copies.
- Camera-ready DEIS.
- Preliminary FEIS, version 1 - 50 copies.
- Revised preliminary FEIS, revised to respond to lead agency comments on version 1 - 50 copies.
- Camera-ready FEIS.

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7.1. PUBLIC EVENTS

7.1.7. Adjacent Project Related Events

In recognizing the need to educate the broader community, maximize participation in adjacent projects' events to share updated information about the project.

The CONSULTANT shall be responsible for responding to requests and working with adjacent projects and groups to coordinate team level of participation, team resource attendance, producing materials, delivering, setting up and taking down displays, drafting and running presentation (when applicable), attending those projects or group's events, including open houses, forums, workshops, etc. The CONSULTANT will also record any comments and questions asked during the event and prepare a summary for inclusion in the comment database.

ASSUMPTIONS:

- It is assumed that seventy-two (72) events will be held over the twenty-four (24) month period and one (1) CONSULTANT staff persons will attend each meeting.
- It is assumed that six (6) hours will be required for preparation, participation, and follow-up by each CONSULTANT participant.

PRODUCTS:

- Regularly updated events calendar.
- Updated list of requests to attend.
- Up to date materials for any last minute requests.
- Event summaries (up to 3 per month).

7.1.8. Site Tours

Provide an opportunity for targeted interests (i.e., leadership group members, elected officials, press,) to tour facilities connected to the project, including the Alaskan Way Viaduct and Seawall. The site tours would serve as a way to educate the targeted interests and allow them to see first hand structural conditions.

The CONSULTANT shall be responsible for coordinating with the State on closures for the Viaduct and arranging tours of the structure, seawall, and surrounding areas of interest during that time. Responsibility of the CONSULTANT includes:

- Identify potential attendees and tailor tour to their specific interests. Draft invitation, contact individuals, and maintain RSVP list. Communicate with invitees as needed.
- Draft tour plan, including arranging logistic details including transportation, ADA, parking, and safety.
- Draft and produce materials for tour.
- Draft press release and work with team to distribute release. Assist press with any special requests, needs or materials.
- Coordinate team resources and scheduling issues, identify speakers and draft talking points.
- Attend and support tour.

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ASSUMPTIONS:

- It is assumed that up to four (4) events will be held over the twenty-four (24) month period and up to two (2) CONSULTANT staff persons will attend each tour for up to four (4) hours.
- It is assumed that eighty (80) hours will be required for preparation of each tour.

PRODUCTS:

- Four (4) bi-annual site tours.
- Meeting logistics and materials (handouts, key messages, talking points) for four (4) meetings. It is assumed that for each site tour, up to 50 packets will be made available. It is also assumed that up to 50 participants will attend each meeting.

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Task 14.8 TRANSPORTATION ANALYSIS OF DESIGN PLANS

14.8. CONTINUED TRANSPORTATION ANALYSIS

This task will provide continued traffic and transportation support of the project EIS process. Changes to the design plan alternatives because of the recent CEVP process has required updated traffic and transportation analyses for inclusion in environmental review process.

Traffic analysis technical support will be provided for the completion of the final draft of the Transportation Discipline Report, the writing of draft EIS, responses to public comments and final technical revisions for Final EIS.

The CONSULTANT shall perform the following:

(A) **Finalize traffic analyses for final five design plan alternatives and alternative options.** This sub task will address analysis required because of recent CEVP-recommended changes for the following design plans and supplemental options:

- a. Rebuild
- b. Aerial
- c. Tunnel
- d. Bypass Tunnel
- e. Surface

(B) **Complete Transportation Discipline Report for all five design plans and alternative scenarios.** This sub task addresses the work needed to complete analysis of an additional design plan alternative, plus alternative options for each design plan.

(C) **Provide technical support for draft and final DEIS.** Technical analyses, coordination meetings and written materials including graphics, tables and narrative supplementing information documented in Discipline Report. Support will be provided for development of draft and final DEIS as needed through the Record of Decision.

ASSUMPTIONS:

- Design plan alternatives and alternative options are complete and not subject to change.

DELIVERABLES:

- Completed traffic model chains for five design plans and alternative options.
- Transportation Discipline Report with the analysis supporting the addition of a design plan alternative, plus an alternative option scenario for each of the five design plans.
- Supplemental traffic and transportation analyses technical memoranda as necessary to support EIS process.
- Coordination with various subject-area discipline and technical report teams as needed as well as staff leads from client agencies. Coordinate with authors of EIS as they develop and refine draft and final EIS documents.

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SW4.7. SEAWALL DESIGN UPDATE

SW4.7.1. Seawall Redesign to Eliminate Drilled Shafts

This task will optimize the design of the Seawall rebuild alternative by eliminating the drilled shafts if possible. The current Seawall rebuild alternative utilizes drilled shafts at the face of the proposed jet grout soil improvement. The shafts provide the following functions in the current seawall rebuild design:

- Anchor the block of soil improvement by strengthening the toe of the improved soil block
- Prevent erosion of the improved soil due to exposure to water and wave action
- Provide a secure mechanism of supporting a new, mostly architectural facing of the Type B Seawall
- Provide a secure mechanism of supporting the existing concrete face panels of the Type A Seawall.

The shafts represent a significant cost and time impact to the project. Preliminary analyses indicate that they may be eliminated if the width of the jet grout soil improvement is increased. The analysis techniques used for the preliminary analyses may not be applicable and the cost and schedule trade-offs between shafts and jet grout volume has not been investigated. This task proposes to develop the analysis techniques that would be used for final design of the Seawall rebuild and utilize those techniques to investigate the possible elimination of the shafts.

The Seawall rebuild alternative will be analyzed using finite difference techniques (FLAC). This program allows the specification of both structural and soil properties, including the degradation in shear strength of liquefied soil. Criteria will be established for evaluation performance of the grouted soil assuming behavior as a soil medium. In addition to the FLAC analysis work, details will be developed for facing options both with and without shafts.

The CONSULTANT shall perform the following:

(A) Select Design Sections to be Analyzed and Develop Material Properties and Computer Models: It is proposed that two locations be analyzed along the waterfront, one Type A Seawall section and one Type B Seawall section. Two models will be developed at each section, one with shafts and one without. The sections to be analyzed will be determined in consultation with WSDOT and the City of Seattle staff. Geotechnical properties required for the FLAC analysis will be prepared from existing data as available. Two-dimensional FLAC models will be prepared at each location.

(B) Perform FLAC Analysis: The analysis will initially be performed for the rare earthquake (RE) with a return period of 2,500 years. The performance of the jet grout will be evaluated and the volume of jet grout reduced or increased as required to provide acceptable performance. Similarly, for alternatives with shafts, the shaft spacing may also be varied. At least one successful configuration will be analyzed for the expected earthquake (EE) with a return period of 100 years to assess the anticipated performance of the jet grout for smaller events.

(C) Develop Wall Face Details for Type B Seawall: Details for attaching a new Type B wall face to the jet grouted soil will be developed.

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(D) **Develop Wall Face Details for Type A Seawall:** Details for attaching the existing Type A wall face to the jet grouted soil will be developed.

(E) **Conceptual Cost Estimating:** Cost for alternatives with and without shafts will be prepared. Conceptual project cost estimates will be updated to reflect the configuration of the preferred alternative.

(F) **Summary Report:** Results of all subtasks will be compiled in a summary report that includes recommendations regarding the elimination of the shafts and proposed methods of attaching wall facings to the jet grouted soil. Conceptual level drawings will also be included in the summary report.

(G) **Engineering Support for EIS:** Graphics and written input will be provided describing the construction procedures for the seawall rebuild so that environmental team members can evaluate construction impacts.

ASSUMPTIONS:

- FLAC analyses will be performed assuming the jet-grouted soil will behave primarily as soil medium with improved properties.
- Progress on the work will be presented at monthly Seawall meetings. It is anticipated that the work will take approximately 6 months to complete.
- Drawings will be developed to same conceptual level as previously submitted design plan drawings.
- Conceptual level cost estimates will be performed per Task 19.7B. 6.6

DELIVERABLES:

- A summary report will be prepared describing configurations tested, comparative costs for each and recommendations resulting from analyses.
- The details of the FLAC analyses will be described in a separate geotechnical report that may be bound with the summary report if preferred by WSDOT and the City of Seattle.
- Input to the EIS will be in the form of a draft and final written description of the seawall rebuild construction procedures suitable for inclusion in a Biological Assessment (BA) for the project to be prepared to WSDOT/FHWA standards.

SW4.7.2. Pilot Program For Seawall Jet Grouting

Plans and specifications for constructing a test section of the Seawall rebuild will be prepared to the 30% completion level. Once the construction cost and scope of the work has been more accurately defined through the 30% design effort, this task may be amended to proceed with completion of the PS&E for the test section.

The test section, when completed, would provide valuable feedback and information regarding the proposed approach(s) for bidding the work on a larger scale and would serve as a comprehensive geotechnical exploration for future bidders of the Seawall rebuild. This may reduce project risks (real or perceived) associated with performing the work in close proximity to the seawall, which may be fragile in places, and in close proximity to the water, which may be contaminated by the work. Both of these constraints, as well as the soil conditions at the site may require greater limitations on the methods to be used.

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The test section program would attempt to investigate the performance of one or more methods with respect to the following:

1. Quality of the improved soil obtained.
2. Time required for completing the work.
3. Disruption to the public (traffic, noise, other)
4. Ability to administer construction.
5. Control water quality outboard of the wall.
6. Control of damage to existing Seawall elements.
7. Impacts to utilities.
8. Amount and control of spoils obtained.

Installation of a new wall fascia or attachment of the existing Type A Seawall fascia to the soil improvement could also be included in the test program to verify the proposed temporary erosion and sediment control plans for the work.

A likely candidate for the location of the test section is the area just north of Union. This area is to be improved under all current project plans. A disadvantage of selecting this section is that it is a Type A Seawall and may not represent the most severe conditions. It also does not allow a test of installing the new wall fascia. The section to be improved will be determined in consultation with WSDOT and City of Seattle staff.

The plans and specifications will include provisions for construction monitoring and verification of the test section. It is anticipated that this will consist of coring, sampling and/or other non-destructive means of verifying the integrity of the grouted soil mass.

The CONSULTANT shall perform the following:

(A) **Select Location and Configuration of Test Section:** Determine the location of the test section and the area to be improved.

(B) **Prepare 30% Plans:** A jet grout improvement pattern will be established using the results of TASK 19.4.1. Potential utility relocations will then be identified and the pattern modified to reduce the amount of utility relocation work if possible. Preliminary traffic control plans will also be prepared.

(C) **Prepare Preliminary Construction Monitoring Plan:** A preliminary plan for monitoring the construction of the test section and verifying the completed test section quality will be prepared.

(D) **Prepare Preliminary Test Section Construction Sequence and Schedule:** A preliminary schedule for the work will be prepared using Microsoft Project.

(E) **Prepare Draft Specifications:** Draft specifications will be prepared for the jet grout procedure. Construction monitoring requirements to be provided by the contractor will be identified as well as time constraints identified from the schedule analysis.

(F) **Cost Estimating:** A cost estimate for the test section will be prepared, including costs for construction administration and monitoring per Task 19.7.5.

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ASSUMPTIONS:

- Progress on the work will be presented at monthly seawall meetings.
- It is anticipated that the work will take approximately 3 to 4 months to complete and will be performed sequentially with TASK 19.4.1 so that the planning of the test sections will incorporate the results of the seawall redesign and will closely resemble the anticipated final design for seawall rebuild.
- 30% Plans, Specifications and Estimates (PS&E) for a test section will be prepared to SDOT standards.
- Coordination with the public about the test program will not be undertaken at this time, but will be deferred to immediately after the 30% plan is prepared so that the scope of what is to be done is better understood. Public input on the 30% plan will be incorporated in the completion of the PS&E for the test section.
- Assumes the drilled shafts can be eliminated from the design.

DELIVERABLES:

- Drawings for the test section at 30% level of completion .A drawing list for the test section is anticipated to include the following. The number of drawings may be dependent on the size and location of the test section.

TITLE PAGE AND VICINITY MAP
SUMMARY OF QUANTITIES
TEMPORARY UTILITY RELOCATIONS
TEMPORARY EROSION AND SEDIMENT CONTROL
TRAFFIC CONTROL PLANS
JET GROUT DETAILS
WALL FACE DETAILS
PAVEMENT RESTORATION

- Preliminary construction monitoring plan
- Preliminary test section construction sequence and schedule
- Draft test section specifications
- Cost estimate for the test section

SW4.7.3. Develop Short-Term Seawall Stabilization Plan

The recent grouting project at Waterfront Park resulted in several discoveries indicating the Seawall may be more vulnerable to movements than originally thought. This vulnerability indicates the need to develop a strategy for stabilizing the Seawall for the near term (next 10 to 20 years) until funding is found for construction of the Alaskan Way Viaduct and Seawall Replacement project. Two possible short term strategies might be:

1. Develop emergency stabilization procedures now, monitor the wall for movements and implement the emergency actions when and if the need arises.
2. Identify specific areas of concern and implement isolated measures in the near future (next one or two years) that stabilize the worst section of wall for operational loadings but not earthquakes.

The CONSULTANT shall perform the following:

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(A) **Develop Wall Monitoring Requirements:** Recognizing that monitoring the entire length of the wall may not be practical, the existing test pit information, previous geoprobe data and knowledge of the wall will be reviewed to determine those portions of the Seawall most likely to exhibit movements in the near future. This information can be used to establish which portions of the wall to monitor with “real-time” movement detection devices similar to those recently installed at Waterfront Park.

(B) **Develop Design Criteria:** Performance/design criteria will be developed for up to two different levels of stabilization. Those are anticipated to be:

1. Emergency stabilization for operational loads only with minimal life expectancy. These would be installed only if Seawall movements or other deterioration warrants the action. These are likely to be easily installed means of stabilizing the wall. An example might be to install some tie backs or possibly pin-piles anchored to the heel of the concrete wall panel.
2. Short term stabilization for operational loads only with longer life expectancy. These are more carefully implemented soon where problems are likely to occur. These may of some version of the emergency stabilization concepts described above, reconstruction of portions of the relieving platform and/or limited amounts of jet grouting.

(C) **Develop Emergency Stabilization Concepts:** Up to three emergency stabilization concepts will be developed that can be utilized to stabilize the sections of the wall most likely to exhibit movements and which are being monitored.

(D) **Develop Short Term Stabilization Concepts:** Up to two short term stabilization concepts will be developed that can be utilized to stabilize the sections of the wall most likely to exhibit movements.

(E) **Cost Estimating:** Costs for the stabilization strategies will be developed. These will include initial costs as well as anticipated life cycle costs.

(F) **Summary Report:** Results of all subtasks will be compiled in a summary report that includes, to the extent possible and in collaboration with WSDOT and City Staff, recommendations regarding the best short term stabilization strategy for the wall.

ASSUMPTIONS:

- Details of the monitoring methods and procedures will be provided by the City of Seattle.
- Progress on the work will be presented at monthly seawall meetings.
- Drawings will be developed to same conceptual level as previously submitted design plan drawings.

DELIVERABLES:

- A summary report will be prepared describing the stabilization concepts, their costs and assessing their relative effectiveness of achieving the goals of two stabilization strategies described previously.

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EA ELLIOTT AVENUE TO ALASKAN WAY UNDERPASS

This scope of services details the work effort to prepare Plans, Specifications, and Estimates (PS&E) for the Elliott Avenue-to-Alaskan Way Underpass project. This project proposes to construct a new road connection that extends from the westerly most end of Broad Street to the intersection of Bay Street and Elliott Avenue, passing under the existing BNSF Railroad tracks. The project features include one (1) northbound and one (1) southbound lane with reduced inside and outside shoulders, intersection improvements at Broad Street and Bay Street/Elliott Avenue, a BNSF railroad bridge, stormwater conveyance, signing and striping, traffic signals, fire/life safety, illumination, utility relocation and system planning. In addition, necessary improvements to intersecting cross streets through the project area, such as Broad Street will be made.

It is anticipated that an environmental review will be conducted to meet the requirements of the Washington State Environmental Policy Act (SEPA) only. The Environmental Review for Air and Noise will be prepared in accordance with the procedures set forth in the STATE Environmental Procedures Manual, the SEPA checklist will be prepared in accordance with City of Seattle SEPA regulations. The Final Design contract plans will be prepared in accordance with both the City of Seattle Design Manual, as revised at the date of authorization for this Project, and the Washington Local Agency Guidelines in effect at the date of authorization for this Project.

General Assumptions

- The duration of the scope of services is assumed to be 12 months from project start date.
- It is assumed that the underpass is configured as shown in the Conceptual Tunnel Plan drawings dated April 11, 2003.
- The surveying and basemapping for the entire project site will be conducted by the CONSULTANT, with the STATE providing suitable as-built, utility, and right-of-way information, as well as assessor's maps, to support these efforts and the final design efforts. It is anticipated that the City of Seattle will also provide suitable as-built, utility, right-of-way information, and assessor's maps.
- It is assumed the City of Seattle will provide updated right-of-way and property ownership information.
- It is assumed the City of Seattle will obtain the needed right of entry into the BNSF right-of-way.
- The project limits are set at Broad Street and Bay Street/Elliott Avenue.
- It is assumed the CONSULTANT will utilize the following computer software, or compatible software, for the Project:
 - Microsoft Office - Version 95 (or latest)
 - Microsoft Project – Version 4.1 (or latest)
 - Microsoft Word – Latest Version
 - Microsoft Excel – Latest Version
 - Internet Access with TCP/FTP capabilities and E-mail address
 - CADD MicroStation – Version J
 - Design Software – CaiCE Software Corp. Version 6.1.7 (or latest)
- English units shall be used for plans and engineering, right-of-way plans and environmental documents.
- Formal preparation of Deviations will not be required for approval.
- Preparation of separate Channelization Plans will not be required for approval.
- Formal preparation of a Design File will not be required for this phase of the project.

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- The Right-of-Way plans are assumed to be prepared by the City of Seattle. However, if requested by the STATE, the CONSULTANT shall prepare the Right-of-Way plans and will prepare a scope and estimate for this extra work.
- The STATE will provide a Surfacing Report detailing the new pavement structural section elements.
- All plans shall be developed at a scale of 1"=50', with the exception of the Traffic Intersection plans, which shall be developed at a scale of 1"=20'.

Project Management and Administration

The CONSULTANT shall be solely responsible for the active coordination and management of all aspects of this work in accordance with the provisions of the AGREEMENT. The CONSULTANT shall designate a Project Manager who will provide ongoing management to ensure that quality work is completed on time and within the AGREEMENT budget. The CONSULTANT shall identify and resolve issues in a timely manner, communicate effectively, and ensure the accuracy and overall quality of the work and work products. The CONSULTANT shall provide project administration and coordination with the STATE and all subconsultants to facilitate efficient progress and timely completion of the work. The CONSULTANT shall be responsible for the performance of all services, and shall furnish materials and information to accomplish the following:

WORK ELEMENT EA-100

PROJECT MANAGEMENT AND ADMINISTRATION

EA-100.1 Project Implementation Plan/Project Quality Control Plan

The CONSULTANT shall prepare a Project Implementation Plan that will organize Project Management and project production information, as well as communicate the project production plan to the project team for all major work elements of the PS&E contract documents. The plan shall articulate a set of project instructions, controls and communications protocol that shall achieve high technical quality and allow all stakeholders and design team members to understand and agree on essential project information and expectations.

EA-100.2 Project Coordination

The CONSULTANT shall provide the management services to effect overall supervision of the CONSULTANT's work, as follows: Provide primary liaison with the designated representatives of the STATE in all contract matters, shall oversee the allocation of work to subconsultants, and, as needed, to other offices of the CONSULTANT, and shall maintain the management information system reports, as needed, to correct or adjust Project activities which are diverting from the established scope, quality, schedule, or cost baselines. In general, CONSULTANT shall carry out by allocation and delegation all authorized work in accord with the established and agreed upon direction from the STATE.

The CONSULTANT shall manage project design and environmental documentation; verify that regular detailed work reviews are performed; monitor the cost and progress of design against the baseline budget and schedule; direct the development of technical work scopes, budgets, and schedules for additional work requests and subcontracts. Where work has been subcontracted, direct and monitor the subconsultants' work activities with regard to conformance with established criteria and design directives; monitor budget, progress, and cost.

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EA-100.5 Project Schedule

The CONSULTANT's first order of work shall be to prepare the project schedule. The schedule shall be prepared using Microsoft Project 98 in a format approved by the STATE and shall show task durations, deliverables, and milestone dates for the events necessary to complete each task. This schedule shall also identify the duration for in-house and STATE reviews. The duration between draft and final submittals shall allow adequate time for a two (2) week STATE distribution and review, and to allow the CONSULTANT two (2) weeks to document responses to and incorporate comments into the final version of the submittal.

WORK ELEMENT EA-101 COORDINATION/MEETINGS

EA-101.1 Agency Coordination/Meetings

The CONSULTANT shall attend, coordinate, and participate in up to six (6) Executive Committee meetings lasting up to two (2) hours per meeting with up to six (6) people.

EA-101.2 Weekly Progress Meetings with STATE

Weekly progress Meetings with the STATE and STATE shall be conducted by the CONSULTANT.

EA-101.3 Coordination Meeting with Consultant Team

The CONSULTANT shall meet with contracted subconsultants for a project kick-off meeting.

EA-101.4 In-House Progress Meetings

The CONSULTANT shall meet to review the progress of the design and documentation process.

EA-101.5 Meetings/Coordination with Other Agencies

The CONSULTANT shall coordinate and participate in up to 6 meetings with public agencies other than the project Executive Committee with up to four (4) people in attendance. The CONSULTANT shall prepare and provide meeting notes for these meetings and provide copies to the attendees.

EA-101.6 Public Hearings/Meetings

The CONSULTANT will attend public hearings and meetings as necessary to support the processing and approval of pending permit applications.

WORK ELEMENT EA-102 PUBLIC AND AGENCY INVOLVEMENT

The CONSULTANT will prepare a public involvement plan that identifies the strategy, objectives, schedule, stakeholders, and activities that will inform and engage the community about the project as well as meet regulatory requirements. The public involvement plan will take advantage of activities already being conducted as part of the Alaskan Way Viaduct and Seawall Replacement project and ensure that efforts are coordinated.

WORK ELEMENT EA-103 SURVEYING AND BASEMAPPING

It is assumed that the CONSULTANT shall perform all ground and office survey work for the entire project site to support all PS&E design efforts. Survey estimates assume 2 crew days of a 2-person crew to perform initial survey of project site. The basemaps shall contain all surface features and shall include all existing surface, underground and overhead utilities on appropriate

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layering levels. As noted under the General Assumptions, it is assumed that the City of Seattle will obtain and provide to the CONSULTANT the right of entry to the BNSF Railroad right of way. As further noted under the General Assumptions, it is assumed that the STATE and/or the City of Seattle will provide the CONSULTANT with as-built information and assessor's maps. Horizontal and vertical control shall be established consistent with City datums, using NAD 83/91 and NAVD 1988, respectively. The CONSULTANT shall field-verify the existing base map information furnished by the STATE, the City of Seattle, utility providers, and others. The CONSULTANT shall coordinate with the BNSF Railroad to schedule survey work needed with the Railroad right-of-way. The CONSULTANT shall coordinate with the private utility companies and request paint-outs prior to survey of existing underground utilities.

WORK ELEMENT EA-104 PLANS, SPECIFICATIONS, & ESTIMATES (PS&E)

The CONSULTANT shall prepare plans, specifications and estimates as the final documents required for the advertisement of the project, in accordance with City of Seattle design guidelines in effect at the date of authorization of the Project, STATE design guidelines in effect at the date of authorization of the Project, and the STATE Plan Preparation Manual / Local Agency Guidelines in effect at the date of authorization of the Project. This project assumes bid package, with one (1) volume, containing Civil, Traffic, and Structural elements. All intermediate, 90%, EA-100% and Proof Copy review plan submittals shall be ½ size (11"x17") bond hard copies, reflecting a drawing scale of one inch equals fifty feet (1"=50'). Each plan submittal will be reviewed and revised according to the Project Quality Control plan. Each plan submittal will be reviewed internally by the CONSULTANT, implementing redline comments prior to submittal to and review by the STATE. The CONSULTANT shall review, incorporate and respond to comments made by reviewing partners, documenting the comment review/comment response efforts. The CONSULTANT assumes one (1) review cycle per plan submittal with all comments to be compiled by the reviewing partners before submittal to the CONSULTANT.

It is assumed that any deviations from the City of Seattle and/or STATE policies and guideline practices will be approved with an informal deviation documentation and approval process, to be determined by the STATE. Any formal preparation of deviations that require approval by the STATE will be considered extra work.

WORK ELEMENT EA-105 GEOTECHNICAL INVESTIGATIONS

The CONSULTANT shall perform a geotechnical evaluation and prepare a soils report in accordance with the STATE guidelines. The soils report is to be performed in two stages to allow the early identification of sensitive areas to be avoided during the early stages of preliminary design.

WORK ELEMENT EA-106 STRUCTURES

For the purposes of this scope of services and the budget estimate the following structures and structure types are assumed:

- **Excavation Support Walls** will consist of rigid diaphragm wall system utilizing reinforced concrete slurry panels with tie-backs and/or internal bracing.
- **Cut-and Cover Tunnel** will be a depressed roadway using reinforced concrete slab and walls.

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- **BNSF Railroad Bridge** will be a minimum depth (possibly through-girder type) bridge designed to American Railway Engineering and Maintenance of Way Association (AREMA) and WSDOT Bridge Design Manual standards.
- **Miscellaneous Structures and Foundations** will consist of drainage structures and sumps associated with the cut-and-cover tunnel. Foundations for light standards, sign bridges, control cabinets, etc. are also included. The site- specific soils and topographic conditions will be reviewed to verify that standard foundations are applicable. If standard foundations cannot be used due to adverse site conditions, special foundations will be designed and detailed for the contract plans. It is assumed that no more than 25% of all foundations will be non-standard.
- **Demolition of Existing Structures** will indicate limits of removal of existing structures on the construction site.

If the actual structural design scope differs from the assumptions stated above, the design budget shall be adjusted by a supplemental agreement.

WORK ELEMENT EA-107

AIR QUALITY & NOISE TECHNICAL ANALYSES

EA-107.1 Air Quality Analysis

The CONSULTANT shall prepare Draft and Final Air Quality Technical Reports, which will describe the methodologies, approaches, and assumptions used in the analysis.

EA-107.2 Noise Technical Analysis

The CONSULTANT shall conduct a noise study for the project area based on the guidelines presented in the current Federal Aid Policy Guide, Sub-Chapter H, Part 772 and the WSDOT State Highway Policy Procedures. The EIS shall contain sufficient information about the noise analyses to determine impacts under FHWA criteria for the alternatives, reasonableness and feasibility of mitigation where appropriate, and support the decision for a Preferred Alternative. The CONSULTANT shall prepare Draft and Final Noise and Vibration Technical Reports documenting the procedures and results. The report shall follow the WSDOT Noise Study outline (Env. Procedures Manual Section 446).

WORK ELEMENT EA-108 PERMITTING

ENVIRONMENTAL REVIEW AND LAND USE

EA-108.1 Environmental Analysis

Environmental documentation for the Elliott Avenue-to-Alaskan Way Undepass will include preparation of an Expanded Environmental Checklist under the Washington State Environmental Policy Act (SEPA) and Seattle City Code. Primary guidance for the Environmental Documentation will be SEPA Guidelines WAC 197-11. It is assumed that one (1) build alternative will be analyzed. The goal of analysis is development of mitigation measures to be incorporated into the project to reduce impacts to make the project eligible for a Mitigated Determination of Non-Significance pursuant to WAC 197-11-350.

All analysis will conform to the standards of the Washington State Department of Transportation Environmental Procedures Manual and the STATE Environmental Codes and Procedures in effect at the date of authorization of the Project.

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EA-108.2 Permitting

Preparation of permit applications will include discretionary land use approvals including a Master Use Permit and Shoreline Management Substantial Development Permit. It is assumed that the preparation of all required construction permits shall be prepared by others. In addition, it is assumed that the acquisition of easements required for the construction of the project shall be performed by others.

WORK ELEMENT EA-109 PLAN SUBMITTALS AND REVIEWS

EA-109.1 Plan Submittals

The following submittals are anticipated and included in this Scope of Work:

1. Preliminary Submittal (30%) – Contract drawings up to a 30% level. Not all Contract drawings will be submitted at this time; only those drawings necessary for defining the project scope and enabling reviewers to comment on the preliminary approach and layout of project elements. Quantities and a preliminary cost estimate will be provided.
2. 60% Submittal – Contract drawings up to a 60% level. Most anticipated contract drawings will be submitted at this time, possibly excluding a few detail sheets. Updated quantities and an updated cost estimate will be submitted for the 60% submittal. An outline of the Special Provisions needed for the project will be provided. Comments on the preliminary submittal (30%) will be incorporated as appropriate into the 60% submittal.
3. 90% Submittal – Contract drawings up to a 90% level, with the 60% review comments incorporated into the 90% drawings as appropriate. All contract drawings anticipated to be needed for the final contract drawing set will be submitted at this time. An updated quantities and cost estimate, with 60% review comments and Special Provisions based on the 60% Special Provisions outline incorporated, will be provided as part of the 90% submittal.
4. EA-100% Submittal – All contract drawings, with the 90% review comments incorporated into the EA-100% drawings as appropriate, will be submitted for this submittal. An updated quantities and cost estimate, with the 90% review comments incorporated, will be included. This is anticipated to be the final submittal for the quantities and cost estimate. Updated Special Provisions with the 90% review comments incorporated (as appropriate) will be submitted at this time.
5. Final Submittal (Bid Set) – All contract drawings and Special Provisions with appropriate EA-100% review comments will be incorporated for this final submittal. Final stamped and signed mylars and electronic copies of the contract drawings and Special Provisions will be submitted at this time.

For the 30%, 60% and 90% submittals, twenty-five (25) half-size sets of the contract drawings other than the Mechanical/Electrical drawings will be submitted. Ten (10) sets of the Mechanical/Electrical drawings will be submitted for the 30%, 60%, and 90% submittals. For the 30%, 60%, 90% and EA-100% submittals, three (3) copies of the quantities and cost estimates will be submitted. One copy of pertinent calculations will be submitted at 100% completion. One copy of the Special Provisions outline will be submitted at 60% completion. Twenty-five (25) copies of the Special Provisions will be submitted with the 90% and 100% submittals. Thirty-five (35) copies of the Special Provisions, thirty (30) half-size sets, and five (5) full-size sets of the contract drawings will be submitted for the final submittal.

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EA-109.2 Submittal Reviews

This scope assumes a maximum three-week review period for the 30%, 60% and 90% submittals. All review comments will be compiled by the STATE into one review comment set, for each of the submittals transmitted to the CONSULTANT within this three-week submittal review period. This scope assumes a maximum two-week review period for the 100% submittal. The 100% submittal review comments will be compiled by the STATE into one review comment set and transmitted to the CONSULTANT within a two-week 100% submittal review period.

The STATE will be responsible for coordinating and compiling all agency reviews during the previously mentioned review periods.

After the CONSULTANT receives the submittal review comments from the STATE, the CONSULTANT will respond to these comments in a formal response process. It is anticipated that this process will include formal responses to the review comments, which describe the action taken. The comment will either be incorporated (with a description of how this was done), or the reasons why an exception to the comment was taken will be documented. Unresolved comments will be addressed between the STATE and the CONSULTANT in comment review meetings.

WORK ELEMENT EA-110 QUALITY ASSURANCE/QUALITY CONTROL

EA-110.1 Quality Control/Assurance Plan Update

The Project Quality Control Assurance Plan shall be updated by the CONSULTANT and submitted to the STATE. The plan will identify all contract deliverables and the responsible party for reviewing and documenting Quality Assurance/Quality Control (QA/QC) comments with follow-up.

EA-110.2 Quality Control/Assurance Plan Implementation

Per the QA/QC Plan updated in item EA-100.1, the CONSULTANT shall implement QA/QC reviews on all deliverables throughout the duration of the project.