

I-5 / Everett HOV Design-Build Project

REQUEST FOR PROPOSALS

CHAPTER 2 TECHNICAL SPECIFICATIONS

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Vacant

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Vacant

Bridge

Drainage

Roadside Restoration and Aesthetics

Vacant

Illumination

Signal

Intelligent Transportation Systems (ITS)

Pavement Marking

Maintenance of Traffic (MOT)

Vacant

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2 TECHNICAL SPECIFICATIONS

2.1 GENERAL INFORMATION

2.1.1 General Requirements

Design-Build Flexibility. The Department’s intent is to permit flexibility in design and subsequent construction to accommodate processes, procedures, and innovative techniques that are preferred by the Design-Builder, as long as they are consistent with site conditions, good engineering practices, and the standards, guidelines, and procedures identified in the Contract Documents.

Other Agencies. The Department has briefly reviewed the Project with the local agencies, public and private, and has incorporated some of those agencies’ feedback into this chapter and in the various appendices. The Department does not guarantee that the agencies will not impose additional requirements with their review of the Design-Builder’s Project design. For any such change that is outside the requirements of the Contract, the Design-Builder is responsible for negotiating and coordinating the Work with the appropriate agency(ies).

2.1.1.1 Document’s Intent

Unless specifically addressed to be performed by others or by WSDOT, all Work described and listed in the Technical Specifications of the Request For Proposal is the responsibility of the Design-Builder to perform, deliver or construct.

2.1.2 Units of Measurement

The Project shall be designed, constructed and documented in English Units of Measure.

2.1.3 Purpose

The purpose of the Project is to construct highway improvements which in general scope is described in Interstate 5 Everett HOV, SR 526 to US 2 Vicinity issued September 2004 Project Environmental Assessment (EA) and modified in the 10 November 2004 FONSI. The general scope of the Work is also shown in *Appendix H – Hydraulic Data, Appendix L – Landscape and Aesthetics Report, Appendix M – Conceptual Designs, Appendix P – Permits and Appendix W – Wetlands Mitigation and other documents included in the RFP.*

2.1.4 Description of Work

Perform, Design, Furnish Materials and Construct all the necessary Work to deliver a complete Project which meets or exceeds the following:

1. Provide and extend the existing I-5 Northbound and Southbound HOV lanes on I-5, from SR 526 vic. to East Marine View Drive.

2. I-5 Northbound Auxiliary lane from 41st St On-Ramp to US-2 Off-Ramp
3. I-5 Southbound Auxiliary lane from Marine View Drive to US-2 Off-Ramp, and from US-2 to Broadway On-Ramp.
4. Reconfigure existing northbound I-5 Off-Ramp at Broadway Avenue into a HOV-Only Southbound On-Ramp and Northbound Off-Ramp.
5. Construct new I-5 general-purpose 2-lane right-hand off-ramp to Broadway Avenue.
6. Reconstruct existing 41st St., Pacific Ave, US-2, Everett Ave. and Marine View Drive On and Off ramps to meet design requirements and provide ramp metering.
7. Provide HOV-By-Pass at ramp meters where no-additional Right of Way is required and in accordance with traffic analysis.
8. Provide stormwater treatment facilities that treat 100% of the existing and proposed impervious surface runoff within the Project limits and meets current regulations.
9. Provide environmental mitigation for the Project as described in the Project EA and Project Permit conditions
10. Meets or exceeds all of the Project permit requirements.
11. Overlay and reconstruct the superelevations and cross-slopes to meet standards within the Asphalt Pavement limits.
12. Other requirements described in the Contract.

2.1.4.1 WSDOT Developed Project Conceptual Designs

The Design-Builder shall develop the Project design so as to meet all the requirements of the Contract Documents. The Project Conceptual Design in Appendix M was developed only to a limited level. If the Design-Builder adopts the Conceptual Design as the basis of the Contract, the Design-Builder is responsible in:

1. Ensuring that the resulting design meets the requirements of the Contract Documents.
2. Assuming responsibility for any Project requirements arising from using the Conceptual Designs as the basis of the Project design and construction.

2.1.4.2 Coordination with Other Projects

Responsible for coordination of the Work with other projects by WSDOT or others that could hinder the progress of the Design-Builder or affect the operation of the roadway other than as approved by WSDOT. This includes roadway closures not in the immediate area of the Project but affect the operation of the roadway.

Several Projects that are known that could possibly occur within the same location or in the immediate vicinity or occur within the projected time for the Project are:

1. Sound Transit: I-5 South Everett Park & Ride / HOV Access – south of the Project
2. WSDOT: SR-529 Bridge Retrofit
3. WSDOT: Seismic Retrofit for Bridge 5/622S-S, Pier No's 1 to 4, Bridge 5/624, Pier No. 2 AD 07-11-2005
4. WSDOT: I-5 – 52nd Avenue West to SR-526 – SB Paving AD 02-06-2006
5. WSDOT: I-5 /SB Off-Ramp – SR-526 Safety Project AD 05-02-2005
6. WSDOT: I-5/SB On-Ramp from Broadway to CD Signalization AD 07-06-2009

7. WSDOT: I-5/Steamboat Slough Bridges 5/648E&W; Scour Repair AD 04-18-2005
8. WSDOT: I-5/SR-526 Interchange Unstable Slope Repair AD 05-04-2009

2.1.5 Project Management Criteria

Manage the entire Project and coordinate all activities necessary to accomplish the requirements of the Contract Documents.

2.1.5.1 Management

Achieve organizational performance that provides to the public a roadway system that incorporates Context Sensitive Solutions, meets the quality described herein at a fair cost, addresses the transportation need, and minimizes the Project impacts on the environment.

Keep communications with the Department continually open to promote betterment opportunities. Continuously look for opportunities to improve efficiency, and at the same time, meet the goals and quality needs described in the Contract. Empower personnel at all organizational levels to meet these goals and their associated tasks.

2.1.5.2 Key Personnel

Key Personnel Directory:

Within seven calendar days of the Notice To Proceed (Contract Execution) and provide a comprehensive Project directory, including the names of the previously committed Key Personnel; their Project office address and location, e-mail address, office, fax number, cellular and/or pager number(s); and their Project title and area(s) of responsibility.

On an organization chart, graphically representing the Project hierarchy and, as a minimum, identify personnel with responsibility for the following functions:

- **Project Management**
- **Quality Control / Quality Assurance**
- **Quality Management**
- **Construction Management**
- **Design Management**
- **Environmental**
- **Environmental Compliance**
- **Subcontracts and Procurement**
- **Design:**
 - Roadway
 - Structures
 - Drainage
 - Geotechnical
 - Advanced Traffic Management System
 - Materials
 - Pavement

- Traffic
- Coordination
- Utilities
- Agencies
- **Safety**
- **Project control**
- **Community Involvement**
- **Public Information**
- **Survey**
- **Materials Testing**
- **Project Closing**
- **Right-of-way (ROW)**
 - Design
 - Appraisal
 - Negotiation
 - Relocation

Changes:

Update the directory throughout the course of the Project. Key personnel cannot be replaced without Department approval. Submit the names and qualifications of the proposed replacement(s) to the Department for advance approval.

2.1.5.3 Communications

2.1.5.3.1 Communication Systems

General:

Establish the communication systems necessary to control all facets of the Project. Maintain communications with the Department, other entities as required for the management of the Project, WSDOT and local and regional emergency response agencies or entities (including the Washington State Highway Patrol), in accordance with the requirement of the Contract Documents. WSDOT will use radio-capable NEXTEL mobile telephones.

WSDOT Web Site and WAN:

Provide e-mail addresses for WSDOT staff compatible with WSDOT's system and maintain capability to access the State web site. Provide the capability for WSDOT staff to connect to the WSDOT email system and other WSDOT network resources. For details of system requirements, see Section 2.1.7-Software.

2.1.5.4 Meetings and Coordination

2.1.5.4.1 Weekly Meetings

Plan and schedule for weekly meetings with the Department Project representatives to discuss Project progress, issues, and planned Work for all phases of design and construction.

Develop the meeting agendas. Provide meeting facilities.

Record minutes of each coordination meeting and distribute copies to the Department participants within five calendar days of the meeting date for the Department's information and confirmation.

2.1.5.4.2 Specialty Meetings

Plan for specialty meetings for safety, quality, public and environmental issues.

2.1.5.4.3 Public Information and Public Relations

See Section 2.9 – Public Information and Community Involvement for staffing and requirements.

2.1.5.4.4 Community Involvement Groups

Organize, Participate and provide support for community public involvement groups pertaining to Work on the Project.

Interface with advisory committees, whose meetings will continue throughout the design and construction phases.

See Section 2.9 - Public Information and Community Involvement and Section 2.14 – Roadside Restoration and Aesthetics for additional information.

2.1.5.4.5 Design Task Force Meetings

The Design–Builder shall meet and coordinate with the Department for all civil disciplines prior to design to reach agreement and clarify design criteria.

2.1.5.5 Emergencies

Emergency Actions:

In any emergency affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, act to prevent any threatened damage, injury, or loss. If the Design-Builder believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof, give the Department prompt written notice.

2.1.5.6 Subcontracts

2.1.5.6.1 General

Incorporate into each subcontract the provisions specified in Section 1-08.1 Prosecution and Progress Subcontracting.

2.1.5.6.2 Communication

Require all subcontractors, suppliers, and other such individuals or entities performing or furnishing any of the Work to communicate with the Department only through the Design-Builder.

2.1.5.6.3 Coordination

Accept sole responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other such individuals or entities performing or furnishing any of the Work under direct or indirect contract with the Design-Builder.

2.1.5.7 Facilities and Space Requirements

Provide and pay for all office and other building space, facilities, equipment, and vehicles necessary to construct the Project and meet the requirements of the Contract and of this Section.

Locate the Project office within 5 miles of the Project site.

2.1.5.7.1 Department Staff Facilities

Provide for the Department's staff a minimum of 25 office spaces of 100 square feet each that are co-located with the Design-Builder's design, construction management and project controls/business staff and computers with at least the software and connections listed in Section 2.1.7.

Provide secured free parking spaces for 30 WSDOT staff vehicles.

General Requirements:

1. Include desks, chairs, and telephones in all offices. Provide copying and fax equipment services.
2. Secure sites, obtain all site permits, install and pay for all utility services, and maintain the facilities as part of the Work.
3. Include in the offices at least two exits from each building or trailer and secure each entrance with a door lock plus a deadbolt lock.
4. Provide daily janitorial service (except holidays) and maintain trash containers and trash pickup service.
5. Maintain the exterior areas of office spaces, including access to parking areas and snow removal.
6. In all interior spaces, include overhead lighting that meets the requirements of U.S. Occupational Safety and Health Administration (OSHA) and building and electrical codes for office space that has a minimum circuit capacity of 20 amperes, and provide at least two duplex receptacles for each office space.

7. Provide restrooms until Physical Completion of the Project, unless otherwise agreed by the Department in writing.
8. Meet all access requirements of the Americans with Disabilities Act.
9. Provide heating, ventilation, air conditioning, and cooling systems capable of maintaining temperatures between 65 and 75 degrees Fahrenheit in all spaces throughout the year.
10. Meet all local building code requirements.
11. Provide one touch-tone speaker telephone for each office, each with a status indicator and access to all outside lines and conference call systems.
12. Dispose or remove all Design-Builder-provided facilities and perform any required site restoration work prior to Physical Completion.
13. For all Department offices that are provided, maintain them for at least 90 Calendar Days after Physical Completion of the Project, unless otherwise agreed by the Department in writing.

2.1.6 Project Documentation

2.1.6.1 General

Accept sole responsibility for the documentation of all project Work activities.

Maintain in good order, in a secure and protected place at the site, one (1) record copy of all drawings, specifications, addenda, written amendments, change orders, Work change directives, field orders, and written interpretations and clarifications. Annotate them to show changes made during construction. Make these record documents, together with all approved samples and approved shop drawings, available to the Department for reference.

The Design-Builder shall use an electronic Document Control System to manage all Project documents. The Design-Builder's Document Control System must be able to be integrated into the Department's system; implementation details will be arranged after Contract award.

2.1.6.1.1 Format

Maintain all files in both the electronic media indicated in Section 2.1.7 - Software and as hard copies.

2.1.6.1.2 Communications Distribution

As a minimum, prepare and circulate to the Department and attendees of all meetings, hard copies and electronic files of all correspondence, minutes of meetings, etc., developed as a result of any and all communications with:

1. The Department
2. Utility owners
3. Communities
4. Agencies
5. Members of the public

Accept sole responsibility for ensuring that all communications are distributed to the appropriate parties.

2.1.6.1.3 Electronic Files

Backups:

Back up all electronic files partially every day and fully every week. Store all back-up tapes and compact disc (CD) ROMs in a secure area . See Section 2.1.7 - Software for software requirements.

Data Back-up and Recovery

Develop and implement data security, back-up and recovery plan for Project information under the control of the Design-Builder.

2.1.6.2 Design Documentation

2.1.6.2.1 Communication and Submittal Documentation

Maintain throughout the course of the Project, in the Design-Builder's engineer's office two (2) complete sets (at a minimum) of:

1. Project Contracts
2. Calculations
3. Reports
4. Studies and investigations
5. Plans
6. Communications
7. Minutes of meetings
8. Review comments
9. Permits
10. ROW Agreements
11. Utility Agreements

At the completion of the Project, submit one set in hardcopy and one in electronic form of the documents listed above to the Department for its retention and use.

2.1.6.3 Field Documentation

2.1.6.3.1 Communication and Submittal Documentation

Maintain in the on-site Project office, and make available for Department review, two (2) complete hard copy sets of orderly files (at a minimum) that include the following:

1. Contracts
2. Subcontracts
3. Change orders
4. Shop drawings
5. Pay invoices
6. Minutes of meetings

7. Field directive changes
8. Claims
9. Calculations
10. Reports
11. Tests
12. Drawings. Do not mark on one set of the drawings, and use the other set as the master copy for As-Built control records.

At the completion of the Project, submit one (1) set of the documents listed above to the Department for its retention and use.

2.1.6.3.2 Record Drawing Documentation

2.1.6.3.2.1 Work In Progress:

Maintain in the field office a complete, neatly marked-up set of drawings upon which daily changes, alterations, and deletions are made to the “approved for construction” drawings. All mark-up revisions shall be made with a red pencil and dated for correlation with field directive changes and change orders.

As-Built changes shall not be made without approval by the Designer of Record.

2.1.6.3.2.2 Project As-Builts

Within 28 calendar days of Physical Completion, provide the Department with the following:

1. As-built documents (computer-aided drafting and design, CADD, files reflecting as-built changes) files and a signed hard copy)
2. Relevant data not previously submitted.

Take special care to ensure that all construction changes have been entered on all As-Built documents affected by the change.

Include in the As-Built documents all changes and corrections to the plans that depict the final completed component, with relevant data showing (including copies of calculations not previously submitted with shop drawings or final design documents)

2.1.6.3.2.3 Format

Submit the As-Built documents in the Department’s standard format, organized in accordance with standard Department numbering and naming conventions. Make all electronic files consistent with the software requirements of Section 2.1.7 - Software. Submit two (2) complete electronic sets on CD ROM (using the CADD standards on the Department web site) and as specified in Section 2.1.7, as follows:

1. Enclose an accompanying index and instructions
2. Attach a cover sheet to the As-Built documents of each constructed Work component. On the cover sheet, include a written certification by the Construction QA Manager

- that the As-Built documents accurately and completely indicate all changes and corrections made during construction.
3. Obtain the signature, certification, and stamp of the Design QA Manager, and the Designer of Record on the cover sheet of the As-Built documents for each constructed work component.
 4. Stamp or otherwise clearly mark each sheet of the As-Built documents “AS-BUILT.”
 5. Submit a final copy of Right of Way drawings signed and stamped by a Washington State Licensed and Registered Land Surveyor.

2.1.6.4 Document Control Verification

General

Monthly, or more often as the situation may warrant, the Department will review the Design-Builder’s document control performance. Develop a sign-off sheet that is filled out monthly, signed by the Project Manager, Design QA Manager and Construction QA Manager, and submit it with each monthly invoice as indicated in Section 1.09.9(1).4 Progress Report. The Department, as indicated in Section 1.09.9 (Payment), may withhold payment until documentation issues are corrected as specified herein.

2.1.7 Software

2.1.7.1 General

Acquire, use, and maintain for Project the software as specified in this Section or as specified elsewhere in the Contract .

Version:

Use the current version of the specified software in effect as of Contract Execution, unless otherwise called for in this Section.

Updates:

Update software programs throughout the Contract within six (6) months of release of a software update, or earlier if mutually agreed to with the Department. The Department will similarly update its software.

File Server:

Store all data files for the applications included in this Section on, or have them accessible through, the Design-Builder’s central file server.

2.1.7.1.1 Required Project Software

Submit all design documentation, whether it is in process, final, or As-Built, to the Department as both hard-copy printouts and electronic files on CD ROMs.

Use the following software programs for Project Work in addition to all other software specified in Chapter 2 of the Contract:

Roadway.

InRoads (by Bentley)—Same version the Department is using at Contract Execution
MicroStation (by Bentley)—Same version the Department is using at Contract Execution

Structures.

MicroStation (by Bentley)—Same version the Department is using at Contract Execution

Traffic Signals.

See Section 2.17

Intelligent Transportation System and Maintenance of Traffic.

See Section 2.18 & Section 2.20

Project Management.

Design-Builder's choice

Viewing of CAD Files.

Bentley MicroStation

Word Processing and Spreadsheets.

Microsoft Word (for word processing)

Microsoft Excel (for spreadsheets)

Microsoft Access (for database)

Contract Software Programs

Text Documents. Text documents generated in the RFP were produced in Microsoft Word. The filenames are designated by a “.doc” extension.

Spreadsheets. All spreadsheet files in the RFP were created in Microsoft Excel. The filenames are designated by an “.xls” extension.

CADD Drawings. All CADD files in the RFP were created in MicroStation. The filenames are designated by a “.dgn” extension.

Scanned Documents. The filenames of scanned documents are designated by a “.pdf” extension.

2.1.7.1.2 Department Electronic Communications

The Department uses the following software for its electronic communications, but use by the Design-Builder is optional.

Network Communications.

Design –Builder to provide a T-1 or better connection for network connections to WSDOT system. Contact David Schmidt at 206.440.4926, email: schmidtd@wasot.wa.gov, to coordinate network connections.

E-mail and Scheduling Software.

The Department uses Microsoft Outlook and Exchange Server for email services. Contact David Schmidt at 206.440.4926, email: schmidtd@wasot.wa.gov, to coordinate network connections and establish email services required.

Document Control.

The Design-Builder and the Department shall share Project data. The Department's document control and data system software for the Project is under development. The Design-Builder's document control system must be able to be integrated into the Department's system; implementation details will be arranged after Contract award.

2.2 SECTION NOT USED

2.3 SECTION NOT USED

2.4 DESIGN VARIANCE

2.4.1 Pre-Approved Design Deviation/ Evaluate Upgrade

The following is a list of the pre-approved Design Deviations and Evaluate Upgrade for the project. The justification, locations and details of the pre-approved Design Deviations are in Appendix M3, and for the Evaluate Upgrade are in Appendix M4.

2.4.2 Additional Design Deviation/ Evaluate Upgrade

The Design-Builder shall avoid additional design deviation/Evaluate upgrade except on conditions where the Design-Builder demonstrates that substantial benefits to the project and the public would accrue from the Design-Builder's recommendation, as Approved by WSDOT. The functional outcome of the proposed deviation\evaluate upgrade must be equivalent to or better than the pre-approved deviations\evaluate upgrade.

Additional design deviations\evaluate upgrade must be submitted and approved by WSDOT .

2.4.2.1 Deviation\Evaluate Upgrade Process

The Design-Builder shall submit design deviation/evaluate upgrade requests in a letter addressed to the Department. See Appendix F for forms or additional information.

The deviations/evaluate upgrades requests shall consist of the following items:

1. Cover sheet identifying the deviation(s)/Evaluate upgrade(s) by number, Project title, and Project number.

2. Completed Deviation\Evaluate Upgrade Request for each element that does not meet standards. The Request shall address the following items:
 - A. General Project Description
 - B. Existing Condition
 - C. Deviation\Evaluate Upgrade Requested
 - D. Geometric Elements
 - E. Design Alternatives
 - a. Build to Meet Standards
 - b. Proposed Design
 - c. No-Build
 - F. Recommendations

3. Supporting documentation indicating the justification for the deviation\evaluate upgrades. The documentation and Justification shall address the following items:
 - A. Vicinity Map
 - B. Design Matrix
 - C. Site conditions of the deviation
 - D. Alternative Plans
 - E. Cost Estimates
 - F. Accident History

WSDOT will review the submittal within 10 business days and respond with a decision.

WSDOT shall be reimbursed by change order for all cost savings resulting from any design deviation proposed and approved after award of the Contract by the Design-Builder.

2.4.2.2 Submittals

Design-Builder shall submit 5 copies of the deviation\evaluate upgrade to WSDOT as both hard-copy printouts and electronic files on CD ROM's. Use software provided in Section 2.1.7

2.5 SURVEYS AND MAPPING

2.5.1 General

The Design-Builder shall be responsible for all of the survey and mapping work necessary to construct the Project.

The Work includes all work necessary to meet the requirements associated with land surveying and survey mapping, including secondary horizontal and vertical control surveys, topographic surveys, Right of Way surveys, bridge surveys, Utility surveys, Design surveys, construction surveys, as-built surveys, Records of Surveys, Permits to Destroy and Remove Monuments, Land Corner Records and all other land surveying services necessary to complete the Project.

Establish and stake the WSDOT Right of Way lines at the project work site if Work is within 25 feet of the WSDOT Right of Way limits.

2.5.2 Mandatory Standards and Reference Publications

2.5.2.1 Mandatory Standards

General. Perform survey work in accordance with the requirements of the standards listed by priority in Table 2.5.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

All field survey work, design and construction will be done in project ground datum. Any conversion from Metric to English shall use the U.S. Survey foot definition: 1 meter = 39.37 inches exactly.

The WSDOT provided dtm for mainline I-5 and the existing ramps was obtained from the photogrammetric digital. The areas between fog lines at the medium and from fog line to the right of way limit has been surveyed by WSDOT survey crews and is accurate within .02’ minimum for bridge, 0.02’ minimum manmade objects and 0.1’ for ground breaks.

The Design-Builder will identify areas requiring additional topographic survey checks or verification and will be responsible for performing the work.

Table 2.5.1

Mandatory Standards for Survey

Priority	Author or Agency	Title	Document or Report No.	Date	Comments , Short Forms
1	WSDOT	Highway Survey Manual	M 22-97		
2		American Congress on Surveying and Mapping			
3	American Society of Civil Engineers	Definitions of Surveying and Associated Terms			

2.5.3 Performance Standards

2.5.3.1 General

Geodetic primary survey control information and history is available on the WSDOT Monument Database, web address of: <http://www.wsdot.wa.gov/monument>. Copies of WSDOT provided primary survey control data are in Appendix X. Enhancement of the geodetic primary control shall meet National Geodetic Survey “Order C” horizontal standards Second Order Class II vertical standards and coordinated with the Geographic Services Survey Office.

The Design-Builder shall verify and confirm the location, accuracy and datum of all information provided to the Design-Builder, regardless of the source of information. The Design-Builder shall document all forms of data verification. If the Design-Builder identifies any discrepancy, the Design-Builder shall perform the necessary work to resolve the discrepancy.

Detailed survey records shall be maintained of the control points used and the equipment and methods used to establish the control points. This information will be made available to WSDOT when requested.

The Design-Builder shall obtain any permits that may be required prior to beginning fieldwork. Preparation of surveys shall conform to requirements referenced in Section 2.5.2.1 including (but not necessarily limited to) procedures, record-keeping requirements, equipment use, and safety precautions.

A traffic control plan shall be prepared whenever work or when the work crew’s vehicle will be within any roadway clear zone. All survey crews working within Limited Access Highway Margins shall have a General Permit in each vehicle.

2.5.3.2 Survey Manager

The Design-Builder shall designate a Survey Manager for the Project. The Survey Manager must be currently licensed as a Professional Land Surveyor in the State of Washington. The Survey Manager will manage all Design-Builder survey activities associated with the Project and shall be responsible for directing and reviewing all Design-Builder and Subcontractor survey work and be the point of contact for all survey activities.

2.5.3.3 WSDOT Provided Surveys and Mapping

To facilitate the establishment of horizontal controls and elevations, WSDOT will provide the Design-Builder with primary survey control information consisting of descriptions of primary control points used for the horizontal and vertical control, and descriptions of additional project control points for every additional 3 miles of project length. Project control points will be described by reference to the primary alignment and the coordinate system and elevation datum utilized by the project.

The survey is in compliance with National Spatial Data Infrastructure “Standards for Geodetic Networks, 1996”, specifications derived from FGCS “Geometric Geodetic Standards and Specifications for Using GPS Relative Positioning Techniques, 1989” and FGCS Specifications and Procedures to Incorporate Electronic Digital/Bar-code Leveling Systems, 1995.

Horizontal accuracy for geodetic primary control is < 2 cm, defined as the diameter of a circle of uncertainty, such that the true or theoretical location of the point falls within that circle 95% of the time.

Vertical accuracy for geodetic primary control is < 1 cm, defined as a linear uncertainty value, such that the true or theoretical location of the point falls within the linear range of uncertainty value 95% of the time.

WSDOT has prepared mapping for I-5 from MP 189.30 to MP 194.32.

Primary and secondary survey horizontal control was established by WSDOT with GPS equipment in the Washington coordinate system, north zone, North American Datum of 1983 (NAD 83/91) with a data set accuracy is < 0.02 M @ 2 Sigma. At the request of the Design-Builder, WSDOT GIS (Geographic Information System) will provide the Metadata (data set) used to transform the data associated with the photogrammetric digital map included with this document.

The initial geodetic primary and secondary project control coordinates were converted from State Plane coordinates to Project Ground coordinates. The State Plane control coordinates were divided by the combined factor of 0.99993997. The combined factor was derived by multiplying the elevation factor of 0.99999323 by the scale factor of 0.99994674. To ensure that the Project Ground coordinates are not mistaken for State Plane coordinates, 100,000 meters were added to both the northings and eastings. This was then converted from metric to English using the U.S. Survey foot definition: 1 meter = 39.37 inches exactly. This project shall be developed using English units.

Vertical control is based on North American Vertical Datum of 1988 (NAVD 88). The 3D MicroStation .DGN file comprised of photogrammetric data was transformed from State Plane coordinates to Project Ground datum.

Secondary surveys are designed to provide supplemental project datum references for topographic mapping and as-builts of existing terrain features and structures. Typical secondary traverse accuracy performed by WSDOT NWR for this project is greater than 1:100,000. Electronic bar code leveling was performed on all secondary control points and meet or exceed third order standard of accuracy (12 square root kilometers leveled).

Tertiary surveys provide for topographical mapping and structural as-builts. Tertiary surveys performed by WSDOT NWR for this project meet a local positional accuracy standard of less than 3cm.

Further information on WSDOT NWR secondary and tertiary surveys can be obtained by contacting Kurt Iverson at 360.709.5532

Note:

- As-builts of structures have not been completed.
- Edge of pavement survey measurements were directly observed by using reflectorless techniques (accuracy less than 1 cm).
- Fog line measurements were observed with a reflector on a pole tilted sideways for safety reasons (accuracy less than 2cm).
- Pertect Engineering did much of the topographic survey on the east side of the North Bound lane.
- WSDOT NWR performed all drainage surveys and ramp topographic survey.

Monuments disturbed by any construction activity require a “Permit to Remove and Destroy” from Washington State Department of Natural Resources (WAC332-120). In addition, Geographic Services must be notified of any geodetic primary control to be disturbed. *Areas beyond the WSDOT right of way limits may be obscured due to dense trees, brush or dark shadows may contain weak x, y, z data. The Design-Builder is responsible in identifying these areas and performing necessary field surveys.*

2.5.4 Design and Construction Criteria

2.5.4.1 Design Survey Work

All field survey work shall be suitable for Design and Construction Document preparation and meet the technical requirements of WSDOT, FHWA, and WAC 332-130 (Survey Standards). Enhancement of the geodetic primary control shall meet National Geodetic Survey “Order C” horizontal standards, Second Order Class II vertical standards and be coordinated with the Geographic Services Survey Office.

The Design-Builder shall utilize Section 1450 of the Design Manual For Design Build Projects for modifying existing monumentation.

The Design-Builder shall report all field survey work in project ground datum, except geodetic primary control, which must be on the state plane coordinate system.

Whenever construction is required to connect or tie-in to existing facilities, the Design-Builder is responsible to field-verify existing vertical and horizontal locations and to provide a design and construct a connection that provides a finished product that meets all Contract requirements. Differences in as-built information provided in the RFP and actual field conditions that are attributable to settlement, normal wear and tear and available survey accuracy when the highway was originally built are at the sole risk of the Design-Builder and shall not be considered a changed condition.

2.5.4.2 Construction Surveying – Bridge

Except for the survey control data to be furnished by WSDOT, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades to perform the Work is the Design-Builder's responsibility.

WSDOT may spot-check the Design-Builder's surveying. These spot-checks will not change the requirements for normal checking by the Design-Builder. Design-Builder will provide WSDOT with a copy of the calculations and survey records required to do a spot check.

2.5.4.3 Construction Surveying - Roadway

WSDOT may spot-check the Design-Builder's surveying. Geographic Services Survey Section will review and check geodetic primary control enhancements. These spot-checks will not change the requirements for normal checking by the Design-Builder. Design-Builder will provide WSDOT with a copy of the calculations and survey records required to do a spot check.

When staking roadway alignment and stationing, the Design-Builder shall perform independent checks from different secondary control to ensure that the points staked are within the specified survey accuracy tolerances.

2.5.4.4 Monumentation

General - Document any WSDOT, Governmental monumentation and property corners that will be disturbed or destroyed during the Contract. The Design-Builder will follow the procedures as set forth under Chapter 9 of the WSDOT Highway Surveying manual relating to the destruction and replacement of monumentation. Copies of any and all permits that are required for the removing and resetting of monuments will be submitted to the Department within 3 days of submittal to the DNR. Copies of the destroyed and reset monument records shall be sent to WSDOT NW Region R/W Plans – Land Survey Section.

2.5.5 Submittals

2.5.5.1 Survey Records

Survey records shall be delivered in a hardcopy format and electronic file format compatible with Bentley MicroStation and Inroads. They shall be delivered within 90 days of Physical Completion.

2.5.5.2 As-Builts

The Design-Builder shall produce reports documenting the location of the as-built alignments, profiles, structure locations, Utilities, and survey control monument placement. These reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed. The Design-Builder as-built data shall

include the coordinate types (x, y, and/or z) and feature codes in the same format that the preliminary construction data was generated in. Where data has been provided to the Design-Builder from WSDOT in x, y, z coordinate format the Design-Builder shall provide the WSDOT with data in an x, y, z coordinate format. Where data has been provided to the Design-Builder from WSDOT in an x, y only coordinate format, or z only coordinate format, the Design-Builder shall provide WSDOT with data in x, y only coordinate format, or z only format.

2.6 GEOTECHNICAL

2.6.1 General

The Design-Builder shall review the existing geotechnical information, which includes the Geotechnical Baseline Report prepared for this project and included in these contract documents, evaluate the requirements of the Work, and perform geotechnical explorations, geotechnical analyses, and laboratory testing, sufficient to supplement the existing data, and to provide geotechnical designs and construction support in accordance with this RFP Section.

2.6.2 Mandatory Standards and Reference Publications

2.6.2.1 Mandatory Standards

General. Design and construct the roadway in accordance with the requirements of the standards listed by priority in Table 2.6.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.6.1
Mandatory Standards for Geotechnical**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for the I-5 Everett HOV Design-Build Project</i>		- -	Proposal
2	WSDOT	<i>Request For Proposal, I-5 Everett HOV Design-Build Project</i>			RFP

3	WSDOT	<i>WSDOT Geotechnical Design Manual (GDM)</i>			Appendix G3
4	WSDOT	<i>Bridge Design Manual (BDM)</i>		Aug. 2002	
5	WSDOT	<i>Design Manual For Design Build Projects</i>	M22-02		
6	WSDOT	<i>Highway Runoff Manual</i>	M31-16		
7	WSDOT	<i>Materials Manual</i>	M46-01		
8	AASHTO	<i>Manual on Subsurface Investigations</i>		1998	
9	AASHTO	<i>LRFD Bridge Design Specifications, US Units</i>		2004	
10	AASHTO	<i>Standard Specifications for Transportation Materials & Methods for Sampling & Testing, 24th Edition</i>		2004	
<p>** Only to the extent that it exceeds another listed standard. ***Includes the original release of the RFP and all addendums.</p>					

2.6.2.2 Reference Publications

Use reference publications as cited in the Geotechnical Design Manual and Bridge Design Manual used in this Project.

2.6.2.3 Historical Geotechnical Data

Historical records for previous geotechnical studies and related contract work along the I-5 project alignment are provided in Appendix G2 of this RFP. This information includes test boring logs, substructure details (foundation type and bearing elevation), and subsurface profiles for many, but not all, of the existing bridges. The Design-Builder should use this information at their discretion. WSDOT makes no warranty, either expressed or implied, on the accuracy of this information.

2.6.3 Performance Requirements

2.6.3.1 Personnel Requirements

The Design-Builder shall provide a Geotechnical Group Manager with a minimum of 10 years of supervisory experience in geotechnical design and construction support of roadways, bridges, retaining walls and other highway related elements. This individual shall have at least five years of experience working in Washington State and shall be familiar with the AASHTO LRFD design specifications. This individual shall be a Professional Engineer licensed by the State of Washington and shall be in responsible charge of the geotechnical design elements of the project.

The individuals responsible for the installation and monitoring of instrumentation such as inclinometers, piezometers, settlement indicating devices, SPT testing, Becker Hammer testing, etc., shall have a minimum of 2 years experience with the specific type of instrumentation the individual will be using.

2.6.3.2 Subsurface Investigations

The Design-Builder shall conduct a subsurface investigation program to supplement information provided in the Geotechnical Baseline Report (GBR)(Appendix G1) to complete the final geotechnical design for the project. Additional explorations as determined necessary by the Design-Builder and to meet mandatory standards shall occur at bridge foundation locations, along the alignment of planned retaining walls, at significant cuts and fills, building structures, noise walls, culverts, signs, signals, and storm-water retention-detention ponds. All historical geotechnical data can be found in (Appendix G2).

The investigation shall be conducted in accordance with the WSDOT *Geotechnical Design Manual (GDM)*. The Design-Builder shall determine the specific locations, frequency, and scope of the supplemental subsurface investigation. Geotechnical investigations at locations of storm-water retention-detention ponds and structures shall be performed as specified in the WSDOT *Highway Run-off Manual*.

The subsurface investigation program shall be submitted to the WSDOT for review and comment prior to start-up of any earthwork or excavation. This submittal shall include the number and depths of the proposed borings/cone penetration tests (CPTs) and other field investigations, and the proposed sampling and testing, to meet the minimum requirements of the Project. Instrumentation to be used for design and construction monitoring purposes shall also be included in the exploration plan (e.g. piezometers, slope inclinometers, etc). The submittal shall also include a traffic control plan, where investigations are in or adjacent to active freeway or city streets. The Design-Builder shall secure an access permit from the appropriate agency, if required.

Soil properties used for design shall be determined in accordance with the WSDOT *Geotechnical Design Manual*. Field tests shall be conducted in general accordance with appropriate AASHTO and WSDOT standards.

Following completion of exploratory work, all boring locations shall be surveyed, and station and offset, elevation, and state plane coordinates, shall be determined and included on the boring logs. Following drilling and laboratory work, the Design-Builder shall retain all samples until the completion of the project, i.e. Project Acceptance, and shall provide such samples to WSDOT, if requested, before the end of this time period.

2.6.3.3 Laboratory Testing Requirements

Laboratory testing of collected soil and groundwater samples shall be conducted in accordance with the *GDM*, and applicable WSDOT and AASHTO testing procedures. Laboratories conducting geotechnical testing shall be either AASHTO accredited for the testing being performed or fulfill the requirements of AASHTO R18 for qualifying testers and calibrating/verifying of testing equipment for those tests being performed. All test results shall be included in the Draft and Final Geotechnical Reports.

2.6.3.4 Instrumentation

The Design-Builder shall develop, implement, and maintain a documented Geotechnical Instrumentation Plan to satisfy design and quality control requirements. The Instrumentation Plan shall be available to the WSDOT for review throughout the project.

Prior to starting any earthwork, the Design-Builder shall identify and submit in writing to the Department the recommended instrument types, locations, purpose, installation requirements, zones of influence, critical readings, and planned frequency of readings.

The Design-Builder shall install geotechnical instrumentation where necessary to monitor parameters such as the following:

- Settlement and settlement rates of embankments and structures,
- Pore water pressures,
- Groundwater levels, and
- Stability of walls and slopes.

Any instruments that are damaged during construction and require removal and/or recalibration shall be replaced and/or recalibrated by the Design-Builder.

The draft and final Geotechnical Reports shall include the Geotechnical Instrumentation Plan and all critical readings, during both design and construction.

2.6.3.5 Borehole Site Cleanup

Backfilling of borings, test pits, CPT holes, etc., shall be performed in accordance with the provisions of applicable local, State, or Federal laws and regulations. Borings shall be abandoned in accordance with Washington State Dept. of Ecology regulations.

The Design-Builder shall backfill all test holes in a manner that ensures against subsequent settlement of the backfill and holes hazardous to persons, animals, or equipment. Upon completion of the field investigation Work, the Design-Builder shall remove all surplus material, temporary structures, and debris on land and water resulting from the Work.

2.6.3.6 Field Logs

The field logs shall be prepared in accordance with the requirements of the *GDM*. Logs of all field explorations shall be included in the Design-Builder's Final Geotechnical Report for the project.

2.6.3.7 Geotechnical Analyses

The Design-Builder shall perform geotechnical engineering and geologic analyses based on the findings from subsurface investigation and laboratory testing programs, and results of

engineering analyses, including information provided in the Geotechnical Baseline Report, in accordance with the *GDM* and standards and publications referenced herein.

2.6.4 Design and Construction Criteria

2.6.4.1 Bridge Foundation Design

All new bridge foundations shall be designed using the LRFD specifications, as described in the WSDOT *Geotechnical Design Manual*, WSDOT *Bridge Design Manual*, and AASHTO *LRFD Bridge Design Specifications*.

2.6.4.2 Wall Design

All retaining walls and wall foundations shall be designed using the LRFD specifications, as described in the WSDOT *Geotechnical Design Manual*, WSDOT *Bridge Design Manual (BDM)*, and AASHTO *LRFD Bridge Design Specifications*, except for soil nail walls, MSE Walls and noise walls. Soil nail walls shall be designed using the Service Load Design (SLD) method as required in the *GDM*. Noise walls shall be designed using the Load Factor Design (LFD) method as required in the *GDM*. MSE walls shall be designed using either the Service Load Design (SLD) method or the LRFD method as required in the *GDM*.

2.6.4.3 Deflection Criteria

Criteria for allowable settlement and horizontal deformation of retaining structures, hydraulic structures, and bridge foundations/piers provided in the WSDOT *GDM* and WSDOT *LRFD BDM* shall be used for the design of these structures.

2.6.4.4 Damage to Adjacent Structures and Utilities

The Design-Builder is responsible for all damage caused by their activities to structures on or immediately adjacent to State right-of-way. “Structures” are defined herein as all private residences, privately-owned buildings, and all existing and proposed public facilities including, but not limited to, utilities, drainage facilities, bridges and buildings.

Damage to structures may be caused by excessive vibrations, embankment-induced settlement, physical impact, and others. Before construction operations commence which may cause damage to sensitive facilities, the Design-Builder shall identify instrument types, locations, zones of influence, critical readings, and frequency of readings in a Settlement and Vibration Monitoring Plan. For non-WSDOT owned buildings and other structures, including private residences and City Streets within a minimum of 200 feet of the project boundaries, the Design-Builder shall conduct a pre-condition survey. Addition pre-condition survey may be necessary as recommended by the Design-Builder’s Geotechnical Engineer. This survey should include video or photographic documentation of internal and external building walls and foundations. The pre-condition survey and Settlement and Vibration Monitoring Plan shall be provided to the WSDOT Project Office prior to beginning any construction activity.

Where embankments are planned, the Design-Builder shall install instrumentation to monitor settlements of structures, utilities, and other features within the zone of influence of the embankment, where existing and proposed facilities are founded on settlement-sensitive, or soft, ground. For embankments, the zone of influence shall be defined as a zone extending a minimum horizontal distance (H) from the toe of the embankment, where H is the height of the embankment. For retaining walls, the zone of influence shall extend from the toe of the footing to a minimum distance of twice the height of the wall.

Where impact or vibratory pile driving is planned, vibration monitoring shall be conducted where sensitive structures or utilities are within 100 feet of pile driving operations. The Design-Builder shall be required to cease all operations when vibration recording equipment exceeds a peak particle velocity of 2 in/sec.

2.6.4.5 Unstable Slope Areas

Several areas along the project alignment have been historically identified as unstable and have exhibited landsliding characteristics. Two specific areas lie along the east side of the northbound shoulder, where fills were used to construct the original highway. These areas are identified as the Woods Creek Slide (Milepost 189.6 to 189.9) and the Lowell Road Hillside (Milepost 190.6 to 190.9). At these locations, historical and recent evidence indicates localized slope failures have occurred. As part of the geotechnical investigation, the Design-Build team shall fully examine these areas and develop appropriate construction procedures to prevent impact to the stability of these unstable areas.

The current project does not include plans to widen I-5 eastward or raise the current northbound roadway profile at these locations. Therefore, the Design-Build team shall not conduct construction activities along the eastern shoulder that could negatively impact the stability of the existing slopes. This includes minimizing construction traffic on the paved shoulder and keeping all construction traffic off the slopes below the shoulder. In addition, the Design-Builder shall not stockpile materials or equipment on or directly above these slopes. The Design-Builder is responsible for slope stability throughout the project corridor, both on- and adjacent to State Right- of-Way. Should any landslide scarps develop during construction, the Design-Builder shall cease all activities in this area until the situation is fully assessed by the State Geotechnical Engineer and Design-Builder and measures are taken to stabilize the existing embankment/hillside. Where necessary during construction, the Design-Builder may be required to drain areas of observed or suspected groundwater seepage to avoid the risk of landslide and surface sloughing through the use of gravel drainage blankets, French drains, horizontal drains, and/or placement of a surface rock facing.

2.6.5 Submittals

2.6.5.1 General

Design-Builder shall address all WSDOT comments to the satisfaction of WSDOT. Final versions of technical memorandums and the Geotechnical Report shall be signed and sealed

by either a geotechnical engineer or an engineering geologist in accordance with the applicable RCW's and WAC's, licensed to practice in Washington State.

2.6.5.2 Design

- Subsurface Investigation Program (three copies)
- Technical Memorandums (three copies of each memo)
- Instrumentation Plan (three copies)
- Settlement and Vibration Monitoring Plan, if applicable (three copies)
- Precondition Survey (three copies)
- Geotechnical Report (three copies of draft, ten copies of final)

The Design-Builder shall prepare a Final Geotechnical Report that summarizes the results of the field and laboratory investigation programs, engineering studies and geotechnical design recommendations, including those provided in the technical memorandums, in accordance with the WSDOT GDM.

2.6.5.3 Construction

The Design-Builder shall not be relieved of obligations to perform the Work in accordance with the Contract Provisions by reviews, tests, inspections or approvals performed by any persons, or by any failure of any person to take such action.

The reviews, inspections, tests and comments conducted by WSDOT and others do not constitute acceptance of the materials or Work reviewed, tested or inspected, and WSDOT may reject any Work or materials, request changes and/or identify additional Work which must be done at any time, whether or not previous reviews, inspections, tests or approvals were conducted by WSDOT.

2.6.5.4 Unexpected Objects

Encountering boulders or unexpected objects and the removal or avoidance of such objects during construction of the Design-Builder's proposed design shall be the sole responsibility of the Design-Builder and does not constitute as changed condition for the Project.

2.6.5.5 Cut and Fill Slopes

Both cuts and fill slopes are planned as part of this project. All cut slopes and fill slopes (reinforced and unreinforced) shall be designed per the requirements of the WSDOT Geotechnical Design Manual. Sliver fills used for roadway widening shall be terraced into the existing ground a minimum horizontal distance of 5 feet and shall be no greater than 5 feet high.

Where groundwater seeps occur between contacts exposed as a result of any cut, the Design-Builder shall employ measures to reduce degradation of the down-slope soils, capture the water, and convey the collected water down slope to an appropriate treatment facility. Groundwater seeps shall not be permitted to spill uncontrolled onto new or existing slope areas.

2.7 PAVEMENT

2.7.1 General

Design and construct pavements for all roadways in accordance with the requirements of this Section, including referenced standards and publications, performance requirements, design and construction criteria, and submittals. The pavement work includes I-5 mainline, ramps and local streets. The paving limits are shown in Appendix M5 - Conceptual Plans. Warranty pavement work shall be in accordance with Section 2.30 (Warranties). Maintain the pavement during construction in accordance with the requirements in Section 2.27 (Maintenance During Construction).

2.7.2 Mandatory Standards and Reference Publications

2.7.2.1 Mandatory Standards

General. Design and construct the roadway in accordance with the requirements of the standards listed by priority in Table 2.7.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.7.1
Mandatory Standards for Pavements**

Prior ity	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design- Builder	<i>Proposal for I-5 Everett HOV Design- Build Project</i>	n/a		Proposal
2	WSDOT	Request for Proposals, <i>I-5 Everett HOV</i>	n/a	***	RFP

Design-Build Project					
3	AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS-3	2001	“Green Book”
4	WSDOT	<i>Pavement Guide – Volume 1, 2004</i>	n/a	2004	n/a
5	AASHTO	<i>Guide for Design of Pavement Structures</i>	S99-GDPS-4	1993	n/a
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.7.2.2 Referenced Publications

Use the publications listed in Table 2.7.2 as supplementary guidelines for the design and construction of the roadway. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.7.2
Referenced Publications for Pavements**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
FHWA	<i>Guidelines for the Design of the Subsurface Drainage Systems for Highway Structural Sections</i>	FHWA RD-72-30	June 1972	n/a
WSDOT	<i>Pavement Surface Condition Rating Manual</i>	n/a	1992	n/a
WSDOT	<i>Construction Manual</i>	M47-01		n/a
AASHTO	<i>Standard Specification for Highways and Bridges</i>	n/a		n/a
WSDOT	<i>Materials Manual</i>	M46-01		n/a
WSDOT	<i>Qualified Product List</i>	n/a		n/a

2.7.3 Performance Requirements

Perform analyses and prepare a design using the criteria specified within this Section, and produce pavement that meets the following performance requirements:

1. Provide a pavement design life of 50 years for Portland cement concrete (PCC).
2. Provide a durable, long-lasting pavement system with the specified structural capacity; skid resistance, and superior ride quality.
3. Include pavement-to-structure transition areas as a part of ride quality.

4. Minimize pavement-to-structure transition deviations.
5. Comprise materials that meet Standard Specification (DB) requirements as provided.
6. Provide pavements with no identifiable distress.
7. See Section 2.30 (Pavement Warranties) for additional warranty information.

2.7.3.1 Pavement Type

Design and construct PCC pavements where widening existing PCC pavements. Design and construct HMA pavement where widening existing HMA pavements.

2.7.3.2 Pavement Design Report

A pavement design report shall be submitted, detailing the pavement designs, for approval to the Department prior to any pavement operations. Any unstable slope areas or subgrade soil conditions shall be stabilized before pavement construction. The pavement report shall also address subsurface drainage under the pavement section, and any transition requirements between differing sections to avoid trapping water in discontinuous pavement layers. Pavement design shall accommodate transverse moisture flow across the top of subgrade without vertical discontinuities.

2.7.3.3 Removal of Existing Cement Treated Base

Where existing cement treated base is encountered vertically below where new pavement is being constructed, prior to the placement of the pavement section, all existing cement treated base shall be removed. Where cement treated base is removed, vertical saw cuts will be necessary to prevent undermining of the adjacent lanes.

2.7.3.4 Ramps

See reference drawings and electronic cross sections for approximate limits and quantities for this work. Parameters for widening of ramps, ramp shoulders, or city streets not defined shall conform to the section for Widening of Existing Pavement.

2.7.3.5 City Streets

Design and construct local street work necessary to meet the requirements shown in the Design Parameters and Conceptual Plans or if left undefined, to meet the requirements of the City of Everett Roadway Standards.

2.7.3.6 Pavement Resurfacing

All existing HMA pavement within the project limits, that is not reconstructed, shall be resurfaced by roto-milling to a depth of 0.15' and then inlaid with 0.15' HMA compacted depth to reconstruct the Superelevations and the lane cross slopes within the Asphalt

Pavement Limits. Transverse butt joints, at a depth of 0.15', shall be provided at the beginning and ending project limits to accommodate the overlay. Butt joints shall be tapered from 0.15' to 0.00' in no less than 30 feet.

2.7.3.7 Roadway Shoulders

Preliminary information indicates that the structural section of the existing shoulders may not be adequate for sustained traffic operations. Specific attention is drawn to construction phasing, and the temporary use of portions of the existing shoulders as travel lanes. If the Design-Builder chooses to use portions of the existing shoulders as travel lanes for maintenance of traffic, (MOT) the shoulders may sustain damage. Any damage to existing shoulders, that are not intended to be replaced, shall be repaired prior to pavement resurfacing. Where existing asphalt shoulders are next to concrete mainline, the asphalt shall be replaced with concrete shoulders, unless 1) no widening is done on that side of the roadway, and 2) the shoulders are repaired, roto-milled to a depth of 0.15' and inlaid with 0.15' HMA .

The new shoulders for mainline pavement shall be constructed with the equivalent depths of HMA or PCCP in addition to the base as the adjacent travel lanes. See Appendix V for coring data of the existing shoulders.

2.7.4 Design and Construction Criteria

2.7.4.1 Design Criteria

Design the pavement sections with the following parameters:

1. Pavement sections for ramps, beginning at the gore, shall be designed to accommodate 40 million ESAL's. All other pavement sections shall be designed to accommodate 200 million ESAL's.
2. The depth of the structural section of the mainline shoulders shall be equal to the depth of the structural section of the adjacent mainline traveled lanes.
3. The depth of the structural section of the ramp shoulders shall be equal to the depth of the structural section of the adjacent ramp traveled lanes and shall have a minimum HMA depth of 0.30 ft.
4. For the new and widened pavement sections, provide for surface and subsurface drainage to eliminate trapped water. If necessary, provide an underdrain system to adequately drain the pavement section. For base course drainage, collector systems, and outlets, meet FHWA Guidelines (RD-72-30).
5. The Design Builder shall make adjustments to the minimum layer thickness to accommodate climatic conditions such as frost depth. A total minimum pavement depth (HMA and base) of 12 inches is required to minimize the effects of freeze-

thaw cycles.

6. If existing or newly constructed shoulders are utilized as temporary detour/staging routes then the Design Builder shall construct or reconstruct them to accommodate the anticipated ESAL's to avoid incurring pavement distress.
7. Provide bridge approach slabs.
8. It will be the responsibility of the Design-Builder to ensure that the longitudinal joint from pavement widening does not reflect through the HMA overlay. Reflective cracking of the longitudinal joint shall be in accordance with Section 2.30 (Warranties).
9. Continuously reinforced PCC pavement shall not be used.
10. PCC pavement shall be designed with a maximum joint spacing of 15 feet utilizing perpendicular joints. Include dowel bars at all transverse joints.

Dowel bar alignment shall be initially validated on pavement produced using production equipment by coring or other destructive testing process. Once dowel bar alignment has been verified and is within specification, dowel alignment may be verified through the use of the MIT Scan or equivalent device (accuracy of device must be confirmed through coring). Dowel bar alignment tolerances are listed in Standard Specification 5-05.3(10). In addition, dowel bars shall be free of surface irregularities or any signs of corrosion.

2.7.4.2 Pavement Design

For design of the PCC and HMA pavement sections, use a Professional Engineer registered in the State of Washington with at least two years of experience in pavement design. In the Design-Builder's plan, provide for construction of pavements within the Project limits. Use information regarding subsurface conditions and existing pavement sections at the Design-Builder's discretion. Pavement sections shall be designed for the anticipated traffic (including percent increases) provided in the Environmental Documentation in Appendix E and the Interchange Modification Reports in Appendix I.

Design pavement sections in accordance with the requirements set forth in the WSDOT *Pavement Guide – Volume 1, 2004* with the following parameters:

2.7.4.3 Pavement Materials

Pavement Materials shall meet the requirements of WSDOT *Standard Specifications* in addition to the following requirements:

1. The pavement base material shall not be cement treated base.

2. Asphalt millings shall not be used as a base aggregate beyond that allowed in WSDOT Standard Specifications.
3. The base material, if crushed stone, shall contain less than 7 percent passing the No. 200 sieve and have a minimum resilient modulus (T-307 modified- see WSDOT Materials Manual) of 25,000 psi.
4. All transverse joints for new concrete roadway shall be constructed with stainless steel clad dowel bars (or approved equal) in accordance with WSDOT Standard Plan A-1.
5. Dowel bars for dowel bar retrofitting may use epoxy coated dowel bars.

Use only materials that meet or exceed the requirements established by the Technical Specifications.

2.7.4.4 Widening of Existing Pavement

Most of the project limits will require pavement widening to accommodate full lane and shoulder width standards and the additional travel lane for NB and SB I-5 – see reference drawings and electronic cross sections for approximate limits and quantities for this work. Additional Crushed Surfacing Base Course (CSBC) depth may be necessary at some locations to eliminate the potential for constructing a bathtub section for subsurface drainage. Existing cement treated base shall be removed from areas where new pavement is constructed. Prior to the removal of cement treated base, vertical cuts will be necessary to prevent the undermining of the adjacent lanes.

2.7.4.5 Dowel Bar Retrofit

Acceptance of dowel bar retrofit patch material is based on the following:

- Concrete patching materials shall be prepackaged patching mortar extended with aggregate.
- The amount of aggregate for extension shall conform to the manufacturer’s recommendation. This material may be used for partial depth spall repair, panel replacement and dowel bar retrofit.
- Prepackaged patching materials (mortar) and extended patching materials (concrete) shall be cementitious material and meet the following requirements:

**Table 2.7.3
Patching Material Specifications**

Characteristics Test Method	Requirements	
Patching Mortar & Grout		
Compressive Strength		
at 3 hours	ASTM C-109	Minimum 3,000 psi

at 24 hours	ASTM C-109	Minimum 5,000 psi
Length Change		
at 28 days	ASTM C-157	0.15 percent maximum
Total Chloride Ion Content	ASTM C-1218	1 lb/yd ³ maximum
Bond Strength		
at 24 hours	ASTM C-882 (As modified by ASTM C-928, Section 8.5)	Minimum 1,000 psi
Scaling Resistance (at 25 cycles of freezing and thawing)	ASTM C-672 (As modified by ASTM C-928, Section 8.4)	1 lb/ft ² maximum

**Table 2.7.4
Extended Aggregate Specifications**

Compressive Strength		
at 3 hours	ASTM C-39	Minimum 3,000 psi
at 24 hours	ASTM C-39	Minimum 5,000 psi
Length Change		
at 28 days	ASTM C-157	0.15 percent maximum
Bond Strength		
at 24 hours	ASTM C-882 (As modified by ASTM C-928, Section 8.5)	Minimum 1,000 psi
Scaling Resistance (at 25 cycles of freezing and thawing)	ASTM C-672	2 Maximum Visual Rating
Freeze thaw	ASTM C 666	Maximum expansion 0.10% Minimum durability 90.0%

1. Aggregate for extension material shall meet the requirements of Appendix B – Standard Specifications Section 9-03.1(4) and be AASHTO Grading No. 7.
2. The Grout manufacturer shall use the services of an accredited laboratory that has an equipment calibration verification system and a technician training and evaluation process per AASHTO R-18. Mitigation for Alkali Silica Reaction (ASR) will not be required for the extender aggregate used for concrete patching material.

2.7.4.6 Submittals

Refer to Section 2.25 (Control of Material) for pavement submittal requirements.

2.8 ENVIRONMENTAL

2.8.1 General

The Design-Builder shall complete the Project in a manner that avoids or minimizes social, economic and environmental impacts to the extent practicable. WSDOT has determined that the I-5 mainline and ramp work can be completed with minimal impact on the aquatic environment. The Design –Builder shall obtain all required permit approvals unless the contract specifically indicates WSDOT will acquire the permit..

The Design-Builder shall implement the Project’s environmental protection commitments in accordance the environmental documents and permits. The Design-Builder shall implement all environmental commitments and permit requirements. Meet or exceeding environmental requirements with no permit violations.

The principal environmental documents for this Project, all of which are incorporated into this RFP in Appendix E, are:

1. NEPA Environmental Assessment (EA) for I-5 Everett HOV, SR 526 to SR 2, September 2004
2. NEPA Finding of No Significant Impact (FONSI) for I-5 Everett HOV, November 12, 2004
3. SEPA Adoption of NEPA EA for I-5 Everett HOV, November 12, 2004

2.8.2 Mandatory Standards and Reference Publications

2.8.2.1 Mandatory Standards

General. Design and construct the roadway in accordance with the requirements of the standards listed by priority in Table 2.8.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.8.1
Mandatory Standards**

Agency or Author	Title	Document or Report No.	Date	Comments, Short Forms
CEQ	National Environmental Policy Act			

	of 1969			
ACHP	36 CFR 800 - Protection of Historical and Cultural Properties			
FHWA	23 CFR 771 - Environmental Impact and Related Procedures			
FHWA	23 CFR 772 - Procedures for the Abatement of Highway Traffic Noise and Construction Noise			
FHWA	FHPM 7-7-9 - Air Quality Guidelines			
	Endangered Species Act of 1973, and supplements			
	Executive Order 11990 (Protection of Wetlands)			
	Executive Order 11988 (Floodplain Management)			
ACHP	National Historic Preservation Act of 1972			
FHWA	Section 4(f) of the Department of Transportation Act of 1966			
Dept. of Army	Section 404 of the Clean Water Act of 1977 (33CFR320-330)			
NRCS	Federal Farmlands Protection Policy Act of 1981			
EPA	Section 1424(e) of the Safe Drinking Water Act (Sole Source Aquifer Review)			
	36 CFR 60 – Determinations of Eligibility for Inclusion in the National Register of Historic Places			
	Public law 91-646 - Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970			
EPA	Resource Conservation and Recovery Act (RCRA)			
EPA	Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)			
EPA	Superfund Amendments and Reauthorization Act (SARA)			
Ecology	Section 402 Clean Water Act (NPDES)			
Ecology	State Water Pollution Control Act			
WDFW	State Hydraulic Code			
WSDOT	Noise Abatement Policy			

Ecology	Model Toxics Control Act			
Ecology	Underground Storage Tank Act			
	Integrated Pest Management			
CTED	Growth Management Act			
Ecology	Shoreline Management Act			
WDNR	Forest Practices Act			
Everett	Shoreline Management Master Program			
Everett	Sensitive Areas Ordinance			
Everett	Construction Noise Ordinance			

2.8.2.2 Referenced Publications

Use the publications listed in Table 2.8.2 as supplementary guidelines for the design and construction of the roadway. Listed under Publications are guidelines that the Design-Builder may use in addressing the requirements, as the Design-Builder deems appropriate. These publications have no established order of precedence.

**Table 2.8.2
Referenced Publications**

Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	WSDOT Environmental Procedures Manual	M31-11		
WSDOT	WSDOT Highway Runoff Manual	M31-16	2004	
WSDOT	WSDOT Hydraulics Manual	M23-03		
WSDOT	WSDOT Design Manual for Design-Build Projects	M22-02		
WSDOT	High Visibility Fence Memorandum	Project Delivery Memo #04-04	8-11-04	

2.8.2.3 Interagency Agreements and Memoranda

WSDOT has entered into several interagency agreements with numerous federal and state agencies which serve to provide guidance and clarifications for meeting regulatory requirements. The Design-Builder shall comply with the Implementing Agreements and Memorandums of Understanding or Agreement identified in Table 2.8.3 as they apply to any of the Work.

**Table 2.8.3
Interagency Agreements and Memoranda**

Agency or Author	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	Implementing Agreement Between		February	

Ecology	the Washington State Department of Ecology and WSDOT Regarding Compliance with the State of Washington Surface Water Quality Standards		1988	
WSDOT WDFW	Memorandum of Agreement Between Washington State Department of Fish and Wildlife and WSDOT Concerning Construction Projects in State Waters		June 2002	
WSDOT Ecology	Implementing Agreement Between the Washington State Department of Ecology and WSDOT Concerning Hazardous Waste Management		April 1993	
WSDOT PSCAA	Memorandum of Agreement between WSDOT and the Puget Sound Clean Air Agency Regarding the Control of Fugitive Dust from Construction Projects		December 1999	
WSDOT WDFW	Memorandum of Agreement between WSDOT and the Washington State Department of Fish and Wildlife Regarding Fish Passage Guidelines: Culvert Installations		August 1990	
WSDOT Ecology	Implementing Agreement Between the Washington State Department of Ecology and WSDOT Concerning Wetlands Protection and Management		July 1993	
WSDOT, et al	Memorandum of Agreement on the WSDOT Wetland Mitigation Bank Program		October 1998	
WSDOT	WSDOT Environmental Compliance Assurance for Construction Projects and Activities Instructional Letter	IL4055.02	August 2004	

2.8.3 Performance Requirements

2.8.3.1 Environmental Compliance Plan

The Design-Builder shall prepare and implement an Environmental Compliance and Monitoring Plan, which shall be incorporated in the Quality Management Plan that identifies

all applicable environmental permits and approvals, identifies key personnel roles and responsibilities, identifies procedures for environmental compliance, establishes procedures for identifying and correcting non-compliance and establishes procedures for emergency response.

The Environmental Compliance Plan shall include the following plus others deemed appropriate by the Design-Builder in order to achieve environmental compliance:

1. Environmental Personnel and Training
2. Commitment Implementation
3. Environmental Plans and Strategies
4. Plan to obtain or finalize all environmental permits not obtained or finalized in the Contract.

The Design-Builder shall comply with all applicable Laws and shall obtain all required permits, orders, and authorizations related to the Work, except as otherwise noted in this Section. WSDOT has conducted certain environmental studies pertaining to this Project. WSDOT shall be responsible for providing the FONSI and all technical studies and concurrences supporting the FONSI. Permits required for construction of the Work, as scoped, are identified in the Project Contract documents and Design-Builder Proposal.

Work conducted in potentially environmentally sensitive areas not identified in the Environmental Assessment will require that the Design-Builder obtain appropriate studies to identify the environmental issues and impacts caused by the additional Work. The Design-Builder shall promptly perform required environmental studies and obtain all environmental permits, orders, and authorizations. The Design-Builder is responsible for EA re-evaluation required for the proposed Work. The Design-Builder shall submit to the Department copies of all environmental studies/reports, permit applications and permits obtained.

Additional permits may be required by federal, state, or local authorities depending on the Design-Builder's design and technical approach.

Neither the Design-Builder's permit applications nor their supporting documents shall obligate WSDOT to future monitoring activity within the Project Site nor suggest use of WSDOT-owned or controlled property to accomplish mitigation activities without prior approval of WSDOT.

Requests for approval must be submitted to WSDOT a minimum of 15 Calendar Days in advance of submittals to the permitting agency.

Regulatory Agencies

Consult specifically with the following agencies if proposing Work outside the boundaries of the Project Site, regarding required permits, Work constrictions, and other special considerations:

U.S Army Corps of Engineers
Kate Stenberg

P.O. Box 3755
Seattle, WA 98124-2255
(206) 764-6912

National Oceanic and Atmospheric Administration – Fisheries
Neil Rickard
7600 Sand Point Way NE, Bldg. 1
Seattle, WA 98115
(360) 753-9090

U.S. Fish and Wildlife Service
Jennifer Quan
510 Desmond Drive. SE, Suite 102
Lacey, WA 98503
(360) 753-6047

Washington Department of Fish and Wildlife
Jim Fraser, Multi-Agency Permitting Team
3190 – 160th Ave. S.E.
Bellevue, WA 98008
(425) 649-7003

Washington Department of Ecology
Penny Kelley, Multi-Agency Permitting Team
3190 – 160th Ave. S.E.
Bellevue, WA 98008
(425) 649-7181

Washington Department of Ecology
Joe Hickey
Toxic Cleanup Program
3190 – 160th Ave. S.E.
Bellevue, WA 98008
(425) 649-7202

City of Everett
Steve Ingalsbe
2930 Wetmore Ave.
Everett, WA 98201
(425) 257-8941

2.8.3.1.1 Commitment Implementation

The Design Builder shall develop and implement an Environmental Compliance Monitoring and Reporting Program to confirm that all permit conditions and environmental clearances and authorizations are being met, that the applicable environmental performance specifications are being followed, and that the environmental performance specification are

achieving their stated goals. This program shall outline the anticipated monitoring schedule and reports required for each stage of project construction including Pre-construction and Mobilization, Construction, and Post-Construction. The Environmental Compliance Monitoring and Reporting Program shall comprise a section of the Environmental Compliance Plan.

2.8.3.2 Environmental Personnel and Training

2.8.3.2.1 Personnel

The Design-Builder shall identify and assemble an Environmental Oversight and Monitoring team, under the direction of an Environmental Compliance Manager, prior to definitive Design Review and prior to the start of construction. This team shall be to oversee the implementation of mitigation measures and Project commitments, and to monitor construction activities to ensure that impacts beyond those described in the Environmental Assessment and environmental permits do not occur.

The Design-Builder must include individuals on the Environmental Team capable and qualified to perform the following types of investigations and activities:

1. Environmental investigations to determine the effect of the Project (design elements and construction activities) on terrestrial and aquatic biological resources, cultural resources, visual and aesthetic conditions, water quality, Environmental Justice, and other issues present within the Project area.
2. Preparation of biological, environmental, and cultural documents consistent with FHWA and WSDOT policies and procedures.
3. Completion of applications for required environmental permits
4. Development and implementation of plans to mitigate impacts to wetlands, wildlife and wildlife habitat, water quality, visual and aesthetic resources, cultural resources, especially as related to slope cuts and fill embankments, revegetation and tree replacement, and other similar issues.
5. Oversight and compliance monitoring for regulatory permits including wetlands and water quality in accordance with WSDOT Instructional Letter 4055.02.
6. Train Design-Build staff on environmental protection and compliance procedures.
7. Other environmental activities as determined necessary by an environmental oversight team consisting of WSDOT and FHWA representatives. If these activities are not contained in or reasonably inferred by the Contract Documents (including the Design-Builder's Proposal) or applicable laws and regulations, such other environmental activities is part of the Work unless WSDOT concurs that it is not.

An Environmental Compliance Manager is among the Design-Builder's key personnel and shall be directly responsible to the Design-Builder's Project Manager. Lead personnel with the Environmental Team shall have experience with highway engineering drawings and concepts and be capable of communicating with and working cooperatively and effectively with design engineers, construction staff, resource and local agencies, and the general public. The lead person for the Environmental Team shall have prior experience in the areas of construction oversight and environmental monitoring. The Environmental Team lead shall work closely with the Public Involvement Specialist and Community Relations Specialist.

Key personnel with the Design-Builder including the project manager, environmental coordinator, and other lead personnel shall participate in a pre-design and construction environmental task force to discuss environmental, cultural, and community issues. The Design-Builder is responsible for organizing, hosting, and leading the conference.

The Department will provide an independent environmental oversight team to assure that all environmental commitments are adhered to by the Design-Builder. It is expected that the Design-Builder's environmental team and the Department environmental team will consult on a regular and frequent basis regarding the implementation of environmental commitments and mitigation measures.

The Design-Builder shall be responsible for obtaining environmental and cultural resources clearances for all Design-Builder-located areas and activities including but not limited to material pits, staging yards, haul roads, etc. Material changes to the highway alignment that result in environmental, cultural, or community impacts beyond those identified in the Environmental Assessment will not be allowed without the prior written consent of WSDOT and FHWA. All changes shall be supported by the necessary investigations, documentation, and approvals of applicable resource management agencies. Time and cost implications resulting from material changes for the convenience of the Design-Builder shall be borne by the Design-Builder.

As part of the Environmental Compliance Plan, the Environmental Compliance Manager shall develop, document, and implement an Environmental Communication Protocol for environmental compliance. The Environmental Communication Protocol shall define compliance roles, responsibilities, and communication procedures. WSDOT will make the Roles and Responsibilities Agreement available to the resource agencies.

The Environmental Communication Protocol shall identify points-of-contact for emergency response and for implementation of design changes, environmental performance specifications, best management practices, and compliance procedures. The communication plan shall clearly identify the appropriate contacts for reporting problems and potential violations of environmental regulations and/or environmental performance specifications. Information required for each point-of-contact includes name, responsibility, office, 24-hour and mobile telephone numbers, e-mail address, and work address.

2.8.3.2.2 Training

Develop and implement an environmental protection and training program for the Design-Builder's design and construction staff. Responsible for all actions of any of their staff persons adversely affecting the environment.

The training program shall orient employees and sub-contractor's to the following:

1. The overall importance of environmental issues in achieving a successful Project
2. The particular environmental sensitivities of the Project
3. Erosion and Sediment Control procedures
4. Environmental Compliance Reporting Procedures
5. Emergency Response

The Environmental Compliance Manager shall notify WSDOT of the training sessions and allow WSDOT personnel to participate.

2.8.3.2.3 Environmental Plans and Strategies

2.8.3.2.3.1 Temporary Erosion and Sediment Control Plan

This plan is intended to prevent, control, and stop erosion and water pollution within the Project, thereby protecting the work, nearby lands, streams, and other bodies of water, including wetlands.

Requirements

Controlling pollution, erosion, run-off, and related damage will require the Design-Builder to perform temporary work items including but not limited to:

1. Providing ditches, berms, culverts, and other measures to control surface water
2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows
3. Controlling underground water found during construction
4. Covering or otherwise protecting slopes until permanent erosion-control measures are working

Before any work begins, the Design-Builder shall submit a plan for temporary water pollution/erosion control according to the provisions of the Scope of Work. The plan shall show the schedule for all erosion-control work, whether permanent as required by the contract or temporary as proposed by the Design-Builder. The plan shall cover all areas the Design-Builder's work may affect inside and outside the limits of the project (including all WSDOT-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water). Before this plan has been reviewed, the Design-Builder shall do no clearing and grubbing or earthwork unless the Department approves in writing.

If natural elements rut or erode the slope, the Design-Builder shall restore and repair the damage, with the eroded material where possible, and clean up any remaining material in ditches and culverts. The Design-Builder shall schedule the work so that grading and

permanent erosion control immediately follows clearing and grubbing. If conditions prevent such scheduling, temporary control measures will be required between work stages.

The area of excavation, borrow, and embankment work shall not exceed the Design-Builder's ability to meet the schedule for finish grading, mulching, seeding, and other permanent erosion control work.

Temporary control measures are required if it appears pollution or erosion may result from weather, the nature of the materials, or progress on the work.

2.8.3.2.3.2 Spill Prevention, Control and Countermeasures Plan

This work shall consist of preparing a Spill Prevention, Control, and Countermeasures (SPCC) Plan and implementation of the plan.

Requirements

The Design-Builder shall be responsible for the preparation of an SPCC plan in accordance with the Highway Runoff Manual to be used for the duration of the Project. The plan shall be submitted to the Department prior to the commencement of any construction activities. A copy of the plan with any updates shall be maintained at the work site by the Design-Builder.

The SPCC plan shall identify construction planning elements and recognize potential spill sources at the site. The Plan shall outline responsive actions in the event of a spill or release and shall identify notification and reporting procedures. The Plan shall also outline Design-Builder management elements such as personnel responsibilities, project site security, site inspections and training.

The Design-Builder shall maintain, at the job site, the applicable equipment and material designated in the SPCC Plan.

2.8.4 Design and Construction Criteria (Commitments)

2.8.4.1 NEPA/SEPA Documentation

A NEPA Environmental Assessment and SEPA Adoption have been prepared and circulated which address the scope, impacts and mitigation for the Project. Changes to the Project proposed by the Design-Builder will require an environmental reevaluation to determine the adequacy of the existing environmental documents. A supplement to the Environmental Assessment or an Environmental Impact Statement may be required if the project impacts increase to the point where the project becomes controversial or the impacts approach significance. The Design-Builder will be responsible for preparation of this additional environmental documentation and assumes all risk associated the proposed change.

The environmental reevaluation requirements for this project shall follow the procedures and requirements established in the WSDOT Environmental Procedures Manual and 23 CFR 771. It is anticipated that the environmental reevaluation and related approvals will not be required provided changes in roadway alignments and grades are negligible and resultant social, economic and environmental affects are not appreciably changed. Coordination with Stakeholder agencies shall occur as part of any reevaluation process. Final determination regarding the necessity of environmental reevaluations will be made by the WSDOT and FHWA.

All environmental reevaluations will be subject to written approval by WSDOT and FHWA.

2.8.4.2 Environmental and Permit Commitments

WSDOT is in the process of obtaining the Project permits listed in Table 2.8.4. The status and conditions of the permit not obtained by WSDOT 30 days prior to the submittal of the Proposals will be sent to the Proposers via a RFP Addendum. The Design-Builder shall complete the permit process for any permits not completed by WSDOT prior to the Proposal due date.

The Design-Builder shall meet with each permitting agency to review the means and methods in constructing the Project and to confirm understanding of permit requirements prior to permit related construction activity. The Design-Builder shall give notice to the Department 5 calendar days prior to all meetings with Permitting Agencies and provide the Department the opportunity to attend.

The Design-Builder is responsible for and shall obtain additional permits and approvals as necessary based on the proposed design.

Applications for any additional permits for which WSDOT is required to be the applicant shall be prepared by the Design-Builder. Draft permit applications for these permits shall be submitted to WSDOT for review at least 10 business days prior to the date the application is to be submitted. The Design-Builder shall be responsible for providing WSDOT with all necessary information, including environmental data and technical data for the roadway cross drainage-ways (i.e. typical sections, location and approximate areas of cut and fill within each drainage way) to support the determination of need for a permit and/or the permit application. The plans for permits shall be on 11"x17" sheets. The Design Builder shall allow time in the project schedule for processing the applications, after completed applications are received by WSDOT.

Permits for which WSDOT is not required to be the applicant shall be the responsibility of the Design-Builder. Construction activities may not begin until the appropriate environmental permits are issued.

Table 2.8.4 summarizes the environmental permits and approvals needed for the Project and gives the status of each. There will be no compensation for costs and schedule delays incurred due to delays in obtaining or finalizing permits or approvals that are required to be obtained or finalized by the Design-Builder.

**Table 2.8.4
Environmental Permits and Approvals**

Permit or Approval	Agency or Governmental Entity with Jurisdiction	Status
Section 404 Nationwide Permit #18	U.S. Army Corps of Engineers	Pending
Section 401 Water Quality Certification (Letter of Verification)	Department of Ecology	Pending
Section 402 NPDES General Permit for Construction Sites)	Department of Ecology	Design-Builder to obtain
Hydraulic Project Approval	WDFW	Approved
Shoreline Substantial Development, Floodplain Development and Wetland Alteration	City of Everett	Pending
Noise Variance	City of Everett	Pending

Federal

WSDOT has submitted a Pre-Construction Notification to the Corps of Engineers for use of a Department of the Army permit that authorizes minor impacts to Waters of the United States. For this project, Corps of Engineers Nationwide Permit 18 is anticipated to cover the loss of no more than 0.03 acres of wetlands and 0.01 acres of stream at Water Quality Site 1 and loss of 0.01 acres of roadside drainage ditches on I-5. Authorization for these impacts is anticipated to be received in January, 2005. WSDOT expects to issue an Addendum to this RFP when the Corps authorization is received. Any special requirements or conditions will be disclosed in the Addendum.

State

WSDOT anticipates that the Department of Ecology will issue a Letter of Verification for this project indicating that an Individual Water Quality Certification is not required under Section 401 Clean Water Act. This verification is anticipated to be received in January, 2005. The verification will be valid provided impacts to waters of the United States do not exceed those authorized by the Corps of Engineers. If Ecology’s verification includes any conditions, these conditions will be included in an Addendum to this RFP.

WSDOT has applied to the Department of Fish and Wildlife for a Hydraulic Project Approval (HPA) for construction of a stormwater outfall at Water Quality Site 1. The HPA is anticipated to be received in January, 2005. The conditions of the HPA, including construction timing for any in-water work, will be included in an Addendum to this RFP.

Extension of the in-water work period requires approval by WDFW and also requires advance notice to the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries. It shall be Design-Builder's responsibility to obtain approval from WDFW and notify the Department fifteen calendar days in advance of the need to obtain an extension. WSDOT will notify USFWS and NOAA Fisheries. No Work shall be allowed in the water or below the ordinary high water mark outside of the WDFW in-water work period, unless it is effectively isolated from the potential wetted channel.

Local

WSDOT has made application to the City of Everett for a Shoreline Management Substantial Development Permit and a Floodplain Development Permit for construction of Water Quality Site 1. These permits will also include review of the Wetland and Stream Alteration proposed at the site. The City's permits are anticipated to be received in February, 2005. The conditions of these permits will be included in an Addendum to this RFP.

2.8.4.3 Other Agreements and Commitments

The NEPA Environmental Assessment, FONSI, and supporting technical studies contain commitments for completion of the Work. The Design-Builder shall ensure that the following commitments are adhered to or implemented:

2.8.4.3.1 Air Quality

Construction Mitigation Measures

The Design Builder shall be responsible for preparing, implementing, and submitting a Fugitive Dust Control Plan. The plan shall identify activities that cause dust, measures planned to prevent dust, methods of inspection, staff responsible to implement the plan, and procedures for tracking and reporting. The Design Builder must also comply with the Memorandum of Agreement between Puget Sound Clean Air Agency and WSDOT.

Permanent Mitigation Measures

No permanent mitigation measures are anticipated for air quality. However, the final project design must meet air quality conformity requirements. The Design-Builder shall be responsible for doing all necessary work to show and report that the proposal meets project level air quality conformity. Hot-spot modeling and reporting by the Design-Builder at intersections built differently than proposed and previously modeled by WSDOT shall be completed.

2.8.4.3.2 Noise

Construction Mitigation Measures

Design-Builder shall obtain a Noise Variance from the City of Everett for construction work that exceeds applicable noise ordinances.

Permanent Mitigation Measures

The requirements for permanent traffic noise abatement are contained in Section 2.12 – Bridge and Structures.

2.8.4.3.3 Streams and Wetlands

A delineation of the wetlands within the existing drainage facility is shown on the basemap. WSDOT has selected a mitigation site, and is in the process of developing a wetland mitigation plan. The wetland mitigation plan will accommodate unavoidable impacts to 0.05 acres of waters of the United States (streams, wetlands and jurisdictional roadside ditches), based on a 2:1 mitigation ratio. WSDOT has submitted Permit applications to the Corps of Engineers, Department of Ecology and the City of Everett for this mitigation. These Permits are anticipated to be received no later than February, 2005. No work shall occur at Water Quality Site 1 or within waters of the United States until all Permits are obtained. The Design-Builder shall design the Project to minimize impacts to wetlands and other waters of the United States and including wetland and stream buffer areas.

WSDOT will develop the mitigation plan, as part of this project. The DB will construct the wetland mitigation site as provided by WSDOT. The DB will assure that the Standards of Success, as outlined in the Wetland Mitigation Report are met through plant establishment activities (see section 2.14)

2.8.4.3.4 Threatened and Endangered Species

Construction Mitigation Measures

Work in the vicinity of the Ordinary High Water Mark will be conducted during the work window specified by the Washington Department of Fish and Wildlife.

Any temporary and/or permanent vegetation removal associated with stormwater conveyance installation, culvert replacement, and water quality facilities will be replaced at a 1 to 1 ratio, will be monitored for a minimum of three years, and will achieve a minimum of 80% survival.

All impacted wetlands will be replaced at ratios dictated by state and local regulatory standards.

Construction will adhere to Best Management Practices (BMPs) and a Standard Pollution Prevention Control and Countermeasures (SPCC) plan as defined by the Temporary Erosion and Sediment Control (TESC) plan, as approved by the Department.

Prior to clearing or grading, those areas that are to remain undisturbed will be clearly marked by flagging or the use of high-visibility fencing. During the construction period, no disturbance beyond the marked clearing limits will be permitted. The flagging/fencing will be maintained by the Design-Builder for the duration of construction.

Erosion and sediment control (ESC) facilities will be constructed in conjunction with all clearing and grading activities, and in such a manner to ensure that sediment-laden water does not enter streams or adjacent wetlands.

The ESC facilities will be inspected daily by the Design-Builder and maintained as necessary to ensure their continued functioning.

Appropriate erosion control measures will be installed in areas where construction will occur adjacent to sloughs or wetlands. These may include sediment fencing, hay bales, sand bags, dirt berms, or other means.

Any area stripped of vegetation where no further work is anticipated for a period of seven days during the dry season (May 1 to September 30), or for more than two days during the wet season (October 1 to April 30), will be stabilized using appropriate methods including covering, mulching, or seeding. Any area to remain unworked for more than 30 days will be seeded and/or covered, unless winter weather make vegetation establishment infeasible.

All vegetation removed from construction areas will be removed from the site and will not be placed in wetlands, streams, or their buffers.

The use of silt fences, straw bales, and other sediment filtration devices will be used to minimize the inputs of fine sediment during rainstorms prior to completion of construction. Silt fence will be used in compliance with western Washington construction BMPs.

Following construction, all disturbed areas will be vegetated or otherwise permanently stabilized and temporary ESC facilities will be removed.

Permanent Mitigation Measures

The stormwater design will meet the March 2004 WSDOT Highway Runoff Manual as amended by the Instructional Letter IL 4020.02 and the 2001 Department of Ecology Stormwater Management Manual for Western Washington.

All stormwater water quality facilities will be designed for enhanced treatment.

Water quality facilities located within the floodplains shall not include vaults.

Any water quality facility located within the floodplain and involving filling will receive equal volume compensation (e.g. equal volume floodplain excavation) in the immediate vicinity unless noted otherwise.

The Biological Assessment will require an addendum if there are changes to the impact of the Project as stated within the Biological Assessment. If an addendum is required, the Design-Builder shall prepare it based upon the changes indicated by the Design-Builder.

The Design-Builder shall implement or construct all mitigation measures required for the Project unless noted otherwise.

2.8.4.3.5 Historic, Archaeological and Cultural Preservation Construction Mitigation Measures

It is national and state policy to preserve, for public use, historical and pre-historical objects such as ruins, sites, buildings, artifacts, fossils, or other objects of antiquity that may have significance from a historical or scientific standpoint. No known historic, archaeological or cultural sites have been identified within the I-5 right of way as described in the Environmental Assessment. Detailed surveys of proposed Water Quality Sites have not been performed.

The Design-Builder shall retain the services of a professional archaeologist. The Project Archaeologist shall prepare a survey and monitoring plan for performing pre-construction surveys of Water Quality Site 1, 2 and 3 and monitoring of construction activities that penetrate undisturbed, native alluvial soils in Water Quality Site 4 and 5 and the Lowell Hillside Drainage Easements. The monitoring plan must be approved by WSDOT prior to starting the work.

Archaeological, historical or cultural objects, which may be encountered by the Design-Builder, shall not be further disturbed. The Design-Builder shall immediately notify the Department of any such finds. The Project Archaeologist in consultation and coordination with the Department will determine if the material is to be salvaged. The Design-Builder may be required to stop work in the vicinity of the discovery until such determination is made. If the archaeologist determines that the material is to be salvaged, the Department may require the Design-Builder to stop work in the vicinity of the discovery until the salvage is accomplished.

Permanent Mitigation Measures

None

2.8.4.3.6

2.8.4.3.7 Hazardous Waste Sites

Known Contaminated Sites

Water Quality Site 1

Field exploration and historical data has shown that the area for Water Quality Site # 1 contains hazardous materials, see Appendix E-7 and Appendix E-8. The Work includes remediation of 100% of all excavated material. Design-Builder shall assume that all excavated material is contaminated. Design-Builder shall include price and schedule impacts for this work in the Proposal. Remediate this excavated material in accordance with applicable state and federal laws and regulations (including the regulations and requirements of the U.S. Environmental Protection Agency (EPA), the Washington Department of Ecology (Ecology), and the Occupational Safety and Health Administration (OSHA)) and the following sections. Within three (3) weeks of completion, document the remedial activities with a remediation report to the Department.

The City of Everett has obtained a No Further Action (NFA) finding for remediation at Water Quality Site #1. The Design-Builder shall contact, demonstrate and obtain approval from the Washington Department Ecology that the proposed site design details at Water

Quality Site #1 meets applicable requirements prior to beginning any construction work at Water Quality site #1.

Water Quality Site 2

Field exploration and historical data has shown that the area for Water Quality Site # 2 contains hazardous materials and two buried underground storage tanks. Design-Builder shall assume that all excavated material is contaminated. The Work includes remediation of 100% of all excavated material and removal and remediation of two underground storage tanks. Design-Builder shall include price and schedule impacts for this work in the Proposal. Remediate this excavated material and storage tanks in accordance with applicable state and federal laws and regulations (including the regulations and requirements of the U.S. Environmental Protection Agency (EPA), the Washington Department of Ecology (Ecology), and the Occupational Safety and Health Administration (OSHA)) and the following sections. Within three (3) weeks of completion, document the remedial activities with a remediation report to the Department.

Sites Discovered During Construction

Suspension of Work

If abnormal conditions are discovered during construction that indicate the presence of a hazardous substance, immediately suspend work in the area and notify the Department. Design Builder shall develop report and remediation plan as described below. Abnormal conditions include the presence of barrels; buried storage tanks; aboveground tanks; obnoxious odors; excessively hot earth; stained or discolored soils; smoke; and unidentifiable powders, sludges, or pellets.

Remediation Plan and Report. Develop a written remediation work plan for the site in accordance with Ecology and EPA regulations and requirements. Develop an opinion of probable construction costs for the remediation plan. Obtain approval of the remediation plan from WSDOT and appropriate governmental agencies. Remediate the hazardous substance in accordance with Governmental rules, regulations, and requirements. Within 14 calendar days of the completion of the remediation, document the remedial activities and regulatory approvals with a remediation report to WSDOT.

2.8.5 Submittals

Submit the following information and documentation, at a minimum, to WSDOT and to regulatory agencies as directed by WSDOT and required by this RFP and environmental approvals:

1. Environmental Compliance Plan
2. Environmental Communication Protocol
3. Environmental Construction Monitoring Reports
4. Temporary Erosion and Sediment Control Plan
5. Spill Prevention, Control, and Countermeasures Plan
6. NPDES Baseline General Permit for Construction Sites
7. Noise Abatement Design Report

8. Fugitive Dust Control Plan
9. Air quality analysis where necessary for ramp metering and for changes to previous modeled intersections
10. Archaeological Survey and Monitoring Plan
11. Investigative work plans, site investigative reports, and remediation work plans as necessary for hazardous material discovery and remediation
12. Wetlands delineations and appropriate Section 404 Permit Application for the design or temporary construction impacts as necessary

2.9 PUBLIC INFORMATION AND COMMUNITY INVOLVEMENT

2.9.1 Public Information

2.9.1.1 General

This major construction project will affect drivers, passengers, businesses, neighbors and the community. WSDOT wants to minimize negative effects and foster project support by achieving the following goals:

- minimize traffic and community impacts; anticipate unavoidable impacts and provide timely, relevant, accurate and reliable information
- increase public awareness and satisfaction with the project and design-build contracting
- appropriately and actively involve communities in decision making, including decisions related to context sensitive design
- prove public accountability

2.9.1.2 Public Information Staff

The Design-Builder shall provide, at a minimum, a full-time public information staff person who will be responsible for providing timely and accurate project information to WSDOT staff and support project communications at WSDOT's direction. Other Design-Builder staff will be available to help with public information as needed and requested by WSDOT. WSDOT will also provide staff dedicated to public information. The Design-Builder's public information staff member will be expected to work cooperatively with WSDOT public information staff to exceed public information expectations, provide information about construction and traffic impacts in advance, foster public satisfaction with the project, and provide and accurate and candid progress updates.

Design-Builder's public information staff member must have professional experience in all aspects of public information on significant transportation projects, including:

- writing for the news media and public
- taking photographs and video
- providing and presenting information to citizens, news reporters, community groups, and others
- developing, implementing and measuring results of strategic communications plans and strategic messaging
- developing and producing maps, charts, graphs, diagrams, and other visual images and graphics
- developing and implementing public involvement and community involvement programs

WSDOT staff will review Design-Builder public information staff qualifications and assess whether they have the skills and experience to do the work. WSDOT reserves the right to request changes if necessary.

2.9.1.3 Project Information

The Design-Builder will write and maintain a teamwork, quality and project information flow plan per WSDOT's standards and coordinate with WSDOT for finalization and implementation. The Design-Builder and public information staff shall meet with WSDOT's Construction Traffic Coordination and public information staff at least two weeks before construction activities begin to review requirements and responsibilities and go over the public information plan.

Design-Builder's public information specialist shall have real-time access to all project details that may be relevant to drivers, neighbors, public agencies, emergency services, businesses, and other interested groups. The Design-Builder shall provide timely and accurate information about all aspects of the project to WSDOT public information, traffic, design, construction, and emergency response staff.

The Design-Builder will provide free and unfettered access to project information and public information materials. Design-Builder is expected to provide information including but not limited to project updates (schedule, budget, work completed and planned, safety, traffic, noise, natural environment, etc.), photos, maps, written detour routes, charts, diagrams, detour route maps, project designs and design element images, ramp closures, channelization plans, video footage, animation and other materials of use to the news media, public and community outreach staff. All must comply with WSDOT's standards and be made available in electronic or print form to WSDOT at any time without additional cost. WSDOT staff will review and approve these materials prior to release or distribution.

The Design-Builder public information specialist is expected to provide construction information to WSDOT on a weekly basis at a minimum, and more frequently if construction and traffic impacts change or if deemed necessary by WSDOT. Design-Builder shall provide weekly updates each Wednesday on the following week's planned closures, detours, general project status and other information relevant to the drivers and the community to

Construction Traffic Coordination staff to be included in the department's Construction Update Report.

The Design-Builder shall provide information in a manner that provides enough time for WSDOT and others to review and use the information, produce and distribute public information materials, and meet related WSDOT standards. Information provided must meet or exceed WSDOT standards as determined by WSDOT. Design-builder shall review public information materials for accuracy at WSDOT's request.

The Design-Builder will provide WSDOT staff and news media easy and immediate access to the project site at WSDOT's request. The Design-Builder's public information staff shall attend weekly public information, construction traffic staff meetings, and training and coordination sessions as requested by WSDOT. The Design-Builder's public information staff shall attend daily traffic impact or incident meetings when requested by WSDOT.

2.9.1.4 Photographs and video

Design-Builder shall document conditions during construction, public outreach, and other project related topics using photos and video.

- Design-Builder shall install, set-up, operate and maintain 3 time-lapse cameras to document the new Broadway exit overpass and other construction areas as determined by WSDOT. The Design-Builder is responsible for relocating the cameras as required.
- Design-Builder shall provide at least three-dozen WSDOT-approved photos monthly with accompanying information and photo releases for Web site, newsletters and other uses.
- Design-Builder shall produce and distribute photos and video as requested.
- Design-Builder shall track and file photos and video using WSDOT-approved documentation system, provide spokesperson and people for photos as needed by WSDOT
- Design-Builder shall provide or obtain needed accompanying information (use permissions, publication rights etc) for photographs and videos.

2.9.1.5 Open Houses & Public Meetings

Design-Builder shall hold at least two public open houses per year to inform the public of the Projects status, answer key issues related to the Project.

Design-Builder shall assist with outreach to civic and community groups, including but not limited to the City of Everett, neighborhoods, businesses, truckers, shippers, transit agencies, employee transportation coordinators, Boeing, U.S. Navy, Everett Mall, tribes, Port of Everett, and environmental justice populations. Design-Builder shall be available to attend public and community meetings or make presentations at WSDOT's request. There will be at least 15 meetings per year for the life of the contract.

Design builder shall assist with set-up and break-down, be available to answer questions and present information, compile and publish meeting records and summaries, develop and produce presentation boards and materials and assist with follow-up, including information to respond to open house attendees and collected comment cards.

Design-Builder shall be responsible for the preparation of graphics, handouts, minutes of the meetings, audiovisual displays and similar material meetings and open houses. All such materials shall prominently identify WSDOT and be pre-approved by WSDOT staff. The Design-Builder shall expect to work with the team to finalize the agenda for any public meetings.

Design-Builder shall conduct tours as needed to WSDOT public information staff and targeted outreach groups as needed.

The Design-Builder will contact the top 50 businesses and large employers (companies that employ more than 100 employees) and community groups within ten-mile radius of project to provide information on potential traffic disruptions and alternate transportation options.

Upon WSDOT's request, the Design-Builder shall personally visit large employers to give presentations to employees on alternative routes/options. The Design-Builder shall provide staff for attendance at the meetings and will provide handouts, detour maps, graphics, displays and a contact person to answer commuter questions.

2.9.1.6 Media relations

Although media interviews will mainly be the responsibility of WSDOT, the Design-Builder shall participate in media interviews or other media information support activities at all times at WSDOT's request. When participating in media interviews, the Design-Builder will provide information that complies with WSDOT messaging and other standards, including requirements for advance project information, project progress and accountability, and timely response to media inquiries.

The Design-Builder shall inform and coordinate all media contact activity with WSDOT prior to interviews.

The Design-Builder shall conduct media tours of project site at WSDOT's request. The Design-Builder shall provide information and materials that meets local broadcast and print media requirements and deadlines. All information released to news media must be pre-approved by WSDOT.

2.9.1.7 Correspondence and e-mail

Design-Builder shall provide staff to receive and respond to correspondence, including e-mail, letters and other forms of correspondence from the public. Design-builder will provide a contact name, postal address and e-mail address to provide to the public. All correspondence will be answered per WSDOT standards.

Design-Builder shall provide WSDOT a weekly summary of public inquiries, complaints and comments and their responses. They will note trends and explain how Design-Builder responded to public comments and complaints.

2.9.1.8 Telephone Project Hotline

Design builder shall set-up, maintain and staff a toll-free project telephone hotline.

Design-Builder shall post the phone number on appropriate motorist signs at the project site. WSDOT and the Design-Builder will use the phone number extensively on public documents.

Design-Builder shall set up the phone hotline to provide callers daily updates on current construction and traffic impacts and project progress. Callers will be provided an option to speak to someone from the Design-Builder staff at all times.

The Design-Builder shall provide timely and accurate information to WSDOT communications staff to update the message daily. Design-Builder shall staff the phone line 24-hours a day and respond to any public inquiries within 12 hours. Design-Builder shall insure that all Design-Builder staff answering the phone are trained, friendly, responsive, and informed about construction and traffic impacts.

Design-Builder shall compile, record, organize and summarize public questions and comments taken on the phone hotline via electronic file; manage response review; record responses to callers; analyze and report trends; provide weekly report via electronic file to WSDOT.

2.9.1.9 Emergency and incident response and during/after hours communications

Design-Builder shall review, coordinate, train staff, provide a trained spokesperson in emergencies and provide information and assistance promptly as requested by WSDOT during an emergency.

2.9.1.10 Portable highway advisory radio

Design builder shall provide timely and accurate information daily or as requested by WSDOT for highway advisory radio (HAR) messages. Design builder shall submit HAR messages to WSDOT for review and approval in advance.

2.9.1.11 Portable variable message signs

Design builder shall purchase, operate and maintain 2 portable variable message signs (VMS) that are acceptable to WSDOT. These 2 VMS shall become the property of WSDOT at the completion of the Project.

Additional VMS signs needed or required for the Project is the responsibility of the Design-Builder.

2.9.1.12 Citizen's advisory committee support

The Design-Builder shall attend and participate in all community or citizen's advisory group meetings at the request of WSDOT. Design-Builder shall prepare and provide supporting documents as requested by WSDOT.

2.9.1.13 Special Events

The Design-Builder shall attend, participate and provide safe, accessible and high-profile staging areas for special events set up by WSDOT staff, to include, but not limited to one ground-breaking ceremony at start of construction, one milestone celebration each year during the life of the contract and a ribbon-cutting ceremony when the lanes open to traffic.

Design-Builder shall prepare and provide supporting documents as requested by WSDOT.

2.9.2 Community involvement

2.9.2.1 Philosophy

WSDOT's goal is to enhance the community and reflect the character and desires of City of Everett and neighborhoods in design elements where applicable. This is needed to assure public satisfaction for the essential success of the project.

Design-Builder shall abide by this philosophy and shall conduct meaningful community involvement in deciding design solutions that reflect community values.

Design-Builder shall base designs of all aesthetics and landscaping components, including water quality treatment sites, park enhancements, noise walls, and bridge abutments on Appendix M7.

2.9.2.2 Working with the City of Everett and Individual Neighborhoods

Design-Builder shall appropriately and actively involve the City of Everett, City of Everett Parks Department, Everett Office of Neighborhoods, neighborhood committees and other community groups in the design decision-making process, including decisions related to context sensitive design.

Design-Builder shall be responsible for working with and getting final approval on designs from WSDOT (including WSDOT's aesthetics team).

2.9.2.2.1 Presentations, Workshops and Neighborhood Meetings

Design-Builder shall communicate and meet directly with established neighborhood committees, City of Everett, City of Everett Parks Department, Everett Office of Neighborhoods and other community groups to actively include them in the context sensitive design process and aesthetics and landscaping components final design choice.

- Design-Builder shall organize, conduct and record feedback for two community involvement presentations and workshops with City of Everett and the community (also called design charrettes). Design-Builder shall work with the City of Everett and WSDOT to plan these workshops.
- The Design-Builder shall attend, present, take community feedback and report back at two meetings each for seven individual neighborhoods during the design process (total of 14 meetings) and one update meeting each year at established neighborhood meetings for the life of the contract (total of 21 meetings). Design-Builder shall be responsible for working with, gathering feedback, gaining approval from and continually updating the Delta, Riverside, Lowell, Pinehurst, Glacier View, Valley View/Sylvan Crest and Cascade View neighborhoods in the City of Everett on noise walls and landscaping facing neighborhoods. Design-Builder shall coordinate with the neighborhood chair and Office of Neighborhoods to book meeting place, time and date for each neighborhood/community involvement meeting by contacting the current neighborhood chair and Everett Office of Neighborhoods via information found on the City of Everett Web site at: <http://www.everettwa.org/> or by phone at 425.257.8717 to set up meetings.
- Design-Builder shall set-up and break down meetings, provide handouts, presentation boards and materials.
- Design-Builder shall implement the recommendations of the community in the final design of the project.

2.9.2.2.2 Collateral Materials and Information for Community Involvement

Design-Builder shall research, draft, design, produce and send out flyers advertising the community involvement meetings per WSDOT communications and printing standards. Design-Builder shall get all flyers approved by WSDOT prior to release or distribution. Design-Builder shall also send final flyer to the Everett Office of Neighborhoods for distribution. All meeting presentation materials and handouts need to be approved by WSDOT. Design-Builder shall give WSDOT ample time to review and Design-Builder to make changes.

2.9.2.2.3 Community Involvement Group Review

Design-Builder shall form a community involvement advisory group with City of Everett Parks, Planning and Public Works, Everett Office of Neighborhoods and WSDOT to identify, propose, and evaluate landscape and aesthetic improvements throughout the project.

Design-Builder shall facilitate the subcommittee meetings and assist the subcommittee(s) in developing a program that meets the requirements of WSDOT, project budget, City of Everett, Everett Parks Department, Everett Office of Neighborhoods, neighborhoods and the community.

2.9.2.2.4 Coordinating with WSDOT and meeting standards

The Design-Builder shall assure WSDOT community involvement standards while conducting community outreach and finalization of plans.

The Design-Builder shall coordinate all community outreach efforts with WSDOT’s communications manager and public information, design and construction staff.

2.10 UTILITIES AND THIRD PARTY AGREEMENTS

2.10.1 General

The Design-Builder will be responsible for the coordination and resolution of all Utility relocation issues within the limits of the Project, as set forth in this document and any related plans, specifications, rules, regulations, tariffs, or requirement. All Utility relocations will be compatible with the Design-Builder’s final design and conform to WSDOT and FHWA requirements for location within a Limited Access (LA) Right of Way (ROW), including meeting all criteria for applications for new Utility Permits or Franchise Amendments, as required. The Design-Builder shall insure that the Utilities apply for their new Utility Permits or Franchise Amendments as far in advance of relocation as possible. Permit or Franchise amendment shall be submitted to the Department a minimum of 30 days prior to construction.

2.10.1.1 Identified Utilities

The Utility Owners listed in Appendix U (Utility Data), are those that have been identified as within the Project limits. The listed Utilities include contact person names, phone numbers and mailing addresses. The contacts were current at the time of publishing this document; the contacts may change subsequent to the publishing of this document. The Design-Builder shall be responsible for maintaining current contacts with all of the Utilities with facilities within the Project limits. The listed and identified utilities have been contacted prior to this RFP concerning the project and provided with a copy of the existing utilities base map. The listed time for response times for the Utilities are estimates at the time of initial contact and may not be realistic and need to be verified. The Design-Builder will be responsible for obtaining current scheduling from the Utilities and updating schedules if conditions differ from those the Utilities were aware of at the time they were provided a schedule.

2.10.1.2 Un-Identified Utilities

The Design-Builder, through research, investigation and other appropriate means, will ensure that all Utility facilities that need to be identified to accommodate the design and construction within the Project limits, whether know or unknown at the time this document is published, will be identified and located.

2.10.1.3 Utility As Builts/Locates

The Design-Builder, will obtain as built information from any Utilities identified by the Design-Builder that were not listed/identified by WSDOT which the Design-Builder has identified through its investigations for Utilities within the project limits.

2.10.1.4 Relocates

The Design-Builder is responsible for the coordination of the relocation of Utility facilities wherever required for construction of the project. The Design-Builder will minimize impacts to Utility facilities wherever possible and work cooperatively with the Utilities to achieve the relocation of their facilities in a reasonable time frame.

2.10.1.5 Utilities within Right of Way - Costs

The Utility Owners are responsible for the cost of Design and Relocation of franchised or permitted Utilities within Department Right of Way per CFR Title 23 Part 645 and the requirements of their franchise or permit with WSDOT, or for the relocation of any Utility facilities within the limited access rights of way without a demonstrable property right. The Design-Builder shall reference Chapter 2 of the WSDOT Utilities Manual to develop any Utility Agreements with the Utilities. The agreement will specify any cost to be paid by the utility company to the Design-Builder for the relocation work described, if any.

The Utility is only responsible for the cost of one design and relocation of any facility. If the relocation design is changed by the Design-Builder after a Utility has completed or is in the process of completing their relocation design. The cost of the second design and/or relocation is to be paid in full by the Design-Builder. There will be no allowance for cost impact due to schedule changes, approvals, permit revisions, Utility reimbursement, or for any related impacts due to a requirement for a second Utility relocation design and/or construction. WSDOT cannot legally reimburse the Design-Builder for any Utility costs for relocation of Utility facilities not on Utility owned easement, fee owned property or a finding by the State Attorney General of prescriptive rights or for second design/relocations that were the sole responsibility of the Design-Builder.

Should the Design-Builder pay any costs for relocation of Utility facilities for which the State is not legally responsible, the Design-Builder will not be able to bill the State for those costs. Such costs are to be borne solely by the Design-Builder and shall come out of the Design-Builder's own monies/profits.

2.10.1.6 WSDOT – Supplied Information

Limited Investigations.

The WSDOT has investigated the Utilities within the project limits. Note that:

1. Investigations may have included: requesting “As-Builts” from Utilities listed as having either franchises or permits with WSDOT within the project limits in the State database. Visually locating above ground Utility objects and visible manhole, valve box, vault, etc. covers and surveying above ground objects.
2. The WSDOT has not identified service lines for any utilities in this Project. Identification, location, protection and relocation of service lines are at the sole risk for cost and schedule impact of the Design-Builder.

3. The Existing Utility Ownership Plans in Appendix U may be used to identify utility ownership only and shall not be relied upon for utility location.
4. The Subsurface Utility Exploration (SUE) data provided in Appendix S may be relied upon by the Design Builder to the degree of accuracy stipulated in the SUE Reports.

2.10.1.7 Maintenance and Care During Construction

Protect all utilities from damage resulting from the contract work. Among others these utilities include, telephone, telecommunication, power lines, sewer and water lines, railroad tracks and equipment; and highway lighting, signing and ITS systems. All costs required to protect utilities shall be at the Design-Builder’s expense. It is the responsibility of the Design-Builder to contact the Utility One-Call Locate Center prior to performing any excavations.

2.10.2 Mandatory Standards and Reference Publications

2.10.2.1 Mandatory Standards

General. All Utilities work shall be performed in accordance to all the standards necessary to complete the relocation work. See Section 2.10.1 and Section 2.10.2 (References and Publications), for additional information.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the higher priority. However, if the Design-Builder’s proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, the Design- Builder shall obtain clarification from the appropriate Utility Owner before proceeding with design or construction as long as the standard used meets or exceeds the applicable Department standards.

Version and Date. The Design-Builder shall utilize the most current WSDOT version of each listed standard together with the most current Utility Owner standard requirements and/or any governing agency regulations.

The following table indicates the ranking of selected standards listed by priority. The Design Builder shall use these mandatory standards to design and construct the project. The following table is not a complete listing, and the Design shall be based on the most stringent standard. The Design-Builder is responsible to obtain all standards from utility companies and other entities that affect the facilities that are to be relocated.

**Table 2.10.1
Mandatory Standards for Utilities**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short
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					Forms
1		Utility Owner Standards	N/A		
2	WSDOT	Utility Regulatory Requirements	N/A		
3	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project**</i>	S99-GDHS-3		
4	WSDOT	RFP, I-5 / Everett HOV***	N/A		
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.10.2.2 Reference Publications

Use the publications listed in Table 2.10.2 as supplementary guidelines for the design and construction of the roadway. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.10.2
Referenced Publications Utilities**

Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	Local Agency Agreements Manual			
WSDOT	Utilities Manual	M 22-87		
WSDOT	Utilities Accommodation	M 22-86		
	Code of Federal Regulations (CFR's)	Title 23 Part 645		
	Revised Code of Washington (RCW's)			
	Washington Administrative Code (WAC's)			

2.10.3 Performance Requirements

2.10.3.1 Design-Builder's Responsibility

General.

The Contract price covers all Design-Builder planned utility relocations, including incidental utility work to be performed by the Design-Builder described in this section, and elsewhere in the Contract.

Access to Existing Utilities

Any authorized agent of WSDOT or a Utility Owner with FHWA approved access may enter the highway right-of-way to repair, rearrange, alter, or connect their equipment. The Design-Builder shall cooperate with such efforts and shall avoid creating delays or hindrances to those doing the work. If a Utility agent needs to be on site to protect their facilities the Design-Builder will give at least 3 working days advance notice to the Utility of the need to be on site. As needed, the Design-Builder shall arrange to coordinate work schedules.

Avoiding Relocations

Regardless of who performs or pays for any proposed utility relocation work, the location of utilities, and the potential impact of their relocation, the Design-Build shall take all steps to:

1. Avoid Utility relocation to the extent practicable.
2. Minimize the extent of the Relocation, if relocation of a Utility is not reasonably avoidable, to the extent practicable.
3. Minimize the potential cost and delays associated
4. Insure that appropriate Best Management Practices (BMP's) and Temporary Erosion and Sedimentation Control (TESC) are followed by the Utilities wherever applicable. Any fines levied against the State for failure to comply with these requirements shall be the sole responsibility of the Design-Builder

2.10.3.2 Investigations by Design-Builder

General

Design-Builder shall be responsible for verifying the existence, exact location, and size of all Utilities affected by the Design-Builder's proposed plan. Such actions shall include making diligent inquiry at the offices of the Utility Companies, consulting public records, and conducting field studies (such as potholing), as appropriate. If a surface inspection of the area shows, or gives cause to suspect, the existence of any previously unidentified Utility facility, or there is cause to suspect that a previously unidentified Utility facility exists, then undertake all appropriate investigations to determine the location of those facilities.

Permits

General

Where the Design-Builder is performing utility construction or relocation work, obtain and comply with all Utility Permits for relocations both within and outside the Limited Access (LA) ROW. A permit or franchise/franchise amendment from the WSDOT is required for construction of a new facility or relocation of an existing facility to be placed within the ROW. A permit or franchise is not required from the WSDOT for the abandonment, or removal of an existing Utility within the ROW.

2.10.3.3 WSDOT Utility Coordination

Department Authority

The Department and utility company shall set the terms of all Utility Agreements and any amendments thereto. The Design-Builder has no authority to enter into any agreement with any utility company on the Department's behalf.

2.10.3.4 Utility Owner Responsibilities

Utility Company Cost

The Utility Owners are responsible for relocation construction costs according to CFR Title 23 Part 645 and the Special Provisions and General Conditions of their Permit or Franchise with WSDOT. The Design-Builder may refer to the copy of the Utility Agreement included

in Appendix U as a template for a basic standard format agreement; this format may not apply to all Utility agreement situations. The Utility Agreements will identify and justify the costs for the relocation work in accordance with CFR Title 23 Part 645. In general, the Utility Owner is responsible for 100% of relocation costs of its facilities, and will reimburse the Design-Builder for the agreed relocation costs in the final approved agreement.

Inspection

Utility Owner to inspect construction of utility work by the Design-Builder and issue an inspection approval letter to formalize completion of the work. Inspection Approval Letter form is in Appendix U. If the utility does not respond within 30 days of written notification of the completion of the work, with either an approval letter or a letter stating any reasons for non-acceptance, the work will be considered accepted. The Design-Builder will be responsible for resolving any non-acceptance issues and any costs involved in resolving those issues.

2.10.3.5 Notification

All notifications will be given in writing unless otherwise specified.

2.10.3.6 Meetings and Correspondence

Notify the Department at least four calendar days in advance of each meeting with a Utility Company representative scheduled by the Design-Builder, and allow the Department the opportunity to participate in the meeting.

Records. Record and maintain objective minutes of all Utility meetings with the Utility Company and/or the Department. Make these meeting minutes available to the Department within four calendar days after the meeting. Provide to the Department copies of all correspondence between the Design-Builder and any Utility Company within four calendar days of receipt or sending, as applicable.

2.10.3.7 Construction

General

Before starting construction that may affect any utility, notify that utility owner in writing thirty (30) days prior to the start of the Work.

Overhead Lines

For work adjacent to overhead lines, give advance notice to the utility owner. If notice is not given, accept sole liability for damage to any overhead facilities. The Design-Builder is responsible for maintaining all appropriate clearances from active power-lines per WAC 296-155-428.

2.10.3.8 Inspection

With the Design-Builder's Quality Assurance Officer, perform the inspection, sampling, and testing to comply with its obligations under the Contract Documents, Utility Agreements, and

in accordance with the approved Quality Management Plan. Perform inspection and testing of backfill of all utility trenches for density and material quality for all utility work within the Project limits.

2.10.3.9 Design and Construction Criteria

General. Except as stated in this Section, perform all utility Work (including efforts and costs) necessary to accommodate the Project including other Utility Work deemed by the Design-Builder to be necessary for its construction activity.

Utility Work Limits. The limits of Utility Work will extend as far as is necessary to accommodate the Project Work, whether inside or outside the Project ROW, and take into account the requirements of the Utility Companies and local agencies with jurisdiction.

Utility Easements. Utility easements will be defined in final design. WSDOT will have approval of all utility easements. Utility easements will only be allowed within LA ROW when it is to replace an existing easement or property right. The Department does not obtain easements for Utilities outside of State owned ROW and cannot reimburse the Utility for such easements if there was no pre-existing property right.

Design-Builder's Responsibilities

Perform all tasks, obligations, and duties assigned to the Department and/or the Design-Builder in the utility Work.

Identify and verify all Utilities located within or near the Project ROW Limits or otherwise affected by the Project that have not been previously identified and verified as part of the utility information provided in Appendix U.

The Design all Utility Relocations for which such responsibility is assigned to the Design-Builder and the coordination of all Utility relocations for the project. If the Design-Builder is designing a Utility relocation, a Utility can only be billed for one (1) relocation design. Should more than one design or relocation of the same Utility facilities be required by the Design-Builder, the Design-Builder will be responsible for the costs of the second design or relocation.

Construct all Utility Relocations for which the Design-Builder has agreed with the Utility Owner to include the construction of their facilities in the Project. The Design-Builder will ensure that the relocations it will perform do not conflict with the relocations of Utilities performing their own relocations in the same area, in order to minimize or eliminate conflicts during construction. Where special qualifications are required to work on a Utility facility the Design-Builder will be required to have qualified personnel to perform such work.

Perform or insure that resurfacing, restoration, and re-striping of all streets or other affected areas occur, where necessary, due to Utility Relocations

For relocations that are designed and/or constructed (in whole or in part) by the Utility Owner, the Design-Builder will provide guidance required to the utility for their placement of the required relocation, and will verify this location prior to the utility being placed in its

final relocated position. This will be a Design-Builder cost, and will not be billed to the Utility Owner.

For Relocations that are designed and/or constructed (in whole or in part) by the Utility Owner, verify that each relocated Utility, as designed and constructed, is compatible with and interfaces properly with the Project.

Prepare and/or negotiate Utility Agreements in accordance with the Department’s Utilities Manual and submit the agreement(s) to WSDOT for review and processing, allowing appropriate time for WSDOT to process the Agreement, as noted in Section 2.10.3.13 of this document. WSDOT will not be responsible for any Utility Agreement not executed by WSDOT nor any agreement costs paid by the Design-Builder, which are not legally reimbursable under CFR Title 23 Part 645, the Design-Builder is responsible for verifying the appropriate reimbursable costs prior to entering into any agreements. Should a Utility that is in conflict with the Project, whether discovered during design or construction, require an agreement, the Design-Builder will utilize the provisions and requirements that are listed in the reference documents Utilities Manual Chapter 2 and CFR Title 23 Part 645, and are available for review.

Department Rights

Without limiting the Design-Builder’s obligations under this Section, the Department shall retain all rights to provide approvals, consents, permissions, satisfactions, agreements, and authorizations called for under the Utility Agreements, unless otherwise provided in the Contract Documents.

2.10.3.10 Known Utilities

City of Everett - Sanitary Sewer and water

Souheil Nasr, P.E.
Senior Engineer
3200 Cedar Street
Everett, WA 98201
425-257-8853
snasr@ci.everett.wa.us

Design. The Design-Builder will perform all design work for relocation and/or adjustment of existing City of Everett Public Utilities. All design work shall meet or exceed City of Everett’s Design and Construction Standards and Specifications.

City Review. City of Everett Public Works Department will have two (2) weeks approval period after design plans have been delivered to City of Everett Public Works Department.

Construction. The Design-Builder will construct all relocations and/or adjustments of City of Everett Public Utilities facilities. All methods and materials used will meet or exceed City of Everett standards.

Inspection. Design-Builder shall perform inspection and materials testing to the satisfaction

of the City of Everett Public Works Department.

Cost. Design-Builder shall include all design and relocation costs in the Proposal Price. In the event City of Everett Works Department wants to have any betterment to its facilities constructed by the Design-Builder, the City of Everett Public Works Department will negotiate with the Design-Builder for these betterments and the City will pay the full cost of these betterments to the Design-Builder. The Design-Builder will ensure that no betterment costs are passed on to the State.

Snohomish County PUD - Power

Jim Jodock
Highway relocation Engineer
2320 California Street
Everett, WA 98201
425-374-4355
JDJodock@snopud.com

Design. Snohomish County PUD will perform all design work for the relocation of buried power lines.

Design Time. Snohomish County PUD will take up to three (3) months for design of both underground and overhead power lines after the Design-Builder provides his civil design and request for utility relocation to Snohomish County PUD. After the PUD design is finalized, there will be an internal two-week PUD approval process.

Schedule. In general Snohomish County PUD cannot have power outages, except for possible limited outages from May 1 through September 1.

Construction. Snohomish County PUD will construct relocations of its power lines, will survey for placement of poles and guy wire locations, provide approved traffic control and perform any other surveying that Snohomish County PUD will require to accomplish their work.

Construction Time. Snohomish County PUD could take as long as 6 months to construct its lines, including time to obtain materials after the relocation design is complete.

Inspection. Snohomish County PUD will inspect construction work.

Cost. Refer to Chapter 1, 1-07.17

Puget Sound Energy - Natural Gas Line

Mariamne Kingsbury
Construction Planning
P.O. Box 90868 – MS E0B-01
Bellevue, WA 98009
Ph: 425-356-7511
mariamne.kingsbury@pse.com

Design. Puget Sound Energy (PSE) will perform all design work for the relocation of their gas lines.

Design Time. PSE may take up to eight (8) months for design and acquisition of materials for high pressure (HP) gas lines and, three (3) months for design and acquisition of materials for intermediate high pressure (IHP) gas lines after the Design-Builder provides his civil design and request for utility relocation to PSE.

Schedule. PSE in general cannot impact its lines from November to March. Their high pressure (HP) lines cannot be impacted from October 1 through April 15. Construction is only allowed during summer with no disruption of service to consumers.

Construction. PSE will construct gas lines, provide approved traffic control, and any surveying required to accomplish their work.

Construction Time. PSE can begin relocation of gas lines as soon as design and acquisition of materials are complete and the time is within the above schedule dates. Assume a construction time of 2 months for each relocation. If relocation is required at 275th Street vicinity transmission line, construction could take up to ten (10) months.

Inspection. PSE will inspect construction work.

Cost. Refer to Chapter 1, 1-07.17.

Comcast Corporation

Casey Brown
1525 75th St SW, Suite 200
Everett, WA 98203
Desk: 425-263-5345
Cell: 425-754-0064
Casey_Brown2@cable.comcast.com

Design. Comcast will perform all design work for the relocation of lines.

Design Time. Comcast may take up to 3 months to do its design after the Design-Builder provides his civil design and request for utility relocation to Comcast.

Construction. Comcast will construct relocations of its facilities, provide approved traffic control, and any surveying required to accomplish their work.

Construction Time: Comcast may require an indeterminate amount of time to begin construction after design is complete due to resource availability and the need for other utilities to be moved first. Once construction begins, it will take up to 2 months.

Inspection. Comcast will inspect construction work.

Cost. Refer to Chapter 1, 1-07.17

Sprint

Wes Carpenter
Cable Project Engineer
2606 70th Ave. E., Suite 102
Fife, WA 98424
253-476-6655
wesley.a.carpenter@mail.sprint.com

Design. Sprint will design all relocation efforts if needed.

Design Time. Sprint will require up to 90 days to complete the design and obtain materials after the Design-Builder provides his civil design and request for utility relocation to Sprint. Sprint has to coordinate with BNSF for any relocation.

Construction. Sprint approved contractor will construct relocation of its communication lines, provide approved traffic control, and any surveying required to accomplish their work.

Construction Time. Sprint may require an indeterminate amount of time to begin construction after design is complete due to resource availability and the need for coordination with BNSF or other utilities. Once construction begins, it will take up to 6 months.

Inspection. Sprint would require an inspector and the BNSF may require an additional inspector.

Cost. By separate agreement with Sprint, WSDOT will reimburse Sprint for all of Sprint's costs associated with Sprint relocation.

Qwest

Sandra Simmons
1313 E. Columbia Street, Room 206
Seattle, WA 98122
206-345-5055
Sandra.Simmons@qwest.com

Design. Qwest will perform all design work for relocation of their lines.

Design Time. Qwest may require up to twelve (12) months to complete the design, obtain FAA permission and obtain materials after the Design-Builder provides his civil design and request for utility relocation to Qwest.

Construction. Qwest will construct relocations of its communications lines, provide approved traffic control and perform any surveying required to accomplish their work. Fiber sections have to be replaced from existing splice to existing splice.

Construction Time. Qwest will require up to 14 months after their design is complete to do its construction.

Cost. Refer to Chapter 1, 1-07.17.

Verizon

Wayne Wendell
Roxanne Troxell
2312 Casino Road
Everett, WA 98208
425-710-4124
wayne.wendell@verizon.com

Design. Verizon OSP Engineering will perform all design work for relocation of their lines.

Design Time. Verizon needs up to 4 months to complete the design and obtain materials after the Design-Builder provides his civil design and request for utility relocation to Verizon..

Construction. Verizon Construction and its prime contractor, Henkels & McCoy will perform the necessary relocations of Verizon facilities, traffic control measures, and associated coordination.

Construction Time. Verizon may require an indeterminate amount of time to begin construction after design is complete due to resource availability and the need for other utilities to be moved first. Once construction begins, it will take up to 3 months.

Inspection. Verizon will inspect construction work.

Cost. Refer to Chapter 1, 1-07.17. Verizon will pay for its final relocations. Any interim relocations will be the responsibility of the requester. An estimate for interim relocation will be provided upon request.

Advanced Telecom

Donald McKay
2939 Colby Ave
Everett, WA 98201
425-212-4030
360-815-2799 (Cell)
dmckay@atgi.net

Design. Advanced Telecom will perform all design work for relocation of their lines.

Design Time. Advanced Telecom may require up to two (2) months to complete the design and obtain materials after the Design-Builder provides his civil design and request for utility relocation to Advanced Telecom.

Construction. Advanced Telecom will construct relocations of its communications lines, traffic control and surveying required to accomplish their work.

Construction Time. Advanced Telecom may require up to two (2) months after their design is complete to do its construction, but it has to be coordinated with other relocation work.

Inspection. Advanced Telecom will inspect construction work.

Cost. Refer to Chapter 1, 1-07.17

Allstream, Inc./Plantec

Dennis Gearhart
Senior Project Manager
1326 5th Street, Suite C1-C
Marysville, WA 98270
360-305-2114

gearhart@plantec.com

Design. Plantec will perform all design work and submit to Allstream for review for relocation of their lines.

Design Time. Plantec may require up to two (2) months to complete the design and obtain materials after the Design-Builder provides his civil design and request for utility relocation to Allstream, Inc./Plantec.

Construction. Plantec Contractor will construct relocations of its communications lines, provide approved traffic control, and perform any surveying required to accomplish the work.

Construction Time. Plantec may require an indeterminate amount of time to begin construction after design is complete due to resource availability and the need for other utilities to be moved first. Once construction begins, it will take up to 2 months.

Inspection. Plantec will inspect construction work.

Cost. Refer to Chapter 1, 1-07.17. Construction work could cost \$50,000.00 to \$60,000.00 approximately.

AT & T

Ken Nybo
15008 8th Ave. SW
Seattle, WA 98166-2246
206-465-7770

Design. AT & T will perform all design work for relocation of their lines.

Design Time. AT & T may require up to two (2) months to complete the design and obtain materials after the Design-Builder provides his civil design and request for utility relocation to AT & T.

Construction. AT & T will construct all lines and the Design-Builder will provide the coordination, traffic control and surveying required to accomplish their work.

Construction Time. AT & T may require an indeterminate amount of time to begin construction after design is complete due to resource availability and the need for other utilities to be moved first. Once construction begins, it will take up to 2 months.

Cost. Refer to Chapter 1, 1-07.17.

2.10.3.11 Vacant

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2.10.3.12 Utility Conflicts and Adjustments

Damage by Design-Builder

If any Utilities are damaged by Design-Builder during construction, the Design-Builder will immediately notify the affected Utility Owner, One-Call Locate Center (see RCW 19.122), and WSDOT. The Utility Owner will repair any damage to their facilities as rapidly as possible or they may assign repairs to the Design-Builder, if the Design Builder has the capabilities to competently perform the repairs to the Utility's satisfaction. The Design-Builder shall bear all costs associated with damage caused by the Design-Builder, including but not limited to utility downtime, all reconstruction, all remediation of hazards, litigation, loss of product, utility startup, and delay costs. Also see Section 1-07.14 (Responsibility For Damage).

2.10.3.13 Time Needed for Design Review and Construction

Design Review

The final design and agreement documents must be submitted to the Department for review and approval of cost, design and relocation prior to initiation of any utility relocation work. Allow the specified amount of time in the schedule for the Utility Owner and WSDOT to review and approve Utility Relocation Plans.

Construction

If the Utility Owner or its contractor is performing the relocate allow time in the schedule for each Utility to be relocated. If the Design-Builder is performing the relocation, provide sufficient advanced notice to the Utility Owner to inspect the installation.

Revision of Time Periods

If a more definitive time commitment is needed from a Utility Owner for a particular Relocation, negotiate such commitment with the Utility Owner.

2.11 GEOMETRIC DESIGN

2.11.1 General

Design and construct the roadways in accordance with the requirements of this Section, including referenced standards and publications, performance requirements, design and construction criteria, and required submittals.

2.11.2 Performance requirements

The Design-Builder shall provide the engineering services required to furnish the work products identified in the Contract. The services include the tasks of data preparation, data interpretation, design and construction documents. The design and construction documents shall be prepared by (or under the direction of) a Professional Engineer, licensed under Title 18 RCW, State of Washington, and shall carry the Professional Engineer's signature and seal.

The Design-Builder shall design and construct Everett HOV Project to meet the following performance requirements:

1. Maintain a safe environment for motorists and give special consideration to avoiding potentially hazardous conditions.
2. Design a roadway meeting the requirements in Appendix M1 – Design Parameters and .
3. In addition to completing the design and construction of the improvements identified in the Conceptual Designs, the Design-Builder shall coordinate and ensure that the Project design accommodates and allows for the design of the Sound Transit Project: South Everett HOV Direct Access – Appendix M6.

2.11.3 Mandatory Standards and Reference Publications

2.11.3.1 Mandatory Standards

General. Design and construct the roadway in accordance with the requirements of the standards listed by priority in Table 2.11.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.11.1
Mandatory Standards for Roadways**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	N/A		Proposal
2	WSDOT	<i>Request for Proposals, I-5 Everett HOV Design-Build Project</i>	N/A	***	RFP
3	WSDOT	<i>Project Design Parameters</i>	Appendix M1	2004	DM
4	WSDOT	<i>WSDOT Design Manual For Design Build Projects</i>	M22-02	2004	N/A
5****	COE	<i>City of Everett Design and Construction Standards and Specifications for developments</i>	N/A	2004	N/A
6****	WSDOT	<i>Local Agency Guidelines</i>	M36063	2004	LAG
7	FHWA	<i>Manual on Uniform Traffic</i>	(Millennium		MUTCD

		<i>Control Devices</i>	Edition)		
8	AASHTO	<i>Guide for the Development of Bicycle Facilities</i>	I-GBF-3	1999	N/A
<p>** Only to the extent that it exceeds another listed standard. ***Includes the original release of the RFP and all addendums. ***** To be used on the developments of the city of Everett streets.</p>					

2.11.3.2 Reference Publications

Use the publications listed in Table 2.11.2 as supplementary guidelines for the design and construction of the roadway. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.11.2
 Referenced Publications for Roadway**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS-3	2001	“Green Book”
AASHTO	<i>Guide for the Design of High Occupancy Vehicles and Public Transfer Facilities Manual</i>	N/A	1983	N/A
AASHTO	<i>Guide for the Development of Bicycle Facilities</i>	I-GBF-3	1999	N/A
AASHTO	<i>Roadside Design Guide</i>	---	----	----
TRB	<i>Highway Capacity Manual</i>	Special Report 209-	2000	N/A
WSDOT	<i>Plan Preparation Manual</i>	M22-31	2002	PPM
TRB = Transportation Research Board				

2.11.4 Design and Construction Criteria

2.11.4.1 Design Criteria

2.11.4.1.1 General

The Project Conceptual Plans – Appendix M5 were prepared for the Environmental Assessment and Access Point Decision Report for the Project and are conceptual in nature.

It is the responsibility of the Design-Builder to perform the work necessary if the Project requires that the EA must be supplemented or re-evaluated, or that the conditions stipulated in the Project Permits are not met or requires change(s).

2.11.4.1.2 Local Roadway Design

Obtain all necessary approvals for design elements outside WSDOT ROW limits, as well as for any facilities owned or maintained by local government agencies.

Coordinate the roadway design with local governing agencies as appropriate and to the satisfaction of the Department.

2.11.4.1.3 Limits of Improvements

Provide smooth tie-in and continuity between new construction and existing facilities.

2.11.4.1.4 Concrete Barriers

Median Types.

- All concrete barriers shall be single-slope.
- Use single slope concrete barrier with a 42” minimum height from finished grade at all locations that require separating traffic from the opposing or adjacent traffic.

2.11.4.1.5 Lanes

Lanes Shift and angle point. Shifting lanes by creating an angle point shall be in accordance with Figure 620-1 of the WSDOT Design Manual For Design Build Projects.

2.11.4.1.6 State Patrol/ Emergency Response Vehicle Turn Around

The Design-Builder shall construct a State Patrol/ Emergency Response Vehicle (ERV) Turn Around in the vicinity of MP 191-192.

The minimum requirements for the ERV is a customized AASHTO 2001(US) SU and modified as follows:

Turning radius 18'

Wheelbase: 14.00'

Length: 22.00' (the equivalent of a full size crew cab pickup with an 8' bed).

2.11.4.1.7 Impact Attenuators

Permanent impact attenuators shall be either the REACT350 or Quadguard Elite. If it is determined that neither of these type fit the application, the Design-Builder shall submit in writing the proposed change identifying at a minimum the location, proposed substitution and the specific rationale why the approved impacts attenuators would not be applicable. Do not use alternate impact attenuators without WSDOT approval.

2.11.4.1.8 Right of Way Fencing

Right of Way Fencing shall be insulated in accordance with Section 2.14.4.7.6 wherever right of way fencing disturbed, displaced by construction activities, acquired for this project and where shown on the Conceptual Plans.

2.11.5 Submittals

2.11.5.1 Channelization Plans for Approval

The Design-Builder shall develop and obtain WSDOT approval for the “Channelization Plans for Approval”, (MP 188.70 to MP 194.80). The Channelization Plans For Approval shall cover mainline, ramp terminals, intersection modifications, impacted city streets and their connection to existing channelization. A draft of the Channelization Plans For Approval shall be submitted for comments to WSDOT prior to Substantial Completion. The Channelization Plans for Approval shall be revised and re-submitted for WSDOT approval for any revisions made during final design and construction. The Channelization Plans for Approval shall be prepared in accordance with WSDOT Northwest Region Checklist for Channelization Plans “Appendix O3”.

2.11.5.2 Project Design File

The Design-Builder shall prepare the Project Design File by organizing all necessary design documentation for the Project in accordance with Appendix O1 - Project Design Documentation Check List.

2.11.5.3 Reports and Summaries

Geometric Design Decision Reports

The Design-Builder shall develop and furnish Design Decision Reports accompanying each plans being submitted to WSDOT documenting decisions made during completion of the design regarding components not covered by the Design Parameters and Mandatory Standards.

Calculations

The Design-Builder is responsible for completing all the calculation necessary for the design. A Professional Engineer’s original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all calculations. The cover page shall include the contract number, contract title, and sequential index to calculation page numbers. The calculations shall include but are not be limited to the following:

1. Horizontal and vertical stopping sight distance
2. Superelevations transition, including station rounding adjustment
3. Intersection entering sight distance
4. Profile tie-in calculation at point of beginning and end of alignments
5. Accelerations and Decelerations length and tapers
6. Channelization taper rate calculations
7. Calculations establishing horizontal and vertical curve stationing, curve delta, radius, tangent and curve length, northing and easting coordinates at all curve points shall be provided.
8. Barrier/Guardrail length of need calculations and Barrier/Guardrail flare rate calculation and determination

All geometric calculations shall be revised and updated to reflect the as-constructed geometry.

2.12 BRIDGE AND STRUCTURES

2.12.1 General

The Design-Builder shall design and construct permanent and temporary structures including bridges, retaining walls, noise walls, traffic barriers, box culverts, pipes, precast concrete arches, sign structures, lighting structures, storm water vaults, and structure retrofits. The Design-Builder shall coordinate all design with future projects within the design area including, but not limited to, the City of Everett’s proposed 41st Street Interchange.

Plans of the existing bridges are found in Appendix N. The plans of the existing bridges are not guaranteed to be dimensionally accurate. The Design-Builder shall field measure existing dimensions as required.

2.12.2 Mandatory Standards and Reference Publications

2.12.2.1 Mandatory Standards

General. Design and construct the roadway in accordance with the requirements of the standards listed by priority in Table 2.6.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

The list in the table below is not complete, and other applicable publications may be required to complete all bridge and structures design elements.

**Table 2.12.1
Mandatory Standards for Structures**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Everett HOV Design-Build			Proposal

		Project			
2***	WSDOT	Request for Proposals, I-5 Everett HOV Design-Build Project	N/A		RFP
3***	WSDOT	<i>Design Manual For Design Build Projects</i>	M21-01		
4	WSDOT	<i>Geotechnical Design Manual</i>		2004	
5***	WSDOT	<i>LRFD Bridge Design Manual</i>	M23-50		
6	AASHTO	<i>LRFD Bridge Design Specifications, U.S. Units, 3rd Edition</i>		2004	
7	FHWA	<i>Seismic Retrofitting Manual for Highway Bridges</i>	FHWA-RD-94-052		
9	WSDOT	<i>Construction Manual</i>	M41-01		
10	AASHTO	<i>Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 4th Edition</i>		2002 & 2003 Interim revisions	
11	AASHTO	<i>Guide Specification for Structural Design of Sound Barriers</i>		1989 w/ 1992 & 2002 interim revisions	
12	AASHTO	<i>Bridge Welding Code: AASHTO/AWS D1.5M-D1.5: 2002, An American National Standard</i>		2003 interim revisions	
13	AASHTO	<i>Manual for Condition Evaluation of Bridges, 2nd Edition</i>			
14	WSDOT	<i>Maintenance Manual</i>	M51-01		
15	WSDOT	<i>Plans Preparation Manual</i>	M22-31		
16	WSDOT	<i>Hydraulics Manual</i>	M23-03		
17	WSDOT	<i>Materials Manual</i>	M46-01		
18	WSDOT	<i>Qualified Products List</i>	M46-02		

** Only to the extent that it exceeds another listed standard.

***Document modified for design-build.

ANSI = American National Standards Institute

AWS = American Welding Society
 BNSFRR = Burlington Northern Santa Fe Railroad

2.12.2.2 Reference Publications

Use the publications listed in Table 2.12.2 as supplementary guidelines for the design and construction of the roadway. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.12.2
 Referenced Publications for Structures**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	<i>Guide Design Specification for Bridge Temporary Works</i>		1993 & interim revisions	
AASHTO	<i>Guide Standard Specifications for Bridge Temporary Works</i>		1993 & interim revisions	

2.12.3 Performance Requirements

2.12.3.1 General

The Design-Builder shall design and construct the bridges and other structures to provide a complete and functional system that provides functionality, durability, ease of maintenance, safety and a pleasing aesthetic theme.

2.12.3.2 Bridge Performance Requirements

The Design-Builder shall comply with the seismic design requirements for all new structures and widened portions of existing structures as stated in WSDOT *LRFD Bridge Design Manual*. The Design-Builder shall use a Multimode Spectral Analysis as defined in Section 4.7.4 of the AASHTO *LRFD Bridge Design Specifications* with a seismic acceleration coefficient of 0.30.

The Design-Builder shall design and construct seismic retrofits on the following bridges as described in Section 2.12.4.3:

1. 5/626W
2. 5/626E
3. 5/631W
4. 5/631E

The Design-Builder shall provide a surface smoothness for bridge decks and approach slabs in accordance with WSDOT *Standard Specification* Section 5-05.3(3) E.

All bridge rails shall be retrofitted to meet current design standards.

**Table 2.12.3
Existing Bridge Widening Geometrics**

Bridge No.	Location	No. of Existing and New Lanes	Existing and New Lane Width (ft)	Shoulder Width (ft)
5/626W	I-5 SB over Lowell Road	5	12.00	10.00 Lt, 10.00 Rt
5/626E	I-5 NB over Lowell Road	5	12.00	10.00 Lt, 10.00 Rt
5/631W	I-5 SB over Abandoned Railroad	5	12.00	10.00 Lt, 9.25 Rt
5/631E	I-5 NB over Abandoned Railroad	5	12.00	9.25 Lt, 10.00 Rt
5/632W	I-5 SB over Smith Avenue	5	12.00	10.00 Lt, 9.25 Rt
5/632E	I-5 NB over Smith Avenue	5	12.00	9.25 Lt, 10.00 Rt
5/633W	I-5 SB over 36 th St. and BNSF Railroad	5	12.00	10.00 Lt, 6.00 Rt
5/633E	I-5 NB over 36 th St. and BNSF Railroad	5	12.00	6.00 Lt, 10.00 Rt
5/635W	I-5 SB over Pacific Avenue	5	12.00	10.00 Lt, 9.25 Rt
5/635E	I-5 NB over Pacific Avenue	5	12.00	9.25 Lt, 10.00 Rt
5/636W	I-5 SB over Hewitt Avenue	4	12.00	10.00 Lt, 9.25 Rt
5/636E	I-5 NB over Hewitt Avenue	4	12.00	9.25 Lt, 10.00 Rt
5/638W	I-5 SB over SR2	5	12.00	10.00 Lt, 8.50 Rt
5/638E	I-5 NB over SR2	5	12.00	8.50 Lt, 10.00 Rt
5/640W	I-5 SB over Everett Avenue	5	12.00	10.00 Lt, 9.25 Rt
5/640E	I-5 NB over Everett Avenue	5	12.00	9.25 Lt, 10.00 Rt

**Table 2.12.4
New Bridge Geometrics**

Bridge No.	Location	No. of New Lanes	New Lane Width (ft)	Shoulder Width (ft)
Aqueduct	Water Quality Site #1	N/A	N/A	N/A
5/628W	I-5 SB over HOV Direct Access	5	12.00	10.00 Lt, 10.00 Rt
5/628N-N	I-5 NB off ramp over I-5 NB & SB	2	12.50	4.00 Lt, 8.00 Rt
2/1W-S	SR2 WB off ramp to I-5 SB	1	15.00	4.00 Lt, 8.00 Rt
5/636N-E	I-5 NB off ramp to SR2 EB	1	15.00	4.00 Lt, 8.00 Rt

The following bridges shall receive traffic barrier retrofits:

1. Bridge 5/622S-S
2. Bridge 99/610

The following bridges shall have 42” barriers on the inside and the typical 34” on the outside:

1. 5/631E&W
2. 5/632E&W
3. 5/633E&W
4. 5/635E&W

5. 5/636E&W
6. 5/638E&W
7. 5/640E&W

The minimum vertical clearance under the widened existing bridges over city streets shall be 15’-6” except at Lowell Road Bridge No. 5/626W where the existing minimum vertical clearance may remain unchanged. At all other highway locations the minimum vertical clearance shall be 16’-6”. The minimum vertical clearance under the aqueduct bridge to the railroad track shall be 23’-6”. The minimum vertical clearance during construction shall be 16’-6” over I-5 and 14’-6” over US 2 and city streets.

The bridge plans included in the RFP show layouts and conceptual structure types for all new bridges and existing bridges to be widened. No plans are included in the RFP for bridge traffic barrier retrofits.

2.12.3.3 Retaining Wall Performance Requirements

Retaining walls shall meet the performance requirements of the WSDOT *Geotechnical Design Manual*, The WSDOT *LRFD Bridge Design Manual* and the AASHTO *LRFD Bridge Design Specifications*.

2.12.3.4 Noise Wall Performance Requirements

The Design-Builder shall design and construct noise walls at the following locations in the Conceptual Plan alignment stationing and noise wall designation:

- | | | | | |
|----------------|------|-----------|----|-----------|
| 1. Noise Wall | NW1 | LR 226+03 | to | LR 241+90 |
| 2. Noise Wall | NW1B | LR 240+10 | to | LR 245+78 |
| 3. Noise Wall | NW2 | LL 458+10 | to | LL 526+80 |
| 4. Noise Wall | NW2B | LR 313+59 | to | LR 326+40 |
| 5. Noise Wall | NW3 | FR 17+30 | to | FR 29+40 |
| 6. Noise Wall | NW3B | LR 355+31 | to | LR 370+26 |
| 7. Noise Wall | NW4 | LL 658+25 | to | LL 680+30 |
| 8. Noise Wall | NW5 | LR 451+50 | to | LR 469+30 |
| 9. Noise Wall | NW6 | LR 469+50 | to | LR 489+50 |
| 10. Noise Wall | NW7 | LL 680+50 | to | LL 698+00 |

The noise wall beginning and ending stations are approximate. Noise wall heights and elevations are shown in Appendix M – Conceptual Designs. Noise wall alignments may be shifted up to 10’ horizontally left or right as long as the noise wall remains within the Right of Way and the top of wall elevations remains the same as in Appendix M – Conceptual Designs. For any alignment change greater than 10’ the noise wall shall be relocated and reanalyzed to meet the sound reduction goals. If the mainline horizontal alignment changes from Conceptual Designs more than 10’ left or right, then re-analysis of the Noise Study will be required. Raising the mainline vertical profile more than 2’ from the Conceptual Designs will require raising the noise wall elevations the same amount as the vertical profile. Where the walls are modified the Design-Builder shall prepare a Noise Abatement Design Report that confirms noise wall heights to alignments, or includes elevation of the alternative

designs, specifies materials types and treatments, and provides a summary of the coordination with communities, if any.

Noise wall design and construction shall implement the requirements and goals of Section 2.14 – Roadside Restoration and Aesthetics.

The requirements for fire and maintenance shall be investigated and provided for by the Design-Builder.

2.12.4 Design and Construction Criteria

2.12.4.1 Design Criteria

The Design-Builder shall utilize the Design Standards and Publications with the Design Criteria listed below in developing the design of the bridges and structures. If any of the Design Criteria are not achievable, the Design-Builder shall submit to the Department documentation of what cannot be achieved and a proposed alternative for review and approval. The Design-Builder shall not proceed with proposed alternative design criteria until a change to the contract is approved.

2.12.4.2 Personnel Requirements

The Design Builder shall provide a Structural Design Manager with the following responsibilities and qualifications:

The Structural Design Manager shall be responsible for ensuring that the bridge and structures design is completed and design criteria requirements are met. The Structural Design Manager must be on site whenever design activities are being performed.

The Structural Design Manager shall be a registered Structural Engineer in the State of Washington at the time of the Notice to Proceed. The Structural Design Manager shall work under the direct supervision of the Design-Builder's Project Manager.

The Structural Design Manager shall have at least ten years of recent experience in managing the design of highway bridges and structures including five years experience designing or managing the design of highway bridges in Washington State. The Structural Design Manager shall be familiar with all applicable structural design codes including the WSDOT *LRFD Bridge Design Manual* and the AASHTO *LRFD Bridge Design Specifications*, 3rd Edition, and shall be knowledgeable of current practice for the seismic design of bridge and structures in Washington State.

2.12.4.3 Bridge Design Criteria

New bridges and bridge widening shall be designed using Load and Resistance Factor Design in accordance with WSDOT *LRFD Bridge Design Manual* and AASHTO *LRFD Bridge Design Specifications*. The deflection criteria in AASHTO *LRFD Bridge Design Specifications*, Section 2.5.2.6.2 shall be met for all permanent structures. All bridges carrying I-5 shall be classified as essential bridges as defined in Section 2.10.3 of the

AASHTO *LRFD Bridge Design Specifications*. The widened portion of existing bridges shall match the roadway grade and superelevation of the existing bridges.

Deck Protective System 1, epoxy-coated top mat steel reinforcing bars with 2 ½ inches cover shall be used on all new concrete bridge decks. On bridge widening, Deck Protective System 1 shall be finished flush with the top surface of the adjoining existing concrete bridge deck or concrete overlay.

Deck Protection System 3, hot mix asphalt (HMA) overlay with membrane waterproofing shall only be used on widening of existing bridges with HMA overlays. Where noted in the plans, the existing HMA overlay shall be removed and replaced with Deck Protective System 3. The existing HMA overlay on the bridge decks of Bridge Nos. 5/626E&W shall be fully removed and replaced with a 1 ½ inch minimum modified concrete overlay. Reprofiling of the approach roadway pavement required to match the top of the concrete overlay on the bridges shall be at a maximum taper rate of 1 inch in 50 feet.

Concrete overlays used for the purpose of reprofiling an existing bridge deck shall be 1 ½ inch minimum modified concrete overlay placed over 1 inch minimum concrete cover remaining over the existing top mat of steel reinforcing bars after scarifying the existing bridge deck. The maximum thickness of the existing deck plus the added modified concrete overlay shall be determined by load rating the bridge and shall have received the approval of the Department before proceeding. Concrete overlays shall conform to WSDOT *Standard Specification* Section 6-09, and shall be either fly ash modified concrete, latex modified concrete, or microsilica modified concrete.

Seismic analysis shall be performed for widened structures, except for widenings not requiring the addition of substructure. Existing portions of the widened bridges shall not be seismically retrofitted except as follows:

Existing Bridge 5/626E and 5/626W over Lowell Road) shall receive substructure retrofit consisting of column jacketing of all existing columns at Piers 2 and 3 as required by the WSDOT *LRFD Bridge Design Manual* and the FHWA *Seismic Retrofitting Manual for Highway Bridges*.

Existing Bridges 5/631E and 6/631W shall receive substructure retrofit consisting of column jacketing of existing columns at piers 2 and 3 as required by seismic analysis and a superstructure seismic retrofit consisting of longitudinal restrainers and lateral girder stops at piers 2 and 3 as required by WSDOT *LRFD Bridge Design Manual* and FHWA *Seismic Retrofitting Manual for Highway Bridges*.

The Design-Builder shall not use masonry, timber, or aluminum materials for permanent bridge superstructures or substructures. The Design-Builder shall not use lightweight concrete for permanent bridge superstructures or substructures unless approved by WSDOT.

The Design-Builder shall not design bridges with intermediate hinges. A minimum of three girders shall be used to provide redundant load path structures.

Prestressed concrete and steel plate girders shall be designed to carry the weight of the fluid concrete deck as well as their own weight without shoring.

Single and multi-span bridges shall be designed as simple span for all dead and live loads. Continuity reinforcement at intermediate piers shall be provided in the bridge deck to resist negative moments due to live load and superimposed dead loads. Multi span bridges shall have the same depth girder in all spans, except where minimum vertical clearance requires the use of shallower depth girders.

Spliced prestressed concrete girders shall have cast-in-place concrete closures constructed in the field.

For widenings, girder types similar to the existing girders shall be used. Wide flange prestressed concrete girders shallower than the existing girders may be used if required to achieve the required minimum vertical clearance. The widening shall maintain live load deflection characteristics similar to those of the existing superstructure. For Bridges 5/638W and 5/638E, steel brackets may be used to support the inside (median) widening in order to reduce the weight to prevent extraordinary upgrades to the box girder, columns, and footings.

Steel girder superstructures shall not be fracture critical. The main longitudinal load carrying girders shall be welded plate girders cambered during fabrication. Heat cambered rolled girders shall not be used except as secondary members or temporary girders. Steel girder superstructures shall have a cast-in-place reinforced concrete roadway deck designed to be composite for live loads.

Steel superstructures shall be designed for AASHTO M270 Grade 36, Grade 50, or Grade 70 steel, or combinations of those grades and shall be painted with the WSDOT standard 3-coat system in accordance with Section 6-07 of the WSDOT *Standard Specifications*.

Bridge roadway decks shall be cast-in-place and have a minimum thickness of 7 ½ inches, 8 ½ inches when stay-in-place deck panels are used, or 7 inches when an overlay is used. Precast stay-in-place deck panels may be used with limitations specified by the WSDOT *LRFD Bridge Design Manual*. Steel stay-in-place forms shall not be used except in concrete box girder cells with no access openings. Widenings shall have closures in crossbeams, diaphragms, and the roadway deck between the widening and the existing structure. Superstructure closures shall be constructed after the formwork and falsework has been removed and all immediate dead load superstructure deflection has taken place. Traffic barriers shall be constructed after the diaphragm and deck closures are constructed.

Longitudinal expansion joints shall not be used. Transverse expansion joints may be used in widenings only if the existing bridge has transverse expansion joints and they shall align with the existing expansion joints. All expansion joints shall be watertight. Adequate shelf width per WSDOT *LRFD Bridge Design Manual* shall be provided at piers with expansion joints. Seismic Restrainers shall be provided at all intermediate piers with expansion joints.

Bridge bearings and expansion joints shall be designed to provide for maintenance accessibility and future replacement. Loads used for the design of jacking locations shall be 200% of the calculated lifting load.

Pier support for widenings shall be located in line with pier support of the existing bridge being widened. Bearing types and type of fixity (superstructure to substructure) shall be similar to the existing bridge. The superstructure to substructure connection at all intermediate piers shall be a moment-resistant fixed diaphragm in accordance with the WSDOT *LRFD Bridge Design Manual*, except for bridge widenings with expansion joints at intermediate piers and multi-span steel girder superstructures.

Column and abutment types for widenings shall be similar in appearance and structure type to the existing columns and abutments. Precast columns and precast bent caps may be used with concurrence of the Department.

Bridge abutments, wingwalls, curtain walls and retaining walls located between abutment walls shall be cast-in-place reinforced concrete. Where structural earth (SE) walls adjoin bridge abutments or curtain walls the joint shall be a single vertical joint full height to the bottom of the traffic barrier. Curtain walls at bridge abutment wall corners shall be cast-in-place walls integral with the abutment walls and extend to the back of the footings.

Wingwalls, curtain walls and retaining walls shall be used as required by slope geometry and under-bridge clearances. They shall prevent soil slopes spilling onto girders and bearings. The top of the slope at bridge ends shall conform to WSDOT Standard Plan H-9. Side slopes of bridge approaches and shoulder widenings for guardrail or concrete barrier shall conform to requirements of WSDOT *Design Manual For Design Build Projects*. End slopes under bridge abutments shall be no steeper than 2 to 1 (horizontal to vertical). The geotechnical investigation may allow a steeper slope in which case the end slopes may be no steeper than 1 ½ to 1.

The bridge substructures and foundations shall be designed in accordance with the WSDOT *Geotechnical Design Manual*.

Drilled shafts, piles (steel and cast-in-place concrete in accordance with sections 6-05 & 9-10 of the WSDOT *Standard Specifications*) and spread footings recommended by the Geotechnical Report may be used for bridge foundations. Unfilled, unreinforced steel pipe piles, prestressed piles, augured cast piles, and bell end shafts shall not be used for bridge foundations. Battered piles may be used upon approval of the WSDOT Project Engineer.

2.12.4.4 Acceptable Bridge Types

Allowable bridge girder types are as follows:

Prestressed Concrete Girders of only the following types as defined in WSDOT *Standard Specifications* Section 6-02.3(25):

1. Prestressed Concrete I Girders
2. Prestressed Concrete Wide Flange I Girders

3. Thin Flange Deck Bulb Tee Girders
4. Spliced Prestressed Concrete Girders
5. Prestressed Concrete Tub Girders

Concrete Slabs (both conventionally reinforced and post-tensioned)
Concrete Box Girders (both conventionally reinforced and post-tensioned)
Steel Plate Girders
Steel Box Girders

2.12.4.5 Bridge Approach Slabs

All bridges shall have reinforced concrete bridge approach slabs full width of the bridge deck at each end of the bridge. Bridge widenings shall include bridge approach slabs widened to the full width of the bridge deck at both ends of the bridge. If existing bridges that are to be widened do not have approach slabs, then full width approach slabs with anchors to the bridge deck shall be added and pavement seats shall be added or modified to conform to current WSDOT standards. Bridge approach slabs shall conform to details contained in WSDOT *Standard Plans* Appendix C.

2.12.4.6 Bridge and Retaining Wall Traffic Barriers

Bridge traffic barriers shall be Single Slope reinforced concrete traffic barriers, 2'-10" high in accordance with the WSDOT *LRFD Bridge Design Manual* unless noted otherwise.

The traffic barriers for bridges 5/631 E&W, 5/632 E&W, 5/633 E&W, 5/635 E&W, 5/636 E&W, 5/638 E&W and 5/640 shall be 3'-6" high. On twin overcrossings where the traffic barriers at the median are back to back (Bridges 4/631E and 5/631W, 5/632E and 5/632W, 5/635E and 5/635W, 5/636E and 5/636W, 5/640E and 5/640W) the gap between the backs of the barriers shall be large enough to allow independent movement during a seismic event and shall allow slip forming of the barriers. If the gap exceeds 6 inches but is less than 5'-0", then a chain-link safety net shall be constructed between the two bridges.

The twin overcrossings (Bridges 5/633E and 5/633W and Bridges 5/638E and 5/638W) shall have chain link safety net constructed between the twin bridges. The safety net shall be a minimum of 1 foot below the top of the lower barrier and located level transverse to the bridges.

Two 2-inch diameter galvanized rigid steel conduit pipes with junction box pairs (one for each conduit pipe) spaced at 180 foot maximum centers shall be cast into all traffic and pedestrian barriers placed on bridge superstructures, bridge approach slabs and all reinforced concrete retaining walls and structural earth walls which extend the ends of the bridge parallel to the mainline for all bridges carrying I-5 traffic. The conduit pipes shall be stubbed into type 1 junction box pairs within fifteen feet of the exit from a traffic or pedestrian barrier.

For bridge rail retrofits, slab cantilever reinforcing steel shall be strengthened as needed to conform to AASHTO LRFD load requirements.

Precast traffic barriers shall not be used for permanent structures. Precast traffic barriers may be used as temporary concrete barriers for the channelization of traffic during construction.

Structure number plates shall be removed from traffic barriers, railings, walls, or columns being removed and shall be reinstalled or replaced on new traffic barriers, walls, or columns. If damaged, before or during removal, the structure number plates shall be replaced.

2.12.4.7 Bridge Drainage

Where bridge deck drainage is required by hydraulic analysis, catch basins or grate inlets off the ends of the bridge shall replace existing bridge drains in the bridge decks wherever possible. Existing bridge drain basins shall be plugged with concrete, and existing drainpipes from the basins shall be removed.

Storm drainpipe hung under the bridges superstructures shall be steel pipe and shall not be visible in the elevation view of the bridges.

2.12.4.8 Bridge Inspection Access

All bridge superstructures, joints, and bearings shall be made accessible for long-term inspection and maintenance. Open-framed superstructures shall be designed to be accessible by ladder or a “UBIT” (under-bridge inspection truck) per the WSDOT *LRFD Bridge Design Manual*.

Concrete box girders containing utilities shall be made accessible for inspection and maintenance. Access doors shall swing into the box and have locking mechanisms. Access doors shall be placed at locations that do not impact traffic under bridges and away from areas easily accessible to the public. Steel box girders shall be made accessible for interior inspection. Box girders shall be ventilated and shall be designed to prevent access of vermin.

2.12.4.9 Bridge Load Ratings

The Design-Builder shall load rate all new, widened, and rehabilitated vehicular bridges and all storm water vaults that carry vehicular loads. The minimum length of structures that are required to be load rated shall be 20 feet measured from back to back of pavement seats along the centerline of the roadway. The bridges shall be load rated using methods described in the WSDOT *LRFD Bridge Design Manual* Chapter 13. A load rating report as described in Section 13.4 of the WSDOT *LRFD Bridge Design Manual* shall be completed and submitted to WSDOT before the bridge is opened to vehicular traffic.

The Design-Builder shall load rate the bridges and vaults using BRIDG software. If BRIDG is unable to rate the structure type, then another commercially available software may be used subject to prior approval by WSDOT.

2.12.4.10 Temporary Bridge Design Criteria

“Temporary bridge” refers to any bridge or portion of bridge that will carry public traffic but will not remain upon completion of the contract. Temporary bridge does not include falsework, shoring, or temporary work access structures or equipment support structures. Haul bridges that will carry construction traffic over a public road shall be designed as temporary bridges.

Temporary bridges shall be designed in accordance with the requirements of WSDOT *LRFD Bridge Design Manual* and AASHTO *LRFD Bridge Design Specifications* and applicable sections of the AASHTO *Guide Design Specifications for Bridge Temporary Works*. In addition, haul bridges shall be designed for any live loads that exceed HL-93 live load and shall have live load deflections less than $L/800$.

The WSDOT Project Engineer shall approve the roadway width and lateral clearance for temporary bridges. All temporary bridges over I-5 shall provide 16.5-foot minimum vertical clearance over I-5 at all times.

The following components will be allowed for temporary bridge construction:

1. The Design-Builder may use concrete abutments or spread footings supported on or adjacent to Structural Earth walls for abutments. The Design-Builder may use steel sheet piling walls or timber lagging between piling for abutments. The measured and calculated horizontal deflection at any location at the top of abutments and walls shall not exceed double the horizontal deflection allowed for permanent construction.
2. The Design-Builder will be allowed to use timber, steel, precast or cast-in-place concrete piles for temporary bridges.
3. The Design-Builder shall design the piers as pile bents or posts on mudsills or spread footings braced against lateral loads, and the pier caps shall be reinforced concrete or steel beams.
4. The Design-Builder may use glue-laminated or nail-laminated timber deck panels, precast concrete deck panels or cast-in-place reinforced concrete for construction of the deck. Stay-in-place steel forms may be used. Previously used deck panels shall not be cracked and have only minor surface defects.
5. The Design-Builder shall overlay the deck panels with a minimum 2-inch-thick bituminous wearing course. The minimum cross slope of the bituminous wearing course shall be 0.01 foot per foot. The driving surface shall have an initial skid number of 35 and maintain a minimum skid number of 26 in accordance with AASHTO T22.
6. The Design-Builder shall use either steel or concrete beams in the superstructure.
7. The Design-Builder may use salvaged structural members meeting the following conditions:

- a. The Design-Builder shall provide documentation showing that the structural members meet all appropriate material properties for their intended function such as: dimensions, yield strength, tensile strength, ductility, toughness, chemistry, weldability and corrosion resistance. Material testing of the structural members may be required in order to provide documentation that the appropriate material properties have been met.
 - b. Salvaged steel beams shall have no areas of detrimental section loss due to corrosion.
 - c. All holes in structural members shall be less than 1 inch in diameter and shall be round.
 - d. All shop and/or field splices shall be bolted.
 - e. Salvaged prestressed concrete beams shall have no exposed strands and no defects, spalls, or cracks deeper than 1 inch. Beam design sheets shall be provided indicating concrete strength, strand type and pattern, shear reinforcement, and other pertinent information.
8. All precast concrete girders in WSDOT *Standard Specification* Section 6-02.3.(25) are allowed for temporary bridges.
 9. The Design-Builder shall use temporary barriers as detailed in the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction*.
 10. The Design-Builder may temporarily widen existing bridge structures if required. The temporary widened portion shall meet the requirements for temporary bridge construction as stated in this section.
 11. The erected temporary bridge shall be inspected in the field by the Design-Builder's Engineer responsible for design for compliance with the Released-for- Construction plans. Any variation of the erected bridge from the Released-for-Construction plans shall be reviewed and approved by the Design-Builder's Engineer and brought to the attention of the Department.
 12. Maintenance of temporary bridges shall be the Design-Builder's responsibility.

2.12.4.11 Temporary Works – Falsework, Forms, and Shoring

Temporary works including falsework, formwork, shoring, temporary work access structures or equipment support structures shall be designed and constructed in accordance with the WSDOT *LRFD Bridge Design Manual*, the WSDOT *Standard Specifications for Road, Bridge and Municipal Construction*, the AASHTO *Guide Design Specifications for Bridge Temporary Work*, the AASHTO *Guide Standard Specifications for Bridge Temporary Works* and the WSDOT *Geotechnical Design Manual*.

2.12.4.12 Wall Design Criteria

Retaining walls and Noise Walls shall be designed and detailed in accordance with the WSDOT *LRFD Bridge Design Manual* and the WSDOT *Geotechnical Design Manual*. Wall

type selection and design by the Design-Builder shall meet all applicable requirements for differential settlement, aesthetic design, Utility location, lighting, signage, and landscaping.

Permanent retaining walls shall have cast-in-place or precast concrete faces or rock faces in accordance with the Aesthetic Design Standards. Gravity block walls and bin walls shall not be used for permanent retaining walls. Geosynthetic walls without a permanent facing (shotcrete or concrete) shall not be used for permanent retaining walls.

Retaining Wall types allowed are as follows:

1. Reinforced Concrete Walls
2. Noise Barrier Walls
3. Structural Earth Walls
4. Permanent geosynthetic Walls
5. Soil Nail Walls
6. Soldier Pile Walls
7. Soldier Pile Tieback Walls
8. Gabion Cribbing
9. Rock Walls

For reinforced concrete retaining walls, geosynthetic retaining walls, and gabion walls, the Design-Builder shall use standard walls in the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction*. The retaining wall standard plans can be modified by the Design-Builder to meet aesthetic design requirements for the project but the modifications shall not adversely affect the strength and safety requirements of the retaining walls.

Proprietary wall systems currently preapproved by WSDOT for use as structural earth wall systems for wall heights of 30 feet or less are as follows:

1. Welded wire faced structural earth wall systems from manufacturers specified in WSDOT GSP 13031.GB6.
2. Precast concrete panel faced structural earth wall systems from manufacturers specified in WSDOT GSP 13032.GB6.
3. Precast concrete block faced structural earth wall systems from manufacturers specified in WSDOT GSP 13033.GB6.

Other proprietary wall systems not yet pre-approved by WSDOT for use as structural earth wall systems may be used if approved by the Department. The Design-Builder shall submit to the Department for review:

1. Six copies of The Highway Innovative Technology Evaluation Center (HITEC), 1015 15th Street NW, Suite 600, Washington DC 20005 review report.

2. Six copies of the design calculations (by hand) for example wall designs at 10', 20', and 30' heights including seismic design.

Approval of a proprietary wall system under this process, by itself, will not be considered sufficient for attaining pre-approval status from WSDOT.

Soil nails in soil nail walls shall be double corrosion protected (i.e., fully encapsulated) in the portion of the wall that supports loading from adjacent structures. Soil nails with epoxy coating are acceptable elsewhere. All permanent ground anchors and deadman anchor cables or bars shall be double corrosion protected.

Fall protection (such as cable fence per WSDOT *Design Manual* Section 1130.04(7)(b)) shall be provided at the top of all retaining walls and retaining wall terraces greater than 10 feet in height.

2.12.4.13 Temporary Retaining Wall Design Criteria

The Design-Builder shall design temporary retaining walls in accordance with the WSDOT *LRFD Bridge Design Manual*, the WSDOT *Geotechnical Design Manual*, and applicable sections of the AASHTO *Guide Design Specifications for Bridge Temporary Works*. Structural components of temporary retaining walls may be reused as part of permanent retaining wall systems provided all of the structural support elements and materials of the permanent retaining walls meet the requirements for permanent structures. Maintenance of temporary wall structure shall be the Design-Builder's responsibility.

2.12.4.14 Noise Wall Design Criteria

Noise wall type selection and design shall meet all applicable requirements including those related to environmental compliance, aesthetic design, utilities, lighting, signage, and landscaping. The Design-Builder shall use standard noise walls in the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction* when the site foundation conditions meet minimum allowable bearing pressures for spread footings or minimum strength requirements for shaft and trench foundations. The noise wall standard plans can be modified by the Design-Builder to meet the aesthetic design requirements for the project but the modifications shall not adversely affect the strength and safety requirements of the noise walls.

Design and construction of noise walls shall be in accordance with the AASHTO *Guide Specification for Structural Design of Sound Walls*. Noise walls shall be designed using an exposure B2 and a design wind speed of 90 MPH. Noise walls shall be constructed of precast concrete, cast-in-place concrete or reinforced concrete masonry. Timber and gravity block (ecology block) noise walls shall not be used. Other products may be considered with the approval of the Department.

Noise wall types D-2e, D-2f, and D-2g from the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction* (Appendix C) shall only be used where the noise wall transitions into a bridge. Elsewhere, noise wall shall not be placed on the top of barriers.

Fire hydrant access openings shall be provided adjacent to fire hydrant locations as authorized by WSDOT and each responsible local fire marshal having jurisdiction. Openings shall be provided per NFPA or other approved details and locations shall be readily accessible to both emergency vehicles and water supply service lines.

For maintenance of the surface of noise walls greater than 10 feet in height, harness tie-offs for the fall protection shall be provided and shall meet the requirements of the Washington Administrative Code WAC 296-155-24510.

Where noise walls are placed less than 8' from limited access fence line, the fence shall be attached to the ends of the noise wall. The Design-Builder shall ensure that there is at least a 10' wide access to the area between the noise wall and fence so that no sections are landlocked.

Grading and drainage shall be done to prevent the collection of water runoff behind noise walls. Drainpipes and other structures shall not pass through noise walls or noise wall footings.

2.12.4.15 Aesthetics

The Design-Builder shall design and construct all Work in compliance with Section 2.14, and Appendix L - Everett HOV Aesthetic Design Report .

2.12.4.16 Overhead Sign Structures and Overhead Lighting

Sign bridges, cantilever sign structures, and bridge mounted signs, and luminaires shall be designed and constructed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4th Edition, 2001, the WSDOT *LRFD Bridge Design Manual*, and WSDOT *Standard Plans for Road, Bridge, and Municipal Construction*. New sign bridges and cantilever sign structures shall be monotube in accordance with the WSDOT *LRFD Bridge Design Manual* standard sheets 8.2-A1 through 8.2-A14. Existing truss-style sign bridges and cantilever sign structures shall be removed and replaced by new monotube sign bridges and cantilever sign structures.

For overhead sign structures, a minimum vertical clearance of 17.5 feet shall be provided from the roadway surface to the bottom of any sign panel or its lighting fixture mounted at any possible location along the overhead sign structure.

The analysis and design of signs, luminaries, and traffic signal support structures shall conform to the following:

1. Basic wind speed of 90 mph for all areas in the State of Washington.
2. Design Life and Recurrence Interval:
 - a. 50 years for luminaire support structures exceeding 50 ft. in height and overhead sign structures.

- b. 25 years for luminaire support structures less than 50 ft. in height and traffic signal structures.
 - c. 10 years for roadside sign structures.
3. Fatigue Design shall conform to AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4th Edition, 2001, Section 11, Table 11-1, with fatigue categories below:
 - a. Luminaire and traffic signal supports use Fatigue Category III.
 - b. High-level lighting poled in excess of 98 feet in height use Fatigue Category II.
 - c. Overhead sign structures use Fatigue Category I.

Foundations for sign bridges or cantilever sign structures shall be shaft or wall type in accordance with the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction*. Where special foundation designs are required, they shall be designed and constructed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4th Edition, 2001. Where overhead sign structures or luminaires are mounted on bridges, the bridge structural elements shall be designed for the foundation loads from the overhead sign structures or luminaires. All sign structure and luminaire loads shall be isolated from all wall systems except for cast-in-place retaining walls.

Overhead sign structures shall conform to the material requirements specified in WSDOT *Standard Specifications* Section 9-28.14(2) and Bridge Special Provisions BSP 210201011.GB8 (see Appendix B.3.12). Hand holes in closed members shall have reinforcement around the holes. Structural bolted splices or connections shall use AASHTO M 164 high strength bolts. All fabricated structural components and hardware shall be galvanized after fabrication in accordance with AASHTO M 111. Hardware shall be galvanized after fabrication in accordance with AASHTO M 232.

2.12.4.17 Storm Water Vaults

Structural design of vaults must meet the criteria of the AASHTO *LRFD Bridge Design Manual* with the following exceptions:

1. Crack control and minimum reinforcing shall meet the requirements of ACI 350 *Manual of the Concrete Practices* - Volume 4 using $z = 115$ kips/inch.
2. Seismic design loads shall be determined from the 2003 International Building Code .

2.12.4.18 Submittals

The Design-Builder shall prepare all new and revised plan sheets in accordance with the WSDOT *Plans Preparation Manual*, Section 440 through 460, and Division 5 and 6. The Design-Builder shall prepare quantity takeoffs, tabulations, and calculations in accordance with the WSDOT *Plans Preparation Manual*. Submittal tabulations, design calculations, plans, and specifications shall be shown in Customary (English) Units.

2.12.4.18.1 Design Submittals

WSDOT will assign personnel to provide a review of the plans and calculations for each structure design for compliance with Section 2.1 of this contract and help the Design-Builder interpret WSDOT design standards. The Design-Builder shall provide WSDOT with plans and calculations of the 30% 60%, 90% and Issued-for-Construction (100%) Work Packages. WSDOT shall review the Work Packages and provide comments on the Review Comment Form.

2.12.4.18.1.1 Plans

Structural detailing shall conform to the requirements of WSDOT *LRFD Bridge Design Manual* and WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction*. The Design-Builder shall prepare Construction Documents on WSDOT standard sheets for the bridges, retaining walls, sign structures, lighting structures, and other minor structures. The plan set for bridges shall include construction staging.

The Engineer-of-Record shall be registered as a Structural Engineer in the state of Washington. The Engineer-of-Record's original signature, date of signature, original seal, registration number, and date of expiration shall appear on new and revised plan sheets. Plans shall be submitted on 11"x17" white bond paper. Computer aided drafting (CAD) files shall be prepared using AutoCAD or MicroStation in accordance with WSDOT *Bridge Design Manual*.

2.12.4.18.2 Shop Drawing Submittals

The Design-Builder shall prepare shop plans for all steel bridge elements and precast elements in bridges, arches, storm water vaults, and box culverts. WSDOT personnel shall review the shop plans and provide comments on the Review Comment Form after review and approval by the Design-Builder. The following information shall be included in the shop drawings, (if applicable):

- Material specifications (ASTM specifications, hardness, alloy and temper, etc.)
- Sizes of members and fasteners.
- Length dimensions if shown on the Contract Plan
- Finish (surface finish, galvanizing, anodizing, painting, etc.).
- Weld size and type and welding procedures if required.
- Strand or rebar placement, jacking procedure, stress calculations, elongations, etc.
- Fabrication, reaming, drilling and assembly procedures.
- Erection procedure.

Shop Plans shall be marked Approved or Approved-As-Noted in the lower right corner. Shop Plans marked Approved-As-Noted shall clearly note the suggested correction. If abbreviations are used, mark as follows:

1. APP'D (Approved, No corrections required.)
2. AAN (Approved as noted - minor corrections only.)

2.12.4.18.3 Falsework, Formwork and Temporary Structures

The Design builder shall prepare design plans and calculations for falsework, formwork and temporary structures. WSDOT personnel shall review the design plans and calculations and provide comments on the Review Comment Form. Design and detailing of falsework, formwork and temporary structures shall conform to the requirements of WSDOT *LRFD Bridge Design Manual* and WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction*. Plans shall be submitted on 11"x17" white bond paper. Computer aided drafting (CAD) files shall be prepared using AutoCAD or MicroStation in accordance with WSDOT *Bridge Design Manual*.

2.12.4.18.4 Plan Sheet Revisions during Construction

Calculations for revisions made during construction shall be incorporated into the design/check calculation file when construction is completed. Whenever new plan sheets are required as part of a contract revision, the information in the title blocks of these sheets must be identical to the title blocks of the contract they are for. Every revision will be assigned a number. The assigned number shall be located both at the location of the change on the sheet and in the revision block of the plan sheet along with an explanation of the change.

2.12.4.18.5 End of Project Submittal

2.12.4.18.5.1 Plans

The Design-Builder shall prepare As-Built Construction Documents on WSDOT standard sheets for the bridges, retaining walls, sign structures, lighting structures, and other minor structures. Plans shall be submitted on 11"x17" white bond paper and as electronic files. The Design Builder shall submit the final approved shop drawings.

2.12.4.18.5.2 Calculations

The Design-Builder is responsible for completing all the calculations necessary for the design covered by the Scope of Work. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all calculations. The engineer-of-record shall be registered as a Structural Engineer in the state of Washington. The calculations shall include but are not limited to the following items:

1. Index Sheets - Number all calculation sheets and prepare an index by subject with the correspondence sheet numbers. List the name of the project, SR Number, designer/checker initials, date (month, day and year) and supervisor's initials.
2. Design Calculations - These shall include design criteria, loadings, and structural analysis, one set of moment and shear diagrams and pertinent computer input and output data (reduced to 8.5 inch by 11-inch sheet size).
3. Field Changes.

4. Special Design Features - Brief narrative of major design decisions or revisions and the reason for them.
5. New Deviations not included in this RFP, and Deviations modified by Design-Builder.
6. Design Decision Summaries.
7. Design Completed Checklist form 230-035. (See Appendix 1.3-A3 in the WSDOT *LRFD Bridge Design Manual*).

2.13 DRAINAGE

2.13.1 General

The Design Builder shall provide a well-drained corridor and a safe environment for those that use and maintain the Project. The design and construction of all drainage structures and appurtenances shall adequately address functionality, durability, maintenance access, safety, aesthetics, and protection against vandalism. The Design Builder shall conduct all Work necessary to meet the requirements associated with drainage, including culverts, bridge hydraulics, roadway ditches, water quality facilities, and closed storm drain systems. Unless explicitly specified in a commitment as referenced in RFP Section 2.13, the Design Builder shall abide by the specifications and standards herein. In fulfilling the requirements for drainage, the Design Builder shall abide by and fulfill the requirements related to the drainage features or systems of RFP Sections 2.13.4.2 (Design Criteria/Water Quality), Section 2.8.4.2 (Permit Commitments), Section 2.8.4 (Environmental Commitments), and Section 2.13.3 (Performance Requirements). The Design-Builder shall also conduct all Work necessary to meet the requirement associated with drainage, including but not limited to:

1. Design and construction of a pavement drainage system of inlets, ditches and storm drains for both the permanent project facilities and the temporary construction conditions for efficient removal of water from the pavement surfaces for vehicle safety.. This includes cleanup and replacement of some storm-drain pipes of Lowell Hillside area, as outlined in section 2.13.4.2.2.
2. Design and construction of permanent project pavement area runoff water quality treatment facilities and the associated conveyance systems.
3. Maintain existing off-site flows where passing through the project area by providing permanent new or by extending, replacing and/or protecting existing ditches, culverts, storm drains and outfalls.
4. Design and construction of temporary flow diversions during construction.
5. Maintain subsurface drainage during construction and provide passage after construction.
6. Temporary erosion and sedimentation control during construction

7. Design and conduct work in a manner that protects existing sensitive natural resources and improves habitat conditions, especially for endangered and threatened species.
8. Prepare and implement a spill prevention plan during construction
9. Design and install permanent and disturbed area restoration plantings to increase infiltration and reduce project area runoff.

2.13.2 Mandatory Standards and Reference Publications

2.13.2.1 Mandatory Standards

2.13.2.1 Mandatory Standards

General. Design and construct the storm drainage system in accordance with the requirements of the standards listed by priority in Table 2.13.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order

Permit requirements will take precedence over all other design and construction Mandatory Standards and Referenced Documents. The list of Referenced Publications is for informational purposes only and can be used to supplement the mandatory Standards. This is not a complete list, and other applicable publications may be required to complete the drainage design elements. The Computer Programs are listed as the primary WSDOT accepted design aids. Use of other computer programs by the Design-Builder may require additional submittal details, coordination and program conformance acceptance during WSDOT reviews.

**Table 2.13.1
Mandatory Standards for Drainage**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>			Proposal
2	WSDOT	Highway Runoff Manual	M 31-16	2004	HRM
3	WSDOT	Hydraulics Manual	M 23-03	March 2004	
4	WSDOT	Design Manual For Design Build Projects	M22-02	November 2004	
5	WSDOT	WSDOT Amendments to the Standard Specifications and			

		General Special Provisions			
6	WSDOT	Standard Plans for Road, Bridge, and Municipal Construction	M21-01	January 2004	
7***	WSDOT	Maintenance Manual	M51-01	September 2004	
8	WSDOT	Plans Preparation Manual	M22-31	July 2004	PPM
9	WSDOT	Construction Manual	M41-01	January 2004	
10	WSDOT	Materials Manual	M46-01	January 2004	
11	WSDOT	Utilities Manual	M 22-87	September 1998	
12	WSDOT	Environmental Procedures Manual		March 2004	
13	WSDOT	Qualified Products List	M46-02		QPL
** Only to the extent that it exceeds another listed standard. ***Document modified for design-build					

2.13.2.2 Referenced Publications

Use the publications listed in Table 2.13.2 as supplementary guidelines for the design and construction of the storm drainage system. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.13.2
Referenced Publications for Drainage**

No.	Author or Agency	Title	Document or Report No.	Date*	Comments, Short Forms
1	WSDOT	Stormwater Technical Report		Aug. 2004	Proposal
2	WSDOE	WSDOE, Water Quality Standards for Surface Waters of the State of Washington,	Chapter 173-201A WAC	July 2003	
3	WSDOE	Stormwater Management Manual for Western Washington, Volumes I - V, August 2000 Final Draft, Publications 91-75			
4	WSDOE	Washington State Water Quality Assessment	Section 305(b) Report	1998	
5	WSDOE	Washington State Water Quality Assessment	Section 305(b) Report	2002	

			Publication # 02-03-06		
6	FEMA	Flood Plain Insurance Maps for Snohomish County			
7	FHWA	Design of Urban Highway Drainage		Aug. 1979	
8	FHWA	Hydraulic Design of Highway Culverts	HDS No. 5	91-85	
9	FHWA	Hydraulic Design of Improved Inlets for Culverts	HEC-13	1981	
10	FHWA	Drainage of Highway Pavements	HEC-12	1984	
11	FHWA	Urban Drainage Design Manual	HEC-22	2001	
12	FHWA	Design of Riprap Revetment	HEC-11	1989	
13	Pertect Engineering	Riverfront Stormwater Master Plan for City of Everett		Aug. 2003	
14	WSDOT	Roadside Classification Plan		1996	
15	HWA Geosciences Inc.	Brownfield's Snohomish Riverfront Stormwater Site Selection Study		Aug. 2003	
16	Brown & Caldwell	South Everett Drainage Basins Plan: Basin Plan	Report Number 3	1986	
17	Brown & Caldwell	South Everett Drainage Basins Plan: Baseline Document Snohomish River Drainage Area Basin Number 11 Lowell Bluffs		1986	
18	Brown & Caldwell	South Everett Drainage Basins Plan: Baseline Document Snohomish River Drainage Area Basin Number 12 Wood Creek		1986	
19	City of Everett	Snohomish Estuary Wetlands Integration Plan	Publication #88-17	April 1997	
20	WSDOE	Non-point Source Pollution Assessment Project		Oct. 1989	
21	USDA	Soils Survey of Snohomish County Area Washington		Nov. 1983	
22	WSDOE	Concurrence Letter, Ed Abbasi		Nov. 2003	
23	Sheldon & Associates, Inc.	Draft Wetland Mitigation Plan, I-5 Everett HOV, SR 526 to SR 2 Vicinity		Oct. 2004	
24	Sheldon & Associates,	Draft Hazardous Materials Technical Report		May 2004	

	Inc.			
25	Sheldon & Associates, Inc.	I-5 Everett HOV lanes: Draft Biology Technical Report		May 2004

2.13.2.3 Data Collection

The Design Builder shall identify all water resources issues, utilizing available data, including water quality requirements as imposed by local, State, and federal government regulations; National Wetland Inventory and other wetland/protected waters inventories (See Talent Decision Summary Appendix W2); and official documents concerning the Project, such as the EA or other drainage and environmental studies. The Design Builder shall also acquire municipal drainage plans, watershed management plans, and records of citizen concerns. Water resources issues include areas with historically inadequate drainage (flooding or citizen complaints), environmentally sensitive areas such as Lowell Hillside, localized flooding such as low point at approximately station LL 422+50 west side of the SB I-5 before entering the off-ramp, and maintenance problems associated with drainage and areas known to contain hazardous waste such as proposed location of Water Quality Site # 1, see section 2.8.4.3.6 (Hazardous Sites).

Although the Project Design Office is providing basin delineation plan in Appendix H1 (Stormwater Technical Report), the Design Builder is responsible for collecting all information necessary to design the project drainage system.

Elements of the existing drainage system that shall remain in place shall be identified and inspected for conditions in accordance with the WSDOT HRM (Highway Runoff Manual).

2.13.2.4 Software

The Design Builder shall use following drainage design software:

**Table 2.13.3
Drainage Design Software**

Software	Functions
MGSFlood	Continuous simulation hydrologic model Calculate runoff volume. Design water quality and detention facilities
Stormshed2G (Engenious Systems)	Storm sewer pipe design
MicroStation	Drainage plans (Drafting)
Inroads	Drainage profiles
WSDOT Spreadsheet	For pavement runoff spread calculations
HEC-RAS	U.S. Corps of Engineers water surface modeling program

HY 8

For Culvert analysis

2.13.2.5 Coordination with Other Agencies and Disciplines

The Design Builder shall coordinate all water resource issues with affected interests and regulatory agencies. The Design Builder shall document the resolutions of issues for the correspondence file, including meeting minutes and memoranda for the record. The Design Builder shall document the permit requirements and contacts with the permitting agencies. A detailed list of coordinating agencies is provided on pages 44-45 of Stormwater Technical Report (appendix-H1)

2.13.2.6 Personnel Requirements

The Design-Builder shall provide a Drainage Lead Engineer with a minimum of ten years of experience in the design and construction of highway-related drainage elements. This lead engineer shall have 5 years of specific highway drainage design experience in WSDOT projects in Western Washington. This individual shall be a Professional Engineer licensed by the State of Washington and shall be responsible of the drainage design elements, including the temporary erosion and sediment control (TESC) and spill prevention control and countermeasures (SPCC) of the project. This same engineer shall also be responsible for the design of any drainage modifications made during construction after the drainage design has been completed.

2.13.2.7 Warranty

Warrant drainage work in accordance with Chapter 2.30

2.13.3 Performance Requirements

Design and construct the drainage system that meets the following performance requirements:

1. Effectively and efficiently remove and treat stormwater from within the roadway corridor. Do not allow drainage from ROW to run onto private property.
2. Address functionality, durability, ease of maintenance, safety, aesthetics, protection from vandalism, water quality, wetland impacts, and environmental compliance.
3. Meet water quality requirements as per WSDOT Highway Runoff Manual 2004.
4. Promote a safe environment for those who use and maintain the Project.
5. Provide construction dewatering to keep excavation free from surface and groundwater during all phases of construction.
6. Control erosion as specified in Section 2.13.4.4 and Section 2.8.3.3.3.1

7. Prepare Spill Prevention Control, and Countermeasures (SPCC) Plans and Temporary Erosion and Sediment Control (TESC) Plans as specified in sections 2.8.3.3.2 and 2.8.3.3.1 respectively.
8. Meet water quality monitoring requirements for stormwater discharge, groundwater and construction dewatering, and hydrostatic testing discharge in accordance with Appendix 6B of the WSDOT Highway Runoff Manual.
9. Provide TESC BMP's in accordance with Appendix 6-A, chapter 6 of the WSDOT Highway Runoff Manual.
10. Comply with required permits as outlined in Section 2.8.4.2
11. The Design Builder shall make minimal excavation at proposed Water Quality Site No.1 due to contaminated soils in the area. See Wetland Mitigation Plans for areas allowed to be excavated.
12. All stormwater quality facilities will be designed for enhanced treatment.

The Design-Builder shall provide stormwater drainage consisting of runoff collection systems, water quality treatment facilities and outfalls for the project's new impervious pollution generating surface areas that meet the requirements of the referenced standards and publications, and the appropriate project permits. The Design-Builder shall also maintain and provide facilities for handling other on-site runoff from non-pollution generating surfaces, off-site originating flows and cross-drainage as required in the mandatory standards and referenced publications. These facilities shall be sized according to the methods described in the Mandatory Standards.

The project Stormwater Technical Report is written on a conceptual basis. The drainage design concepts shown in the report utilize a basin-by-basin, Threshold Discharge Area (TDA) approach. The Design-Builder shall design the drainage for this project's area utilizing this same basin approach, to accommodate highway corridor runoff that discharges to, or flows through or within the construction limits. The Design-Builder shall provide design and facilities to accommodate all flows, which may include such items as pipe stubs and ditch grading for connection by future or on-going adjacent projects. The Design-Builder shall assist with the design and construction coordination of drainage for adjacent projects that share a common TDA with this Contract as may be required by the WSDOT.

The project permits and right-of-way is being processed assuming that this preliminary concept would be constructed. It is expected that the Design-Builder will utilize the Stormwater Technical Report concepts as a basis for the drainage design, refining and detailing the system as necessary to ensure the design meets all permit conditions and fulfills the environmental commitments listed in RFP Section 2.8. The Design-Builder shall be responsible for permit or right-of-way modifications that may result from utilizing other concepts.

The Design-Builder shall design and construct all drainage facilities to avoid impacting environmentally sensitive areas as defined in RFP Section 2.8 and RFP Section 2.13.4.2.2. The Design Builder shall also refer to Talent Decision Summary (Appendix W2) and Wetland Mitigation Plan by Sheldon Associates dated Oct. 2004. The permanent project impacts identified in the project permit applications.

2.13.4 Design and Construction Criteria

2.13.4.1 Design Criteria

The Design-Builder shall utilize the Mandatory Standards with the Design Criteria listed below in developing the design of the project. If any of the Design Criteria are not achievable, the Design-Builder shall submit to WSDOT clear documentation of what cannot be achieved and a proposed alternative for review. All designs shall conform to applicable project permits.

A full retrofit of I-5's storm water collection and drainage system within the project limits shall be provided to bring the roadway up to the WSDOT Highway Runoff Manual's (2004) water quality treatment requirements. The drainage features are described in detail in Appendix H1-Stormwater Technical Report. The improvements will include construction of a new drainage collection system from the south project limit to Lowell Road and a combination of upgrades to the existing drainage system in conjunction with a new storm drainage system from Lowell Road to the northern project limit.

The Design Builder shall design water quality facilities compatible with existing or proposed drainage systems in WSDOT Right of Way and on properties as specified in Stormwater Technical Report and shall attempt to preserve existing drainage patterns wherever possible. Where drainage patterns must be changed from the existing, the Design Builder shall secure all permits and drainage easements. The Design Builder shall develop a Project Drainage Overview Map, which shall serve as the base plan for final drainage design. The Overview Map shall show the existing drainage features and proposed Project drainage master plan, including drainage areas and contributing flows. The Overview Map shall also show impacts from the Project and proposed mitigation within the Map extents.

The project is proposing six (6) water quality facilities (WQF) within the project limits. Facilities 1 and 2 are located outside of the WSDOT right of way. WQF-1 at Snohomish Riverfront property and WQF-2 in the northeast corner quadrant of I-5 & 36th Street. WQF-3 is located on the Pacific Avenue off-ramp. WQF 4 & 5 are located between the ramps at the I-5/US-2 interchange within WSDOT right of way. WQF-6 is located at Marine View Drive on- and off-ramps.

2.13.4.2 Treatment of Runoff

The design of the permanent highway water quality treatment facilities shall be located outside of streams, steep slopes and wetland buffer area and designed in accordance with the WSDOT Highway Runoff Manual (M31-16) and all permit requirements unless specifically noted otherwise. The Design-Builder shall provide sufficient water quality treatment facilities (6 water quality facilities are proposed by the Design Office) to achieve the minimum contact-residence time for treating 91% of the mean annual runoff volume for flow-rate based treatment facilities, or to provide the 6-month 24-hr design storm event

runoff volume, for wet pool facilities, within existing WSDOT right-of-way and offsite facilities as outlined below;

Water Quality for Wood Creek and portion of Lowell Basins

1. Provide water quality treatment and direct discharge to the Snohomish River (no detention)
2. Pretreatment Facility (approved BMP from WSDOT HRM, 2004) shall be provided within the WSDOT right of way in the proximity of Highway Station LR 319+00 on the east side of North bound I-5. See attachment G2 of Stormwater Report for Pretreatment Facility dimensions.
3. Provide full retrofit for water quality treatment from the existing and proposed pavement in accordance with the WSDOT Highway Runoff Manual (March 2004).
4. Provide Enhance Treatment.
5. Build new conveyance systems in the northbound and southbound I-5 to separate onsite runoffs from offsite runoff and to convey runoff into water quality treatment facility (See basin delineation, Appendix H-1). Treatment will be provided to the 6-month storm per MGSFlood calculations.
6. The Department of Ecology concurred with this approach (see Appendix H1, Pages 01 and 02).

Water Quality Facility No. 1

All runoff from the southern project limits (Station LR 165+00±) to Lowell Snohomish River Road (Station LL 526+00) will be conveyed through Main Street to the Water Quality Facility No. 1 at the Simpson site (Riverfront property). The conveyance system will overcross the railroad tracks in an Aqua duct/bridge structure. The structure will also be used as a pedestrian crossing to provide public access to Water Quality Site 1 and to Lowell River Trail. See Section 2.12 (Bridges and Structures). Access shall be maintained to all dwellings and businesses along impacted by construction activities during the installation of the conveyance system. The Design-Builder shall be responsible for the coordination and permits required from the City of Everett / Utility Owners impacted by the work. The Design-Builder shall bear all cost for utility re-location required to construct the conveyance system to Water Quality Site 1.

The stormwater runoff from the southern limits of the Project to Main Street will be pretreated in an approved BMP located within the State Right of Way prior to discharging to Water Quality Site 1. The conveyance system will be routed through a velocity reducer at the end of the pedestrian bridge. The onsite runoff (6-month storm) shall be treated in a water quality/wetland sanctuary treatment facility and then discharge to the Snohomish River along with higher storms. The current Highway Runoff Manual recognizes BMP RT.13 Stormwater Treatment Wetland as an approved enhanced treatment BMP. Design Builder shall keep the excavation at Water Quality Site No. 1(wetland impact-Boardwalk area) to a minimum due to impacts that could result uncovering of contaminated materials at this location. Refer to section 2.8 (permits) and Wetland mitigation Plans for measurements of excavation.

Brownfields Snohomish Riverfront Stormwater Report and Geotechnical reports including Draft Hazardous Waste Materials Technical Report (May 2004) from Shannon & Wilson can

be used to assess water table and soil characteristics at this location (see Appendix M of Stormwater Technical Report). If Design-Builder elects not to use this information, the Design Builder will provide acceptable alternate documentation.

This treatment facility will be similar to Narbeck Wetland Sanctuary at a location close to the Snohomish Riverside near Lowell-Snohomish Road (see Sheets G1 & G2, Appendix G of Stormwater Technical Report). Design this facility in a park-like setting with walking trails, ponds and natural habitat environment (see Sheets G6 to G9, Appendix G of Stormwater Technical Report). For more information visit www.narbeck.org.

Water Quality for portion of Lowell and 36th Street Combined Basin

1. Provide water quality treatment and direct discharge to the Snohomish River (No detention)
2. Provide full retrofit for water quality treatment from the existing and proposed pavement, to meet the WSDOT Highway Runoff Manual (March 2004).
3. The Department of Ecology concurred with this approach ((see Appendix H-1, Pages 01 and 02).

Water Quality Facility No. 2

The Design Office is proposing City of Everett Property (GTS Drywall Site, Snohomish County Assessor Tax Parcel #29052900401000, WSDOT Parcel # 1-21644) north of 36th St. for construction of a storm water treatment area. The Design-Builder shall accommodate the BNSF/City of Everett proposed land exchange and shall not construct any facility to the West of the proposed turnback line as depicted in Exhibit Q. The Design-Builder shall be responsible for coordinating with the City and Railroad Company to determine the final geometry of the proposed turnback line as negotiated between the Railroad Company and the City.

The Design Builder shall provide Sand Filter Vaults (Enhanced treatment) at Water Quality No 2 at this location (City Property). Enhanced treatment is being provided as a result of BA, EA and discussions with WDFW. The schematic of these vaults are shown on Appendix H1, page G3 of the Stormwater Technical report.

Water Quality Facility No. 3

The Design Builder shall provide Sandfilter Vault at Water Quality No 3 at Pacific Avenue Off-ramp within WSDOT Right of Way. The schematic of these vaults are shown on Appendix H1, page G3 of the Stormwater Technical report.

Vaults will only be accepted at these locations as other treatment BMPs are not feasible due to physical hydraulic limitations and right-of-way constraints. The sizes should be minimized by incorporating with other best management practices as much as possible. Calculations shall demonstrate that every attempt has been made to minimize the vault use and size.

Water Quality Facility No. 4 & 5

Existing bioswales shall be enhanced at Water Quality Facilities 4 & 5 (Onsite), see Appendix H1-Stormwater Technical Report.

Water Quality Facility No. 6

An approved enhanced treatment BMP at Water Quality No. 6 (Marine View Drive-Onsite) shall be provided.

South Everett HOV Direct Access Project

The design Builder shall include 11024 SF of runoff from new impervious surface added from the Sound Transit project. This runoff will be added to the Water Quality Facility No.

1. The proposed new impervious surface begins north of SR 99 undercrossing on NB I-5 and ends at the south side of beginning NB lanes project limits. See Appendix H8.

Downstream Analysis

The Design Builder shall perform downstream analysis for individual stormwater facilities, which shall include a review of the regional (usually city or county) stormwater pipes receiving runoff, thus factoring this information into the highway runoff design. Project improvements shall not increase the potential for flooding downstream of the project. Where downstream conveyance structures have insufficient capacity to handle the project design criteria off-site cross-drain and/or project area discharge flows, then alternate proposals shall be prepared to resolve the problem using alternative discharge locations or hydraulic detention routing type solutions. The Design-Builder shall advise WSDOT and provide supporting calculations prior to beginning work on any drainage work within that same drainage basin boundary, for any locations where improvements are required to existing downstream drainage conveyance systems outside of the limits of construction.

2.13.4.2.1 Hydraulic Structures

The design of the highway collection and conveyance structures shall be in accordance with the WSDOT Hydraulics Manual (M23-03).

It is intended that the Design-Builder utilize as much of the existing storm drainage system as possible in the 36th Street combined Basin to minimize disturbance of the existing pavement that is to remain in the pavement widening areas. For project areas where the existing pavement is being replaced, a new drainage system will be expected. The capacity of all proposed and existing-to-remain inlets, storm drains, ditches, outfalls and other conveyance structures within the project limits shall be sized and and/or checked for capacity and included in the calculations and Final Stormwater Report. Capacity calculations shall compare required capacity to actual capacity.

The Design-Builder shall include construction of a new drainage collection system from the south project limit to Lowell Road and a combination of upgrades to the existing drainage system in conjunction with a new storm drainage system from Lowell Road to the northern project limit.

Wall Drains

Retaining walls shall be designed to avoid stormwater flows running over the face of the wall. Typically this is be done by directing runoff away from the wall, by selected grading or by collecting the surface flows prior to it reaching the wall, or by installing a lined channel or

ditch at the top of the wall (sealed so that surface flows do not flow down behind the wall thereby avoiding saturation of the backfill or wall underdrain system) with flows collected by inlets and storm drains to the roadway storm drain system. Avoid placing surface drainage structures and pipelines in the reinforcement zone of reinforced earth and soil nail/tie back type walls, or otherwise align the pipes/structures to minimize conflict with the wall's reinforcement straps and anchors. Wall surface drainage facilities shall be designed to be esthetically compatible with the wall design, or otherwise located at low visibility locations. Wall surface drainage systems shall be designed for ease of maintenance, providing low clogging minimal maintenance type structures and/or removable clean-out covers and ports as necessary.

The internal wall drainage system (perforated pipe underdrain system) shall be connected wherever possible directly to the highway collection and conveyance system (pipes connected directly to inlets or manholes, or daylighted with appropriate erosion protection splash pad into ditches). Placement of open "weep holes" through the exposed wall face acting as underdrain outlets will not be allowed unless specifically approved in low visibility locations. Sub-drain outlet ends shall be fitted with flap type anti-rodent entry fittings. Maintenance clean-out ports shall be provided where subdrain pipes are combined with surface drainage pipes having angled fittings not inside a structure. See Retaining walls in RFP section 2.12.3.3.

Cross-Drains and Culverts

The Design Builder shall analyze the existing and proposed culverts and drainage-ways impacted, replaced, and created by the project design, for any localized flooding problems. The Design Builder shall design culvert replacements and improvements to meet the requirements of the WSDOT Highway Runoff Manual (March 2004). The Design Builder, for major culverts, shall complete design computations and risk assessments. Where culvert or bridge design is influenced by upstream storage, the flood-routing computations shall be included with the culvert or bridge analysis. Culvert design shall meet the requirements of the Hydraulics Manual.

Culvert ends within the clear zone shall be beveled and subject to further reinforcement protection as required in the WSDOT Hydraulics Manual and requirements noted on the applicable WSDOT Standard Plans for Road, Bridge and Municipal Construction.

In pavement widening areas, where most of the existing pavement is to remain, the existing cross-drains and culverts shall be maintained and extended where necessary to match revised roadway sections, unless the condition of the facility requires replacement. In areas where the pavement section is to be replaced or constructed, new cross-drains and culverts shall be constructed.

All cross-drainage widenings or new cross-drains identified as stream crossings shall be designed in accordance with WSDOT Hydraulics Manual (M23-03) for flow passage and the Washington Department of Fish and Wildlife's (WDFW) Design of Road Culverts for Fish Passage (2003). Compensatory storage requirements for filling of the floodway (volume of fill or structures below the ordinary high water elevations or if a regulated floodplain below the FEMA mapped 100-yr flood level) shall also be met. The design and construction plans

and specifications shall be prepared in conjunction with biologists to reduce impacts on the natural streambed and, when appropriate to the given project, impacts shall be mitigated by placing gravel in the culverts, planting riparian trees, and using other natural features such as log weirs, boulders, and other types of woody debris. Where practicable, construction shall be done during low flow periods that are least likely to harm fish and other wildlife in accordance with WDFW requirements.

Cross-drains operated and maintained by others (i.e. city and county storm drain systems) shall be protected, kept separate from the project drainage system and maintained at its existing capacity and function.

It is the responsibility of the Design Builder to not impact any culvert crossings, owned by the City of Everett. This includes no construction runoff to be discharged to the City system. A list of crossings is provided below for assistance, however this list is not complete and the Design Builder shall verify the number of crossings and stationing through field data and reconnaissance. See Table 2.13.4 for conveyance lines crossings at Mainline I-5. These conveyance lines crossings are also shown on utility plans Appendix U

Table 2.13.4

Pipe Type	City of Everett existing culvert crossings
24" MCP	LR 175+80
42" RCCP	LR 230+00
18" SCH C	LL 484+13
12" CCP (SB West Side)	LL 485+77
Under-Drain	
18" RCCP	LL 494+90
24" RCCP	ER1 22+00
18" SCH C	LL 566+90
12" Conc. Drain	LL 484+13
24" RCCP	North of Flyover u/c
18" CCP	GL 15+80
	LL 627+76

All existing and proposed cross-drains and culverts in the project area shall be sized and/or checked for capacity and results included in the design calculations and Final Stormwater Report. Capacity calculations shall compare required capacity to actual capacity.

Culvert ends within the clear zone shall be beveled, with safety bars, subject to further reinforcement protection as required in the WSDOT Hydraulics Manual and requirements noted on the applicable WSDOT Standard Plans for Road, Bridge and Municipal Construction.

For structural plate culverts, the Design-Builder shall use the standard structural plate culvert interior, headwall, and end sections included in the WSDOT Standard Plans for Road, Bridge, and Municipal Construction. The Design-Builder shall not use corrugated steel structures with a span greater than 26 feet. The Design Builder may use pre-cast or cast-in-place concrete interior, headwall, and end sections in accordance with the requirements stated in the WSDOT Bridge Design Manual. Pre-cast arch segments and wingwall sections shall

be supported on spread footings, drilled shafts, or piling. Timber piles shall not be used as foundations for culverts or pre-cast concrete arches.

Runoff Treatment Vaults

Sand filter vaults shall be designed for Water Quality Facilities No. 2 & 3 due to hydraulic limitations, enhanced treatment BMPs and right of way constraints. Incorporating with other best management practices as much as possible should minimize sizes. Enclosed vaults and galleries shall be designed for ease of maintenance access, with paved access and work areas outside of the highway traffic and shoulder area. The vaults shall be equipped with necessary hydraulic controls for ease of dewatering. Bypass piping and control valves shall be incorporated to route flows around the structure during cleaning operations. The vaults shall have the floor sloped to the access end. Smallest possible vaults shall be designed and constructed suitable for cleaning with high-pressure rodding and vacuum trucks. The vaults shall include a sump in the lower elevation end, under an access cover to assist with the pump out. Large vaults shall have ramp access suitable for motorized sediment removal equipment (i.e. small front-end loaders such as bobcats or skid steers). Secondary access shall be also provided suitable for easy personnel entry during inspections.

Vaults shall have paved site access and staging area suitable for the necessary cleaning operations and loading of dump trucks. The vaults shall be vented and have locking covers, or be otherwise fenced to protect against unauthorized entry. See Section 2.12.4.17 for additional vault structural requirements.

Bridges and Cross Drains

Coordination Coordinate all crossings located in FEMA-regulated floodplains with the Department

Design

Provide end sections or head walls for cross drains. Perform hydraulic calculations for cross drains in accordance with WSDOT Hydraulics Manual (M23-03). Show tailwater and headwater elevations on the computation sheets. Provide chamfer for all cross drains operating under inlet control at the design flow per WSDOT Standards. Limit the allowable headwater by the minimum elevation of the following:

1. Non damaging to upstream property
2. 18 inches below the edge of the shoulder
3. $HW/D < 1.25$ ft
4. Low point in the road grade
5. Elevation where flow diverts around the culvert.

2.13.4.2.2 Lowell Hillside

Lowell Hillside area on the northbound, east side of Mainline I-5 along the shoulder between 190.60 to MP 190.90 had problems of embankment settlement due to voids in the fill below the pavement. See Appendix H4 (1990 Geotechnical Report) for details. Due to past issues

and hazards to the Northbound I-5, a Technical Memorandum was submitted earlier, outlining issues and remedies. See Appendix H5 (2004 WSDOT Memorandum). A recent video inspection data and project recommendation report is also attached as Appendix H6.

The Project Design Office is providing data of existing pipe systems, including summaries of the inventory survey, pipe types, general condition of pipe and structures for each system, with photo and plan exhibits that illustrate the general condition and specific problems of each pipe run. The report (Appendix H5) identifies specific failures and blockages and suggested repair methods for all four trunk lines.

The Design-Builder shall provide fixes to the existing drainage system, per recommendations of the Project Design Office as outlined in Lowell Hillside drainage History and Project Recommendation (Appendix H5).

The Design Builder shall also perform the following while working in Lowell vicinity:

1. Pipe routing from MP 190.60 to 190.90 shall be done on the west side of the NB I-5.
2. Due to steep slopes and sensitive area, no heavy machinery will be placed on the Lowell Hillside slopes.
3. Inclinometers shall be placed for long-term observation of any earth movement in the area.
4. Before commencement of any work the Design Builder will provide its own recommendations for approval, on the basis of engineering judgment and available data.
5. The Design Builder will also submit an exclusive report with plans after performing this work. This report will include observations and recommendations of the Design Builder to further improve the stability of this area.
6. Any major work other than mainline drainage in the Lowell Hillside vicinity would require prior approval from the Department.
7. All work shall be performed in accordance with WSDOT Highway Runoff Manual Chapter 6 (Temporary erosion and sediment control Design Guidance and Process), the WSDOT Standard Specifications Section 1-07.15 and Division 8, WAC 173-201 A and the project permits.

2.13.4.2.3 Bridge Deck Drainage

Where spread limits are exceeded during the design storm, provide a bridge deck drainage system that is compatible with the structural reinforcement, components, and aesthetics of the bridge. Where bridge deck drainage is required, existing bridge drains in the bridge decks shall be replaced by grate inlets off the ends of the bridge wherever possible. Existing bridge drains shall be plugged and existing drainpipes from the basins shall be removed. Refer to Section 2.12.4.7 (Bridge Drainage).

2.13.4.2.4 Outfalls and Downspouts

Position outfalls to avoid corrosion of structural members, erosion of embankments, and splash on moving traffic and sidewalk areas below the bridge. Install downspout discharge

not greater than 4 feet above the finish grade of surface; use galvanized steel pipe with a minimum diameter of 8 inches and a minimum wall thickness of 1/8 inch. Provide maintenance access at every 250 feet for downspout systems.

2.13.4.2.5 Bridge Approach Drains

Intercept pavement drainage at both ends of bridges. For stormwater flowing toward the bridge, intercept it before the approach slab; for stormwater leaving a bridge, intercept it before it leaves the approach slab. Refer to Bridge Plans showing inlet locations.

2.13.4.2.6 Storm Drain Systems

2.13.4.2.6.1 General

The storm drain system will consist of gutters, inlets, ditches, pipe and other appropriate fixtures designed to convey storm runoff to the receiving waters

2.13.4.2.6.2 Design

Stormshed software shall be used for rainfall intensity and calculation of runoff rates and to size the pipes. Do not decrease the storm drain size in the downstream direction. Do not allow sump or inverted siphon conditions. The storm drain system shall include:

1. Drainage area maps for each storm drain structure with pertinent data, such as boundaries of the drainage area, topographic contours, etc.
2. Location and tabulation of all existing and proposed pipe and drainage structures. These include size, class or gauge, catch basin spacing, detailed structure designs, and any special designs.
3. Specifications for the pipe bedding material on all proposed pipes and pipe alternates as required in the WSDOT Specifications for Construction and WSDOT Geotechnical Manual.
4. Complete pipe profiles, including pipe size, type and gradient; station offsets from the centerline of the roadway; length of pipe; class/gauge of pipe; and numbered drainage structures with coordinate location and elevations.
5. Gasketed, reinforced concrete pipe with tied joints shall be used anywhere that significant traffic disruption will result from replacement of storm drainpipe and cross-culverts. Pipes with flow velocities less than 3 fps shall be designed for full flow at 80% of the internal diameter to account for sedimentation in the pipe. Other storm drainpipes shall be designed using the full internal diameter.
6. Rubber gasketed joints are required for all drain pipe installations as per Section 7-04.3(2) E and Section 9-05 of the Standard Specifications

2.13.4.2.6.3 Inlets and Catch Basins

Inlets and Catch basins will comply with WSDOT Standard Plans (M21-01). At the Design-Builder's option, use pre-cast catch basins. Use 300 feet maximum catch basin spacing for storm drainpipes lesser than 48" diameter. It is the responsibility of the Design Builder to coordinate with WSDOT Maintenance Office for more specifics on spacing between catch basins.

2.13.4.2.6.4 Connections to Existing Systems

Develop plans and specifications for connections to existing WSDOT storm drainage systems. Before making connections, obtain design approval as required from the Department. Show the design flow on the hydraulic plan sheets at the location of entry to the system.

2.13.4.2.6.5 Planned Future Systems

Develop plans and specifications for providing stubs beyond the edge of the ROW for planned future storm drain connections. Coordinate the locations of these connections with the stakeholder agencies. Show the design flow on the hydraulic plan sheets at the location of entry to the system.

2.13.4.2.6.6 Pipes and Culverts

Design Life

For new pipes and culverts, use a design life of 50 years.

Existing Pipes and Culverts

Evaluate and replace or reline all existing drainage pipes and culverts under the proposed roadway and ramps. If an existing pipe is to be relined, maintain at least the same hydraulic capacity in the resulting facility as that of the existing structure. Structurally evaluate any existing pipe that will remain to verify that any change in fill or loading placed on the pipe will not exceed design recommendations. Do not reuse or allow any existing drainage pipe or culvert to remain that does not meet this criterion, whether or not its modification is required for project drainage.

Locating Facilities Locate existing facilities as required in Section 2.10 (Utilities and Third Party Agreements). Identify conduit, pipe, and structure materials.

Hydrologic Data

Refer to Stormwater Technical Report (Appendix H-1) for basic hydrologic data and preliminary drainage basin delineation. (This information is provided as a basis of bid only, and is subject to the final evaluation and engineering of the Design-Builder.)

Floodplains

The I-5 Everett HOV project site is not located within a FEMA-mapped flood plain. However, proposed water quality facility sites 1 & 2 near the Snohomish River are within the FEMA 100-year floodplain (see Appendix L of Stormwater Technical report). The proposed water quality sites are located in an Urban Flood Fringe District, and could be fully developed with no floodplain mitigation (FEMA allows up to 1' of rise). WQF-1 lies within 200 feet of the Ordinary High Water Mark, a Shoreline Substantial Development permit needs to be obtained.

Currently, the Snohomish River Estuary located near the Snohomish River is within the 100-year floodplain and is comprised primarily of inter tidal wetlands that over time have been converted to agriculture and residential uses.

Sag Locations

Provide catch basins at each low point on each sag vertical curve to prevent ponding.

Inlets

Use grate inlets on the mainline, ramps and collector-distributors combination curb-and-grate for all other inlets.

2.13.4.3 Wells and springs

See Appendix H1, pages 18-19

2.13.4.4 Temporary Erosion and Sediment/Pollution Control

Temporary erosion and sediment control (TESC) and spill prevention control and countermeasures plans (SPCC) and narratives shall be prepared and implemented in accordance with the RFP Section 2.8, WSDOT Highway Runoff Manual Chapter 6, WSDOT Standard Specifications, Section 1-07.15 and Division 8, WAC 173-201 A and the project Permits. Runoff from construction areas shall be collected and treated and/or discharged consistent with the WSDOT Highway Runoff Manual.

The TESC plans and narrative shall be prepared under the direction of, and signed by a Drainage Design Lead Engineer, a Professional Engineer licensed in the State of Washington.

The Design-Builder's TESC and SPCC plans shall be stamped by the Licensed Engineer as outlined above. Copy of such plans will be submitted to WSDOT for information only. No construction work shall be performed prior to the Design-Builder having submitted stamped TESC and SPCC plans in strict guidance of applicable codes and standards.

Failure of the Design-Builder to comply with the Mandatory Standards and Permits for TESC and SPCC can result in extensive damage to the natural resources of the State, with long term negative effects on wildlife, habitat and public use. Non-compliance will also cost taxpayers undue sums of money, adding costs needed for administration, analysis, engineering, inspection, and supervision. The Design Builder will be responsible for any fines incurred as a result of violations.

2.13.4.5 Drainage Outfalls

Existing Outfalls

Runoff from the proposed water quality facilities will be discharged to the Snohomish River through existing outfalls at various locations in the project vicinity. See page 25-26 of the Stormwater Technical Report for details. Only the 18" outfall at Water Quality Facility No. 1 will be replaced with a larger sized pipe.

New Outfall at Snohomish Riverfront Property

Avoid riparian habitat disturbances as much as possible during the design and construction of the new drainage outfall at Riverfront property (WQ1). Situate the new outfall so that the outlet elevation is as close to the existing grade as possible. Avoid high outlet elevations that will necessitate the use of excessive amounts of riprap. See section 2.8 (permits) for dimensions and other details. The size of the existing Outfall is not adequate to handle the proposed runoff. Culvert analysis shows that a 54-inch CMP culvert is needed to handle the proposed runoff. The existing 18" outfall shall be replaced by a 54-inch diameter CMP culvert at 1/2 % slope. The designed culvert will have the capacity of handling over 85 cfs (See Stormwater Technical Report, Outfalls). The Design Builder shall provide fish screen at this outfall to restrict fish from moving into the outfall at high flows. The fish screen shall be designed in accordance with Department of Fish and Wildlife website (Screening Requirements For Water Diversions), RCW 77.16.220, RCW 77.55.040 and WAC criteria as specified in WDFW website. The Design Builder shall also verify need for providing flap gate at this outfall due to high stormwater flow during a high-river stage case scenario; by determining flows, volumes, areas and functionality.

2.13.4.6 Construction Schedule

Provide the Department a schedule for storm drain outfall construction as part of the monthly plan updates. Include estimated dates for connecting to other municipalities' storm drains and new outfall construction.

Construction Hours

Construction across the dike to lay the conveyance pipe under the City's bike path is only allowed after closure of the park.

2.13.4.7 Quality

Provide quality inspection, testing, and acceptance in accordance with Section 2.26 –Design-Build Quality Management Plan.

2.13.5 Submittals

2.13.5.1 Proposal Submittals

The Design-Builder shall demonstrate their understanding of the permit requirements for temporary erosion and sedimentation control (TESC) by submitting a set of basic plans and a general description of the intended runoff treatment procedures for construction area runoff for each stage of the Design-Builder's proposed staging plan, included in the Design-Builder's Proposal submittal (See RFP Instructions to Proposers Appendix A and RFP Section 2.8).

2.13.5.1.1 Initial Design Submittals

The Design-Builder shall prepare quantity takeoffs, tabulations, and backup calculations to support items requiring a statistical acceptance/performance basis as required by the Design-Build QC/QA Plan.

Prior to starting construction on the drainage system, the Design-Builder shall inventory, use existing survey data and inspect all existing drainage pipe systems and associated structures that are to remain in the project area, including storm drains, cross-drains and culverts. The survey shall identify each system by highway milepost and project stationing and offsets from alignments, and show the pipe end and structure coordinates, sizes, structure types, invert levels at ends and structures, skews and upstream and downstream channel profile and cross sections within the construction limits. The channel cross-sections shall be taken at no longer than 50' spacing, to include the cross-section at the culvert end and at edge of construction limit. The Design-Builder shall submit the Drainage Existing Condition Report, along with copies of the inspection videos and electronic format survey data, as part of the Stormwater Report 100% submittal.

2.13.5.1.2 Plans

The Design-Builder shall prepare drainage plan sheets in accordance with the Plans Preparation Manual, Section 440 through 460, and Division 5 and 6. The Design-Builder shall prepare Construction Documents on WSDOT standard sheets for the drainage. Plans shall be submitted on 11" x 17" white bond paper and in electronic format on a CDROM. Plans shall be submitted at 30%, 60%, 90% and 100% stages for review.

2.13.5.1.3 Calculations

The Design-Builder shall prepare drainage calculations in accordance with the WSDOT Hydraulics and Highway Runoff Manuals to accompany and support each drainage plan review submittal. The calculations shall be in a white paper type summary format with narrative that describes the approach and order of the calculations including sections on the methodologies used (include appropriateness and accuracy requirements), design decisions made and resultant summaries. The calculations shall have copies of the supporting computer programs input and output printouts, spreadsheets, hand calculations, exhibits and sketches attached.

The calculations shall include any draft project special provisions required for construction.

2.13.5.2 Final Design Submittal

The final design submittal shall be made after the 100% submittals have been reviewed and all comments resolved and prior to start of the associated submittal's construction. This submittal shall be the same design plans and documents that are used for construction.

2.13.5.2.1 Plans

Prepare plan and detail sheets in accordance with the Plans Preparation Manual, Section 440 through 460, and Division 5 and 6. The Design-Builder shall prepare Construction Documents on WSDOT standard sheets for the drainage construction. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the all plan and detail sheets. The engineer-of-record shall be registered as a civil engineer in the state of Washington. Plans shall be submitted on 11" x 17" white bond paper and in electronic format on a CDROM.

2.13.5.2.2 Calculations

A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all calculations.

The Design-Builder is responsible for completing all the calculation necessary for the design covered by the Scope of Work. The Design-Builder shall prepare calculations in accordance with the Plans Preparation Manual, the Hydraulics Manual and the Highway Runoff Manual to support the design shown on the plans and details. The engineer-of-record shall be registered as a civil engineer in the state of Washington. The calculations shall be in a white paper type summary format with narrative that describes the approach and order of the calculations including sections on the methodologies used (include appropriateness and accuracy requirements), design decisions made and resultant summaries. The calculations shall have copies of the supporting computer programs input and output printouts, spreadsheets, hand calculations, exhibits and sketches attached. The calculations shall include but are not limited to the following items:

1. Index Sheets - Number all calculation sheets and prepare an index by subject with the correspondence sheet numbers. List the name and number of the project, SR Number, designer/checker initials, date (month, day and year), and supervisor's initials.
2. Design Calculations - These shall include design criteria, hydrology and hydraulics calculations and pertinent computer input and output data (reduced to 8.5 inch by 11-inch sheet size). The calculations shall include a narrative of approach taken, final conclusions and summaries of the calculation results in both narrative and table format. The calculations shall be in logical order, technically clear, and cross-referenced to correspond directly with drainage structure and basin numbering on the drainage plans, maps and exhibits for ease of reference.
3. Special Design Features - Brief narrative of major design decisions or revisions and the reason for them.
4. Special Design Features - Brief narrative of major design decisions or revisions and the reason for them.
5. New Deviations not included in this RFP, and Deviations modified by Design-Builder.
6. Design Decision Summaries.
7. Drainage maps showing the hydrologic features, drainage basins, sub basins, threshold discharge areas, existing and final conveyance and cross-drain structures, flow direction arrows and any other features necessary to support and clarify the design calculations. The drainage maps shall also show all geotechnical and environmental sensitive areas, streams and wetlands with buffer boundaries, riparian zones, the ordinary high water and FEMA flood level contours, aquifer and well head protection zones, sanitary drain fields and major utilities that will effect the drainage design. The drainage maps shall be on 11" x 17" bond paper.
8. Other exhibits as necessary to provide details necessary to clarify and support the calculations

2.13.5.2.3 Stormwater Report

The Design-Builder shall prepare a Stormwater Report in accordance with the WSDOT Hydraulics Manual and the Highway Runoff Manual. The Stormwater Report shall follow the same general outline and format as shown on the Stormwater report template. A hard

copy is attached as Appendix H2; the template is also available online at <http://wwwi.wsdot.wa.gov/regions/northwest/RP&S/Environmental/HWQ/default.htm>. The Stormwater Report shall be submitted in an 8.5" x 11" format except that exhibits may be 11" x 17". The report shall be submitted bound on bond paper and in electronic format on a CDROM.

The Stormwater Report shall be updated, by the Design-Builder to reflect changes in the original design during construction. Updating shall be done by the Design-Builder providing supplemental attachments to the Stormwater Report. The supplements should reference the original Stormwater Report and be specific as to the changes, but be easily readable as a stand-alone type document as to why the revision was made, how it effected the design and include the revised drawings and exhibits, supporting calculations, and revised summaries and tables. The supplements shall be submitted as part of the drainage design revision reviews and approval process for major modifications, and as a record of as-built changes for minor changes grouped together as convenient, but at frequency not to exceed five revisions at any one time. The combined Stormwater Report and supplemental updates should reflect the design and as-built condition of the drainage system at the end of construction.

A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the Stormwater Report and all supplemental attachments. The engineer-of-record shall be registered as a civil engineer in the State of Washington.

2.13.5.3 Specifications

The Design-Builder is responsible for completing all specifications necessary for the construction of design elements covered by the Scope of Work. The Design-Builder shall prepare project construction specifications (special provisions) for all items of construction that are not otherwise covered by the Mandatory Standards, or as needed to clarify specific items of work. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all project construction specifications. The engineer-of-record shall be registered as a Professional Civil Engineer in the State of Washington.

2.13.5.4 Shop Drawing Submittals

The Design Builder shall submit approved shop plans for all drainage structure and pipe elements. The following information shall be included in the shop drawings, (if applicable):

- Material specifications (ASTM specifications, class, type, coatings, etc.)
- Copies of manufacturer's literature, including manufactures installation, handling and maintenance recommendations.
- Sizes.
- Pipe bedding and jointing methods. Pipe loading and stress calculations. Drain and culvert camber calculations with final bedding profiles. Any pipe jacking/boring installations will require specific pipe material and installation methodology submittals to be prepared in full detail along with the necessary geotechnical investigations/recommendations.

- Structure types (pre-cast or cast-in-place).
- Structure forming and rebar details, along with supporting calculations.
- Complete material submittals for approval if material is not on the approved material list
- Installation procedure.
- Shop Plans shall be marked with of two categories in lower right corner. Shop Plans marked Approved-As-Noted should clearly note the suggested correction.
- APP'D (Approved, No Corrections required.)
- AAN (Approved as noted- minor corrections only. Do not place written questions on an approved as noted sheet.)

2.13.5.5 Project Submittals during Construction

Construction Problems or Revisions (As They Develop) - Calculations for revisions made during construction shall be incorporated into the design/check calculation file when construction is completed.

Whenever new plan sheets are required as part of a contract revision, the information in the title blocks of these sheets must be identical to the title blocks of the contract they are for.

Every revision will be assigned a number, which shall be enclosed inside a triangle. The assigned number shall be located both at the location of the change on the sheet and in the revision block of the plan sheet along with an explanation of the change.

The Design-Builder shall prepare all new and revised plan sheets in accordance with the Plans Preparation Manual, Section 440 through 460, and Division 5 and 6. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the all-new and revised plan sheets. The engineer-of-record shall be registered as a civil engineer in the state of Washington. Plans shall be submitted on 11"x17" white bond paper and in electronic format on a CDROM.

Any proposed design changes requiring permit modifications or additional regulatory/resource agency approvals shall first be submitted for review by WSDOT will work with the Design-Builder and the appropriate regulatory/resource agencies, should an approved design change require a permit modification or additional approvals.

2.13.5.6 Maintenance Manual

The Design-Builder shall prepare a drainage maintenance manual that describes the "what" and "when" maintenance procedures for all drainage facilities, including the maintenance requirements for the runoff water quality treatment facilities. The maintenance manual shall be complete with a description of the best management practices used on the project, how they function and what areas contribute to them. The maintenance manual shall be prepared in an 8.5" by 11" bond paper format, bound, except that exhibits may be on 11" by 17" sized paper. The Design-Builder shall submit a final version of the manual consisting of five (5) bound copies of the Drainage Maintenance Manual. The final submittal shall include an electronic version in PDF format on a CDROM.

2.13.5.7 As-Built Plans

Upon completion of the Project, the Design-Builder shall deliver to WSDOT a complete set of As-Built Documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project.

2.14 ROADSIDE RESTORATION AND AESTHETICS

2.14.1 General

2.14.1.1 General Scope

Design, provide, install, construct and establish/maintain the landscape and aesthetics improvements in accordance with the requirements of this Section and the Appendix L (Everett HOV Project Aesthetic Design Standards), including referenced standards and publications, performance requirements, design and construction criteria, and submittals. All areas that are considered to be permanent construction must meet the requirements of this Section and Appendix L (Everett HOV Aesthetic Design Standards).

2.14.1.2 Definition

Roadside Restoration vegetates disturbed areas, provides and/or enhances roadside functions, integrates the project into adjacent communities, and blends the project into the overall I-5 corridor character (See Roadside Classification Plan). Roadside Restoration elements include grading, amending soils, trees, shrubs, groundcovers, turf, grass seeding, mulch, rock, topsoil, irrigation system, and other elements identified during Community Coordination Committee meetings.

Aesthetic treatments are design details that provide a coordinated visual appearance for the project and blend the project into the overall highway corridor. These details dictate the form, color, and texture of structural, civil and traffic components including bridges, noise walls, retaining walls, pavement, raised features, traffic barriers, and hardware for utilities and traffic control devices.

2.14.1.3 Roadside Restoration and Aesthetic Treatment Master Plan

Develop a master plan that defines the Roadside Restoration and Aesthetic Treatment for the Project. The master plan shall outline the treatment strategies for roadside areas within entire project to meet the classification, revegetation of disturbed areas, providing and/or enhancing roadside functions, integration of the project into adjacent communities, blending the project into the overall I-5 corridor character, and environmental compliance. It shall identify, at a conceptual level, the various roadside and aesthetic treatments that will be applied to all areas through the project. Treatment strategies shall address the highway corridor, city entrance areas, city and community corridors, neighborhood enhancement areas, and how the architectural standards will be applied.

Conceptual architectural renderings and identification of landscaping and aesthetic areas/opportunities are shown in Appendix M7 – Landscape Renderings. The Design-Builder shall submit as part of the Proposal documents the Project Roadside Restoration and Aesthetic Master Plan. This includes architectural renderings that conveys the Proposals intent.

2.14.1.4 WSDOT Aesthetic Review Team

The Master Plan for the Roadside Restoration and the Aesthetic Treatment, application of the Everett HOV Aesthetic Design Standards (Appendix L) and the development of unique features for the city entrance areas, city and community corridors, and neighborhood enhancement areas shall be reviewed and approved by the WSDOT Aesthetic Review Team.

2.14.1.5 Advisory Committee Subcommittee(s)

Coordinate the development of the roadside restoration master plan and aesthetic treatments plan, and the development of city entrance areas, city and community corridors, and neighborhood enhancement areas with the appropriate subcommittees as outlined herein and in Section 2.9 (Public Information And Public Involvement Plan).

2.14.1.6 Early Aesthetics Review

Aesthetic design considerations directly influence other Project components, such as the pier configuration on bridges. Early coordination and concurrence with the WSDOT Aesthetic Review Team and subsequently with subcommittees (Section 2.9) on treatment concepts is crucial so that the aesthetic treatment may be incorporated into the structural design.

2.14.1.7 Maintenance During Construction

Establish the Roadside Restoration elements and maintain aesthetic treatments during construction in accordance with the requirements in Section 2.27 (Maintenance During Construction).

2.14.2 Mandatory Standards and Reference Standards

2.14.2.1 Mandatory Standards

General. Design, provide, install, and construct the landscape and aesthetic improvements in accordance with the requirements of the standards listed by priority in Table 2.14.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.14.1
Mandatory Standards for Landscape and Aesthetic Improvements**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Design-Build Project</i>	N/a		Proposal
2	WSDOT	Request for Proposals, I-5 Design-Build Project	N/a	***	RFP
3	WSDOT	Roadside Classification Plan	M25-31	1996	
4	WSDOT	Design Manual For Design Build Projects	M22-02		
5	WSDOT	<i>Roadside Manual</i>	M25-30	2003	
6	AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS-3	2001	“Green Book”
7	WSDOT	<i>Standard Plans</i>	N/a		
8	Amer. Assoc. of Nursery-men	<i>American Standard for Nursery Stock</i>	ANSI Z60.1		n/a
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.14.2.2 Reference Publications

Use the publications listed in Table 2.14.2 as supplementary guidelines for the design, provision, installation, and construction of the landscape and aesthetic improvements. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.14.2
Reference Publications for Landscape and Improvements**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	<i>A Guide for Transportation Landscape and Environmental Design</i>	S99-HLED-2	1991	n/a
FHWA	Flexibility In Highway Design	FHWA-PD-97-062		
WSDOT	DRAFT Understanding Flexibility in Highway Design			
WSDOT	<i>Highway Runoff Manual</i>	M31-16	2004	n/a
Cornell University L.H. Bailey Hortorium	<i>Hortus Third, A Concise Dictionary of Plants Cultivated in the United States and Canada</i>	MacMillan Publishing Co., NY		n/a

2.14.3 Performance Requirements

The Department and the City of Everett desires to preserve the existing matured trees in the along the roadway.

The Design-Builder shall not remove or damage any trees except those that are physically in conflict with permanent Project roadway or structure features.

Prepare a proposed Roadside Restoration / Aesthetic Treatment Draft Master Plan based on the criteria in this Section. The proposal shall address the integration of the Aesthetic Treatments throughout the project based on the criteria in Appendix L (Aesthetic Design Standards). The Draft Plan will be used to gain preliminary input and for Community meetings for the project.

Develop a revised Final Master Plan that incorporates input from the WSDOT Aesthetic Review Team and Advisory Committee Subcommittee(s). The final plan shall show a more refined concept for the treatment of areas to be included in the roadside restoration, wetland mitigation, and aesthetic treatment of visual elements.

Provide and construct roadside restoration and aesthetic treatments that:

1. Respond to the recommendations of the Aesthetic Review Team and the advisory committee(s) in coordination with the Roadside Restoration Final Master Plan;
2. Provide a unified appearance through the highway corridor and a connection to communities in the community enhancement areas;
3. Are aesthetically pleasing and fit the neighboring environment.

2.14.4 Design and Construction Criteria

2.14.4.1 WSDOT Aesthetic Review Team

The development and application of Roadside Restoration and Aesthetic Treatments shall be reviewed and approved by the WSDOT Aesthetic Review Team.

2.14.4.2 Advisory Committee Subcommittee(s)

Form one or more subcommittees from the Community Coordination Committee noted in Section 2.9 (Public Information And Public Involvement Plan) as required to identify, propose, and evaluate landscape and aesthetic improvements for city entrance areas, city and community corridors, and neighborhood enhancement areas within the Project . Facilitate the subcommittee meetings and assist the subcommittee(s) in developing a program that meets the requirements of the Project, including budget. Where appropriate, establish partnerships for funding and develop maintenance agreements for unique design features in community enhancement areas. This would apply to elements that exceed WSDOT established standards. Incorporate the recommendations into the Roadside Restoration Master plan and the Aesthetic Treatment Plan.

2.14.4.3 Roadside Restoration

The project should focus on preservation of desirable existing vegetation to the greatest extent possible. Roadside restoration within the ROW shall be done in accordance to the Roadside Classification Plan. Plants shall be selected to meet the needs and requirements and to blend with the context of each of the various planting areas. Native plants should be primarily used for the roadside restoration within the highway corridor. Existing planting areas that have Warminster Broom shall be replanted with desirable species. Community corridor areas, community entrances, and neighborhood enhancement areas should blend with community areas, provide a transition between the highway environment and the community, and may include non-native plant species. Coordinate landscape design for the community enhancement areas with the Community Coordination Committee noted in Section 2.9 (Public Information And Public Involvement Plan) . Consider plant material long term sustainability and maintenance requirements, including watering, fertilizing, and pruning requirements of individual species; frequency of maintenance; and access by and safety of maintenance personnel.

2.14.4.4 Aesthetic Treatment of Design Elements

Apply Aesthetic Design Standards (see Appendix L) in design of all elements throughout the project. Using the Aesthetic Design Standards, design and construct the project so it has a coordinated visual appearance that blends the project into the overall highway corridor (form, color, texture, etc.) and connects to the community context. Unique design elements can be developed for community enhancement areas and identified areas within the corridor, subject to the approval by the WSDOT Aesthetic Review Team. Where unique design is incorporated, the features must blend with existing elements and follow the standards defined in the Aesthetic Design Standards. The standards defined in the Aesthetic Design Standards must be a component of proposals for unique design features.

2.14.4.5 Disturbance of Landscape Outside the Right-of-Way

Utility relocations will temporarily affect areas outside the Planned ROW Limits of the Project as identified in the Environmental Assessment, which may also impact vegetation. After a relocation has been completed by the Design-Builder, backfill the utility facility to the proper standards and prepare the site for future landscaping. (This includes the replacement of topsoil.)

The property owner will be responsible for the replacement of the actual vegetation as that owner is to be compensated for that vegetation as a cost to cure item. The cost to cure will be determined by an appraiser and the actual compensation paid will be a negotiable item to be documented on the purchase contract as part of the acquisition process, if any. (All cost to cure items must be clearly stated on the ROW purchase contract and as such are subject to approval by the Director of Right of Way for the Department.)

2.14.4.6 Planting Design Criteria

2.14.4.6.1 Roadside Restoration along the I-5 corridor and at Interchanges

General. Roadside Restoration shall be done in accordance to the Roadside Classification Plan. Operational, environmental, aesthetic and auxiliary roadside functions shall be restored throughout the project limits (See the WSDOT Roadside Classification Plan and the Roadside Manual). Planting concept shall consider corridor continuity, blending with the natural environment, travel speeds, safety standards, drainage needs, long-term sustainability, competition with invasive plant species, maintenance requirements/practices and other elements. Determine areas that visually relate to the highway character and the areas that transition to the community. Develop plans for Community Entrance Areas that transition from the highway corridor to the community context at Broadway/ 41st Street, Pacific Avenue, SR 2, Everett Avenue, and Marine View Drive. Provide long term erosion control for steep slopes.

2.14.4.6.2 Roadside Restoration in Community Enhancement Areas

General. Landscape elements should relate to the context of the community areas. City street tree plans shall be tied into to provide transition, relationship to community and pedestrian scale. Plans shall include input from the Community Involvement process (Section 2.9) and shall be approved by the WSDOT Aesthetic Review Team. If elements exceed WSDOT standards, funding partnerships and maintenance agreements shall be established with the City.

2.14.4.6.3 City of Everett

Meet the applicable landscape and irrigation requirements of the City for areas outside of the WSDOT Right of Way. Consider long-term maintenance concerns. See Section 2.9 (Public Information And Public Involvement Plan) for coordination and committee requirements.

2.14.4.6.4 Plantings

General. Roadside restoration plantings within the I-5 corridor will follow the appropriate treatment level in the Roadside Classification Plan and generally follow a reforestation type concept using smaller initial-size plantings of native woody species arranged in natural-appearing mixed planting areas. Plant in masses appropriate to viewing/design speed. Replace Warminster Broom planting areas with desirable plant species. Community enhancement areas should blend with community landscape elements and may include larger size, non-native plant species. Planting concept and plant list to be used for project must be approved by WSDOT. Permanent irrigation systems will only be used in areas where they are necessary for long-term health and vigor of plants (such as planting areas enclosed by retaining walls or curbs , raised beds, etc.) and where city requirements apply. Temporary irrigation may be used to establish planting areas. Three years of establishment will be required for all roadside restoration areas. Plantings for the wetland mitigation site shall meet the requirements outlined in the Wetland Mitigation Plan (Appendix W1), shall be native species that provide the functions outlined in the Plan. Plant establishment for the wetland mitigation shall be for 5 years.

Planting Area Preparation. Prior to planting, all planting areas shall be prepared for long-term, healthy vigorous growth of plants. Planting areas will be free of weeds and undesirable vegetation prior to preparation of soils. Compacted soils will be ripped to loosen compaction. Debris shall be removed. Soils shall be amended with organics to loosen compaction, raise organic and nutrient content, and improve moisture retention. Mulch will be used over all planting areas to improve moisture retention and discourage weed growth.

Grading. Grading through project appear natural and shall blend with surrounding landscape. Cut slopes shall connect to adjacent areas by rounding. Grading for the wetland mitigation site shall follow the Conceptual Design in appendix M7 (Water Quality Site 1) and adhere to the Wetland Mitigation Plan (Appendix W1).

Weed Control. Planting areas should be weed free before planting. Control of noxious and invasive weeds will be required throughout the project.

Trees. Install trees to provide roadside functions. Design standards (clear zone, sight distance, setbacks, etc.) shall be followed for all locations. Tree in the highway corridor shall be included in the overall plant mix and should be spaced at 10 feet on center. Evergreen species shall be a minimum size of two feet. Deciduous species shall be ½ inch caliper. Trees in community enhancement areas shall tie into city street tree concept. Deciduous street trees may be up to 2 inch caliper. Spacing for street trees shall not exceed 20 feet. Evergreen species shall not exceed 4 feet in height.

Shrubs. Install shrubs in mass plantings appropriate to scale. Evaluate the height of proposed shrub species in relation to landscape location, motorist visibility, pedestrian safety, and maintenance requirements.

Groundcovers. Groundcovers may be used in community enhancement areas to add color, texture, and seasonal interest to the landscape design.

Vines. Vines may be used along retaining walls to provide a visual softening of walls. Determine areas where vines will be appropriate and follow the Aesthetic Design Standards.

Turf Sod. If desired by the affected property owner, replace existing sod areas disturbed by construction with new sod. Sod may also be used in community enhancement areas if determined appropriate.

Grasses. Seeding of grasses will be used to provide temporary erosion control and to establish lawn areas where determined appropriate. Grasses within the I-5 corridor will be a WSDOT standard seed mix. Wild flowers may be included in seed mix if approved by the WSDOT. Community enhancement areas may have turf areas if maintenance agreements with City are developed. Turf for these areas can be developed using seed or sod.

Erosion Control

Provide and install temporary erosion control measures per Section 2.14.5.7 Scour and Erosion Control. It is desirable to use compost or arborist wood chips as an erosion control measure for all areas that will be planted.

2.14.4.7 Aesthetic Treatment of Structural Elements

The Project structural elements include, but are not limited to all bridge components, retaining walls, and noise walls.

2.14.4.7.1 General

Design. Follow the Aesthetic Design Standards (Appendix L) to determine appropriate aesthetic treatment for structural elements. Design of aesthetic treatment shall have a multidisciplinary approach to assure uniformity and feasibility. Consider the visual context when designing the aesthetic treatment of a structural element. Use aesthetic treatments that employ the use of color and texture, which can be further expressed by pattern reveals, bevels, shadow lines, surface finishes, and geometric form work.

All treatment shall be coordinated with and approved by the WSDOT Aesthetic Review Team. Incorporate community input for unique elements that blend with the standards in community enhancement areas.

When designing the aesthetic treatments, consider the following elements:

1. Provide corridor continuity and opportunities for community connection.
2. Integration of the aesthetic treatment with the landscape design;
3. Continuity of the visual treatments within the highway corridor;
4. Consistency of, signage, lighting, and architectural treatments
5. Relief, form, and proportion of structures within the Project
6. Use of texture and color to define aesthetic treatments
7. Unique elements included in the design must incorporate the standard as a component of the design and provide smooth visual transition.
8. Views of structural elements through/from the corridor will follow the Aesthetic Design Standards. Views of structural elements toward the highway can provide opportunity for unique elements.
9. Ease of maintenance and repair
10. Deterrence of vandalism and graffiti

2.14.4.7.2 Bridges

General. The quality of views to the structures are influenced by the form of the structural components, the balance between span length and structure depth, the avoidance of bulky appearance, and the continuity between bridge supports (both piers and abutments) and the superstructure. The scale and proportion of a bridge are important influences on its aesthetic quality.

2.14.4.7.3 Walls

General. For vertical surfaces of both retaining and noise walls, apply aesthetic treatment according to the Aesthetic Design Standards where the surface is visible to I-5. Walls viewed from I-5 may incorporate unique design elements only with the approval of the WSDOT Aesthetic Review Team. Aesthetic treatment of surfaces may vary from standards where viewed by the community, neighborhoods, trail users and from the adjacent ROW (outside of walls). Development of the aesthetic treatment for walls viewed toward the highway should include community input (section 2.9). Each wall shall have a uniform treatment for both retaining and noise walls, use a consistent treatment that articulates the design themes established by the bridge aesthetic treatments and landscape design. Design the proposed treatment to be a part of the wall, regardless of the wall construction.

2.14.4.7.4 Paving

General. Aesthetic treatment may be used in community enhancement areas to paving of selected and approved areas including medians between curbs, planter strips between the curb and sidewalk, and special pavements at selected crosswalks. Use aesthetic treatments such as colored concrete or imprinted patterns.

2.14.4.7.5 Lighting

General. The Department has a lighting standard to be used at interchanges and intersections. Any lighting feature or enhancement that exceeds this standard can only occur in community enhancement areas and must include a funding partnership/maintenance agreement with the City. If the Design-Builder's Proposal uses additional lighting as an aesthetic feature, design the lighting levels to avoid glare, distraction, impairment of night vision of conditions that may compromise a safe driving condition.

2.14.4.7.6 Fencing

Where fencing is required , dark brown PVC coated chain link fence shall be used.

2.14.4.7.7 Sculpture and Art

Address incorporation of specialty elements in community enhancement areas of the ROW, such as flags, banners, sculpture, or artwork, with the Subcommittee(s), if they desire such improvements. These elements exceed the WSDOT standards and require a funding partnership with the City. The WSDOT Aesthetic Review Team must approval these elements.

2.14.4.7.8 Plant Establishment

The Design - Builder shall perform plant establishment activities as outlined in the Standard Specifications. The Roadside Restoration areas shall have three years of plant establishment meeting the standards as outlined in the Warranty Section 2.30. The Water Quality Treatment Facility #1 site shall have 5 years of plant establishment warranty

2.14.4.7.9 Invasive Weed Control

Weed Control After Planting

Planting areas must have weeds and invasive plant species controlled through the life of the project. Water Quality Facility #1 (Wetland Mitigation Site) shall meet the requirements of the Standard of Success for the 5 year period as outline in the Wetland Mitigation Report (Appendix W1). A Weed Control Plan must be submitted to WSDOT for approval prior to weed control activities. Control of noxious weeds shall occur throughout the project limits for the life of the project. Integrated vegetation management strategies shall be used to control weeds.

Chemical Weed Control

If using chemical weed control, application must be performed by a licensed applicator in accordance to the Weed Control Plan and documentation must occur as outlined in the Standard Specifications. Ensure that the product will not damage or kill the surrounding desirable plant material.

2.14.4.7.10 Aesthetic Treatment Maintenance

Maintain the appearance of the aesthetic treatments on any walls or bridges until Project completion.

Clean up any damage caused by vandalism.

2.14.5 Submittals

Roadside Restoration and Aesthetic Treatment Draft Master Plan

Before community involvement occurs, provide a Roadside Restoration and Aesthetic Treatment Draft Master Plan to the Department for approval. The plan will detail all aspects outlined in this section. .

Final Roadside and Aesthetic Treatment Plan

Provide a Final Roadside Restoration and Aesthetic Treatment Plan that indicates the location and treatment strategies for all planting and aesthetic treatment within the project as outlined in this section. The Plan shall include names and locations of all plants; limits and types of soil improvements and mulch; irrigation system components; seeding or turf sod limits; and aesthetic treatment locations and designs. Provide cross sections or elevations if needed for graphic clarity. See also Section 2.1.1 (General Requirements) for general submittal requirements.

Roadside Work Plan and Weed Control Plan

A Roadside Work Plan and a Weed Control Plan in accordance to the Standard Specifications must be submitted for approval by WSDOT prior to construction activities occurring in the roadside. Provide copies of all pesticide application records.

Samples

Submit samples of proposed organic topsoil, soil amendments and mulches for Department review and approval before final selection. Submit photos and examples of proposed colors, textures, patterns, and other aesthetic treatments to be applied to the Project structures and paving for Department review and approval prior to final selection.

As-Built Drawings

At Physical Completion, provide the Department with an as-built drawing of the installed irrigation system, and the installed plantings keyed by botanical name and size if there is a variation from the accepted planting plan.

2.15 SIGNING

Abbreviations

AAH	Adopt A Highway
CPM	Current Practices Manual
DMS	Dynamic Message Signs
HAC	High Accident Corridors
HAL	High Accident Locations
HAR	Highway Advisory Radio
HOV	High Occupancy Vehicle
MIS	Motorist Information Signs
PAL	Pedestrian Accident Locations
VMS	Variable Message Sign

2.15.1 General

The Design-Builder shall design, furnish, and install the sign system, including both temporary and permanent signs, for all roadways in accordance with the requirements of this RFP, including referenced standards and publications, performance requirements, design and construction criteria, and submittals.

The Design-Builder shall design and construct the Signing elements described in this section. Signing elements shall include but not be limited to the following:

Mainline I-5 - Northbound

1. A cantilever structure shall be installed on the right shoulder to accommodate a highway advisory radio (HAR) sign at LR STA 102+00.
2. A sign bridge structure shall be installed at LR STA 143+00 to accommodate two advance guide signs for exit 189 only. The Vancouver B.C. sign shall not be used.
3. The existing truss sign bridge, signs and all appurtenances at LR STA 145+20 shall be removed.
4. The existing generic Motorist Information Sign (MIS) at milepost 188.36 shall be removed.
5. A sign bridge structure shall be installed at LR STA 154+95 to accommodate the exit direction guide signs for exit 189.
6. The existing truss sign bridge, signs and all appurtenances at LR STA 159+00 shall be removed.
7. The existing truss sign bridge, signs, and all appurtenances at LR STA 170+90, 63.50' RT, shall be removed and replaced with a new structure in the same location.
8. A cantilever structure shall be installed on the left at LR STA 266+25 to accommodate an HOV regulatory sign.
9. A sign bridge structure shall be installed at LR STA 282+00 to accommodate the left side one-mile advance guide sign for the direct access exit and the right side one-mile exit only advance guide sign for the drop lane condition at exit 192. The verbiage for both the Naval Station and the Port of Everett shall be removed from this overhead sign series and replaced with a single shoulder mounted supplemental guide sign.

10. Port of Everett is signed in two locations on northbound Interstate 5. The Design-Builder shall contact the city to determine which exit they want used to sign to their port.
11. All existing signs for the left-hand Broadway exit (192) shall either be removed or relocated to the right-hand side of the road. The MIS signs shall be placed in the correct order per the MIS manual.
12. A sign bridge structure shall be installed at LR STA 308+60 to accommodate an exit only advance guide sign for the drop lane condition at exit 192 and a variable message sign (VMS). The drop lane skip striping shall begin at this location.
13. The existing monotube cantilever structure, sign, and all appurtenances at LR STA 331+16 shall be removed.
14. A cantilever structure shall be installed at FR STA 10+00 to accommodate the exit only direction guide sign for the drop lane condition at exit 192.
15. A cantilever structure shall be installed at LR STA 345+00 on the left shoulder to accommodate the exit direction sign for the HOV direct access exit.
16. The existing truss sign bridge, signs, and all appurtenances at LR STA 349+25 shall be removed.
17. A cantilever structure shall be installed at LR STA 355+00 to accommodate the one-mile advance guide sign for exit 193. This installation shall include a hospital plaque above the guide sign. The city center verbiage shall be dropped from this overhead sign series.
18. The existing shoulder-mounted VMS at LR STA 361+95 shall be removed.
19. The existing Sound Transit/Everett Events Center sign assembly at LR STA 370+50 shall be relocated to LR STA 363+50.
20. A bridge mounted sign bracket shall be installed on the Cascade View overpass at LR STA 371+50 to accommodate a HAR sign. The sign shall be centered over the lanes.
21. A cantilever sign structure shall be installed at LR STA 395+95 to accommodate a special design advance guide sign for the drop lane condition at exit 194. This sign shall have verbiage for Pacific Ave @ exit 193 as well. The right half of the sign on northbound Interstate 5 at milepost 153.42 (visible on SRView @ 153.40) shall be used as a model for this sign.
22. The existing truss sign bridge, signs, and all appurtenances at LR STA 396+06 shall be removed.
23. A sign bridge structure shall be installed at LR STA 414+50 to accommodate an advance exit only guide sign for the drop lane condition at exit 194 and an exit direction guide sign for exit 193. The signing for exit 193 at this location shall include the hospital plaque.
24. The existing truss sign bridge, signs and all appurtenances at LR STA 416+15 shall be removed.
25. The existing shoulder mounted sign at LR STA 422+29 for Stevens Pass shall be removed.
26. A sign bridge structure shall be installed at LR STA 427+55 to accommodate an HOV sign, an exit only one-mile advance guide sign for the drop lane condition at exit 195, and the exit direction guide sign for exit 194. The verbiage for Port of Everett shall be dropped from all overhead signs in this series and replaced with a single shoulder mounted supplemental guide sign.

27. The existing truss sign bridge, signs, and all appurtenances at LR STA 432+21 shall be removed.
28. A cantilever structure shall be installed at LR STA 446+00 to accommodate an advance exit only guide sign for the drop lane condition at exit 195.
29. The two bridge mounted sign brackets, signs, and all appurtenances on the 23rd St overpass shall be removed.
30. The existing truss cantilever structure, sign, and all appurtenances at LR STA 477+13 shall be removed and replaced with a new structure at the same location.
31. The end of the HOV lane shall be signed in accordance with the NW Region's HOV Design Guide.

Mainline I-5 - Southbound

1. The existing Sound Transit sign assembly at milepost 195.70 shall be relocated to milepost 195.85.
2. A sign bridge structure shall be installed at milepost 195.65 to accommodate a VMS.
3. A hospital plaque shall be installed above the existing one-mile advance guide sign for exit 194.
4. A cantilever structure shall be installed at milepost 195.35 to accommodate a HAR sign.
5. The beginning of the HOV lane shall be signed in accordance with the NW Region's HOV Design guide. The R3-10 MOD will be located on the Snohomish River bridge structure approximately ¼ mile prior to the beginning of the lane using a barrier mounted sign bracket. The WSDOT Bridge & Structures Office normally does the design of these brackets.
6. A cantilever structure shall be installed at LL STA 689+90 on the left to accommodate an HOV sign.
7. A cantilever structure shall be installed at LL STA 688+00 to accommodate an advance exit only guide sign for the drop lane condition at exit 194.
8. The existing City Center/Naval Station/Stevens Pass sign shall be replaced, and relocated to comply with WSDOT's sign spacing guidelines. The Stevens Pass verbiage shall be removed.
9. The existing bridge mounted sign bracket, sign, and all appurtenances on the 23rd St overpass shall be removed.
10. A cantilever structure shall be installed LL STA 675+00 to accommodate the exit only exit direction sign for the drop lane condition at exit 194.
11. The existing truss sign bridge, signs, and all appurtenances at JL2 STA 16+10 shall be removed.
12. A sign bridge structure shall be installed at JL2 STA 16+00 to accommodate follow through guide signing for exit 194.
13. A cantilever structure shall be installed at LL STA 635+00 to accommodate a ¾ mile advance guide sign for exit 192.
14. A cantilever structure shall be installed at LL STA 601+90 to accommodate the exit direction guide sign for exit 192.
15. The existing truss sign bridge, signs, and all appurtenances at LL STA 597+45 shall be removed.
16. A cantilever structure shall be installed at E STA 14+98 to accommodate the direct access sign for the on ramp to SB I-5.

17. A cantilever structure shall be installed at LL STA 535+00 on the left to accommodate an HOV sign.
18. A sign bridge structure shall be installed at LL STA 522+50 to accommodate a VMS.
19. A cantilever structure shall be installed at LL STA 513+00 to accommodate a HAR sign.
20. A sign bridge structure shall be installed at LL STA 492+00 to accommodate a 1-mile advance guide sign for exit 189 to SR 527 etc. and a 1-mile advance exit only guide sign for the drop lane condition at exit 189 to West SR 526.
21. All existing signs shall be relocated to maintain proper sign spacing. All MIS signs shall be relocated so they are in the correct order per the MIS manual.
22. The existing monotube sign bridge, signs, and all appurtenances at LL STA 475+40 shall be removed. The structure shall be removed with no damage and shall be delivered to the Pilchuck pit site. Contact Craig Harvey at 425-339-3825 three-business days prior to delivery.
23. A sign bridge structure shall be installed at LL STA 466+50 to accommodate the ½-mile advance guide sign for exit 189 to South SR 527 etc. and a ½-mile advance exit only guide sign for the drop lane condition for exit 189 to West SR 526 etc. The mileage can be dropped from the exit only sign.
24. The existing truss sign bridge, signs, and all appurtenances at LL STA 447+50 shall be removed.
25. A sign bridge structure shall be installed at LL STA 443+00 to accommodate the two exit direction guide signs for exit 189. The destination messages shall be the same as the previous signs for this exit.
26. The existing truss sign bridge, signs, and all appurtenances at LL STA 441+00 shall be removed.
27. A sign bridge structure/cantilever combination structure shall be installed at LL STA 423+70 to accommodate follow through signing on the ramp of exit 189. The cantilever section shall accommodate the one-mile advance for the rest area/weigh station. The sign shall be centered over the outside mainline lane.
28. The existing truss sign bridge, signs, and all appurtenances on the off ramp at mainline station LL STA 423+55 shall be removed.
29. The existing bridge mounted sign bracket, sign, and all appurtenances on the SR 527 overpass for the SR 99/SR 527 exit shall be removed and replaced with a new bracket, sign and light(s). The sign shall reflect the exit only / ok condition for the exit.
30. The existing Begin HOV Lane sign on the SR 527 overpass shall be replaced with an R3-1401.

Westbound US 2

A new truss style cantilever structure shall be installed at milepost 1.00 in the westbound direction to accommodate a HAR sign.

Eastbound SR 526

A cantilever structure shall be installed at milepost 2.10 to accommodate a HAR sign. The sign shall be placed as close to the through lanes as the maximum span of a cantilever will allow. The existing MIS station at milepost 2.04 shall be relocated back of its current

location to maintain the 800' spacing between signs. The existing right 2 lanes must exit shall be relocated to midpoint between the new cantilever and the existing sign bridge at the Evergreen Way exit.

Broadway @ 41st St. Overpass

The bridge mounted sign and bracket for the Broadway exit on the 41st St overpass shall be removed, updated, and replaced.

Southbound on-ramp from Broadway

A cantilever structure shall be installed at NB Broadway off-ramp line station FL STA 43+90 on the left to accommodate an HOV only exit direction sign for the left side ramp to mainline HOV. The HOV exit shall be signed in advance, possibly in the raised traffic island prior to the 41st St Overpass.

Note:

A Signing Type, Size, & Location Plan has been included in Appendix M5. All existing and proposed overhead sign locations in this document and Appendix M5 are approximate and shall be verified, and relocated if necessary, by the Design-Builder during the design process. Structures should be kept as close to these locations as possible. If there is a conflict between Section 2.15.1 and the Signing TS&L in Appendix M5, the Design-Builder shall use Section 2.15.1.

All cantilever structures are located on the right unless otherwise noted.

2.15.2 Warranty

Warrant signing work in accordance with Section 2.30 - Warranties.

2.15.3 Maintenance During Construction

Maintain the sign system during construction in accordance with the requirements in Section 2.27 - Maintenance During Construction.

2.15.4 Mandatory Standards and Referenced Publications

2.15.4.1 Mandatory Standards

General. Design and construct the sign system in accordance with the requirements of the standards listed by priority in Table 2.15.1. The Department may require signing that exceeds minimum standards when appropriate conditions arise.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard. All signing will be in accordance with the MUTCD and Freeway Standards applied.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.15.1
Mandatory Standards for Signing**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	n/a		Proposal
2	WSDOT	Request for Proposals, I-5 Design-Build Project	n/a	***	RFP
3	WSDOT	Modifications to MUTCD	N/A		MUTCD
4	WSDOT	Traffic Manual M51-02	N/A		TM
5	WSDOT	Design Manual For Design Build Projects M22-02	N/A		DM
6	WSDOT	Sign Fabrication Manual	N/A		Sign Fab Man
7	WSDOT	Standard Plans for Road, Bridge, and Municipal Construction	N/A		STD PLANS
8	WSDOT	Highway Design Manual For Design Build Projects	N/A		
9	FHWA	Manual on Uniform Traffic Control Devices (Millennium Edition)	MUTCD		MUTCD
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.15.4.2 Referenced Publications

Use the publications listed in Table 2.14.2 as supplementary guidelines for the design, provision, installation, and construction of the landscape and aesthetic improvements. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.15.2
Referenced Publications for Signing**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	Construction Manual	N/A		
WSDOT	Plans Preparation Manual	N/A		Plans Prep
WSDOT	Maintenance Manual	N/A		
WSDOT	NWR Traffic Operations Redbook	N/A		Redbook
WSDOT	NWR Current Practices Manual-Traffic Sign Design	N/A		CPM

WSDOT	HOV Design Guide for the Northwest Region	N/A		
AASHTO	A Policy on Geometric Design of Highways and Streets	S99-GDHS-3	2001	“Green Book”

2.15.5 Performance Requirements

Design, furnish, and install all components of a sign system necessary to provide a complete and functional system that meets the following performance requirements:

1. Provide for the orderly and predictable movement of all traffic.
2. Provide such guidance and warnings as are needed to ensure the safe and informed operation of individual elements of the traffic stream.

2.15.5.1 Software

The Design-Builder shall use software for the design of signs that is compatible with and/or can be imported to the latest version of MicroStation.

2.15.5.2 Meetings

The Design-Builder shall meet every 2 weeks with WSDOT and affected Cities and Counties to resolve signing issues during design and construction. These meetings may be reduced to monthly or as needed as major signing issues are resolved.

2.15.5.3 Permanent Sign Concept Meeting

The Design-Builder shall schedule a permanent signing concept meeting(s) 30 Days after Contract execution to present a sketched layout of the in-place signing on the Project to the Department. The Design-Builder shall use the meeting to determine the permanent signing needs of the Project.

2.15.5.4 Design-Builder’s Personnel

See Section 1-011.6 - Design-Builder Personnel.

2.15.6 Design and Construction Criteria

2.15.6.1 Standards

The design shall prepare a signing plan and sign specification sheets giving the location of the sign, the size of the sign, sheeting type, the legend of the sign, and the mounting type. In addition, signing details plan sheets shall be developed for all signs that are not included in WSDOT’s manual of approved signs. For overhead signs, sign elevation sheets showing the sign position in relation to the travel lanes and the position of the sign lighting fixtures in relation to the sign panel shall be provided. Prior to fabrication of any sign elements, a guide sign concept plan with proposed formats shall be submitted to the Department for review.

Any modifications made to “R” and “W” series signs shall be submitted to the Department for approval. This process should take one to two weeks. The remainder of the Design-Builders design will be reviewed in accordance with Section 1-011.9 (Design Review and Oversight Visits).

2.15.6.2 Software

The Design-Builder shall use software for the design that is compatible with and/or can be imported to the latest version of MicroStation. Sign Specifications shall be entered using the NW Region version of WSDOT’s SignSpec2000 Microsoft Excel program. NW Region uses only the sheet titled “Sign Specifications” (sheet tab “Sign Sp #”). The relocation and removal sheets shall not be used in the plans. The SignSpec2000 Microsoft Excel program can be accessed through this link:

<http://www.wsdot.wa.gov/Regions/Northwest/Traffic/SignDesign/htm/signdesign.htm>

2.15.7 Design Requirements

2.15.7.1 High Accident Location and High Accident Corridor Signing

The Design/Builder shall be responsible for addressing all signing recommendations for High Accident Locations (HAL), High Accident Corridors (HAC) and Pedestrian Accident Locations (PAL) within the project limits.

The Design Builder shall utilize the NW Region Signing PS&E Checklist (Appendix O4) to obtain information on potential HAC and HAL locations within the project limits.

The signing plans for these areas shall be submitted to the Department for comments and concurrence prior to installation.

2.15.7.2 Sign Inventory

Data on the existing signing for the I-5 Everett HOV project shall be obtained. The data shall be gathered in the field and entered on a sheet called the “Signing Inventory Sheet”(Appendix F3). All columns in the inventory represent vital data needed to complete comprehensive and accurate signing plans. Please see the Northwest Region’s (NW Region) “Sign Design Current Practices Manual” (CPM) for more information. The CPM can be accessed through this link:

<http://www.wsdot.wa.gov/Regions/Northwest/Traffic/SignDesign/htm/signdesign.htm>

The Sign Inventory shall include, but not be limited to, the following items:

1. All existing signs within the project limits shall be inventoried whether they are impacted by the widening or not. Some signs outside the project limits may be impacted by changes to the signing within the limits – these signs shall be inventoried also.

2. The NW Region Signing PS&E Checklist (Appendix O4) shall be used and submitted with each review.

2.15.7.3 Existing Sign Requirements

All existing signs shall be inspected and removed, replaced, or relocated as necessary whether they are impacted by the widening or not. This shall include impacted signs outside the project limits.

Follow the NW Region CPM for guidelines. If a sign has no, date it is considered out of date and shall be replaced.

Any city or county street signs impacted by this project shall be brought up to the city or county standards. Coordination shall be through the Department.

Unless otherwise noted in this document, all existing signs/sign messages shall be maintained during construction.

2.15.7.4 Guide Sign Requirements

All major guide signs throughout this corridor shall be overhead.

Unless noted otherwise in this RFP the following will apply:

- Guide signs shall be limited to two messages.
- One supplemental guide is allowed approximately half way between the two primary guide signs and is allowed a maximum of two destinations. All exits shall have a minimum of the following overhead signs:
 - Advance guide sign of at least 1 mile
 - Exit direction signs shall be placed at the beginning of the exit taper.
 - Drop lane conditions shall have an additional guide sign halfway between the advance and exit direction signs.
- All advance and supplemental signs shall have the same message on all subsequent signs.

2.15.7.5 Specialized Guide Sign Requirements

Directional ramp signing that does not have related mainline signs shall not be allowed. All mainline guide & MIS signs must be represented on the ramps.

2.15.7.5.1 MIS Sign Requirements

1. All MIS signs shall be shoulder mounted.
2. When MIS signs are relocated they shall be in the correct order per the MUTCD.
3. MIS signs are to remain in place and be visible for as long as possible during construction activities. If the removal of any MIS signing is required because of construction, the Design-Builder will be instructed by WSDOT to salvage and reinstall existing MIS sign at a location determined by WSDOT. Existing MIS signs shall be relocated, replaced or temporarily mounted within two weeks of removal.
4. WSDOT Sign Crews shall have access to MIS Panels during construction activities to install, replace, or remove existing logo signs or back panels, or perform other needed work.
5. The Design-Builder may move existing MIS signs as directed by WSDOT to accommodate other guide or regulatory side requirements.
6. MIS signs shall not be permanently removed as a result of the Work.

2.15.7.5.2 HOV Signing Requirements

HOV signs will be placed according to the WSDOT Design Manual for Design Build Projects ; NWR HOV Design guide.

2.15.7.5.3 Temporary Signing Requirements

See Section 2.20 Maintenance of Traffic (MOT)

2.15.7.6 Sign Fabrication Requirements

All signs within State right of way and/or limited access shall be in accordance with the Sign Fabrication Manual. Signs may be modified but need WSDOT approval as follows:

- Guide signs (including MIS) – NW Region Sign Design
- Regulatory signs – State Traffic Engineer @ WSDOT HQ
- Warning signs – State Traffic Engineer @ WSDOT HQ

Note: Pictorial warning signs may not be altered without approval from FHWA.

2.15.7.7 Sign Location

Supplemental messages and MIS signs shall be shoulder mounted.

A minimum distance of 800 feet between major guide, supplemental guide, and motorist information signs (MIS) shall be maintained on the mainline.

Distances less than 800 feet shall require concurrence by the Department.

Desired sign spacing on ramps shall be a minimum of 100 feet.

2.15.7.8 Sign Foundations

See Sections 2.6 Geotechnical & 2.12 Bridge and Structures.

2.15.7.9 Overhead Signing Requirements

For all overhead sign structures, the Design-Builder shall provide sufficient electrical conduit in the foundation to accommodate future sign lighting. The Design-Builder shall light regulatory signs on overhead sign structures. The Design-Builder shall light all signs on the overhead sign structure if one sign on the structure requires lighting.

If the highway is designated as a house-moving route, the Design-Builder shall have a minimum clearance of 23 feet for all overhead sign structures. When determining the minimum clearance, the Design-Builder shall include future walkways for sign lighting and take the minimum clearance of 23 feet from the bottom of the walkway.

Refer to Section 2.12 Bridge and Structures for structural design of sign supports.

2.15.7.10 Sign Structures

All sign structures being removed shall be identified by the structure ID number on both the plan sheets and the specification sheets. This number should be on an aluminum plate attached to the structure. If no number can be found contact the WSDOT's Bridge and Structures office @ WSDOT HQ.

The Design-Builder shall contact the WSDOT's Bridge and Structures office @ WSDOT HQ for structure ID numbers when replacing/relocating existing sign structures or installing new sign structures.

2.15.7.10.1 Sign Posts

Shoulder mounted sign posts shall be either W-beam, steel pipe, or Telespar according to the DM and Standard Plans G-8a, G-8b, G-8f, & G-8g (Appendix C). All Telespar signposts

shall have a 4' tall 2 ¼ x 2-¼ inch insert. All signposts not protected by barrier/guardrail shall have a slip base.

2.15.7.10.2 Sign Bridges and Cantilevers

(See Section 2.12 Bridge and Structures)

All new sign structures shall be monotube type.

2.15.7.11 Sign Lighting

All overhead signs shall be illuminated per the Design Manual For Design Build Projects (DM) and the NW Region CPM. This work shall be coordinated with the Electrical Design team.

2.15.7.12 Signing Plan Submittals

The Design-Builder shall provide a Signing Conceptual Plan for the entire project as described in the Section 2.15.6.1. WSDOT will respond within 10 Working Days of receipt of each Signing Conceptual plan.

The NW Region Signing Checklist shall be used and submitted with each review.

All signs (removals, installs, and relocations) shall be shown on the same sheet (plan & specification). All signs to be removed shall be shown.

The Design-Builder shall provide Final Signing Plan for each ramp, roadway section as described in Section 2.15.6.1. WSDOT will respond within 10 Working Days of receipt of each Final Signing Plan.

All signs (removals, installs, and relocations) shall be shown on the same sheet (plan & specification). All signs to be removed shall be shown.

2.15.7.13 Permanent Signing Plan Requirements

The Design-Builder shall mark in the field locations of the proposed signs and conduct a construction design review with WSDOT before installation. The Design-Builder shall obtain WSDOT Acceptance of all sign locations in the field prior to installation.

2.15.7.14 Exceptions to WSDOT Standard Specifications

The Design-Builder shall provide signs that conform to the requirements of Standard Specifications 8-21, except as modified below:

Existing Sign Structures: All existing sign structures shall be removed and become the property of the Design-Builder, except as noted in this RFP.

2.15.7.15 Material Requirements

Provide signing materials that:

Are new at the time of installation, and unless otherwise noted, meet the requirements of Section 8-21 (Permanent Signing) of the Standard Specifications.

Reuse of Existing Sign Panels: The Design-Builder shall **not** reuse any existing sign materials as part of the new permanent signing installation.

2.15.8 Construction Requirements

2.15.8.1 General

All signs installed before they are applicable shall be covered.

The Design-Builder shall use Materials off the WSDOT Approved Products List for Work Zones and Pavement Markings, Signals and Lighting. The Design-Builder shall obtain from WSDOT the Approved Products List current at the Proposal Due Date.

Positive guidance by the use of existing, interim and new signing shall be provided for the traveling public at all times during construction to ensure safe and informed operation while traffic is maintained on the roadway. The traffic control plan submitted by the Design-Builder shall address the use of interim signing and pavement markings during the transition from existing to new signing.

If the roadway alignment is shifted, and any of the above listed signs are in excess of thirty feet from the edge of the nearest travel lane, the sign must be relocated closer to the travel lane.

2.15.8.2 Salvage

Salvage and deliver to the Department all existing galvanized steel tube sign structures and associated sign frames and lighting. Dispose of all other removed signing materials and structures. The Design-Builder shall salvage existing signs on frontage roads and make them available for pickup by the city or county to which the signs belong and shall notify the city or county 48 hours in advance of removal. The existing monotube sign bridge, signs, and all appurtenances at LL STA 475+40 shall be removed. The structure shall be removed with no damage and shall be delivered to the Pilchuck pit site. Contact Craig Harvey at 425-339-3825 three-business days prior to delivery.

2.15.9 Submittals

2.15.9.1 Permanent Signing Concept Plan

The Design-Builder shall develop a Permanent Signing Concept Plan for the Project that includes all necessary guide, warning, regulatory, and Dynamic Message Signs (DMS). The Permanent Signing Concept Plan shall provide for modifications to signage outside the limits of the Project that are rendered inaccurate, ineffective, confusing, or unnecessary by the Project. The modifications shall include the addition, removal, or alteration of signs and appurtenances.

The Permanent Signing Concept Plan shall include and provide for all signing necessary for the Project inside and outside of the Project limits.

The Permanent Signing Concept Plan shall include as a minimum, the following:

1. Sign locations
2. Panel legends
3. Proximity to ITS devices, including DMS locations
4. Types of proposed sign structures
5. Permanent signing proposed on bridges
6. Signal system mast arm sign legends

2.15.9.2 Permanent Signing Plan

The Design-Builder shall submit as-built plans for the signing system after construction is complete. Final acceptance will not be granted until this material is submitted.

Prepare sign specification, plan, and detail sheets in accordance with the Plans Preparation Manual (Division 5 & 6) and the Design Manual (Section 820). A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the all plan and detail sheets. The engineer-of-record shall be registered as a civil engineer in the state of Washington. Plans shall be submitted on 11" x 17" white bond paper and in electronic format on a CDROM.

2.15.9.3 Release for Construction Signing Plans

The signing plans shall include as a minimum, the following:

1. Design drawings showing existing and proposed utilities
2. Design drawings showing type and location (station and offset) of signs
3. Panel sizes
4. Design drawings (other than WSDOT standard drawings) showing details of sign mounting, foundations, base connections, and frames
5. For each Type A and OH (Overhead) sign, depiction of a cross section with indication of footing details, offsets, and mounting heights
6. Complete design of overhead signs and sign structures, including provisions for sign lighting

7. Analysis of signal system mast arm loading for mast arm installed signs

2.16 ILLUMINATION

2.16.1 Description

2.16.1.1 Abbreviations

HPS High Pressure Sodium

2.16.1.2 General

The Design-Builder shall conduct all work necessary to meet the requirements for illumination in accordance with this RFP Standards and publications, performance requirements, design and construction criteria, warranty of work, maintenance during construction, and submittals are covered herein.

The electrical/illumination elements shall include but not limited to the following:

1. Light standards
2. Luminaires
3. Sign lights
4. Foundations
5. Junction boxes
6. Conduits and Wirings
7. Electrical services
8. Transformers and cabinets
9. Power supply for ITS systems
10. Power supply for Signal systems

A basemap containing illumination elements in the I-5 corridor is provided in Appendix M9. With WSDOT approval, illumination elements may be relocated as necessary from locations depicted in the basemap provided the new locations meet the requirements set forth in this RFP and Appendix B

2.16.1.3 Highmast Illumination Systems

The Design-Builder shall conduct all work necessary to meet the requirements for highmast illumination system in accordance with this RFP.

Highmast illumination systems shall be installed at the following locations:

Broadway Interchange (SR99/SR527/SR526/SR5)

- Continuous illumination shall be installed for the entire interchange from LL STA 371+00 to LL STA 443+00 and LR STA 160+20 to LR STA 231+00 within the limited access area of the interchange.

- Replace existing 3 phase electrical service cabinet SAC 1231 and all associated highmast light standards, foundation, conduits, conductors, and junction boxes (except for two newer 40’-50’ light standards with cobra head fixture located at the I-5 NB ON Ramp and two newer highmast light standards with six luminaires arrangement located along the I-5 median). Erosion-control retaining wall shall be provided for service cabinet SAC 1231.
- Replace existing 3 phase electrical service cabinet SAC 1232 and all associated highmast light standards, foundation, conduits, conductors, and junction boxes. New service cabinet shall be located approximately 200’ north of the existing service cabinet at the SE quadrant of SR 526/Broadway intersection.
- Replace all under-deck light fixtures and associated conduits, conductors, junction boxes and NEMA 4X boxes located at SR527/I-5 undercrossing.

2.16.1.4 Standard Illumination Systems

Standard illumination systems shall be installed at the following locations:

41St /Broadway Interchange

- Replace existing electrical service cabinets SAC 1581, SAC 1587 and all associated light standards, foundation, conduits, conductors, and junction boxes.
- The portion of the existing illumination system under SAC 1587 located west of WSDOT limited access areas shall be disconnected from WSDOT electrical service cabinet and turned over to the City of Everett. The Design-Builder shall coordinate with the City of Everett for city’s requirements. The contact for the City of Everett is Souheil Nasr, 425-257-7210.
- Continuous illumination shall be installed for the following areas:
 - a. I-5 mainline LL STA 530+00 to LL STA 605+00
 - b. I-5 mainline LR STA 319+20 to LR STA 393+30
 - c. NB HOV Direct Access Off-ramp at Broadway from ER STA 10+00 to ER STA 19+00
 - d. SB HOV Direct Access On-ramp at Broadway from EL STA 10+00 to EL STA 19+00
 - e. NB right side Broadway Off-ramp from LR STA 343+00 to FR STA 31+00
 - f. NB 41st St On-ramp from GR STA 10+00 to GR STA 16+00
 - g. SB Broadway/41st Off-ramp from GL STA 10+00 to GL STA 18+00
 - h. SB Broadway/41st On-ramp from FL STA 10+00 to FL STA 17+40
 - i. Broadway area where NB HOV Direct Access Off-ramp, SB HOV Direct Access On-ramp, and NB Right side Broadway Off-ramp connecting to Broadway

Pacific to Marine View Drive Interchanges

- Replace existing electrical service cabinets SAC 1584, SAC 1585 and SAC 1586 and all associated light standards, foundation, conduits, conductors, and junction boxes.
- Continuous illumination shall be installed for the following areas:
 - a. I-5 mainline LL STA 605+00 to LL STA 695+00
 - b. I-5 mainline LR STA 393+30 to LR STA 483+70
 - c. SB SR 529/Pacific Ave On-ramp from HL STA 10+00 to HL STA 20+50
 - d. NB I-5: SR 529/Pacific Ave Off-ramp from I-5 LR STA 415+00 to HR STA 19+12
 - e. SB I-5: SR 2 On-ramp from IL STA 10+00 to IL STA 23+21.91
 - f. NB I-5 SR 2 Off-ramp from IR STA 10+00 to IR STA 22+20
 - g. SB I-5: SR2/Everett Ave Off-ramp from JL2 STA 10+00 to JL2 STA 23+00, JL1 STA 10+00 to JL1 STA 14+00
 - h. NB I-5: SR2/Everett Ave On-ramp from JR2 9+00 to JR2 STA 22+00, JR1 STA 15+00 JR1 21+00
 - i. SB I-5: Marine View Drive On-ramp from KL STA 10+00 to KL STA 17+80
 - j. NB I-5: Marine View Drive Off-ramp from KR STA 10+00 to KR STA 17+35

2.16.1.5 Power supply for Illumination Systems

The Design-Builder shall install electrical service to provide power to all existing and proposed illumination systems including temporary illumination systems in this RFP.

Except for highmast illumination systems, new service cabinets for illumination systems shall be Type E 240/480V single-phase services.

2.16.2 Mandatory Standards and Reference Publications

2.16.2.1 Mandatory Standards

General. Design and construct the illumination system in accordance with the requirements of the standards listed by priority in Table 2.16.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.16.1
Mandatory Standards for Illumination**

Priority	Author or	Title	Document or	Date	Comments,
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	Agency		Report No.		Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	N/A		Proposal
2	WSDOT	Request for Proposals, I-5 Design-Build Project	N/A	***	RFP
3	WSDOT	Design Manual for Design-Build Project	N/A		DM
4	WSDOT	Traffic Manual	N/A		
5	WSDOT	Amendments to the Standard Specifications	N/A		
6		Manual on Uniform Traffic Control Devices (MUTCD)-WSDOT Modified	N/A		MUTCD
7		National Electric Code (NEC)	N/A		NEC
8		National Fire Protection Association (NFPA)	N/A		
9		All applicable State and local codes	N/A		
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.16.2.2 Reference Publications

Use the publications listed in Table 2.16.2 as supplementary guidelines for the design, provision, installation, and construction of the landscape and aesthetic improvements. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.16.2
Reference Publications for Illumination**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	Information Guide to Roadway Lighting			
AASHTO	Roadway Design Guide			
	IES Roadway Lighting			

2.16.3 Performance Requirements

The Design-Builder shall design and construct all components of a roadway lighting system (including temporary lighting system) necessary to provide a complete and functional system that meets the following performance requirements:

Light levels shall conform to the requirements of Section 840 of the WSDOT Design Manual For Design Build Projects. See Figure 840-6 for “Light Levels and Uniformity Ratios” Table.

In general the minimum average maintain horizontal light levels shall be as follows:

- Mainline and ramps: 0.6 foot-candles
- Ramp intersections: 0.9 foot-candles

Maximum Uniformity Ratio:

- Mainline and ramps: 4:1
- Crossroads and ramp intersections: 3:1

Maximum Veiling Luminance:

- All areas: 0.3:1

2.16.3.1 Software

Lighting calculations utilizing AGI Lighting Design Software available from Lighting Analysts, Inc. Littleton, Colorado 303.972.8851 shall be submitted in hard copy and computer disc.

2.16.3.2 Meetings

The Design-Builder shall work with WSDOT to form an Illumination design team to oversee and provide input on the illumination design and construction. The Illumination design team shall develop a schedule for meetings and coordination during the Project from the Contract Execution to Project Final Acceptance.

The Design-Builder shall be responsible for determining the number and location of proposed illumination components required by the Mandatory Standards (Section 2.16.2.1) that are in addition to the required illumination components listed in the Description (Section 2.16.1)

To monitor design progress and assist in the conduct of these meetings, the Design-Builder shall have available for review and inspection location maps showing all proposed locations for highway illumination components and how the equipment locations interrelate to form the highway illumination.

The Design-Builder shall schedule, organize, and conduct the Illumination Design progress meetings to accomplish the following:

- Review existing illumination systems and operations, including field verification of all existing illumination systems and components
- Define and finalize illumination functional, technical, operational, and maintenance requirements
- Finalize goals and parameters of illumination design
- Establish integration requirements
- Develop acceptance of the illumination design
- Address and discuss illumination construction issues

2.16.3.3 Design-Builder's Personnel

See Section 1-011.6 Design-Builder Personnel.

2.16.4 Design and Construction Criteria

The Design-Builder shall be responsible for determining the number and location of the proposed illumination components required by the Mandatory Standards (Section 2.16.2.1) that are in addition to the required illumination components listed in Section 2.16.1.

2.16.4.1 Design Requirements

The designer shall comply with WSDOT's current illumination policy and provide a complete set of roadway illumination Construction Documents including, but not limited to:

- Continuous freeway illumination including mainline, entrance and exit gore areas, ramps, and crossroads.
- Sign Lighting.
- Existing electrical services shall be replaced for the new illumination systems.
- The Design-Builder shall design and construct the illumination system with consideration to future maintenance. The illumination system shall be designed to minimize lane closures required for maintenance.

Temporary illumination shall be furnished and installed per current WSDOT Design Standards For Design Build Projects and Standard specifications.

A minimum of ten feet distance (circumferential) shall exist between power lines including neutral wires and any illumination structure.

2.16.4.1.1 Illumination Plan Submittals

The Design-Builder shall provide an Illumination Plan for each ramp/roadway section as described in the Section 2.16.4.1. WSDOT will respond within 10 Working Days of receipt of each Illumination Plan. The plan submittal shall include the following:

Design Summary: This summary shall identify and document Roadway Classification, Area Classification, and Design Light Level requirements. The summary shall also identify the deficiencies of the existing system and proposed mitigation, impacts to the existing system due to site preparation or other proposed work.

Photometric Analysis Report as described in Section 2.16.4.1.11.

The Design-Builder shall provide illumination calculations to support luminaire type, distribution, wattage, mounting height, spacing and service voltage to achieve the required design light level, including H1 height calculations (pole length) to achieve proposed

mounting heights (height of light above the lighted surface). Attach cross sections for review. The Illumination Plan shall have the following items:

1. Title sheet, north arrow and scale bar.
2. Legend of symbols.
3. Existing electrical features.
4. Proposed channelization.
5. Luminaire pole locations.
6. Power source and service locations.
7. Luminaire Schedule.
8. Conduit runs and junction box location.
9. All existing and proposed overhead and under ground utilities.

The Design-Builder shall provide a final Illumination Plan for each ramp/roadway section as described in the Section 2.16.5. WSDOT will respond within 5 Working Days of receipt of each final Illumination plan.

In addition to the items listed above for conceptual plan, the final plans shall have the following items:

10. Conductor schedule.
11. Breaker Schedule
12. Construction notes
13. Details
14. The engineering backup data to support the illumination design shall be submitted.
They are as follows:
15. Voltage drop calculations.
16. Calculations to support transformer sizing, and transformer overcurrent protection devices.
17. Conduit fill and junction box capacity calculations.
18. Service load calculations.
19. Permission from bridge for attachment to structures or installations, which would affect structures.
20. Soils information for foundation design.

2.16.4.1.2 Excavation and Backfilling

See Chapter 8-20.3(2) of the Standard Specifications.

2.16.4.1.3 Foundations

Foundations for highmast light standards shall require soil analysis to determine the lateral bearing pressure. See Sections 2.6 - Geotechnical & 2.12 - Bridge and Structures for additional requirements.

2.16.4.1.4 Conduits

Provide separate conduits for illumination circuits to isolate them from communication and traffic signal circuits on new construction. Communication cable shall not be combined with illumination power circuits of any voltage under any circumstances. Illumination circuits may share a junction box with other circuits, including traffic signal detection and display circuits, provided that all circuits in the junction box are energized from the same service. When modifying an existing traffic signal, the installation of separate illumination conduits might be impracticable. In these situations, the illumination circuit conductors may be installed in the signal circuit conduit. When considering this, verify that all conductors in the conduit have an insulation rating equal to or exceeding the maximum circuit voltage applied to any conductor within that raceway. Ratings for various types of insulation are contained in the National Electrical Code.

In new conduits, conductors shall occupy a maximum 26% of the cross-sectional area of the conduit. In existing conduits, conductors fill shall meet NEC requirement for conduit with three or more conductors, conductors shall occupy a maximum of 40% of the conduit's area. The minimum size conduit for illumination installations is 1 in diameter. The minimum size conduit for installation under a roadway is 2 in diameter.

All proposed conduits placed under existing pavement shall be installed by jacking, drilling, directional boring, or by boring and casing.

Open trenching to install conduits may be allowed under new sub base and pavement. The Design-Builder shall install two 2" conduits with associated NEMA 4X junction boxes and conduit expansion/deflection fittings as required in all structures, walls, and barriers. The two 2" conduits shall transition and exit the structures, walls, and barriers and terminate in type 1 junction boxes located in grade.

The Design-Builder shall install a spare 2" conduit associated with every conduit crossing under pavement.

The maximum spacing for junction boxes in bridge rail is 180 feet. When a structure is shorter than 180 feet, two sets of junction boxes shall be installed centered between the second and third dummy joints from each end of the bridge.

2.16.4.1.5 Junction boxes

Junction box shall be located out of paved areas and sidewalks. Any junction boxes located within paved areas shall be traffic bearing type 4, 5 or 6. See details in Appendix C.

Junction box located out of paved areas shall be type 1, 2 and 7. See standard plans and details in Appendix C.

Junction box shall be installed within a nominal 5 feet and maximum 10 feet from each light standard.

2.16.4.1.6 Wiring

Copper conductors are required for all permanent underground illumination circuits. Aluminum conductors may be used for temporary overhead illumination circuits. The conductor type installed between the utility power source and the service cabinet shall be copper meeting serving utility company. The minimum conductor size for illumination circuits is a #8 AWG (American Wire Gage). Diameters, areas, ampacities, and resistance factors for various conductor sizes are shown in Figure 840-8.

Line loss is the voltage drop between the electrical service and the electrical load. In more complex systems the voltage drop can be significant. The light standards farthest from the service might fail to energize if this loss is not compensated for by using larger electrical conductors or by splitting the system into two or more circuits. Some voltage drop is allowable. For design purposes, the allowable line loss for illumination circuits is 5% where the system might be expanded in the future. An 8% loss is acceptable when future expansion seems unlikely. A larger line loss of 10% is allowed for temporary illumination circuits on construction projects. Line loss is calculated by using the formula:

$$\text{Voltage Drop} = 2ALR.$$

Where: A = Current in amps , L = Length of conductors, R = Resistance of the conductor

2.16.4.1.7 Bonding, Grounding

Existing junction box lid shall be grounded.

2.16.4.1.8 Electrical services

Highmast illumination shall be powered by Type E 277/480 volts three phase electrical services. All three-phase conductors shall be routed to each highmast light standard.

Conventional illumination shall be powered by Type E 240/480 volts single-phase electrical services.

Access for maintenance shall be provided. The Design-Build shall install access gate for fence line service cabinet.

Standard service cabinet installations shall provide a minimum of two lighting circuits for Type B Services and five circuits for Type D or E Services.

Although the electrical load can usually be carried with one or two circuits, consider using multiple circuits for the lighting system. Multiple circuits are easier to install, maintain, and allow quicker location of circuitry failures. The Design-Builder shall provide separate circuits for each approach at intersections and at each ramp and the crossroad at interchanges.

Power feed conductors, from the utility transformer to the service, shall be isolated from other circuits by using a separate conduit. Junction boxes in this conduit run are not allowed.

Branch breakers shall be at least 140% of the computed illumination circuit load. The breaker size shall not exceed the ampacity of the smallest conductor it protects. The #10 pole and bracket cable is protected by fusing and is not a consideration in this sizing requirement. Size the main breakers to exceed 140% of all of the computed illumination loads and 125% of all other loads on the service. The minimum main breaker size shall be a minimum 200 amps. Lighting contactors shall be equal or exceed the branch breaker rating for the circuit it switches.

Control Equipment. Photoelectric control devices and time clocks are used to control illumination circuits. The photoelectric control shall be provided in electrical service cabinet for all illumination systems.

Other locations, such as tunnels with daytime lighting, require special controls. Controls are provided for circuits that energize certain fixtures throughout the day and night. Other controls energize additional fixtures to provide minimum daytime light levels, entrance zone light levels, and any subsequent zone lighting.

Service cabinets shall meet Electric Utility Service Equipment Requirement Committee (EUSERC) standards. Service cabinets shall be in accordance with standard plans J3b, J3c and J3d (See Appendix C). WSDOT Type A or C service cabinets shall not be installed.

The Design-Builder shall coordinate with WSDOT and submit the necessary design information for new and modify electrical services. WSDOT will obtain any Service Agreements from the public utility company. The time required for WSDOT to obtain the service agreement once the Design-Builder submits the required information will be 21 calendar days. The Design-Builder shall pay all costs charged by the electric power companies for providing power connections. The Design-Builder shall pay the monthly electric bills starting on the day Work begins for the existing lighting and lighting installed under the Contract until Final Acceptance of the Project.

The Design-Builder shall coordinate with WSDOT per Section 2.10 Utilities and Third Party Agreements and submit the necessary design information for new and modified electrical services. WSDOT will obtain any Service Agreements from the public utility company. The time required for WSDOT to obtain the service agreement once the Design-Builder submits the required information will be 21 calendar days. The Design-Builder shall pay all costs charged by the electric power companies for providing power connections. The Design-Builder shall pay the monthly electric bills starting on the day Work begins for the existing lighting and lighting installed under the Contract until Final Acceptance of the Project.

2.16.4.1.9 Testing

See Appendix B.

2.16.4.1.10 Illumination

Illumination systems shall operate on 480 volts, single phase (except highmast illumination, Section 2.16.4.8).

Highmast light standards shall at maximum 110 feet high. Holophane LD5 fixture lowering device shall be installed at each pole. Two remote control units for the entire highmast light standard system to operate the lowering device shall be provided. Highmast luminaires shall be maximum eight fixtures clustered with 400 watts HPS open bottom Type V distribution.

All highmast light standards shall be located behind barrier in accordance with the barrier's deflection requirements.

Conventional light standards shall be 40 or 50 feet high. All conventional light standards shall be installed on slip base except for those that are located behind guardrail, wall or barrier. Conventional luminaires shall be HPS Type III, medium cut off distribution.

The Design-Builder shall design the illumination system to meet the light level requirements contained in WSDOT Design Manual For Design Build Projects Chapter 840 (Illumination). This work shall include calculation for Light Level, Uniformity and Veiling Luminance. These calculations are used to determine the spacing of the luminaires to illuminate the design area. The Design-Builder shall use AGI software as listed in Section 2.16.3.1

The Design-Builder shall design the illumination system to meet the light level requirements contained in WSDOT Design Manual For Design Build Projects Chapter 840 (Illumination). This work shall include calculation for Light Level, Uniformity and Veiling Luminance. These calculations are used to determine the spacing of the luminaires to illuminate the design area. The Design-Builder shall use AGI software as listed in Section 2.16.3.1

For the purpose of determining lighting requirements at intersections, the intersection design area shall be defined as the area bounded by the stopping points. Where no marked stop bars are present, this area is bounded by a line perpendicular to the approaching leg, which is ten feet back from the extension of the intersecting street.

Illumination shall be house side shielded where there are adjacent business or residential concerns.

2.16.4.1.11 Photometric Analysis

The Design-Builder shall complete and submit a Photometric Analysis Report that includes but is not limited to the following:

1. Average maintained horizontal light level, maximum uniformity ratio, and maximum veiling luminance for each design area and direction of travel.

2. Luminaire locations with mounting heights, luminaire types, wattage and quantities of each.
3. Use a grid point spacing of 5 feet with two decimal points in both X and Y directions for all illuminance, luminance and veiling luminance calculations.
4. Lighting calculations accounting for the anticipated loss of light due to lamp lumen depreciation (LLD) and lamp dirt depreciation (LDD) shall be 0.62.
5. A graphical print of all design areas with calculation points. Prints shall be legible and scaleable. The report shall list all photometric files, luminaire definitions and their characteristics.
6. The Design-Builder shall clearly indicate all calculated values and exactly where they came from.
7. The Design-Builder shall explain any unusual design areas.
8. When adjacent to residential areas, the maximum spillover lighting allowed shall be 0.2 foot-candles at ground level on residential properties.
9. Consideration of roadway safety, ease and cost of maintenance, cost of construction, consistency with adjacent roadway lighting designs, annual energy costs, and provision for future lighting needs and local planning policies.
10. All requirements set forth in the Final Environmental Impact Statement (FEIS)

2.16.4.1.12 Lighting Under Structures

The Design-Builder shall furnish and install lighting only when the Bridge span is greater than 50 feet or when a Bicycle and/or Pedestrian facility cross under the Structure. The Design-Builder shall provide and install WSDOT standard wall pack lighting.

The Design-Builder shall submit three dimensional aspects analysis of the roadway with respect to the positioning of the illumination assemblies for underpasses.

2.16.4.1.13 Spillover Light

When cobra head fixtures are used, the Design-Builder shall provide shallow glass medium semi-cut-off fixtures to limit spillover lighting outside of the Project Right of Way.

2.16.4.1.14 Salvage

The Design-Builder shall salvage all lighting units, steel light bases, lighting service cabinets, and deliver the salvaged items to a location determined by WSDOT. The Design-Builder shall remove and dispose of all concrete light standard bases.

2.16.5 Submittals

2.16.5.1 Released for Construction (RFC) Documents

The illumination design plans and engineering back up data shall include as a minimum, the following:

- Luminaire type, distribution, wattage.
- Luminaire spacing.
- Mounting height and H1 height calculations to achieve proposed mounting heights. Attach cross sections for review.
- Service voltage.
- Electrical load calculations and line loss calculations to support breaker, wire and lighting contactor sizing. Load balancing for three phase services.
- Calculations to support transformer sizing, and transformer over current protection.

2.16.5.2 As-Built Plans

The Design-Builder shall submit as-built plans, product manuals and shop drawings for the illumination system after construction is complete. Final acceptance will not be granted until this material is submitted.

2.17 SIGNALS

Abbreviations

EVP Emergency Vehicle Pre-emption

2.17.1 General

The Design-Builder shall conduct all work necessary to meet the requirements for the traffic signal system in accordance with this RFP Standards and publications, performance requirements, design and construction criteria, warranty of work, maintenance during construction, and submittals are covered herein.

- The Design-Builder shall replace the traffic signal system located at the SR 526/S. Broadway Avenue intersection. The existing signal controller cabinet, transformer cabinet and the induction loop system shall remain and be incorporated into the new traffic signal system.

The elements of the traffic signal system shall include but not limited to the following:

- Signal standards and mast arms
- Luminaires on signal standards
- Foundations
- Vehicle and pedestrian heads
- Emergency vehicle preemption detectors
- Terminal cabinets
- Junction boxes
- Conduits and Wirings
- Temporary video detection system
- Temporary traffic signal system

Power supply for Signal systems

The Design-Builder shall install electrical service to provide power to all existing signal systems and proposed signal systems in this RFP.

The Design-Builder shall remove the existing pole mounted type A service cabinet SAC 2123. The Design-Builder shall provide power from the new electrical service SAC 1231 via 480V/120V transformer to the existing signal system located at the I-5 NB off ramp/SR 527 intersection.

For additional requirements see Section 2.16 (Illumination).

Maintenance During Construction. Maintain the traffic signal system during construction in accordance with the requirements in Section 2.27(Maintenance During Construction).

2.17.2 Referenced Standards and Publications

2.17.2.1 Mandatory Standards

General. Design and construct the Signals system in accordance with the requirements of the standards listed by priority in Table 2.17.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.17.1
Mandatory Standards for Signals**

Priority	Author or	Title	Document or	Date	Comments,
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	Agency		Report No.		Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	N/A		Proposal
2	WSDOT	Request for Proposals, I-5 Design-Build Project	N/A	***	RFP
3	WSDOT	Design Manual for Design-Build Project	N/A		DM
4	WSDOT	Traffic Manual	N/A		
5	WSDOT	Amendments to the Standard Specifications	N/A		
6		Manual on Uniform Traffic Control Devices (MUTCD)-WSDOT Modified	N/A		MUTCD
7		National Electric Code (NEC)	N/A		NEC
8		National Fire Protection Association (NFPA)	N/A		
9		All applicable State and local codes	N/A		
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.17.2.2 Referenced Publications

Use the publications listed in Table 2.17.2 as supplementary guidelines for the design, provision, installation, and construction of the traffic signals system. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.17.2
Reference Publications for Illumination**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
	ITE Manual of Traffic Signal Design			
	TRB Highway Capacity Manual			

* If no date is given, the most current version as of the initial publication date of this RFP is specified.

2.17.3 Performance Requirements

The Design-Builder shall design and construct all components of a traffic signal system necessary to provide a complete and functional system that meets the following performance requirements:

- Optimize traffic flows and minimize delay.
- Operate in coordination with adjacent intersections and arterial roads.
- Accommodate pedestrians as necessary.

2.17.4 Software

The Design-Builder shall use SimTraffic, by Trafficware Corporation, or Approved equal, to simulate vehicular traffic in the network.

2.17.5 Meetings

The Design-Builder shall work with WSDOT to form a signal design team to oversee and provide input on the signal design and construction. The Signal design team shall develop a schedule for meetings and coordination during the Project from the Contract Execution to Project Final Acceptance.

During the signal design development, the Design-Builder shall organize, schedule, and conduct weekly meetings with the signal design team, WSDOT, and affected Cities and Counties to discuss goals and parameters of the signal design. The signal design progress meetings are intended to build consensus on system functionality as well as feasibility.

To monitor design progress and assist in the conduct of these meetings, the Design-Builder shall have available for review and inspection a Signal Conceptual Plan showing all proposed locations for the traffic signal components and how the equipment locations interrelate to form the highway traffic corridor.

The Design-Builder shall schedule, organize, and conduct the signal design progress meetings to accomplish the following:

- Review existing traffic signal systems and operations, including field verification of all existing components
- Define and finalize traffic signal functional, technical, operational, and maintenance requirements
- Finalize goals and parameters of the signal design
- Establish integration requirements
- Develop acceptance of the signal design
- Address and discuss the construction of the traffic signal system

2.17.6 Design-Builder's Personnel

See Section 1-011.6 Design-Builder Personnel.

2.17.7 Design and Construction Criteria

2.17.7.1 Design Requirements

The Design-Builder shall make provisions and provide necessary materials for intersection lighting as part of any new signal system. The Design-Builder shall provide all necessary

emergency vehicle pre-emption (EVP) wiring for all permanent signal system installations. The Design-Builder shall wire all signals for pedestrian push buttons. For new permanent signal systems, the Design-Builder shall include LED signals for all vehicle and pedestrian signal indications. The Design-Builder shall provide optically programmed or louvered signal heads when closely spaced consecutive signals confuse the driver. The Design-Builder shall seek the assistance of WSDOT on when to use optically programmed signal heads. All vehicle signal heads shall have louvered aluminum back plate installed by the Design-Builder.

2.17.7.2 Permanent Signals

Traffic signals shall be designed using the following criteria:

- A. The traffic signal standards shall be steel pole and mast arm type.
- B. Signals shall be furnished and installed per current WSDOT Design Manual For Design Build Projects Chapter 850 and Standard specifications.
- C. The Design-Builder shall furnish and install all signal equipment. All signal equipment shall be new and conform to WSDOT standards and specifications
- D. The Design-Builder shall install temporary video detection prior to existing induction loop disconnect. No down time will be allowed.
- E. The existing traffic signal system shall be kept operational at all times. The Design-Builder shall install a temporary traffic signal system if any portion of the existing signal system has to be removed prior to the new traffic signal system is operational.

2.17.7.3 Signal Plan Submittals

The Design-Builder shall provide a Signal Conceptual Plan as described below. WSDOT will respond within 10 Working Days of receipt of each Signal Conceptual plan. The required submittal is as follows:

The plans shall include the following minimum information:

- A. Lane geometry and intersection layout.
- B. Phasing diagram
- C. Signal pole locations
- D. Signal head locations and schedule.
- E. Ped head locations and schedule.
- F. Type and location of detection
- G. Pole and conductor schedule
- H. Existing induction loop location.

In addition to the items listed above for conceptual plan, the final plans shall have the following items:

- A. Conductor schedule.
- B. Breaker Schedule

- C. Construction notes
- D. Conduit routing and junction box locations.
- E. Field Wire Termination Sheet
- F. Cabinet Wire Termination Sheet
- G. Input File and Display Panel sheet.
- H. Signal Standard Details Sheet.
- I. Details
- J. Overhead Mast arm signing.

2.17.7.4 Excavation and Backfilling

See Chapter 8-20.3(2) of the Standard Specifications.

2.17.7.5 Foundations

Foundations for signal standards shall require soil analysis to determine the lateral bearing pressure. See Sections 2.6 Geotechnical & 2.12 Bridge and Structures for additional requirements.

2.17.7.6 Conduits

Provide separate conduits for illumination circuits to isolate them from communication and traffic signal circuits on new construction. Communication cable shall not be combined with illumination power circuits of any voltage under any circumstances. Illumination circuits may share a junction box with other circuits, including traffic signal detection and display circuits, provided that all circuits in the junction box are energized from the same service. When modifying an existing traffic signal, the installation of separate illumination conduits might be impracticable. In these situations, the illumination circuit conductors may be installed in the signal circuit conduit. When considering this, verify that all conductors in the conduit have an insulation rating equal to or exceeding the maximum circuit voltage applied to any conductor within that raceway. Ratings for various types of insulation are contained in the *National Electrical Code*.

The size of a conduit is dependent on the number and size of the conductors it contains. In new conduit, conductors shall occupy a maximum 26% of the cross-sectional area of the conduit. In existing conduits, conductors fill shall meet NEC requirement for conduit with three or more conductors, conductors shall occupy a maximum of 40% of the conduit's area. The minimum size conduit for illumination installations is 1 in diameter. The minimum size conduit for installation under a roadway is 2 in diameter.

All proposed conduits placed under existing pavement shall be installed by jacking, drilling, directional boring, or by boring and casing.

Open trenching to install conduits may be allowed under new sub base and pavement.

2.17.7.6.1 Junction boxes

- Junction box shall be located out of paved areas and sidewalks. Any junction boxes located within paved areas shall be traffic bearing type 4, 5 or 6. See details in Appendix C.
- Junction boxes shall not be placed in wheelchair ramps.
- Junction box located out of paved areas shall be type 1, 2 and 7. See standard plans and details in Appendix C.
- Junction box shall be installed near each signal pole for wiring routing to the pole through the junction box. Junction box shall be installed within a nominal 5 feet and maximum 10 feet from each signal pole.

2.17.7.6.2 Wiring

- Use (1) seven-conductor cable for a dual pedestrian display from the signal controller cabinet to the terminal cabinet located on signal pole.
- Use (1) five-conductor cable for each single pedestrian display.
- Use two-conductor (shielded) cable for each pedestrian detector.
- Use three-conductor (shielded) cable for each emergency pedestrian detector.

2.17.7.6.3 Bonding, Grounding

See Appendix B.

2.17.8 Signal System

Signal Heads

- Maintain a minimum 8 feet between all signal displays for a given approach.
- Use 12-inch signal lenses. All signal displays shall have back plates.
- Use type M mounting as practical for all vehicle heads.
- All signal and pedestrian heads shall be LED.
- All arrow displays for left turn signal shall be used for protected only operation.
- Use directional, extended visors for appropriate signal displays at a skewed intersection. The intent is to shield visibility of signal displays, which could be seen by drivers on an approach for which the displays are not intended. When directional

visors are installed for displays supported on a span wire, a tether shall be used to stabilize and maintain proper orientation of the directional visors.

Induction Loop Vehicle Detectors

- Existing induction loops shall be incorporated into the signal system.

Test for Induction Loops and Lead-in Cable

See Appendix B.

Signal Standards

- Locate signal poles behind sidewalks.
- Type 2 and type 3 signal poles shall have terminal cabinet with a spare 12-position terminal.

2.17.8.1 Construction Requirements

The Design-Builder shall construct all components of a traffic signal system necessary to provide a complete and functional system that meets the performance requirements specified in the Appendix B2.16.4 in this RFP.

2.17.8.2 Operation and Maintenance

WSDOT will provide signal timing for temporary, revised, and permanent signals. WSDOT will enter the timing parameters into the signal controller. WSDOT will be responsible for the operation and maintenance of the signal controllers and signal controller cabinets for the permanent, revised, and temporary signals.

For items not maintained by WSDOT, the Design-Builder shall maintain those items of all signal systems from the first day of construction until Final Acceptance. The Design-Builder shall remove all temporary signal system installations upon completion and operation of the new permanent signal systems.

2.17.8.3 Emergency Maintenance

Notification of a trouble call will come from TSMC. The Design-Builder shall on site within 2 hours of notification by TSMC working on the trouble call. Failure to respond, will cause WSDOT Signal Branch Office to respond to the problem at the Design-Builder's expense. (This arrangement could be set up in advance if all parties are willing to prevent delays in response to trouble calls.) Any work by WSDOT will be limited to correcting the trouble call and will not result in acceptance of any work by the Design-Builder.

2.17.9 Submittals

2.17.9.1 Shop Drawings

Shop drawings and product data shall, at a minimum, include the following:

- Poles, mast arms (by type and size), and pedestals
- Service cabinets
- Luminaires and lamps
- Ballasts and photoelectric controls
- Paint (prime and finish)
- Fuse holder kits, fuses, and insulating boots
- Loop detector splice kits
- Vehicle signal indications and lenses
- Pedestrian signal indications, lenses, and housings
- EVP equipment

2.17.9.2 As-Built Documentation

The Design-Builder shall submit as-built plans, product manuals and shop drawings for the signals system after construction is complete. Final acceptance will not be granted until this material is submitted.

2.18 INTELLIGENT TRANSPORTATION SYSTEM (ITS)

2.18.1 General

2.18.1.1 Abbreviations

bps	Bits Per Second of Serial Data
CAM	Camera
CCTV	Closed Circuit Television
CC	Camera Cabinet
CPU	Central Processing Unit
CWDM	Course Wave Division Mutiplex
dB	Decibel
dBm	Decibel referenced to 1 milliwatt
DS	Data Station
DS-1	Digital Signal Level 1 (1.544 Mbits/s)
DS-3	Digital Signal Level 3 (44.736 Mbits/s)
ES	Electronic Surveillance
EPROM	Electronically Programmable Read-Only Memory
FM	Frequency Modulation
HAR	Highway Advisory Radio
HARS	Highway Advisory Radio Sign
HART	Highway Advisory Radio Transmitter
ITS	Intelligent Transportation System
Kbps	Thousands of Bits Per Second of Serial Data
LASER	Light Amplification by Stimulated Emission of Radiation
LED	Light Emitting Diode
Mbps	Millions of Bits Per Second of Serial Data
MMFO	Multimode Fiber Optics
MUX	Multiplexer
nm	Nanometer (10 ⁻⁹ meter)
OC-1	Optical Carrier Level 1 (50.84 Mbits/s)
OC-12	Optical Carrier Level 12 (622.08 Mbits/s)
OC-48	Optical Carrier Level 48 (2.44 Gbits/s)
OFNR	Optical Fiber Nonconductive Riser
OSP	Outside Plant
OTDR	Optical Time Domain Reflectometer
PTZ	Pan, Tilt, Zoom (for camera control)
RGB	Red, Green, Blue video signals
RMU	Rack Mounting Unit (1.75 inches)
SC&DI	Surveillance, Control and Driver Information
SMFO	Singlemode fiber optics
SONET	Synchronous Optical Network
STS-1	Synchronous Transport Signal Level 1 (electrical 50.84 Mbits/s)
T1	See DS-1
T3	See DS-3
TC	Terminal Cabinet

TDM	Time Division Multiplex
TMS	Traffic Management System
TSMC	Traffic Systems Management Center
TWP	Twisted Wire Pair
UPS	Uninterruptible Power Supply
VMS	Variable Message Sign
WSTA	Weather Station
ZIF	Zero-Insertion Force

2.18.1.2 General

The Design-Builder shall conduct all work necessary to meet the requirements for ITS in accordance with this RFP. Standards and publications, performance requirements, design and construction criteria, warranty of work, maintenance during construction, and submittals are covered herein.

The Design-Builder shall design, furnish, install, and test all materials and equipment for a fully operational system that includes the ITS devices described in this section. For each of these devices, the Design-Builder shall be responsible for making all wiring and cabling connections to provide both local and remote operation from the TSMC. The Design-Builder shall be responsible for making all equipment, wiring, and cabling connections to provide continuous communications to both the ITS devices and the TSMC.

The Design-Builder shall be responsible for ITS fiber infrastructure in all areas that the Design-Builder works. This may include areas outside the project limits.

The Design-Builder shall be responsible for:

1. Maintaining communications to all ITS devices and centers during construction.
2. A complete and accepted fiber optic communications system as defined herein.

ITS elements shall include but not be limited to the following:

- Closed Circuit Television Camera (CCTV) Systems
- Ramp Metering Systems
- Data Stations Systems
- Variable Message Signs (VMS)
- Highway Advisory Radio Signs (HARS)
- Highway Advisory Radio Transmitters (HART)
- Communication Conduit System
- Communication Cable and Interface Systems
- Video, Voice & Data Distribution and Transmission Systems
- Communication Hubs
- Permanent Traffic Recorder Station
- Environmental Sensor Stations

The Design-Builder shall provide WSDOT with the x, y, and z GPS coordinates of the newly installed ITS components listed above and the following:

- Loop detectors
- Control cabinets
- All Junction and Pull Boxes and Cable Vaults
- Mainline Fiber-Optic cable (every 50 feet)
- Fiber-Optic splice vaults
- Stand alone electric service pads

The Design-Builder shall also provide WSDOT with the x, y, and z GPS coordinates of existing components when they are connected to the new components.

The Design-Builder shall design and construct the ITS using the criteria specified within this RFP to:

- Integrate the project ITS with the existing regional ITS to provide continuous and uninterrupted service of the ITS and associated communications throughout the region.
- Facilitate system integration by using materials and components that are consistent and compatible with those of the existing system.
- Provide a fully functional system of which the design and construction are documented as meeting the Contract Requirements.
- Provide a final product that facilitates regular maintenance of ITS components.
- Provide a final product that functions as designed in conjunction with all project components.
- Maintain the operation of all existing ITS components within the project limits throughout the duration of construction, except as otherwise stated herein.

The Design-Builder shall:

- Install all ITS equipment in the field, including devices on I-5 and on surface streets in the project area.
- Design and install foundations, poles, supports, and mounting systems necessary to meet the performance criteria for the individual work element.
- Protect all existing ITS equipment that will not be relocated in this project.
- Maintain operable, and communicating with the TSMC all existing ITS equipment during the course of the project.
- Demonstrate to the Department that the designs and installations meet all installation requirements and recommendations, including the supply and connection of all cables between each device and the local controller assembly, and the provision of power to the local controller sufficient to permit the device to function in a local mode.
- Demonstrate that the cabling between the device and the local controller satisfies applicable codes and the performance criteria, and that the device is operable at the local level (i.e., satisfies the test plan for the equipment installed).
- Install all communications material and equipment for all ITS devices.

Allowable Working Hours on the Existing ITS System

The I-5 ITS elements are part of the existing ITS. Various ITS elements (Closed Circuit Television Cameras (CCTV), detector stations (ES), and Variable Message Signs (VMS)) have been installed within the project limits. These ITS elements shall operate in their current manner throughout construction.

All ITS devices outside the Project limits shall not be affected by the Design-Builder and shall remain operable during construction of the Project.

The Design-Builder shall be restricted to only work on the active part of the system from 9:00 a.m. to 3:00 p.m. and 8:00 p.m. to 4:00 a.m. The Design-Builder shall contact the ITS Implementation Engineer 48 hours prior to performing any work on existing/active ITS devices. The Design-Builder shall perform all work in a manner ensuring the integrity and proper performance of all ITS components during these hours.

Repair Parts

The Design-Builder shall have repair parts available during construction for all ITS components.

Power supply

The Design-Builder shall install electrical service to provide power to all existing ITS systems and proposed ITS systems in this RFP. The Design-Builder shall make appropriate arrangements with the electric company for installation or relocation of power service. The Design-Builder shall be responsible for all costs of installing or relocating power sources.

The Design-Builder is responsible for all ongoing monthly electricity costs for any new ITS equipment installed under this project until acceptance of the ITS. WSDOT will be responsible for on-going electricity costs of ITS elements that are not impacted by this project.

New service cabinets for ITS systems shall be Type E 240/480V single phase services.

For additional requirements see Section 2.16 (Illumination).

Core Devices

The following subsections contain the proposed locations of the core ITS devices that shall be included with the Design-Builder's Proposal.

The Design-Builder shall be responsible for determining the number and location of proposed ITS components required by the Referenced Standards (Section 2.18.2.1) that are in addition to the core ITS devices.

WSDOT will consider proposals that relocate the core ITS devices, provided the same level of functionality is obtained.

2.18.1.3 CCTV Systems

The Design-Builder shall conduct all work necessary to meet the requirements for CCTV Systems in accordance with this RFP

CCTVs shall be installed at the following locations:

Station

- LL STA 441+00 (Shoulder on Ex. Sign Bridge)
- LL STA 468+50 (Median)
- LR STA 257+50 (Shoulder)
- LR STA 295+00 (Shoulder)
- LL STA 509+00 (Median)
- LR STA 331+00 (Median)
- LL STA 555+50 (Shoulder)
- LR STA 356+00 (In HOV / Northbound gore)
- LR STA 374+75 (Median)
- or
- LL STA 591+00 (SB Off-Ramp gore) ~ whichever provides the best coverage
- LL STA 402+50 (Shoulder)
- or
- LR STA 415+00 (Existing Location) ~ whichever provides the best coverage
- LR STA 635+00 (SB On-Ramp gore)
- LR STA 654+50 (At Hewitt Ave grade)
- SR 5 / SR 2 Ramps
- LR STA 452+00 (Gore between NB On-Ramps)
- LL STA 693+00 (Existing Location)

Two (2) additional cameras will be installed outside of the I-5 corridor. One camera and associated hardware shall be installed on the existing sign bridge on eastbound SR 2, approximately 0.7 miles from the I-5 interchange. Another with associated hardware shall be installed approximately 0.7 miles from the I-5 interchange on SR 526. Final locations will be determined during the ITS design meetings.

2.18.1.4 Ramp Metering Systems

Ramp Meters shall be installed at the following locations:

Ramp ID	Description	# Metered Lanes	HOV Bypass	Mainline Loop Location
N/A	SR 527 to NB I-5	1	N/A	LR STA 216+00
N/A	SR 99 to NB I-5	1	N/A	LR STA 216+00
FL	Broadway to SB I-5	2	N/A	LL STA 563+00
GR	41st ST to NB I-5	2	N/A	LR STA 380+50
HL	Pacific Ave to SB I-5	1	1	LL STA 632+20
IL	US 2 to SB I-5	1	N/A	LL STA 645+00

JR 1	US 2 to NB I-5	1	N/A	LR STA 456+00
JR 2	Everett Ave to NB I-5	2	N/A	LR STA 456+00
KL	Marine View Dr to SB I-5	1	1	LL STA 695+00

2.18.1.5 Data Stations Systems

Data Stations shall be installed at the following locations:

Southbound

LL STA 442+00
 LL STA 467+80
 LL STA 493+60
 LL STA 519+00
 LL STA 545+00

Northbound

LR STA 230+60 (in same cabinet)
 LR STA 256+50 (maybe same cabinet)
 LR STA 282+30 (maybe same cabinet)
 LR STA 308+00 (maybe same cabinet)
 LR STA 334+00 (maybe same cabinet)
 LR STA 354+00 (maybe combine w/SB ramp meter)

LL STA 588+00(combine with NB ramp meter)

LL STA 613+00

LR STA 401+50 (in same cabinet)
 LR STA 421+00 (combine w/ SB ramp meter)
 LR STA 433+50 (combine w/ SB ramp meter)

LL STA 666+70(combine w/ NB ramp meter)

LR STA 483+70 (combine w/SB ramp meter)

Two (2) additional data stations will be installed outside of the I-5 corridor. One shall be installed on eastbound SR 2, approximately 0.7 miles from the I-5 interchange. Another shall be installed approximately 0.7 miles from the I-5 interchange on SR 526. Final locations will be determined during the ITS design meetings.

Combining the loops from northbound and southbound I-5 in the same cabinet is encouraged and will be allowed provided that all requirements of this RFP are met and accessibility and safety are not compromised.

2.18.1.6 Variable Message Signs (VMS)

VMS shall be installed at the following locations:

Station

LR STA 308+60
 MP 195.55 (N of Limits - Sign Bridge) (may combine with HARS)
 LL STA 522+50 (Sign Bridge) (may combine with HARS)

View

Northbound
 Southbound
 Southbound

2.18.1.7 Highway Advisory Radio Signs (HARS)

HARS shall be installed at the following locations:

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Station	View
LR STA102+00 (Cantilever) [MP 187.50]	Northbound
LR STA 371+50 (Bridge Mounted)	Northbound
LL STA 513+00 (Cantilever) (may be combined with VMS)	Southbound
MP 195.55 (N. of Limits - Cantilever) (combined with VMS)	Southbound
SR 2, MP 1.00 (E. of Limits - Cantilever)	Westbound
SR 526, MP 0.97 (W. of Limits - Shld. Mount)	Eastbound

2.18.1.8 Highway Advisory Radio Transmitters (HART)

HART shall be installed at the following locations:

Station	Description
LL STA 419+00	I-5 / SR 526 Interchange area
LL STA 655+00	I-5 / SR 2 Interchange area

2.18.1.9 Communication Conduit System

The Communication Conduit System shall consist of two 4-inch conduits with innerduct (including cable vaults, pull boxes, junction boxes, etc) extending from the south (existing communication hub near LR STA 190+00) to the north (south bridge seat of the Snohomish River bridge). There will also be two 4-inch conduits with innerduct (with associated vaults and boxes) installed for approximately 0.5-mile from the I-5 interchanges at SR 526 and SR 2. Whenever possible, conduits shall be installed within new structures.

The Design-Builder shall provide a cable vault at the northern end of the I-5 conduit run at Marine View Drive.

2.18.1.10 Communication Cable and Interface Systems

New 48-strand and 36-strand single mode fiber optic cables extending from the south (existing communication hub near LR STA 190+00) to the north (south bridge seat of the Snohomish River bridge) will be installed. New 36 strand cables will also be installed on SR 526 and US 2 to connect to the new CCTV and data stations. Fiber optic interface (cable termination and patch panels) shall be provided at new and existing Communication Hubs as well as all ITS cabinets.

The Design-Builder shall design, furnish, and install all required material and equipment for a complete and operational fiber optic communications system providing full communication with all ITS elements and the Northwest Region TSMC.

The Design-Builder shall be allowed 1 splice in the 48-strand single mode fiber optic cable between the HUB at LR Sta. 190+00 and SR 2. This splice shall occur in a cable vault near the middle of the run.

2.18.1.11 Video, Voice & Data Distribution and Transmission Systems

The Design-Builder shall install all necessary distribution and transmission equipment to provide an ITS system as described in this RFP. This shall include, but not be limited to a new SONET terminal at the existing LR Sta. 190+00 HUB. Video links (multiplexers) for every 10 new cameras built and a video receiver and transmitter for each new camera shall be installed. Fiber optic modems shall also be included for each ES, HARS, and VMS as well as a hub modem for every 10 ES/HARS and one for the VMS's.

2.18.1.12 Communication Hub

The Design-Builder shall remove and replace the existing HUB at LR 190+00 with the proposed HUB as described in this Section 2.18.4.4.11.

2.18.1.13 Permanent Traffic Recorder Station

There is an existing Permanent Traffic Recorder (PTR) Station at approximate station LL STA 623+00 (Pacific Ave. On-Ramp to SB I-5.) It shall be replaced using the applicable details and requirements of this RFP.

2.18.1.14 Environmental Sensor Stations (ESS)

ESS shall be installed at the following locations:

Station	Description
LL STA 419+00	I-5 / SR 526 Interchange area
LL STA 655+00	I-5 / SR 2 Interchange area

2.18.1.15 Temporary ITS Systems

The Design-Builder shall install 5 CCTV Cameras throughout the project as a first order of work. They shall be operational and able to be controlled and their video viewed from the TSMC. Video snapshots shall also be available on the Internet. The video snapshots shall be updated at least once every minute.

2.18.2 Referenced Standards and Publications

2.18.2.1 Mandatory Standards

General. Design and construct the ITS system in accordance with the requirements of the standards listed by priority in Table 2.18.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Design-Builders Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.18.1
Mandatory Standards for ITS**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	N/A		Proposal
2	WSDOT	Request for Proposals, I-5 Design-Build Project	N/A	***	RFP
3	WSDOT	Design Manual for Design-Build Project	N/A		DM
4	WSDOT	Traffic Manual	N/A		
5	WSDOT	Amendments to the Standard Specifications	N/A		
6		Manual on Uniform Traffic Control Devices (MUTCD)-WSDOT Modified	N/A		MUTCD
7		National Electric Code (NEC)	N/A		NEC
8		National Fire Protection Association (NFPA)	N/A		
9		All applicable State and local codes	N/A		
10		Listing Requirements and the Uniform Building Code (UBC)	N/A		UBC
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.18.2.2 Referenced Publications

Use the publications listed in Table 2.18.2 as supplementary guidelines for the design, provision, installation, and construction of the ITS system. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.18.2
Reference Publications for Illumination**

Author or	Title	Document or	Date	Comments,
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Request for Proposals

Agency		Report No.		Short Forms
AASHTO	A Policy on Geometric Design of Highways and Streets			
AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals			
AASHTO	Roadside Design Guide			
	EIA/TIA Fiber Optic Test Procedure (FOTP) Standards			FOTP
	Electronics Industries Alliance (EIA) Standards			EIA
	Institute of Transportation Engineers (ITE) Standards			ITE
	National Electrical Manufacturers Association (NEMA) Standards			NEMA
	National ITS Architecture			
	National Transportation Communications for ITS Protocol (NTCIP) Standards			NTCIP
	Rural Utilities Service (RUS) Specifications			
	Telecommunications Industries Association (TIA) Standards			

2.18.3 Performance Requirements

2.18.3.1 Meetings

The Design-Builder shall work with WSDOT to form an ITS design team to oversee and provide input on the ITS design and construction. The ITS design team shall develop a schedule for meetings and coordination during the Project from the Contract Execution to Project Final Acceptance.

To monitor design progress and assist in the conduct of these meetings, the Design-Builder shall have available for review and inspection the Core ITS Plan showing all proposed locations for highway ITS components and how the equipment locations interrelate to form the highway ITS.

The Design-Builder shall schedule, organize, record minutes, and conduct the ITS design progress meetings to accomplish the following:

- Review existing ITS systems and operations
- Discuss the outcomes of the Design-Builder's field verification of all existing ITS systems and components
- Define and finalize ITS functional, technical, operational, and maintenance requirements

- Finalize goals and parameters of ITS design
- Establish integration requirements
- Develop Acceptance of ITS design
- Address and discuss ITS construction issues

2.18.4 Design and Construction Criteria

2.18.4.1 General Items

Requirements for the items necessary for design and/or construction of the Intelligent Transportation System that are not explicitly detailed within Section 2.18 of this RFP, are detailed in Appendix B3.18. The Design Builder shall adhere to all requirements set forth in Appendix B3.18.

2.18.4.2 ITS Training

The Design-Builder shall provide WSDOT personnel with instruction in the operation and maintenance of installed ITS elements, including the software.

The Design-Builder shall prepare training documentation. This documentation shall be structured in such a way that it can be used as a reference manual for the training of future staff.

Training courses shall not be scheduled until WSDOT's approval of training documentation.

The ITS training shall include the following:

- VMS Training shall be provided in accordance with Appendix B3.18.4.3.3 "VMS Training"
- ESS Training shall be provided in accordance with Appendix B3.18.12.3.2 "System User Training"

2.18.4.3 WSDOT Personnel

2.18.4.3.1 ITS Implementation Engineer

The ITS Implementation Engineer acts as the WSDOT integrator and liaison between the TSMC, WSDOT Construction administration, and the Design-Builder.

The ITS Implementation Engineer performs the following:

- Recommends Acceptance of components and/or methods to the WSDOT Project Manager.
- Reviews the certification of test device calibration (to American National Standards Institute (ANSI) specified guidelines).
- Makes recommendations for Acceptance to the WSDOT Project Manager.
- Reviews and makes recommendations for Acceptance to the Department of the required documentation including specifications, shop drawings, and all measured and recorded values for the system and for each cabinet.

- Is present when splice vault, CCTV, cabinet, and communication hub locations are staked.
- The ITS Implementation Engineer or representative will supervise all connections to the existing ITS communication network.
- Reviews component-submittal packages.
- Makes recommendations to the Department for the acceptance of ITS components based on the submittal and other documentation packages.

2.18.4.3.2 WSDOT Electrical Engineer Inspector

The Department of Labor and Industries has authority over all electrical installations within the State of Washington. The Washington State DOT has been granted authority over all electrical installations within the rights of way of state highways, provided the Washington State DOT maintains and enforces an equal, higher or better standard of construction and of materials, devices, appliances and equipment than is required by state law. It is the role of the WSDOT Electrical Inspector to assure compliance of all electrical installations to meet the requirements of the National Electric Code and all applicable state law and provisions.

The WSDOT Electrical Inspector performs the following:

- Assists as a resource for the ITS design team.
- Assists with ITS plan reviews.
- Performs periodic inspections during construction.
- Witnesses required ITS field tests (as desired).
- Inspect and approve of all electrical and ITS installations provided under this RFP.

2.18.4.3.3 Northwest Region Signal Maintenance Superintendent

The Northwest Region Signal Maintenance Superintendent is Brian Bailey. The Northwest Region Signal Maintenance Superintendent supervises the maintenance of all existing WSDOT signal, illumination and ITS facilities within the rights of way of state highways.

The Northwest Signal Superintendent performs the following:

- Where called for in this RFP provides State supplied ITS materials.
- Where called for in this RFP collects salvaged ITS materials.
- Performs acceptance inspection of all Design Builder installed ITS facilities prior to project completion. (Before these ITS facilities are turned over to the State to maintain).

2.18.4.4 Design Requirements

2.18.4.4.1 General

The Design-Builder shall design a complete, operational, and maintainable ITS which includes at a minimum the core devices described in section 2.18.1. The Design-Builder shall incorporate ITS devices that are compatible with the existing equipment, software, and communication infrastructure of the Northwest Region Transportation System Management Center (TSMC).

The Design-Builder shall design and install a system that meets all of the requirements of Appendix B3.18.

The Design-Builder shall design an ITS that is expandable and will support stand-alone operation of all field devices using back-up software components.

The cabinets shall be laid out consistently throughout the project

The Design-Builder shall provide for the labeling of the ITS devices with WSDOT-provided naming and numbering convention. Cabinet labeling shall be in accordance with Appendix B3.18.1.2.8 “Cabinet Labeling”. Junction box, pullbox, and cable vault labeling shall be in accordance with 9-29.2(4) of the Standard Specifications.

All material, equipment, and component parts to be furnished shall be new (within 12 months from date of manufacture), of the latest design and manufacture, in an operable condition at the time of delivery and installation, and compatible with the in-place system.

The Design-Builder shall provide a Core ITS Plan that includes the devices described in the Section 2.18.1. WSDOT will respond within 10 Working Days of receipt of the plans.

The Core ITS Plan shall have the following items:

- Title sheet, north arrow and scale bar.
- Legend of symbols.
- Existing ITS features.
- Locations of all proposed ITS devices with labels
- Proposed channelization.
- Power service locations.
- Conduit runs and junction box location.

The Design-Builder shall provide a final ITS plan that addresses the comments received from the Core ITS Plan review and any issues raised during the ITS design meetings. WSDOT will respond within 10 Working Days of receipt of the final ITS plans.

These plans shall be complete and include all items from the Core ITS Plan and the following:

- Wire and Construction Notes
- ITS Details

- All ITS labels
- Calculations to support transformer sizing, and transformer overcurrent protection devices
- Conduit fill and junction box capacity calculations
- Service load calculations
- Permission from bridge for attachment to structures or installations, which would affect structures
- Soils information for foundation design

Power Service

The Design-Builder shall be responsible for obtaining (from the power service providers and WSDOT) review and approval of its power service design. The Design-Builder shall coordinate and meet all requirements as specified by the power service provider and the Illumination section (2.16) of this RFP for the complete and operational power service to all required locations.

Service Drops for Electric Equipment Cabinets

If type B or D (120/240 VAC) services are used, the service drop should be within 500 feet of the cabinet containing the electronic equipment.

Distances greater than 500 feet should have a type C or E 480 VAC service installed. The 480 VAC should then be run to the electronic equipment cabinet and transformed to 120 VAC.

The transformers shall not be mounted on or in the electronic cabinet.

Location of ITS Devices

All ITS devices shall be installed within WSDOT Right-of-Way. All ITS devices shall be located outside of the clear zone (per the *Roadside Design Guide*) and in an area where access to equipment shall not affect traffic operations nor require maintenance of traffic. With WSDOT approval, the Design-Builder may install barrier, guardrail, or crash protection equipment to protect new and existing ITS devices that are in the clear zone.

The Design-Builder shall not locate any cabinet in the highway median.

Maintenance Pullouts

Maintenance pullouts shall be provided at all cabinet locations and other locations where maintenance vehicles will be required (i.e., bucket truck access near VMS structure or CCTV poles).

Existing Facilities

The Design-Builder shall be responsible for locating all underground existing facilities (City, County, State, and Utilities) and designing all ITS elements to avoid conflicts with these facilities. In the cases of unavoidable utility conflicts, the requirements of Utilities and Third

Party Agreements (Section 2.10) shall be followed.

The Design-Builder shall be responsible for all repairs to facilities damaged by the Design-Builder.

2.18.4.4.2 CCTV Systems

General

The Design-Builder shall provide for the video feeds from cameras to be sent to a communication hub in the field on distribution fiber and then be transmitted to the TSMC on the communication fiber.

The Design-Builder shall provide the CCTV hardware. The CCTV hardware components shall include the CCTV Camera, CCTV pole, pole foundation, CCTV control cabinet (ground-mounted), and the video/communication components and cables.

Camera Location

Camera locations shall be as described in CCTV Systems (Section 2.18.1.3)

Location Criteria

Video surveillance locations for CCTV surveillance assemblies shall provide full, unobstructed viewing of all freeway segments in the project.

Plans shall include the complete site design, structural design of camera pole and foundation, exact camera placement (plan and elevation), and cabinet layout.

Cameras should be located so that the main view will have the camera looking away from bright light. Looking into bright light from a low light condition causes washout of the video image.

CCTV cameras shall be able to turn 360 degrees.

CCTV cameras shall have overlapping coverage.

CCTV is located along the highway at a maximum distance of 1 mile between cameras.

A camera is typically located at each interchange. This allows monitoring of ramp metering as well as ramp queues. A minimum of two cameras should be placed at freeway-to-freeway interchanges (one to monitor each freeway).

Cameras should, where feasible, be located so that the message of an adjacent Variable Message Sign (VMS) can be read. This allows for visual verification of VMS status.

Placement to allow monitoring of ramp metering and ramp queues, if applicable

The best camera location will often be on or next to an under crossing because of the increased altitude over the roadway or view of an interchange. If possible, the camera should be located off of the bridge structure. Vibration of the bridge can have an affect on camera reliability (usually this affect is minimal). Often however, because of obstructions such as trees, the bridge structure will clearly be the best place to install the camera. Headquarters Bridge Department must design a suitable foundation for this camera pole. Ideally this pole would be located above a bridge column or bent to reduce vibration. Headquarters Bridge Department should be notified early on if a bridge will be affected.

A less desirable alternative to bridge placement is to place the camera adjacent to the roadway, a maximum of 10 feet from the bridge structure, and extending a minimum 30 feet above the top of the under crossing. The camera may then be serviced from the roadway on top of the under crossing.

Poles and cameras shall not be placed in the median of the highway (unless specifically called for in Section 2.18.1.3)

Camera Height

It is often desirable to locate cameras as high as possible over the roadway, to a maximum of 60 feet. The camera pole shall be 50 feet tall. However, cameras mounted on retaining walls and under structures may not need a pole. In rare instances a 60-foot pole may be used, but only when service access is located directly underneath, since the largest Northwest Region bucket truck reaches 65 feet. WSDOT will consider proposals with pole elevations of less than 60 feet, provided the level of coverage has been approved by WSDOT.

Provision to be added for WSDOT to verify coverage.

If proposals are submitted with different camera locations or heights than detailed in CCTV Systems (Section 2.18.1.3) WSDOT will have to verify the coverage. WSDOT will schedule the use of a bucket truck from NW Region Signals Branch.

CCTV System Components

Most CCTV components, except for cabinets and twisted pair cable, will be obtained under proprietary requirements. The Design-Builder shall use the items required by Appendix B3.18.2.2 “Materials”. Major CCTV components are as follows:

Camera Assembly

The camera assembly shall be in accordance with Appendix B3.18.2.2.1 “Camera Assembly”.

Camera Pole

The camera pole shall be in accordance with Appendix B3.18.2.2.2 “Camera Poles”.

Camera Control Cabinet (Pad Mount)

The camera cabinet houses the video/data transceiver and the power distribution panel. The camera cabinet requires 120 volts AC for power. The camera should be clearly visible from the camera cabinet location.

The camera control cabinet shall be in accordance with Appendix B3.18.2.2.3 "Camera Control Cabinet (Pad Mount)".

CCTV System Cabling

The CCTV System Cabling shall be in accordance with Appendix B3.18.2.2.4 "CCTV System Cabling" ICCTVCABLE.DT1

Communications

Camera control signals are carried from the TSMC over singlemode fiber optic cable to the communications hub nearest the camera. The signal continues on singlemode fiber optic cable to the video/data transceiver in the camera cabinet. A control cable connects the video/data transceiver to the camera.

The video signal leaves the camera via camera control cable to the camera cabinet. The video/data transceiver in the camera cabinet puts the signal onto singlemode fiber optic cable back to the nearest communication HUB.

2.18.4.4.3 Ramp Meter Installations

Although there is a significant difference in function between a data station (surveillance) and a ramp meter station (surveillance and control), equipment specifications for both are nearly identical.

Background

WSDOT ramp meters perform all data station functions as well as, control the flow of vehicles entering the freeway by allowing them on, one at a time, at a rate that can be accommodated by the mainline facility. This is accomplished with a standard traffic signal display that is actuated by the ramp meter controller.

Motorists are given advance warning of the ramp meter operation prior to entering the metered ramp by means of warning signs and yellow flashing beacons located at the head of the ramp or on the adjacent local arterial.

There are two ways a metering rate is determined, remote and standby metering

Remote metering

In this mode of operation, the central computer determines metering rates for all ramp meter locations. This is the normal mode of operation for the Seattle system. Central is capable of adjusting the upstream metering rates based on the downstream conditions. The length of

each on-ramp queue is also taken into account. Metering start and end times can be adjusted from Central

Standby metering (local control)

This is used when communications between the ramp meter and the central computer are interrupted. In these cases, each ramp meter will determine a metering rate for its on-ramp according to local traffic conditions or by a time of day table, while also taking into account the on-ramp queue conditions. In standby metering, a ramp meter operates independently, without coordinating with other ramp meters.

Controller

The controllers used for data stations and ramp meters are Model 170 controller. The controller processes traffic volume and occupancy information and sends this information to the central computer at TSMC. At ramp meter locations, the controller also operates the signal displays and warning sign flashing beacons.

All controllers use a modem for communication of information to and from a compatible modem in a communication hub.

General

Wherever possible, metered ramps should be provided with HOV bypass lanes. These allow transit, carpools, vanpools and motorcycles to bypass queues at the ramp meter signal. (Design Manual For Design Build Projects section 1050).

When no shoulder or HOV lane is available, preemption for emergency vehicles should be considered.

Location Criteria

Ramp metering locations shall be as described in Ramp Metering Systems, Section 2.18.1.4

Cabinets must be easily accessible from the ramp and/or the mainline by maintenance and operations personnel. Cabinets should be placed so that the signal display, ramp and mainline loops are visible from the front door. The cabinet location shall be protected from traffic by placing them out of danger (behind a guardrail for example). The cabinets should also be placed out of the flood plain and above the water level.

The Design-Builder shall consult with WSDOT for final loop, stop bar, signal, and advance warning sign placement.

At the mainline loop locations, junction boxes shall be placed on both sides of the freeway (connected by conduit) to handle the mainline loops of that location. This way the entire roadway will not have to be closed for loop repair.

Hardware

All cabinet equipment for new data stations and ramp meter controller stations are to be identical.

The major components of a data station/ramp meter are:

Cabinet Equipment:

1. Controller
2. Modem
3. Display Panel
4. Detector Amplifiers
5. Output/Power Distribution Assembly
6. Load Switches
7. Current Monitor (suggested)
8. Flasher for Warning Sign Beacon

Field Equipment:

9. Junction Boxes
10. Detectors
11. Signal Display
12. Warning Signs and Flashing Beacons
13. Central Computer (remote ramp metering only)

A general description of each item follows. For further information see Appendix B3.18.3.

Cabinets

The ramp meter cabinets shall be in accordance with Appendix B3.18.3.1.3 "Model 334 Cabinet".

For master detail see Appendix C3.18

Ramp meter cabinets are physically limited to 40 loops. The number of loops for a single cabinet shall not exceed 32 loops.

Controllers

The ramp meter controllers shall be in accordance with Appendix B3.18.3.1.1 "Model 170E Controller".

For master detail see Appendix C3.18

Modems

The modems shall be in accordance with Appendix B3.18.3.1.1 "Model 170E Controller".

Ramp meters and data stations require drop-insert modems capable of re-transmitting a signal to the next modem and be capable of operating in a ring configuration.

Detector Display Panel

For master detail see Appendix C3.18

Auxiliary Display Panel

For master detail see Appendix C3.18

Loop Detector Amplifiers

Loop amplifiers shall be in accordance with Appendix B3.18.3.1.4 “Rack Mount Vehicle Loop Detectors”.

Output/Power Distribution Assembly (Power Panel)

For master detail see Appendix C3.18

Load Switches

For master detail see Appendix C3.18

Junction Boxes

Junction boxes are located alongside the roadway adjacent to roadway loops. The loops are spliced in the junction box to shielded lead-in cable that then runs to the loop amplifiers in the cabinet. Junction boxes can also be used as "pull points".

Junction boxes should never be placed in the traveled roadway. When a junction box is placed in the shoulder in front of the barrier section where occasional traffic exposure occurs, a Traffic Bearing junction box shall be used.

For master detail see Appendix C3.18

Detectors Loops

The detector loops shall be in accordance with Appendix B3.18.3.2.2 “Induction Loop Vehicle Detectors”.

The Design-Builder shall furnish and install queue detection on metered entrance ramps and collector-distributor roads. The Design-Builder shall furnish and install queue loops (up to 4 per metered lane) at the distances based on volume and storage capability of the ramp. The location of queue loops shall be determined during the ITS design meetings.

The Design-Builder shall locate detector loops in the center of the lane and a minimum of 1 foot from transverse panel joints. The Design-Builder shall not exceed a 1,000-foot length for loop detector lead-in cable.

Mainline loops (two per lane) shall also be installed at all metered ramps as detailed in section 2.18.1.4.

The Design-Builder shall provide the WSDOT Implementation Engineer with the calculations showing that the inductance in the cable from the amplifiers to the loop is less than the inductance of the loop itself.

All vehicle detection loops shall be identified using WSDOT naming convention. The Design-Builder shall consult with WSDOT for the proper names.

Meter Signal Display

Signal displays shall be in accordance with Appendix B3.17.

Warning Sign and Flashing Beacon

POLICY STATEMENT ON ADVANCED WARNING FOR RAMP METERING

Ramp meter warning signs and flashing beacons shall be used to:

- 1) Provide motorists advanced warning that a ramp is being metered.
- 2) Provide motorists the option of using a ramp that is being metered.
- 3) Advise motorists of impending stops, due to ramp metering, on a ramp where sight distance concerns exist.

To provide advanced warning and the option of using a metered ramp, all ramp metered ahead signs shall be clearly visible from all approaches to the ramp. The advanced warning signs will be placed at the head of the ramp. If a decision point exists at a location other than the ramp entrance, the sign shall be placed so that it is clearly visible from that location.

To advise motorists of stops ahead on a limited sight distance ramp, a second advanced warning sign may be placed on the ramp. This sign should be approximately half the distance from the head of the ramp to the stop bar.

When metering is in effect, the beacons flash. All other times, the beacons are off. A warning sign is supplied only for a ramp meter, not for a data station. An aluminum NEMA 3R box, housing the flasher for the beacon, shall be installed on the sign pole over the handhold, approximately four feet above ground level, under the warning sign.

Central Computer

The central computer, a Digital VAX system located at TSMC, receives and processes data from all data station/ramp meters simultaneously. Central also transmits ramp meter instructions to ramp meters. Ramp metering is controlled from central during remote metering operation.

2.18.4.4 Data Station Installations

Although there is a significant difference in function between a data station (surveillance) and a ramp meter station (surveillance and control), equipment specifications for both are nearly identical.

Background

Data stations collect current volume, occupancy, and speed data (when speed loops are present) from specific roadway sections. This information is transmitted to the central computer (Central) located at TSMC for analysis and application.

Location Criteria

Data Station locations shall be as described in Data Station Systems (Section 2.18.1.5)

The data station controller cabinet is situated along the freeway mainline adjacent to corresponding roadway detection loops.

Cabinets must be easily accessible from the ramp and/or the mainline by maintenance and operations personnel. The cabinet location shall be protected from traffic by placing them out of danger (behind a guardrail for example). The cabinets shall be placed out of the flood plain and above the water level.

At the mainline loop locations, junction boxes shall be placed on both sides of the freeway (connected by conduit) to handle the mainline loops of that location. This way the entire roadway will not have to be closed for loop repair.

Hardware

The major components of a data station/ramp meter are:

Cabinet Equipment:

1. Controller
2. Modem
3. Display Panel
4. Detector Amplifiers
5. Output/Power Distribution Assembly

Field Equipment:

6. Junction Boxes
7. Detectors

From a construction standpoint, the only differences between a data station and a ramp meter are the signal display, warning signs, and the number of loops needed on the on-ramp of a ramp meter. A general description of each item follows. For further information see Appendix B3.18.3.

Cabinets

The data station cabinets shall be in accordance with Appendix B3.18.3.1.3 "Model 334 Cabinet".

Data station cabinets are physically limited to 40 loops. The number of loops for a single cabinet shall not exceed 32 loops.

Controllers

The data station controllers shall be in accordance with Appendix B3.18.3.1.1 "Model 170E Controller".

Modems

The modems shall be in accordance with Appendix B3.18.3.1.1 "Model 170E Controller".

Detector Display Panel

For master detail see Appendix C3.18

Loop Detector Amplifiers

Loop amplifiers shall be in accordance with Appendix B3.18.3.1.4 "Rack Mount Vehicle Loop Detectors".

Output/Power Distribution Assembly (Power Panel)

For master detail see Appendix C3.18

The transformers shall not be mounted on or in the electronic cabinet.

Junction Boxes

Junction boxes are located alongside the roadway adjacent to roadway loops. The loops are spliced in the junction box to shielded lead-in cable that then runs to the loop amplifiers in the cabinet. Junction boxes can also be used as "pull points".

Junction boxes should never be placed in the traveled roadway. When a junction box is placed in the shoulder in front of the barrier section where occasional traffic exposure occurs, a Traffic Bearing junction box shall be used.

For master detail see Appendix C3.18.

Detectors Loops

The detector loops shall be in accordance with Appendix B3.18.3.2.2 "Induction Loop Vehicle Detectors".

The Design-Builder shall locate detector loops in the center of the lane and a minimum of 1 foot from transverse panel joints. The Design-Builder shall not exceed a 1,000-foot length for loop detector lead-in cable.

The Design-Builder shall provide the WSDOT Implementation Engineer with the calculations showing that the inductance in the cable from the amplifiers to the loop is less than the inductance of the loop itself.

New and retrofitted data stations should have mainline speed loops, located 17 feet downstream of the mainline loops, used for calculating vehicle speed and length, See Appendix C3.18.

Mainline loops (two per lane) shall be installed at all metered ramps as detailed in section 2.18.1.4.

Vehicle Detection

The Design-Builder shall install permanent induction loops in on-ramps, exit-ramps, and auxiliary and mainline lanes.

The Design-Builder shall not have more than 32 detector inputs per cabinet.

2.18.4.4.5 Variable Message Signs (VMS)

The Design-Builder shall install LED Walk-in NTCIP 105x27 Full Matrix VMS from Daktronics, Inc at every VMS location.

General

The Design-Builder shall have a Structural Engineer licensed in the State of Washington design the VMS support structure. The Design-Builder shall mount the VMS to the support structure.

The Design-Builder shall install maintenance walkways for all VMS Signs as detailed in Standard Plan G-6.

The Design-Builder shall account for sign viewing angle for each VMS location. The Design-Builder shall provide VMSs with a safe ingress/egress structure to accommodate maintenance personnel.

The Design-Builder shall obtain WSDOT approval of the sign locations with safety and aesthetics considered as part of the process. An operating policy will be established by WSDOT working with the Design-Builder and the ITS design team that addresses sign messages, control, and responsibilities. Messages on the signs will be controlled from the TSMC.

The Design-Builder shall locate the VMSs so no lane closures are required to perform maintenance.

Location

Variable Message Sign locations shall be as described in Variable Message Sign (VMS) (Section 2.18.1.6)

Control Cabinet

The VMS cabinet houses the controller, modem, and associated electrical and climate control equipment. The VMS requires 120 volts AC (VAC) for power, which may be stepped down from 480 VAC if needed. The cabinet should be large enough to provide adequate air circulation for cooling. The cabinet is usually mounted to the outside of the VMS support (i.e. sign bridge)

Control Cabinets shall be design and constructed in accordance with Appendix B3.18.4.2.5 “Ground-mounted VMS Field Cabinet” and Appendix B3.18.4.2.5 “Control System”.

Modem

The Design-Builder shall specify an appropriate modem and communication circuit for VMS located beyond the limits of the fiber optic cable facility.

Controller

The controller locally controls the message display functions of the sign.

The controller shall be designed and constructed in accordance with Appendix B3.18.4.2.9 “VMS Sign Controller”.

Sign Housing

The sign housing shall be designed and constructed in accordance with Appendix B3.18.4.2.3 “Sign Housing”.

Communications

VMS control signals are carried from the TSMC to the communications hub over singlemode fiber optic cable. The signal is then put on a distribution, singlemode fiber optic cable that carries it to the VMS cabinet.

VMS Software shall be in accordance with Appendix B3.18.4.2.10 “Control Software”.

2.18.4.4.6 Highway Advisory Radio Signs (HARS)

Background

Highway Advisory Radio (HAR) is used as a driver information system to warn motorists via their car radio of construction and maintenance roadway closures, and major traffic incidents. HAR has an advantage over Variable Message Sign (VMS) because more detailed information can be relayed to the motoring public, giving them the chance to use alternate routes. Both the Radio Shop and the TSMC should be included in any plan review involving HAR.

Restrictions on Message Content

HAR message content is restricted by federal regulations. WSDOT restricts HAR messages to non-commercial voice information pertaining to traffic and road conditions, major incidents, traffic hazards and travel advisories.

HAR Signs

HAR signs tell the motorists to tune to the HAR broadcast when beacons above the sign are flashing. HAR signs are typically located on the approach legs of major freeway interchanges, thus giving the motorist ample warning to avoid an incident or closure. Signs should be located far enough from the alternate route to give motorist time to locate radio channel (15-20 seconds), listen to message twice (approx. 60 seconds), and divert to alternate route.

General

The current standard is "**TRAFFIC ADVISORY / TUNE 530 AM / WHEN FLASHING**" on a 7' by 15', black on yellow sign.

Location

HAR Sign locations shall be as described in Highway Advisory Radio Signs (HARS) (Section 2.18.1.7)

Location Criteria

The distance from sign to alternate route on a 55 mph freeway should be approximately 1 1/2 to 2 miles. The distance from the HAR transmitter to its HAR sign should not exceed 2 miles. Existing sign spacing standards should be used when placing HAR sign, except that the motorist should not have to take their attention from a difficult stretch of roadway (sharp curves, merges, etc.) to tune radio. HAR signs should be located within sight of a CCTV to visually confirm the status of flashing beacons.

HARS Components

For further information see Appendix B3.18.5 "Highway Advisory Radio Sign (HARS)".

All components for the HARS shall be in accordance with Appendix B3.18.5.2 "Materials".

Relay Panel and Power Supply

The relay panel and power supply are located in control cabinet. The HAR sign uses a 12-volt DC power supply and relay to interface with the 170E controller.

Manual Switch

The manual switch allows for control of the HAR sign beacons and illumination for maintenance and testing. The manual switch has three positions: "manual on" for control of beacons at the HAR sign, "off" to turn the signs beacons and equipment off, and "auto on" to remotely control the sign.

2.18.4.4.7 Highway Advisory Radio Transmitters (HART)

Background

Highway Advisory Radio (HAR) is used as a driver information system to warn motorists via their car radio of construction and maintenance roadway closures, and major traffic incidents.

General

The HAR transmitter shall be controlled remotely from the TSMC via singlemode fiber optic. The maximum transmitter output is 10 watts.

Location

HAR Transmitter locations shall be as described in Highway Advisory Radio Transmitter (HART) (Section 2.18.1.8)

Location Criteria

The HAR transmitter is usually located at the interchange that the HAR signs are covering. Typically the transmitter is located within the open area within a loop ramp, since the transmitter's antenna requires a 20-foot minimum radius on the ground. The HAR transmitter should be located on the highest ground possible, to aid reception of the transmission.

HART Components

The HART system consists of an Antenna, control cabinet, AM Transmitter, Voice Storage Unit, and a Relay Panel and Power Supply. For further information see Appendix B3.18.6 “Highway Advisory Radio Transmitter (HART)”.

All components for the HART shall be in accordance with Appendix B3.18.6.2 “Materials”.

2.18.4.4.8 Communication Conduit System

General

The Traffic Systems Management Center (TSMC) employs various methods of communication from its central VAX computer to ITS components in the field. Voice, data and video communications are used by TSMC.

TSMC communicates to ITS devices through fiber optic cable, copper twisted pair cable, leased telephone lines and microwave transmission. These communication lines are housed and protected by conduit and related structures.

Location

The Communication Conduit System shall consist of two 4-inch conduits with innerduct (including cable vaults, pull boxes, junction boxes, etc) extending from the south (existing communication hub near LR STA 190+00) to the north (south bridge seat of the Snohomish River bridge). There will also be two 4-inch conduits with innerduct (and associated vaults and boxes) installed for approximately 0.7-mile west on SR 526 from the I-5 interchange and 0.7-mile east on SR 2 from its interchange with I-5. Whenever possible, conduits shall be installed within new structures.

Communication Conduit System Components

The Communication Conduit System Components shall be in accordance with Appendix B3.18.7.1 “Description” and Appendix B3.18.7.2 “Materials”.

Conduit

Conduit may be buried in a trench, attached to or incorporated into structures.

When buried, all PVC conduit shall be encased in controlled density-fill in accordance with Appendix B3.18.7.2.3 “Controlled-density Fill” and buried in a trench with fiber optic warning tape and a location wire in accordance with Appendix B3.18.7.2.1 “Location Wire and Warning Tape”.

When attached to structures, Rigid Galvanized Steel, RGS, must be used along with approved mounting brackets. The WSDOT headquarters bridge section shall be contacted when planning to attach conduit to a bridge.

Innerduct shall be in accordance with Appendix B3.18.7.2 “Materials”.

Cable Vaults

Cable vaults are used as pull points, splice locations, and where the mainline conduit has major changes in direction. They are also used whenever mainline communications conduit changes from PVC to GRS and visa versa.

Cable Vaults shall be in accordance with Appendix B3.18.7.2.2 “Cable Vaults and Pull Boxes”.

The Design-Builder shall coil and rack at least 50 feet of cable at all cable vaults.

Junction Boxes

Junction boxes can be used as "pull points" for copper twisted pair. Type 2 should be used as a minimum for distribution communication cables.

Junction boxes shall never be placed in the traveled roadway. When a junction box is placed in a paved shoulder, a Traffic Bearing junction box shall be used.

For master detail see Appendix C3.18

Generally, in grade junction boxes are sized following standard Plan J-11a.

All sizing of junction boxes, whether in grade or structure mounted, shall meet the requirements of the National Electrical Code, Section 270-18.

Pull Boxes

Pull boxes shall be spaced at 1000-foot intervals along mainline conduit runs. Pull boxes, as their name implies, are used as intermediate pull points where cable vaults are not needed. Pull boxes are generally smaller than cable vaults. Splices are not allowed in pull boxes.

Pull Boxes shall be in accordance with Appendix B3.18.7.2.2 “Cable Vaults and Pull Boxes”.

A pull box shall be placed at all cabinet locations.

Terminal Cabinets

A fiber optic terminal cabinet shall be installed at the I-5 and SR 2 interchange. The mainline and distribution cables shall terminate in patch panels within this cabinet.

Fiber Optic Terminal Cabinets shall be in accordance with Appendix B3.18.8.2.8 “Fiber Optic Terminal Cabinets”.

Existing Conduit Systems

Existing conduit systems consist of stick PVC, or GRS conduit.

When installing fiber-optic cables in existing conduits through existing pull boxes and cable vaults, the Design-Builder shall check the cable route to ensure that there is a smooth transition between exit and entrance elevations and that the horizontal angle is not so sharp as to cause damage to the cable as it is being pulled through the existing conduit. If the Design-Builder encounters sharp bends, the Design-Builder shall reinstall conduit to provide a smooth transition.

The Design-Builder shall clean the existing conduit of any debris that could impede pulling fiber-optic or copper cable through it or that could damage the cable if the debris remained.

Directionally Bored NMC

When installing conduit under slope paving, the Design-Builder shall use directional boring so as to not damage the slope paving.

The bore under the roadway surface shall extend 10 feet beyond the pavement edge or curb line.

2.18.4.4.9 Communication Cable and Interface Systems

The Design-Builder shall provide a communication network to serve the highway ITS components within the ITS project limits. The system shall also provide the required communication links to the highway ITS components that are not located within the Right of Way for the Project.

The Design-Builder shall not substitute or apply any part or attach any piece of equipment contrary to the manufacturer’s recommendations and standard practices.

All locations containing identical equipment shall be configured and wired in a consistent if not identical manner by the Design-Builder, including internal wiring and harnesses, wiring color codes, labeling terminal block positions, termination strips, power service configuration, and panel and equipment mounting and locations. Wiring details shall be similar to those shown in Appendix C3.18 but wiring diagrams will be finalized during the design meetings.

Communication Cable and Interface System shall be in accordance with the following:

Appendix B3.18.8.1 “Description”
Appendix B3.18.1.2 “Materials”

Fiber-Optic Cable

The Design-Builder shall locate mainline fiber-optic cable or cable conduit systems as close to the right-of-way line as practicable. The Design-Builder shall minimize the number of transverse crossings of the freeway. The Design-Builder shall place the fiber-optic trunk cable in conduit.

Fiber-Optic Cable shall be in accordance with Appendix B3.18.8.2.1 “Cables”.

Fiber-Optic Connection Components

Fiber-optic connection components will be necessary to connect Project-installed cable to the ITS communications network.

Patch Cords

For indoor patch cords, the Design-Builder shall meet the following requirements for single-mode fibers:

- Indoor patch cords shall not be armored.
- Single mode patch cord jackets shall be yellow, 3 mm (0.12 inches) outside diameter, have aramid strength members, and yellow boots.
- Patch cord fibers shall have a secondary buffer from 250 μm to 900 μm .
- Patch cords shall be individually constructed.
- Patch cords shall not have factory fusion fiber splices.
- Patch cords shall have FC-UPC connectors.
- Boots shall be glued to the patch cord jacket.

Fiber Connectors

Fiber optic connectors shall be in accordance with Appendix B3.18.8.2.3 “Fiber Optic Connector”.

Patch Panel Components

Patch panels shall be in accordance with the following:

Appendix B3.18.8.2.2.1 “Fiber Optic Patch Panels”

Appendix B3.18.2.2.1.1 “Wall Mounted Fiber Optic Patch Panel”

Appendix B3.18.2.2.1.2 “Small Cabinet Fiber Optic Patch Panel”

Appendix B3.18.2.2.1.3 “Cabinet Fiber Optic Patch Panel”

Appendix B3.18.8.2.2.1.4 “HUB Fiber Optic Patch Panel”

Fiber Splice Closure

The Design-Builder shall provide an outdoor fiber splice closure that includes an outer enclosure, an inner enclosure, and plastic splice trays.

The temperature rating for the splice enclosure shall be -30 to 60°C (-22 to 140°F).

In addition to the following requirements, the fiber splice closure shall be in accordance with Appendix B3.18.8.2.5 “Fiber Optic Splice Closure”.

Outer Enclosure

The outer enclosure shall meet the following requirements:

- Protect splices from damage
- Be of salt corrosion resistant material and compatible materials not supporting galvanic cell action
- Be re-enterable
- Permit splicing without circuit disruption
- Have a grounding lug (ground all fiber-optic cable shields)
- Have cable (trunk and pigtail) strain relief and be compatible with the inner enclosure, splice trays, and cables

Splice Enclosure

The splice enclosure (which allows re-entry of fiber-optic cable), shall permit the cable to enter without exceeding the minimum bending radius, have non-oxidizing coating on all connections, and have a cable clamp bonding it to the armor of the cable. The enclosure shall have space to terminate up to two trunk cables and armored pigtails.

The splice enclosure shall permit selective fiber splicing (a cable can loop in and out with only the selected fibers cut). The Design-Builder shall pressurize each splice enclosure to 20 kPa (3 psi).

The enclosure shall expand to allow eight fiber-optic cables and pigtails to enter through one end. All cables shall enter the enclosure through one end of the enclosure. The eight-cable configuration shall include a splice case, three cable addition kits, and a triple butt adapter bolt kit.

Inner Enclosure

The inner enclosure (plastic splice tray) shall meet the following requirements:

- Allow entry to individual fibers
- Be stackable
- Hold 12 splices and 24 fibers
- Not violate bare fiber bend radius
- Have room for splice identification on the cover

Wireless Communications

The Design-Builder may temporarily use wireless communications between field devices and communication nodes. Permanent communication shall use fiber optic cable.

2.18.4.4.10 Video, Voice & Data Distribution and Transmission Systems

All devices of Video, Voice & Data Distribution and Transmission Systems shall be in accordance with Appendix B3.18.9 “Video, Voice, Data Distribution and Transmission Systems”.

2.18.4.4.11 Communication Hub

Hubs

Communication hubs are used as information gathering points in the field. Data from the field devices is transmitted to a local hub via twisted pair copper and singlemode fiber optic cables. This data is placed on a single mode optical fiber and sent to TSMC where it is compiled for immediate use and stored for future use.

The Communication Hub shall be in accordance with Appendix B3.18.10 “Communication Hub / Concrete Universal Enclosure (CUE)”.

2.18.4.4.12 Permanent Traffic Recorder Station

Location

There is an existing Permanent Traffic Recorder (PTR) Station at approximate station LL STA 623+00 (Pacific Ave. On-Ramp to SB I 5.)

The new PTR location shall be between LL STA 605+00 and 618+00.

The Permanent Traffic Recorder Station shall be in accordance with Appendix B3.18.11 “Permanent Traffic Recorder Station”.

The design and installation of the PTR shall be as shown in Appendix C3.18.

2.18.4.4.13 Environmental Sensor Stations

The Environmental Sensor Station shall be in accordance with Appendix B3.18.12 “Environmental Sensor Stations (ESS)”.

2.18.4.4.14 Temporary ITS Systems

The Design-Builder shall design and install the 5 CCTV cameras as described in section 2.18.1.15. The Design-Builder shall select, provide, and install the camera systems and communications to transport full motion video (30 fps) to TSMC and snapshot JPEG to the Internet.

2.18.4.5 Construction Requirements

2.18.4.5.1 General

Maintenance Responsibility

The Design-Builder shall maintain and keep operational existing ITS devices for the duration of the project. The Design-Builder shall be responsible for maintaining all ITS devices and infrastructure in the project area starting at the beginning of construction activities. The date of beginning of construction will be set or announced at the project Preconstruction Meeting. The Design-Builder shall retain maintenance responsibility for all devices until it has completed all work through final acceptance of the project.

Testing of Existing Equipment

To ensure that all existing equipment is in working order at a site where the Design-Builder will work, the Design-Builder may request a meeting at each site with the Department and the party with current maintenance responsibility. At this time all loops, cabling, connectors, and cabinet operations may be tested by the Design-Builder. The Design-Builder shall be responsible for requesting, coordinating, and conducting the on-site meeting, and for providing all labor, materials, test equipment, and test documentation. All testing shall be non-destructive. If the Design-Builder begins to work at a location without arranging this testing it will be assumed that all cabinet components and operations were in proper working order at that time, and the Design-Builder shall have the responsibility for complete and proper operation upon the completion of its work. If no pre-testing is completed, any equipment that is not functioning at the completion of work, will be assumed to be working at the project start, and must be replaced at the Design-Builder's expense.

Existing Cables

When new cables are to be installed into existing conduits containing existing cables, the Design-Builder shall remove the existing cables and reinstall the existing cables simultaneously with the new cables. The Design-Builder shall take every precaution to protect the existing cables. In the event of damage to the existing cables, the Design-Builder shall replace all damaged cables and terminations, in-kind, at no additional expense to the Department. No splicing shall be permitted except as allowed Appendix B3.18

Existing Utilities

The Design-Builder shall be responsible for locating and marking all underground utilities prior to any ITS installation work.

Use and Operation Prior to Acceptance

The Department, as justified by public interest, may order some ITS elements to be placed into service before Substantial Completion of the project. Such action shall not be deemed as acceptance of the project in whole or in part, nor shall the Department on a provision of the Contract for the project construe such action as a waiver.

WSDOT will approve and/or control all electronic displays that are potentially in the public view. No display of any kind or activation of any component shall be permitted without prior approval of WSDOT.

Restoration

The Design-Builder shall be responsible for complete restoration (before Substantial Completion) of all work sites to a like or better condition to the satisfaction of WSDOT. All

grading, seeding, and mulching shall be in accordance with the prevailing standards of the agency with jurisdiction and with the requirements of Landscape and Aesthetics (Section 2.14).

Verification of Usefulness

When the Design-Builder elects to reuse existing conduit, ducts, and junction boxes, the Design-Builder shall be responsible for all verification of their availability and usefulness. Before the Design-Builder installs cabling into existing conduit, the Design-Builder shall thoroughly clean, blow, and brush out all conduit or ductwork runs to minimize damage to cables during the installation process, and prove conduit integrity with the use of an approved mandrel.

Damage and Delay

If damage to existing facilities inhibits the Design-Builder's progress of work, the Design-Builder shall immediately notify the Department. The Design-Builder shall adjust its work schedule to provide the Department with up to seven calendar days to resolve the situation; during that time, the Design-Builder shall retain responsibility for the site maintenance and continued normal operations as directed by the Department. Damaged existing facilities shall not be deemed as justification for project delay claims.

Construction Schedule

The Design-Builder shall develop and implement into the project schedule the ITS implementation schedule, which shall show the required sequence of all activities that must be completed prior to the initiation of other activities. The ITS implementation schedule shall address all major activities, components, and milestones of the ITS equipment installation and, at a minimum, include the following:

- Design reviews
- Equipment deliveries
- System element installation milestones:
 - Traffic signal cabinets
 - Metered ramp locations
 - Non-metered ramp locations
 - Traffic monitoring stations
 - Freeway VMS
 - Video surveillance locations
 - Communications system
 - Local testing
 - Communications testing
 - Acceptance
 - Utilities coordination, design and construction

Materials Furnished by Design-Builder - The Design-Builder shall supply all material and equipment required for the complete installation of the various ITS elements.

Similar Material and Equipment - Each type of material and equipment to be installed by the Design-Builder shall be the same model and made by the same manufacturer, and must be compatible with existing WSDOT standards and communication protocols.

All cabinets containing similar equipment shall be configured and wired identically, including but not limited to internal wiring and harnesses, wiring color codes, terminal block positions, termination strips, power service configuration, panel and equipment mounting locations. For master details see Appendix C3.18.

Conduit and Junction Box - All conduit and junction box installations shall be designed, furnished, and installed in accordance with prevailing WSDOT standards.

Incidental Materials - All incidental materials shall be furnished by the Design-Builder in accordance with the prevailing standards of the agency with jurisdiction over the facility where the equipment is located.

2.18.4.5.2 CCTV Systems

The CCTV System shall be in accordance with Appendix B3.18.2 “Closed Circuit Television System”.

The Design-Builder shall test the CCTV systems in accordance with Appendix B3.18.2.3.1 “CCTV Test”.

2.18.4.5.3 Ramp Metering Systems

The Ramp Metering System shall be in accordance with Appendix B3.18.3 “Traffic Data and Ramp Metering System”.

Ramp Control Signal Foundation

The Design-Builder shall comply with WSDOT Standard Plan J-7a when constructing the RCS foundation.

Testing for Loop Detectors shall be in accordance with Appendix B3.18.3.2.2.3 “Test for Induction Loops and Lead-in Cable”.

2.18.4.5.4 Data Stations Systems

The Data Station System shall be in accordance with Appendix B3.18.3 “Traffic Data and Ramp Metering System”.

Testing for Loop Detectors shall be in accordance with Appendix B3.18.3.2.2.3 “Test for Induction Loops and Lead-in Cable”.

2.18.4.5.5 Variable Message Signs (VMS)

The Design-Builder shall install power and communications cable conduits within the support structure. The Design-Builder shall install power and communications cables between the variable message signs (VMS) and the control cabinet.

The VMS shall be in accordance with Appendix B3.18.4 “Variable Message Sign (VMS)”.

2.18.4.5.6 Highway Advisory Radio Signs (HARS)

The HARS shall be in accordance with Appendix B3.18.5 “Highway Advisory Radio Sign (HARS)”.

Construction of the HARS shall be in accordance with Appendix B3.18.5.3 “Construction Requirements”.

2.18.4.5.7 Highway Advisory Radio Transmitters (HART)

The HART shall be in accordance with Appendix B3.18.6 “Highway Advisory Radio Transmitter (HART)”.

Construction of the HART shall be in accordance with Appendix B3.18.6.3 “Highway Advisory Radio Transmitter (HART)” IHART.DT1

2.18.4.5.8 Communication Conduit System

The Communication Conduit System shall be in accordance with Appendix B3.18.7 “Communication Conduit System”.

The Communication Conduit System shall be in accordance with Appendix B3.18.7.3 “Construction Requirements”.

Pull Boxes shall be in accordance with Appendix B3.18.7.2.2 “Cable Vaults and Pull Boxes”.

2.18.4.5.9 Communication Cable and Interface Systems

The Communication Cable and Interface System shall be in accordance with Appendix B3.18.8 “Communication Cable and Interface System”.

New 48-strand and 36-strand single mode fiber optic cables extending from the south (existing communication hub near LR STA 190+00) to the north (south bridge seat of the Snohomish River bridge) will be installed. New 36 strand cables will also be installed on SR 526 and US 2 to connect to the new CCTV and data stations. Fiber optic interface (cable termination and patch panels) shall be provided at new and existing Communication Hub as well as all ITS cabinets.

Fiber-Optic Cable Installation

The fiber optic cable shall be install in accordance with Appendix B3.18.8.3.2 “Cable Installation – General” and Appendix B3.18.8.3.2.2 “Fiber Optic Cable Installation”.

Lubricant for cable installation shall be in accordance with Appendix B3.18.8.2.4 “Fiber Optic Cable Lubricant”.

Racking of Cable shall be in accordance with Appendix B3.18.8.3.6 “Cable Racking in Pull Boxes and Cable Vaults”.

Fiber optic cable shall be labeled in accordance with Appendix B3.18.8.3.4 “Fiber Optic Cable Labeling”.

Fiber-Optic Cable Splicing

Fiber optic cable shall be spliced in accordance with Appendix B3.18.8.3.2.2 “Fiber Optic Cable Splicing”.

Testing

Testing shall be in accordance with Appendix B3.18.8.3.8 “Fiber Optic Cable Testing”.

2.18.4.5.10 Video, Voice & Data Distribution and Transmission Systems

The Video, Voice & Data Distribution and Transmission Systems shall be in accordance with Appendix B3.18.9 “Video, Voice, & Data Distribution and Transmission Systems”.

2.18.4.5.11 Communication Hub

The Communication Hub shall be in accordance with Appendix B3.18.10 “Communication Hub / Concrete Universal Enclosure (CUE)”.

2.18.4.5.12 Permanent Traffic Recorder Station

There is an existing Permanent Traffic Recorder (PTR) Station at approximate station LL STA 623+00 (Pacific Ave. On-Ramp to SB I-5.) It shall be replaced using the applicable details and requirements of this RFP.

The Permanent Traffic Recorder Station shall be in accordance with Appendix B3.18.11 “Permanent Traffic Recorder Station”.

The design and installation of the PTR shall be as shown in Appendix C3.18.

2.18.4.5.13 Environmental Sensor Stations

The Environmental Sensor Station shall be in accordance with Appendix B3.18.12 “Environmental Sensor Station”.

2.18.4.5.14 Temporary ITS Systems

The devices describe in section 2.18.1.15 shall be constructed as a first order of work.

2.18.4.6 ITS Testing

2.18.4.6.1 General

Once the ITS devices are installed, a 30-Working-Day reliability test shall take place. If the ITS devices and system perform trouble free for 30 Working Days of continuous operation, testing may stop. If not, repairs shall be made and a second 30-Working-Day test shall be conducted.

The Design-Builder shall have current training and certification on all testing equipment used. The Design-Builder shall provide documentary evidence that the instruments used for testing have been calibrated per the instrument manufacturer's specifications within the last 12 months. The Design-Builder shall have all testing equipment calibrated yearly for the life of the Contract. Measurements recorded during the tests shall be supplied to WSDOT.

The Design-Builder shall have in its possession a certification of test device calibration (American National Standards Institute [ANSI] specified guidelines) used to measure electrical and insulation characteristics of power and signal control cables and calibration documentation of optical cable test equipment. (ANSI guidelines call for annual calibration of test equipment.)

Depending on the construction schedule, highway ITS components may be installed and operational and later relocated. Highway ITS components shall undergo all series of tests when relocated.

In addition to the individual testing requirements detailed in their respective sub-sections, the ITS shall undergo the following tests:

2.18.4.6.2 Pre-Installation Test (PIT)

The Design-Builder shall perform a pre-installation test (PIT) on all ITS devices supplied under this Contract. The purpose of the PIT is to ensure that all ITS devices meet the requirements of the Contract prior to leaving the storage and testing facility.

The PIT shall be completed and all results must be accepted by WSDOT prior to installation of ITS devices. The PIT test shall include the following:

- PIT overview (objectives of the test, relationship to other tests)
- Test equipment to be used (including calibration certificates)
- Setup of test environment
- Specific methodology for each test to be completed

The Design-Builder shall obtain WSDOT Approval of the PIT test procedures. Specific PIT requirements shall include:

- Visual Inspection: The Design-Builder shall perform detailed visual inspection to confirm that the ITS devices are in compliance with the requirements of this Contract.
- Functional Testing: The Design-Builder shall perform tests to demonstrate that all functional requirements are in compliance with the Contract, in addition to all environmental testing.

For standard off-the-shelf products, submission of a warranty certificate may be used as an alternative to a PIT.

2.18.4.6.3 Proof of Performance Test (POP)

The proof of performance (POP) test shall be completed by the Design-Builder on fiber-optic cable links and each electrical system supplied for this Contract, following installation and prior to ITS devices becoming operational. POP tests shall verify that the subsystem is fully functional under local control, usually independently from other portions of the Work. The POP test shall verify all essential operational features of the installed component on a stand-alone basis.

The POP test shall be performed for all highway ITS devices at each site location.

The Design-Builder shall obtain WSDOT Approval of the POP test procedures prior to commencing with the POP test.

The POP test shall be performed for all highway ITS devices at each site location. If the ITS devices and system perform trouble free for 30 Working Days of continuous operation, testing may stop. If not, repairs shall be made and a second 30-Working-Day test shall be conducted.

2.18.4.6.4 System Integration Test (SIT)

Following completion of all POP tests, the Design-Builder shall conduct a system integration test (SIT) for Acceptance by WSDOT to demonstrate and verify the full functionality and integrated operability of all portions of the system.

The Design-Builder shall obtain WSDOT Approval of the SIT test procedures prior to commencing with the SIT.

This testing shall demonstrate successful interface of all ITS devices, ramp metering control system, and TSMC computer systems, with applicable local jurisdiction systems and with ITS devices installed in previous highway ITS implementation projects.

Completion of the SIT shall include a 60-Day burn-in period. WSDOT shall be provided with access to all ITS devices during this period for purposes of verifying operations. The Design-Builder shall log all ITS device failures and their method of repair during this period and provide this log to WSDOT prior to SIT Acceptance. The highway ITS devices shall exhibit a failure rate lower than what is expected during final operation during the entire

burn-in period. Only failures due to activities of others, power failures, or traffic accidents are expected. The burn-in may be repeated if other failures are experienced.

Following Acceptance of the SIT, the system shall be put into service and the system performance monitored for not less than six months to verify system reliability in an operating environment. Any failures and defects occurring during this period shall be documented. Any serious defects that affect the functionality or availability of the system will be a basis for restarting the SIT, at which time performance shall be monitored for not less than 14 Days. ITS Acceptance will not occur until the monitoring period is completed.

2.18.4.6.5 Cabinet and Component Testing

Cabinet testing shall be in accordance with Appendix B3.18.3.2.1 “Model 330 & Model 334 Cabinet Testing”.

2.18.4.6.6 Loop Detector Testing and Setup

The Design-Builder shall notify WSDOT prior to beginning loop detector testing. A WSDOT representative may observe each test.

Loop detector testing shall be in accordance with Appendix B3.18.3.2.2.3 “Test for Induction Loops and Lead-in Cable”.

2.18.4.6.7 Fiber Optic Cable Testing

The Design-Builder shall notify WSDOT prior to beginning fiber-optic system testing. A WSDOT representative may observe each test.

Fiber Optic Testing shall be in accordance with Appendix B3.18.8.3.8 “Fiber Optic Cable Testing”.

Outdoor Fiber Splice Pressure Test

To ensure that the outdoor fiber splice enclosure is properly sealed, the Design-Builder shall use the following test procedure:

1. Perform the test while the enclosure is in its final hanging position and in the presence of the ITS Integration Engineer.
2. Pressurize the enclosure to 48 to 62 kPa (7 to 9 psi).
3. After 45 second, the enclosure shall not have lost more than 17 kPa (2.5 psi). If the pressure loss is greater than 17 kPa (2.5 psi), proceed to the next step for further testing.
4. Pressurize the enclosure again to 48 to 62 kPa (7 to 9 psi) and lightly spray soapy water around the seal to check for leaks. If a leak is found, repair the leak and retest the enclosure.

The enclosure will lose air through the fiber-optic cable. The soapy water test should verify the enclosure seal.

2.18.4.6.8 Power and Control Cable Testing

The Design-Builder shall test power and control cables according to the requirements of Standard Specification 8-20.3(11).

2.18.5 Warranty of Work

The Design-Builder shall warranty its ITS work in accordance with Appendix B3.18 and Section 2.30 (Warranty).

WSDOT will warranty all Department-furnished items; however, WSDOT will review all such warranty claims to confirm their validity.

2.18.6 Maintenance During Construction

2.18.6.1 General

It is the Department's intention to only accept ITS elements when all work (ITS and non-ITS) has been completed.

The Design-Builder shall be responsible to provide maintenance and operation of furnished and installed highway ITS component equipment as part of this Project until one year after the date of ITS Acceptance unless otherwise noted.

Maintenance and operation includes the response to faults. There are three categories of faults: urgent, priority, and minor, as follows:

Urgent: Any fault that causes a total failure, disruption, or system-wide disruption of the following equipment or services:

- TSMC computer equipment
- Communications links and equipment
- Central database, logging, and dissemination facilities
- Ramp metering facility or CCTV facility

The response time for urgent faults of ITS components shall be less than four hours. The repair time for urgent faults of ITS components shall be less than four hours.

Priority: Any fault causes a failure or disruption of an operator workstation, local control unit for VMS, or the VMS itself.

The response time shall be by noon the next day. The repair time shall be less than four hours.

Minor: Any other fault. The response time shall be by midnight of the next day.

The repair time shall be less than four hours.

The Design-Builder shall supply as part of the Work a written description for providing maintenance and operation of furnished and installed ITS components. The description shall include, at a minimum, the following:

- For each highway ITS component, a general description of the proposed emergency maintenance/operation response program. This description shall include the categories of faults and how the faults will be detected.
- A description of the maintenance/operation management system to be used to track
- Maintenance/operation activities

As of Contract Execution, the Design-Builder shall be responsible for any and all highway ITS/communications components that the Design-Builder works on, including those components already in place. These responsibilities include the operation and maintenance of these components until one year following ITS Acceptance.

2.18.6.2 Interval Between Installation and Operation

All ITS equipment visible to the motoring public (e.g., VMS and CCTV) shall be made operational from the TSMC within 28 calendar days of installation.

2.18.6.3 Maintenance Response

The Design-Builder shall respond to a reported non-operable component, not safety related, within 24 hours of notification of the problem. In order to determine response time, the Design-Builder will be notified by the Department by telephone, fax, or e-mail that there is a problem. The date and time of the telephone call, the transmitting fax machine's log, or the e-mail delivery date/time stamp shall be considered the date and time when the Design-Builder was notified of the problem. The Design-Builder shall return the component to working condition within 48 hours of notification of the problem.

In the case of problems affecting entire subsystems (i.e., all detection, all video, all devices in a specific area), the Design-Builder shall respond within 24 hours of problem notification and shall work continuously until the problem has been corrected.

In the case of problems affecting the communications backbone to the TSMC (i.e., all systems), the Design-Builder shall respond within 2 hours of problem notification and shall work continuously until the problem has been corrected.

If a problem is not corrected within 48 hours of notification, the Design-Builder shall provide the Department with a written description of the problem, efforts to fix the problem to date, anticipated course of corrective action, and anticipated schedule for completion of such corrective action.

The Design-Builder shall replace – not repair – a piece of hardware or equipment if any of the following occurs:

- The Design-Builder has attempted to repair the piece of hardware or equipment on at least one previous occasion and there has been a subsequent failure.
- The repair activities interfere with the movement of traffic and/or WSDOT decides that replacement is necessary in the interest of public safety.

2.18.6.4 Maintenance Log

The Design-Builder shall maintain a log of all response maintenance and repair activities performed during the project by the Design-Builder. The log shall be kept in a spreadsheet or other Department-approved software and include, at a minimum, the following information:

- Date and time problem reported.
- Entity reporting the problem.
- Description of the reported problem.
- Arrival time at the site of the reported problem.
- Technician performing repair or replacement.
- Corrective actions taken.
- Model and serial number of any component repaired or replaced.
- Date and time problem rectified.

2.18.7 Submittals and Reviews

2.18.7.1 Design Reviews

Design reviews shall be in accordance with RFP Section 2.26.5 (Submittals), and the submittal requirements below shall be incorporated into the requirements of Section 2.26.5 (Submittals). Supplemental specific requirements shall apply to submittals for certain ITS equipment.

Oversight Review

The Design-Builder shall have available for review and inspection an overall regional system location map showing all proposed locations for ITS equipment, how the equipment locations interrelate to form the ITS, and how the equipment connects to the existing ITS infrastructure. The following items are related to the design and installation of the required ITS equipment.

a) *Ramp Locations.* The Design-Builder's designs and plans shall include a site-specific plan view identifying the location of all infrastructure related to each metered and non-metered ramp location. This information shall include, at a minimum, all utility information, pole locations and details, signal assemblies, location of warning and advisory signs, location and orientation of controller cabinet, size and location of detection zones, location of power service and disconnect, striping, and a distinction between new and existing equipment.

b) *Data Stations.* The Design-Builder shall have a complete listing of all monitoring stations within the project area, and a determination of the final location of each station.

The Design-Builder's designs and plans shall include a plan view identifying the location of all infrastructure related to a given traffic monitoring station, including, at a minimum, all existing utility information, the location and size of detection zones, conduit and junction box locations, location and orientation of controller cabinet, location of power source and disconnect, and a distinction between new and existing equipment.

c) Video Surveillance Locations. The Design-Builder shall have a complete listing of all video surveillance locations within the project area, and a determination of the final location of each camera. The Design-Builder shall provide mapping which identifies the proposed viewing areas of each camera location in the project construction area.

The Design-Builder's designs and plans shall include a plan view identifying the location of all infrastructure related to a given video surveillance location. This infrastructure shall include, at a minimum, the existing utility information, the location and height of camera pole, conduit and junction box locations, location and orientation of equipment cabinet, location of power source and disconnect, and a distinction between new and existing equipment.

d) Sign Locations. For new and relocated VMS, the Design-Builder shall have a complete listing of all VMS locations within the project area including other freeway locations, and a determination of the final location of each sign. The Design-Builder's design and plans for freeway VMS shall include the following information:

- A plan view identifying the location of all infrastructure related to a given sign location (existing utilities, pole, local access point, equipment cabinets, conduit, and junction boxes).
- A plan view identifying the proposed area available to motorists to view each sign.
- A cross-section showing the relationship of the sign to the travel lanes and the elevation of the road surface, the bottom and top of the sign, and the vertical sign supports.

e) Communications System. The Design-Builder's design and plans for the Fiber Optic Communications System shall include the following information:

- Block and system diagrams detailing the entire fiber optic backbone communications system.
- A separate single line block and system diagram shall be submitted for each of the two subsystems (voice/data and video) and for the fiber optic backbone communications system.
- A block diagram shall be submitted showing interconnection between major independent elements, such as fiber optic cable, optical patch cord, fiber optic multiplexer, channel bank and distribution frames.
- A separate single line block diagram shall be submitted for system and distribution nodes and for every other category of nodal facility.
- Proposed manufacturer's detailed product data "cut-sheets" and specifications for each piece of equipment.

- Schematic diagrams and location maps of all individual backbone system links and distribution loops.
- Wiring diagrams of distribution frames, equipment racks, and the fiber optic cable.

2.18.7.2 Construction Reviews

2.18.7.3 Documentation

Plan submittals shall be made in accordance with Section 2.1.6 (Project Documentation).

The Design-Builder shall submit approved final plans as originally signed and stamped to the Department. Include ten copies of 11”x17” (or metric equivalent) drawings and a copy of the computer files. Include three copies of calculations and specifications for any ITS elements. Submit as-built plans with shop drawings for each electrical cabinet.

The Design-Builder shall furnish six sets of factory-issued manuals containing all technical information on each piece of Design-Builder-furnished equipment installed. Acceptable factory manuals shall contain technical, diagnostic, and maintenance (preventive and troubleshooting) information. Advertising brochures and catalog cuts will not be accepted.

ITS Plan Submittals

The Core ITS Plan shall be submitted for Approval 20 Days after the ITS design workshop. WSDOT will respond within 10 Working Days of receipt of the Core ITS Plan.

The Design-Builder shall submit the Fiber-Optic System Test Plan for Approval. WSDOT will respond within 10 Working Days of receipt of the Fiber-Optic System Test Plan.

Training course documentation shall be submitted to WSDOT for Approval two weeks prior to the date of the proposed training course.

Released for Construction (RFC) Documents Plans

Plans shall, at a minimum, include the following:

- Title sheet
- Legend of symbols (WSDOT convention)
- Existing components with utilities
- Proposed ITS devices with GPS locations
- Communication schematics
- Component details
- Quantity tabulations

Component, Test, and Project Documentation

The Design-Builder shall prepare and submit component, test, and Project documentation. The test documentation shall include completed forms and electronic documentation. Two sets of component and test documentation shall be submitted directly to WSDOT for Acceptance.

Two sets of component documentation shall be required; one set for the WSDOT Project Manager and one set for the WSDOT ITS Integration Engineer.

The Design-Builder shall obtain WSDOT Acceptance of the ITS component submittal package before installation of the ITS components will be authorized.

The Design-Builder shall notify WSDOT when all ITS requirements have been met. WSDOT will accept the Contract work after the verifying proper operation of all components.

The Design-Builder shall submit to WSDOT for Approval detailed pre-installation test (PIT) procedures in accordance with standard testing procedures at least two weeks before the commencement of the test. The Design-Builder shall submit the PIT results to WSDOT for Approval at least two weeks prior to the scheduled installation of the equipment.

The Design-Builder shall submit the loop detector test report to WSDOT within one week after completing installation for both the preformed and saw cut loops.

The Design-Builder shall submit all wiring diagrams for review to WSDOT and incorporate all comments in the wiring diagram.

The Design-Builder shall submit power and control cable test results to WSDOT within one week of making final connections.

Fiber-Optic Cable Test Documentation

The Design-Builder shall submit fiber-optic cable test documentation including calibration and certification of the fiber-optic cable test equipment as part of the component documentation.

The Design-Builder shall provide all test documentation both in hardcopy format and on a CD in accordance with Appendix B3.18.8.3.8 “Fiber Optic Cable Testing”.

The Design-Builder shall store OTDR files under a directory named by the highway number. These files shall include the following: actual date of testing, all splice points marked, the “index of refraction” (recorded on the cable spool by the manufacturer), and file names and notes as described by WSDOT’s file naming convention.

The Design-Builder shall provide a test summary describing the final measurements out of range, any Approved changes in specified methods, and actual dates of tests performed by both power meter and OTDR.

The Design-Builder shall provide the WSDOT ITS Integration Engineer with two copies of the manufacturer’s reel (spool) test documentation. The test documentation is shipped with the fiber-optic cable spool.

2.19 DELINEATIONS OR PAVEMENT MARKING

2.19.1 General

The Design-Builder shall prepare pavement-marking plans that show all striping delineations in accordance with the WSDOT standard plans Appendix C, standard drawing Appendix C1, and the NWR Striping and signing Guidelines:

<http://wwwi.wsdot.wa.gov/regions/Northwest/Traffic/TrafficOps/Redbook.htm>.

2.19.2 Mandatory Standards and Publication

2.19.2.1 Mandatory Standards

General. Develop and implement the MOT plan in accordance with the requirements of the standards listed by priority in Table 2.19.2.1

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.19.2.1
Mandatory Standards for Pavement Markings**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	N/A		Proposal
2	WSDOT	<i>Request for Proposals, I-5 Everett HOV Design-Build Project.</i>	N/A		RFP
3	WSDOT	<i>Standard Plans for Roads, Bridge and Municipal Construction</i>	M21-01	2004	Std. Plans
4	WSDOT	<i>NWR Striping and signing Guidelines</i>	N/A	2002	<i>Red Book</i>
5	FHWA	<i>Manual On Uniform Traffic Control Devices (Millennium Edition)</i>			MUTCD
** Only to the extent that it exceeds another listed standard.					

***Includes the original release of the RFP and all addendums.

2.19.2.2 Referenced Publications

Use the publications listed in Table 2.19.2.2 as supplementary guidelines for the design and implementation of the MOT plan. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.19.2.2
Referenced Publications for Pavement Markings**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	<i>Design Manual For Design Build Projects</i>	MS22-01	2004	DM
WSDOT	<i>Traffic Manual</i>	MS1-02	**	*****

2.19.3 Design Requirements

The Design-Builder shall prepare permanent pavement marking plans that show center striping, edge striping, lane line striping, arrows, legends, symbols, object markers, delineation, and other markings consistent with the needs of the Project.

Main Line and Ramps

Profiled Type D Methyl Methacrylate Pavement Markings shall be used for delineations.

Local Roads

Design-Builder shall use the local agency requirements for the pavement marking material on the local roads and limits out side of WSDOT right of way.

2.20 MAINTENANCE OF TRAFFIC (MOT)

2.20.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements associated with maintenance of traffic (MOT), including providing for the safe and efficient movement of people, goods, and services through and around the Project while minimizing negative impacts to residents, commuters, and businesses.

Begin maintenance of traffic activities at the start of construction Work (including preparatory MOT work), or when first hauling construction materials and/or equipment, whichever is earliest. Continue MOT activities until Physical Completion of the Project.

2.20.2 Mandatory Standards and Publications

2.20.2.1 Mandatory Standards

General. Develop and implement the MOT plan in accordance with the requirements of the standards listed by priority in Table 2.20.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.20.1
Mandatory Standards for Maintenance of Traffic**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	n/a		Proposal
2	WSDOT	<i>Request for Proposals, I-5 Everett HOV Design-Build Project.</i>	N/A		RFP
3	WSDOT	<i>Work Zone Traffic Control Guidelines</i>	MS54-44		
4	AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS-3	2001	“Green Book”
5	WSDOT	<i>MUTCD-Washington State Modifications.</i>	MS24-61		
6	FHWA	<i>Manual on Uniform Traffic Control Devices (Millennium Edition)—in particular, Part VI (Temporary Traffic Controls)</i>	MUTCD		MUTCD
8	WSDOT	<i>Sign Fabrication Manual</i>	M55-05		
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.20.2.2 Referenced Publications

Use the publications listed in Table 2.20.2 as supplementary guidelines for the design and implementation of the MOT plan. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.20.2
Referenced Publications for Maintenance of Traffic**

Author or	Title	Document or	Date	Comments, Short
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Agency		Report No.		Forms
FHWA	National Cooperative Highway Research Program (NCHRP)	350		N/A
AASHTO	<i>Roadside Design Guide</i>	S99-RSDG-3	2002	n/a
WSDOT	<i>Design Manual For Design Build Projects</i>	M22-02	2004	DM
WSDOT	<i>Traffic Manual</i>	MS1-02	**	

2.20.2.3 Conformance to Established Standards

Flagging, signs, and all other traffic control devices and procedures furnished or provided shall conform to the standards established in the latest adopted edition of the Manual On Uniform Traffic Control Devices for Streets and Highways (MUTCD,) published by the U.S. Department of Transportation and the Washington State Modifications to the MUTCD. Judgment of the quality of devices furnished will be based upon Quality Standards for Work Zone Traffic Control Devices, published by the American Traffic Safety Services Association. Copies of the MUTCD may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Washington State Modifications to the MUTCD and Quality Standards for Work Zone Traffic Control Devices may be obtained from the Department of Transportation, Olympia, Washington 98504.

The condition of signs and traffic control devices shall be new or “acceptable” as defined in the book Quality Standards for Work Zone Traffic Control Devices, and will be accepted based on a visual inspection by the Engineer. The Engineer’s decision on the condition of a sign or traffic control device shall be final. A sign or traffic control device determined to be “not acceptable” shall be removed from the project and replaced within 12 hours.

2.20.3 Performance Requirements

2.20.3.1 Personnel

Traffic Engineer Manager Duties. Provide a traffic engineer at Contract Execution to:

- Coordinate construction activities with the Department (including its Traffic Operations Center [TOC]);
- Implement traffic management strategies;
- Prepare an MOT report to the Department with each change in traffic phasing; and
- Be continuously available during the construction schedule until Substantial Completion of the Project and elimination of all construction traffic control.

Traffic Engineer Manager Qualifications. Within ten days of Contract Execution, obtain Department approval of the person named as traffic engineer. Establish that the education and professional experience of the traffic engineer meet the following minimum qualifications:

- Bachelor of Science degree in civil engineering with an emphasis in traffic engineering
- Professional Engineer licensed in Washington State
- Ten years of practical experience with consulting firms, city, county, or state transportation agencies

Traffic Control Supervisor.

The Design-Builder shall provide a Traffic Control Supervisor (TCS) to manage and monitor all MOT operations for the duration of the construction. The TCS will be considered a critical component of the Design-Builder’s management team and must have prior experience managing MOT operations on similarly complex projects. The TCS shall maintain current Evergreen Safety or Labors Union Traffic Control Supervisor Certification. Registration as a licensed professional engineer is not required. The TCS shall also coordinate activities with the public information officer.

The TCS or his designate shall be available on a 24-hour per day basis with a single contact phone number throughout the duration of the Project, must supervise and verify all changes in the MOT setup, and perform daily Project reviews to verify that MOT devices are correctly placed and traffic is safely and efficiently moving through the Project. The TCS or his designate shall be available on the Site within 45 minutes of notification of an emergency situation and be prepared to positively respond to the need to repair the work zone traffic control or to provide alternate traffic arrangements. The TCS shall have enough authority and resources to immediately correct any deficiencies discovered or to demobilize any construction operation that is resulting in excessive delays to traffic or creating an unsafe condition.

The TCS shall maintain a seven-day advance schedule of all traffic control activities and a long-range schedule for all planned ramp or roadway closures.

The TCS shall perform drive-through inspections each Working Day and immediately after any shift in MOT setup while crews are still on site to make modifications. If the Project has signalized intersections, the review shall be done prior to each AM Peak, and each signal cycle shall be reviewed. At least two of the daily inspections each week must be performed at night so that the arrangement and condition of the lights can be reviewed. The inspections shall also include assurances that pedestrians and bicyclists have a safe travel path around or through the work Site and that existing businesses have adequate access during business hours, if applicable. The results of the inspections shall be documented in a daily report that, at a minimum, lists the exact time frame of the drive-through inspection and the defects noted. The report shall also document any maintenance or corrective action ordered as a result of the inspection and the name and position of the Design-Builder personnel directed to provide the maintenance or corrective action. The daily report shall state that the MOT setup and all traffic control devices are in substantial conformance with the Contract requirements except as noted and shall be signed by the TCS.

2.20.3.2 Maintenance of Traffic Plans

Design-Builder’s MOT Plans shall consider, but not limited to, the following:

- Procedures to identify and incorporate the needs of transit operators, Utility Owners, schools, and business owners in the Project corridor.
- Procedures for obtaining Acceptance and implementing road and lane closures.
- Process for developing and obtaining Acceptance by stakeholders of switching procedures.
- Procedures to identify and incorporate the needs of traffic engineering agencies affected by the Work.
- Process for signing transitions during construction from one stage to the next and from interim to permanent signing.
- Procedures to identify and incorporate the needs of emergency service providers, law enforcement entities, and other related corridor users. Also include procedures to ensure all information needed by these agencies to protect the public is available.
- Provisions for Incident Response Team and emergency response.
- Process to identify, produce, and receive Acceptance for designs of any necessary temporary traffic signals.
- Methods and frequency of inspection and maintenance of all traffic control throughout the Project's limits.
- Descriptions of contact methods, personnel available, and response times for responses to any conditions needing attention during off-hours. Include communications plan to WSDOT radio and field offices.
- Identification of measurable limits for the repair and replacement of traffic control devices, including pavement markings.
- Process to determine the need for revised traffic signal timings, and if revisions are required, detail the procedures for the development, Approval, implementation, testing, and maintenance of all affected signals.
- Process to determine if a courtesy patrol or other measure is needed to aid the traffic control in the corridor.
- Provisions to maintain existing access to all properties within the Project limits for the duration of the Project, except as provided by other sections. Appropriate information about access modifications shall be made available to the appropriate parties.
- Provisions to provide continuous access to established truck routes, hazardous material (HazMat) routes, transit routes and school bus routes.
- Procedures to modify the plans as needed to adapt to current Project circumstances.
- Procedures to determine detour routes and for obtaining acceptance from all stakeholders for all proposed detour routes.
- Procedures to communicate MOT information to the Design-Builder's public information personnel and notify the public of maintenance of traffic issues in conjunction with the requirements of Section 2.9.
- Procedure to accommodate adjoining project's MOT plans if applicable.
- Procedure to accommodate the MOT plans when the staging schedule of the Project or any adjoining project changes.
- Temporary breaks in Limited Access lines and utilization of breaks in Limited Access line.

2.20.3.3 MOT Task Force

MOT Task Force Members

The Design-Builder and WSDOT shall establish an MOT task force. The MOT Task Force shall develop a schedule for meetings and coordination during the Project from the Contract Execution to Physical Completion.

The MOT task force will serve as an advisory committee to the Design-Builder. The Design-Builder shall consider all recommendations and input provided by the task force; however final design and implementation remains the responsibility of the Design-Builder. Temporary breaks in the Limited Access lines and utilization of the breaks require concurrence by the Department.

The Design-Builder shall deliver to WSDOT a list of all parties invited to take part in the MOT task force and the responses to all the invitations. Preliminary agendas shall be provided to all invitees a minimum of two (2) Working Days prior to each meeting.

A copy of the MOT diary shall be submitted to WSDOT on a monthly basis. Upon completion of the Project, the MOT diaries shall be delivered to and become the property of WSDOT.

Meeting

The Design-Builder shall chair MOT task force meetings. The meeting schedule and frequency may be adjusted upon the agreement of the MOT task force members. The purpose of the meetings shall be to:

- Further refine and develop the MOT plans and strategies.
- Review the Design-Builder's MOT details.
- Disseminate Project MOT information to task force meeting attendees.
- Obtain MOT input from task force meeting attendees.
- Develop, refine, and review the TMP and its implementation.
- Take meeting minutes and distribute them to the task force members there by the following Working Day.

2.20.4 Design and Construction Criteria

2.20.4.1 Design Requirements

The Design-Builder shall develop MOT plans that provide for all construction stages and phasing and identify opportunities to expedite construction throughout the course of the Project. The MOT plans shall be prepared under the direction of the Design-Builder's Traffic Engineering Manager.

All construction signs, flaggers, spotters and other traffic control devices shall be shown on the traffic control plan(s) except for emergency situations. Where mainline traffic controls plans are developed with the intent of operating without the use of flaggers or spotters, the plans shall note that intent. The use of flaggers or spotters to supplement these traffic control plans will not be allowed except in a case where no other means of traffic control can be used or in the event of an emergency. The modified plans must show locations for all required advance warning signs and a safe, protected location for the flagging station. If flagging is to

be performed during hours of darkness, the plan must include appropriate illumination for the flagging station.

The plans shall show the necessary construction signs, flaggers, spotters and other traffic control devices required to support the work. The Design-Builder's submittal shall be provided to the Department for approval at least ten calendar days in advance of the time the signs and other traffic control devices are scheduled to be installed and utilized. The Design-Builder shall be solely responsible for submitting any proposed traffic control plan or modification, obtaining the Engineer's approval and providing copies of the approved Traffic Control Plans to the Traffic Control Supervisor.

The Design-Builder's MOT plans shall include, at a minimum, the following items:

- Complete plan sheets and details for all stages of construction.
- The appropriate details when temporary construction of any of the following is required to maintain traffic: traffic signals, detour roadways, bridges, retaining structures, drainage, and other miscellaneous construction.
- Roadway plan sheets showing all traffic control devices that are in place that need to be retained, relocated, or removed and all temporary traffic control devices that need to be installed, retained, relocated, or removed.
- The spacing, size, color (legend and background, if applicable) and quantity of all traffic control devices.
- Access to the work zones, ingress and egress for construction vehicles.
- Roadway plan sheets with the location of each sign so it can be easily read in relation to the roadway and other traffic control devices. A small scale layout of each sign shall be shown on the corresponding roadway plan sheet where the sign is to be placed.
- Provisions for using temporary guardrail, temporary concrete barrier wall, or attenuators to satisfy clear zone requirements and to protect the traveling public and Design-Builder' personnel.
- Temporary lighting, temporary signalization and temporary ITS details, as required. The Design-Builder shall refer to additional requirements stated within the respective sections in addition to the requirements herein.
- Signing plan sheets shall include layouts showing the locations of ground-mounted and overhead signs, special sign details, clear zones and structural and foundation requirements.
- Drawings on how to fabricate any sign not detailed in the WSDOT *Sign Fabrication Manual* showing dimensions, the background color, and the legend.
- Methods for covering, partially covering or modifying signs when not applicable to the current phase.
- Pavement marking plan sheets shall include striping, crosswalks, intersection details, and traffic delineators.
- Type and location of all pavement markings to be installed, removed, or renewed for each stage and placement location of the final pavement markings.
- Access and control of bicyclists and pedestrians including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA) through the traffic control zones shall be included on the plans.

- Detail modifications to the Project MOT to address wintertime conditions or periods of suspended Work.
- A switching procedure for each control stage change identified in the MOT plans. The switching procedure shall consist of the methods, actions, and signing necessary to complete the switch and the number and duties of traffic personnel assigned to perform the switch.
- The traffic control plans shall be complete including all necessary details. Only approved traffic control plans shall be used by the Design-Builder, typical plans are not acceptable unless incorporated into the approved plans.

The MOT plans and revisions to the plan shall be submitted to WSDOT for comment. The MOT plans and plan revisions shall be signed and sealed by the Design-Builder’s Traffic Engineering Manager. WSDOT will respond to the MOT plan submittals within 10 business days.

Design Vehicle

The MOT Plan shall accommodate the WB-67 design vehicle. Provisions for oversized vehicles shall be coordinated with WSDOT when detours or limited vertical clearance are included in the MOT plans.

Minimum Vertical Clearance

A minimum vertical clearance of sixteen and half feet shall be maintained for I-5 and State Highways. A minimum vertical clearance of fifteen and half feet shall be maintained for City Streets.

Restricted Hours

The Design-Builder shall not close any traffic lanes during events at the Everett Convention Center, Evergreen State Fair and other events with expected attendance over 10,000, from 2 hours before the event to 2 hours after the event.

The following tables list the allowable hours for I-5 mainline, on/off ramps, and the impacted city streets. These tables shall not be construed to supercede the maximum number of closures stipulated elsewhere in Chapter 2.20. Any restrictions for roadway segments not listed in the table require WSDOT approval.

The Design-Builder agrees to pay liquidated damages in the amounts listed below for closures outside of the allowable hours. Liquidated damages will be assessed per 15 minutes. A fraction of a 15 minute period will be rounded up to the next whole 15 minutes.

Table 2.20.4.1

Title: I-5 Northbound Allowable Closure Hours and Liquidated Damage Amounts

I-5 NB South of MP-190		
Weeknight	Saturday/Sunday	Notes
10pm-5am	11pm-9am	Single Lane Closure

11pm-5am	Mid.- 7am	Two Lanes Closure
I-5 NB North of MP-190		
10pm-8am	10pm-10am	Single Lane Closure
Mid.-6am	Mid.-8am	Two Lanes Closure
\$2000 Per 15-minutes Per Lane		

Table 2.20.4.2

Title: I-5 Southbound Allowable Closure Hours and Liquidated Damage Amounts

I-5 SB South of MP-190		
Weeknight	Saturday/Sunday	Notes
8pm-5am	10pm-7am	Single Lane Closure
11pm-5am	Mid. - 7am	Two Lanes Closure
I-5 SB North of MP-190		
7pm-6am	10pm-10am	Single Lane Closure
11pm-5am	Mid.-9am	Two Lanes Closure
\$2000 Per 15-minutes Per Lane		

Rolling slowdowns for setting of girders or sign bridges must be approved by the Department on a case by case basis.

Table 2.20.4.3

Title: I-5 On-Ramps Allowable Closure Hours and Liquidated Damage Amounts

Weeknight	Saturday/Sunday	
SR 99 SR 526 Collector to SB 5 On-Ramp		
11pm-4am	11pm-7am	Merge lane Closure only
11pm-4am	11pm-7am	Add lane Closure only
\$250 Per 15-minutes per lane		
EB SR 526 to NB 5 On Ramp		
11pm-5am	11pm-7am	Single Lane Closure Only
\$500 Per 15-minutes		
NB SR 527 to NB I-5 On-Ramp		
11pm-6am	11pm-7am	Single Lane Closure Only
\$250 per 15 minutes		
41st Ave SE to NB 5 On-Ramp		
11pm-6am	11pm-7am	Single Lane Closure Only
\$150 Per 15-minutes		
41st Ave SE to SB 5 On-Ramp		
11pm-5am	11pm-7am	Single Lane Closure Only
\$200 Per 15-minutes		
Pacific Ave to SB 5 On-Ramp		
11pm-5am	11pm-7am	Single Lane Closure Only
\$150 Per 15-minutes		
Everett Ave to NB 5 On-Ramp		
11pm-7am	11pm-9am	Single Lane Closure Only
\$200 Per 15-minutes		

WB US 2 to SB I-5 On-Ramp		
11pm-4am	11pm-7am	Single Lane Closure Only
\$400 Per 15-minutes		
WB US 2 to NB I-5 On Ramp		
11pm-6am	11pm - 7am	Single Lane Closure Only
\$250 per 15 minutes		
Marine View Drive to SB 5 On-Ramp		
11pm-5am	11pm-7am	Single Lane Closure Only
\$250 Per 15-minutes		

Table 2.20. 4.4

Title: I-5 Off-Ramps Allowable Closure Hours and Liquidated Damage Amounts

Weeknight	Saturday/Sunday	
SB 5 to SR 527/SR 99/WB 526 Off-Ramp		
11pm-4:00am	11pm-7am	
\$400 Per 15-minutes		
NB 5 to SR 527/SR 99/WB 526 Off-Ramp		
11pm-4am	11pm-7am	
\$750 Per 15-minutes		
SB 5 to 41st Ave SE Off-Ramp		
11pm-5am	11pm-7am	
\$350 Per 15-minutes		
NB 5 to Pacific Ave Off-Ramp		
11pm-6am	11pm-7am	
\$150 Per 15-minutes		
SB 5 to EB US 2 movement		
11pm-5am	11pm-7am	
\$200 Per 15-minutes for this movement		
SB 5 to Everett Ave Off-Ramp		
11pm-5am	11pm-7am	
\$200 Per 15-minutes for this movement		
NB 5 to Broadway (left side exit)		
8pm-7am	8pm-7am	Left lane only (Drop lane)
\$350 per 15 minutes		
8pm-7am	8pm-7am	Right lane only (Option lane)
\$350 per 15 minutes		
11pm - 7am	11pm – 7am	Right & Left lane (Full Closure)
\$150 per 15 minutes		
NB 5 to Marine View Drive Off-Ramp		
11pm-5am	11pm-7am	
\$400 Per 15-minutes		
NB I-5 to EB US 2 Off Ramp		
midnight-5am	midnight-5am	
\$400 per 15 minutes		

Table 2.20.4.5

City of Everett Streets Allowable Nighttime Closure Hours

Unless otherwise Approved by the City of Everett

Weekdays		Saturday/Sunday	
Weekdays and Weekends	Rate	Number of Closures Allowed	
11:00pm-6:00am, unless otherwise approved by the City /	\$150 per 15 minutes per lane	4	Lowell Road
N/A	N/A	Provide continuous access to all residences and businesses	Main Street
11:00pm-6:00am, unless otherwise approved by the City	\$150 per 15 minutes per lane	4	36th Street
11:00pm-6:00am, unless otherwise approved by the City	\$150 per 15 minutes per lane	4	Smith Ave.
11:00pm-6:00am, unless otherwise approved by the City	\$150 per 15 minutes per lane	4	Pacific Avenue
11:00pm-6:00am, unless otherwise approved by the City	\$150 per 15 minutes per lane	4	Hewitt Avenue

I-5 Mainline

General Requirements

The following apply only to temporary MOT and do not apply to permanent design.

Any existing shoulders that are used to carry short-term temporary traffic shall meet the requirements in Section 2.7.3.7.

Mainline general purpose and HOV lanes for MOT shall be a minimum of 11-feet wide.

Each shoulder shall be a minimum of 2-feet wide and shall be paved. For shoulders with barrier, the minimum distance from the edge of the driving lane to the face of barrier shall be 2 feet. A nominal 8-foot right shoulder/distress lane shall be provided when feasible.

A minimum 2-foot sliding distance shall be provided behind temporary concrete barrier unless the barrier is adequately anchored. Temporary concrete barrier placed along the edge of a bridge structure shall be anchored.

Opposing traffic lanes of mainline I-5 shall be separated by temporary concrete barrier (TCB) in accordance with WSDOT design requirements. 18 inch glare screen shall be placed on top of the TCB when opposing lanes are separated by less than 12 feet.

Lane Markings for temporary lane markings shall be raised pavement markers.

Temporary impact attenuators may be those listed in 2.11.5.1.8 or the following:

- Quad-guard CZ 6 bay - Energy Absorbing System Inc.,
- Absorb 350 with 8 absorbing elements - Barrier Systems
- REACT 350 – Roadway Safety Service Inc.

Design Criteria

The minimum design speed for MOT shall be 60 mph.

Work Zone Speed Limit

Speed reduction guidelines are outlined in RCW 47.48.020, the Construction Manual, and Directive D 55-20, “Reduced Speed in Maintenance and Construction Zones.”

Law Enforcement

Law enforcement for the Work Zone, when required by law or when requested by the Design-Builder, shall be included in the Proposal Price.

Sequential Arrow Displays

Each vehicle used to place, maintain, or remove components of a traffic control system on multilane highways shall be equipped with a sequential arrow display that shall be in operation when the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with sequential arrow displays not involved in placing, maintaining, or removing the components when operated within a stationary type lane closure shall display only the caution mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. Sequential arrow displays used in moving lane closures shall be truck-mounted. This requirement applies to all vehicles placing, maintaining, and removing traffic control devices, including concrete barrier trailers and “cherry pickers.”

I-5 Ramps

General Requirements

No ramp closures shall be permitted from November 15 to January 02.

Each Ramp will be designed to accommodate WB67 design vehicle, each lane shall be a minimum of 12 feet wide on entrance and exit Ramps. Minimum 2-foot wide paved shoulders shall be provided on both sides of each Ramp.

Each shoulder shall be a minimum of 2-feet wide and shall be paved. For shoulders with barrier, the minimum distance from the edge of the driving lane to the face of barrier shall be 2 feet. A nominal 8-foot right shoulder/distress lane shall be provided when feasible.

A minimum 2-foot sliding distance shall be provided behind temporary concrete barrier unless the barrier is adequately anchored. Temporary concrete barrier placed along the edge of a bridge structure shall be anchored.

Design Criteria

The minimum design speed for MOT on the entrance and exit Ramps shall be 35 mph, except for loop Ramps, where the design speed may be reduced to 25 mph. Exit speeds shall be posted for all ramps. For ramps where the MOT design speed is reduced, black on orange construction signs shall be used for the exit speed signs.

Entrance and Exit Ramps Closures

Consecutive off-ramps or on-ramps may not be closed concurrently.

At least 12 Working Days in advance of a Ramp closure, the Design-Builder shall furnish to WSDOT a written Ramp closure schedule. The schedule shall show the locations and times of all Ramp closures and the closure time limits specified in the Contract Documents. The Design-Builder will be notified promptly of any disapproved closures or any closure that will require coordination with other parties as a condition of Approval. Requests for Ramp closures made less than 12 Working Days in advance will not be approved.

The Design-Builder shall confirm all scheduled closures with WSDOT at least five (5) Working Days prior to the date on which the Ramp closure is to be made. All Ramp closures not confirmed as scheduled shall be cancelled. Closures will be approved by 4:00 p.m. the following Working Day. Confirmed Ramp closures that are cancelled for unsuitable weather may be rescheduled for the next Day.

Ramp closures will be allowed during nighttime or weekend hours during the allowed hours of closure. These nighttime closures are meant to be short-term in nature and should not be considered a long-term approach to the Ramp construction by the Design-Builder.

The Design-Builder shall furnish and install Black and white information signs that provide advance notification of a ramp closure a minimum of 5-working days prior to closure. In addition, each Ramp closure on I-5 shall have a supplemental CMS that display the date and time of the closure a minimum of 48 hours in advance of the closure.

Detours

All detours must be in place including all signing prior to the ramp closure. Ramp detours using local roads shall follow traffic control permit requirements of each municipality impacted.

Allowable Weekend Ramp Closures

The following weekend ramp closures will be allowed without assessment of Liquidated Damages inside the hours listed below. Liquidated Damages will be assessed to hours outside the list below as stipulated in Table 2.20.4.3 and Table 2.20.4.4.

If additional ramp closures are required in addition to the Allowable Ramp Closures in Table 2.20.4.6 and Table 2.20.4.7, Liquidated Damages will be assessed in accordance with rates shown in Table 2.20.4.3 and Table 2.20.4.4.

**Table 2.20.4.6
Allowable Weekend Ramp Closures**

Starting	Ending	Number of Closures Allowed	
		No Weekend Closures Allowed	SR 99/WB SR 526 Collector to SB 5 On-Ramp
		No Weekend Closures Allowed	EB SR 526 to NB 5 On Ramp
		No Weekend Closures Allowed	NB SR 527 to NB I-5 On-Ramp
11pm Friday	4 am the following Monday	4	41st Ave SE to NB 5 On-Ramp
		No Weekend Closures Allowed	BroadWay to SB 5 On-Ramp
11pm Friday	4 am the following Monday	2	Pacific Ave to SB 5 On-Ramp
11pm Friday	4 am the following Monday	2	Everett Ave to NB 5 On-Ramp
11pm Friday	4 am the following Monday	2	WB US 2 to SB I-5 On-Ramp
11pm Friday	4 am the following Monday	2	WB US 2 to NB I-5 On Ramp
11pm Friday	5 am the following Monday	5	Marine View Drive to SB 5 On-Ramp

**Table 2.20. 4.7
Allowable Weekend Ramp Closures**

Starting	Ending	Number of Closures Allowed	
11pm Friday	4 am the following Monday	2	SB 5 to SR 527/SR 99/WB 526 Off-Ramp
11pm-Friday	5 am the following Monday	1	NB 5 to SR 527/SR 99/WB 526 Off-Ramp
11pm-Friday	6 am the following Monday	2	SB 5 to 41st Ave SE Off-Ramp
11pm-Friday	6 am the following Monday	2	NB 5 to Pacific Ave Off-Ramp
11pm-Friday	5 am the following Monday	2	SB 5 to EB US 2 movement
11pm-Friday	5 am the following Monday	2	SB 5 to Everett Ave Off-Ramp
11pm-Friday	5 am the following Monday	4	NB 5 to Broadway (left side exit)

11pm-Friday	5 am the following Monday	2	NB 5 to Marine View Drive Off-Ramp
11pm-Friday	5 am the following Monday	4	NB I-5 to EB US 2 Off Ramp

Local Roads

General Requirements

All traffic control plans affecting local roads including but not limited to mainline I-5 closures, Entrance and Exit Ramp closures and closure of other local roads shall follow traffic control permit requirements of each municipality impacted. The Design-Builder shall be responsible for obtaining required permits. The Design-Builder shall coordinate with the City of Everett regarding concurrent construction work along city cross streets that may be affected by traffic control for this project.

The existing number of through lanes must be maintained on all local roads during the restricted hours. Turn lanes shall be a minimum of 12 feet wide, through lanes shall be a minimum of 11 feet wide and all curb lanes shall be a minimum of 12 feet wide.

A minimum 2-foot shy distance and 2-foot for sliding distance behind the barrier shall be provided for any temporary or permanent barrier device. Impact attenuators shall be used to protect the ends of barrier within the clear zone.

Design Criteria

The design speed of all local roads shall be at the existing posted speed limit unless otherwise approved by the City of Everett.

Detours

All detours must be in place including all signing prior to closure of a road. Detours using local roads shall follow traffic control permit requirements of each municipality impacted.

The Design-Builder shall identify all bus routes that may be affected by the detour and coordinate with the bus agency regarding impacts to schedule and location of bus stops.

Allowable Local Road Closures

The Design-Builder shall provide written notice to WSDOT and impacted local agency a minimum of 10 Working Days prior to closing, restricting, or detouring traffic. The Design-Builder shall be responsible for complying with all requirements contained within permits. A Traffic Control Plan shall be submitted for review and approval of the City Engineer. When any Road is closed to traffic, a detour shall be provided. A Detour Plan shall be submitted and approved by the City Engineer prior to any street closures. The review and approval is estimated to take five working days.

Notice of Closures

Each Roadway closure on city streets shall have a supplemental PCMS as part of the traffic control layout. The PCMS shall display the date and time of the closure a minimum of 72 hours in advance of the closure. All roadway closures must provide access for local residents

and business access. The Design-Builder shall individually notify residents and businesses directly affected by any closures a minimum of 5-working days in advance.

The Design-Builder shall furnish and install black and white information signs that provide advance notification of the roadway closure a minimum of 5-working days prior to closure.

The following weekend local street closures will be allowed without assessment of Liquidated Damages inside the hours listed below. Liquidated Damages will be assessed to hours outside the list below as stipulated in Table 2.20.4.5

If additional weekend local street closures are required in addition to the Allowable Local Street Weekend Closures in Table 2.20.4.8. Liquidated Damages will be assessed in accordance with rates shown in Table 2.20.4.5

**Table 2.20.4.8
City of Everett Streets Allowable Weekend Closure
Unless otherwise Approved by the City of Everett**

Starting	Ending	Number of Closures Allowed	Local Street
11pm-Friday	6 am the following Monday	2	Lowell Road
N/A	N/A	Provide continuous access to all residences and businesses	Main Street
11pm-Friday	6 am the following Monday	2	36 th Street
11pm-Friday	6 am the following Monday	4	Smith Ave.
11pm-Friday	6 am the following Monday	2	Pacific Avenue
11pm-Friday	6 am the following Monday	2	Hewitt Avenue

Pedestrian Access

The Design-Builder shall maintain pedestrian access on all sidewalks and intersections along City Streets insofar as it is possible. Pedestrian sidewalks and paths that are currently ADA accessible shall be maintained conforming to ADA requirements. If it is necessary to close sidewalks, detour routes shall be provided with consideration for ADA accessibility. For arterial roads at least one side of the street shall provide pedestrian access at all times with the exception of periods of full roadway closure or with prior Approval from WSDOT and the local agency. If work will be performed over the pedestrian route, temporary lighted

covered walkways shall be provided to protect pedestrians from overhead hazards. Refer to the *Pedestrian Facilities Guidebook, Toolkit*.

MOT Push Vehicles

The Design-Builder shall provide a minimum of 6 vehicles equipped with safety push bars and emergency warning lights and be capable of pushing disabled vehicles to emergency pull-outs within 15 minutes response time. The tow truck patrol must meet the following minimum requirements:

Patrol should be available Monday through Friday 6:00 am to 7:00 pm.

Maintain communication with the Traffic Systems Management Center (TSMC) for traveler information and dispatching via 800 MHz radio and Nextel phone.

Temporary Emergency Pullouts

Pullouts shall be located on the right side of the travel lanes.

Temporary Emergency Vehicle Access

The Design-Builder shall provide coordination with local and regional emergency service providers, law enforcement entities, and other related corridor users including timely communication of lane closure plans, detour plans, and other project elements that may affect the appropriate delivery of time-sensitive services. Emergency vehicle access shall be maintained through all nighttime, weekend and evening closures when feasible.

Maintain Camera Surveillance

The freeway management system cameras are used to detect and verify incidents in the construction Work zone. The existing cameras shall remain operational or temporary cameras installed as follows:

When two or more consecutive, in-place cameras are to be off line due to construction for greater than 21 Days, the Design-Builder shall install a temporary camera. The temporary camera shall be installed and operational within 7 Days of the removal of the existing in-place camera. The temporary cameras, if utilized, must be compatible with the existing system, must be installed at approximately the same height as the existing cameras, and must be aligned to produce a similar view as the cameras it replaces.

Variable Message Signs (VMS)

There are no existing overhead variable message signs (VMS) within the Project limits. Existing VMS signs approaching the Project should be utilized to provide motorists with incident and construction related information prior to entering the Work zone. The Design-Builder shall coordinate with the TSMC to provide timely, accurate information regarding planned closures and updated traffic and construction information.

Design-Builder Response Time

At all times the Design-Builder shall have at least one employee on call equipped with a mobile phone who can respond to and take appropriate action to manage an incident within 30 minutes. Upon arrival that employee shall have the experience, resources and equipment required to repair barrier or set up temporary traffic control until the barrier can be repaired.

2.20.4.2 Construction Requirements

Signing, Pavement Markings and Traffic Control Devices During Construction

The Design-Builder shall inspect all signing (existing and temporary) daily noting damaged signs, misplaced signs and graffiti affecting legibility of the sign. Every detour route shall be driven daily; at least twice each week at night, to ensure all detour signing is in place.

Signing for detours shall be covered or removed when detours are not in use. The Design-Builder shall provide a schedule for repairing, cleaning or replacing signs; procedures shall address rectifying incorrect or misleading signing that may present a hazard to road users.

The Design-Builder shall inspect all pavement markings daily. The Design-Builder shall provide a schedule for replacing damaged pavement markings and establish minimum replacement timeframes based on the degree of degradation. If missing or damaged pavement markings present a hazardous condition, WSDOT may require the Design-Builder to close lanes or replace the pavement marking within 24 hours.

The Design-Builder shall maintain, clean and/or replace all pavement markings when they become damaged or lose reflectivity.

The Design-Builder shall use equipment that is not detrimental to the roadway surface for removing pavement markings, as Approved by WSDOT.

Temporary Signalization

This section applies to new temporary signals necessary for detour routes or other construction phasing. Any modifications to existing traffic signals must be shown in the MOT plans and approved by the operating agency. Modifications proposed for signal timing or phasing must be coordinated with and Approved by the operating agency.

Electrical Service

The Design-Builder shall coordinate with the local power supplier to provide the electrical service connection for each temporary signal system. The Design-Builder shall pay the connection fees and monthly electrical power costs of the temporary signal system.

Material Requirements

The Design-Builder shall furnish and install all required materials for the temporary signalization.

The Design-Builder shall provide vehicle detection methods to optimize all temporary signal system installations. The Design-Builder may use inductive loops or video image detection for temporary signal installations.

WSDOT Inspection

The Design-Builder shall provide 24 -hour notices to WSDOT prior to implementing temporary signal phasing.

Signals Operation and Maintenance

The Design-Builder shall provide and maintain all components of the temporary and permanent signal systems. The signal system shall conform to WSDOT Design Manual Guidelines and conform to the Manual on Uniform Traffic Control Devices. Access to the pedestrian push button shall be provided throughout the project. The vehicle detection system shall be operational at all times, either through induction loops or temporary video detection. The Design-Builder shall remove all temporary signal system installations upon completion and turn-on of the new permanent signal systems. The Design-Builder shall maintain all components of the temporary and permanent signal systems from the first day of construction until Final Acceptance.

Temporary Lighting

Temporary lighting shall be used when existing lighting must be removed or disconnected and new lighting is not in operation and for areas where traffic has been shifted and additional lighting is necessary for the safety of the traveling public or workers. Temporary lighting shall be provided for all on-ramps and off-ramps and at intersections where traffic control devices are in place.

The Design-Builder shall:

1. Design temporary lighting plans.
2. Maintain current levels of roadway illumination for all roadway segments and interchanges that are currently lit.
3. Provide all materials and equipment for temporary lighting installations.
4. In the clear zone, provide only lighting units that are breakaway or protected from crash potential.
5. Provide maintenance for the temporary lighting system. Maximum repair times shall be established by and adhered to by the Design-Builder for individual luminaries and segment

Timber Light Standards

Timber light standards may be used for temporary lighting where breakaway or slip bases are not required. Timber light standards must be outside of the clear zone or protected by barrier.

Power Service Cable

The Design-Builder shall coordinate with the local power supplier to provide the power service connection. The Design-Builder shall pay all costs charged by the electric power companies for providing power connections. The Design-Builder shall pay the monthly

electric bills for existing, temporary and new lighting installed under the Contract until Final Acceptance of the Project.

WSDOT or others will pay all monthly electrical bills for lighting after Final Acceptance of the Project.

Video Record

A drive-through video of all MOT devices shall be made each week, and immediately after each accident causing injuries, and after each shift in MOT setup. The tapes shall be maintained in a remote fireproof location, and a log of the tapes with dates and times shall be provided to WSDOT on a monthly basis. WSDOT shall have the right to review the tapes at any time with 24 hours notice to the Design-Builder.

2.21 RELATIONS WITH RAILROAD

2.21.1 General

Railroad facilities belonging to The Burlington Northern Santa Fe Railway Company (BNSF) have been identified in the Project corridor as depicted in Exhibit 2.21-A, Appendix Q (Railroad Exhibits). The Railway Company or Railroad Company, as used in the following specifications, shall be the Burlington Northern Santa Fe Railway Company, or other railway company or companies specified in the RFP.

This section provides information relating to the requirements applicable to the Work performed upon or adjacent to the Railroad Right of Way. The Design-Builder shall abide by and fulfill the requirements related to Railroads as outlined in this section and applicable standards.

The Railroad Company has indicated its willingness to accommodate WSDOT with the construction of this project; however, the Railroad Company will dictate its own schedule for railroad-related work. The Railroad Company will provide working windows for demolition and construction.

The Railroad Company operates up to 80 trains per day on the tracks in the Project vicinity at speeds up to 40 m.p.h.; this should be verified with the Railway Company by the Design-Builder, as rail traffic service levels are subject to change by the Railway Company at any time.

The Railroad Company has notified the Department that no interference with railroad operations will be allowed from October 1 to December 31 in any given year; this should be verified by the Design-Builder, as the Railroad Company may change this restriction to be more or less restrictive.

The Design-Builder shall make a good faith effort to accommodate the City of Everett Master Plan with regard to the proposed City of Everett/BNSF land exchange in its design, as depicted in Exhibit 2.21-B, Appendix Q, and indicated in the electronic project files.

Contacts:

WSDOT Railroad Liaison

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Railroad Engineer
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Olympia, WA 98504-7329
360-705-7271
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The Burlington Northern and Santa Fe Railway Company (BNSF)

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2.21.2 Mandatory Standards and Reference Publications

2.21.2.1 Mandatory Standards

General – Perform all Railroad Vicinity work in accordance with the requirements of the standards listed by priority in Table 2.21-1, or as approved by the Railroad Company, whichever standard is greater.

Conflicts and Priority – If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity – If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date – Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order..

Railroad Permits and Agreements – Any work on Railroad Company Property shall require a permit from the Railroad Company or its designated Property Manager. As of 2004, the Staubach Company is BNSF’s designated Property Manager. Permits may be arranged by contacting Julie Alexander at the Staubach Company at 817-230-2631 (fax: 817-306-8265). Agreements may be arranged by contacting BNSF’s Manager of Public Projects as identified in Section 2.21.1. The Design-Builder shall be responsible for acquiring any necessary rights of entry, permits, and or agreements as required by the Railroad Company.

**Table 2.21-1
Mandatory Standards for Railroad Work**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1	Design-Builder	Proposal for I-5 Everett HOV Design-Build Project	n/a	**	Proposal
2	WSDOT	Request for Proposals, I-5 Everett HOV Design-Build Project	n/a	***	RFP
3	BNSF	Utility Accommodation Policy ****	n/a	April 16, 2004	n/a
4	BNSF	Design Guidelines for Industrial Track Projects ****	n/a	March 2004	Industrial Track Standards
5	American Railway Engineering and Maintenance-of-Way Association	Manual for Railway Engineering *****	n/a	2004	AREMA Manual
<p>** Only to the extent that it exceeds another listed standard. *** Includes the original release of the RFP and all addenda. **** These documents are available from the BNSF web site (www.bnsf.com) ***** The Design-Builder is responsible for obtaining this document.</p>					

2.21.3 Design and Construction Criteria

All work over, below, or adjacent to any Railroad Company Right of Way shall be performed in conformance with the provisions of the Mandatory Standards as listed in Table 2.21-1., or as approved by the Railroad Company, whichever standard is greater.

The Design-Builder shall be required to make its own arrangements with the Railroad Company for coordinating its operations and those of the Railroad Company. No additional compensation will be made to the Design-Builder for any costs incurred by him, or because of any delays to his forces or equipment, which may be caused by the operations of the Railroad Company.

Existing vertical clearances at 36th St. Overcrossing (Bridge 5/633 E&W) are depicted in Exhibit 2.21-C, Appendix Q.

Exhibit of conceptual aqueduct design crossing BNSF right of way at Main St. is provided in Exhibit 2.21-D, Appendix Q.

2.21.4 Submittals

2.21.4.1 General

If the Design Builder will have equipment, materials, or personnel within the Railroad Company's Right of Way, Liability Insurance will be required by the Railroad Company. The Design-Builder shall submit to the Department an approved Design-Builder's Right of Entry Agreement with the Railroad Company prior to entering or conducting activities within the Railroad Company's Right of Way.

2.21.4.2 Railroad Protective Liability Insurance

The Design-Builder shall protect the Railroad Company and any other railroad company occupying or using the Railroad Company's rights of way or lines of railroad against all loss and damages arising from activities of the Design-Builder or the Design-Builder's forces or any of the Design-Builder's subcontractors or agents.

The Design-Builder shall furnish for the Railroad Company copies of a Railroad Protective Liability Insurance Policy providing for the protection to the Railroad Company in the manner and form as required by the Railroad Company. The Design-Builder shall furnish the Department a copy of the Railroad Company-approved Railroad Protective Liability Insurance Policy.

When all the work involving construction activities within or immediately adjacent to the railroad right of way is completed the Design-Builder may make a written request to the Department to be relieved of the responsibility to continue all or part of the insurance specified above. If the Department deems the portion of the work in that area is complete the Department may approve the Design-Builder's request. However, if for any reason the Design-Builder resumes or starts any new work in that area, including being ordered to do so by the Department, the insurance shall be reinstated by the Design-Builder before the work is started. If the insurance must be reinstated because of negligence or acts by the Design-Builder or failure of the Design-Builder to perform all the contract requirements, the costs shall be the responsibility of the Design-Builder. If the insurance must be reinstated because of changes to the contract, the costs will be considered in accordance with Section 2.9 as stated herein.

2.22 RIGHT OF WAY

2.22.1 General

The Design Builder shall verify right-of-way boundaries prior to utilization of right-of-way areas outside of existing fence line. Survey control has been established and is identified in

the ROW and Monumentation Plans. All operations of the Design-Builder, upon the portions of the Site made available to the Design-Builder from time to time (including storage of equipment and materials), shall be confined to portions of the ROW authorized or approved by the Federal Highway Administration (FHWA) through the certification process.

All acquisitions shall be performed in accordance with all Applicable Laws, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, as well as the Uniform Relocation Assistance and Real Property Acquisition, Washington Administrative Code (WAC) WAC 468-100 and 49 CFR Part 24.

WSDOT shall be responsible for the acquisition of all ROW identified on the ROW Plans. WSDOT shall provide the Design-Builder copies of construction commitments (in the form of a Construction Memorandum) and, if requested any documentation of WSDOT ownership.

The utility relocation process is set forth in Section 2.10 (Utilities and Third Party Agreements) and the railroad process is found in Section 2.21 (Relations with Railroad).

2.22.2 Mandatory Standards and Publication

2.22.2.1 Mandatory Standards

General. Conduct all ROW activities in accordance with the requirements of the standards listed by priority in Table 2.22.1 and in accordance with 2.22.2.2, Referenced Publications. Questions regarding the applicability of Mandatory Standards and Referenced Publications will be referred to WSDOT.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the WSDOT before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.22.1
Mandatory Standards for Right-of-Way Acquisition**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for Everett-HOV Design-Build Project</i>	n/a		Proposal
2	WSDOT	Request for Proposals, Everett-HOV Design-Build Project	n/a	***	RFP

** Only to the extent that it exceeds another listed standard.

***Includes the original release of the RFP and all addendums.

2.22.2.2 Referenced Publications

Use the publications listed in Table 2.18.2 as supplementary guidelines for the design, provision, installation, and construction of the ITS system. These publications are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.22.2
Referenced Publications for Right-of-Way Acquisition**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
Code of Federal Regulations	23 CFR Chapter 1 part 712 subpart B, General Provisions and Project Procedures			
	49 CFR Part 24 Uniform Relocation Assistance and Real Property Acquisition Act of 1970			
Revised Code of Washington (RCW)	Relocation Assistance - Real Property Acquisition Policy	RCW 8.26		
Washington Administrative Code (WAC)	Uniform Relocation Assistance and Real Property Acquisition	WAC 468-100		
WSDOT	Agreements Manual	M 22-99		
WSDOT	Right of Way Manual	M 26-01		
WSDOT	Design-Build Design Manual			
WSDOT	Plans Preparation Manual	M 22-31		
WSDOT	Utilities Manual	M 22-87		
TRB = Transportation Research Board				

2.22.3 Performance Requirements

Use the publications listed in Table 2.22.2 as mandatory requirements for the practices, procedures, and methods to be used in the appraisal and acquisition of ROW. Listed publications have no established order of precedence.

Design-Builder is required to meet with the WSDOT to assure compliance with required standards.

WSDOT will be responsible for certifying, at each new construction phase, that all property rights necessary to construct, operate, and maintain the highway facility have been acquired

in accordance with applicable laws and regulations cited in Section 2.22.2.2 prior to the commencement of construction by Design-Builder.

**Table 2.22.2
Referenced Publications for Right-of-Way Acquisition**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
FHWA	<i>23 CFR Part 710.313 (Design-Build Projects)</i>			
FHWA	<i>49 CFR Part 24, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended</i>	n/a	*	n/a
WSDOT	<i>Right of Way Manual, M 26-01</i>	n/a	*	n/a
WSDOT	<i>Design-Build Design Manual, M XX-XX</i>	n/a	*	n/a
WSDOT	<i>Plans Preparation Manual, M 22-31</i>	n/a	*	n/a
WSDOT	<i>Agreements Manual, M 22-99</i>	n/a	*	n/a
WSDOT	<i>Utilities Manual, M 22-87</i>	n/a	*	n/a
* If no date is given, the most current version as of the date the RFP is initially released is specified.				

2.22.4 Right-of-Way Acquisition

2.22.4.1 Right-of-Way Requirements Determination

If additional right-of-way is requested by the Design-Builder, WSDOT will review the request, prepared in accordance with Section 1-04.4 and Section 2.22.2.2 (Referenced Publications). All costs and delays for acquiring the additional ROW will be borne by the Design-Builder. Design-Builder shall determine the requirements for new right-of-way rights.

Design-Builder shall submit to the WSDOT Project Director, in writing, the preliminary right-of-way needs. The submittal shall include the following:

- A letter indicating the project name, contract number, project location, originator of report (Firm’s Name), submittal date and submittal type.
- A plan of sufficient scale and detail to show the existing and proposed roadway right-of-way and proposed easements prepared according to WSDOT Plans Preparation Manual M 22-31.
- ROW needs include, but are not limited to, additional land ownership, airspace corridors, access rights, and permanent or temporary easements.
- A discussion on the impacts to schedule and the proposed plan to recover the schedule.

Upon WSDOT approval to acquire additional ROW, WSDOT will provide staff or consultants to perform the work. In order to minimize the impacts of acquisition on the

property owners and expeditiously acquire the necessary property, all additional ROW, whether permanent or temporary, from an ownership shall be acquired in a single offer. The Design-Builder may acquire permits where no permanent rights are needed, in accordance with all applicable laws (see Section 2.22.2.2 Referenced Publications).

WSDOT will provide a funding estimate to the Design-Builder who will furnish sufficient funds to perform the work. A ROW work order will be established by WSDOT with those funds. Any settlements exceeding the funding estimate will require the approval of the Design-Builder.

Design-Builder may acquire any rights or interests in real property that, in the discretion of the Design-Builder is deemed necessary or advisable to acquire, for workspace, Design-Builder lay-down areas, material storage areas, or other convenience. WSDOT will not be obligated to exercise its power of eminent domain, will not come into title to the property, nor will it have any responsibility for the acquisition, maintenance, or disposition of additional properties or of any temporary right or interest therein.

**Table 2.22.3
WSDOT Responsibility - Right-of-Way/Easement Acquisition**

	Site	Snohomish County Parcel #	Owner	Land Acquisition	Air Space Easement	Drainage Easement	Possession & Use
1	WQF-1	29052900401000	Hammer, David Lee			596	Sep 05
2	WQF-1	00500302200100	Sprint Communications			570	Sep 05
3	WQF-1	Operating property	BNSF			191	Sep 05
4	WQF-1	29053200401600	City of Everett	358,705			Sep 05
5	Br. 5/631 E/W	00576002400004	Tisdell, Donald E.				May 05
6	Br. 5/632 E/W	00579001100002	Northbrook Properties				May 05
7	Br. 5/633 E/W	29052900201200	Smith St. Properties #1, LLC		455		May 05
8	Br. 5/633 E/W	29052900102800	Washington Trucking, Inc.		353		May 05
9	Br. 5/633 E/W	00576004300000, 00576004300001, 29052900400800, 29052900400900, operating property	BNSF			1,000	May 05
10	WQF-2	29052900401000	City of Everett	108,989			May 05
11	WQF-2	n/a	City of Everett			12,685	May 05
12	WQF-2	00576000200002	Newland Construction			6,443	May 05
13	Br. 5/633 E/W	29052900102300	Port of Everett		56		May 05

14	WQF-2	29052900101100, 00439080501700, 00439080502500	Eclipse Properties/City of Everett			17,909	May 05
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2.22.4.2 Risk of Loss, Obligation to Maintain and Repair

Design Builder shall be responsible for the maintenance of improvements and for providing reasonable safety and security measures relative to the preservation of the acquired ROW parcels. The Design Builder shall establish a Property Management Plan and shall submit such plan to WSDOT prior to Notice To Proceed (Contract Execution). The Property Management Plan is subject to acceptance by WSDOT. The plan must assure that all acquired ROW is maintained in a manner, which will prevent, minimize, or correct problems such as vandalism, trespassing, rodent infestation, illegal dumping or disposal of rubble, and other debris on any ROW.

2.22.4.3 Demolition

Design Builder shall demolish all buildings, structures, and other improvements located on the ROW. The Design Builder shall conduct any asbestos inspections, lead-based paint inspections and any other required action in accordance with applicable Washington State regulations. All Utilities installed on or connected to the ROW shall be abandoned or removed in accordance with the requirements of the applicable Utility Owner as a part of the demolition, unless otherwise noted.

2.22.4.4 Restoration of Property and Landscape

Design Builder shall restore, at its own cost, property and landscaping that is damaged in the course of construction to a condition similar or equal to that existing prior to the damage occurrence by repairing, replacing in kind, rebuilding, replanting, restoring the property, or compensating the property owner.

2.22.4.5 Temporary Fencing

Design Builder shall be required to furnish and install temporary chain link security fencing in order to contain animals, people etc., prior to removal of any existing sound barrier or ROW fencing in place within the Project limits.

2.23 SECTION NOT USED

2.24 SECTION NOT USED

2.25 CONTROL OF MATERIAL

2.25.1 General

The quality of materials and methods of construction and testing are essential to achieving an end product that provides the maximum benefit to the public. The Design-Builder's approach to materials sampling, testing and approval is essential in achieving an acceptable end product. The Design-Builder's process is required to meet FHWA and WSDOT requirements for sampling, testing and approval of materials used in this project. The Design-Builder shall be responsible for the quality of construction and materials incorporated in the project. The Design-Builder's Quality Assurance measures are to insure that operational techniques and activities provide material of acceptable quality.

2.25.1.1 Materials Approval

Prior to use, the Design-Builder shall notify the Engineer of all proposed materials. The Design-Builder shall use the Qualified Product List or the Request for Approval of Material form.

All equipment, materials, and articles incorporated into the permanent work:

1. Shall be new, unless the special provisions permit otherwise;
2. Shall meet the requirements of the contract and be approved by the Engineer if required by the contract provisions;
3. May be inspected or tested at any time during their preparation and use; and
4. Shall not be used in the work if they become unfit after being previously approved.

The Design Builder will be responsible for all materials approvals and acceptance by means of testing, inspection, and documentation. A Materials Certification package as defined in the Construction Manual chapter 9-1, approved by the Design Builder's Construction QA Manager, shall be submitted to WSDOT prior to acceptance of the project.

All materials shall be reviewed and approved by the Construction QA Manager prior to use. The Design-Builder may use the Qualified Product List (QPL), may submit a Request for Approval of Materials (RAM), to the Construction QA Manager for approval, or may denote approval by listing the material in the plans and specification as stamped by the Construction QA Manager.

Qualified Products List (QPL) – The Design-Builder may use products listed on the latest edition of WSDOT's Qualified Product List (QPL). The Construction Design-Builder shall submit the QPL page to the Construction QA Manager for approval. The Construction QA Manager shall ensure that the acceptance requirements as listed in the QPL for the product/material used is being followed.

Request for Approval of Material (RAM) - The RAM shall be used when the Design-Builder elects not to use the QPL or the material is not listed in the QPL or not shown on the sealed plans and specifications. The RAM shall be prepared by the Design-Builder and submitted to the Engineer of Record for approval before the material is incorporated into the work. Approval of the material does not constitute acceptance of the material for incorporation into the work. The Construction QA Manager shall ensure that the acceptance

requirements as listed in the Standard Specifications; Section 9.4 of the Construction Manual, or the contract special provisions for the product/material used has been followed.

Aggregate Source Approval – The Design Builder can use any approved aggregate that is included in the WSDOT Aggregate Source Approval System for the approved purpose. If the Design Builder wishes to use an aggregate source that is not on the WSDOT Aggregate Source Approval System, preliminary samples will have to be evaluated for the quality tests including degradation and LA Abrasion in addition to the acceptance testing. WSDOT will sample and test the materials from the unapproved source.

Materials Acceptance – All material that the Design Builder wishes to use shall be tested, field verified, and or documented. All materials have to be approved prior to use. The materials acceptance program shall be as defined in the WSDOT Construction Manual, Materials Manuals, Standard Specifications, or other contract provisions defined in the design build agreement.

Visual Inspection – The acceptance of certain types of materials may be based on visual inspection prior to incorporating the materials into the project. Product documentation shall be provided in the form of a manufacturer’s catalog cut or product data sheets. For details regarding specific instructions for field acceptance see Chapter 9-04 of the WSDOT Construction Manual.

Certificate of Compliance – The acceptance of certain types of materials shall be based on receipt of a Certificate of Compliance prior to incorporating the materials into the project. This process is intended to speed the materials approval process and insure the correct material is being used on the project. The Certificate of Compliance shall meet the requirements of Section 2.25.3.

Field Verification – All materials permanently incorporated into a contract shall be field verified and documented by the Design Build inspector. The field verification or visual inspection shall occur prior to or during initial placement of materials. Field verification documentation should contain sufficient information to identify what was used including quantities. The field verification documentation needs to be signed and dated by the inspector at the time of verification. The field verification information should be the link between what was placed and paid for to what was specified by the Construction Quality Assurance Manager or approved on the RAM or QPL and its proper acceptance criteria.

WSDOT Oversight – The Design-Builder shall maintain files and distribute copies of all approvals and acceptance documents and make these available to the WSDOT. These documents need to be distributed to the WSDOT in a timely manner. The WSDOT will use these documents to verify what is being used.

2.25.1.1.1 Mandatory Standards and Reference Publications

2.25.1.1.1.1 Mandatory Standards

General. Develop and implement the Quality Management Plan in accordance with the requirements of the standards listed by priority in Table 2.20.1.

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding with design or construction.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

**Table 2.25.2.1
Mandatory Standards for Control of Material**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1	WSDOT	Construction Manual	M47-01		
2	WSDOT	Materials Manual.	M41-10	2004	Std. Book
** Only to the extent that it exceeds another listed standard.					
***Includes the original release of the RFP and all addendums.					

2.25.1.2 Fabrication Inspection

The Design Builder is responsible for the QA inspection and approval of project specific fabricated items. The Fabrication Inspector’s will work under the direction of the Construction QA Manager. WSDOT will manage the Quality Verification (QV) of the fabrication items. The Design Builder will promptly notify WSDOT of the intended fabricator, fabricator inspector, and provide a copy of the “Approved” Shop Drawings. The Design Builder’s Fabrication Inspector(s) shall provide a certification of compliance as appropriate for the type of material being inspected, and Stamp or Tag each approved item similar to the WSDOT requirements in section 9-1.5D of the Construction Manual. The qualifications for the Fabrication Inspector is covered in Section 2.26 of this RFP.

The fabricated items to be inspected include but are not limited to the following:

1. Treated timber and lumber except guardrail post and blocks
2. Treated piling
3. Epoxy coated rebar
4. Anchor bolts shipment
5. Type 1 raised pavement markers
6. Bridge bearings
7. Miscellaneous items that are shop welded
8. Miscellaneous galvanized steel items
9. Concrete and metal culvert pipe over 700 mm (27 inches) in diameter

10. Precast concrete panels
11. Prestressed concrete girders
12. Permanent precast concrete median barrier
13. Steel for bridges
14. Traffic signal and illumination standards
15. Utility vaults
16. Metal drainage castings
17. Precast Concrete Catch Basins, Manholes and Inlets. This includes all sections and risers 6 inch and above
18. Three sided Structures
19. Metal Bridge Rail
20. Sign Mounting Hardware

2.25.2 Acceptance of Materials

2.25.2.1 General

All field and laboratory materials testing by the Construction QA Manager will follow methods described in the Contract, in the Washington State Department of Transportation Materials Manual, or other recognized standards. The following provisions will apply when the Design Builder uses the specifications or methods from the sources named below:

ASTM — American Society for Testing and Materials. The ASTM designation number refers to this society’s latest adopted or tentative standard. The standard or tentative standard in effect on the bid advertising date will apply in each case.

Design Builder will consider any revisions to become effective on December 1 of the year they are adopted.

Copies of any separate ASTM specifications or testing method may be obtained from: the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA.

AASHTO — American Association of State Highway and Transportation Officials. An AASHTO number refers to that organization’s currently published (1) “Standard Specifications for Highway Materials and Methods of Sampling and Testing” or any adopted revisions, or (2) “Interim Specifications and Methods of Sampling and Testing Adopted by the AASHTO Subcommittee on Materials.”

Any standards, revisions, and interim standards in effect on the bid advertising date will apply. Standards, revisions, and interim standards will be considered as becoming effective on December 1 of the year, which they are adopted.

Copies of “Standard Specifications for Highway Materials and Methods of Sampling and Testing” may be obtained from the American Association of State Highway and Transportation Officials, 917 National Press Building, Washington, D.C.

Federal Specification — U.S. Government Federal Stock Catalogue. The specification number refers to the most recent revision adopted by the General Services Administration. Revisions in effect on the bid advertising date will apply.

Design Builder will consider any revision as in effect 60 calendar days after its adoption.

Copies of separate specifications listed in the Federal Stock Catalogue may be obtained at the prices indicated from the Business Service Center, General Services Administration, Regional Office Building, Seventh and D Streets, Washington, D.C.

Other Publications — Any other publication referred to in these Specifications or the special provisions will mean its latest edition. Requirements, and any revisions, in effect on the bid advertising date will apply. Design Builder will consider them as in effect 60 calendar days after publication.

Copies may be obtained from the publishing organizations. For example, copies of standard grading and dressing rules may be obtained from: West Coast Lumber Inspection Bureau in Seattle, Washington or Portland, Oregon, and from the Western Wood Products Association, Portland, Oregon.

WAQTC — Western Alliance for Quality Transportation Construction. The WAQTC designation number refers to this alliance's latest adopted or tentative standard. The standard or tentative standard in effect on the bid advertising date will apply in each case. Design Builder will consider them as in effect 60 calendar days after publication.

Copies of any separate WAQTC testing method may be obtained from: The WSDOT Quality Systems Manager, State Materials Laboratory, PO Box 47365, Olympia, Washington, 98504-7365.

2.25.2.2 Acceptance by F and t Test Analysis

The Construction QA Manager shall be responsible for statistically evaluating QA test data and the WSDOT QV test data to determine the acceptability of the material tested. This evaluation will be performed by using the F and t Test analysis as described in Section 2.26 of this RFP.

The acceptance decision will consider results of Design-Builder Quality Assurance sampling and testing and WSDOT's or their agent's verification sampling and testing, and any dispute resolutions to resolve discrepancies between the verification sampling and testing and the Design-Builder Quality Assurance sampling and testing.

2.25.3 Manufacturer's Certificate of Compliance

The Construction QA Manager may accept certain materials on the basis of a Manufacturer's Certificate of Compliance as an alternative to material inspection and testing. When a Manufacturer's Certificate of Compliance is authorized by these Specifications or the special provisions, the certification shall be furnished prior to use of the material.

The Manufacturer's Certificate of Compliance must identify the manufacturer, the type and quantity of material being certified, the applicable specifications being affirmed, and the signature of a responsible corporate official of the manufacturer and include supporting mill tests or documents. A Manufacturer's Certificate of Compliance shall be furnished with each

lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate.

All materials used on the basis of a Manufacturer's Certificate of Compliance may be sampled and tested at any time. Any material not conforming to the requirements will be subject to rejection whether in place or not. Construction QA Manager reserves the right to refuse to accept materials on the basis of a Manufacturer's Certificate of Compliance.

The Manufacturer's Certificate of Compliance shall meet the requirements of this Section. In lieu of placing the material without a proper Manufacturer's Certificate of Compliance the Design-Builder may request that Construction QA Manager sample and test the materials prior to incorporating them into the project. For details regarding sample size and other requirements see Chapter 9-4 of the WSDOT Construction Manual.

2.25.4 Acceptance of Small Quantities of Materials

The Design Builder may request the acceptance of small quantities of materials based on this provision.

Upon the request of the Design Builder, the Construction QA Manager may elect to accept small quantities of materials without normal sampling and testing frequencies. The determination to accept materials using this provision rests solely with Construction QA Manager. Structural Concrete will not be considered under the small quantity definition.

An item can be accepted as - small quantity if the proposed project quantity for a specific material is less than the one subplot (quality assurance sample size) as defined in Section 1-06, Table 6 or less than one-half of a subplot as defined in Section 1-06, Table 6 for mainline paving.

Questions that the Design Builder should and the Engineer will consider prior to use of small quantity acceptance are:

Has the material been previously approved?

Is the material certified?

Is there a current mix design or reference design?

Has it been recently tested with satisfactory results?

Is the material structurally significant?

Small quantity acceptance may be accomplished by visual, certification, or other methods. Acceptance of small quantities of materials by these methods must be fully documented. Documentation of materials under these methods must be provided by the Design-Builder accepting the material. For visual acceptance, the Construction QA Manager shall have written documentation, such as an entry made in the Inspectors Daily Report, or noted on field records, with a statement as to the basis of acceptance of the material and the approximate quantity involved.

Small quantity acceptance may be used for any proposal quantity of the following uses:

Driveways

Road approaches

Paved ditches and slopes

2.25.5 Handling and Storing Materials

In storage and handling, the Design-Builder shall protect materials against damage from careless handling, from exposure to weather, from mixture with foreign matter, and from all other causes. The Construction QA Manager will reject and refuse to test materials improperly handled or stored.

The Design-Builder shall repair, replace, or make good all WSDOT-provided materials that are damaged or lost due to the Design-Builder's operation or while in the Design-Builder's possession, at no expense to WSDOT.

2.25.6 PCC and HMA, Mix Designs and Batch Plants Mix Designs

The Design Builder, or their designee, shall develop the concrete mix design per the standard specifications. The Design Builder's Construction QA Manager QA will certify that the concrete mix design conforms to the contract provisions and the Standard Specifications.

The concrete batch plant that the Design Builder uses for the production of Portland cement concrete shall be a National Ready Mix Concrete Association (NRMCA) approved plant.

The Design Builder, or their designee, shall develop the HMA mix design. They will determine the gradation, asphalt content, and anti-strip requirement according to the Standard Operating Procedure 732 in the Materials Manual. The Design Builder's Construction QA Manager shall certify that the HMA mix design meets all of the requirements of the contract provisions and the Standard Specifications. The asphalt concrete plant(s) that the Design-Builder uses for the production of asphalt concrete shall meet all of the requirements as specified in the Standard Specifications. The Design-Builder's QA shall inspect the asphalt concrete plant(s) and document that it meets all requirements.

The Design Builder shall send a copy of the completed HMA mix design showing all trial blends and calculations, along with a sufficient amount of prepared aggregate for the Department to verify the adequacy of the proposed design. The verification effort by the Department will consist of mixing, at the determined asphalt content, eight (8) samples for checking the Air Voids, the Stripping requirements, and the Compactive effort. The use of the verified or non-verified HMA mix design shall be in accordance with WSDOT Standard Specifications.

2.25.7 State Inspected and Tested Items

There are certain items that WSDOT has determined are critical to the everyday operations of the roadway. These items would be inspected and tested by state forces to ensure that they meet state and federal requirements. These items include:

Highway Traffic Signs: All traffic signs will be inspected at the point of fabrication by the WSDOT department. All signs so inspected will be tagged by the WSDOT Fabrication inspector prior to shipment with a Sign Acceptance report sent to the Design Builder.

Traffic Signal Controllers: All traffic signal controllers will be tested by WSDOT accordance with WSDOT SOP 429 at the State Materials Laboratory in Tumwater, WA. The Design-Builder is advised that the time necessary to test a controller is dependent upon the quality of the product submitted and the response time of the vendor in correcting deficiencies in the programming or circuitry. Typically it will take approximately 2 weeks for testing if everything is correct. Only controllers tested by WSDOT shall be installed.

2.26 QUALITY

2.26.1 General

General Scope. Assume the primary responsibility for the overall quality of the Work, including products of subcontractors, required fabricators, suppliers, and vendors under the oversight of the Department and in coordination with relevant governmental agencies.

The Design-Builder shall respond to all WSDOT audits, questions and request for information regarding quality issues when so requested by the Department.

2.26.2 Quality Assurance

Perform all of the Quality Assurance (QA) tasks required to ensure that the final project complies with all of the terms of the Contract. These shall include but not be limited to the following:

2.26.2.1 Design Quality Control (DQC)

Perform all of the Design Quality Control checks outlined in Appendix D, Draft Quality Management Plan.

Senior experienced engineers shall check all design work. Senior experienced engineers shall be engineers that have significant relevant qualifications and experience in the design discipline and type of work being checked and shall have an equal or higher level of qualifications and experience than the engineer(s) in the discipline being checked. Senior experienced engineers shall not check the work they are involved in actually designing.

2.26.2.2 Design Quality Assurance (DQA)

Perform all of the design audits outlined in Appendix D, Draft Quality Management Plan, to substantiate that the required quality control checks and reviews are being performed and that the project calculations and design comply with the Contract documents.

2.26.2.3 Construction Quality Control (CQC)

Perform all of the Quality Control (QC) inspection, sampling, and testing needed to ensure that the final installed product meets or exceeds the specifications outlined in the contract documents. It is expected that the QC group will be part of the Design-Builder's production organization and will work seamlessly with them to guarantee effective results.

Quality Control documentation is primarily for the use of the Design-Builder. The Department does not require copies of this information.

2.26.2.4 Construction Quality Assurance (CQA)

Perform Construction Quality Assurance tasks as outlined in Appendix D, Draft Quality Management Plan. CQA provides inspection and testing verification that the project was built in compliance with the Contract documents. Construction Quality Assurance is divided into two subcategories: Inspection Quality Assurance and Testing Quality Assurance.

In addition to the minimum qualifications outlined in Table 2.26.1, personnel performing IQA or TQA shall successfully complete 2 weeks of training (40 hours per week) before performing any CQA activities. CQA staff will conduct the training specifically for CQA personnel for the Everett HOV Design-Build project. Design-Builder personnel who fail to achieve an acceptable rating at the end of the training shall not be eligible to perform CQA functions.

2.26.2.4.1 Inspection Quality Assurance (IQA)

Inspect and document all Project Work. This documentation shall show that all materials and equipment were installed in accordance with contractual requirements or industry standards whichever governs. In conjunction with Department oversight inspections, these inspections will form part of the basis for project acceptance. The Design-Builder has the responsibility to demonstrate that the Work meets Contract requirements. The WSDOT has the authority to accept the Work.

2.26.2.4.2 Testing Quality Assurance (TQA)

Perform all Quality Assurance (QA) sampling and testing as required in Chapter 1-06.2 Table 6, Chapter 2.25, and 2.26.

2.26.2.5 Documentation

The Design-Builder has sole responsibility to maintain all construction workmanship and materials quality records of all CQA inspections, sampling and tests performed. Provide all hardware, connections, and T-1 line. Submit to the Department in electronic and hard copy format CQA inspection reports and material sampling and testing results within twenty-four (24) hours following the inspection or test. WSDOT will provide access to the WSDOT server for the Design-Builder to input test results. WSDOT will retain control on who has rights for data entry, read-write, delete, etc.

Store the testing results in the WSDOT-provided materials database. Store QA Inspection Reports in a database provided and developed by the Design-Builder. The purpose of electronic storage of inspection reports and test data and results is to facilitate the retrieval and manipulation of information to promote timely and accurate decisions during the construction of the Project. Store all CQA inspection reports and test data in the materials database on a daily basis in a manner approved by the Department.

The electronic database shall be available for data entry no later than 60 days after NTP or five days before the first CQA test, whichever is later. If CQA inspections and tests are

made before that date, hard copy information shall be kept and entered into the database no later than 7 days after the system is available.

2.26.2.6 Definitions

Construction Quality Organization (CQO): The persons on the Design-Builder's Team who are involved in Construction Quality Control and Construction Quality Assurance activities.

Design Quality Organization (DQO): The persons on the Design-Builder's Team who are involved in Design Quality Control and Design Quality Assurance activities.

Independent Assurance (IA): An independent assessment (by a party not responsible for production, Quality Control, Quality Assurance, or acceptance) of the reliability of the test results and inspection processes obtained in the Quality Assurance and Owner Verification activities. The results of IA tests are not to be used as a basis of acceptance of materials.

Owner Independent Assurance: Owner independent assurance comprises split sampling and testing performed by the Department. These tests and observations of both the CQA and the Owner Verification Inspection (OVI) sampling and testing procedures are performed to:

- Confirm that all testers are qualified and certified and that test equipment meets requirements.
- Confirm that all test methods and procedures are performed accurately.

Owner Verification Inspection (OVI): Owner verification inspection is the oversight inspection of the Design-Builder's Work by the Department that includes:

- Department checks to see if design and construction meets the requirements of the contract.
- The Department's participation in meetings.
- Audits of all documentation to confirm that the Design-Builder is achieving the Contract obligations and commitments.
- The Department's oversight verification inspection of items fabricated off-site, including but not limited to structural steel, and precast and prestressed concrete structures.

Owner Verification Testing (OVT): Owner verification testing is the sampling and testing performed by the Department to check for contract compliance. Material sampling and testing performed by Department personnel to statistically compare and validate the results of the CQA's tests, in accordance with Chapter 2.25.

Quality Assurance (QA): The sum of the efforts performed by the Design-Builder to demonstrate that the work complies with the requirements of the contract. Includes Design Quality Assurance (DQA) and Construction Quality Assurance (CQA). Includes inspection, tests, audits, documentation, etc.

Quality Check Point (QCP): A Quality Checkpoint is a point in time when construction has proceeded to a defined stage at which representatives of the Design-Builder and the CQA organization determine the progress to date by reviewing the following:

- All daily inspection reports
- CQO and OVT reports
- Settlement data
- Pile driving records
- String line measurements
- Audits and other pertinent data

The Design-Builder shall notify the Department 24 hours in advance of when a quality checkpoint will occur to give the Department's oversight representative the option to attend. If the work is not in compliance, the CQA representative will notify the Design-Builder of the non-conformance. If the work is in compliance, the CQA representative will recommend that the work be accepted. No additional Work shall take place past the QCP until all parties mutually agree that the Work up to that point is acceptable.

Quality Control (QC): The activities performed by the Design-Builder, designer, producer, or manufacturer to assess design, production and construction processes so as to control the level of quality being produced in the end product. Components may include checking, materials handling and construction procedures, calibrations and maintenance of equipment, shop drawing review, document control, production process control, and any sampling, testing, and inspection done for these purposes. The purpose of QC is to modify the processes so that the products will meet the Contract requirements when checked and tested at the point of acceptance, and can be incorporated into the Project.

Quality Management Plan (QMP): The plan described in Section 2.26 and Appendix D. The plan included in Appendix D is in a draft form, the format of which is acceptable to the Department. The Proposer shall complete this plan and augment it to match their approach to quality management. The final plan is subject to review and approval by the Department.

Quality Organization: The Design Quality Organization (DQO) is the Design-Builder's organization designated in the Proposal to manage and implement the Design Quality Management Plan (DQMP). The Construction Quality Organization (CQO) is the organization designated in the Proposal to manage and implement the Construction Quality Management Plan (CQMP).

2.26.3 Department Independent Assurance and Verification

The Department will perform inspections and tests as described in the following paragraph to validate the Design-Builder's CQA inspections and tests and to ensure that the quality of the finished to product meets the contractual requirements. The results of these inspections and tests along with Design-Builder CQA inspections and test data will form the basis for Final Owner Acceptance.

The Department will perform Independent Assurance (IA) testing and inspection to validate the accuracy and reliability of the CQA testing and inspection.

The Department will also perform Verification inspection and testing to confirm that the work and materials meet contract requirements. These inspections and tests will be performed at times and places selected by the Department. They will be totally independent of the Design-Builder CQA inspections and tests. The Design-Builder shall rectify any problems identified by the verification inspections and tests in a prompt and effective manner.

2.26.4 Department Authority

Department's Role. The Department's role in the construction quality program is to:

- a. On a spot-check basis, actively participate in quality checkpoint (QCP) on-site meetings.

- b. Review the CQA organization's statistical evaluation of the results of material sampling and testing.
- c. Audit the Design-Builder's quality program activities to ensure adherence to the QMP.
- d. Audit the CQA organization's records.
- e. Conduct owner verification inspection and testing (oversight, sampling, inspection, and evaluation) and owner independent assurance (OIA)
- f. Perform the final investigation, final audit of CQA records, and final acceptance of work.

Access to Testing Facilities. The Department reserves the right to:

- a. Check testing equipment for compliance with specified standards and check testing procedures and techniques.
- b. Access the testing facilities of independent testing agencies, at no additional cost to the Department, to witness testing and verify compliance of testing procedures, testing techniques, tester certifications, and test results.

Right to Stop Work. If there is evidence that the QMP procedures are not adequate, or if a problem is encountered during the oversight reviews or becomes evident during construction, the Department may, at its sole discretion, stop Work until appropriate quality procedures have been established and implemented. In addition, the Department retains authority to stop Work without liability wholly or in part, if the Design-Builder fails to:

- a. Correct conditions that is unsafe for Project personnel or the general public.
- b. Correct unacceptable construction practices.

2.26.5 Quality Management Plan

Included in Appendix D is a draft Quality Management Plan in a format and organization that shall be followed by the Design-Builder. As part of the proposal, the Proposer shall finalize and augment this plan based on its individual approach to project quality management.

General. Develop and implement a written QMP, in close coordination with the Department and any relevant government agencies, for all elements of the Project, including, but not limited to, management, administration, design, construction, maintenance of public and private facilities, geotechnical investigations, and environmental monitoring and compliance. Develop the quality management plan (QMP) for the Project, subject to Department approval, using the draft QMP in the Appendix as a guide.

Format. Use the format in the draft QMP in Appendix D.

Department Approval. Submit the QMP for Department review and approval. The Department will approve or disapprove the QMP submission within 10 business days of its submission. After QMP approval, submit any changes to the QMP Plan, quality program staffing levels, or Key Quality Personnel for written Department approval (in advance of their implementation). The QMP must be approved by the Department before any Work is performed on any element of the Project.

2.26.5.1 Performance Requirements

Develop and maintain a quality program that maintains consistency in the Project’s quality functions, as carried out by the Design-Builder, the DQA and CQA organizations, and the Department, and meets the following goals:

- a. Facilitates efficient and effective Project operations.
- b. Uses teamwork to overcome quality challenges.
- c. Enables the Design-Builder, the DQA and CQA organizations, and the Department to support each other.

2.26.5.2 Management Requirements

General. In Section 1 (Management) of the QMP:

- a. Describe the quality management organization, including the number of full-time equivalent employees and an organization chart showing the lines of authority and reporting responsibilities; and
- b. Identify the name, position, qualifications, duties, quality management responsibilities, and authorities of each person proposed for a quality management function.

Personnel. For persons and organizations performing quality management functions:

- a. Give them sufficient authority and organizational freedom to identify quality problems, and to recommend, provide, and verify implementation of solutions; and
- b. Place them at an organizational level high enough to ensure that Project schedule, performance, or cost will not influence implementation of quality management measures.

Management Review

The Design-Builder’s executive management shall review the Quality Management Plan at least quarterly, and more frequently if necessary, to ensure its continuing suitability and effectiveness in satisfying the requirements of this Contract and the Design-Builder’s stated quality policy and objectives.

The Design-Builder shall invite WSDOT to participate in the management reviews.

The management reviews shall, at a minimum, review the results of internal audits, WSDOT audit results, corrective actions taken, trends in nonconformance, and time to resolution.

The outputs of management reviews shall be incorporated into the Quality System.

2.26.5.3 Design-Builder Quality Control and Quality Assurance Staff

At a minimum, Design-Builder Quality Assurance staff shall include the following:

2.26.5.3.1 Design QA Manager

Job Description

- Implement Design QA Plan. Train all design engineers in the design quality process. Audit design packages and release for construction plans for conformance with the QMP. Audit and certify all design packages for release to construction for compliance with the QMP. Ensure appropriate Engineers review all plan sheets for conformance with the RFP standards and criteria. Certify that design, for which progress payments are being requested, meets the quality requirements of the contract.

Minimum Qualifications

- Must be a registered professional engineer in the State of Washington not later than notice to proceed, and have a minimum of 5 years recent experience managing design of highway projects.

2.26.5.3.2 Construction QA Manager

Job Description

- The Construction Quality Assurance Manager manages the Design-Builder's quality Assurance program and is responsible for demonstrating to the Department that the Work and materials are acceptable. Develops and implements the Design-Builder's construction QA plan, implements quality planning, oversees Design-Builder's construction quality assurance testing and inspection. Provides monthly certification of compliance of construction and materials for compliance with the RFP and design documents. Coordinates with WSDOT's verification testing and inspection and independent assurance requirements. Reports directly to the person/group with overall project management responsibilities (design, construction, PI, quality, etc) and not to someone who exclusively has construction production responsibilities. Must not be assigned any other duties or responsibilities on the Project or any other projects. This person will be required to be on site whenever any construction activities are being performed.
- The Construction Quality Assurance Manager shall have the authority to stop any and all work that does not meet the standards, specifications or criteria established for the Project.
- The Construction Quality Assurance Manager shall submit a final materials certification package to the Department.

Required Licensure

- Must be a registered professional engineer in the State of Washington by not later than notice to proceed.

Minimum Qualifications

- Must have at least 6 years experience in construction materials acceptance administration, and at least 6 years experience in construction inspection administration. The experience of an assistant to the Construction QA

Manager may be used to meet the experience requirement of up to 6 years of either construction inspection or construction materials administration.

In addition, the Construction QA Manager or his designated representative shall be available or on the project within four hours of being notified of a problem regarding the quality assurance of any work being done by the Design-Builder, or any of its subcontractors or agents.

2.26.5.3.3 Quality Testing Supervisor

Job Description

- The Quality Testing Supervisor shall oversee all sampling and testing operations and report directly to the Construction QA Manager. The Quality Testing Supervisor shall be responsible for insuring that qualified testers are performing all testing according to the proper test procedure, and using calibrated and verified testing equipment. The Quality Testing Supervisor may be an employee of the Design-Builder's QA laboratory, and shall be on the site during testing.

Minimum Qualifications

- The Quality Testing Supervisor shall meet one of the following requirements:
 - A. A Professional Engineer, registered in the State of Washington, with at least one year of highway materials testing experience acceptable to the Department, or
 - B. An Engineer-In-Training, certified by the State of Washington, with at least two years of highway materials testing experience acceptable to the Department, or
 - C. A Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology, Construction, or related field acceptable to the Department; and at least three years of highway materials testing experience acceptable to the Department, or
 - D. Certification by the National Institute for Certification in Engineering Technologies (NICET) in the Construction Materials Testing field as an Engineering Technician (Level III) or higher in the appropriate subfield in which sampling and testing is being performed, or
 - E. Certification by NICET in the Transportation Engineering Technology field as an Engineering Technician (Level III) or higher in the Highway Materials subfield, or
 - F. Certification by NICET as an Engineering Technician, or higher, in Civil Engineering Technology with at least five years of highway materials testing experience acceptable to the Department, or
 - G. An individual with at least eight years of highway materials testing and construction experience acceptable to the Department.

2.26.5.3.4 Environmental Compliance Manager

Job Description

- Advise design team on how to avoid and minimize adverse effects to the natural environment and communities.
- Ensure and provide documentation that all Project environmental commitments are met.
- Ensure that design and construction complies with all environmental regulations, Project environmental documentation, and Project permits.
- Must be on site for the duration of both the design and construction periods.

Minimum Qualifications

- 5 years experience managing environmental compliance for transportation projects.
- Experience working with engineering teams to develop designs that avoid and minimize adverse environmental and community impacts.
- Experience working with transportation and natural resource agencies obtaining permits and/or permit modifications.

2.26.5.3.5 Testing Technicians

The Design Builder shall have all QA testing performed by qualified testers. The testers shall be qualified as defined in the requirements in AASHTO R-18. A testing technician currently qualified in concrete testing by the American Concrete Institute (ACI) (Level I) will be considered qualified in those concrete tests. The qualifications of the laboratory technicians employed by an AASHTO Accreditation Program (AAP) will be accepted for AASHTO test methods only when confirmed by the laboratory's training and evaluation records. The competency of the tester shall be re-evaluated at least annually in all tests they perform. The testing technicians performing the field and laboratory QA sampling and QA testing shall be employed by the Design-Builder or agents laboratory and supervised by the Quality Testing Supervisor.

2.26.5.3.6 Restrictions on QA Staff

The restrictions in the following table will apply to the Design-Builders Quality Assurance staff:

TABLE 2.26.1 WASHINGTON STATE DEPARTMENT OF TRANSPORTATION – EVERETT HOV DESIGN-BUILD PROJECT

POSITION	QA duties and responsibilities	Restrictions on who they get their paycheck from (their employer)	Restrictions on what they do	Restrictions on who they report to on the org chart	Expected qualifications for their position?
Construction QA Manager (Key personnel)	Included in section 2.26.5.3	none	cannot have responsibility for construction "production". Cannot be the same person as the Quality Testing Supervisor	Directly to the person/group with overall project management responsibilities	Included in section 2.26.5.3
Quality Testing Supervisor (Key Personnel)	Included in section 2.26.5.3	none	cannot have responsibility for construction "production". Cannot be the same person as the Construction QA Manager.	Project Manager or Construction QA Manager	Included in section 2.26.5.3
Construction field inspectors	Inspect aspects of the work in which qualified. Prepare Daily Inspection Reports. Document inspection of materials brought to the job site.	Cannot be employed by materials suppliers or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Construction QA Manager	Minimum of 4 years of qualifying experience in highway construction inspection
Field samplers and field testers	Take samples and tests necessary to meet the requirements of the contract, specifications and plans.	Cannot be employed by materials suppliers or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Construction QA Manager or the Quality Testing Supervisor	Included in section 2.26.5.3
Construction materials lab testers	Perform tests on various materials within the laboratory environment and in accordance with applicable procedures.	Cannot be employed by materials suppliers or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Quality Testing Supervisor	Included in section 2.26.5.3
Design QA Manager (Key Personnel)	Included in section 2.26.5.3	Could be an employee of the firm designated as the lead design firm, that employs the designer of record	cannot have responsibility for construction "production" Also cannot have been involved in the design that is being QA'd	Directly to the Project Design Manager or to the person/group with overall project management responsibilities.	Included in section 2.26.5.3
Fabrication QA Manager	Implement the Fabrication QA Plan. Manage inspection and testing of all off-site fabrication work. Ensure all fabrication QA inspection staff has appropriate training and certification. Maintain NCR log. Schedule Quality Checkpoints. Maintain calibration records for fabrication test equipment.	Cannot be employed by fabricators, materials suppliers, or subsidiaries	cannot have responsibility for construction "production". May be the same person as the Construction QA Manager.	Must either report to the Construction QA manager or can be the Construction QA manager	WA PE license, 10 years experience in Fabrication inspection and Fabrication Quality Assurance, including qualification in welding, structural coatings, precasting
Fabrication QA Inspectors and testers	Daily Fabrication Inspection Reports. Prepare Materials Receiving Report to document inspection of materials during fabrication.	Cannot be employed by fabricators, materials suppliers, or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Fabrication QA manager (if used) or the Construction QA Manager	Must be qualified in test standards they perform, must use verified equipment
Environmental Compliance Manager (Key Personnel)	Included in section 2.26.5.3	None	cannot have responsibility for construction "production"	Directly to the Project Manager or the person/group with overall project management responsibilities	Included in section 2.26.5.3
Environmental Compliance Inspectors	Assist in the review of the design and implementation of environmental BMPs and mitigation measures. Assist in the verification of regulatory compliance.	Cannot be employed by "constructors" or materials suppliers or subsidiaries	Cannot have responsibility for construction "production"	Directly to the Environmental Compliance Manager	Wildlife Biologist. Watershed Scientist. Soil Scientist, Revegetation Specialist, Prof. Environmental Engineer.

2.26.5.3.7 CQA Staff Qualifications

General. CQA staff is required to be trained in the applicable procedures for inspection of Work, geotechnical and environmental monitoring, and material sampling and testing.

The professional training and experience of the CQA staff (including biologists, hydrologists, and geotechnical engineers) shall be commensurate with the scope, complexity, and nature of the activity to be inspected, monitored, or tested.

Department Right To Remove. The Department has the authority, by written notice, to have any of the following removed permanently from the Project:

- a. A tester who does not perform the CQA tests in accordance with the test methods
- b. A tester who does not report test results accurately
- c. An inspector or geotechnical or environment monitor who, in the opinion of the Department, does not exercise good judgment in the performance of duty
- d. A tester who is not certified per Contract requirements

Certifications. CQA personnel performing on-site inspection and material sampling and testing are required to have the certifications listed in Table 2.26.1.

2.26.5.3.8 CQA Staff Responsibilities

The CQA inspection staff and geotechnical and environmental monitors shall check for compliance with all permits, environmental monitoring, and construction operations. Staff shall be on-site to monitor all field operations for their appropriate disciplines. Construction operations requiring continuous field sampling and testing shall proceed only in the presence of the assigned CQA staff personnel.

Inspection. All on-site Work shall be inspected by the CQA staff, except that certain portions of the Work may be inspected by qualified individuals who are employees of or retained by manufacturers, vendors, or Suppliers, if approved in writing by the Department.

Utilities. The CQA's staff is responsible for the following:

- a. Coordinating with the Utility Owners and Design-Builder to ensure that adequate notification is provided to the Utility Owners for them to inspect construction activities performed on or around their utility.

Department Oversight. The Department's oversight staff will periodically review the Field performance and test results of the CQA staff. The CQA organization shall perform statistical reviews (including but not limited to normal distribution, control charts, percent within limits) of the inspection and test results and submit monthly summaries to the Department.

2.26.5.3.9 CQA Staffing Levels

Identify QA staffing levels in the QMP. The staffing levels in the Proposal shall be updated in the QMP and again, as necessary, during the course of the Project to reflect the actual construction schedule. The size of the CQA staff shall reflect the complexity, needs, shifts,

and composition of the construction activities consistent with the construction schedule, relative locations of the Work to be covered, geotechnical considerations, environmentally sensitive areas, and specific nature of the Work. The Department will review and comment on proposed staffing levels for adequacy in meeting Project needs. Construction shall not take place when CQA staffing levels are inadequate to provide the inspection and testing required by the contract.

2.26.5.4 Administration Requirements

General. In Section 2 (Administration) of the QMP, describe the procedures for coordinating and ensuring the consistency and quality of all Work performed or provided for the Project by all participants.

2.26.5.4.1 Personnel Qualifications and Certifications

In the QMP, specify procedures that:

- a. Familiarize all personnel with all requirements of the Contract Documents pertaining to their responsibilities;
- b. Educate, train, and certify (as appropriate) personnel performing activities affecting or measuring the quality of the Work and ensure that they achieve and maintain reasonable proficiency; and
- c. Ensure that personnel performing the Work do so according to the QMP.

2.26.5.4.2 Document Control

General. In the QMP, specify procedures for meeting documentation requirements and document control for the filing of design criteria, reports and notes, calculations, plans, specifications, schematics, support materials, etc., and for the specific responsibilities of personnel to satisfy these requirements. Maintain all such documents for the duration of the Contract and organize, index, and deliver them to the Department upon Final Acceptance as well as within five (5) Working Days of receipt of any such request from the Department. Use a format for the documentation that is acceptable to the Department. In the QMP, identify by name the document control supervisory personnel for the maintenance and management of records and documents pertinent to QA activities. The Department strongly encourages using videotaped and electronic documentation of the Project.

2.26.5.4.3 Change Documentation

General. In the QMP, specify measures to control the receipt and issuance of documents, such as instructions, procedures, drawings, and any changes thereto, which prescribe activities affecting quality. With these measures, ensure that approved documents, including all authorized changes thereto, are reviewed for adequacy, approved for release by authorized personnel, and distributed to and used at the locations where the prescribed activity is performed. Ensure that any changes to documents are reviewed and approved by the same organizations that performed the original review and approval, unless the Department allows, in writing, another responsible organization to perform such reviews and approvals.

2.26.5.4.4 Audits

General. In the QMP, specify a comprehensive series of planned periodic audits to determine the effectiveness of the Quality Program. Require that audits be performed by appropriate trained personnel of the QA organization in accordance with the written procedures or checklists. For audit results, specify that the management having responsibility in the areas audited shall document, review, and act upon them. The QA auditor shall take follow-up action, including re-audit of deficient areas, as indicated.

2.26.5.4.5 Design Changes

General. In the QMP, specify procedures for tracking and distributing design changes made after the release-for-construction design drawings.

2.26.5.4.6 As-Built Drawings

General. In the QMP, specify procedures to be used in preparation and submission of the final As-Built drawings to ensure accurate and timely documentation of the constructed Project.

2.26.5.4.7 Scheduling Reviews and Submittals

General. For each design item, segment, or construction phasing review, include oversight reviews in the Initial Monthly Plan Update and Monthly Plan Updates. Keep the Department, and other affected governmental Agencies up to date on the exact timing of reviews with day-to-day communications. Allow five (5) Working Days in the schedule for each milestone review and 10 Working Days for each full review of designs.

Bear the schedule impacts of revisions arising from the Department's and municipality's review and caused by noncompliance with Contract requirements, including the Department's time for reviewing revisions.

Coordinate frequently and early regarding resolution of previously identified issues.

2.26.5.4.8 Progress Payment Documentation by QA Organization

Material Sampling Tracking. The CQA shall obtain and track manufacturers' certificates for all materials accepted by certifications and shall document receipt of "Approved for Shipment" certificates. A manufacturer's certificate of compliance may be used for acceptance of materials as provided in Chapter 2.25.

Quality Documentation. The CQA Manager shall review monthly progress payment requests to ensure that acceptable quality documentation is on file for all payment items.

2.26.5.4.9 Contract Price Adjustments

Quality-Based Price Adjustments. The CQA Manager shall be responsible for calculating the statistical acceptance of materials as required in Chapter 1-06.2 of the General Conditions, calculating any indicated price reduction, and submitting the calculations to the Department for review and approval.

The Department will base any price reduction on the documentation of testing and inspection results provided by the CQA Manager and subsequently approved by the Department, the quantity of noncompliant materials, and/or additional OVT.

2.26.5.4.10 Documentation

General. Collect and retain each of the following types of data in written form during the performance of the Work, all of which shall be in a form acceptable to the Department. Make this documentation available to the Department daily throughout the Project.

Daily Manpower and Equipment Reports. Maintain daily manpower and equipment reports for construction-related activities, and require subcontractors to do the same.

Daily Occurrence Log. Maintain, in narrative form, a daily occurrence log of construction activities by the CQA or its designee(s). In this log, document all significant occurrences on the Project, including:

- a. Unusual weather
- b. Asserted Force Majeure events
- c. Events and conditions causing or threatening to cause any significant delay, disruption, or interference with the progress of Work
- d. Significant injuries to a person or property
- e. All activities on the current Monthly Plan Update that are being actively prosecuted
- f. (In a standard format) all labor, materials, and equipment expenses incurred

Hazardous Materials. For hazardous material remediation Work, maintain the data required by the QMP in Section 6 (Environmental Requirements) separately for each site.

Utilities. The QA organization shall:

- a. Oversee coordination with Utilities
- b. Document (for the Project team's use) design, construction, rework, and protection of Utilities
- c. Maintain the above-required data separately for each Utility facility

Quality Records. Document all quality, inspection, and test activities, any delays encountered; Work that does not conform to the requirements of the Contract and design/ and the corrective actions taken regarding such nonconforming Work.

Monthly Certification. As part of the monthly progress payment request, provide a written certification signed by the Design QA Manager and the Construction QA Manager, indicating that the QMP and all of the measures and procedures provided therein are functioning properly and are being fully complied with, that the work meets the requirements of the Contract, and that the work meets the RFC plans and specifications.

CQA Manager Weekly Reports. The CQA Manager shall also maintain and submit weekly records with evidence that all required activities and/or tests have been performed, including the following:

- a. Type, number, and results of all current quality management activities, including reviews, inspections, materials analysis, tests, audits, and monitoring of Work performance

- b. Closely related data, such as the qualifications of personnel and the procedures and equipment used
- c. Identity of the inspector or data recorder, the type of test or observation employed, the results and acceptability of the Work
- d. Minutes of all QA meetings
- e. The nature of any nonconforming Work causes for rejection, etc.
- f. Proposed corrective actions(s) for any nonconforming Work, corrective action(s) taken, and results of corrective action(s)

The Department reserves the right to inspect and review these documents at any time.

Weekly Scheduling Notice to Department. Notify the Department in writing by Friday noon of each week of planned construction activities, including fabrication. In this notification, describe the anticipated construction activities for the following week (Monday through Sunday) to allow the Department to schedule its resources. For activities (fabrication, etc.) occurring beyond 60 miles of the Project area, give the notification at least 10 Working Days before the planned Work.

CQA Final Inspection. At the completion of Work, the CQA Manager shall jointly conduct a final inspection with the Department, including inspection of Work and associated as-built documents, certifications, other documentation, and Design-Builder clean-up requirements. Accomplish this inspection within five (5) Working Days of notification that the Project is ready for final inspection. During the inspection, examine the Work and review CQA documentation. The Department and the CQA Manager will jointly agree upon a list of nonconforming Work and include the list in quality documentation with an agreed-upon date of correction for each deficiency.

Design-Builder Corrections. Ensure that each deficiency identified during the final inspection has been corrected before the agreed-upon completion date.

Final Certificate of Compliance. At completion of the Project, submit with the final invoice a Certificate of Compliance, signed by the Project Manager and CQA Manager, indicating that all materials incorporated in the Project conform to the Contract requirements.

Final Owner Acceptance. The Department has sole responsibility and authority for the acceptance of all Work.

2.26.5.5 Investigations and Testing Requirements

General. In Section 3 (Investigations and Testing) of the QMP:

- a. Describe procedures for coordinating and ensuring the consistency and quality of materials and products supplied by various vendors;
- b. Describe procedures for ensuring the quality and documentation of Project field investigations, including geotechnical investigations and testing, field surveying, and the Project mapping coordinate system, and traffic counts; and
- c. Include assurance of the qualifications of all laboratories.

2.26.5.6 Design Requirements

General. In Section 4 (Design) of the QMP, describe design quality management practices and processes that are intended to:

- a. Place responsibility for design quality on the Design-Builder;
- b. Ensure that Work is designed and built in accordance with the Contract;
- c. Ensure that all Design Documents are prepared in accordance with generally accepted design and engineering practices, and meet all the requirements of the Contract; and
- d. Allow the Department to fulfill its responsibility to exercise due diligence in overseeing the design process and design products.

2.26.5.6.1 Quality Requirements

Quality Procedures. In the QMP, specify procedures for ensuring the quality of all design plans, specifications, reports, calculations, and other Design and Construction Document. Formulate these procedures to ensure that appropriate quality requirements are specified and included in all design and construction documents and that deviations from such requirements are controlled. For any deviations from these procedures, obtain the advance written approval of the Department.

2.26.5.6.2 Design Checks

Quality Procedures. In the QMP, specify quality procedures for preparing and checking all plans, specifications, calculations, reports, and other documentation submitted to the Department to ensure that they are independently checked and back-checked in accordance with generally accepted engineering practices. Include specific procedures for verifying computer programs used and their output, and the process and procedures that the DQA managers will employ to demonstrate that the QMP is understood and followed by the design personnel. Clearly identify the design engineer and checker on all final Design and RFC Documents.

2.26.5.6.3 Design Adequacy

General. In the QMP, specify the level, frequency, and methods of checking the design adequacy of the Project, including the methods by which all Design Documents, calculations, and reports shall be independently checked, verified for adequacy of design, and back-checked in accordance with generally accepted design and engineering practices by senior experienced engineers from the Design-Builder's staff.

2.26.5.6.4 Design Coordination

General. In the QMP, specify detailed procedures for coordinating Work performed by different persons, firms, or disciplines on related tasks, in the same geographic area, or in adjacent geographic areas. Formulate these procedures to ensure that, under such circumstances, no conflicts, omissions, or misalignments occur between drawings or between the drawings and the specifications, and that the Design-Builder coordinates the review, approval, release, distribution, and revision of documents. Such procedures could be an

interdisciplinary review process, conflict identification process, omission identification process etc.

2.26.5.6.5 Unique Design Features

In the QMP, specify those elements of the Contract Documents, Design Documents, and Construction Documents that require special attention to or emphasis on quality, including applicable standards of quality or practice to be met, level of completeness, and/or level of detail required.

2.26.5.6.6 Design Changes

Initiation. Both the Design-Builder and the Department may initiate design changes (during design or after final design).

Appropriate Changes. The Department may deem design changes to be appropriate for several reasons, including errors in the final design plans or specifications, unexpected or changed conditions in the field, and design alternatives proposed by field or other personnel.

Invalid Change. Requests for information (e.g., earthwork settlement releases, additional alignment information, and dimensions) and design engineer evaluation of nonconforming constructed Work do not constitute valid design changes. Design changes to make constructed or partially constructed Work acceptable will not be allowed.

Procedures. In the QMP, include a process to propose, receive, track, respond to, and distribute design changes, and to identify the general goal, the participants, the participants' responsibilities, and a Work process for each change. Request review by the DQA and the Department of all design changes. The DQA, the Department, and the Design-Builder shall jointly determine the procedures and timing of reviews, with the mutual understanding that a timely and expeditious design change process benefits all parties.

Quality Checks. For all design changes, perform the same quality checks as were performed on the original design, and conform to all provisions of the Contract. Make no design change without first obtaining the written approval of the Designer of Record or a Utah PE employed by the same firm as the Designer of Record. Require that all design changes, including but not limited to plans, sketches, memoranda, specifications, calculations, and reports shall be signed, stamped, and dated by a Professional Engineer licensed in Utah.

Make no design change affecting a Utility without obtaining the written approval of the appropriate Utility Owner.

Certification. In all cases, the DQA Manager shall certify in writing that the design change:

- a. Has been designed in accordance with Contract requirements
- b. Has been checked in accordance with the approved QMP; and
- c. Is consistent with other elements of the original design.

2.26.5.6.7 Design-Builder's Design Quality Control Checks

General. Require, at a minimum, that a senior experienced engineer check all designs, including making independent calculations for all structural elements. If a checking engineer

is not available within the design firm or if the design firm does not have a documented, operative, and effective quality program consistent with the approved QMP, employ an independent firm to conduct the quality checks. The DQA organization shall have a documented, operative, and effective quality program consistent with the approved QMP.

2.26.5.6.8 Design Reviews

2.26.5.6.8.1 General

DQA Review. The DQA Manager will review all designs to ensure the development of the plans and specifications are in accordance with the requirements of the Contract.

Department Review. The Department will audit, as needed, the DQA processes and Design Documents to verify compliance with the Contract Documents. The Department will be invited to attend all reviews.

Participation. Require, at a minimum, that the engineer-in-responsible-charge of the Work and the appropriate design manager(s) for the discipline(s) involved in the design (e.g., structures design manager and highway design manager) be present for and participate in all reviews.

Document Copies. For any type of review, the Department reserves the right to take to its offices copies of Design Documents being reviewed for further review and examination.

2.26.5.6.8.2 Oversight Reviews

General. The DQA Manager shall conduct oversight reviews, and the Department may participate in these reviews and comment as requested or as it otherwise deems necessary. These reviews will be conducted in the office of either the Design-Builder or its design engineer and in the presence of the design personnel, with the intent of minimizing disruption of ongoing design Work. The DQA Manager, and design staff, shall jointly determine the materials to be compiled for each review. Formal assembly and submittal of drawings or other documents will not be required, but the Design-Builder is encouraged to provide informal submittals to facilitate reviews. The review may be of progress prints, computer images, draft documents, working calculations, draft specifications or reports, or other design documents. If mutually agreed upon for specific review items, the over-the-shoulder review may consist of a transfer of electronic files.

2.26.5.6.8.3 Milestone (30%, 60%, and 90%) Reviews

General. The DQA Manager will conduct formal milestone reviews at the 30%, 60%, and 90% (or as otherwise agreed by the WSDOT and Design-Builder) stage of project elements to determine whether the Contract requirements and design are being followed and that QC/QA activities are following the approved QMP. For these reviews, prepare a formal design submittal to the DQA Manager that includes, as a minimum, design drawings, calculations (as appropriate), reports, specifications, geotechnical data, environmental requirements, and any other relevant design information. The DQA Manager shall compile and maintain documentation of the review. The Department will be invited to attend these reviews.

Structures. The Department will participate in a full review of all structures at the type, situation, and layout (TSL) (Sheet Ones) stage of design.

2.26.5.6.8.4 100 % Design Reviews

When the designer has completed a design package to 100% and the package has been checked and audited, a formal design submittal is assembled and distributed for review, including plan sheets, calculations, specifications, and other pertinent data. The Designer shall prepare for these reviews a full set of drawings and other documents stamped “Checked and Ready for Review.”

Redline Documentation. Develop a method to redline the 100%-design review package, then use it to document the comments provided by the DQA Manager and the Department at the 100% review.

Redline Incorporation. Develop a method to document the incorporation of redlined 100% review comments in the final design. Incorporate the review comments and resolve any remaining design questions to the Satisfaction of the DQA Manager and the Department.

2.26.5.6.8.5 Release for Construction Review

After the 100% comments have been addressed and the design documents have been checked and audited, a "ready to be released for construction" submittal package is assembled and distributed to the Design-Builder for release for construction.

RFC designs for bridge foundations shall include submitting to WSDOT the geotechnical evaluation memo, geotechnical pile design calculations, and the seismic design memo.

Certification. When a design package is ready to be released for construction, the DQA Manager shall certify all of the following related to the Work:

- a. The design is in accordance with the Contract requirements.
- b. The design has been checked in accordance with the approved QMP.
- c. No design exceptions exist that have not previously been approved by the Department.

2.26.5.6.8.6 Final Design Review for Design of Entire Project

Final Design Submittal. When construction of the entire project is completed, prepare a formal final design submittal for the entire project that includes:

- a. All design plans
- b. Design calculations
- c. Design reports
- d. Specifications
- e. Estimated quantities
- f. Electronic files, in the format(s) specified in the Proposal documents
- g. All as-built information

Department Acceptance of Final Design. All plans, reports, and specifications shall be signed and stamped by the engineer-in-responsible-charge. The Department will conduct its review and accept or reject the final design package within 20 Working Days of receipt of the final design documents.

2.26.5.6.9 Design Review Documentation

Records. Prepare a written record of each design review, including informal oversight reviews:

- a. List the participants in each review or visit.
- b. Report all items discussed.
- c. Identify discrepancies noted and report corrective action(s) taken or planned.
- d. Identify follow-up action items, due dates, and the responsible party.
- e. Identify items needing resolution and time constraints for resolution.

Reports. Maintain a record of internal quality activities and summarize them in monthly progress reports. Submit to the Department a report of each design review, including oversight visits, within five (5) Working Days of the completion of the review or visit.

2.26.5.6.10 Acceptance of Design

General. Department acceptance of the design will occur essentially at the time of acceptance of construction. The DQA Manager shall submit all documents required for final approval, with a certification that the constructed Work has been built in conformance with the Contract documents, design documents, and the construction documents prepared and approved by the DQA Manager.

2.26.5.6.11 Quantity Estimate

General. Provide quantity estimates as needed to demonstrate that the minimum sampling and testing frequencies are in compliance.

2.26.5.7 Construction Requirements

General. In Section 5 (Construction) of the QMP, describe construction quality management requirements that are intended to:

- a. Place responsibility for construction quality on the Design-Builder.
- b. Ensure that Work is constructed in accordance with the Contract, plans, and specifications.
- c. Allow the Department to fulfill its responsibilities of exercising due diligence in overseeing the construction.

Goal. It is the goal of the Department to have the Project constructed with the highest quality of workmanship and with the least adverse impact on the public, the environment, and long-term maintenance costs.

2.26.5.7.1 Work Conditions

General. In the QMP, specify procedures to ensure that all activities affecting the quality of the Work are accomplished under suitably controlled conditions, using appropriate equipment, and with assurance that all prerequisites to the proper accomplishment of a give task by a work have been satisfied. Coordinate these activities with the Department safety representative.

2.26.5.7.2 Quality Procedures

General. In the QMP, describe specific procedures to be followed to ensure that all the Work conforms to all requirements in the Contract Documents and the design documents being used as the basis for construction, and that all materials, equipment and elements of the Work incorporated in the Project will perform satisfactorily for the purpose intended. Specifically include the procedures for inspecting, sampling, testing, checking, and documenting the Work, including all Work performed by subcontractors.

2.26.5.7.3 Materials

In the QMP, specify procedures and measures that demonstrate compliance with Chapter 2.25.

2.26.5.7.4 Inspection

Work. In the QMP, describe a program for inspection of all Work, including examinations, measurement, and tests of materials or elements for each Work operation, where appropriate, to verify quality. Do not limit such inspections to those required for quality testing purposes. If the design documents specify mandatory inspection points that require witnessing or inspecting by the CQA and approval of the designated representative before Work shall proceed, indicate the specific inspection points in all appropriate documents.

Production Plants. In the QMP, specify procedures for plant inspection for production of hot-mix asphalt, PCC, and structural concrete.

2.26.5.7.5 Field Procedures

Quality. In the QMP, specify procedures to address all elements that affect Project quality in production, placement, and finishing (i.e., surfacing, embankments, paving, and structural concrete). Include elements such as management and process control personnel, testing equipment and laboratory facilities, testing frequencies, aggregate production, stockpile management, proportioning, mixing and processing, transporting, placing, spreading, depth or thickness, finishing, compaction, joints, and mix designs.

2.26.5.7.6 Dispute Resolution

System. In the QMP, recommend a system to resolve disputes that may arise in the CQA sampling and testing process. If the dispute resolution system includes a dispute resolution laboratory (DRL), recommend a DRL that is not a participant in the quality process of either the Design-Builder or the Department and is AASHTO accredited.

Maintain all materials for the dispute resolution laboratory.

2.26.5.7.7 Shop and Falsework Drawings

In the QMP, specify personnel assigned to shop drawing review and approval, including falsework drawings and other critical structure shop drawing; procedures for documenting reviews and approvals and for obtaining corrective action, when necessary; and procedures for checking compliance with shop drawing and falsework drawing requirements.

2.26.5.7.8 Testing

Test Procedures. In the QMP, specify written test procedures for all testing required to demonstrate that all materials, equipment, and elements of the Work will perform satisfactorily for the purpose intended and will meet the standards specified in the Contract Documents and the design documents. In the test procedures, incorporate the requirements and acceptance limits contained in applicable design documents, and include provisions for verifying that all prerequisites for the given test have been met and that adequate test instrumentation is available and used. Require test results to be documented and evaluated to verify that test requirements have been satisfied.

Equipment Certifications. In the QMP, specify measures to ensure that tools, gauges, instruments, and other measuring and testing devices used in activities affecting quality are properly maintained, controlled, calibrated, certified, and adjusted at specified times or frequencies to maintain accuracy within necessary limits.

Instrumentation. In the QMP, specify procedures and personnel to be used to ensure that specified instrumentation is installed, maintained, and monitored in accordance with applicable specifications.

Coordination. In the QMP, set forth a program to coordinate inspections and testing by local agencies and Utility Owners.

Qualification of Laboratories. Laboratories must meet the requirements of Chapter 2.25.

Field Laboratories. Satellite (field) laboratories may be used, where appropriate, for testing. Equipment in the satellite laboratories shall meet the requirements of Chapter 2.25. The laboratory shall have written policies and procedures to ensure the satellite laboratories

performing testing activities on the Project are capable of providing testing services in compliance with applicable test methods. The policies and procedures shall address inspection and calibration of testing equipment, as well as a correlation-testing program between the accredited laboratory and portable or satellite facilities.

QA Testing. The TQA organization shall perform testing in accordance with the requirements of Chapter 2.25. The Department will statistically compare results of the CQA's testing with the OVT, in accordance with the F and t test. If the results of the CQA material tests are statistically validated by the Department's tests, they are the basis of acceptance. Perform initial CQA tests and OVT side-by-side to establish a confidence level between the results of the CQA tests and OVT. Exercise sound judgment in the testing approach and increase the frequency of testing in situations in which quantities may be small but location is critical, such as sliver fills.

QA Test Reporting. Use a Department-approved standardized form for reporting CQA test results, and the Design-Builder shall enter all QA test results into the Department-provided materials test database.

2.26.5.7.9 Materials Testing Frequencies and Random Sampling

Materials Quality Assurance, (QA), sampling and testing frequency will be performed in accordance with General Conditions Chapter 1-06 Table 6, the WSDOT Construction Manual, Materials Manuals, Standard Specifications, or other contract provisions defined in the design built agreement.

Materials Quality Verification, (QV), sampling and testing will typically be performed at a rate of one (1) verification test to every five (5) of the design builder's acceptance testing. During production startup testing may be required on a more frequent basis until the process is established to be under good control. When QV testing reaches 25 samples, and the QA and QV testing can be statically validated, the frequency of the QV tests can be reduced to 1 in 20. If at any time the QA and QV testing can not be validated, then the QV testing frequency shall be reduced to 1 in 5 until 25 samples are reached again with satisfactory statistical validation.

For all materials that are not addressed by WSDOT standards, material-testing specifications, testing procedures, and frequencies will be determined by the Materials Quality Assurance Team with concurrence of the Engineer of Record.

All acceptance and verification sampling and testing shall be randomly obtained, at the location and frequency stated in the contract documents. The Design-Builder shall provide to WSDOT a testing plan for each material. The testing plan shall be developed using a Random Numbers Table and reflect the proposed total project quantity. The testing plan shall be submitted prior to the beginning of production or placement of the material.

When small quantities of materials are to be used, they can be accepted without sampling and testing when the quantity of materials proposed for use by the Design Builder are less than the minimum sampling and testing frequencies. Structural Concrete will not be considered under the small quantity definition. The Construction QA Manager shall follow the procedure for acceptance of small quantities found in Section 2.25.4 of this Contract.

2.26.5.7.10 Materials Quality Analysis Program

The Design-Builder sampling and testing results may be used for acceptance provided that they are validated by WSDOT's verification sampling and testing

Both the Design Builder QA and the WSDOT's QV test result will be recorded in the Statistical Analysis of Materials Software that has been provided by WSDOT to statistically evaluate the test data to determine the acceptability of the material tested. This evaluation will be performed using the F and t Test analysis. The Construction QA Manager shall be responsible for performing the evaluation. Any test data that is found to be outside the normal F and t distribution will have to be reviewed by the Quality Assurance Team and a determination be made to why the test data is outside the normal distribution.

The Quality Assurance Team shall make cooperative effort by the Design-Builder and WSDOT to identify the cause of discrepancies in test results. The Quality Assurance Team will need to generate a report for the materials files defining what the problem was, the cause of the problem, and the solution to prevent the problem from happening again. As a minimum, the review should include the following actions:

A check of test data, calculations and results;

Observation of the sampling and testing by the Independent Assurance Inspector;

Check of test equipment by the Independent Assurance Inspector.

If the Quality Assurance Team fails to identify the cause of discrepancies in test results, then the WSDOT's test results shall be used for acceptance.

When certain attributes of a material are not statistically evaluated for acceptance, such as concrete slump, entrained air content, and temperature for concrete, and the differences between the Design-Builder's test results and verification test results exceed the values for precision and bias as found in the testing procedure, placement of the material shall be halted until the Design-Builder can demonstrate that the material is within the required specifications.

2.26.5.7.11 Materials Testing Laboratory

All QA testing will be performed by a WSDOT approved laboratory reporting directly to the Design Builder's Construction QA Manager. The Design Builder, or a sub contractor, may employ the laboratory personnel. To avoid conflict of interest requirements, the materials testing laboratory that is used for QA testing shall not be owned, operated, equipped, or staffed by material suppliers. . . . The laboratory shall meet the requirements of AASHTO R-18 for qualified testers and calibrated/verified equipment and be able to accomplish the testing according to the test procedure they are performing.

The Design Builder shall develop and maintain a Laboratory Quality Systems Manual. The manual shall include:

Staff qualifications, position description, and qualification process

Listing of test procedures used,

Equipment, including verification and calibration procedures and inventory

Test reports, worksheet, and forms

Sample management

Diagnostic and corrective action

Quality systems review

WSDOT approval of the laboratory will be required. WSDOT will perform an on-site evaluation of the facility to ensure all work is being performed according to the contract standards. The evaluation includes both audit and inspection functions, including reviewing training records, reviewing equipment calibration and verification records, and witnessing DB testers performing the test procedures.

The laboratory shall be properly equipped, staffed, and fully operational for WSDOT inspection a minimum of five (5) days prior to start of work. The Design Builder will be advised in writing of any deficiencies noted during WSDOT inspection and must take immediate action to correct the noted deficiencies. Work will not be permitted to proceed until the laboratory and staff is inspected and has received written approval from WSDOT.

The test equipment for the following test procedures shall be as shown so that proper correlation between the QA and QV test results may be established.

WSDOT Field Operating Procedures (FOP), for AASHTO T308 Asphalt Content by Ignition Method (Barnstead Thermolyne Model F85938 or other approved ignition furnace with internal balance).

WSDOT FOP for AASHTO T-310 and WSDOT FOP for WAQTC TM8 In-place Densities by Nuclear Method (Troloxer 3430 Series Moisture/Density Gauge)

2.26.5.7.12 Materials Quality Team

The Design Builder and WSDOT will jointly form and participate in a Materials Quality Assurance Team. The Construction QA Manager will be responsible for setting the meeting schedule, agenda, and documenting the meeting attendees and minutes. The meetings will be held as needed to address all quality issues on the project. It is suggested that meetings occur every two weeks or more often if it is determined that a problem exists concerning materials.

The purpose of the meetings will be to discuss any issues of poor quality, processes that are unstable or out of good control, evaluation of disagreement between QA and QV test data, future quality concerns, and any issues that WSDOT or the Design Builder may have about the materials quality of the project. The quality team will address materials sampling, testing and acceptance of materials that not address within the section Control of Materials to determine the acceptable method for the acceptance of those materials.

It is recommended that the Design Builder designate to the Materials Quality Assurance Team their personnel in charge of QC and QA, superintendents, and others who have quality concerns. It is recommended that the Department designate to the Materials Quality Assurance Team our chief manager, project engineer, field engineers, and others who have quality concerns.

2.26.5.7.13 Fabrication Inspection

The fabrication inspectors that are responsible for acceptance of structural steel shall be qualified as follows:

The Inspector shall be an AWS Certified Welding Inspector (CWI) qualified and certified in accordance with the provisions of AWS QCI, Standards for Qualification and Certification of Welding Inspectors, or, the Inspector shall be qualified by the Canadian Welding Bureau (CWB) to the requirements of the Canadian Standard Association (CSA) standard W178.2, Certification of Welding Inspectors, level II or the level III requirements.

The inspector shall, prior to performing any inspections, have documented training on all applicable codes and specifications applicable to this specific project for the inspections to be performed. This training shall include evidence that the inspector is competent with the project specific specifications and requirements.

2.26.5.7.14 Nonconforming Work

Nonconformance Report Identification. The CQA Manager shall identify and document in a nonconformance report (NCR) all elements of the Work that have not, or are believed to have not, been constructed in accordance with the approved drawings and specifications. The NCR shall be submitted to the Department in writing within 24 hours of identification, and a copy sent to the design engineer.

NCR Remediation. In the NCR, the CQA Manager shall clearly describe the element of Work that is nonconforming and the reason for nonconformance. The design engineer (or a designated designer with equivalent experience and State registration) who signed and stamped drawings for the Work shall evaluate and determine whether a nonconformance exists; and the effect of the nonconformance on performance, safety, durability, long-term maintenance, and the life of the item. Document remedial actions and have them stamped by a Professional Engineer licensed in Utah. The CQA Manager must also sign the NCR, stating that remedial actions to be employed have undergone the same level of inspection and testing as required for the original design.

Removal of Work. If the Department does not agree with the remedial actions set forth in an NCR, it has the authority to call for removal of the nonconforming Work.

Biweekly NCR Reports. The CQA Manager shall maintain a log of all NCRs and submit it biweekly to the Department. The CQA Manager shall number each NCR sequentially; give a brief description and status of the nonconforming Work, and, if the NCR has not been closed, an expected closure date. The Department will not grant acceptance for any portion of Work that has an outstanding NCR.

Department NCR's and Audit Findings. The Department shall retain the right to write its own NCRs and Audit Findings based on its observance of Work. Department-generated NCRs and Audit findings require the same review and ultimate closure as NCRs generated by the CQA Manager.

2.26.5.7.15 Quality Checkpoints

General. Establish quality checkpoints (QCP) at certain stages of the construction process to ensure that only acceptable Work is incorporated into the Project. With the CQA Manager and the Department's oversight representative, review the progress of Work to date,

including inspection reports, process and acceptance test reports, settlement data, pile driving records, string-line measurements, audits, and other pertinent data. The CQA Manager shall coordinate the review group members to ensure that the QCPs are reached in a timely fashion so that the Design-Builder is not delayed. When a QCP is reached, the Department's oversight representative shall respond within four (4) working hours of notification of embankment checkpoints and within 24 working hours of notification of all other QCPs. Provide necessary documents to determine the acceptability of Work, such as inspection reports, test reports, settlement data, etc. to all parties at the time of QCP notification. Do no additional Work past the QCP until all parties mutually agree that the Work up to that point is acceptable.

As a minimum, establish QCPs at the stages of construction listed below. The DQA Manager or CQA Manager shall identify any additional QCP's necessary to certify compliance. The following checkpoints are not intended to limit or diminish the Design-Builder's responsibility to inspect all construction work.

Embankments.

- a. After completion of drainage and utility installations and before backfill
- b. At intervals of embankment construction of every 5 vertical feet (applicable to all embankments, including retaining walls)

Structures.

- a. At completion of bridge embankment and before the start of bridge foundation work.
- b. Before beginning pile driving, pile driving submittals (including design calculations and WEAP analysis).
- c. After completion of pile-driving at each structure support (pile group) (including pile-driving results and records)
- d. Before concrete placement of any substructure element including pile infilling
- e. After girder and diaphragm placement
- f. Before concrete placement of deck, approach slabs, diaphragms, and parapet walls, but with forms, reinforcement, and inserts in place
- g. Before beginning construction of box culverts (to confirm subgrade materials)
- h. Before concrete placement for cast-in-place (CIP) box culverts, but with forms, reinforcement, and inserts in place.

Surfacing and Paving.

- a. Before placement of each course above subgrade on permanent roadways.
- b. Before placement of each roadway surfacing lift (including base courses, top courses, ATB, HMA, and PCCP) on permanent roadway components

Retaining Walls

- a. Before the placement of the leveling pad of a mechanically stabilized earth (MSE) wall or the foundation of any other type of retaining wall (to confirm subgrade materials and conditions).
- b. For single-stage MSE Walls with height of 25 feet or more, panel tolerances when the wall is three panels tall.
- c. Panel tolerances after completion of placement of panels for each MSE wall, prior to beginning coping placement.
- d. Before concrete placement for cast-in-place retaining walls - with forms, reinforcement, and inserts in place.

Noise Walls.

After completion of every 500 feet of noise wall, before proceeding with placement of more noise walls.

Drainage

After placement of pipe or box, before placement of backfill.

Environmental Controls

Before any construction occurs, other than to install BMP's and environmental controls, verify that all BMP's and environmental controls, as designed by the Design-Builder's Environmental Compliance Manager, are installed according to design and RFP requirements.

2.26.5.8 Environmental Compliance and Monitoring Requirements

General. In Section 6 (Environmental Compliance and Monitoring) of the QMP, describe the methods, processes, and procedures to provide for the effective implementation and documentation of the environmental protection, training, compliance, and monitoring program.

See Section 2.8 (Environmental) for the environmental protection program requirements.

2.26.5.9 Maintenance of Public Facilities Requirements

General. In Section 7 (Maintenance of Public Facilities) of the QMP, specify procedures to follow in the maintenance of detours constructed on the Project; and for controlling noise, dust, and debris associated with the hauling operations using off-site haul roads. In such procedures, identify provisions to be implemented in providing safe and effective alternative routes for the public, as well as safe and convenient access to residences and businesses affected by construction activities.

2.26.5.10 Survey Verification

General. In Section 8 (Surveying) of the QMP, specify procedures to follow in verifying the Construction Surveying, Property Surveying, establishment of ROW markers, As-Built Plans, re-established County and Subdivision Monuments, and Record of Survey Map.

2.26.5.11 Utilities

In Section 9, describe processes to ensure contract compliance for utility relocation done by the Design-Builder and the Utility Company.

2.26.5.12 Partnering

Partnering should be considered an integral part of the Quality Control and Quality Assurance programs. A partnering agreement is recommended to handle disputes. In addition a separate procedure for conflict resolution should be developed and agreed to by the partnering participants. The procedure should include, but is not limited to, the following elements:

- a. Disputes should be delegated to the lowest appropriate level of authority on the project team to resolve within a specified timeframe.
- b. A timeframe for each level of authority should be established before the project begins for a list of typical disputes that could occur on a project.
- c. If the dispute were not resolved to the satisfaction of both parties within the specified time frame, the dispute would be automatically escalated to the next level of authority on the project team.
- d. If left unresolved, the process would then continue to escalate to the highest level of authority where a final resolution would be arbitrated by an unbiased third party, whose selection would be agreed upon in advance as part of the Quality Management Plan.
- e. A written report describing the dispute, all subsequent actions, and final disposition of the dispute should be submitted to the project records.
- f. If subsequent disputes arise on the same issue, the written report should be included as a resource during the resolution process.

2.27 MAINTENANCE DURING CONSTRUCTION

2.27.1 General

The Design-Builder is responsible for the operations, maintenance and repairs to the existing facilities and facilities constructed under this contract on the day construction work begins, and ending on the day of Physical Completion, at which time the Warranty Agreement will govern such work.

The only maintenance that will be performed by the WSDOT inside the project limits will be snowplowing, applying deicing agents and/or abrasives on the roadways open to use by the general public, nuisance vegetation control and noxious weed control. See also Section titled Snow and Ice Operations.

The Design-Builder's maintenance work includes routine maintenance, and inspections and repairs required on an "as needed" basis throughout the life of the Agreement in a manner acceptable to WSDOT. WSDOT reserves the right to perform such work, as it deems

necessary with its own forces, and/or to enter into special contracts for the maintenance of specific items, and to deduct from monthly payments the dollar amount for any work performed by WSDOT personnel, equipment or their agent.

The Design-Builder is responsible for maintenance and repairs when working on local street or crossings that are within the limited access(WSDOT Right Of Way). The Design-Builder is responsible for coordination with the City of Everett

Perform the operations and maintenance portions of the Project in a safe, reasonable, and prudent manner and shall employ good business practices and appropriate management techniques. Furnish all labor, materials, equipment and necessary services (such as highway safety controls) in connection with the operation, maintenance, and/or repair.

2.27.2 Maintenance of the Right of Way

2.27.2.1 General

Maintenance of highway vegetation including nuisance vegetation control, noxious weed control, tree and brush control, turf and grass care.

2.27.2.2 Tree and Brush Control

The Design-Builder will be responsible for the removal or trimming of any tree(s) or brush that may obscure any roadway sign or cause a reduction in the sight distance. The WSDOT will identify and notify the Design-Builder of any tree(s) and brush that is falls within this section. The Design-Builder will be responsible for the removal of any downed trees that have fallen and or identified by WSDOT that are considered danger or hazard or may be a safety concern for public travel. Any fallen tree(s) shall be removed within 24 hours.

2.27.2.3 Turf and Grass Care

The Design-Builder shall mow existing turf or grasses from the edge of pavement to outside limit of the right of way through the active construction area. The grass or turf shall be mowed when the average grass height reaches 30 inches to a height of no less than 6 inches but no higher than 12 inches. The Design-Builder shall not scalp the ground within sensitive areas. Mowing will not be required on slopes steeper then 2:1.

WSDOT maintenance will coordinate other routine turf and grass mowing operations within the construction zone, through the WSDOT Project office, but will not mow the areas maintained by the Design-Builder.

2.27.3 Maintenance of Roadways

2.27.3.1 General

Complete all components of the work required to allow for unrestricted traffic access to mainline lanes and shoulder prior to substantial completion. Any closure will be subject to the requirements of Section 2.20 of this Contract.

2.27.3.2 Roadway Sweeping

Abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water resulting in mud on streets and paved areas will not be permitted as a substitute for sweeping or other methods. Take care to prevent spillage on haul routes. Remove spillage immediately and clean the area.

Furnish and operate a self-loading motor sweeper with spray nozzles as necessary to keep paved areas acceptably clean wherever construction, including restoration, is incomplete.

Discharge of smoke, dust, or any other air contaminants into the atmosphere in such quantity as will violate applicable environmental laws or governmental approvals is a permit violation. The Design-Builder shall pay fines from such violations.

As construction is completed, daily:

Clean and broom paved surfaces adjoining the Project. Rake and clean other surfaces of the Project site. Shoulders of the traveled lanes through the construction zone shall be swept 1 time per each 24 hour period, or more frequently if required for dust abatement or water quality. The shoulders of the entire haul route over state highways shall be swept once every 14 days when the design / builder is hauling dirt or other construction debris, from the construction area to a disposal site.

Adhere to the dust-control, erosion control, noise abatement and other site procedures required by the Contract Documents

2.27.3.3 Existing Pavement

The Design-Builder is responsible for maintaining all existing pavement including pothole repair. Any pothole greater than 36 square inches (i.e. 6"x 6") shall be repaired within 24 hours.

2.27.3.4 Roadway Debris

Animal carcasses and other road debris that would present a traffic hazard such as damage to vehicles, blocking a lane or cause traffic to slow below the posted speed limit shall be removed from the travel lanes by the Design Builder with 1 hour of notification. The carcass shall be removed from the project limits and disposed of by proper means at an approved location.

Failure to maintain the Project free from accumulation of waste and rubbish as set forth above or otherwise failure to comply with use of site and clean-up procedures required by the Contract Documents, and failure within a 24 hour period after receipt of oral notice, subsequently confirmed in writing, to commence and continue correction of such failures with diligence and promptness, WSDOT may after such twenty-four (24) hour period, immediately, without prejudice to other remedies WSDOT may have, correct such deficiencies. In such case, WSDOT shall deduct from payments then or thereafter due, the cost of correcting such deficiencies. If payments then or thereafter due are not sufficient to cover such amounts, pay the difference to WSDOT on demand.

2.27.3.5 Pavement Markings

The Design-Builder will be responsible for maintaining existing and new striping within the project limits until Final Acceptance. The Engineer will indicate the location where existing striping requires being refreshed. Temporary Pavement Marking Paint shall be per WSDOT Standard Specification 9-34.2(4). Design-Builder should anticipate that at a minimum existing striping will need to be refreshed once per calendar year. All other pavement marking shall meet the requirements of chapter 4 and 5 of Maintenance Accountability Process (MAP) Manual. See Appendix Y.

2.27.3.6 Traffic Control Devices

The Design Builder shall be responsible to maintaining the travel way that is open to traffic free from fugitive traffic barrels, cones and other devices that are within the open lanes. All traffic control devices such as but limited to traffic barrels and cones shall be placed behind barrier or placed off the shoulder of the roadway when the shoulder width is at least 6 feet in width.

2.27.3.7 Guardrail, Concrete Barrier and Attenuators

The Design-Builder will be responsible to replace or repair any guardrail, concrete barrier and attenuators that become damaged by the motoring public or by the Design-Builders operations. Attenuators must be replaced in kind or if repairable must meet applicable NCHRP standards. Payment for any damaged guardrail, concrete barrier or attenuators caused by the motoring public will be paid in accordance with Section 1-09.6.

2.27.3.8 Traffic System Signs

The maintenance of existing permanent signs shall be the responsibility of the Design-Builder. Signs such as Stop and Yield shall be replaced within one hour of notification. Maintenance of the permanent signs includes cleaning, repairing, replacing damaged signs and posts. Payment for repairing permanent signing damaged by the motoring public will be in accordance with Section 1-09.6 of this Contract.

2.27.3.9 Drainage

The Design-Builder is responsible for maintaining and providing adequate drainage on the project until Physical Completion of the Project. Maintenance shall include the repair of riprap, cribbing, cleaning of ditches, channels, culverts, cross drains, drainage structures and gutters.

2.27.3.10 Access to Public Facilities

Maintain uninterrupted access to all public facilities, as affected by the Project. Access shall mean providing a clear and easily understood route into and out of an existing facility or business. Provide all necessary signing to convey that the route to the facility or business is open to traffic. WSDOT will determine whether the signing is adequate. Provided access for all types of vehicles, including trucks needed for deliveries.

2.27.4 Snow and Ice Operations

2.27.4.1 Public Travel Way

The WSDOT will perform snowplowing, application of deicer and/or abrasives for lanes of traffic open for public travel. The snowplowing will be done as part of the normal course of plowing the public roadways within and the vicinity of the project, and the WSDOT when plowing inside the project limits will take no special measures. The Design-Builder shall be responsible to maintain any channelization devices that may be displaced or damaged by plowing operations and for removal of snow and or abrasives deposited on the shoulders through the project limits.

2.27.4.2 Work Zone

The Design-Builder shall be responsible for any snow and ice removal for the Design-Builder's operations within the work zone. The Design-Builder shall not allow any snow and ice removal from their operations to be placed within the traffic lanes opened to the general public.

2.27.5 Electrical

2.27.5.1 Signals

The Design Builder shall be responsible for maintenance and operation of all traffic and pedestrian signal systems until Physical Completion of the Project or when the new signal systems are in place. Maintenance and operation will include, but not be limited to, the following:

1. Replacement of lamps, as required.
2. Replacement or repair of any damaged equipment or underground cable.

3. Maintenance concerning a public safety issue (including exposed wires and knockdowns), within 1 hour of notice.

Payment for repairing existing signals damaged by the motoring public will be in accordance with Section 1-09.6.

In the event of that the existing signal system is damaged to the point that it no longer functions the Design Builder shall contact the WSDOT. The Design Builder shall assist in the repair of the signal system and shall have WSDOT present at turn on of the signal.

2.27.5.2 SC and DI:

The Design-Builder shall be responsible to provide maintenance and operation of furnished and installed highway ITS component equipment as part of this Project until one year after the date of ITS Acceptance unless otherwise noted.

Maintenance and operation includes the response to faults. There are three categories of faults: urgent, priority, and minor, as follows:

- Urgent: Any fault that causes a total failure, disruption, or system-wide disruption of the following equipment or services:

- TSMC computer equipment
- Communications links and equipment
- Central database, logging, and dissemination facilities
- Ramp metering facility or CCTV facility

- The response time for urgent faults of ITS components shall be less than four hours. The repair time for urgent faults of ITS components shall be less than four hours.

- Priority: Any fault causes a failure or disruption of an operator workstation, local control unit for DMS, or the DMS itself. The response time shall be by noon the next Day. The repair time shall be less than four hours.

- Minor: Any other fault. The response time shall be by midnight of the next day. The repair time shall be less than four hours.

The Design-Builder shall supply as part of the Work a written description for providing maintenance and operation of furnished and installed ITS components. The description shall include, at a minimum, the following:

- For each highway ITS component, a general description of the proposed emergency maintenance/operation response program. This description shall include the categories of faults and how the faults will be detected.

As of Contract Execution, the Design-Builder shall be responsible for any and all highway ITS/communications components that the Design-Builder works on, including those components already in place. These responsibilities include the operation and maintenance of these components until one year following ITS Acceptance.

Interval Between Installation and Operation

All ITS equipment visible to the motoring public (e.g., VMS and CCTV) shall be made operational from the TSMC within 28 calendar days of installation. An operational piece of equipment is one that satisfies the functional requirements identified in Appendix F (ITS Requirements), and passes all required acceptance testing.

Maintenance Response

The Design-Builder shall respond to a reported non-operable component, not safety related, within 24 hours of notification of the problem. In order to determine response time, the Design-Builder will be notified by the Department by telephone, fax, or e-mail that there is a problem. The date and time of the telephone call, the transmitting fax machine's log, or the e-mail delivery date/time stamp shall be considered the date and time when the Design-Builder was notified of the problem. The Design-Builder shall return the component to working condition within 48 hours of notification of the problem.

In the case of problems affecting entire subsystems (i.e., all detection, all video, all devices in a specific area), the Design-Builder shall respond within 24 hours of problem notification and shall work continuously until the problem has been corrected.

In the case of problems affecting the communications backbone to the TSMC (i.e., all systems), the Design-Builder shall respond within 2 hours of problem notification and shall work continuously until the problem has been corrected.

If a problem is not corrected within 48 hours of notification, the Design-Builder shall provide the Department with a written description of the problem, efforts to fix the problem to date, anticipated course of corrective action, and anticipated schedule for completion of such corrective action.

The Design-Builder shall replace – not repair – a piece of hardware or equipment if any of the following occurs:

The Design-Builder has attempted to repair the piece of hardware or equipment on at least one previous occasion and there has been a subsequent failure.

The repair activities interfere with the movement of traffic and/or WSDOT decides that replacement is necessary in the interest of public safety.

Maintenance Log

The Design-Builder shall maintain a log of all response maintenance and repair activities performed during the project by the Design-Builder. The log shall be kept in a spreadsheet or other Department-approved software and include, at a minimum, the following information:

1. Date and time problem reported.
2. Entity reporting the problem.
3. Description of the reported problem.

4. Arrival time at the site of the reported problem.
5. Technician performing repair or replacement.
6. Corrective actions taken.
7. Model and serial number of any component repaired or replaced.
8. Date and time problem rectified.

2.27.5.3 Luminaires

The Design-Builder shall be responsible for maintenance and operation of all lighting systems until Final Acceptance of the entire project. Maintenance and operation will include, but not be limited to, the following:

1. Replacement of lamps, as required.
2. Replacement or repair of any damaged equipment or underground cable.
3. Maintenance concerning a public safety issue (including exposed wires and knockdowns), within 1 hour of notice.
4. Routine maintenance and other maintenance not of a public safety nature, within 24 hours of notice.
5. Payment for repairing damaged permanent luminaries by the motoring public will be in accordance with Section 2.4.4.
6. WSDOT will pay for electric utility cost for public lighting.

2.27.6 Hazardous Spills Response

2.27.6.1 Public Travel Way

Hazardous spills within the lanes of traffic open to the general public will be the responsibility of the WSDOT and the Department of Ecology. The Design-Builder shall allow access to within the project and work zone for response to any spill. The Design-Builder shall make personnel and equipment available to respond to all emergencies, except when such emergency is life-threatening to the personnel.

2.27.6.2 Work Zone

Any hazardous spills within the Design-Builder's work zone outside of public traveled wayh shall be the responsibility of the Design-Builder. The Design-Builder shall immediately notify the WSDOT and any other government agency required to be notified of any hazardous spill that may endanger the general public that may require closure of any traffic lanes and/or any evacuation of nearby residences or businesses.

2.27.7 Section Not Used

2.27.8 Structures

2.27.8.1 Existing Bridges

The Design-Builder shall be responsible for repair and maintenance of all Bridge Expansion Joints, Bridge Deck Surface, Bridge Railing and drainage structures on and off the bridges within the project limits. Free draining of water through any drainage structure must be maintained.

2.27.9 Maintenance of Property

2.27.9.1 General

The Design-Builder shall preserve public and private property at all times. The Design-Builder shall witness or reference land monument and property marker locations by a registered land surveyor before moving, disturbing or damaging.

The Design-Builder shall be responsible for damage or injury to public or private property resulting from any act, omission, neglect, or misconduct in the method of executing the Project.

The Design-Builder shall restore any damaged or injured property to a condition similar or equal to that existing before the damage or injury occurred. The repairing, restoring, rebuilding, or making good such damage or injury shall be at no additional cost to WSDOT.

2.27.10 Maintenance of Aesthetic Treatment

2.27.10.1 General

The Design-Builder shall monitor the appearance of the aesthetic treatments on any walls or bridges for any defects, flaws, or vandalism during the construction period. The Design-Builder shall note and bring to WSDOT's attention defects, flaws, or vandalism. The Design-Builder will be responsible for all graffiti removal on State owned structures within 24 hours of notification within the project limits.

The use of paint and/or permanent marking of any type on permanent features such as but not limited to barrier, railing and walls will not be allowed.

The Design-Builder shall be responsible for cleaning up vandalism on the Project until Final Acceptance.

2.28 SECTION NOT USED

2.29 SECTION NOT USED

2.30 WARRANTIES

2.30.1 Warranty Bond

Design-Builder shall provide a warranty bond commencing on the day of Physical Completion and ending 36 months thereafter, in the amount of \$20,000,000 covering the warranty work described below.

2.30.2 General Warranty

Design-Builder warrants that:

- (a) All design Work performed pursuant to the Contract Documents, including that done by its Subcontractors and manufacturers, shall conform to all professional engineering principles generally accepted as standards of the industry in the State of Washington;
- (b) The Project shall be free of defects, including design errors, omissions, inconsistencies and other defects;
- (c) Materials and equipment furnished under the Contract Documents shall be of good quality and, when installed, shall be new;
- (d) The Work shall meet all of the requirements of the Contract Documents;
- (e) The specifications and/or drawings selected or prepared for use during construction are appropriate for their intended use; and
- (f) The Project shall be fit for use for the intended function.

2.30.2.1 General Warranty – Time of General Warranty

The General Warranty shall commence upon Physical Completion. The General Warranty shall remain in effect until two years after the date of Physical Completion. If the Department determines that any of the Work has not met the standards set forth in this Section at any time during the Warranty period for such Work, then the Design-Builder shall correct such Work as specified below even if the performance of such correction Work extends beyond the stated Warranty period. Within seven days of receipt by the Design-Builder of notice from the Department specifying a failure of any of the Work to satisfy the Design-Builder's Warranties, or of any Subcontractor representation, Warranty, guarantee, or obligation which the Design-Builder is responsible to enforce, the Design-Builder and the Department shall mutually agree when and how the Design-Builder shall remedy such violation, provided, however, that in case of an emergency requiring immediate curative action, the Design-Builder shall implement such action as it deems necessary and shall notify the Department of the urgency of a decision. The Design-Builder and the Department shall agree on a remedy immediately upon notice by or to the Department of such emergency. If the Design-Builder does not use its best efforts to proceed to effectuate such remedy within

the agreed time, or if the Design-Builder and the Department fail to reach such an agreement within such seven-day period (or immediately, in the case of emergency conditions), then the Department, upon notice to the Design-Builder, shall have the right to order the Design-Builder to perform the work or to perform or have performed by third parties the necessary Department-approved remedy, and the costs thereof shall be borne by the Design-Builder.

2.30.2.2 General Warranty - Subcontractor Warranties

Without in any way derogating the Design-Builder's own representations, Warranties, and other obligations with respect to all of the Work, the Design-Builder shall obtain from all Subcontractors and cause to be extended to the Department appropriate representations, Warranties, guarantees, and obligations with respect to design, Material, workmanship, Equipment, tools, and supplies furnished by such Subcontractors. All representations, Warranties, guarantees, and obligations of Subcontractors shall be written so as to survive all Department and Design-Builder Inspections, tests, and approvals, and shall run directly to and be enforceable by the Design-Builder and/or the Department and their respective successors and assigns.

2.30.2.3 General Warranty - Performance Responsibility

The Design-Builder retains responsibility for all Work performed on the Project, including all Work of Subcontractors and all Materials and Equipment provided by suppliers, vendors and/or manufacturers. Upon receipt from the Department of notice of a failure of any of the Work to satisfy any Subcontractor Warranty, representation, covenant, guarantee, or obligation, the Design-Builder shall be responsible for enforcing or performing any such representation, Warranty, guarantee, or obligation, in addition to the Design-Builder's other obligations hereunder. The Department's rights under this Section shall commence at the time such representation, Warranty, guarantee, or obligation is furnished and shall continue until the expiration of the Design-Builder's relevant Warranty (including extensions for redone Work). Until such expiration, the cost of any Equipment, Material, labor (including re-engineering), and/or shipping shall be for the account of the Design-Builder if such cost is covered by such a Warranty, and the Design-Builder shall be required to replace or repair defective Equipment, Material, or workmanship furnished by Subcontractors.

2.30.2.4 General Warranty – Extension of General Warranty

The Design-Builder's Warranties shall apply to all Work re-done pursuant to the terms of this Contract. The Design-Builder's Warranty for re-done elements of the Work shall extend beyond the original Warranty period if necessary to provide a two year Warranty period following acceptance for any re-done Work.

2.30.2.5 General Warranty – No Limitations of Liability

The foregoing Warranties are in addition to all rights and remedies available under the Contract Documents or applicable law, and shall not limit the Design-Builder's liability or responsibility imposed by the Contract Documents or applicable law with respect to the Work, including liability for design defects, latent construction defects, strict liability, negligence, or fraud provided.

2.30.2.6 Damages For Breach Of Warranty

In addition to all rights and remedies available under the Contract Documents or applicable law, if the Design-Builder fails or refuses to provide the Warranty remedy described in this Section, notwithstanding a valid request by the Department, the Design-Builder shall be liable for the cost of performance of the Warranty work by others. The Department may also call the warranty performance bond.

2.30.2.7 Exclusions

The Warranties shall not require the Design-Builder to perform repair or replacement Work to the extent necessitated by the following:

- A) Normal wear and tear provided that damage and/or deterioration outside allowable limits specified in Contract Documents shall not be considered normal wear and tear;
- B) Failure to perform routine maintenance consistent with policies and/or procedures established by the Department or other maintenance agencies, including Utility Owners, or in the absence of such policies and/or procedures in accordance with industry standards of maintenance for similar Projects in the United States;
- C) Rebellion, war, riot, act of sabotage, civil commotion, or acts of vandalism;
- D) Wind, flood, and/or earthquakes and other acts of God which exceed the severity or intensity of a 100 year event.
- E) Spill or release of hazardous or contaminated substances not caused by the Design-Builder's organization; and/or

2.30.2.8 Warranty Inspections

The Department and the Design-Builder shall conduct joint annual Warranty Inspections of the Project commencing one year after Physical Completion. A semi-final Warranty Inspection shall also be conducted six months prior to the end of the Warranty period. The measurements and/or tests for those Warranty items that require specific measurements shall be taken during the scheduled joint inspections. Notwithstanding the provisions of this Section, the Department may inspect any component of the Project at any time and issue notice to Design-Builder to perform remedial work. The failure to conduct any inspection specified herein shall not invalidate or cancel the warranty provisions, responsibilities or performance requirements.

2.30.2.9 Warranty Performance Requirements

In addition to the Warranty provisions of this Section, Project components shall meet the specific performance requirements specified in the Contract Documents.

2.30.2.10 Costs of Correction of Work

All costs of correcting such rejected Work, including additional testing and inspections, shall be deemed included in the Contract Price. Design-Builder shall reimburse WSDOT and pay WSDOT’s expenses made necessary thereby within ten days after Design-Builder's receipt of invoice therefore.

2.30.2.11 Damages for Breach of Warranty

If Design-Builder fails or refuses to provide the warranty remedy described in Section 10.2.3, notwithstanding a valid request by WSDOT, Design-Builder shall be liable for the cost of performance of the Warranty Work by others.

2.30.2.12 Disputes

Any disagreement between WSDOT and Design-Builder relating to this Section shall be subject to the dispute resolution provisions, provided that Design-Builder shall proceed as directed by WSDOT pending resolution of the dispute.

2.30.3 Pavement Warranty

The Design-Builder shall be responsible for the pavement performance and warranty work for a period of three (3) years following Physical Completion of the Project.

The extent of warranty work and the Design-Builder’s liability for the work that may be required by these warranty provisions is not limited by the warranty bond amount.

2.30.3.1 Mandatory Standards

Conflicts and Priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

Ambiguity. If there is any unresolved ambiguity in standards, obtain clarification from the Department before proceeding.

Version and Date. Use the most current version of each listed standard as of the initial publication date of this Contract unless modified by addendum or change order.

**Table 2.30.1
Mandatory Standards for Pavement Warranty**

Priority	Author or	Title	Document or	Date	Comments,
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	Agency		Report No.		Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	n/a		Proposal
2	WDOT	Request for Proposals, <i>I-5 Everett HOV Design-Build Project</i>	n/a	***	RFP
3	SHRP	*** <i>Distress Identification Manual for Long-Term Pavement Performance Project</i>	SHRP-P-338		n/a
** Only to the extent that it exceeds another listed standard. ***Includes the original release of the RFP and all addendums.					

2.30.3.2 Performance Requirements - All Pavements

The parameters that will be used by WSDOT to evaluate performance of all constructed pavements for this project are ride quality, pavement friction, pavement surface condition, structural capacity and material quality. These parameters will be measured and evaluated by WSDOT on an as needed basis during the warranty period.

At least 60 days prior to the expiration of the warranty or at any time deemed necessary by the Engineer, the Engineer will notify the Design-Builder in writing if the pavement distress exceeds the criteria outlined in Tables 2 through 4 , as applicable. The Design-Builder will not be held responsible for distresses that are caused by factors beyond the control of the Design-Builder. A finding that the distress is due to factors outside the control of the Design-Builder shall be based on evidence submitted by the Design-Builder to the Engineer. If the Engineer does not agree with the Design-Builder then the Dispute Resolution provisions as outlined in Special Provision Section 1-04.5 will be followed.

Within 45 days of receiving notice, the Design-Builder shall commence to undertake the warranty work, submit a plan for completing the work within the following nine months, and/or provide written objection if the need for warranty work is contested. Disagreement between the Design-Builder and the Engineer shall be resolved in accordance with the dispute resolution provisions as outlined in Special Provision Section 1-04.5. If the Design-Builder fails to undertake warranty work within 45 days after receiving written notice from the Engineer or Dispute Resolution Team, WSDOT will complete the warranty work or contract to have it completed and the Design-Builder shall be responsible for the total cost of the warranty work.

Coring, milling, or other destructive procedures may not be performed by the Design-Builder, without prior consent of the Engineer. The Design-Builder will not be responsible for damages as a result of coring, milling or other destructive procedures conducted by WSDOT, utility companies or other entities not under the control of the Design-Builder.

All repair, maintenance, and warranty work performed as part of this warranty provision, except as excluded elsewhere in this provision, shall be covered by the warranty provision for the remainder of the warranty term.

During the warranty period, the warranty work shall be performed at no cost to WSDOT. Maintenance (elective and preventative action) work that the Design-Builder elects to perform during the warranty period shall be at no cost to WSDOT. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities to minimize disruption to the traffic, with prior approval of

WSDOT.

Maintenance or Warranty work that requires a resurfacing of the pavement shall not be performed later than October 1 without written approval from the Department. In addition, hot mix asphalt (HMA) shall not be placed on any wet surface, or when the average surface temperatures are less than those specified in Table 1, below, or when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures:

Table 1 HMA Placement		
Compacted Thickness (ft)	Surface Course Temperature	Sub-Surface Course Temperature
Less than 0.10	55°F	55°F
0.10 to 0.20	45°F	35°F
0.21 to 0.35	35°F	35°F
More than 0.35	DNA	25°F*

- Only on dry subgrade, not frozen and when air temperature is rising.

2.30.3.3 Performance Requirements - Asphalt Concrete Pavement

2.30.3.3.1 Ride Quality

Ride quality, determined by the International Ride Index (IRI), will be evaluated using WSDOT’s South Dakota Type Profiler, and as follows:

- A. The requirement for final acceptance will be an IRI value of less than 60 inches per mile. If this limit is exceeded the Design-Builder shall replace the defective pavement (minimum depth of 0.15 ft.) for the full lane width over the section at the Design-Builder’s expense.

The ride quality value at the end of three (3) years following Physical Completion shall not exceed and IRI value of 90 inches per mile. If this criterion is not met, the Design-Builder shall take corrective action as indicated above to bring this parameter within the limits.

2.30.3.3.2 Pavement Friction

Pavement friction shall meet the following performance criteria:

- A. The friction value at the end of three (3) years after Physical Completion shall be no less than 40. Pavements with a friction number less than 40 will require corrective action within six months.
- B. If at any time during said three (3)-year period WSDOT determines, in accordance with ASTM E274-90, that this criterion is not met, upon receipt of notice to such effect from WSDOT, the Design-Builder shall take corrective action to provide values that meet or exceed 40, within six months after receipt of the notice.

2.30.3.3.3 Pavement Surface Condition

Pavement surface condition shall meet the following performance criteria:

- A. Final acceptance will permit no identifiable distress as defined by the WSDOT Pavement Surface Condition Rating Manual. If these criteria are not met, the Design-Builder shall take corrective action as outlined in Table 2.
- B. Distress types exceeding the allowable level of severity at the end of three (3) years after Physical Completion shall require corrective action as outlined in Table 2.

2.30.3.3.4 Structural Capacity

The structural capacity (thickness, strength) of pavement sections shall be evaluated during the construction phase through the Design-Builder’s approved Quality Management Plan. The parameters that will be evaluated include thickness, strength, and quality of materials. The strength, thickness, and quality of materials will be evaluated to ensure compliance with the approved design.

The requirements for final acceptance shall be to meet or exceed the design criteria. If the structural capacity is determined to be deficient by WSDOT, the Design-Builder shall take corrective action to rectify the deficiency.

2.30.3.3.5 Material Quality

Material quality shall be evaluated prior to and during construction through the Design-Builder’s approved Quality Management Plan. Materials specified in the design and meeting the requirements outlined in the Standard Specifications shall be evaluated to meet or exceed requirements. Materials not meeting these specifications shall be removed immediately and replaced with acceptable material.

2.30.3.3.6 Required Corrective Actions

TABLE 2. Hot Mix Asphalt Pavements

Distress Type	Allowable Level of Severity	Allowable Extent of Severity	Corrective Action
Rutting and Wear	Less ¼ inch average	No individual 100 lane-foot section greater than ¾ inch	Mill and fill with 0.15 feet of HMA pavement full lane width
Alligator Cracking	Less than ¼ inch in width	Less than 0.1 percent of total pavement surface	Pavement repair
Longitudinal Cracking	Less ¼ inch in width	Less than 1 percent of the project length	Crack sealing
Transverse Cracking	Less ¼ inch in width	Less than 1 one crack per 2000 lane-feet	Crack sealing
Systematic Density Defects	0 percent detected	None	Mill and fill with 0.15 feet of HMA pavement full lane width

2.30.3.4 Performance Requirements - Portland Cement Concrete Pavement

2.30.3.4.1 Ride Quality

Ride quality, determined by the International Ride Index (IRI), will be evaluated using WSDOT's South Dakota Type Profiler, and as follows:

The requirement for final acceptance will be an IRI value of less than 60 inches per mile. If this criterion is not met, the Design-Builder shall diamond grind the profile back to acceptable limits provided the area requiring grinding does not exceed five percent of the surface area of a day's production and does not reduce the section thickness by more than five percent. If these limits are exceeded the Design-Builder shall replace the defective pavement for the full lane width over the section at the Design-Builder's expense.

The IRI value at the end of three (3) years following Final Acceptance shall not exceed 90 inches per mile. If this criterion is not met, the Design-Builder shall take corrective action as indicated above to bring this parameter within the limits.

2.30.3.4.2 Pavement Friction

Pavement friction shall meet the following performance criteria:

- a. The friction value at the end of three (3) years after the project has been completed shall be no less than 40. Pavements with a friction number less than 40 will require corrective action within six months.
- b. If at any time during said three (3)-year period WSDOT determines, in accordance with ASTM E274-90, that this criterion is not met, upon receipt of notice to such effect from WSDOT, the Design-Builder shall take corrective action to provide values that meet or exceed 40, within six months after receipt of the notice.

2.30.3.4.3 Pavement Surface Condition

Pavement shall meet the following performance criteria:

- Final acceptance will permit no identifiable distress as defined by the WSDOT Pavement Surface Condition Rating Manual. If this criterion is not met, the Design-Builder shall take corrective action as outlined in Table 3 or 4.
- Distress types exceeding the allowable level of severity at the end of three (3) years after Final Acceptance shall require corrective action as outlined in Table 3 or 4.

2.30.3.4.4 Structural Capacity

The structural capacity (thickness, strength) of pavement sections shall be evaluated during the construction phase through the Design-Builder's approved Quality Management Plan. The parameters that will be evaluated include thickness, strength, and quality of materials. Load transfer capacity (> 90%) of new concrete pavements will be verified to comply with design assumptions. The strength, thickness, and quality of materials will be evaluated to

ensure compliance with the approved design.

The requirements for final acceptance shall be to meet or exceed the design criteria. If the structural capacity is determined to be deficient by WSDOT, the Design-Builder shall take corrective action to rectify the deficiency.

2.30.3.4.5 Material Quality

Material quality shall be evaluated prior to and during construction through the Design-Builder’s approved Quality Management Plan. Materials specified in the design and meeting the requirements outlined in the Standard Specifications shall be evaluated to establish that they meet or exceed requirements. Materials not meeting these specifications shall be removed immediately and replaced with acceptable material. WSDOT verification testing shall in no way relieve the Design-Builder of responsibility under this warranty.

2.30.3.4.6 Required Corrective Actions

TABLE 3. New Concrete Pavement

Distress Type	Allowable Level of Severity	Allowable Extent of Severity	Corrective Action
Cracking	One crack per panel	Less than 0.1 percent of panels	Full depth slab replacement
Faulting	None	None	Full depth slab replacement
Wear	Less than 1/8 inch	Less than ten percent of one lane mile	Diamond grinding back to zero tolerance without compromising pavement section. If the structural integrity of the pavement section is compromised, full depth slab replacement
Joint Seal Damage	Hardening, adhesive failure, cohesive failure, complete loss of sealant	Less than two percent of joint length per lane mile	Reseal joint

TABLE 4. Dowel Bar Retrofit of Existing Concrete Pavement

Distress Type	Allowable Level of Severity	Allowable Extent of Severity	Corrective Action
Cracking within dowel bar slot	None	None	Replace pour back material and dowel bar
Wear within dowel bar slot	None	None	Partial depth repair of dowel bar slot
Bond failure within slot	None	None	Replace pour back material and dowel bar
Faulting	None	None	Full depth panel replacement of slabs on both side of faulted joint
Spalling within dowel bar slot	None	None	Partial depth repair of dowel bar slot
Joint seal damage	Hardening,	Less than two percent of	Reseal joint

	adhesive failure, cohesive failure, complete loss of sealant	joint length per lane mile	
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2.30.4 Warranty for Roadside Restoration

2.30.4.1 Community Enhancement Areas:

2.30.4.1.1 First year after planting:

100% of the plants are alive, healthy, and vigorously growing.
 All dead, dying or unhealthy plants are replaced.
 Planting areas are free of plants other than those that have been planted or seeded.

2.30.4.1.2 Second and Third years:

100% of trees are alive, healthy, and vigorously growing.
 90% of shrubs and groundcovers area alive, healthy, vigorously growing, and provide masses with coverage that does not have openings of more than 2 plants.
 Planting areas are free plants other than those that have been planted or seeded.

2.30.4.2 Roadside:

2.30.4.2.1 First year after planting:

100% of the plants are alive, healthy, and vigorously growing.
 All dead, dying or unhealthy plants are replaced.
 Planting areas are free of plants other than those that have been planted or seeded.

2.30.4.2.2 Second and Third years:

90% of trees are alive, healthy, and vigorously growing.
 80% of shrubs are alive, healthy, vigorously growing and provide masses with coverage that does not have openings of more than 4 plants.
 Planting areas are free of noxious weeds in accordance with Section 8-02.3(2)B. Planting areas are free of invasive weeds including Reed Canarygrass (*Phalaris arundinacea*), Purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus discolor*) and Evergreen blackberry (*Rubus laciniatus*), Scotch broom (*Cytisus scoparius*), Hedge bindweed (*Calystegia sepium*), Giant hogweed (*Heracleum Mantegazzianum*), Canadian thistle (*Cirsium arvense*), Butterfly bush (*Buddleia spp.*), Common reed (*Phragmites australis*) and Japanese knotweed (*Polygonum cuspidatum*), Red Alder (*Alnus rubra*), Black Cottonwood (*Populus nigra*), Bigleaf Maple (*Acer macrophylla*), English Ivy (*Hedera sp.*) and other invasive and competitive vegetation.

2.30.4.3 Environmental Mitigation Areas:

2.30.4.3.1 First year after planting:

100% of the plants are alive, healthy, and vigorously growing.

All dead, dying or unhealthy plants are replaced.

Planting areas are free of plants other than those that have been planted or seeded.

2.30.4.3.2 Second Year through Monitoring Period:

Meet the success criteria as detailed in the applicable permits.