

Washington State Department of Transportation

Southwest Region

Quality Management Plan for Design

February 2019



Washington State Department of Transportation

Southwest Region *Quality Management Plan for Design*

Recommended for Approval:

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By 
Project Development Engineer

Recommended for Approval:

Date 2/14/19

By 
Project Development Engineer

Recommended for Approval:

Date 14 Feb 19

By 
Construction Engineer

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Date 2/14/19

By 
ARA for Project Development and Delivery



Washington State
Department of Transportation

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1. Introduction

The following document is the Southwest Region Quality Management Plan for Design (SWR QMP). This document provides the framework of the Region's approach to design management practices, procedures and expectations associated with design quality. The SWR QMP establishes a baseline uniform approach to quality management throughout the SWR. This plan encompasses business practices intended to promote the quality and accuracy of underlying engineering, design documentation, and PS&E packages to help ensure they are comprehensive, clear and enforceable.

1.1 Purpose

To provide a consistent approach to developing and implementing Quality Management Plans for all projects developed within the Southwest Region.

1.2 Goal

To promote the overall quality of underlying engineering, design documentation and PS&E packages associated with projects developed in the Southwest Region.

1.3 Background

On November 20, 2018, the Washington State Department of Transportation (WSDOT) Headquarters Design Office issued a memorandum emphasizing the importance of quality during the design phase. The memorandum states, "WSDOT has determined that it is a priority to provide for improvements to the process used in providing quality on each phase of Project Delivery. WSDOT has successfully been performing quality control (QC) and quality assurance (QA) in various ways from region to region, specialty office to specialty office, and program to program for many years. However, at this time there is no single policy or centralized process guiding the conduct of this function statewide."

This memorandum goes on to direct Regions to develop and implement a Region Quality Management Plan that addressed various focus areas of quality management as they pertain to successful project development and delivery. As such, this document serves as Southwest Regions Quality Management Plan.

2. Definition of Terms

Quality Control (QC) - Refers to those actions, procedures, and methods that are to be routinely employed at the production and administrative levels, under the purview of the Engineer of Record, during the development of work products to produce the desired quality. This includes procedures of checking the design and associated design documentation for completeness, accuracy of the calculations, consistency of the drawings, detecting and correcting design omissions and errors before the contract documents are finalized, and in alignment with WSDOT design policy, practices and procedures.

Quality Assurance (QA) – Refers to those actions, procedures, and methods to be employed at management levels, under the jurisdiction of Engineer of Record, Project Development Engineer and Construction Engineer, to observe and ensure prudent quality control procedures are in place and are being carried out, and the desired results of quality are being achieved.

Quality Verification (QV) - Refers to those actions, procedures and methods employed at the Engineering Services Office and Headquarters Design Office, to review final products to ensure quality management was implemented, the appropriate project development process was followed, and is reflected in the final contract document.

Designer - An individual directly responsible for the development of design calculations, drawings, specifications, contract documents and design documentation with a level of technical skills and experience commensurate with the complexity of the subject design they have been assigned.

Checker - An individual with sufficient technical skills and experience responsible for performing a full technical review of the design calculations, drawings, specifications, contract documents and design documentation. In an effort to promote objectivity, the checker and designer shall not be the same person.

Reviewer - An individual responsible for performing QA procedures for assuring that QC procedures have been performed. Please note, the reviewer is typically the EOR or their assistant and shall not be either the checker or designer.

Engineer of Record (EOR) – The Professional Engineer currently licensed in the State of Washington, and, as required, the State of Oregon for projects in both States, that manages all aspects of project development and delivery. They are responsible for all aspects of the design and documentation for a project under their direct supervision. The Engineer of Record normally stamps and signs the final contract, specifications and pertinent design documentation.

Ancillary Engineer of Record (AEOR) – For projects that require stamped plan(s), special provision(s) and/or stamped discipline report(s) from one or more disciplines groups, this Professional Engineer or Landscape Architect, as required, is currently licensed in the State of Washington and, as required, the State of Oregon for projects in both States, that is responsible for the design and design documentation for those aspects of the project under their direct supervision. The Ancillary Engineer of Record normally stamps and signs their contribution to the final contract plans, and/or design documentation.

3. Acronyms

Acronyms used in this document:

AEOR – Ancillary Engineer of Record
AD – Advertisement
CE – Construction Engineer
DTP – Designer Training Program
EOR – Engineer of Record
ESO – Engineering Services Office
PDE – Project Development Engineer
PMP – Project Management Plan
PS&E – Plans, Special Provisions and Estimate
QA – Quality Assurance
QC – Quality Control
QMP – Quality Management Program
QV – Quality Verification
SWR – Southwest Region
SWR QMP – Southwest Region Quality Management Plan

4. General Approach

4.1 Project Management

The EOR has primary responsibility to manage and lead all aspects of a project's development and delivery. This includes all necessary coordination and collaboration with support groups, AEORs, local agencies and stakeholders. EOR's are responsible to provide support groups, AEORs and others all pertinent information necessary for their aspect(s) of project development. Said information shall be timely and accurate. Once pertinent and accurate information has been provided by the EOR, support groups and AEOR are responsible for developing and delivering their respective aspects of any given project.

Understandably, aspects of project development will be delegated to staff under the direct supervision of the EOR or AEOR. As such, a project's team lead (i.e. TE3 under the direct supervision of the EOR or designee) will most typically have primary responsibility for all coordination with support groups and AEORs. Within any given project team, a TE2 level designer or designer with 3 years of relevant experience representing the EOR is lowest level of independent project coordination with support groups or AEORs. A TE2 or higher shall attend all meetings with support groups, AEOR, etc. Additionally, a project's TE3 or higher shall be included on all correspondence associated with the project development.

4.2 Accountability

EOR has primary responsibility for quality of design documentation and PS&Es. Likewise, support groups and AEORs are responsible for quality of their contributions to design documentation and PS&Es.

4.3 Project Management Plan and Project Schedule

The EOR or designee shall develop and maintain a PMP and accurate project schedule throughout project development. They shall have sufficient detail to manage all aspects of project development and shall be endorsed by the PDE at the project's PS&E Kickoff Meeting. The project schedule shall reflect delivery milestones as expected by the Washington State Legislature.

The PS&E Kickoff Meeting is intended to align the team and initiate the design phase of the project. Invitees should include the 'Project Team' as indicated on the project's PMP and others as necessary. An example of a PMP for a low or medium complexity project (see Section 5.1 *Level of Complexity* for explanation of terms) can be found in Appendix A.

4.4 Designer Training Program

To better promote the successful development of quality design and documentation, each EOR will implement DTP for their staff. The DTP is intended to ensure that designers and checkers are provided with the necessary training, skills and expertise to conduct assigned design work activities.

The EOR, or designee, will develop an individual DTP for each employee and shall follow the "Engineering Training Tool" developed by WSDOT Headquarter Design Support Office. It is suggested that each employee successfully completes 80 hours of training or self-study within the first year of employment. Thereafter, as part of continued education, it is suggested that each employee successfully completes 30 hours of training every two (2) years. Each individual DTP shall be reviewed and/or updated with the employee and supervisor annually.

5. Scalability of Quality Management

Although quality is important for all projects, the level of effort necessary to achieve a quality design varies between projects. For instance, larger, more complex projects require a substantially greater amount of effort to ensure quality and generally equates to greater risk for cost and schedule problems than does a smaller, less complex project. To help establish the minimum level of effort necessary to achieve an acceptable level of quality, each project will be categorized by its relative level of complexity. Each level of complexity has increasing levels of obligations and deliverables throughout the project development process.

5.1 Level of Complexity

Each project will be categorized as having a low, medium or high level of complexity. Below is a description of each level of complexity:

1. Low – Smaller projects with a low degree of complexity and/or risk
 - a. Typically small projects delivered almost entirely by a single Engineer of Record
 - b. Minor Preservation and Improvement projects with all work typically occurring within existing roadway footprint and/or right of way.
 - c. Examples: Paver, Bituminous Surface Treatment, rumble strip, signing, guardrail replacement
2. Medium – Larger projects with medium degree of complexity and/or risk
 - a. Typically includes contributions from multiple discipline groups and multiple Engineers of Record (e.g. bridge, geotech, traffic, etc.)
 - b. Preservation or Improvement projects that may involve minor widening, re-channelization, constructability considerations, minor right of way acquisitions, etc.
 - c. Examples: culvert replacement, minor intersection improvement, bridge deck repair, expansion joints, Americans with Disability Act (ADA) compliance
3. High – Major roadway improvements with high degree of complexity and/or risk
 - a. Major Preservation or Improvement projects that involve complex or high cost features, major constructability/staging considerations, significant right of way acquisitions, etc.
 - b. Typically includes contributions from multiple discipline groups and multiple Engineers of Record (e.g. bridge, geotech, traffic, etc.)
 - c. Examples: Interchange reconstruction, bridge replacements, roundabouts

A project's level of complexity, which is established for each project at the Project Definition Endorsement Meeting, has different obligations associated with project delivery as outline in *Table 1.0 – Region Project Review, QMP and PMP Requirements*.

Table 1.0 – Region Project Review, QMP, and PMP Requirements

Level of Complexity	Review Requirements															Recommended Minimum Review Duration	QMP	PMP	
	30% Review			60% Review					90% Review					AD Ready Review					
	P	S	E	P	S	E	CSM	RRM	P	S	E	CSM	RRM	P	S				E
Low				X		X			X	X	X	X	X	X	X	X	2 weeks	SWR QMP	Basic
Medium	X		X	X		X		X	X	X	X	X	X	X	X	X	3 weeks	SWR QMP	Basic
High	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	4 weeks	Project Specific	Project Specific

P - Plans

S - Special Provisions

E - Estimate

AD - Advertisement

CSM - Construction Staging Meeting

RRM - Region Review Meeting

QMP - Quality Management Plan

SWR QMP - Southwest Region Quality Management Plan

PMP - Project Management Plan

As noted in *Table 1.0*, a low or medium level of complexity project can follow the standards and practices as outlined in the SWR QMP as that project's QMP. High level of complexity projects must develop and implement a project specific QMP. A project's QMP will be endorsed at the project's PS&E Kick- Off Meeting and is approved by the PDE and CE.

5.2 Review Cycle and Activities

As specified in *Table 1.0*, all projects will have periodic reviews. These reviews will occur at 30%, 60%, 90% and AD Ready levels of completeness. These reviews will be comprised of an internal office review and a region review. Prior to initiating a formal region review, the EOR's and AEOR's offices shall conduct an internal office review. The depth and duration the internal review shall be determine by each EOR or AEOR on a project by project basis. As part of an internal office review and for the purposes of QC, the checker will review the design, supporting documentation and calculations for accuracy. To further promote an objective review, the checker and the designer shall not be the same person. As part of QA, the EOR's designated reviewer shall confirm QC procedures were followed.

The region project review includes reviews by support groups, PDE and CE. The duration of each project review shall be determined by the EOR. A region project review is led by ESO unless the EOR has elected to lead 30% and/or 60% region review(s). On a project by project basis, the EOR will acknowledge in the project's PMP if their office will handle the 30% and/or 60% review(s).

For each review that ESO is leading, the EOR shall provide all review materials (see section 5.3 Review Cycle Deliverables) to ESO for distribution. ESO will distribute materials, as appropriate, and provide a combined set of comments to the EOR at the conclusion of a review period. The EOR or designee will provide written responses for all review comments prior to conducting the next review.

For each review that EOR is leading, the EOR shall distribute review materials, as appropriate, and at the conclusion of a review period will create a combined set of comments. The EOR or designee will provide written responses for all review comments prior to conducting the next review.

All low complexity projects shall have a sit down region review meeting at 90%, whereas, all medium and high complexity projects shall have sit down region review meetings at 60% and 90% levels of completeness. These meetings shall be organized by the ESO or EOR (whoever is leading the review). EOR or designee are responsible to attend and take meeting minutes as they deem necessary.

As noted in Table 1.0, each project shall have a construction staging and/or Traffic Management Plan meeting at various levels of project development, unless otherwise approved by the CE. The EOR or designee is responsible to organize the said meetings.

5.3 Review Cycle Deliverables

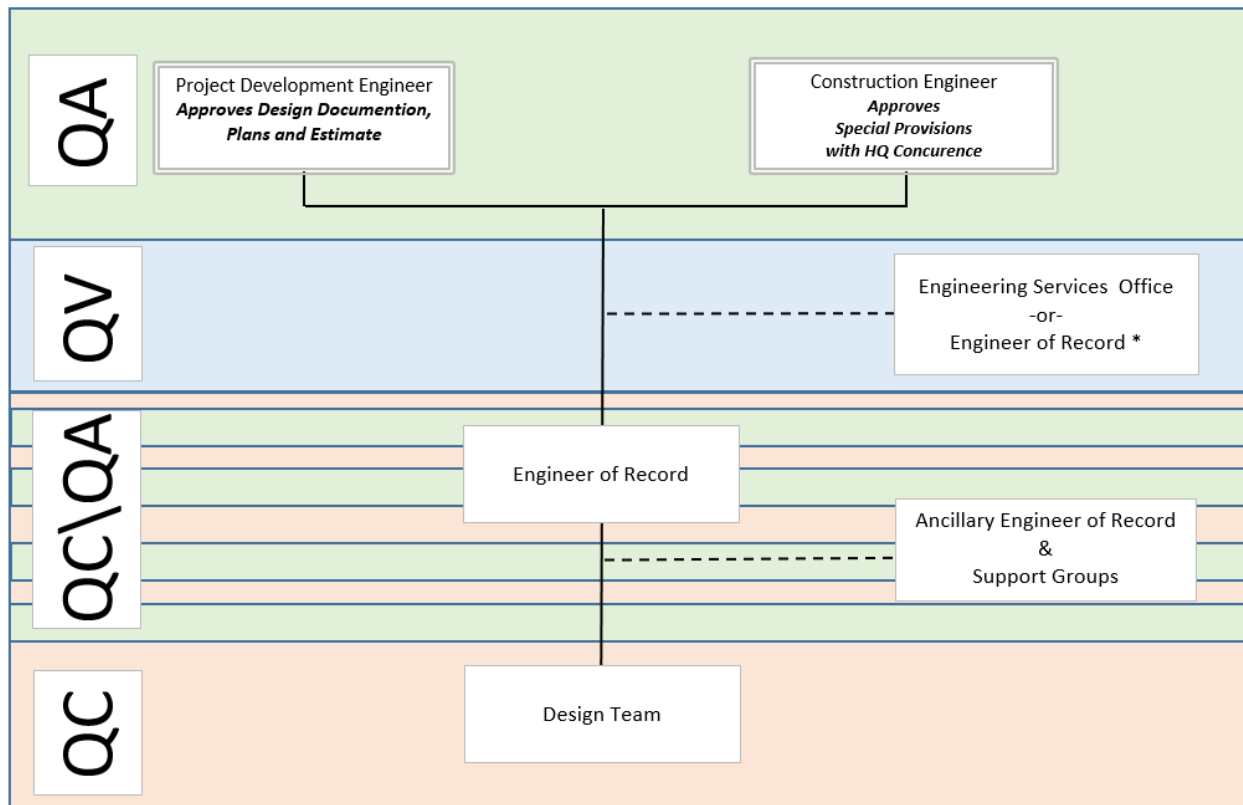
At each review, the EOR or designee is responsible to provide ESO with supporting design documentation, appropriate verification that backup design calculations have been checked per EOR internal QA/QC procedures and other materials in addition to the PS&E packages as outlined in the Project Development Deliverable Checklists for 30, 60, 90 and AD reviews and the Guidelines for Special Provisions Preparation (see Appendix B, C, D, E and F, respectively). PS&E packages shall conform the WSDOT Plans Preparation Manual.

6. Roles and Responsibilities

6.1 QC, QA and QV

SWRs roles and responsibilities for QA, QC, and QV are shown in Exhibit 1.0 – Quality Management Plan Organizational Chart:

Exhibit 1.0 – Quality Management Plan Organizational Chart



* EOR may elect to lead 30% and/or 60% review(s), see description below.

As noted above, EOR and AEOR are responsible for QC and QA of their teams work. Each office should work to create their own protocols to ensure work products adhere and/or exceed delivery and quality expectations. Each office should develop their own QA and QC checklists.

Most typically, ESO is responsible for QV activities; however, the EOR may elect to lead 30% and/or 60% reviews on a project by project basis. In those situations, the EOR is responsible to conduct QV for said reviews. See Section 6.2 Region Quality Verification for details associated with QV.

6.2 Region Quality Verification

For each review, ESO or EOR shall complete the *Project Development Deliverable Checklist* (see Appendix B, C, D and E) to verify design documentation, backup calculations, and PS&E packages were submitted, complete, accurate, and/or reviewed per the EOR's or AEOR's internal QA/QC procedures. Depending on who is leading any given review, ESO or EOR shall report the QV outcome to PDE. If ESO is lead for reviews, EOR will also share the QV outcome to EOR.

As part of QV, ESO will coordinate with HQ Design for periodic audits and review of SWR work products.

7. Performance Measures

As part of the QMP, various aspects of project development and delivery will be tracked to help ensure the principles of quality management are being applied and reflected in work products. The PDE and CE shall meet with EOR and AEOR within SWR on an annual basis to review the following table:

Table 2.0: Annual Performance Measures

Performance Metric	Performance Target (per contract)	5 Year Historical Average (per contract relative to complexity)	Last Year's Average (per contract relative to complexity)
Number of Addenda	Reduce 25% from the 5 year average/program	Low: ## Medium: ## High: ##	Low: ## Medium: ## High: ##
Over/Under Engineer's Estimate	Bids within +/-10% of Engineer's Estimate	Low: xx% within +/-10% Medium: xx% within +/-10% High: xx% within +/-10%	Low: xx% within +/-10% Medium: xx% within +/-10% High: xx% within +/-10%
Plan Error Change Orders	Reduce 25%	Low: ## Medium: ## High: ##	Low: ## Medium: ## High: ##
Contract Changes exceeding 4% contingency	Reduce 25%	Percentage exceeding 4% contingency (all contracts) Low: ## Medium: ## High: ##	Percentage exceeding 4% contingency (all contracts) Low: ## Medium: ## High: ##

8. Lessons Learned

To further promote quality management principles and practices, SWR will engage in various activities to promote the sharing of knowledge and lessons learned. The following is a list of venues to share lessons learned:

- Monthly Area Engineers Meeting
- Internal Office Design Meetings
- Design Status Meetings with PDE and ESO
- Monthly Project Status Meetings with Region support staff
- Post CN lessons learned meeting with designer and inspectors – for every project
- WSDOT Lessons Learned Database
 - At: <http://wwwi.wsdot.wa.gov/Projects/Delivery/LessonsLearned/>
- PS&E Peer Exchange Meetings (Statewide) ESO attends
 - Yearly conference call in fall
 - Yearly in person meeting in spring
- Annual SWR Design/Construction Conference

APPENDIX A

Project Management Plan

Enter Project Title

Basic Project Management Plan

Revision: 2/12/2019

Template

Project Description

--

Management Team Mission

Lead our team in the development of PS&E's, while taking concerted effort to develop each team member's professional skills, ensuring that we deliver high quality products on time and within budget. We will accomplish this by: removing roadblocks, effective communication internally and externally, effective delegation of work assignments, recognizing accomplishments, and always exhibiting integrity

Milestones (Add milestone as appropriate)

[illegible]

Current Risks and Opportunities (To be updated)

[illegible]

Project Limits

Southwest Region	
County	Clark
BMP:	
EMP:	

★ Critical Success Factors

Fund Source	

Project Team (Expand as needed)

[See SWR](#) [List of contacts](#)

[illegible]

PE Phase Cost Estimate/Scope of Work Agreements

Group	Budget	Note
Project Office		
Environmental		
Ad and Award		
TOTAL	\$0	

Project Budget [TEIS]

Pull Down Menu *See Fill-in tab to add text*

Phase	\$	%
Preliminary Engineering		#DIV/0!
Right of Way		#DIV/0!
Construction		#DIV/0!
Total Project	\$0	#DIV/0!

Budget Request

Date	Phase	Status	Amount	% INCR
	PE	★ Future	\$1	#DIV/0!

<http://sharedot/regions/swr/swpd/default.aspx>

Stakeholders/Elected Officials

*** Endorsed by:**

Engineer of Record	Date
SWR Project Development Engineer	Date

* PMP must be updated and endorsed at the beginning of the design phase.

Quality Management Plan Level of Complexity:

Low

Review Lead									
Low	30%		Engineer of Record						
Medium	30%		TBD						
	60%		TBD						
Review Lead							Recommended Minimum Review Duration	QMP	PMP
0% Review			AD Ready Review						
E	CSM	RRM	P	S	E				
X	X	X	X	X	X	2 weeks	SWR QMP	Basic	
X	X	X	X	X	X	3 weeks	SWR QMP	Basic	
X	X	X	X	X	X	4 weeks	Project Specific	Project Specific	

CSM - Construction Staging Meeting
RRM - Region Review Meeting
QMP - Quality Management Plan
SWR QMP - Southwest Region Quality Management Plan
PMP - Project Management Plan

Note: This PMP must be placed in each team member office and updated when any data element is revised. Pictures are alternated with project maps, current site status or team/ team member successes.

Project Reference Section

Go to these locations to find specific guidance/information

[illegible]

Photo

APPENDIX B

Project Development Deliverable Checklist 30% Quality Review

Washington State Department of Transportation

Southwest Region

<Insert Project Name>

<Date>

Project Development Deliverable Checklist

30% Quality Review

30% Project Development Quality Review Considerations

The design team should complete, as appropriate, the following deliverables prior to performing the review (consider including in the initial scopes of work at the start of the project):

❖ **Design Quality Review Members***

- ☐ Required - Engineer of Record (EOR), Project Development Engineer (PDE), Region Construction Engineer (RCE), Construction PE (if differs from EOR), Design Team Lead, Designer(s), Traffic (WZTC, illumination and/or signal designer) Maintenance representative, Environmental coordinator, Program Management, Utilities Engineer, Engineering Services Office (ESO)
- ☐ Optional (As needed) – Geotechnical Engineer or designee, Bridge Design representative, and Landscape Architect

❖ **Required Design Review Deliverables****

- ☐ Approved Basis of Design & Alternative Comparison Table
- ☐ Completed Critical Geometric Design Parameters
 - Horizontal Alignment (lane & shoulder widths, curve radius, superelevation, horizontal stopping sight distance (SSD, intersection SSD, etc.)
 - Vertical Profile (grade, cross slope, vertical SSD, vertical clearance, etc.)
 - Quantitative analysis for lane and shoulder widths?
- ☐ Known Design Analysis – For elements not meeting minimum values in DM
- ☐ Draft Intersection and/or Interchange Channelization Plans
- ☐ Inroads 3D or Open-roads roadway model:
 - Roadway cross-sections
 - Staged roadway cross-sections for proposed Staging Strategy (if applicable)
- ☐ Verified Survey Datum, Control, and Right of Way alignment
- ☐ Utilities identified and potential conflicts determined
- ☐ Surfacing type determined
- ☐ Preliminary soil investigation information, if available:
 - Boring logs
 - Soil Types
 - Groundwater elevation
- ☐ Stormwater management & treatment strategy including locations of stormwater facilities
- ☐ Completed Preliminary Bridge Plans and bridge site data
- ☐ Retaining Walls Type, Size, and Location identified and wall site data completed
- ☐ Preliminary Hydraulics Design Report complete (for fish passage projects)
- ☐ Fish Passage Culvert Type, Size, and Location (for fish passage projects)
- ☐ Temporary and permanent signal/illumination locations and conflicts identified

- ☐ Construction Staging Strategy
- ☐ Traffic Management Strategy
- ☐ Wetlands & Sensitive Areas identified
- ☐ Defined Roadside restoration and landscaping strategy
- ☐ Types of Permits identified (Environmental, detour, coast guard, etc.)
- ☐ Railroad impacts and coordination requirements identified
- ☐ Proposed right of way and construction easements
- ☐ Initial maintenance review completed and any known deficiencies identified
- ☐ Draft Geotechnical Report:
 - Summary of Geotechnical conditions, if available.
 - Key geotechnical recommendations (groundwater, soil type, footing recommendations, etc.)
- ☐ Roll Plots or Plan Sheets with information to show any known or potential conflicts between various disciplines:***
 - Alignment and Right of Way
 - Existing features
 - Project Footprint (cut/fill limits)
 - Existing Utilities and Potential Conflicts
 - Construction Staging Plans & construction access locations
 - Existing and proposed drainage System (w/ pond/treatment locations)
 - Bridge Preliminary Bridge Plans and foundation locations
 - Retaining Wall type, size, and location
 - Illumination and Signal foundation locations

❖ **Constructability Evaluation Considerations**:**

- ☐ Evaluate and identify potential conflicts for below ground construction items such as:
 - Drainage structures and pipes
 - Ponds
 - Culverts
 - Bridge foundations and piers
 - Wall foundations
 - Structure excavation
 - Extra excavation or shoring limits
 - Existing monuments (DNR, WSDOT, property corners)
- ☐ Traffic Staging and Management strategy review and verification
- ☐ Construction Access review including haul routes and/or need for detour agreements
- ☐ Sensitive areas protection and turbid water management strategy review
- ☐ Contaminated soils identification and evaluation
- ☐ Contractor staging and/or stockpiling
- ☐ Environmental considerations & review:
 - Known commitments in EIS or NEPA
 - Environmental permit drawings and Level 2 information
 - Noise concerns
- ☐ Maintenance accessibility needs
- ☐ Potential non-standard items & special provisions

❖ **Recommended Format:**

- ☐ Independent discipline review and comments
 - EOR responds to all comments prior to initiating next review
- ☐ Follow-up roundtable with appropriate staff as determined by EOR to discuss critical and significant comments

*If ESO is leading the review, the EOR will submit all necessary review materials to ESO. ESO will distribute materials, as appropriate, for review and provide a combined set of comment to the EOR. EOR will respond to comments prior to the next review.

* If the EOR is leading the review, the EOR will distribute materials, as appropriate, for review and provide a combined set of comments. EOR will respond to comments prior to the next review.

* Design Quality Review Members may have designee conduct review in their place.

***The Design Review Deliverables and Constructability Evaluation Considerations provided in this document do not provide an exhaustive list and should be supplemented with other items of importance for individual projects.*

**** Since 30% quality review is not intended for contract plan reviews, Roll plots or PDFs with multiple CADD layers and levels shown maybe more appropriate to identify conflicts among various disciplines. If roll plots are used, scale them appropriately and include the North arrow.*

APPENDIX C

Project Development Deliverable Checklist 60% Quality Review

Washington State Department of Transportation

Southwest Region

<Insert Project Name>

<Date>

Project Development Deliverable Checklist

60% Quality Review

60% Project Development Quality Review Considerations

The design team should complete the deliverables listed in this section prior to performing the review:

❖ ***Design Quality Review Members****

- ☐ Required - Engineer of Record (EOR), Project Development Engineer (PDE), Region Construction Engineer (RCE), Construction PE (if differs from EOR), Design Team Lead, Designer(s), Traffic (WZTC, illumination and/or signal designer) Maintenance representative, Environmental coordinator, Program Management, Utilities Engineer, Engineering Services Office (ESO)
- ☐ Optional (As needed) – Geotechnical Engineer or designee, Bridge Design representative, or Designee, and Landscape Architect

❖ ***Required Design and Contract Plans Deliverables*****

- ☐ Design Documentation
 - Completed design parameters
 - Approved design analyses
 - Approved Plans for Approval or Channelization Plans
 - Completed Design Approval
- ☐ Contract Plan Sheets (60% unless noted otherwise)
 - Vicinity Map **(100%)**
 - Roadway Sections
 - Construction Staging Plans **(100%)** (if applicable)
 - Alignment/Right of Way Plans **(100%)**
 - Site Prep Plans including refined Clearing and Grubbing limits **(90%)**
 - Include all removal items
 - Sawcut limits
 - Potential Staging areas
 - Existing Utilities **(100%)**
 - Include proposed relocations
 - Roadway Profiles & Superelevation
 - Profiles and Superelevation **(100%)**
 - Earthwork Quantities
 - TESC Plans including
 - Proposed Stormwater Treatment BMPs
 - Groundwater management Plan
 - Drainage Plans with cut/fill limits **(90%)**
 - Drainage Profiles
 - Station and offset **(90%)**

- Rim and flowline grade/elevations
 - Identify existing utility crossings **(90%)**
- Drainage ponds
 - Layout and excavation limits **(100%)**
 - Control Structure
- Pond Details (30%)
- Paving Plans
- Paving Details (30%)
- Pavement Marking Plans (30%)
- Pavement Marking Details (30%)
- Retaining Wall Plans & Profiles
- Bridge Plans
 - Bridge layout **(100%)**
 - Superstructure Plans (60%)
 - Pier and Substructure foundation type and locations **(100%)**
 - Substructure Plans (60%)
- Traffic Signals Plans
 - Foundation locations **(90%)**
 - Signal cabinet and conduit locations **(90%)**
- Illumination Plans
 - Foundation locations **(90%)**
 - Conduit locations **(90%)**
- Traffic Control Plans (30%)
 - Lane closure hours **(100%)**
- Roadside Restoration and Environmental Mitigation Plans
 - Soil preparation **(90%)**
 - Major site grading **(90%)**
 - Streambank protection/restoration methods **(90%)**
 - Irrigation conduit location **(90%)**
 - Irrigation service location **(90%)**
- ❑ Special Provisions
 - List of known contract requirements (fish windows, environmental commitments, proprietary items)
 - List of potential contract requirements (environmental, local jurisdiction, etc.)
 - List of all non-standard items
 - Any draft specifications prepared to date
- ❑ Estimates
 - Summary of Quantities
 - Significant cost items quantified (earthwork, surfacing & pavement, structures, walls, signal, illumination, drainage) (90%)
 - Minor items are identified but may not be quantified (30%)
 - Appropriate allowance for minor items
- ❖ **Recommended Format:**
 - ❑ Independent discipline review and comments
 - EOR responds to all comments prior to initiating next review
 - ❑ For Medium and High complexity projects, conduct a Region Review Meeting with Design Quality Review Members or their designee
 - Follow-up Roundtable with appropriate staff as determined by EOR to discuss critical and significant comments

* If ESO is leading review, the EOR will submit all necessary review materials to ESO. ESO will distribute materials, as appropriate, for review and provide a combined set of comment to the EOR. EOR will respond to comments prior to the next review.

* If the EOR is leading the review, the EOR will distribute materials, as appropriate, for review and provide a combined set of comments. EOR will respond to comments prior to the next review.

* Design Quality Review Members may have designee conduct review in their place.

***The Required Design and Contract Plans Deliverables provided in this document do not provide an exhaustive list and should be supplemented with other items of importance for individual projects.*

APPENDIX D

Project Development Deliverable Checklist 90% Quality Review

Washington State Department of Transportation

Southwest Region

<Insert Project Name>

<Date>

Project Development Deliverable Checklist

90% Quality Review

90% Project Development Quality Review Considerations

The design team should complete the deliverables listed in this section prior to performing the review:

❖ **Design Quality Review Members***

- ☐ Required - Engineer of Record (EOR), Project Development Engineer (PDE), Region Construction Engineer (RCE), Construction PE (if differs from EOR), Design Team Lead, Designer(s), Traffic (WZTC, illumination and/or signal designer) Maintenance representative, Environmental coordinator, Program Management, Utilities Engineer, Engineering Services Office
- ☐ Optional (As needed) – Geotechnical Engineer or designee, Bridge Design representative, or Designee, and Landscape Architect

❖ **Design and Contract Plans Review****

- ☐ Contract Plans Formatting Review per Chapter 4 of Plans Prep Manual
 - Drafting requirements and details
 - Plan sheet scale and layout format
 - Plan Sequence
- ☐ Contract Plan Sheets
 - Completeness Review (Contract Plan sheets should be near 100% and missing elements should be documented to the reviewers)
 - Formatting Review
 - Consistency & Accuracy Review
 - Quantities shown on various plan sheets (Q-tabs, Roadway Profiles, Structure Notes, etc.) match Summary of Quantities total
 - Bid item names and measurement on various plan sheets (Q-tabs, Roadway Profiles, Structure Notes, etc.) match those in Summary of Quantities
 - Standard Plan and Standard Specs references are correct
- ☐ Special Provisions
 - Completeness Review (Special Provisions should be near 100% and missing elements should be documented to the reviewers).
 - Most of the Environmental Restrictions are known and incorporated
 - All non-standard bid items have a special provision
 - Includes number of working days
 - Traffic control lane restriction are included

- ☐ Cost Estimate

- Summary of Quantities are complete
- UBA for all bid items
- Lump Sum cost estimate detail complete
- Below the line items identified
- Taxes correct and applied appropriately
- Construction Engineering costs included
- ☐ Geotechnical Report Complete
 - Summary of Geotechnical conditions included
 - Geotechnical recommendations incorporated into the design and the contract.
- ☐ Hydraulics Report Approved

❖ **Constructability Review****

- ☐ Verify no known conflicts in various below ground construction items:
 - Drainage (ponds, vaults, drainage structures, culverts & stormwater pipe elevations, etc.)
 - Bridge footings and piers conflicts (utilities, drainage etc.)
 - Structure excavation, extra excavation, and shoring envelope conflicts with staging, roadway, signal and luminaire foundations, etc.
 - Traffic signal, signal cabinet, and luminaire footings conflicts
- ☐ Traffic Staging review and conflict identification
- ☐ Sensitive areas protection and turbid water management strategy evaluation
- ☐ Shoring or extra excavation limits and evaluation
- ☐ Hazardous materials and contaminated soils determination and evaluation
- ☐ Maintenance access for new and existing features (luminaires, sign bridges, ponds, vaults, etc.) and special maintenance needs identified

❖ **Recommended Format:**

- ☐ Independent discipline review and comments
 - EOR responds to all comments prior to initiating next review
- ☐ Conduct a Region Review Meeting with Design Quality Review Members or their designee
 - Follow-up Roundtable with appropriate staff as determined by EOR to discuss critical and significant comments

*Engineer of Record (EOR) will submit all necessary review materials to the Southwest Region Engineering Services Office (ESO). ESO will distribute materials, as appropriate, for review and provide a combined set of comment to the EOR. EOR will respond to comments prior to the next review.

* For Design Quality Review Members may have designee conduct review in their place.

***The items provided in this document do not provide an exhaustive list and should be supplemented with other items of importance for individual projects.*

APPENDIX E

Project Development Deliverable Checklist AD Ready Quality Review

Washington State Department of Transportation

Southwest Region

<Insert Project Name>

<Date>

Project Development Deliverable Checklist

AD Ready Quality Review

AD Ready Project Development Quality Review Considerations

The AD Ready review is a targeted review conducted by a small group of discipline experts to ensure critical PS&E components are completed and the final PS&E package is ready for advertisement. The design team must complete the deliverables listed in this section prior to performing the review:

❖ **Design Quality Review Members***

- ☐ Required - Project Development Engineer (PDE), Construction Engineer (CE), Engineer of Record (EOR), Construction Support Engineer, Engineering Services Office (PS&E Engineer), Program Management

❖ **Contract Plans, Special Provisions and Estimate Review ****

- ☐ Signed and Stamped Contract Plans
 - Completeness/accuracy
 - Sheet Numbering
 - Federal Aid Number included, as appropriate
 - Index
 - Summary of Quantities
 - Project Development Engineer's signature
- ☐ Special Provisions
 - Completeness Review
 - All "fill ins" complete, including but not limited to,
 - Bid Opening Date,
 - Working days,
 - Lane restrictions,
 - Liquidated damages,
 - Utilities,
 - Adjacent projects,
 - Goals,
 - Permits,
 - Appendices,
 - Etc.
 - All Environmental Restrictions are known and incorporated
 - All non-standard bid items have approved special provision
 - All language required for using selected standard items included (i.e. GSPs, Special Provisions)
 - Copies of all appendices supplied

- CE approval and HQ concurrence
 - Stamped and signed Notice to PLANHOLDERS once specials approved
- ☐ Cost Estimate
 - EBase Estimate
 - EBase Estimate reviewed against Contract Plans
 - Item numbering sequential
 - Federal Aid Number, as appropriate
 - Review tabs information (including bid and non-bid items) for accuracy and conformity with EBase Users guide

❖ ***Recommended Format:***

- ☐ Targeted review conducted by a small group of discipline experts
 - EOR responds to all comments and makes any necessary corrections

*Engineer of Record (EOR) will submit all necessary review materials to the Southwest Region Engineering Services Office (ESO). ESO will distribute materials, as appropriate, for review and provide a combined set of comment to the EOR. EOR will respond to comments prior to AD.

***The Contract Plans, Special Provisions and Estimate Review items provided in this document do not provide an exhaustive list and should be supplemented with other items of importance for individual projects.*

APPENDIX F

Guidelines for Special Provision Preparation

GUIDELINES FOR SPECIAL PROVISION PREPARATION

Existing Standard Specifications and General Special Provisions are preapproved for use. Any departure from these, be it revision, deletion, replacement or supplement, requires approval in accordance with the Region's Quality Management Plan.

This document contains guidelines and consideration for best practices when preparing special provisions.

Timeliness:

The worst time to propose a special provision for review and approval is shortly before the ad date. Special Provisions should be developed well ahead of the final review set.

Preliminary Discussions:

Depending on the topic of the special provision, a preliminary discussion may save a lot of time and effort. Talk it over before you start. Consider including the following parties in the discussion: Construction Project Engineer, CE, PDE, ESO, HQ ASDE and HQ ASCE into the project strategy discussions before any Special Provision work is started. Discuss concepts and potential conflicts with specifications at an early stage and there will be a greater chance for the development of a successful specification. Engage appropriate subject matter experts in the discussion (e.g. HQ Construction, hydraulics, region materials lab, structures) to help refine the provision. Make sure you thoroughly understand the problem you are trying to solve with your proposed Special Provision. Then make sure what you have written will really solve that problem.

Why is a special provision necessary?

It is important to remember that the existing Standard Specifications have the advantage of being familiar, broadly understood by both WSDOT and our design and construction partners, and have frequently been tested in the courts. Consequently, there is well-placed reluctance to abandon their use. WSDOT benefits from our long history of consistent and predictable behavior under contract and the Standard Specifications help us maintain that.

A standard specification should be considered fine unless you provide a sound reason why it is not. Typically, there are four reasons for proposals to change a specification:

1. The situation is such that no standard specification covers the work required (mechanical/electrical rehabilitations, 'new' technology, ITS systems, seismic retrofits, buildings, new products.)
2. The standard specification is fine, but it just doesn't work in the situation we are faced with. In this situation, make a good case and write a good spec.
3. The standard specification is flawed and does not do the job. In this case, write a good spec and propose your language to become the basis for an update to the Standard Specifications.
4. There's nothing wrong with the standard spec; we just don't want to do it that way. You need to explain why the standard spec won't work in this case and why the special provision works better.)

In any case, your special provision proposal should always be accompanied by an explanation. Do not plan on others figuring out why you want to do this or even what your spec is trying to say.

Who says a special provision is needed and appropriate?

The design team working in cooperation with the EOR should determine the need for a special provision. As a design team member, you are working in a design office under the direct supervision of a professional engineer. The EOR must endorse the specification/special provision proposal. The PS&E you are preparing will be administered by a construction project engineer. The Southwest Region Construction Engineer approves all special provisions.

Do not take support group special provision packages and simply staple them onto a project package. The special provisions prepared by a support group must be reviewed to ensure that they fit within the specifications/special provisions of your project.

HQ Design and Construction will conduct routine audits to identify improvement opportunities, compile lessons learned, and identify “best practices” for the development and approval of Special Provisions by the Regions.

Questions you should ask yourself when developing a special provision:

- Is it clear and concise?
- Does it conflict in any way with other specifications or project provisions?
- Is it legal?
- Does it satisfy all Federal spec requirements?
- Does it maintain WSDOT’s philosophy of sharing risk with the contractor?
- Is it enforceable?
- Can the contractor bid it competently?
- Are grammar, punctuation and spelling correct?
- Is there any chance for ambiguity? Can it be interpreted more than one way?
- Does the spec still work if things do not go as expected?
- Do other specs have to be modified to make it work?
- Does this type of provision exist in another Region?
- What is the appropriate level of approval? Following-up later, did that approval happen?

Special Provision Tips:

- Have an experienced individual provide an objective review. It is easy to believe that your specification will work as intended when you are the author or supporter, but sometimes a contractor will read it differently. Having someone else review it, who was not part of the writing or development, can be very illuminating and reveal ambiguities or hidden flaws.
- Strive for end-product rather than method specs
- If you can get an end-product that works, don’t try to impose methods