INTRO.AP1

INTRODUCTION

The following Amendments and Special Provisions shall be used in conjunction with the 2012 Standard Specifications for Road, Bridge, and Municipal Construction.

AMENDMENTS TO THE STANDARD SPECIFICATIONS

The following Amendments to the Standard Specifications are made a part of this contract and supersede any conflicting provisions of the Standard Specifications. For informational purposes, the date following each Amendment title indicates the implementation date of the Amendment or the latest date of revision.

Each Amendment contains all current revisions to the applicable section of the Standard Specifications and may include references which do not apply to this particular project.

1-01.AP1

Section 1-01, Definition and Terms
January 2, 2012

1-01.3 Definitions

The definition for **"Bid Documents**" is revised to read:

> The component parts of the proposed Contract which may include, but are not limited to, the Proposal Form, the proposed Contract Provisions, the proposed Contract Plans, Addenda, and, for projects with Contracting Agency subsurface investigations, the Summary of Geotechnical Conditions and subsurface boring logs (if any).

1-02.AP1

Section 1-02, Bid Procedures and Conditions
January 2, 2012

1-02.4(2) Subsurface Information

The first two sentences in the first paragraph are revised to read:

> If the Contracting Agency has made subsurface investigation of the site of the proposed work, the boring log data, soil sample test data, and geotechnical recommendations reports obtained by the Contracting Agency will be made available for inspection by the Bidders at the location specified in the Special Provisions. The Summary of Geotechnical Conditions, as an appendix to the Special Provisions, and the boring logs shall be considered as part of the Contract.

1-03.AP1

Section 1-03, Award and Execution of Contract
April 2, 2012

1-03.1(1) Tied Bids

This section's title is revised to read:

> **1-03.1(1) Identical Bid Totals**

1-07.AP1

Section 1-07, Legal Relations and Responsibilities to the Public
June 4, 2012

1-07.1 Laws to be Observed

The following two sentences are inserted after the first sentence in the third paragraph:

> In particular the Contractor's attention is drawn to the requirements of WAC 296.800 which requires employers to provide a safe workplace. More specifically WAC 296.800.11025 prohibits alcohol and narcotics from the workplace.

1-08.AP1

Section 1-08, Prosecution and Progress
April 2, 2012

1-08.1 Subcontracting

In the eighth paragraph, "Contracting Agency" is revised to read "WSDOT".

1-08.3(1) General Requirements

The following new paragraph is inserted after the first paragraph:

> Total float belongs to the project and shall not be for the exclusive benefit of any party.

1-08.7 Maintenance During Suspension

The second paragraph is revised to read:

> At no expense to the Contracting Agency, the Contractor shall provide through the construction area safe, smooth, and unobstructed roadways and pedestrian access routes for public use during the suspension (as required in Section 1-07.23 or the Special Provisions.) This may include a temporary road, alternative pedestrian access route or detour.

1-09.AP1

Section 1-09, Measurement and Payment
April 2, 2012

1-09.2(5) Measurement

The second sentence in the first paragraph is revised to read:

> The frequency of verification checks will be such that at least one test weekly is performed for each scale used in weighing contract items of Work.

3-04.AP3

Section 3-04, Acceptance of Aggregate
April 2, 2012

3-04.3(7)D4 An Entire Lot

The last sentence is deleted.

3-04.5 Payment

In the second paragraph, the reference “Section 3-04.3(6)C “ is revised to read “Section 3-04.3(8)“.

In Table 1, the row containing the item “Gravel Borrow for Geosynthetic Retaining Wall” is revised to read:

9-03.14(4)	Gravel Borrow for Geosynthetic Retaining Wall	4000	2000	$30	$60

5-01.AP5

Section 5-01, Cement Concrete Pavement Rehabilitation
April 2, 2012

5-01.3(2)B Portland Cement Concrete

The fifth sentence in the third paragraph is revised to read:

> The lower Specification limit for compressive strength shall be 4,000-psi.

The last two sentences in the third paragraph are deleted.

5-01.3(11) Concrete Slurry

This section including title is revised to read:

> **5-01.3(11) Concrete Slurry and Grinding Residue**
>
> All concrete slurry and grinding residue shall be removed from the pavement surface on a continual basis immediately behind the grinding or cutting operations. Slurry shall not be allowed to drain into an area open to traffic, off of the paved surface or into any drainage structure.
>
> The Contractor shall collect the concrete slurry and grinding residue from the pavement surface and dispose of it in accordance with Section 2-03.3(7)C.
>
> Opening to traffic shall meet the requirements of Section 5-05.3(17).

5-04.AP5

Section 5-04, Hot Mix Asphalt
April 2, 2012

5-04.3(10)B3 Longitudinal Joint Density

The section including title is revised to read:

> **5-04.3(10)B3 Vacant**

6-02.AP6

Section 6-02, Concrete Structures

April 2, 2012

6-02.3(16) Plans for Falsework and Formwork

Item No. 4 in the seventh paragraph is revised to read:

4. Conditions required by other Sections of 6-02.3(17), Falsework and Formwork.

Item's No. 5, 6, 7, and 8 in the seventh paragraph are deleted.

The following paragraph is inserted after the seventh paragraph:

Plan approval can be done by the Project Engineer for footings and walls 4 to 8 feet high (excluding pedestal height) provided:

1. Concrete placement rate is 4 feet per hour or less.

2. Facing is ¾-inch plywood with grades as specified per Section 6-02.3(17)I.

3. Studs, with plywood face grain perpendicular, are 2 by 4's spaced at 12 inches.

4. Walers with 3,000 pound safe working load ties spaced at 24 inches are two 2 by 4's spaced at 24 inches.

6-02.3(17)F Bracing

In the first paragraph, the phrase "per Section 6-02.3(17)I" is revised to read "in accordance with Section 6-02.3(17)I".

This section is supplemented with the following new sub-section:

6-02.3(17)F5 Temporary Bracing for Bridge Girders During Diaphragm and Bridge Deck Concrete Placement

Prestressed concrete girders shall be braced to resist forces that would cause rotation or torsion in the girders caused by the placing of precast concrete deck panels and concrete for the bridge deck.

Bracing shall be designed and detailed by the Contractor and shall be shown in the falsework/formwork plans submitted to the Engineer for approval. These braces shall be furnished, installed, and removed by the Contractor at no additional cost to the Contracting Agency. The Contractor may consider the bracing effects of the diaphragms in developing the falsework/formwork plans. The Contractor shall account for the added load from concrete finishing machines and other construction loadings in the design of the bracing.

Falsework support brackets and braces shall not be welded to structural steel bridge members or to steel reinforcing bars.

6-02.3(17)F4 Temporary Bracing for Bridge Girders

This section including title is revised to read:

6-02.3(17)F4 Temporary Bracing for Bridge Girders During Erection

Steel girders shall be braced in accordance with Section 6-03.3(7)A.

Prestressed concrete girders shall be braced sequentially during girder erection. The bracing shall be designed and detailed by the Contractor and shall be shown in the falsework/formwork plans submitted to the Engineer for approval. The Contractor shall furnish, install, and remove the bracing at no additional cost to the Contracting Agency.

At a minimum, the Contractor shall brace girders at each end and at midspan to prevent lateral movement or rotation. This bracing shall be placed prior to the release of each girder from the erection equipment. If the bridge is constructed with cast-in-place concrete diaphragms, the bracing may be removed once the concrete in the diaphragms has been placed and cured for a minimum of 24 hours.

6-02.3(25)N Prestressed Concrete Girder Erection

The third sentence in the fifth paragraph is revised to read:

The girders shall be braced in accordance with Sections 6-02.3(17)F4 and 6-02.3(17)F5.

6-02.3(26)E5 Leak Tightness Testing

The first sentence in the first paragraph is revised to read:

The Contractor shall test each completed duct assembly for leak tightness after placing concrete but prior to placing post tensioning reinforcement.

The second paragraph is revised to read:

Prior to testing, all grout caps shall be installed and all vents, grout injection ports, and drains shall either be capped or have their shut-off valves closed. The Contractor shall pressurize the completed duct assembly to an initial air pressure of 50 psi. This pressure shall be held for five minutes to allow for internal adjustments within the assembly. After five minutes, the air supply valve shall be closed. The Contractor shall monitor and measure the pressure maintained within the closed assembly, and any subsequent loss of pressure, over a period of one minute following the closure of the air supply valve. The maximum pressure loss for duct assemblies equal to or less than 150 feet in length shall be 25 psig. The maximum pressure loss for duct assemblies greater than 150 feet in length shall be 15 psig. If the pressure loss exceeds the allowable, locations of leakage shall be identified, repaired or reconstructed using methods approved by the Engineer. The repaired system shall then be retested. The cycle of testing, repair and retesting of each completed duct assembly shall continue until the completed duct assembly completes a test with pressure loss within the specified amount.

6-03.AP6

Section 6-03, Steel Structures
April 2, 2012

6-03.3(28)A Method of Shop Assembly

The first sentence in Item 2.C. is revised to read:

For Trusses and Girders – After the first stage has been completed, each subsequent stage shall be assembled to include: at least one truss panel or girder shop section of the previous stage and two or more truss panels or girder shop sections added at the advancing end.

6-07.AP6

Section 6-07, Painting
April 2, 2012

6-07.3(9)A Paint System

The first sentence in the second paragraph is revised to read:

All paint coating components of the selected paint system shall be produced by the same manufacturer.

6-07.3(10)H Paint System

The first and second sentences in the second paragraph are revised to read:

All paint coating components of the selected paint system shall be produced by the same manufacturer.

6-10.AP6

Section 6-10, Concrete Barrier
April 2, 2012

6-10.5 Payment

In the second paragraph, the bid item "Conc. Class 4000" is revised to read:

"Conc. Class 4000___"

6-12.AP6

Section 6-12, Noise Barrier Walls
January 2, 2012

6-12.3(3) Shaft Construction

The third sentence in the fifth paragraph is revised to read:

When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of advance of the shaft drilling equipment being significantly reduced relative to the rate of advance for the rest of the shaft excavation, then the Contractor shall remove the obstruction under the provisions of Section 6-12.5.

6-12.5 Payment

This section is supplemented with the following:

"Removing Noise Barrier Wall Shaft Obstructions", estimated.

Payment for removing obstructions, as defined in Section 6-12.3(3), will be made for the changes in shaft construction methods necessary to remove the obstruction. The Contractor and the Engineer shall evaluate the effort made and reach agreement on the

equipment and employees utilized, and the number of hours involved for each. Once these cost items and their duration have been agreed upon, the payment amount will be determined using the rate and markup methods specified in Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Removing Noise Barrier Wall Shaft Obstructions" in the bid proposal to become a part of the total bid by the Contractor.

If the shaft construction equipment is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then standby payment for the idled equipment will be added to the payment calculations. If labor is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then all labor costs resulting from Contractor labor agreements and established Contractor policies will be added to the payment calculations.

The Contractor shall perform the amount of obstruction work estimated by the Contracting Agency within the original time of the contract. The Engineer will consider a time adjustment and additional compensation for costs related to the extended duration of the shaft construction operations, provided:

1. the dollar amount estimated by the Contracting Agency has been exceeded, and;

2. the Contractor shows that the obstruction removal work represents a delay to the completion of the project based on the current progress schedule provided in accordance with Section 1-08.3.

6-14.AP6

Section 6-14, Geosynthetic Retaining Walls
January 2, 2012

6-14.2 Materials

The referenced section for the following item is revised to read:

Grout	9-20.3(4)

In the first paragraph, the following items are inserted after the item “Gravel Borrow For Geosynthetic Retaining Wall”:

Polyurethane Sealant	9-04.2(3)
Closed Cell Foam Backer Rod	9-04.2(3)A

6-15.AP6

Section 6-15, Soil Nail Walls
January 2, 2012

6-15.2 Materials

The referenced section for the following item is revised to read:

Grout	9-20.3(4)

6-15.3(3) Submittals

Item f beneath item number 3 is revised to read:

f. Mix design and procedures for placing the grout.

6-15.3(6) Soil Nailing

This section is supplemented with the following:

The Contractor shall make and cure grout cubes once per day in accordance with WSDOT Test Method T 813. These samples shall be retained by the Contractor until all associated verification and proof testing of the soil nails has been successfully completed. If the Contractor elects to test the grout cubes for compressive strength, testing shall be conducted by an independent laboratory and shall be in accordance with the WSDOT FOP for AASHTO T106.

6-16.AP6

Section 6-16, Soldier Pile and Soldier Pile Tieback Walls
January 2, 2012

6-16.3(3) Shaft Excavation

The third sentence in the seventh paragraph is revised to read:

When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of advance of the shaft drilling equipment being significantly reduced relative to the rate of advance for the rest of the shaft excavation, then the Contractor shall remove the obstruction under the provisions of Section 6-16.5.

6-16.5 Payment

This section is supplemented with the following:

"Removing Soldier Pile Shaft Obstructions", estimated.

Payment for removing obstructions, as defined in Section 6-16.3(3), will be made for the changes in shaft construction methods necessary to remove the obstruction. The Contractor and the Engineer shall evaluate the effort made and reach agreement on the equipment and employees utilized, and the number of hours involved for each. Once these cost items and their duration have been agreed upon, the payment amount will be determined using the rate and markup methods specified in Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Removing Soldier Pile Shaft Obstructions" in the bid proposal to become a part of the total bid by the Contractor.

If the shaft construction equipment is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then standby payment for the idled equipment will be added to the payment calculations. If labor is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then all labor costs resulting from Contractor labor agreements and established Contractor policies will be added to the payment calculations.

The Contractor shall perform the amount of obstruction work estimated by the Contracting Agency within the original time of the contract. The Engineer will consider a

time adjustment and additional compensation for costs related to the extended duration of the shaft construction operations, provided:

1. the dollar amount estimated by the Contracting Agency has been exceeded, and;

2. the Contractor shows that the obstruction removal work represents a delay to the completion of the project based on the current progress schedule provided in accordance with Section 1-08.3.

6-17.AP6

Section 6-17, Permanent Ground Anchors
January 2, 2012

6-17.3(3) Submittals

The first sentence in the sixth paragraph is revised to read:

The Contractor shall submit the mix design for the grout conforming to Section 9-20.3(4) and the procedures for placing the grout to the Engineer for approval.

6-17.3(7) Installing Permanent Ground Anchors

The following new paragraph is inserted after the sixth paragraph:

The Contractor shall make and cure grout cubes once per day in accordance with WSDOT Test Method T 813. These samples shall be retained by the Contractor until all associated verification, performance and proof testing of the permanent ground anchors has been successfully completed. If the Contractor elects to test the grout cubes for compressive strength, testing shall be conducted by an independent laboratory and shall be in accordance with the WSDOT FOP for AASHTO T106.

7-02.AP7

Section 7-02, Culverts
April 2, 2012

7-02.5

The bid item “Steel Rib Reinforced Polyethylene Culvert Pipe _____ In. Diam.”, per linear foot is revised to read:

“St. Rib Reinf Polyethylene Culv. Pipe _____ In. Diam.”, per linear foot

7-04.AP7

Section 7-04, Storm Sewers
April 2, 2012

7-04.3(1)B Exfiltration Test – Storm Sewers

The fifth column title “PE[4]” is revised to read “PP[4]” from the table titled, “**Storm Sewer Pipe Schedules”.**

7-04.5

The bid item "Steel Rib Reinforced Polyethylene Storm Sewer Pipe _____ In Diam", per linear foot is revised to read:

> "St. Rib Reinf Polyethylene Storm Sewer Pipe _____ In. Diam", per linear foot

7-05.AP7

Section 7-05, Manholes, Inlets, Catch Basins, and Drywells
April 2, 2012

7-05.3 Construction Requirements

The third paragraph is supplemented with the following:

> Leveling and adjustment devices that do not modify the structural integrity of the metal frame, grate or cover, and do not void the originating foundry's compliance to these specifications and warranty is allowed. Approved leveling devices are listed in the Qualified Products List. Leveling and adjusting devices that interfere with the backfilling, backfill density, grouting and asphalt density will not be allowed. The hardware for leveling and adjusting devices shall be completely removed when specified by the Project Engineer.

8-01.AP8

Section 8-01, Erosion Control and Water Pollution Control
April 2, 2012

8-01.3(2)D Mulching

The following two new paragraphs are inserted after the fourth paragraph:

> Short-Term Mulch shall be hydraulically applied at the rate of 2500 pounds per acre and may be applied in one lift.
>
> Moderate-Term Mulch and Long-Term Mulch shall be hydraulically applied at the rate of 3500 pounds per acre with no more than 2000 pounds applied in any single lift.

8-01.3(2)E Soil Binders and Tacking Agents

The first paragraph is revised to read:

> Tacking agents or soil binders applied using a hydroseeder shall have a mulch tracer added to visibly aid uniform application. This tracer shall not be harmful to plant, aquatic, or animal life. A minimum of 125 pounds per acre and a maximum of 250 pounds per acre of Short-Term Mulch shall be used as a tracer.

The last two paragraphs are deleted.

8-01.3(2)F Dates for Application of Final Seed, Fertilizer, and Mulch

In the first paragraph, "Engineer" is revised to read "Project Engineer".

Note 1 of the table in the first paragraph is revised to read:

[1] Where Contract timing is appropriate, seeding, fertilizing, and mulching shall be accomplished during the fall period listed above

The third paragraph is deleted.

8-01.3(5) Placing Plastic Covering

The second and third paragraphs are revised to read:

Clear plastic covering shall be used to promote seed germination when seeding is performed outside of the Dates for Application of Final Seed in Section 8-01.3(2)F. Black plastic covering shall be used for stockpiles or other areas where vegetative growth is unwanted.

The plastic cover shall be installed and maintained in a way that prevents water from cutting under the plastic and prevents the plastic cover from blowing open in the wind.

8-01.3(6) Check Dams

This section is revised to read:

Check dams shall be installed as soon as construction will allow, or when designated by the Engineer. The Contractor may substitute a different check dam, in lieu of what is specified in the contract, with approval of the Engineer. The check dam is a temporary or permanent structure, built across a minor channel. Water shall not flow through the check dam structure. Check dams shall be constructed in a manner that creates a ponding area upstream of the dam to allow pollutants to settle, with water from increased flows channeled over a spillway in the check dam. The check dam shall be constructed to prevent erosion in the area below the spillway. Check dams shall be placed perpendicular to the flow of water and installed in accordance with the Standard Plans. The outer edges shall extend up the sides of the conveyance to prevent water from going around the check dam. Check dams shall be of sufficient height to maximize detention, without causing water to leave the ditch. Check dams shall meet the requirements in Section 9-14.5(4).

8-01.3(7) Stabilized Construction Entrance

The first paragraph is revised to read:

Temporary stabilized construction entrance shall be constructed in accordance with the Standard Plans, prior to beginning any clearing, grubbing, embankment or excavation. All quarry spall material used for stabilized construction entrance shall be free of extraneous materials that may cause or contribute to track out.

8-01.3(9)B Gravel Filter, Wood Chip, or Compost Berm

The first paragraph is revised to read:

Filter berms shall retain sediment and direct flows. The gravel filter berm shall be a minimum of 1 foot in height and shall be maintained at this height for the entire time they are in use. Rock material used for filter berms shall meet the grading requirements in Section 9-03.9(2), but shall not include any recycled materials as outlined in Section 9-03.21.

8-01.3(9)C Straw Bale Barrier

This section including title is revised to read:

8-01.3(9)C Vacant

8-01.3(11) Vacant

This section including title is revised to read:

8-01.3(11) Outlet Protection

Outlet protection shall prevent scour at the outlets of ponds, pipes, ditches or other conveyances. All quarry spall material used for outlet protection shall be free of extraneous material and meet the gradation requirements in Section 9-13.6.

8-01.3(13) Temporary Curb

This section is revised to read:

Temporary curbs shall divert or redirect water around erodible soils.

Temporary curbs shall be installed along pavement edges to prevent runoff from flowing onto erodible slopes. Water shall be directed to areas where erosion can be controlled. The temporary curbs shall be a minimum of 4 inches in height. Ponding shall not be in roadways.

8-01.4 Measurement

The third paragraph is revised to read:

Check dams will be measured per linear foot one time only along the completed check dam. No additional measurement will be made for check dams that are required to be rehabilitated or replaced due to wear.

This section is supplemented with the following:

Outlet Protection will be measured per each initial installation at an outlet location.

8-01.5 Payment

This section is supplemented with the following:

"Outlet Protection", per each.

8-02.AP8

Section 8-02, Roadside Restoration

April 2, 2012

8-02.5 Payment

The paragraph following bid item "Coarse Compost", per cubic yard" is revised to read:

The unit Contract price per cubic yard for "Fine Compost", Medium Compost" or "Coarse Compost" shall be full pay for furnishing and spreading the compost onto the existing soil.

8-03.AP8

Section 8-03, Irrigation Systems
April 2, 2012

8-03.3(7) Flushing and Testing

The fifth paragraph is deleted.

8-04.AP8

Section 8-04, Curbs, Gutters, and Spillways
April 2, 2012

8-04.3(1) Cement Concrete Curbs, Gutters, and Spillways

This section is supplemented with the following new sub-section:

8-04.3(1)B Roundabout Cement Concrete Curb and Gutter

Roundabout cement concrete curb and gutter and roundabout splitter island nosing curb shall be shaped and finished to match the shape of the adjoining curb as shown in the Plans. All other requirements for cement concrete curb and cement concrete curb and gutter shall apply to roundabout cement concrete curb and gutter.

8-04.4 Measurement

This section is supplemented with the following:

Roundabout splitter island nosing curb will be measured per each.

8-04.5 Payment

The bid item, “Roundabout Truck Apron Cement Concrete Curb”, per linear foot is deleted.

This section is supplemented with the following:

“Roundabout Cement Concrete Curb and Gutter”, per linear foot

The unit Contract price per linear foot for “Roundabout Cement Concrete Curb and Gutter” shall be full payment for all costs for the Work including transitioning the roundabout cement concrete curb and gutter to the adjoining curb shape.

“Roundabout Splitter Island Nosing Curb”, per each.

The unit Contract price per each for “Roundabout Splitter Island Nosing Curb” shall be full payment for all costs for the Work including transitioning the roundabout splitter island nosing curb to the adjoining curb shape.

8-12.AP8

Section 8-12, Chain Link Fence and Wire Fence
April 2, 2012

In this Section “Engineer” is revised to read “Project Engineer”.

8-12.1 Materials

This section is supplemented with the following:

Paint 9-08.1(2)B

8-12.3(1)A Posts

The words “for Type 3 and Type 4 fences” and “on Type 3 and Type 4 fences” are deleted from this section.

The first sentence of the fifth paragraph is revised to read:

> After the post is set and plumbed, the hole shall be filled with Grout Type 4.

The third sentence in the sixth paragraph is replaced with the following two sentences:

> After the post is set and plumbed, the hole in the portion of the post in solid rock shall be filled with Grout Type 4. The grout shall be thoroughly worked into the hole so as to leave no voids.

The seventh paragraph is deleted.

The ninth paragraph is revised to read:

> Steep slopes or abrupt topography may require changes in various elements of the fence. It shall be the responsibility of the Contractor to provide all posts of sufficient length to accommodate the chain link fabric.

The tenth paragraph is revised to read:

> All round posts shall have approved top caps fastened securely to the posts. The base of the top cap fitting for round posts shall feature an apron around the outside of the posts.

8-12.3(1)B Top Rail

This section’s content including title is deleted and replaced with:

> **8-12.3(1)B Vacant**

8-12.3(1)C Tension Wire and Tension Cable

This section’s content including title is revised to read:

> **8-12.3(1)C Tension Wire**
>
> Tension Wires shall be attached to the posts as detailed in the Plans or as approved by the Engineer.

8-12.3(1)D Chain Link Fabric

The first three paragraphs are revised to read:

> Chain link fabric shall be attached after the cables and wires have been properly tensioned.

Chain link fabric shall be placed on the face of the post away from the Highway, except on horizontal curves where it shall be placed on the face on the outside of the curve unless otherwise directed by the Project Engineer.

Chain link fabric shall be placed approximately 1-inch above the ground and on a straight grade between posts by excavating high points of ground. Filling of depressions will be permitted only upon approval of the Project Engineer.

The fourth sentence in the fourth paragraph is revised to read:

The top and bottom edge of the fabric shall be fastened with hog rings to the top and bottom tension wires as may be applicable, spaced at 24-inch intervals.

8-12.3(1)E Chain Link Gates

The third paragraph is deleted.

8-12.3(2)A Posts

In the second paragraph, “commercial” is deleted.

The first sentence of the fifth paragraph is revised to read:

After the post is set and plumbed, the hole shall be filled with Grout Type 4.

The fourth sentence in the sixth paragraph is replaced with the following two sentences:

After the post is set and plumbed, the hole in the portion of the post in solid rock shall be filled with Grout Type 4. The grout shall be thoroughly worked into the hole so as to leave no voids.

The tenth paragraph is revised to read:

Where the new fence joins an existing fence, the 2 shall be attached in a manner satisfactory to the Project Engineer, and end or corner posts shall be set as necessary.

The eleventh paragraph is deleted.

8-12.5 Payment

The paragraph following the item “Chain Link Fence Type ____”, per linear foot is revised to read:

The unit Contract price per linear foot for “Chain Link Fence Type ___” shall be full payment for all costs for the specified Work including brace post installation and all other requirements of Section 8-12 for Chain Link Fence, unless covered in a separate Bid Item in this Section.

The following paragraph is inserted after the item “End, Gate, Corner, and Pull Post for Chain Link Fence”, per each:

The unit Contract price per each for “End, Gate, Corner, and Pull Post for Chain Link Fence” shall be full payment for all costs for the specified Work.

The following paragraph is inserted after the item “Single 6 Ft. Chain Link Gate”, per each:

> The unit Contract price per each for “Double 14 Ft. Chain Link Gate”, “Double 20 Ft. Chain Link Gate”, and “Single 6 Ft. Chain Link Gate”, shall be full payment for all costs for the specified Work.

The paragraph following the item “Wire Fence Type ____”, per linear foot is revised to read

> The unit Contract price per each for “Wire Fence Type ____” shall be full payment for all costs for the specified Work including payment for clearing of the fence line.

The following paragraph is inserted after the item “Double Wire Gate 20 Ft. Wide”, per each:

> The unit contract price per each for “Single Wire Gate 14 Ft. Wide” and “Double Wire Gate 20 Ft. Wide” shall be full payment for all costs for the specified Work.

The paragraph following the item “Access Control Gate”, per each is revised to read:

> The unit contract price per each for “Access Control Gate” shall be full payment for all costs to perform the specified Work.

8-15.AP8

Section 8-15, Riprap
April 2, 2012

8-15.1 Description

The second paragraph is revised to read:

> Riprap will be classified as heavy loose riprap, light loose riprap, and hand placed riprap.

8-20.AP8

Section 8-20, Illumination, Traffic Signal Systems, And Electrical
January 2, 2012

8-20.3(9) Bonding, Grounding

The first sentence in the second paragraph is replaced with the following two sentences:

> All conduit installed shall have an equipment ground conductor installed in addition to the conductors noted in the Contract. Conduit with innerducts shall have an equipment ground conductor installed in each innerduct that has an electrical conductor.

8-21.AP8

Section 8-21, Permanent Signing
April 2, 2012

8-21.2 Materials

The third sentence is revised to read:

> Materials for sign mounting shall conform to Section 9-28.11.

8-21.3(9)A Fabrication of Steel Structures

The first sentence in the first paragraph is revised to read:

> Fabrication shall conform to the applicable requirements of Section 6-03 and 9-06.

This section is supplemented with the following:

> All fabrication, including repairs, adjustments or modifications of previously fabricated sign structure members and connection elements, shall be performed in the shop, under an Engineer approved shop drawing prepared and submitted by the Contractor for the original fabrication or the specific repair, adjustment or modification. Sign structure fabrication repair, adjustment or modification of any kind in the field is not permitted. If fabrication repair, adjustment or modification occurs after a sign structure member or connection element has been galvanized, the entire member or element shall be re-galvanized in accordance with AASHTO M 111.

8-21.3(9)B Vacant

This section including title is revised to read:

> ### 8-21.3(9)B Erection of Steel Structures
>
> Erection shall conform to the applicable requirements of Sections 6-03 and 8-21.3(9)F. Section 8-21.3(9)F notwithstanding, the Contractor may erect a sign bridge prior to completion of the shaft cap portion of one foundation for one post provided the following conditions are satisfied:
>
> 1. The Contractor shall submit design calculations and working drawings of the temporary supports and falsework supporting the sign bridge near the location of the incomplete foundation to the Engineer for approval in accordance with Section 6-01.9. The submittal shall include the method of releasing and removing the temporary supports and falsework without inducing loads and stress into the sign bridge.
>
> 2. The Contractor shall submit the method used to secure the anchor bolt array in proper position with the sign bridge while casting the shaft cap concrete to complete the foundation.
>
> 3. The Contractor shall erect the sign bridge and temporary supports and falsework, complete the remaining portion of the incomplete foundation, and remove the temporary supports and falsework, in accordance with the working drawing submittals as approved by the Engineer.

8-21.3(9)F Foundations

The eighth paragraph is replaced with the following three new paragraphs:

> After construction of concrete foundations for sign bridge and cantilever sign structures, the Contractor shall survey the foundation locations and elevations, the anchor bolt array locations and lengths of exposed threads. The Contractor shall confirm that the survey conforms to the sign structure post, beam, span and foundation design geometry shown in the Plans, and shall identify any deviations from the design geometry shown in the Plans. When deviations are identified, the Contractor shall notify the Engineer, and

such notice shall be accompanied by the Contractor's proposed method(s) of addressing the deviations, including removal and reconstruction of the shaft cap portion of the affected concrete foundation as outlined in this Section, or fabrication repair, adjustment or modification, with associated shop drawings, in accordance with Section 8-21.3(9)A.

If the Contractor's survey indicates that a concrete foundation has been constructed incorrectly for a sign structure that has already been fabricated, the Contractor may remove and reconstruct the shaft cap portion of the foundation, in accordance with Section 1-07.13, provided the following conditions are satisfied:

1. The Contractor shall submit the method and equipment to be used to remove the portion of the concrete foundation to be removed and reconstructed to the Engineer for approval in accordance with Section 1-05.3. The submittal shall include confirmation that the equipment and the method of operation is appropriate to ensure that the existing anchor bolt array and primary shaft vertical steel reinforcing bars will not be damaged.

2. All steel reinforcing bars, except for steel reinforcing bars extending from the bottom portion of the foundation to remain, shall be removed and disposed of in accordance with Sections 2-02.3 and 2-03.3(7)C, and shall be replaced with new steel reinforcing bars conforming to the size, dimensions and geometry shown in the Plans. All concrete of the removed portion of the foundation shall be removed and disposed of in accordance with Sections 2-02.3 and 2-03.3(7)C.

3. The Contractor shall adjust the primary shaft vertical steel reinforcing bars as necessary in accordance with Section 6-02.3(24)C to provide clearance for the anchor bolt array.

Sign structures shall not be erected on concrete foundations until the Contractor confirms that the foundations and the fabricated sign structures are either compatible with each other and the design geometry shown in the Plans, or have been modified in accordance with this Section and as approved by the Engineer to be compatible with each other, and the foundations have attained a compressive strength of 2,400-psi.

8-21.5 Payment

This section is supplemented with the following:

All costs in connection with surveying completed concrete foundations for sign bridges and cantilever sign structures shall be included in the lump sum contract price for "Structure Surveying", except that when no Bid item is included in the Proposal for "Structure Surveying" then such costs shall be included in the lump sum contract price(s) for "Sign Bridge No. ___" and "Cantilever Sign Structure No. ___".

8-25.AP8

Section 8-25, Glare Screen
April 9, 2012

In this section, "tension cable" and "cable" are deleted.

8-25.3(3) Posts

The first sentence in the first paragraph is revised to read:

> Posts shall be constructed in accordance with the Standard Plans and applicable provisions of Section 8-12.3(1)A.

The last paragraph is revised to read:

> All round posts for Type 1 Design B and Type 2 glare screen shall be fitted with a watertight top securely fastened to the post. Line posts shall have tops designed to carry the top tension wire.

8-25.3(5) Tension Cables

This sections content including title is deleted:

8-25.3(6) Fittings, Attachments, and Hardware

This sections content including title is deleted.

9-03.AP9

Section 9-03, Aggregates
April 2, 2012

9-03.14(1) Gravel Borrow

Note [1] is deleted, including the reference in the table.

9-03.14(2) Select Borrow

Note [1] is deleted.

Note [2] is re-numbered Note [1], including the reference in the table.

9-03.14(4) Gravel Borrow for Geosynthetic Retaining Wall

This section is revised to read:

> All backfill material for geosynthetic retaining walls shall consist of granular material, either naturally occurring or processed, and shall be free draining, free from organic or otherwise deleterious material. The material shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The backfill material shall meet the following requirements for grading and quality:

Sieve Size	Percent Passing
1 ¼ “ [1]	99-100
1”	90-100
No. 4	50-80
No. 40	30 max.
No. 200	7.0 max.
Sand Equivalent	50 min.

All percentages are by weight

Property	Test Method	Allowable Test Value
Los Angeles Wear 500 rev.	AASHTO T 96	35 percent max.
Degradation Factor	WSDOT Test Method 113	15 min.
pH, permanent walls	AASHTO T 289	4.5-9
pH, temporary walls	AASHTO T 289	3-10

Wall backfill material satisfying these grading and property requirements shall be classified as nonaggressive.

9-03.21(1) General Requirements

The first sentence in the first paragraph is revised to read:

Hot Mix Asphalt, Concrete Rubble, Recycled Glass (glass cullet), and Steel Furnace Slag may be used as, or blended uniformly with naturally occurring materials for aggregates.

9-03.21(1)C Vacant

This section including title is revised to read:

9-03.21(1)C Recycled Glass (Glass Cullet)

Glass Cullet shall meet the requirements of AASHTO M 318 with the additional requirement that the glass cullet is limited to the maximum amounts set in Section 9-03.21(1)E for recycled glass. Prior to use the Contractor shall provide certification to the Project Engineer that the recycled glass meets the physical properties and deleterious substances requirements in AASHTO M-318.

9-03.21(1) E Table on Maximum Allowable Percent (By Weight) of Recycled Material

The column heading “Recycled Glass” is revised to read “Recycled Glass (Glass Cullet) in the table.

In the column “Recycled Glass (Glass Cullet)” all amounts are revised to read “20” beginning with the item “Ballast” and continuing down until the last item in the table.

9-04.AP9

Section 9-04, Joint And Crack Sealing Materials
January 2, 2012

9-04.2 Joint Sealants

This section is supplemented with the following new sub-sections:

9-04.2(3) Polyurethane Sealant

Polyurethane sealant shall conform to ASTM C 920 Type S Grade NS Class 25 Use M.

Polyurethane sealant shall be compatible with the closed cell foam backer rod. When required, compatibility characteristics of sealants in contact with backer rods shall be determined by Test Method ASTM C 1087.

9-04.2(3)A Closed Cell Foam Backer Rod

Closed cell foam backer rod for use with polyurethane sealant shall conform to ASTM C 1330 Type C.

9-06.AP9

Section 9-06, Structural Steel and Related Materials
April 2, 2012

9-06.5(3) High Strength Bolts

In this section, “AASHTO M 291” is revised to read “ASTM A 563”.

9-10.AP9

Section 9-10, Piling
April 2, 2012

9-10.4 Steel Pile Tips and Shoes

In the first paragraph “ASTMA A 148 Grade 60-90” is revised to read “ASTMA A 148 Grade 90-60”.

9-14.AP9

Section 9-14, Erosion Control and Roadside Planting
April 2, 2012

9-14.3 Fertilizer

The second sentence in the first paragraph is revised to read:

It may be separate or in a mixture containing the percentage of total nitrogen, available phosphoric acid, and water-soluble potash or sulfur in the amounts specified.

9-14.4(2) Hydraulically Applied Erosion Control Products (HECPs)

The fourth row in Table 1 is revised to read:

Heavy Metals	EPA 6020A Total Metals	Antimony – < 4 mg/kg Arsenic – < 6 mg/kg Barium – < 80 mg/kg Boron – < 160 mg/kg Cadmium – < 2 mg/kg Total Chromium – < 4 mg/kg Copper – < 10 mg/kg Lead – < 5 mg/kg Mercury – < 2 mg/kg Nickel – < 2 mg/kg Selenium – < 10 mg/kg Strontium – < 30 mg/kg Zinc – < 30 mg/kg

9-14.4(2)A Long Term Mulch

In the first paragraph, the phrase “within 2 hours of application” is deleted.

9-14.4(4) Wood Strand Mulch

The last sentence in the second paragraph is deleted.

This section is supplemented with the following new paragraph:

The Contractor shall provide Material Safety Data Sheet (MSDS) that demonstrates that the product is not harmful to plant life and a test report performed in accordance with WSDOT Test Method 125 demonstrating compliance to this specification prior to acceptance.

9-14.4(8) Compost

The second paragraph is revised to read:

Compost production and quality shall comply with WAC 173-350 and for biosolids composts, WAC 173-308.

The third paragraph is to read:

Compost products shall meet the following physical criteria:

1. Compost material shall be tested in accordance with U.S. Composting Council Testing Methods for the Examination of Compost and Composting (TMECC) 02.02-B, “Sample Sieving for Aggregate Size Classification”.

Fine compost shall meet the following gradation:

Sieve Size	Percent Passing	
	Minimum	Maximum
1”	100	
5/8”	90	100
¼”	75	100

Note Maximum particle length of 4 inches.

Medium compost shall meet the following gradation:

Sieve Size	Percent Passing	
	Minimum	Maximum
1”	100	
5/8”	85	100
¼”	70	85

Note Maximum particle length of 4 inches. Medium compost shall have a carbon to nitrogen ration (C:N) between 18:1 and 35:1. The carbon to nitrogen ration shall be calculated using dry weight of “Organic Carbon” using TMECC 04.01A divided by the dry weight of “Total N” using TMECC 04.02D.

Coarse compost shall meet the following gradation:

Sieve Size	Percent Passing	
	Minimum	Maximum
2”	100	
1”	90	100

¾”	70	100
¼”	40	60

Note Maximum particle length of 6 inches. Coarse compost shall have a carbon to nitrogen ratio (C:N) between 25:1 and 35:1. The carbon to nitrogen ratio shall be calculated using the dry weight of “Organic Carbon” using TMECC 04.01A divided by the dry weight of “Total N” using TMECC 04.02D.

2. The pH shall be between 6.0 and 8.5 when tested in accordance with U.S. Composting Council TMECC 04.11-A, “1:5 Slurry pH”.

3. Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1 percent by weight as determined by U.S. Composting Council TMECC 03.08-A “Classification of Inerts by Sieve Size”.

4. Minimum organic matter shall be 40 percent by dry weight basis as determined by U.S. Composting Council TMECC 05.07A “Loss-On-Ignition Organic Matter Method (LOI)”.

5. Soluble salt contents shall be less than 4.0 mmhos/cm when tested in accordance with U.S. Composting Council TMECC 04.10 “Electrical Conductivity.”

6. Maturity shall be greater than 80 percent in accordance with U.S. Composting Council TMECC 05.05-A, “Germination and Root Elongation”.

7. Stability shall be 7-mg CO2–C/g OM/day or below in accordance with U.S. Composting Council TMECC 05.08-B “Carbon Dioxide Evolution Rate”.

8. The compost product shall originate from organic waste as defined in WAC 173 350 as “Type 1 Feedstocks”, “Type 2 Feedstocks”, and/or “Type 3 Feedstocks”. The Contractor shall provide a list of feedstock sources by percentage in the final compost product.

9. The Engineer may also evaluate compost for maturity using U.S. Composting Council TMECC 05.08-E “Solvita® Maturity Index”. Fine compost shall score a number 6 or above on the Solvita® Compost Maturity Test. Medium and coarse compost shall score a 5 or above on the Solvita® Compost Maturity Test.

9-14.4(8)A Compost Approval

This section’s title is revised to read:

9-14.4(8)A Compost Submittal Requirements

The first sentence in this section up until the colon is revised to read:

The Contractor shall submit the following information to the Engineer for approval:

Item No. 2 in the first paragraph is revised to read:

2. A copy of the Solid Waste Handling Permit issued to the manufacturer by the Jurisdictional Health Department in accordance with WAC 173-350 (Minimum Functional Standards for Solid Waste Handling) or for biosolid composts a copy of the Coverage Under the General Permit for Biosolids Management issued to the manufacturer by the Department of Ecology in accordance with WAC 173-308 (Biosolids Management).

9-14.5(2) Erosion Control Blanket

The second sentence in the first paragraph is revised to read:

The Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP) meeting the following requirements in Tables 6 and 7:

9-14.5(4) Geotextile Encased Check Dam

This section including title is revised to read:

9-14.5(4) Check Dams

All materials used for check dams shall be non-toxic and not pose a threat to wildlife when installed.

This section is supplemented with the following new sub-sections:

9-14.5(4)A Biodegradable Check Dams

Biodegradable check dams shall meet the following requirements:

Biodegradable Check Dams	Materials
Wattle Check Dam	9-14.5(5)
Compost Sock Check Dam	9-14.5(6)
Coir Log Check Dam	9-14.5(7)

The Contractor may substitute a different biodegradable check dam as long as it complies with the following and is approved by the Engineer:

1. Made of natural plant fiber.

2. Netting if present shall be biodegradable.

9-14.5(4)B Non-biodegradable Check Dams

Non-biodegradable check dams shall meet the following requirements:

1. Geotextile materials shall conform to section 9-33 for silt fence.

2. Other such devices that fulfill the requirements of section 9-14.5(4) and shall be approved by the Engineer prior to installation.

9-14.6(1) Description

In item No. C in the fourth paragraph, “22-inch” is revised to read “2-inch”.

9-16.AP9

Section 9-16, Fence and Guardrail
April 2, 2012

9-16.1(1)A Post Material for Chain Link Fence

The last sentence in the last paragraph is deleted.

9-16.1(1)C Tension Wire and Tension Cable

This section including title is revised to read:

> ### 9-16.1(1)C Tension Wire
>
> Tension wire shall meet the requirements of AASHTO M 181. Tension wire galvanizing shall be Class 1.

9-16.1(1)D Fittings and Hardware

The last paragraph is deleted.

9-16.1(2) Approval

This section is deleted.

9-16.6(3) Posts

This section is revised to read:

> Line posts for Types 1 and 2 glare screens shall be 2 inch inside diameter galvanized steel pipe with a nominal weight of 3.65 pounds per linear foot. End, corner, brace, and pull posts for Type 1 Design A and B and Type 2 shall be 2 ½ inch inside diameter galvanized steel pipe with a nominal weight of 5.79 pounds per linear foot. Intermediate pull posts (braced line posts) shall be as specified for line posts.
>
> The base material for the manufacture of steel pipes used for posts shall conform to the requirements of ASTM A 53, except the weight tolerance on tubular posts shall be applied as provided below.
>
> Posts provided for glare screen will have an acceptance tolerance on the weight per linear foot, as specified, equal to plus or minus 5 percent. This tolerance will apply to each individual post.
>
> All posts shall be galvanized in accordance with AASHTO M 181 Section 32. The minimum average zinc coating is per square foot of surface area. This area is defined as the total area inside and outside. A sample for computing the average of mass of coating is defined as a 12-inch piece cut from each end of the galvanized member.

9-16.6(5) Cable

This section including title is revised to read:

> ### 9-16.6(5) Vacant

9-16.6(6) Cable and Tension Wire Attachments

This section including title is revised to read:

9-16.6(6) Tension Wire Attachments

All tension wire attachments shall be galvanized steel conforming to the requirements of AASHTO M 232 unless otherwise specified. Eye bolts shall have either a shoulder or a back-up nut on the eye end and be provided with an eye nut where needed or standard hex nut and lock washer ⅜-inch diameter for tension wire and of sufficient length to fasten to the type of posts used. Turnbuckles shall be of the shackle end type, ½ inch diameter, with standard take-up of 6 inches and provided with ⅜ inch diameter pins.

9-16.6(9) Fabric Bands and Stretcher Bars

The first paragraph is revised to read:

Fabric bands shall be ⅛ inch by 1inch nominal. Stretcher bars shall be $^{3}/_{16}$ inch by ¾ inch nominal or $^{5}/_{16}$ inch diameter round bar nominal. A $^{5}/_{16}$ inch diameter round stretcher bar shall be used with Type 1. Nominal shall be construed to be the area of the cross section of the shape obtained by multiplying the specified width by thickness. A variation of minus 5-percent from this theoretical area shall be construed as “nominal” size. All shall be galvanized to meet the requirements of ASTM F 626.

9-20.AP9

Section 9-20, Concrete Patching Material, Grout, and Mortar
January 2, 2012

9-20.3(3) Grout Type 3 for Unconfined Bearing Pad Applications

This section is revised to read:

Grout Type 3 shall be a prepackaged material meeting the requirements of ASTM C 928 – Table 1, R2 Concrete or Mortar.

9-20.3(4) Grout Type 4 for Multipurpose Applications

In the third sentence of the first paragraph, the reference “0.40” is revised to read “0.45”.

9-23.AP9

Section 9-23, Concrete Curing Materials and Admixtures
April 2, 2012

9-23.2 Liquid Membrane-Forming Concrete Curing Compounds

In the first paragraph, “moisture loss” is revised to read “water retention”.

9-29.AP9

Section 9-29, Illumination, Signal, Electrical
April 2, 2012

9-29.10(2) Decorative Luminaries

The second sentence in the third paragraph is deleted.

9-29.25 Amplifier, Transformer, and Terminal Cabinets

In item No. 2.C., “Transformer 23.1 to 12.5 KVA” is revised to read “Transformer 3.1 to 12.5 KVA”.

9-34.AP9

Section 9-34, Permanent Marking Material
April 2, 2012

9-34.2 Paint

The second paragraph is revised to read:

> Blue and black paint shall comply with the requirements for yellow paint in Section 9-34.2(4) and Section 9-34.2(5), with the exception that blue and black paints do not need to meet the requirements for titanium dioxide, directional reflectance, and contrast ration.

INTRO.GR1

SPECIAL PROVISIONS

The following Special Provisions are made a part of this contract and supersede any conflicting provisions of the 2012 Standard Specifications for Road, Bridge and Municipal Construction, and the foregoing Amendments to the Standard Specifications.

Several types of Special Provisions are included in this contract; General, Region, Bridges and Structures, and Project Specific. Special Provisions types are differentiated as follows:

(date)	General Special Provision
(******)	Notes a revision to a General Special Provision and also notes a Project Specific Special Provision.
(Regions[1] date)	Region Special Provision
(BSP date)	Bridges and Structures Special Provision

General Special Provisions are similar to Standard Specifications in that they typically apply to many projects, usually in more than one Region. Usually, the only difference from one project to another is the inclusion of variable project data, inserted as a "fill-in".

Region Special Provisions are commonly applicable within the designated Region. Region designations are as follows:

Regions[1]	
ER	Eastern Region
NCR	North Central Region
NWR	Northwest Region
OR	Olympic Region
SCR	South Central Region
SWR	Southwest Region
WSF	Washington State Ferries Division

Bridges and Structures Special Provisions are similar to Standard Specifications in that they typically apply to many projects, usually in more than one Region. Usually, the only difference from one project to another is the inclusion of variable project data, inserted as a "fill-in".

Project Specific Special Provisions normally appear only in the contract for which they were developed.

DIVISION1.GR1

Division 1
General Requirements

DESWORK.GR1

DESCRIPTION OF WORK

DESWORK1.FR1
(March 13, 1995)

This Contract provides for the improvement of *** $$1$$ *** and other work, all in accordance with the attached Contract Plans, these Contract Provisions, and the Standard Specifications.

DESWORK2.FB1
(December 1, 2008)
This contract provides for the improvement of *** $$1$$, *** by cleaning and painting the metal surfaces of the following *** $$2$$ *** and other work, all in accordance with the Contract Provisions and Standard Specifications.

Highway & Bridge	Location	Structure	Surface Area

*** $$3$$ ***

The surface area of structural steel to be painted as specified above is approximate and is intended for use as a guide in determining the amount of preparation and paint involved.

1-02.GR1
Bid Procedures and Conditions

1-02.4.GR1
Examination of Plans, Specifications and Site of Work

1-02.4.INST1.GR1
Section 1-02.4 is supplemented with the following:

1-02.4.OPT1.FR1
(January 2, 2012)
The soils information used for study and design of this project is available for review by the bidder at the following location:

*** $$1$$ ***

The soils information includes the following:

*** $$2$$ ***

1-02.6.GR1
Preparation of Proposal

1-02.6.INST1.GR1
Section 1-02.6 is supplemented with the following:

1-02.6.OPT1.FR1
(March 13, 1995)
Alternative Bids
The bidding proposal on this project permits the bidder to submit a bid on one or more alternatives for the construction *** $$1$$ ***.

Bid Proposal
The bid proposal is composed of the following parts: Base Bid and Alternatives *** $$2$$ *** i.e. A1, A2, etc.

The base bid includes all items that do not change as to quantity, dimension, or type of construction, regardless of which alternative is bid.

The Alternative portions of the bid proposal contain all items which change as to quantity, dimension, or construction method, depending on which alternative is bid.

Alternative A1
Alternative A1 is based on constructing the *** $$3$$ ***.

The bid items for Alternative A1 are as listed in the bid proposal.

Alternative A2
Alternative A2 is based on constructing the *** $$4$$ ***.

The bid items for Alternative A2 are as listed in the bid proposal.

Bidding Procedures
The bidder shall submit a price on each and every item of work included in the base bid. The bidder shall also submit prices on each and every item under the alternative on which the bidder chooses to bid, or, if the bidder chooses to bid on more than one alternative, the bidder shall submit prices for each and every item under each alternative chosen.

The successful bidder will be determined by the lowest total of an alternative plus the base bid. Award will be based on the lowest total subject to the requirements of Section 1-03.

1-02.6.OPT2.FR1
(August 7, 2006)
Cumulative Alternates Bidding
This Bid Proposal requires the bidder to bid cumulative Alternates as part of the bid. As such the bidder is required to submit a Base Bid and a bid for each of the cumulative Alternate(s) A1, A2, A3, (etcetera.)

Bid Proposal
The bid proposal is composed of the following parts:

1. Base Bid
   The base bid shall include constructing all items included in the proposal *except* those items contained in the Alternate(s) A1, A2, A3, (etcetera.)

2. Alternate(s) A1, A2, A3, (etcetera)

   a. Alternate A1
      Based on constructing (*** $$1$$ ***)
      The bid items for Alternate A1 are as listed in the bid proposal.

b. Alternate A2
Based on constructing (*** $$2$$ ***)
The bid items for Alternate A2 are as listed in the bid proposal.

c. Alternate A3
Based on constructing (*** $$3$$ ***)
The bid items for Alternate A3 are as listed in the bid proposal.

Bidding Procedures
To be considered responsive the bidder shall submit a price on each and every item of work included in the Base Bid and all Alternate(s.)

Award Procedures
The successful bidder will be the bidder submitting the lowest responsible bid for the preference, listed in the order below, which is within the amount of Available Funds for the project to be announced at the time of the bid opening. Available Funds will be announced immediately prior to the opening of bids.

1. Preference 1: Lowest total for (Base Bid plus Alternate A1 plus Alternate A2 plus Alternate A3, plus (etcetera))

2. Preference 2: Lowest total for (Base Bid plus Alternate A1 plus Alternate A2 plus Alternate A3,)

3. Preference 3: Lowest total for (Base Bid plus Alternate A1 plus Alternate A2.)

4. Preference 4: Lowest total for Base Bid plus Alternate A1.

5. Preference 5: Lowest total for Base Bid.

In any case, the award will be subject to the requirements of Section 1-03.

1-02.6.OPT3.FR1
(August 7, 2006)
Progress Schedule Minimum Bid
A minimum bid of *** $$1$$ *** lump sum has been established for the item “Type *** $$2$$ *** Progress Schedule.” The Contractor’s bid shall equal or exceed that amount. If the Contractor’s bid is less than the minimum specified amount, the Contracting Agency will unilaterally revise the bid amount to the minimum specified amount and recalculate the Contractor’s total bid amount. The corrected total bid amount will be used by the Contracting Agency for award purposes and to fix the amount of the contract bond.

1-02.6.OPT4.FR1
(December 1, 2008)
A minimum bid of *** $$1$$ *** per each has been established for the item “Schedule Update.” The Contractor’s bid shall equal or exceed that amount. If the Contractor’s bid is less than the minimum specified amount, the Contracting Agency will unilaterally revise the bid amount to the minimum specified amount and recalculate the Contractor’s

total bid amount. The corrected total bid amount will be used by the Contracting Agency for award purposes and to fix the amount of the contract bond.

1-02.6.OPT5.GR1
(August 2, 2004)
The fifth and sixth paragraphs of Section 1-02.6 are deleted.

1-02.6.INST2.GR1
The fourth paragraph of Section 1-02.6 is revised to read:

1-02.6.OPT10.GR1
(May 7, 2012)
The Bidder shall submit with the Bid a completed Disadvantaged Business Enterprise (DBE) Utilization Certification, when required by the Special Provisions. For each and every DBE firm listed on the Bidder's completed Disadvantaged Business Enterprise Utilization Certification, the Bidder shall submit written confirmation from that DBE firm that the DBE is in agreement with the DBE participation commitment that the Bidder has made in the Bidder's completed Disadvantaged Business Enterprise Utilization Certification. WSDOT Form 422 031 EF (Disadvantaged Business Enterprise Written Confirmation Document) is to be used for this purpose.

Bidder must submit good faith effort documentation only in the event the bidder's efforts to solicit sufficient DBE participation have been unsuccessful. Directions for delivery of the Disadvantaged Business Enterprise Written Confirmation Documents and Disadvantaged Business Enterprise Good Faith Effort documentation are included in Sections 1-02.9.

1-02.9.GR1
Delivery of Proposal

1-02.9.INST1.GR1
Section 1-02.9 is revised to read:

1-02.9.OPT1.GR1
(May 7, 2012)
For projects scheduled for bid opening in Olympia, each Proposal shall be sealed and submitted in the envelope provided with it, or electronically via Trns·Port Expedite® software and BidExpress® at the location and time identified in Section 1-02.12. The Bidder shall fill in all blanks on this envelope to ensure proper handling and delivery.

For projects scheduled for bid opening in other locations, each Proposal shall be sealed and submitted in the envelope provided with it, at the location and time identified in Section 1-02.12. The Bidder shall fill in all blanks on this envelope to ensure proper handling and delivery.

The Contracting Agency will not consider Proposals it receives after the time specified for receipt of Proposals under Deadline for Receipt of Proposals.

Deadline for Receipt of Proposal
Sealed Bids shall be received no later than 11:00:59 am Pacific Time on the date given in special provision Date of Opening Bids. Bids that are received on time will be publicly

opened and read as specified in Section 1-02.12. The Contracting Agency will not open or consider any Proposal or Supplement to a Proposal, other than those Supplements identified below under the heading, Deadline for Receipt of DBE Written Confirmation Document(s), that are received after the time of 11:00:59 am Pacific Time.

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Electronic Bidding Documents:

Certain documents CANNOT be submitted electronically via Trns Port Expedite® software and BidExpress®. These documents include:

1. DBE Written Confirmation Documents;

2. Good Faith Effort Documentation;

3. Proposal Deposit such as, cash, certified checks, cashier's checks, or a proposal bond (Surety Bond) in formats other than via Surety2000.com or Insurevision.com.

The Proposal Deposit is a responsive document required with Bid Proposal. When the Bid Proposal is submitted electronically through via Trns·Port Expedite® software and BidExpress®, the Proposal shall be submitted as a supplement to the Bidders electronic Bid Proposal as follows:

The Proposal Deposit supplement shall be submitted physically in a sealed envelope marked as "BID SUPPLEMENT" and bearing the Bidders company name, project title, Bid date, and description of contents prior to the 11:00:59 am Deadline for Receipt of Proposal.

The DBE Written Confirmation Documents and/or Good Faith Effort Documents are not required documents with Proposal (refer to Deadline for Receipt of Disadvantaged Business Enterprise (DBE) Written Confirmation Document(s) and/or Good Faith Effort (GFE)). These documents can be submitted as follows:

1. In an envelope bearing the Bidders company name, project title, Bid date, and description of contents or;
2. They may be submitted by facsimile to the following FAX number (360) 705 6966.

Note: E-mails submittals are not acceptable. The Contracting Agency is not responsible for delayed, partial, failed, illegible or partially legible FAX document transmissions, and such documents may be rejected as incomplete at the Bidder's risk.

Deadline for Receipt of Disadvantaged Business Enterprise (DBE) Written Confirmation Document(s) and/or Good Faith Effort (GFE)

To be considered responsive, the Bidders shall submit Written Confirmation Documentation from each DBE firm listed on the Bidder's completed DBE Utilization Certification, form 272-056 EF, and/or Good Faith Effort (GFE) as required by Section 1-02.6. The DBE Written Confirmation Document(s) and/or Good Faith Effort (GFE) (if any) shall be received either with the sealed Bid Proposal at the time described above in Deadline for Receipt of Proposal or as a Supplement to the sealed Bid no later than 48 hours (not including Saturdays, Sundays and Holidays) after the time given above in

Deadline for Receipt of Proposal at the location identified in the Special Provision Date of Opening Bids.

Note: The only documents that can be accepted after the 11:00:59 am time for Deadline for Receipt of Proposal are the Written Confirmation Documentation and/or Good Faith Effort (GFE). Incomplete or inaccurate documents will be rejected.

1-02.12.GR1

Public Opening of Proposals

1-02.12.INST1.GR1

Section 1-02.12 is supplemented with the following:

1-02.12.OPT1.GR1

(July 11, 2011)

Date of Opening Bids

Sealed bids are to be received at one of the following locations prior to the time Specified:

1. At Post Office Box 47360, Olympia, Washington 98504-7360 until 11:00:59 A.M. of the bid opening date. The Department of Transportation will consider notification of bid receipt by the Post Office as the actual receipt of the bid.

2. In the Department of Transportation Bid Room (SA19), located at the Transportation Building, 310 Maple Park Avenue SE, Room SA19, Olympia WA 98501-2361, until 11:00:59 A.M. of the bid opening date. Bids delivered in person will be received only in the Bid Room SA19 on the bid opening date.

3. Electronically via, Trns Port Expedite software and BidExpress until 11:00:59 am Pacific time. Bids delivered in person or electronically via Trns Port Expedite software and BidExpress will be received only in the Bid Room on the bid opening date.

The bid opening date for this project is _____. Bids received will be publicly opened and read after 11:00:59 A. M. Pacific Time on this date.

1-02.INST1.GR1

Section 1-02 is supplemented with the following:

1-02.OPT1.GR1

(April 5, 2004)

Protest Procedures

Form and Substance

All protests regarding any contents or portion of the bid proposal must be submitted to the Contracting Agency as soon as possible after the protestant becomes aware of the reason(s) for the protest. All protests must be in writing and signed by the protestant or an authorized agent. Such writing must state all facts and arguments on which the protestant is relying as the basis for its action. Such protestant shall also attach, or supply on demand by the Contracting Agency, any relevant exhibits

referenced in the writing. Copies of all protests and exhibits shall be mailed or delivered by the protestant to the bidder against whom the protest is made (if any) at the same time such protest and exhibits are submitted to the Contracting Agency. All protests shall be directed to:

Washington State Department of Transportation
Attn: Manager, Contract Ad & Award
PO Box 47360
Olympia, Washington 98504-7360
Phone: (360) 705-7017
Fax: (360) 705-6810

Pre-award Protests

To allow sufficient response time, all pre-award protests must be received by the contracting agency no later than 5:00 p.m. of the second business day after the bid opening date. If the protest is mailed after the bid opening date and before the pre-award protest deadline, the protestant shall immediately notify WSDOT's Manager, Contract Ad & Award by telephone, or some other means of rapid communication, that a protest has been made.

The Contracting Agency shall consider all the facts available to it, and issue a decision in writing within five (5) business days after receipt of the protest, unless, in the Contracting Agency's sole discretion, more time is needed. The protestant and the bidder(s) against whom the protest is made will be notified if additional time is necessary; and if the additional time required affects the bid opening date or the award date, all bidders shall be notified.

The Contracting Agency's decision shall be final and conclusive. Selection of the successful bidder, if one is to be made, will be postponed until after the Contracting Agency has issued its decision. The Contracting Agency shall provide the protestant with written notice of this decision no later than two full working days prior to execution of the contract.

Post-award Protests

The Contracting Agency shall immediately notify all unsuccessful bidders of the Contracting Agency's award decision. Any decision made by the Contracting Agency regarding the award and execution of the contract or bid rejection shall be conclusive subject to the scope of the judicial review permitted under Washington Law. Such review, if any, shall be timely filed in the Superior Court of Thurston County, Washington.

Protests which do not comply with the above-specified procedures will not be considered.

1-03.GR1

Award and Execution of Contract

1-03.2.GR1

Award of Contract

1-03.2.INST1.GR1
The first sentence of Section 1-03.2 is revised to read:

1-03.2.OPT1.GR1
(April 7, 2008)
It is the Contracting Agency's intent to award the contract within 24 hours of the bid opening.

1-03.2.INST2.GR1
Section 1-03.2 is supplemented with the following:

1-03.2.OPT7.FR1
(April 7, 2008)
The contract will be awarded on the basis of the total of all bid items (Contract Total). After the award, the Contracting Agency has the option of deleting work associated with the construction of *** $$1$$ ***. This work is represented by the bid items found in the column(s) headed GROUP(S) *** $$2$$, *** on the Summary of Quantities. The deletion of this work will be documented by a change order. The change order will not be subject to protest or negotiation. The amount of the change order price reduction shall be the sum of the amounts bid for all items within the GROUP(s).

Should the Contracting Agency exercise the option to delete the work in one or more of the GROUPS listed above and shown on the Summary of Quantities, then Section 1-09.5 will not apply to the items that are deleted.

1-03.3.GR1
Execution Of Contract

1-03.3.INST1.GR1
Section 1-03.3 is supplemented with the following:

1-03.3.OPT1.GR1
(March 13, 1995)
Escrow Bid Documentation

Scope and Purpose
The purpose of this specification is to preserve the Contractor's bid documents for use by the State in any litigation between the State and Contractor arising out of this contract.

The Contractor shall submit a legible copy of all documentation used to prepare the bid for this contract to a banking institution designated by the State. Such documentation shall be placed in escrow with the banking institution and preserved by that institution as specified in the following sections of this specification.

Bid Documentation
The term "bid documentation" as used in this specification means any writings, working papers, computer printouts, charts, and any other data compilations which contain or reflect all information, data, and calculations used by the Contractor to determine the bid in bidding for this project. The term "bid documentation" includes but is not limited to Contractor equipment rates, Contractor overhead rates, labor rates, efficiency or productivity factors, arithmetic extensions, and quotations from

Subcontractors and materialmen to the extent that such rates and quotations were used by the Contractor in formulating and determining the amount of the bid. The term "bid documentation" also includes any manuals which are standard to the industry used by the Contractor in determining the bid for this project. Such manuals may be included in the bid documentation by reference. The term does not include bid documents provided by the State for use by the Contractor in bidding on this project.

Submittal of Bid Documentation

The Contractor shall submit the bid documentation to the banking institution. The bid documentation shall be submitted to the banking institution within seven calendar days after the contract for this project has been executed by the State. The bid documentation shall be submitted in a sealed container. The container shall be clearly marked "Bid Documentation" and shall also show on the face of the container the Contractor's name, the date of submittal, the project title, and the contract number.

Affidavit

The sealed container shall contain, in addition to the bid documentation, an affidavit signed under oath by an individual authorized by the Contractor to execute bidding proposals. The affidavit shall list each bid document with sufficient specificity so a comparison can be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed in the sealed container. The affidavit shall show that the affiant has personally examined the bid documentation and that the affidavit lists all of the documents used by the Contractor to determine the bid for this project and that all such bid documentation has been enclosed in the sealed container.

Verification

The banking institution upon receipt of the sealed container shall place the container in a safety deposit box, vault, or other secure place, and immediately notify the State in writing that the container has been received. Upon receipt of such notice, the State will promptly notify the Contractor in writing that the State will open the sealed container to verify that the affidavit has been enclosed and to compare the bid documents listed in the affidavit with the bid documents enclosed in the container to ensure that all of the bid documentation has been submitted and that the copies are legible. The notification will advise the Contractor of the date and time the container will be opened and the name of the State employee who will verify the contents of the container. The State employee verifying the contents of the escrow container will not be involved or connected with the review, evaluation, or resolution of any claim by the Contractor made to the State in connection with the contract for which the verification was made. The Contractor may have representatives present at the opening.

Supplementation

Documents listed in the affidavit but not enclosed in the sealed container through error or oversight shall be submitted in a sealed container within five calendar days after the opening of the original container. Also, any bid documentation that is illegible shall be replaced with legible copies and furnished within five calendar days after the opening of the original container. The face of the container shall show the same information as the original container except the container shall be

marked "Supplemental Bid Documentation". The same procedure used in verifying the contents of the original container shall be used in verifying the contents of the supplemental submittal.

Duration and Use

The bid documentation and affidavit shall remain in escrow during the life of the contract and will be returned to the Contractor by the banking institution, provided that the Contractor has signed the final contract voucher certification and has not reserved any claims on the final contract voucher certification against the State arising out of the contract. In the event that claims against the State are reserved on the final contract voucher certification, the bid documentation and affidavit shall remain in escrow. If the claims are not resolved and litigation ensues, the State may serve a request upon the Contractor to authorize the banking institution, in writing, to release the bid documentation and affidavit in escrow to the State. The Contractor shall respond to the request within 20 days after service of the request. If the Contractor objects or does not respond to the request within 20 days after service of the request, the State may file a motion under the Civil Rules requesting the court to enter an order directing the banking institution to deliver the bid documentation and affidavit in escrow to the State. The Contractor shall respond to the request within the time required by the then applicable Civil Court Rules for the Superior Court of the State of Washington. If the Contractor objects or does not respond to the request within the time required by the then applicable Civil Rules, the State may file a motion pursuant to such rules requesting the court to enter an order directing the banking institution to deliver the bid documentation and affidavit in escrow to the State. The banking institution shall release the bid documentation and affidavit as follows:

1. To the State upon receipt of a letter from the Contractor authorizing the release;

2. To the State upon receipt of a certified copy of a court order directing the release of the documents;

3. To the court for an <u>in camera</u> examination pursuant to a certified copy of a court order;

4. The bid documentation and affidavit shall be returned to the Contractor if litigation is not commenced within the time period prescribed by law.

The Contractor agrees that the sealed container placed in escrow and any supplemental sealed container placed in escrow contain all of the bid documentation used to determine the bid and that no other bid documentation shall be utilized by the Contractor in litigation over claims brought by the Contractor arising out of this contract unless otherwise ordered by the court.

Remedies for Refusal or Failure to Provide Bid Documentation

Failure or refusal to provide bid documentation shall be deemed a material breach of this contract. The State may at its option refuse to make payment for progress estimates under Section 1-09.9 until the Contractor has submitted the bid documentation required by this specification. The State may at its option terminate

the contract for default under Section 1-08.10. These remedies are not exclusive and the State may take such other action as is available to it under the law.

Confidentiality of Bid Documentation

The bid documentation and affidavit in escrow are and will remain the property of the Contractor. The State has no interest in or right to the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless litigation ensues between the State and Contractor over claims brought by the Contractor arising out of this contract. In the event of such litigation, the bid documentation and affidavit may become the property of the State for use in the litigation as may be appropriate subject to the provisions of any court order limiting or restricting the use or dissemination of the bid documentation and affidavit as provided in the preceding section entitled Duration and Use.

Cost and Escrow Instructions

The cost of the escrow will be borne by the State. The State will provide escrow instructions to the banking institution consistent with this specification.

1-03.4.GR1

Contract Bond

1-03.4.INST1.GR1

Section 1-03.4 is supplemented with the following:

1-03.4.OPT1.GR1

(June 27, 2011)

Release of Contract Bond will be 60 days following Contracting Agency Final Acceptance of Contract, provided following conditions are met:

1. Payment to the State with respect to taxes imposed pursuant to Title 82, RCW on Contracts totaling more than $ 35,000, a release has been obtained from the Washington State Department of Revenue.

2. Affidavits of Wages Paid for the Contractor and all Subcontractors are on file with the Contracting Agency (RCW 39.12.040).

3. A certificate of Payment of Contributions Penalties and Interest on Public Works Contract is received from the Washington State Employment Security Department.

4. Washington State Department of Labor and Industries (per Section 1-07.10) shows the Contractor, Subcontractor(s) and any lower tier Subcontractor(s) are current with payments of industrial insurance and medical aid premiums.

5. All claims, as provided by law, filed against the Contract Bond have been resolved.

1-05.GR1

Control of Work

1-05.3.GR1

Plans And Working Drawings

1-05.3.INST1.GR1

Section 1-05.3 is supplemented with the following:

1-05.3.OPT1.GR1

(August 2, 2004)

When submittals require review by the railroad, the Engineer will require up to 60 calendar days from the date the submittals are received until they are returned to the Contractor. If a submittal is returned unapproved and then resubmitted, then an additional review time of up to 60 calendar days will be required.

If more than 60 calendar days are required for the Engineer's review of any individual submittal or resubmittal, an extension of time will be considered in accordance with Section 1-08.8.

1-05.4.GR1

Conformity With And Deviations From Plans And Stakes

1-05.4.INST1.GR1

Section 1-05.4 is supplemented with the following:

1-05.4.OPT1.GR1

(April 4, 2011)

Contractor Surveying - Structure

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Project Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of bridges, noise walls, and retaining walls. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

The Contractor shall inform the Engineer when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans “DO NOT DISTURB” shall be protected throughout the length of the project or be replaced at the Contractors expense.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work by the Contractor shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, by placing hubs and/or marked stakes, the location with offsets of foundation shafts and piles.

3. Establish offsets to footing centerline of bearing for structure excavation.

4. Establish offsets to footing centerline of bearing for footing forms.

5. Establish wing wall, retaining wall, and noise wall horizontal alignment.

6. Establish retaining wall top of wall profile grade.

7. Establish elevation benchmarks for all substructure formwork.

8. Check elevations at top of footing concrete line inside footing formwork immediately prior to concrete placement.

9. Check column location and pier centerline of bearing at top of footing immediately prior to concrete placement.

10. Establish location and plumbness of column forms, and monitor column plumbness during concrete placement.

11. Establish pier cap and crossbeam top and bottom elevations and centerline of bearing.

12. Check pier cap and crossbeam top and bottom elevations and centerline of bearing prior to and during concrete placement.

13. Establish grout pad locations and elevations.

14. Establish structure bearing locations and elevations, including locations of anchor bolt assemblies.

15. Establish box girder bottom slab grades and locations.

16. Establish girder and/or web wall profiles and locations.

17. Establish diaphragm locations and centerline of bearing.

18. Establish roadway slab alignment, grades and provide dimensions from top of girder to top of roadway slab. Set elevations for deck paving machine rails.

19. Establish traffic barrier and curb profile.

20. Profile all girders prior to the placement of any deadload or construction live load that may affect the girder's profile.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with the following primary survey and control information:

1. Descriptions of two primary control points used for the horizontal and vertical control. Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each alignment included in the project.

2. Horizontal coordinates for the centerline of each bridge pier.

3. Computed elevations at top of bridge roadway decks at one-tenth points along centerline of each girder web. All form grades and other working grades shall be calculated by the Contractor.

The Contractor shall give the Contracting Agency three weeks notification to allow adequate time to provide the data outlined in Items 2 and 3 above. The Contractor shall ensure a surveying accuracy within the following tolerances:

		Vertical	Horizontal
1.	Stationing on structures		±0.02 feet
2.	Alignment on structures		±0.02 feet
3.	Superstructure elevations	±0.01 feet variation from plan elevation	
4.	Substructure	±0.02 feet variation from Plan grades.	

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

When staking the following items, the Contractor shall perform independent checks from different secondary control to ensure that the points staked for these items are within the specified survey accuracy tolerances:

Piles
Shafts
Footings
Columns

The Contractor shall calculate coordinates for the points associated with piles, shafts, footings and columns. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the survey work. The

Contracting Agency will require up to seven calendar days from the date the data is received to issuing approval.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item when included in the proposal:

"Structure Surveying", lump sum.

The lump sum contract price for "Structure Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the Work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts.

1-05.4.OPT2.GR1

(April 4, 2011)

Contractor Surveying - Roadway

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Project Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of the roadbed, drainage, surfacing, paving, channelization and pavement marking, illumination and signals, guardrails and barriers, and signing. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

The Contractor shall inform the Engineer when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans “DO NOT DISTURB” shall be protected throughout the length of the project or be replaced at the Contractors expense.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of

secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, the centerlines of all alignments, by placing hubs, stakes, or marks on centerline or on offsets to centerline at all curve points (PCs, PTs, and PIs) and at points on the alignments spaced no further than 50 feet.

3. Establish clearing limits, placing stakes at all angle points and at intermediate points not more than 50 feet apart. The clearing and grubbing limits shall be 5 feet beyond the toe of a fill and 10 feet beyond the top of a cut unless otherwise shown in the Plans.

4. Establish grading limits, placing slope stakes at centerline increments not more than 50 feet apart. Establish offset reference to all slope stakes. If Global Positioning Satellite (GPS) Machine Controls are used to provide grade control, then slope stakes may be omitted at the discretion of the Contractor

5. Establish the horizontal and vertical location of all drainage features, placing offset stakes to all drainage structures and to pipes at a horizontal interval not greater than 25 feet.

6. Establish roadbed and surfacing elevations by placing stakes at the top of subgrade and at the top of each course of surfacing. Subgrade and surfacing stakes shall be set at horizontal intervals not greater than 50 feet in tangent sections, 25 feet in curve sections with a radius less than 300 feet, and at 10-foot intervals in intersection radii with a radius less than 10 feet. Transversely, stakes shall be placed at all locations where the roadway slope changes and at additional points such that the transverse spacing of stakes is not more than 12 feet. If GPS Machine Controls are used to provide grade control, then roadbed and surfacing stakes may be omitted at the discretion of the Contractor.

7. Establish intermediate elevation benchmarks as needed to check work throughout the project.

8. Provide references for paving pins at 25-foot intervals or provide simultaneous surveying to establish location and elevation of paving pins as they are being placed.

9. For all other types of construction included in this provision, (including but not limited to channelization and pavement marking, illumination and signals, guardrails and barriers, and signing) provide staking and layout as necessary to adequately locate, construct, and check the specific construction activity.

10. The Contractor shall collect additional topographic survey data as needed in order to match into existing roadways such that the transition from the new pavement to the existing pavement is smooth and that the pavement and ditches drain properly. If changes to the profiles or roadway sections shown in the contract plans are needed to achieve proper smoothness and drainage where matching into existing features, the Contractor shall submit these

changes to the Project Engineer for review and approval 10 days prior to the beginning of work.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with primary survey control information consisting of descriptions of two primary control points used for the horizontal and vertical control, and descriptions of two additional primary control points for every additional three miles of project length. Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each alignment included in the project.

The Contractor shall ensure a surveying accuracy within the following tolerances:

	Vertical	Horizontal
Slope stakes	±0.10 feet	±0.10 feet
Subgrade grade stakes set 0.04 feet below grade	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Stationing on roadway	N/A	±0.1 feet
Alignment on roadway	N/A	±0.04 feet
Surfacing grade stakes	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Roadway paving pins for surfacing or paving	±0.01 feet	±0.2 feet (parallel to alignment) ±0.1 feet (normal to alignment)

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

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

The Contractor shall calculate coordinates for the alignment. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the work. The Contracting Agency will require up to seven calendar days from the date the data is received.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Stakes shall be marked in accordance with Standard Plan A10.10. When stakes are needed that are not described in the Plans, then those stakes shall be marked, at no additional cost to the Contracting Agency as ordered by the Engineer.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item when included in the proposal:

"Roadway Surveying", lump sum.

The lump sum contract price for "Roadway Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the Work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts.

1-05.4.OPT3.GR1

(April 4, 2011)

Licensed Surveyors

The Contractor shall be responsible for reestablishing or locating legal survey markers such as GLO monuments or property corner monuments, conduct boundary surveys to determine Contracting Agency right-of-way locations, and obtain, review and analyze deeds and records as necessary to determine these boundaries. The Contracting Agency will provide “rights of entry” as needed by the Contractor to perform the work.

The Contractor shall brush out or clear and stake or mark the right-of-way lines as designated by the Engineer.

The Contractor shall inform the Engineer when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans “DO NOT DISTURB” shall be protected throughout the length of the project or be replaced at Contractors expense.

When required, the Contractor shall prepare and file a Record of Survey map in accordance with RCW 58.09 and provide a recorded copy to the Contracting Agency. The Contracting Agency will provide all existing base maps, existing horizontal and vertical control, and other material available with Washington State Plane Coordinate information to the Contractor. The Contracting Agency will also provide maps, plan sheets, and/or aerial photographs clearly identifying the limits of the areas to be surveyed. The Contractor shall establish Washington State Plane Coordinates on all points required in the Record of Survey and other points designated in the Contract documents.

Existing right of way documentation, existing base maps, existing horizontal and vertical control descriptions, maps, plan sheets, aerial photographs and all other available material may be viewed by prospective bidders at the office of the Project Engineer.

The Contractor shall perform all of the necessary calculations for the contracted survey work and shall provide copies of these calculations to the Contracting Agency. Electronic files of all survey data shall be provided and in a format acceptable to the Contracting Agency.

All survey work performed by the Contractor shall conform to all applicable sections of the Revised Code of Washington and the Washington Administrative Code.

The Contractor shall provide all traffic control, signing, and temporary traffic control devices in order to provide a safe work zone.

Payment

Payment will be made in accordance with Section 1-09.6 for the following bid item when included in the proposal:

> "Licensed Surveying", Force Account.
> For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Licensed Surveying" in the bid proposal to become a part of the total bid by the Contractor.

1-05.9.GR1

Machine Control Grading

1-05.9.INST1.GR1

Section 1-05.9 is supplemented with the following:

1-05.9.OPT1.FR1

(April 7, 2008)

General

This specification contains requirements for the use of machine control grading.

Instead of providing grade control through construction stakes, the Contractor may control grade with equipment that is controlled by a machine control system.

The Contractor may use any type of equipment and machine control system that produces results meeting the requirements of the Contract.

Electronic data is provided for the Contractor's convenience, and is not a part of the Contract. No guarantee or warranty is made by the Contracting Agency that electronic data provided to the Contractor: is compatible with any of the systems that are used by the Contractor; is complete; is representative of actual conditions at the project site, or; accurately reflects the quantities and character of the actual Work required. The furnishing of electronic design data or documentation shall not relieve the Contractor from any risks or of any duty to make examinations and investigations as required by Section 1-02.4 or any other responsibility under the Contract or as required by law. Except as provided above, no corrections, additions, or updates of any kind will be made to electronic data provided to the Contractor.

The Engineer may perform spot checks of the Contractor's machine control grading results, calculations, records, field procedures, and quality control measures. If the Engineer determines that the Work being performed is not achieving results that will

meet the Contract requirements, the Contractor shall make corrections to the Work at no additional cost to the Contracting Agency.

WSDOT Responsibilities

1. The Project Engineer will set the initial horizontal and vertical control points for the project as shown in the Contract documents.

2. The Project Engineer will provide additional datum and scale factor information upon request.

3. After execution of the Contract, the Project Engineer will make available upon written request the following electronic data used to design the project:

   *** $$1$$ ***

   Data may be obtained by furnishing a written request to the Project Engineer at the following address:

   *** $$2$$ ***

Contractor's Responsibilities

1. The Contractor shall provide any information or data that is requested by the Contracting Agency for the purpose of performing the verification of quantities, and quality.

2. The Contractor shall be responsible for any edits or conversions of the Contracting Agencies electronic data whether done by the Contractor or a vendor that is hired by the Contractor to perform such edits or conversions.

3. The Contractor shall be responsible for the accuracy and usability of any data or model that is developed from the Contracting Agencies data.

4. The Contractor shall be responsible for checking and recalibrating Machine Control Equipment as required to achieve results that meet the requirements of the Contract.

5. The Contractor shall be responsible for establishing any additional control points needed to achieve results that meet the requirements of the Contract.

6. The Contractor shall provide the Contracting Agency electronic as-built construction data for the final Roadway surface model in a MicroStation format.

7. One week prior to the start of grading operations the Contractor shall meet with the Project Engineers staff to review the grading plans, quality processes, and tolerance requirements.

Payment

All costs associated with the use of machine control grading equipment are incidental to related items of Work, and no additional payment will be provided.

1-05.14.GR1

Cooperation With Other Contractors

1-05.14.INST1.GR1

Section 1-05.14 is supplemented with the following:

1-05.14.OPT1.FR1

(March 13, 1995)

Other Contracts Or Other Work

It is anticipated that the following work adjacent to or within the limits of this project will be performed by others during the course of this project and will require coordination of the work:

*** $$1$$ ***

1-05.14.OPT2.FR1

(March 13, 1995)

The Contractor on this project shall provide sufficient room within the right of way for a two-way haul road past the Contractor's operations for use of the *** $$1$$ *** Contractor.

1-06.GR1

Control of Material

1-06.INST1.GR1

Section 1-06 is supplemented with the following:

1-06.OPT1.GR1

Buy America

1-06.OPT1(A).GR1

(August 2, 2010)

The major quantities of steel and iron construction material that is permanently incorporated into the project shall consist of American-made materials only. Buy America does not apply to temporary steel items, e.g., temporary sheet piling, temporary bridges, steel scaffolding and falsework.

Minor amounts of foreign steel and iron may be utilized in this project provided the cost of the foreign material used does not exceed one-tenth of one percent of the total contract cost or $2,500.00, whichever is greater.

American-made material is defined as material having all manufacturing processes occurring domestically. To further define the coverage, a domestic product is a manufactured steel material that was produced in one of the 50 States, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States.

If domestically produced steel billets or iron ingots are exported outside of the area of coverage, as defined above, for any manufacturing process then the resulting product does not conform to the Buy America requirements. Additionally, products manufactured domestically from foreign source steel billets or iron ingots do not

conform to the Buy America requirements because the initial melting and mixing of alloys to create the material occurred in a foreign country.

Manufacturing begins with the initial melting and mixing, and continues through the coating stage. Any process which modifies the chemical content, the physical size or shape, or the final finish is considered a manufacturing process. The processes include rolling, extruding, machining, bending, grinding, drilling, welding, and coating. The action of applying a coating to steel or iron is deemed a manufacturing process. Coating includes epoxy coating, galvanizing, aluminizing, painting, and any other coating that protects or enhances the value of steel or iron. Any process from the original reduction from ore to the finished product constitutes a manufacturing process for iron.

Due to a nationwide waiver, Buy America does not apply to raw materials (iron ore and alloys), scrap (recycled steel or iron), and pig iron or processed, pelletized, and reduced iron ore.

The following are considered to be steel manufacturing processes:

1. Production of steel by any of the following processes:

    a. Open hearth furnace.

    b. Basic oxygen.

    c. Electric furnace.

    d. Direct reduction.

2. Rolling, heat treating, and any other similar processing.

3. Fabrication of the products.

    a. Spinning wire into cable or strand.

    b. Corrugating and rolling into culverts.

    c. Shop fabrication.

A certification of materials origin will be required for any items comprised of, or containing, steel or iron construction materials prior to such items being incorporated into the permanent work. The certification shall be on DOT Form 350-109EF provided by the Engineer, or such other form the Contractor chooses, provided it contains the same information as DOT Form 350-109EF.

1-06.OPT1(B).FR1

(October 25, 1999)

The following items of work containing steel or iron construction materials are considered to be temporary and are excluded from the requirements for American-made materials described in the above paragraphs:

*** $$1$$ ***

1-06.OPT1(C).FR1

(August 6, 2007)

Structural Steel Construction Material

Definitions

1. Construction material: Defined as any article, material, or supply brought to the construction site for incorporation into the final product.

2. Domestic Construction Material: A manufactured construction material will be considered domestic if it has been manufactured in the United States.

3. Manufactured in the United States: A construction material will be considered as manufactured in the United States if all manufacturing processes have occurred in the United States.

4. Structural Steel: Defined as all structural steel products included in the project.

5. United States: To further define the coverage, a domestic product is a manufactured steel construction material that was produced in one of the 50 states, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States.

Bidding and Award

The Contractor shall submit a bid for the following bid items containing domestic structural steel appearing in the proposal under the heading **ALTERNATE *** $$1$$ ***.**

*** $$2$$ ***

(A) The Contractor may also submit a bid for the following bid items containing foreign structural steel appearing in the proposal under the heading **ALTERNATE *** $$3$$ ***.**

*** $$4$$ ***

A Contractor electing to submit a bid for any of the foreign structural steel items under **ALTERNATE *** $$5$$ ***** must also submit a bid for the appropriate domestic structural steel items under **ALTERNATE *** $$6$$ ***.** If a bid is received only for foreign structural steel material on any of the above items, the bid will be considered irregular.

Subject to the provisions of Section 1-03, all bidders are advised that the contract will be awarded to the bidder who submits the lowest total bid based on furnishing domestic structural steel construction material as specified, unless such total bid exceeds the lowest total bid based on furnishing foreign structural steel construction material as specified, by more than 25 percent. In that event, the contract will be awarded to the bidder who submits the lowest total bid based on furnishing the specified foreign structural steel material.

Except the material contained in the above foreign structural steel item(s) for which alternate bids were submitted and accepted as a basis of award, the steel and iron construction material that is permanently incorporated into the project shall consist of American-made materials only. Buy America does not apply to temporary steel items, e.g., temporary sheet piling, temporary bridges, steel scaffolding and falsework. American-made material is defined as material having all manufacturing processes occuring domestically.

If domestically produced steel billets or iron ingots are exported outside of the United States for any manufacturing process then the resulting product does not conform to the Buy America requirements. Additionally, products manufactured domestically from foreign source steel billets or iron ingots do not conform to the Buy America requirements because the initial melting and mixing of alloys to create the material occurred in a foreign country.

Manufacturing begins with the initial melting and mixing, and continues through the coating stage. Any process which modifies the chemical content, the physical size or shape, or the final finish is considered a manufacturing process. The processes include rolling, extruding, machining, bending, grinding, drilling, welding, and coating. The action of applying a coating to steel or iron is deemed a manufacturing process. Coating includes epoxy coating, galvanizing, aluminizing, painting, and any other coating that protects or enhances the value of steel or iron. Any process from the original reduction from ore to the finished product constitutes a manufacturing process for iron.

Due to a nationwide waiver, Buy America does not apply to raw materials (iron ore and alloys), scrap (recycled steel or iron), and pig iron or processed, pelletized, and reduced iron ore.

1. Production of steel by any of the following processes:

    a. Open hearth furnace.

    b. Basic oxygen.

    c. Electric furnace.

    d. Direct reduction.

2. Rolling, heat treating, and any other similar processing.

3. Fabrication of the products.

    a. Spinning wire into cable or strand.

    b. Corrugating and rolling into culverts.

    c. Shop fabrication.

The Contractor may utilize minor amounts of foreign steel and iron in this project provided the cost of the foreign material used does not exceed one-tenth of one percent of the total contract cost or $2,500.00, whichever is greater.

A certification of materials origin will be required for any items comprised of, or containing, steel or iron construction materials prior to such items being incorporated into the permanent work. The certification shall be on DOT Form 350-109EF provided by the Engineer, or such other form the Contractor chooses, provided it contains the same information as DOT Form 350-109EF.

1-07.GR1

Legal Relations and Responsibilities to the Public

1-07.1.GR1

Laws to be Observed

1-07.1.INST1.GR1

Section 1-07.1 is supplemented with the following:

1-07.1.OPT1.GR1

(March 25, 2009)

American Recovery and Reinvestment Act of 2009 (ARRA) Employment Report

The Contractor shall submit monthly reports of the number of employees actively working on this project for the Contractor and all Subcontractors of every tier. The reports shall include all employees actively working on this project at the jobsite, in the project office, in the home office, or teleworking from a home or other alternative office location; and all engineering personnel, inspectors, sampling and testing technicians, and lab technicians actively performing work directly in support of this project (excluding suppliers) during the reporting month.

The report shall be prepared using Form FHWA-1589 and submitted monthly to the Project Engineer. The initial report shall be submitted to the Project Engineer within 30-days of execution. Subsequent reports shall be submitted to the Project Engineer no later than 10-days after the end of each report month.

Failure by the Contractor to submit ARRA Employment Reports for the Contractor and all Subcontractors of every tier shall be reason for withholding all progress payments until reports are received. The cost of preparing and submitting ARRA Employment Reports is incidental to the Contract. The Contractor shall include all related costs in the unit Bid prices of the Contract.

1-07.1.OPT2.FR1

(January 5, 2004)

Lead Health Protection Program

Structural and non-structural materials located at the project site *** $$1$$ *** contain lead-based products. The Contractor shall be fully responsible for the safety and health of all on-site workers and compliant with Washington Administrative Code (WAC 296-155-176). The Contractors Lead Health Protection Program shall be sent to the Contracting Agency at least 2 weeks prior to the Contractor beginning work involving exposure to lead contamination. The Contractor shall communicate with the Project

Engineer to ensure a coordinated effort for providing and maintaining a safe worksite for both the Contracting Agency's and Contractor's workers.

Construction Requirements

The Contractor shall be responsible for the containment measures required to provide and maintain a safe and healthful jobsite for the duration of the project in accordance with all applicable laws and this Special Provision.

Payment

All costs to comply with this Special Provision for the Lead Health Protection laws and regulations are the responsibility of the Contractor and shall be included in related items of work.

1-07.1.OPT3.FR1

(April 3, 2006)

Confined Space

Confined spaces are known to exist at the following locations:

*** $$1$$ ***

The Contractor shall be fully responsible for the safety and health of all on-site workers and compliant with Washington Administrative Code (WAC 296-809).

The Contractor shall prepare and implement a confined space program for each of the confined spaces identified above. The Contractors Confined Space program shall be sent to the contracting agency at least 30 days prior to the Contractor beginning work in or adjacent to the confined space. No work shall be performed in or adjacent to the confined space until the plan is submitted to the Engineer as required. The Contractor shall communicate with the Project Engineer to ensure a coordinated effort for providing and maintaining a safe worksite for both the Contracting Agency's and Contractor's workers when working in or near a confined space.

All costs to prepare and implement the confined space program shall be included in the bid prices for the various items associated with the confined space work.

1-07.2.GR1

State Taxes

1-07.2.INST2.GR1

The third paragraph of Section 1-07.2 is revised to read:

1-07.2.OPT4.GR1

(June 27, 2011)

The Contracting Agency will release the Contract Bond only if the Contractor has obtained from the State Department of Revenue a certificate showing that all Contract-related taxes have been paid.

1-07.2.INST3.GR1

Section 1-07.2 is supplemented with the following:

1-07.2.OPT10.GR1

(March 13, 1995)

The work on this contract is to be performed upon lands whose ownership obligates the Contractor to pay Sales tax. The provisions of Section 1-07.2(1) apply.

1-07.2.OPT11.GR1

(March 13, 1995)

The work on this contract is to be performed upon lands whose ownership obligates the Contractor to collect State sales tax from the Contracting Agency. The provisions of Section 1-07.2(2) apply.

1-07.2.OPT12.FR1

(March 13, 1995)

The work on this contract is to be performed upon lands whose ownership obligates the Contractor to pay State sales tax on portions of the project work and obligates the Contractor to collect State sales tax from the Contracting Agency on other portions of the project as follows:

1. The provisions of Section 1-07.2(1) apply to the following listed portions of the project:

   *** $$1$$ ***

2. The provisions of Section 1-07.2(2) apply to all of the remaining portions of the project.

For bidding purposes the Contracting Agency has segregated the plan quantities which are affected by Section 1-07.2(1) from those quantities affected by Section 1-07.2(2). These approximate quantities are shown on the Summary of Quantities sheets; however, any tax payments shall be based on actual quantities used.

1-07.3.GR1

Forest Protection and Merchantable Timber Requirements

1-07.3.INST1.GR1

Section 1-07.3 is supplemented with the following:

1-07.3.OPT1.GR1

(August 2, 2004)

The Forest Service Provisions, included in the Appendix to these Special Provisions, are made a part of this contract. The Contractor shall comply with the requirements of these Forest Service provisions at no additional cost to the Contracting Agency.

1-07.3(2).GR1

Merchantable Timber Requirements

1-07.3(2).INST1.GR1

Section 1-07.3(2) is supplemented with the following:

1-07.3(2).OPT1.GR1

(April 7, 2008)

This project contains merchantable timber.

Export Restrictions - DOT Form 410-100, Purchaser Certification for Export Restricted Timber, will be included when the contract is sent to the Contractor for execution. The form shall be completed and signed by the Contractor. The Contractor shall send the original signed form and one copy of the signed form directly to the Washington State Department of Revenue at the address on the form. The Contractor shall send one signed copy along with the other documents required by Section 1-03.3 to the Contracting Agency with the executed contract.

State Tax Requirements - It shall be the Contractor's responsibility to pay to the State Department of Revenue all taxes on harvested timber.

1-07.4.GR1

Sanitation

1-07.4(2).GR1

Health Hazards

1-07.4(2).INST1.GR1

Section 1-07.4(2) is revised to read:

1-07.4(2).OPT1.FR1

(August 1, 2011)

This project site is known to be occupied by transients and therefore contains biological hazards and associated physical hazards. These may include, but not be limited to violent and dangerous individuals, hypodermic needles, garbage, broken glass, human and animal excrement, drug paraphernalia, and other hazards.

The Contractor shall take precautions and perform any necessary Work required to provide and maintain a safe and healthful jobsite for all workers and the public for the duration of the project in accordance with all applicable laws and contract requirements.

The Contractor shall ensure that the public, including persons who may be non-English speaking or those who may not be able to recognize potential safety and health hazards within the project area, are not harmed by the Contractors activities.

Nothing required by this Specification shall operate as a waiver of the Contractor’s responsibility for taking all steps necessary to ensure the safety of the public under Section 1-07.23 or responsibility for liability and damages under Section 1-07.14 or for any other responsibility under the Contract or as may be required by law.

Health and Safety Plan

The Contractor shall prepare a written Health and Safety Plan. The plan shall be prepared under the supervision of a certified industrial hygienist and shall incorporate all required County, State, and Federal health and safety provisions. The plan shall include requirements of the Federal Occupational Safety and Health Act of 1970 (OSHA), all amendments, and all other applicable health regulations.

Preparation of the Health and Safety Plan shall include an initial site assessment by the industrial hygienist. The plan shall break initial cleanup of the project into identifiable construction areas. The plan shall be submitted to the Project Engineer prior to commencing cleanup Work. At least one copy of the plan shall be posted at the work site while cleanup Work is in progress. The industrial hygienist shall perform one or more follow-up site assessments as needed to approve the site following completion of the initial site cleanup.

Public Notification

The Contractor shall furnish and install the "No Trespassing" signs shown in the Plans at locations staked by the Project Engineer at least 72 hours prior to performing site cleanup or any potentially hazardous Work (such as clearing or operating equipment).

At the same time that "No Trespassing" signs are posted, provide written notification of the following to the Project Engineer and to the chief law enforcement officer of the local governmental entity where the Work will occur:

1. The precise location of each area that is posted "No Trespassing";

2. The date and time that each site was posted "No Trespassing";

3. The date, time, description and duration of the Work to be performed at each site.

At least 72 hours prior to performing site cleanup in Work areas containing encampments (such as tents, makeshift dwellings, sleeping sites, or accumulations of personal property that are not refuse), the Contractor shall post a notification at each encampment area. Each notice shall:

1. Be weather resistant, and written in both English and Spanish.

2. Be affixed to each dwelling or post mounted within 10-feet of each encampment;

3. State the Prime Contractor's company name as the entity that performed the cleanup as required by the Washington State Department of Transportation;

4. Provide the date that the notice is posted;

5. Provide date(s) and time(s) that cleanup will occur;

6. Provide the telephone number, business hours and physical address of the location where stored personal property may be claimed.

7. State that personal property will be stored for 70-days from the date of removal, and if unclaimed within that time, will be disposed of.

At the same time that notifications are posted at encampment areas, provide written notification of the schedule to perform site cleanup to the Project Engineer and to the following advocacy groups:

$$1$$

Acceptance of signs and notifications will be based on visual inspection that the sign and notifications meet these requirements.

Site Cleanup of Biological and Physical Hazards

An initial cleanup of the site, including all preparatory work required to make the worksite sanitary and safe in accordance with applicable laws and with the Contract, shall be completed to remove all individuals, encampments, and personal property from areas signed “No Trespassing”, and to address all biological and associated physical hazards present on the project. Necessary worker training, on and off site preparations, and personal protective equipment shall be provided by the Contractor to complete this Work. If aggressive or violent individuals are encountered, the Contractor shall notify the local law enforcement agency to assist them in clearing the Work area.

Site cleanup of individual areas identified in the Health and Safety Plan shall be performed no more than 30 days in advance of performing other Work in each area.

The refuse generated by the site cleanup shall become the property of the Contractor and shall be removed from the project. Personal property shall be handled as required by this Specification and applicable laws.

Removal, Storage and Return of Personal Property

Personal property may include radios, audio and video equipment, sleeping bags, tents, stoves and cooking utensils, lanterns, flashlights, bed rolls, tarps, foam, canvas, mats, blankets, pillows, medication, personal papers, photographs, books and other reading materials, luggage, backpacks or other storage containers, clothing, towels, shoes, toiletries and cosmetics, clocks and watches, and eye glasses. Personal property does not include building materials such as wood products, metal, or rigid plastic.

Personal property items that are not refuse, contaminated, illegal or hazardous shall be removed from the Work area and stored at a location near the project site for return to the property owner. Items shall be placed in large transparent plastic bags and stored in a manner that protects them from adverse weather and theft. Reasonable efforts shall be made to place all items from each encampment into a separate bag. Each bag shall be labeled with an inventory to include a brief description of the contents, a description of the location that it was removed from, and the date that it was removed from the Work area. The Contractor shall not open closed items of personal property unless, in its determination, it is necessary to do so to protect public safety.

The Contractor shall retain the property for 70-days.

If the name and contact information of the owner of a personal property item is identified on that item, then for a period of not less than 10-days after removing the property from the Work area, the Contractor shall attempt to notify the apparent owner of the property and make arrangements for the owner to claim the property.

The Contractor shall release the property to any individual who claims ownership provided they are able to establish ownership by identifying the property and its approximate location. The Contractor shall maintain a record of all property that is claimed. The record shall include a description of the property, the date claimed, and the name of the claimant.

If personal property is not claimed within 70-days of removal from the encampment, then the property shall become the property of the Contractor and shall be removed from the project.

Site Preservation

The Contractor shall preserve the site after initial cleanup of biological and physical hazards.

On a daily basis and prior to performing any Work in areas where pedestrians or encampments may be present, the Contractor shall verify that the Work area is cleared of all persons not associated with the project. Individuals may seek shelter in dumpsters, equipment, under blankets, or other places hidden from view. Individuals may be disabled, or under the influence of alcohol or drugs and it should not be assumed that loud construction noise will wake them.

If the worksite becomes unsanitary or unsafe due to new encampments or new biological and associated physical hazards after initial cleanup is completed, then the Contractor shall perform additional site assessment, additional notification and additional cleanup.

The Project Engineer may authorize additional site preservation measures. The nature and frequency of these measures will be as agreed to by the Project Engineer. Additional site preservation measures may include the use of fencing, lighting, or security, provided it is approved in advance by the Project Engineer. Work performed without Project Engineer authorization will not be eligible for payment.

Measurement

No trespassing signs will be measured per each.

No specific unit of measurement shall apply to the Lump sum item for “Health and Safety Plan”.

No specific unit of measurement will apply to the force account item of “FA-Site Cleanup of Bio. And Physical Hazards”.

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid items:

"No Trespassing Sign", per each.

The unit contract price per each "No Trespassing Sign" shall be full payment for all Work required to furnish, install, maintain and remove the signs.

"Health and Safety Plan", lump sum.

The lump sum unit contract price for "Health and Safety Plan" shall be full payment for all Work associated with the preparation and implementation of the Health and Safety Plan including the initial and follow up assessment(s) for initial site cleanup, worker training and personal protective equipment, and providing required notifications.

"FA-Site Cleanup of Bio. And Physical Hazards", by force account as provided in Section 1-09.6.

Removal and disposal of biological and physical hazards; removal of individuals and encampments; removal, storage, and return of personal property; disposal of unclaimed personal property; additional site assessment, notifications, worker training and personal protective equipment required after the initial site cleanup is completed; and site preservation Work authorized by the Project Engineer will be paid for by force account in accordance with Section 1-09.6.

For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "FA-Site Cleanup of Bio. And Physical Hazards" in the bid proposal to become a part of the total bid by the Contractor.

1-07.5.GR1

Environmental Regulations

1-07.5.INST1.GR1

Section 1-07.5 is supplemented with the following:

1-07.5.OPT1.GR1

(September 20, 2010)

Environmental Commitments

The following Provisions summarize the requirements, in addition to those required elsewhere in the Contract, imposed upon the Contracting Agency by the various documents referenced in the Special Provision PERMITS AND LICENSES. Throughout the work, the Contractor shall comply with the following requirements:

1-07.5.OPT1(B).FR1

(August 3, 2009)

A mixing zone is established within which the turbidity standard is waived during actual in-water work. The mixing zone is established to only temporarily allow

exceeding the turbidity criteria (such as a few hours or days) and is not authorization to exceed the turbidity standard for the entire duration of the construction. The mixing zone shall not exceed *** $$1$$ *** feet downstream from the construction area.

1-07.5.OPT1(R).GR1

(August 3, 2009)

Heavy equipment working in wetlands or mudflats must be placed on mats or other measures taken to minimize soil disturbance as approved by the Engineer.

1-07.5.OPT1(S).GR1

(August 3, 2009)

Materials placed below OHW or MHHW may not consist of trash, debris, car bodies, asphalt, or other potentially contaminating materials.

1-07.5.OPT1(T).FR1

(August 3, 2009)

Any temporary fills placed *** $$1$$ *** must be removed in their entirety and the affected areas returned to their preexisting elevation. (Choose from the following list to be used for the fill-in information: “below OHW”, “below MHHW”, or “within wetlands”).

1-07.5.OPT1(U).FR1

(August 3, 2009)

The Contractor shall notify the Engineer a minimum of *** $$1$$ *** calendar days prior to commencing any work in environmentally sensitive areas, mitigation areas, and wetland buffers. Installation of construction fencing is excluded from this notice requirement. At the time of notification, the Contractor shall submit a work plan for review and approval detailing how the work will be performed. Plan detail must be sufficient to verify that work is in conformance with all contract provisions.

1-07.5.OPT1(V).GR1

(August 3, 2009)

The intentional bypass of stormwater from all or any portion of a stormwater treatment system is prohibited without the approval of the Engineer.

1-07.5.OPT1(W).GR1

(August 3, 2009)

The Contractor shall dispose of all creosoted timber, creosote piling and associated debris as shown in the Plans in accordance with current federal, state, and local regulations and provisions, and following Best Management Practices. Disposal shall be made in a landfill which meets the liner and leachate standards of the Minimum Functional Standards, Chapter 173-304 WAC. The Contractor shall provide receipts from the disposal facility to the Project Engineer. If the material is transported to a transfer station, the Contractor shall obtain documentation indicating that final disposal will comply with the standards referenced above.

1-07.5.OPT1(X).FR1

(August 3, 2009)

No Contractor staging areas will be allowed within *** $$1$$ *** feet of any waters of the State including wetlands.

1-07.5.OPT2.GR1

(August 3, 2009)

Payment

All costs to comply with this special provision for the environmental commitments and requirements are incidental to the contract and are the responsibility of the Contractor. The Contractor shall include all related costs in the associated bid prices of the contract.

1-07.6.GR1

Permits and Licenses

1-07.6.INST1.GR1

Section 1-07.6 is supplemented with the following:

1-07.6.OPT2.FR1

(September 20, 2010)

The Contracting Agency has obtained the below-listed permit(s) for this project. A copy of the permit(s) is attached as an appendix for informational purposes. All contacts with the permitting agency concerning the below-listed permit(s) shall be through the Engineer. The Contractor shall obtain additional permits as necessary. All costs to obtain and comply with additional permits shall be included in the applicable bid items for the work involved. Copies of these permits are required to be onsite at all times.

*** $$1$$ ***

1-07.6.OPT3.GB1

United States Coast Guard

1-07.6.OPT3(A).FB1

(April 2, 2012)

The Contracting Agency has obtained a United States Coast Guard Bridge Permit for this project. A copy of Bridge Permit *** $$1$$ *** is available in the Engineer's office for the Contractor's information.

The Contractor shall furnish, install, maintain, and remove all temporary navigation lights, signs, signals, and any other warning devices required by the Coast Guard and as required for public safety on all falsework, cofferdams, or other temporary structure in the waterway.

The Contractor shall comply with all Coast Guard requirements inclusive of the following Bridge Permit conditions:

1. The construction of falsework, cofferdams or other obstructions, if required, shall be in accordance with plans submitted to and approved by the Commander, 13th Coast Guard District, prior to construction of the bridge. All work shall be so conducted that the free navigation of the waterway is not unreasonably interfered with and the present navigable depths are not impaired. Timely notice of any and all events that may affect navigation shall be given to the District Commander during construction of the bridge. The channel or channels through the structure shall be promptly cleared of all obstructions placed therein or caused by the construction of the bridge to the

satisfaction of the District Commander, when in the District Commander's judgment the construction work has reached a point where such action should be taken, but in no case later than 90 calendar days after the bridge has been opened to traffic.

2. *** $$2$$ ***

The Contractor shall notify the Coast Guard in writing, with a copy to the Project Engineer, of the work start date at least seven calendar days before beginning any site work and shall at that time designate the Contractor's authorized representative, and work phone number, for coordination on matters that relate to Coast Guard approvals and requirements.

The Contractor's applications for required Coast Guard construction approvals for this project shall include, but not be limited to, cofferdams, falsework, temporary navigation lighting, work bridges, and other obstructions. These applications shall be submitted to the Coast Guard by the Contractor, with a copy to the Project Engineer, a minimum of 30 calendar days in advance of the scheduled work. A schedule of when the work is to be performed and when the obstructions are to be permanently removed shall be a part of the Contractor's application.

The Contractor shall provide the Coast Guard and the Project Engineer with prompt verbal notice, followed by written notice, of any subsequent changes to this proposed schedule.

A copy of all Coast Guard approvals shall be provided to the Project Engineer upon receipt but not later than prior to beginning work on the items of work involved.

By the 20th of each month, the Contractor shall furnish the Project Engineer a schedule of the work expected to be performed in the next two months. The Project Engineer will transmit this information through the Bridge and Structures Office to the Coast Guard so that interested users of the waterway can be notified.

The Coast Guard contact is:

Bridge Administrator
Thirteenth Coast Guard District
915 Second Avenue Suite 3510
Seattle, WA 98174-1067
Telephone: (206) 220-7282

All costs in connection with furnishing, installing, maintaining, and removing temporary navigation lights, signs, signals, or other warning devices shall be included in the contract prices for the items of work involved.

All costs incurred in obtaining the required Coast Guard approvals and in complying with all requirements specified herein shall be included in the contract prices for the items of work involved.

All costs in connection with delays in the construction caused by the Contractor's failure to obtain the necessary Coast Guard approvals shall be at the Contractor's expense.

1-07.6.OPT3(B).GB1

(April 2, 2012)

The Contractor shall comply with all United States Coast Guard requirements.

The Contractor shall contact the Coast Guard at least 30 calendar days in advance of all work in or near the navigable portion of the waterway and request that a Local Notice to Mariners be issued for the waterway at this site.

The Contractor shall contact the Coast Guard for requirements related to the mooring of barges, placement of log booms, and all other equipment that could be a hazard to waterway users.

Provisions shall be made for the removal, on 2 hours notice, of all equipment that would block or partially block, the navigable portion of the waterway.

The Coast Guard contact is:

Bridge Administrator
Thirteenth Coast Guard District
915 Second Avenue Suite 3510
Seattle, WA 98174-1067
Telephone: (206) 220-7282

All costs incurred in contacting the Coast Guard and in complying with all the requirements specified herein shall be included in the contract prices for the items of work involved.

All costs in connection with delays in the construction caused by the Contractor's failure to contact the Coast Guard shall be at the Contractor's expense.

1-07.7.GR1

Load Limits

1-07.7.INST1.GR1

Section 1-07.7 is supplemented with the following:

1-07.7.OPT1.GR1

(March 13, 1995)

Except for the load limit restrictions specified in Section 1-07.7(2), the Contractor may operate vehicles which exceed the legal gross weight limitations without special permits or payment of additional fees provided such vehicles are employed in the construction and within the limits of this project.

Subparagraph 1 of the second paragraph of Section 1-07.7(1) is deleted.

1-07.7.OPT2.FR1

(March 13, 1995)

Except for the load limit restrictions specified in Section 1-07.7(2), and as outlined below, the Contractor may operate vehicles which exceed the legal gross weight

limitations without special permits or payment of additional fees provided such vehicles are employed in the construction and within the limits of this project.

Subparagraph 1 of the second paragraph of Section 1-07.7(1) is deleted.

The Contractor shall not operate vehicles which exceed the maximum gross weight provided by law within the following areas of this project:

*** $$1$$ ***

1-07.7.OPT3.FR1
(March 13, 1995)
The State has made arrangements with *** $$1$$ *** for the Contractor's use of the *** $$2$$ *** shown in the Plans as a haul route for materials coming from *** $$3$$ *** Site *** $$4$$ *** and used on this project. The Contractor shall comply with all existing legal restrictions.

If the Contractor selects different haul routes than those designated, the Contractor shall, at the Contractor's expense, make all arrangements for the use of the haul routes.

1-07.7.OPT4.FR1
(March 13, 1995)
The Contractor shall also comply with the further restrictions imposed by the owner of the roads as follows:

*** $$1$$ ***

1-07.7.OPT5.GR1
(March 13, 1995)
Whenever the Contractor obtains materials from a source other than that provided by the Contracting Agency, or provides a source for materials not designated to come from a source provided by the State and the location of the source necessitates hauling on other than State Highways, the Contractor shall, at the Contractor's expense, make all arrangements for the use of the haul routes.

1-07.7.OPT6.GR1
(March 13, 1995)
If the sources of materials provided by the Contractor necessitates hauling over roads other than State Highways, the Contractor shall, at the Contractor's expense, make all arrangements for the use of the haul routes.

1-07.9.GR1
Wages

1-07.9(1).GR1
General

1-07.9(1).INST1.GR1
Section 1-07.9(1) is supplemented with the following:

1-07.9(1).OPT1.GR1

(January 10, 2012)

The Federal wage rates incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. WA120001.

The State rates incorporated in this contract are applicable to all construction activities associated with this contract.

1-07.9(1).OPT2.FR1

(January 10, 2012)

The Federal wage rates for Highway Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. WA120001. These rates are applicable to highway construction.

The Federal wage rates for Building Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. *** $$1$$ ***. These rates are applicable to building construction.

The State rates incorporated in this contract are applicable to all construction activities associated with this contract.

1-07.9(1).OPT3.FR1

(May 11, 2010)

The Federal wage rates for Building Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. *** $$1$$ ***. These rates are applicable to building construction.

The State rates incorporated in this contract are applicable to all construction activities associated with this contract.

1-07.9(1).OPT4.GR1

(April 2, 2007)

Application of Wage Rates for the Occupation of Landscape Construction

State prevailing wage rates for public works contracts are included in this contract and show a separate listing for the occupation:

<u>Landscape Construction</u>, which includes several different occupation descriptions such as: Irrigation and Landscape Plumbers, Irrigation and Landscape Power Equipment Operators, and Landscaping or Planting Laborers.

In addition, federal wage rates that are included in this contract may also include occupation descriptions in Federal Occupational groups for work also specifically identified with landscaping such as:

Laborers with the occupation description, Landscaping or Planting, or

Power Equipment Operators with the occupation description, Mulch Seeding Operator.

If Federal wage rates include one or more rates specified as applicable to landscaping work, then Federal wage rates for all occupation descriptions, specific or general, must be considered and compared with corresponding State wage rates. The higher wage rate, either State or Federal, becomes the minimum wage rate for the work performed in that occupation.

Contractors are responsible for determining the appropriate crafts necessary to perform the contract work. If a classification considered necessary for performance of the work is missing from the Federal Wage Determination applicable to the contract, the Contractor shall initiate a request for approval of a proposed wage and benefit rate. The Contractor shall prepare and submit Standard Form 1444, Request for Authorization of Additional Classification and Wage Rate available at http://www.wdol.gov/docs/sf1444.pdf, and submit the completed form to the Project Engineer's office. The presence of a classification wage on the Washington State Prevailing Wage Rates For Public Works Contracts does not exempt the use of form 1444 for the purpose of determining a federal classification wage rate.

1-07.9(1).OPT5.FR1

(January 10, 2012)

The Federal wage rates for Highway Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. WA120001. These rates are applicable to highway construction.

The Federal wage rates for Heavy Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. *** $$1$$ ***. These rates are applicable to heavy construction.

The State rates incorporated in this contract are applicable to all construction activities associated with this contract.

1-07.9(1).OPT6.FR1

(January 10, 2012)

The Federal wage rates for Highway Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. WA120001. These rates are applicable to highway construction.

The Federal wage rates for Heavy Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. *** $$1$$ ***. These rates are applicable to heavy construction.

The Federal wage rates for Building Construction incorporated in this contract have been established by the Secretary of Labor under United States Department of Labor General Decision No. *** $$2$$ ***. These rates are applicable to building construction

The State rates incorporated in this contract are applicable to all construction activities associated with this contract.

1-07.11.GR1

Requirements for Nondiscrimination

1-07.11.INST1.GR1

Section 1-07.11 is supplemented with the following:

1-07.11.OPT1.GR1

(January 3, 2011)

Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)

1. The Contractor's attention is called to the Equal Opportunity Clause and the Standard Federal Equal Employment Opportunity Construction Contract Specifications set forth herein.

2. The goals and timetables for minority and female participation set by the Office of Federal Contract Compliance Programs, expressed in percentage terms for the Contractor's aggregate work force in each construction craft and in each trade on all construction work in the covered area, are as follows:

Women - Statewide

Timetable	Goal
Until further notice	6.9%

Minorities - by Standard Metropolitan Statistical Area (SMSA)

Spokane, WA:

SMSA Counties:

Spokane, WA	2.8

WA Spokane.

Non-SMSA Counties	3.0

WA Adams; WA Asotin; WA Columbia; WA Ferry; WA Garfield; WA Lincoln, WA Pend Oreille; WA Stevens; WA Whitman.

Richland, WA

SMSA Counties:

Richland Kennewick, WA	5.4

WA Benton; WA Franklin.

Non-SMSA Counties	3.6

WA Walla Walla.

Yakima, WA:
SMSA Counties:
Yakima, WA 9.7
WA Yakima.
Non-SMSA Counties 7.2
WA Chelan; WA Douglas; WA Grant; WA Kittitas; WA Okanogan.

Seattle, WA:
SMSA Counties:
Seattle Everett, WA 7.2
WA King; WA Snohomish.
Tacoma, WA 6.2
WA Pierce.
Non-SMSA Counties 6.1
WA Clallam; WA Grays Harbor; WA Island; WA Jefferson; WA Kitsap; WA Lewis; WA Mason; WA Pacific; WA San Juan; WA Skagit; WA Thurston; WA Whatcom.

Portland, OR:
SMSA Counties:
Portland, OR-WA 4.5
WA Clark.
Non-SMSA Counties 3.8
WA Cowlitz; WA Klickitat; WA Skamania; WA Wahkiakum.

These goals are applicable to each nonexempt Contractor's total on-site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, or federally assisted project, contract, or subcontract until further notice. Compliance with these goals and time tables is enforced by the Office of Federal Contract compliance Programs.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, in each construction craft and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goal shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of $10,000 or more that are Federally funded, at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the Subcontractor; employer identification number of the Subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the

subcontract; and the geographical area in which the contract is to be performed. The notification shall be sent to:

District Director
U.S. Department of Labor
Office of Federal Contract Compliance Programs
Seattle District Office
1111 Third Avenue, Suite 745
Seattle, WA 98101-3212

Additional information may be found at the U.S. Department of Labor website: http://www.dol.gov/ofccp/TAguides/ctaguide.htm

4. As used in this Notice, and in the contract resulting from this solicitation, the Covered Area is as designated herein.

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these specifications:

   a. Covered Area means the geographical area described in the solicitation from which this contract resulted;

   b. Director means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

   c. Employer Identification Number means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U. S. Treasury Department Form 941;

   d. Minority includes:

      (1) Black, a person having origins in any of the Black Racial Groups of Africa.

      (2) Hispanic, a fluent Spanish speaking, Spanish surnamed person of Mexican, Puerto Rican, Cuban, Central American, South American, or other Spanish origin.

      (3) Asian or Pacific Islander, a person having origins in any of the original peoples of the Pacific rim or the Pacific Islands, the Hawaiian Islands and Samoa.

      (4) American Indian or Alaskan Native, a person having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith effort to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of this Special Provision. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its action. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunity and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the U.S. Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and

suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of the obligations under 7a through 7p of this Special Provision provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensure that the concrete benefits of the program are reflected in the Contractor's minority and female work-force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrate the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspensions, terminations and cancellations of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of this Special Provision, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the

Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the government and to keep records. Records shall at least include, for each employee, their name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, the Contractors will not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

16. Additional assistance for Federal Construction Contractors on contracts administered by Washington State Department of Transportation or by Local Agencies may be found at:

    Washington State Dept. of Transportation
    Office of Equal Opportunity
    PO Box 47314
    310 Maple Park Ave. SE
    Olympia WA
    98504-7314
    Ph: 360-705-7090
    Fax: 360-705-6801
    http://www.wsdot.wa.gov/equalopportunity/default.htm

1-07.11.OPT2.GR1

(May 7, 2012)

Disadvantaged Business Enterprise Participation

The Disadvantaged Business Enterprise (DBE) requirements of 49 CFR Part 26 apply to this Contract. As such, the requirements of this Contract are to make affirmative efforts to solicit DBEs, provide information on who submitted a Bid or quote and to report DBE participation quarterly as described elsewhere in these Contract Provisions. No preference will be included in the evaluation of Bids/Proposals, no minimum level of DBE participation shall be required as a Condition of Award and Bids/Proposals may not be rejected or considered non-responsive on that basis.

DBE Goals

No DBE goals have been assigned as part of this Contract.

Affirmative Efforts to Solicit DBE Participation

DBE firms shall have an equal opportunity to compete for subcontracts in which the Contractor enters into pursuant to this Contract.

Contractors are encouraged to:

1. Advertise opportunities for Subcontractors or suppliers in a timely and reasonably designed manner to provide notice of the opportunity to DBEs capable of performing the Work. All advertisements should include a Contract Provision encouraging participation by DBE firms. This may be accomplished through general advertisements (e.g. newspapers, journals, etc.) or by soliciting Bids/Proposals directly from DBEs.

   Note: A Directory of Certified DBE Firms denoting the Description of Work the DBE Contractors are certified to perform is available at:

   www.omwbe.wa.gov/certification/index.shtml.

   The directory provides a plain language on the Description of Work that the listed DBE's have been certified by the Office of Minority and Women's Business Enterprises (OMWBE) to perform.

2. Establish delivery schedules that encourage participation by DBEs and other small businesses.

3. Participate with a DBE as a joint venture.

DBE Eligibility/Selection of DBEs for Reporting Purposes Only

Contractors may take credit for DBEs utilized on this Contract only if the firm is certified for the Work being performed.

Absent a mandatory goal, all DBE participation that is attained on this project will be considered as "race neutral" participation and shall be reported as such.

Crediting DBE Participation for Reporting Purposes

Joint Venture

When a DBE performs as a participant in a joint venture, only that portion of the total dollar value of the Contract equal to the distinct, clearly defined portion of the Work that the DBE performs with its own forces shall be credited.

DBE Prime Contractor

A DBE Prime Contractor may only take credit for that portion of the total dollar value of the Contract equal to the distinct, clearly defined portion of the Work that the DBE Prime Contractor performs with its own forces.

DBE Subcontractor

When a DBE firm participates as a Subcontractor, only that portion of the total dollar value of the Contract equal to the distinct, clearly defined portion of the Work that the DBE performs with its own forces shall be credited.

- Include the cost of supplies and materials obtained by the DBE for the Work in the Contract including supplies purchased or equipment leased by the DBE. However, you may not take credit supplies, materials, and equipment the DBE Subcontractor purchases or leases from the Prime Contractor or its affiliate. In addition, Work performed by a DBE, utilizing resources of the Prime Contractor or its affiliates shall not be credited.

- In very rare situations, a DBE firm may utilize equipment and/or personnel from a non-DBE firm other than the Prime Contractor or its affiliates. Should this situation arise the arrangement must be short-term and have prior written approval from the Office of Equal Opportunity (OEO). The arrangement must not impact a DBE firm's ability to perform a Commercially Useful Function (CUF).

- Count the entire value of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, managerial services, or for providing bonds or insurance.

- When a DBE subcontracts to another firm, the value of the subcontracted Work may be counted as participation only if the DBE's lower tier Subcontractor is also a DBE.

- When non-DBE Subcontractor further subcontracts to a lower-tier Subcontractor or supplier who is a certified DBE, then that portion of the Work further subcontracted may be credited as DBE participation, so long as it is a distinct clearly defined portion of the Work that the DBE is performing with its own forces.
- If a firm is not certified as a DBE at the time of the execution of the contract, their participation cannot be counted toward any DBE goals.

Trucking

Use the following factors in determining DBE credit and whether a DBE trucking company is performing a Commercially Useful Function (CUF):

1. The DBE must be responsible for the management and supervision of the entire trucking operation for which credit is being claimed.

2. The DBE must itself own and, with its own workforce, operate at least one fully licensed, insured, and operational truck used on the Contract.

3. The DBE receives credit only for the value of the transportation services it provides on the Contract using trucks it owns or leases, licenses, insures, and operates with drivers it employs. For purposes of this requirement a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others provided it is with the consent of the DBE and the lease provides the DBE first priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

4. The DBE may lease trucks from another DBE firm including an owner-operator provided they are certified as a DBE for trucking. The DBE who leases trucks from another DBE may claim participation for the total value of the transportation services the lessee DBE provides on the Contract.

5. The DBE may also lease trucks from a non-DBE firm and may enter into an agreement with an owner-operator who is a non-DBE. The DBE shall only receive credit for the number of additional non-DBE trucks equal or less than the number of DBE trucks the firms owns or has leased/subcontracted through another DBE trucking company. The DBE must control the work of the non-DBE trucks. If the non-DBE is performing the Work without supervision of that Work by the DBE, the DBE is not performing a Commercially Useful Function (CUF).

6. In any lease or owner-operator situation, as described in requirement #4 and #5 above, the following rules shall apply:

    a. A written lease/rental agreement is required for all trucks leased or rented; documenting the ownership and the terms of the agreement. The agreements must be submitted and approved by the Contracting Agency prior to the beginning of the Work. The agreement must show the leaser's name, truck description and agreed upon amount and method of payment (hour, ton, or per load). All lease agreements shall be for a long-term relationship, rather than for the individual project. (This requirement does not apply to owner-operator arrangements.)

    b. Only the vehicle, (not the operator) may be leased or rented. (This requirement does not apply to owner-operator arrangements.)

7. Credit may only be claimed for DBE trucking firms operating under a subcontract or a written agreement approved by the Contracting Agency prior to performing Work.

Expenditures paid to other DBEs

Expenditures paid to other DBEs for materials or supplies may be counted toward DBE goals as provided in the following:

Manufacturer

You may claim DBE credit for 100 percent of value of the materials or supplies obtained from a DBE manufacturer.

A manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract. A manufacturer shall include firms that produce finished goods or products from raw or

unfinished material or that purchases and substantially alters goods and materials to make them suitable for construction use before reselling them.

In order to receive credit as a DBE Manufacturer, the firm must be certified by OMWBE as a manufacturer in a NAICS code that falls within the 31XXXX to 33XXXX classification.

Regular Dealer

You may claim credit for 60 percent of the value of the materials or supplies purchased from a DBE regular dealer. Rules applicable to regular dealer status are contained in 49 CFR Part 26.55.e.2.

To be considered a regular dealer you must meet the following criteria:

1. WSDOT considers and recognizes a regular dealer, as a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the Contract and described by the specifications of the Contract are bought, kept in stock and regularly sold or leased to the public in the usual course of business.

2. Sixty percent (60%) of the cost of materials or supplies purchased from an approved regular dealer may be credited as DBE participation.

Regular dealer status is granted on a contract-by-contract basis. A firm wishing to be approved as a regular dealer for WSDOT contracted projects or Highways & Local Program administered projects must submit a request in writing to the OEO no later than seven days prior to bid opening.

Once the OEO has received the request, an onsite review will be set up with the firm and a review conducted to determine the firm's qualifications. If it is determined that the firm qualifies as a regular dealer the OEO will list the firm on an approved regular dealers List. The list may be accessed through the OEO Home website is at:

www.wsdot.wa.gov/equalopportunity

Note: Requests to be listed as a regular dealer will only be processed if the requesting firm is certified by the Office of Minority and Women's Business Enterprises in a NAICS code that fall within the 42XXXX NAICS Wholesale code section.

Materials or Supplies Purchased from a DBE

With regard to materials or supplies purchased from a DBE who is neither a manufacturer nor a regular dealer you may claim credit for the following:

1. Fees or commissions charged for assistance in the procurement of the materials and supplies.

2. Fees or transportation charges for the delivery of materials or supplies.

In either case, you may not take credit for any part of the cost of the materials and supplies.

Joint Checking Allowance

Prime Contractors and DBEs must receive pre-approval by the OEO before using a joint check. Joint check requests shall be submitted, by the Prime Contractor to the Contracting Agency for approval.

When requesting approval for use of a joint checking allowance, the Contractor must distribute a written joint check agreement among the parties (including the suppliers involved) providing full and prompt disclosure of the expected use of the joint checks. The agreement shall contain all the information concerning the parties' obligations and consequences or remedies if the agreement is not fulfilled or a breach occurs. The joint check request shall be submitted to the Contracting Agency for approval prior to signing the Contract agreement.

The following are some general conditions that must be met by all parties regarding joint check use:

a. It is understood the Prime Contractor acts as the guarantor of a joint check.

b. The DBE's own funds are used to pay supplier of materials. The Prime Contractor does not make direct payment to supplier. In order to be performing a Commercially Useful Function (CUF), the DBE must release the check to the supplier (paying for the materials it-self and not be an extra participant in a transaction).

c. If the Prime Contractor makes joint checks available to one DBE Subcontractor, the service must be made available to all Subcontractors (DBE and non-DBE).

d. The relationship between the DBE and its suppliers should be established independently of and without interference by the Prime Contractor. The DBE has final decision-making responsibility concerning the procurement of materials and supplies, including which supplier to use.

e. The Prime Contractor and DBE shall be able to provide receipts, invoices, cancelled checks and/or certification statements of payment if requested by the Contracting Agency.

f. The DBE remains responsible for all other elements of 49 CFR 26.55(c) (1).

Failure by the Prime Contractor to request and to receive prior approval of a joint check arrangement will result in the joint check amount not counting towards the Prime Contractor's DBE goal.

Commercially Useful Function (CUF)

In any case, you may only take credit when the associated DBE that is determined to be performing a Commercially Useful Function (CUF).

- A DBE performs a CUF when it is responsible for execution of a distinct element of Work and is carrying out its responsibilities by performing, managing and supervising the Work involved. The DBE must also be responsible with respect to materials and supplies used on the Contract. For example; negotiating price, determining quality, determining quantities, ordering, installing (if applicable) and paying for the material itself.

- A DBE does not perform a CUF if its role is limited to that of an extra participant in a transaction, Contract, or project through which funds are passed.

Procedures Between Award and Execution

After award and prior to Execution of the Contract, the successful Bidder shall provide additional information as described below. Failure to comply may result in the forfeiture of the Bidder's Proposal bond or deposit.

A list of all firms who submitted a Bid or quote in an attempt to participate in this project whether they were successful or not.

Include the correct business name, federal employer identification number (optional) and a mailing address.

The firms identified by the Prime Contractor may be contacted by Contracting Agency to solicit general information as follows:

1. Age of the firm.

2. Average of its gross annual receipts over the past three years.

Procedures after Execution

Reporting

Quarterly Report of Amounts Credited as DBE Participation Form #422-102

The Prime Contractor shall submit a Quarterly Report of Amounts Credited as DBE Participation form (422-102 EF) on a quarterly basis for any calendar quarter in which DBE Work is accomplished or upon completion of the project, as appropriate. This is a record of payments to the DBE that the Prime Contractor is taking credit for as DBE participation. The dollars reported as specified in Crediting DBE Participation for Reporting Purposes section of this contract provision.

In the event that the payments to a DBE have been made by an entity other than the Prime Contractor (as in the case of a lower-tier Subcontractor or supplier), then the Prime Contractor shall obtain the quarterly report, including the signed affidavit, from the paying entity and submit the report to the Contracting Agency.

Payment
Compensation for all costs associated with complying with the conditions of this specification shall be included in payment for the associated Contract items of Work.

Prompt Payment
Prompt payment to all Subcontractors shall be in accordance with Section 1-08.1(1) of the Contract Provisions.

Damages for Noncompliance
The Prime Contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Prime Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of Contracts, which contain funding assistance from the United States Department of Transportation. Failure by the Prime Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the Contracting Agency deems appropriate.

1-07.11.OPT3.FR1
(May 7, 2012)
Disadvantaged Business Enterprise Condition of Award Participation
The Disadvantaged Business Enterprise (DBE) requirements of 49 CFR Part 26 apply to this Contract. Demonstrating compliance with these specifications is a Condition of Award (COA) of this Contract. Failure to comply with the requirements of this specification may result in your bid being found to be nonresponsive and may be rejected.

DBE COA Goal
The Contracting Agency has established a COA Contract goal in the amount of: *** $$1$$ ***.

DBE Eligibility/Selection of DBEs
A Directory of Certified DBE Firms denoting the Description of Work the DBE Contractors are certified to perform is available at:

www.omwbe.wa.gov/certification/index.shtml.

The directory provides plain language on the Description of Work that the listed DBE's have been certified by the Office of Minority and Women's Business Enterprises (OMWBE) to perform. The Bidder shall use the Directory of Certified DBE Firms to confirm if a DBE is certified for the "Description of Work" the Bidder lists on the DBE Utilization Certification form #

272-056 EF (see form instructions) and therefore qualifies for credit towards the COA goal.

Crediting DBE Participation

Joint Venture

When a DBE performs as a participant in a joint venture, only that portion of the total dollar value of the Contract equal to the distinct, clearly defined portion of the Work that the DBE performs with its own forces shall be credited.

DBE Prime Contractor

A DBE Prime Contractor may only take credit for that portion of the total dollar value of the Contract equal to the distinct, clearly defined portion of the Work that the DBE Prime performs with its own forces.

DBE Subcontractor

When a DBE firm participates as a Subcontractor only that portion of the total dollar value of the Contract equal to the distinct, clearly defined portion of the Work that the DBE performs with its own forces shall be credited.

- Include the cost of supplies and materials obtained by the DBE for the Work in the Contract including supplies purchased or equipment leased by the DBE.
    - However, you may not take credit for supplies, materials, and equipment the DBE Subcontractor purchases or leases from the Prime Contractor or its affiliate. In addition, Work performed by a DBE, utilizing resources of the Prime Contractor or its affiliates shall not be credited.
- In very rare situations, a DBE firm may utilize equipment and/or personnel from a non-DBE firm other than the Prime Contractor or its affiliates. Should this situation arise the arrangement must be short-term and have prior written approval from the Office of Equal Opportunity (OEO).
- Count the entire value of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, managerial services, or for providing bonds or insurance.
- When a DBE subcontracts to another firm, the value of the subcontracted Work may be counted as participation only if the DBE's lower tier Subcontractor is also a DBE. Work that a DBE subcontracts to a non-DBE firm shall not be credited.
- When non-DBE Subcontractor further subcontracts to a lower-tier Subcontractor or supplier who is a certified DBE, then that portion of the Work further subcontracted may be credited as DBE participation, provided it is a distinct clearly defined portion of the Work that the DBE is certified to perform and the DBE Subcontractor performs the Work with its own forces.

- If a firm is not certified as a DBE at the time of the execution of the contract, their participation cannot be counted toward any DBE goals.

Trucking

Use the following factors in determining DBE credit and whether a DBE trucking company is performing a commercially useful function:

1. The DBE must be responsible for the management and supervision of the entire trucking operation for which credit is being claimed.

2. The DBE must itself own and, with its own workforce, operate at least one fully licensed, insured, and operational truck used on the Contract.

3. The DBE receives credit only for the value of the transportation services it provides on the Contract using trucks it owns or leases, licenses, insures, and operates with drivers it employs. For purposes of this requirement a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others provided it is with the consent of the DBE and the lease provides the DBE first priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

4. The DBE may lease trucks from another DBE firm including an owner-operator provided they are certified as a DBE for trucking. The DBE who leases trucks from another DBE may claim participation for the total value of the transportation services the lessee DBE provides on the Contract.

5. The DBE may also lease trucks from a non-DBE firm and may enter into an agreement with an owner-operator who is a non-DBE. The DBE shall only receive credit for the number of additional non-DBE trucks equal or less than the number of DBE trucks the firms owns or has leased/subcontracted through another DBE trucking company. The DBE must control the work of the non-DBE trucks. If the non-DBE is performing the work without supervision of that work by the DBE, the DBE is not performing a Commercially Useful Function (CUF).

6. In any lease or owner-operator situation, as described in requirement #4 and #5 above, the following rules shall apply:

    a. A written lease/rental agreement is required for all trucks leased or rented; documenting the ownership and the terms of the agreement. The agreements must be submitted and approved by the Contracting Agency prior to the beginning of the Work. The agreement must show the leaser's name, truck description and agreed upon amount and method of payment (hour, ton, or per load). All lease agreements shall be for a long-term relationship, rather than for the individual

project. (This requirement does not apply to owner-operator arrangements.)

b. Only the vehicle, (not the operator) may be leased or rented. (This requirement does not apply to owner-operator arrangements).

7. Credit may only be claimed for DBE trucking firms operating under a subcontract or a written agreement approved by the Contracting Agency prior to performing Work.

Expenditures paid to other DBEs

Expenditures paid to other DBEs for materials or supplies may be counted toward DBE goals as provided in the following:

Manufacturer

You may claim DBE credit for 100 percent of value of the materials or supplies obtained from a DBE manufacturer.

A manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract. A manufacturer shall include firms that produce finished goods or products from raw or unfinished material or that purchases and substantially alters goods and materials to make them suitable for construction use before reselling them.

In order to receive credit as a DBE Manufacturer, the firm must be certified by OMWBE as a manufacturer in a NAICS code that falls within the 31XXXX to 33XXXX classification.

Regular Dealer

You may claim credit for 60 percent of the value of the materials or supplies purchased from a DBE regular dealer. Rules applicable to regular dealer status are contained in 49 CFR Part 26.55.e.2.

To be considered a regular dealer you must meet the following criteria:

- WSDOT considers and recognizes a regular dealer, as a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the Contract and described by the specifications of the Contract are bought, kept in stock and regularly sold or leased to the public in the usual course of business.

- Sixty percent (60%) of the cost of materials or supplies purchased from an approved regular dealer may be credited as DBE participation.

Regular dealer status is granted on a contract-by-contract basis. A firm wishing to be approved as a regular dealer for WSDOT contracted

projects or Highways & Local Program administered projects must submit a request in writing to OEO for approval, no later than seven days prior to bid opening.

Once the OEO has received the request, an onsite review will be set up with the firm and a review conducted to determine the firm's qualifications. If it is determined that the firm qualifies as a regular dealer the OEO will list the firm on an Approved Regular Dealers List. The list may be accessed through the OEO Home website is at:

www.wsdot.wa.gov/equalopportunity.

Note: Requests to be listed as a regular dealer will only be processed if the requesting firm is certified by the Office of Minority and Women's Business Enterprises in a NAICS code that fall within the 42XXXX NAICS Wholesale code section.

Materials or Supplies Purchased from a DBE

With regard to materials or supplies purchased from a DBE who is neither a manufacturer nor a regular dealer you may claim credit for the following:

1. Fees or commissions charged for assistance in the procurement of the materials and supplies.

2. Fees or transportation charges for the delivery of materials or supplies.

In either case you may not take credit for any part of the cost of the materials and supplies.

Commercially Useful Function (CUF)

The Prime Contractor has a responsibility and must treat the working relationship with the DBE such that the DBE is performing a commercially useful function. The Prime Contractor may only take credit for Work performed by a DBE that is determined to be performing a commercially useful function.

- A DBE performs a commercially useful function when it is responsible for execution of a distinct element of Work and is carrying out its responsibilities by performing, managing and supervising the Work involved. The DBE must also be responsible with respect to materials and supplies used on the Contract. For example; negotiating price, determining quality, determining quantities, ordering, installing (if applicable) and paying for the material itself.

- A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, Contract, or project through which funds are passed.

Joint Checking Allowance

Prime Contractors and DBEs must receive pre-approval by the OEO before using a joint check. Joint check requests shall be submitted by the Prime Contractor to the Contracting Agency for approval.

When requesting approval for use of a joint checking allowance, the Contractor must distribute a written joint check agreement among the parties (including the suppliers involved) providing full and prompt disclosure of the expected use of the joint checks. The agreement shall contain all the information concerning the parties' obligations and consequences or remedies if the agreement is not fulfilled or a breach occurs. The joint check request shall be submitted to the Contracting Agency for approval prior to signing the contract agreement.

The following are some general conditions that must be met by all parties regarding joint check use:

a. It is understood that the Prime Contractor acts solely as the guarantor of a joint check.

b. The DBE's own funds are used to pay supplier of materials. The Prime Contractor does not make direct payment to supplier. In order to be performing a Commercially Useful Function (CUF), the DBE must release the check to the supplier (paying for the materials it-self and not be an extra participant in a transaction).

c. If the Prime Contractor makes joint checks available to one DBE Subcontractor, the service must be made available to all Subcontractors (DBE and non-DBE).

d. The relationship between the DBE and its suppliers should be established independently of and without interference by the Prime Contractor. The DBE has final decision-making responsibility concerning the procurement of materials and supplies, including which supplier to use.

e. The Prime Contractor and DBE shall be able to provide receipts, invoices, cancelled checks and/or certification statements of payment if requested by the Contracting Agency.

f. The DBE remains responsible for all other elements of 49 CFR 26.55(c)(1).

Failure by the Prime Contractor to request and receive prior approval of a joint check arrangement will result in the joint check amount not counting towards the Prime Contractor's DBE goal.

Disadvantaged Business Enterprise Utilization Certification FORM # 272-056 EF

To be eligible for award of the Contract, the Bidder shall properly complete and submit a Disadvantaged Business Enterprise Utilization Certification with the Bidder's sealed Bid Proposal, as specified Section 1-02.9 Delivery of Proposal.

The Bidder's Disadvantaged Business Enterprise Utilization Certification must clearly demonstrate how the Bidder intends to meet the DBE COA goal. A Disadvantaged Business Enterprise Utilization Certification (form # 272-056 EF) is included in your Proposal package for this purpose as well as instructions on how to properly fill out the form.

In the event of arithmetic errors in completing the Disadvantaged Business Enterprise Utilization Certification the amount listed to be applied towards the goal for each DBE shall govern and the DBE total amount shall be adjusted accordingly.

Note: The Contracting Agency shall consider as non-responsive and shall reject any Bid Proposal submitted that does not contain a Disadvantaged Business Enterprise Utilization Certification that accurately demonstrates how the Bidder intends to meet the COA goal.

Disadvantaged Business Enterprise (DBE) Written Confirmation Document(s) FORM # 422-031 EF

The Bidder shall submit a complete and accurate Disadvantaged Business Enterprise (DBE) Written Confirmation Document for each DBE firm listed in the Bidder's completed Disadvantaged Business Enterprise Utilization Certification as submitted with the bid. Failure to do so will result in the associated participation being disallowed, which may result in bid rejection.

A Disadvantaged Business Enterprise (DBE) Written Confirmation Document (form No. 422-031 EF) is included in your Proposal package for this purpose.

The form(s) shall be received as specified in the special provisions for Section 1-02.9 Delivery of Proposal.

It is prohibited for the Bidder to require a DBE to submit a Written Confirmation Document with any part of the form left blank. Should the Contracting Agency determine that a Written Confirmation Document was signed by a DBE that was not complete; the validity of the document comes into question and the associated DBE Participation may not receive credit.

Selection of Successful Bidder/Good Faith Efforts (GFE)

The successful Bidder shall be selected on the basis of having submitted the lowest responsive Bid, which demonstrates a good faith effort to achieve the DBE COA goal. Achieving the goal may be accomplished in one of two ways, as follows:

1. <u>By meeting the goal</u>
   The best indication of good faith efforts is to document, through submission of the Disadvantaged Business Enterprise Utilization Certification and supporting Disadvantaged Business Enterprise (DBE) Written Confirmation Document(s) that the Bidder has obtained enough DBE participation to meet or exceed the assigned DBE COA contract goal. That being the case no additional GFE documentation is required. Or;

2. By documentation that it made adequate GFE to meet the goal
The Bidder may demonstrate a GFE in whole or part through GFE documentation ONLY IN THE EVENT a Bidder's efforts to solicit sufficient DBE participation have been unsuccessful. In this case, the Bidder must supply GFE documentation in addition to the Disadvantaged Business Enterprise Utilization Certification, and supporting Disadvantaged Business Enterprise (DBE) Written Confirmation document(s).

Note: In the case where the Bidder was awarded the contract based on demonstrating adequate GFE the advertised DBE goal will not be reduced to the Bidder's partial commitment. The Bidder shall demonstrate a GFE during the life of the Contract to attain the DBE Condition of Award (COA) Goal as assigned to the project.

Good Faith Efforts (GFE) Documentation

GFE documentation shall be received, as specified in the special provisions for Section 1-02.9 Delivery of Proposal.

Based upon all the relevant documentation submitted in Bid or as supplement to Bid, the Contracting Agency shall determine whether the Bidder has demonstrated a sufficient GFE to achieve DBE participation. The Contracting Agency will make a fair and reasonable judgment of whether a Bidder that did not meet the goal through participation, made adequate good faith efforts as demonstrated by the GFE documentation.

The following is a list of types of actions, which would be considered as part of the Bidder's GFE to achieve DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases:

1. Attendance by the Bidder at any pre-solicitation or pre-Bid meetings that were scheduled by the Contracting Agency to inform DBEs of contracting and subcontracting or material supply opportunities available on the project;
2. Contacting local Tribes, Tribal Employment Rights Offices (TERO) concerning the subcontracting or supply opportunities in sufficient time to allow the enterprises to participate effectively;
3. Selection by the Bidder of specific economically feasible units of the project to be performed by DBEs in order to increase the likelihood of participation by DBEs even if the Bidder preferred to perform these Work items as the Prime Contractor;
4. Advertising by the Bidder in general circulation, trade association minority and trade oriented, women focus publications, concerning the subcontracting or supply opportunities;
5. Providing written notice from the Bidder to a reasonable number of specific DBEs, identified from the OMWBE Directory of Certified DBE

Firms for the selected subcontracting or material supply Work, in sufficient time to allow the enterprises to participate effectively;

6. Follow-up by the Bidder of initial solicitations of interest by contacting the DBEs to determine with certainty whether they were interested. Documentation of this kind of action shall include the information outlined below:

    a. The names, addresses, telephone numbers of DBEs who were contacted, the dates of initial contact, and whether initial solicitations of interest were followed-up by contacting the DBEs to determine with certainty whether the DBEs were interested;

    b. A description of the information provided to the DBEs regarding the plans, specifications, and estimated quantities for portions of the Work to be performed;

    c. Documentation of each DBE contacted but rejected and the reason(s) for that rejection;

7. Providing, to interested DBEs, adequate information about the plans, specifications, and requirements for the selected subcontracting or material supply Work;

8. Negotiating in good faith with the DBE firms, and not, without justifiable reason, rejecting as unsatisfactory, Bids that are prepared by any DBE. The DBE's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations - union vs. non-union employee status - are not legitimate causes for the rejection or non-solicitation of bids in the Prime Contractor's efforts to meet the project goal;

9. Advertising and making efforts to obtain DBE participation that were reasonably expected to produce a level of participation sufficient to meet the goal or requirements of the Contracting Agency;

10. Making any other efforts to obtain DBE participation that were reasonably expected to produce a level of participation sufficient to meet the goal or requirements of the Contracting Agency;

11. Using the services of minority community organizations, minority contractor groups, local, State, and federal minority business assistance offices and other organizations identified by WSDOT and advocates for disadvantaged, minority, and women businesses that provide assistance in the recruitment and placement of disadvantaged, minority, and women business enterprises; and

12. Using the WSDOT OEO DBE Supportive Services to assist you. For more information please contact the OEO by calling toll free at (888) 259-9143 or emailing dbess@wsdot.wa.gov.

Administrative Reconsideration of GFE Documentation

Any Bidder has the right to reconsideration but only for the purpose of reassessing their GFE documentation that was determined to be inadequate.

- The Bidder must request and schedule a reconsideration hearing within seven calendar days of notification of being nonresponsive or forfeit the right to reconsideration.

- The reconsideration decision on the adequacy of the Bidder's GFE documentation shall be made by an official who did not take part in the original determination.

- The Bidder shall have the opportunity to meet in person with the official for the purpose of setting forth the Bidder's position as to why the GFE documentation demonstrates a sufficient effort.

- The reconsideration official shall provide the Bidder with a written decision on reconsideration within five business days of the hearing explaining the basis for their finding.

Procedures between Award and Execution

After Award and prior to Execution the Bidder shall provide the additional information described below. Failure to comply shall result in the forfeiture of the Bidder's Proposal bond or deposit.

1. Additional information for all successful DBE's as shown on the Disadvantaged Business Enterprise Utilization Certification:

    a. Correct business name, federal employee identification number (if available), and mailing address.

    b. List of all Bid items assigned to each successful DBE firm, including unit prices and extensions.

    c. Description of partial items (if any) to be sublet to each successful DBE firm specifying the distinct elements of Work under each item to be performed by the DBE and including the dollar value of the DBE portion.

    Total amounts shown for each DBE shall not be less than the amount shown on the Disadvantaged Business Enterprise Utilization Certification. A breakdown that does not conform to the Disadvantaged Business Enterprise Utilization Certification or that demonstrates a lesser amount of DBE participation than that included in the Disadvantaged Business Enterprise Utilization Certification will be returned for correction.

2. A list of all firms who submitted a Bid or quote in an attempt to participate in this project whether they were successful or not. Include the business name and a mailing address.

Note: The firms identified by the Prime Contractor may be contacted by the Contracting Agency to solicit general information as follows: age of the firm and average of its gross annual receipts over the past three-years.

Procedures after Execution

Crediting DBE Participation toward Meeting the Goal

Reporting

All DBE work whether COA or race neutral participation is reported. The Prime Contractor shall submit a Quarterly Report of Amounts Credited as DBE Participation form (422-102 EF) on a quarterly basis for any calendar quarter in which DBE has accomplished Work or upon completion of the project, as appropriate. The dollars are to be reported as specified herein.

In the event that the payments to a DBE have been made by an entity other than the Prime Contractor, as in the case of a lower-tier Subcontractor or supplier, then the Prime Contractor shall obtain the quarterly report, including the signed affidavit, from the paying entity and submit the report to the Contracting Agency.

Changes in DBE COA participation

Owner initiated Change Orders

The Prime Contractor shall demonstrate a GFE to substitute COA DBE participation when the Contracting Agency deletes Work items by change order that impact a COA DBE's Work.

When the Contract allows alternate Work methods which serve to delete or create under-runs in COA DBE Work then the Prime Contractor must provide documentation of negotiating the change with the DBE that was to perform the reduced Work and demonstrate a GFE to substitute other DBE COA participation.

Original Quantity Under runs

In the event that Work committed to a DBE firm as part of the COA under runs the original planned quantities the Prime Contractor shall demonstrate a GFE to substitute other DBE COA participation.

Contractor-Initiated Proposals—General

The Contractor cannot reduce the amount of work committed to a DBE firm at contract award without good cause and only with written concurrence from the OEO. Reducing a COA DBE's Work is viewed as a partial DBE termination, subject to the procedures below.

DBE Termination

A COA DBE Subcontractor may only be terminated in whole or part with the approval of the Contracting Agency (in coordination with OEO). Approval will be granted provided the Prime Contractor demonstrates that the termination is based on good cause.

Good cause typically includes situations where the DBE Subcontractor is unable or has failed to perform the work of its subcontract in accordance with normal industry standards. While not all inclusive, some examples of good cause include the following circumstances:

Good cause may exist if:

- The listed DBE Subcontractor fails or refuses to execute a written contract.

- The listed DBE Subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards.

- The listed DBE Subcontractor fails or refuses to meet the Prime Contractor's reasonable, nondiscriminatory bond requirements.

- The listed DBE Subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness.

- The listed DBE Subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1,200 or applicable state law.

- The listed DBE Subcontractor voluntarily withdraws from the project and provides to you written notice of its withdrawal.

- The listed DBE is ineligible to receive DBE credit for the type of work required.

- A DBE owner dies or becomes disabled with the result that the listed DBE is unable to complete its work on the contract.

Good cause does not exist if:

- The Prime Contractor seeks to terminate a COA DBE so that the Prime can self-perform the Work.

- The Prime Contractor seeks to terminate a COA DBE so the Prime Contractor can substitute another DBE or non-DBE after contract award.

- The failure or refusal of the DBE Subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Prime Contractor (e.g., the failure of the Prime Contractor to make timely payments or the unnecessary placing of obstacles in the path of the DBE's Work).

Prior to requesting termination, the Prime Contractor must give notice in writing to the DBE Subcontractor with a copy to the Contracting Agency of its intent to request to terminate DBE work and the reasons for doing so. The DBE Subcontractor shall have five (5) days to respond to the prime Contractor's notice. The DBE's response shall either support the termination or advise the Contracting Agency and the Prime Contractor of the reasons it objects to the termination of its subcontract.

Decertification

When a DBE is performing as a COA in any capacity and the DBE becomes decertified during the course of the Work for reasons other than graduation, the portion of the Work performed after the decertification shall not be credited and the Contractor is obligated to make a good faith effort to substitute other DBE participation to meet the goal.

Counting payments

Payments to a DBE firm will count toward DBE goals only if the participation is in accordance with these specifications.

Prompt Payment

Prompt payment to all Subcontractors shall be in accordance with Section 1-08.1(1) of these Contract special provisions.

Payment

Compensation for all costs involved with complying with the conditions of this specification and any other associated DBE requirements is included in payment for the associated Contract items of Work.

Damages for Noncompliance

The Prime Contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Prime Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of Contracts, which contain funding assistance from the United States Department of Transportation. Failure by the Prime Contractor to carry out these requirements is a material breach of this Contract, which may result in the Termination of this Contract or such other remedy as the Contracting Agency deems appropriate.

If the Prime Contractor does not comply with any part of its Contract as required under 49 CFR part 26, and/or any other applicable law or regulation regarding DBE, the Contracting Agency may withhold payment, suspend the ability of the Prime Contractor to participate in future Contracting Agency contracts, impose sanctions or Terminate the Contract, and subject the Prime Contractor to civil penalties of up to ten percent of the amount of the Contract for each violation. In the case of WSDOT Contracts, prequalification may be suspended pursuant to WAC 468-16-180, and continuous violations (exceeding a single violation) may also disqualify the Prime Contractor from further participation in WSDOT Contracts for a period of up to three years.

An apparent low Bidder must be in compliance with these Contract Provisions as a condition precedent to the granting of a notice of award by the Contracting Agency. The Prime Contractor is entitled to request an adjudicative proceeding with respect to the Contracting Agency's determination of Contract violation and assessed penalties by filing a written application within thirty days of receipt of notification. The adjudicative proceeding, if requested, will be conducted by an administrative law judge pursuant to the procedures set forth in RCW 34.05 and Chapter 10.08 of the Washington Administrative Code.

1-07.11.OPT4.FR1

(August 2, 2010)

Special Training Provisions

General Requirements

The Contractor's equal employment opportunity, affirmative action program shall include the requirements set forth below. The Contractor shall provide on-the-job training aimed at developing trainees to journeyman status in the trades involved. The number of training hours shall be *** $$1$$ ***. Trainees shall not be assigned less than 400 hours. The Contractor may elect to accomplish training as part of the work of a subcontractor, however, the Prime Contractor shall retain the responsibility for complying with these Special Provisions. The Contractor shall also ensure that this training provision is made applicable to any subcontract that includes training.

Trainee Approval

The Federal government requires Contracting Agencies to include these training provisions as a condition attached to the receipt of Federal highway funding. The Federal government has determined that the training and promotion of members of certain minority groups and women is a primary objective of this training provision. The Contractor shall make every effort to enroll minority groups and women trainees to the extent such persons are available within a reasonable recruitment area. This training provision is not intended and shall not be used to discriminate against any applicant for training, whether that person is a minority, woman or otherwise. A non-minority male trainee or apprentice may be approved provided the following requirements are met:

1. The Contractor is otherwise in compliance with the contract's Equal Employment Opportunity and On-the-Job Training requirements and provides documentation of the efforts taken to fill the specific training position with either minorities or females

2. or, if not otherwise in compliance, furnishes evidence of his/her systematic and direct recruitment efforts in regard to the position in question and in promoting the enrollment and/or employment of minorities and females in the craft which the proposed trainee is to be trained

3. and the Contractor has made a good faith effort towards recruiting of minorities and women. As a minimum this good faith effort shall consist of the following:

- Distribution of written notices of available employment opportunities with the Contractor and enrollment opportunities with its unions. Distribution should include but not be limited to; minority and female recruitment sources and minority and female community organizations;

- Records documenting the Contractor's efforts and the outcome of those efforts, to employ minority and female applicants and/or refer them to unions;

- Records reflecting the Contractor's efforts in participating in developing minority and female on-the-job training opportunities, including upgrading programs and apprenticeship opportunities;

- Distribution of written notices to unions and training programs disseminating the Contractor's EEO policy and requesting cooperation in achieving EEO and OJT obligations.

No employee shall be employed as a trainee in any classification in which the employee has successfully completed a training course leading to journeyman status or in which the employee has been employed as a journeyman. The Contractor's records shall document the methods for determining the trainee's status and findings in each case. When feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

For the purpose of this specification, acceptable training programs are those employing trainees/apprentices registered with the following:

1. Washington State Department of Labor & Industries — State Apprenticeship Training Council (SATC) approved apprenticeship agreement:

    a. Pursuant to RCW 49.04.060, an apprenticeship agreement shall be;

        i. an individual written agreement between an employer and apprentice
        ii. a written agreement between (an employer or an association of employers) and an organization of employees describing conditions of employment for apprentices
        iii. a written statement describing conditions of employment for apprentices in a plant where there is no bona fide employee organization.

    All such agreements shall conform to the basic standards and other provisions of RCW Chapter 49.

2. Apprentices must be registered with U.S. Department of Labor — Bureau of Apprenticeship Training (BAT) approved program.

Or

3. Trainees participating in a non-BAT/SATC program, which has been approved by the contracting agency for the specific project.

4. For assistance in locating trainee candidates, the Contractor may call WSDOT's OJT Support Services Technical Advisor at (360) 705-7088, (206) 587-4954 or toll free at 1-866-252-2680.

Obligation to Provide Information

Upon starting a new trainee, the Contractor shall furnish the trainee a copy of the approved program the Contractor will follow in providing the training. Upon completion of the training, the Contractor shall provide the Contracting Agency with a certification showing the type and length of training satisfactorily completed by each trainee.

Training Program Approval

The Training Program shall meet the following requirements:

1. The Training Program (DOT Form 272-049) must be submitted to the Engineer for approval prior to commencing contract work and shall be resubmitted when modifications to the program occur.

2. The minimum length and type of training for each classification will be as established in the training program as approved by the Contracting Agency.

3. The Training Program shall contain the trades proposed for training, the number of trainees, the hours assigned to the trade and the estimated beginning work date for each trainee.

4. Unless otherwise specified, Training Programs will be approved if the proposed number of training hours equals the training hours required by contract and the trainees are not assigned less than 400 hours each.

5. After approval of the training program, information concerning each individual trainee and good faith effort documentation shall be submitted on (DOT Form 272-050.)

6. In King County, laborer trainees or apprentices will not be approved on contracts containing less than 2000 training hours as specified in this Section. In King County, no more than twenty percent (20%) of hours proposed for trainees or apprentices shall be in the laborer classification when the contract contains 2000 or more hours of training as specified in this Section. Trainees shall not be assigned less than 400 hours.

7. Flagging programs will not be approved. Other programs that include flagging training will only be approved if the flagging portion is limited to an orientation of not more than 20 hours.

8. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Some off-site training is permissible as long as the training is an integral part of an approved training program.

9. It is normally expected that a trainee will begin training on the project as soon as feasible after start of work, utilizing the skill involved and remain on the project as long as training opportunities exist in the work classification or upon completion of the training program. It is not required that all trainees be on board for the entire length of the contract. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

10. Wage Progressions: Trainees will be paid at least the applicable ratios or wage progressions shown in the apprenticeship standards published by the Washington State Department of Labor and Industries. In the event that no training program has been established by the Department of Labor and Industries, the trainee shall be paid in accordance with the provisions of RCW 39.12.021 which reads as follows:

    > Apprentice workmen employed upon public works projects for whom an apprenticeship agreement has been registered and approved with the State Apprenticeship Council pursuant to RCW 49.04, must be paid at least the prevailing hourly rate for an apprentice of that trade. Any workman for whom an apprenticeship agreement has not been registered and approved by the State Apprenticeship Council shall be considered to be a fully qualified journeyman, and, therefore, shall be paid at the prevailing hourly rate for journeymen.

Compliance

In the event that the Contractor is unable to accomplish the required training hours but can demonstrate a good faith effort to meet the requirements as specified, then the Contracting Agency will adjust the training goals accordingly.

Requirements for Non BAT/SATC Approved Training Programs

Contractors who are not affiliated with a program approved by BAT or SATC may have their training program approved provided that the program is submitted for approval on DOT Form 272-049, and the following standards are addressed and incorporated in the Contractor's program:

- The program establishes minimum qualifications for persons entering the training program.

- The program shall outline the work processes in which the trainee will receive supervised work experience and training on-the-job and the allocation of the approximate time to be spent in each major process. The program shall include the method for recording and reporting the training completed shall be stated.

- The program shall include a numeric ratio of trainees to journeymen consistent with proper supervision, training, safety, and continuity of employment. The ratio language shall be specific and clear as to application in terms of job site and workforce during normal operations (normally considered to fall between 1:10 and 1:4).

- The terms of training shall be stated in hours. The number of hours required for completion to journeyman status shall be comparable to the apprenticeship hours established for that craft by the SATC. The following are examples of programs that are currently approved:

CRAFT	HOURS
Laborer	4,000
Ironworker	6,000
Carpenter	5,200-8,000
Construction Electrician	8,000
Operating Engineer	6,000-8,000
Cement Mason	5,400
Teamster	2,100

- The method to be used for recording and reporting the training completed shall be stated.

- A numeric ratio of trainees to journeymen shall be established. It shall be consistent with proper supervision, training, safety and continuity of employment. The ratio language shall be specific and clear as to application in terms of job site and workforce during normal operations.

Measurement

The Contractor may request that the total number of “training” hours for the contract be increased subject to approval by the Contracting Agency. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other sources do not prohibit other reimbursement. Reimbursement to the Contractor for off-site training as indicated previously may only be made when the Contractor does one or more of the following and the trainees are concurrently employed on a Federal-aid project:

- contributes to the cost of the training,
- provides the instruction to the trainee,
- pays the trainee’s wages during the off- site training period.

Reimbursement will be made upon receipt of a certified invoice that shows the related payroll number, the name of trainee, total hours trained under the program, previously paid hours under the contract, hours due this estimate, and dollar amount due this estimate. The certified invoice shall show a statement indicating the Contractor’s effort to enroll minorities and women when a new enrollment occurs. If a trainee is participating in a SATC/BAT approved apprenticeship program, a copy of the certificate showing apprenticeship registration must accompany the first invoice on which the individual appears. Reimbursement for training occurring prior to approval of the training program will be allowed if the Contractor verbally notifies the Engineer of this occurrence at the time the

apprentice/trainee commences work. A trainee/apprentice, regardless of craft, must have worked on the contract for at least 20 hours to be eligible for reimbursement.

Payment

The Contractor will be reimbursed under the item “Training” per hour for each hour of training for each employee.

1-07.11.OPT5.FR1

(August 4, 2008)

Minority and Women's Business Enterprise (M/WBE) Participation

General Statement

In accordance with the legislative findings and policies set forth in Chapter 39.19 RCW the State of Washington encourages participation in all of its contracts by M/WBE firms certified by the office of Minority and Women's Business Enterprises (OMWBE). Participation may be either on a direct basis in response to a solicitation/invitation or as a subcontractor to a Bidder/Proposer. No preference will be included in the evaluation of bids/proposals, no minimum level of M/WBE participation shall be required as a condition for receiving an award and bids/proposals will not be rejected or considered non-responsive on that basis.

Voluntary M/WBE Goals

Voluntary numerical M/WBE participation goals shall be established for all solicitation/invitations where applicable. These goals are voluntary, but achievement of the goals is encouraged. No preference will be included in the evaluation of bids/proposals, no minimum level of M/WBE participation shall be required as a condition of award or completion of the contract work, and bids/proposals will not be rejected or considered non-responsive on that basis. Bidders may contact OMWBE at 360-753-9693 to obtain information on certified firms.

Required M/WBE Participation Plan

Prime Contractors shall submit an M/WBE Participation Plan as part of responsibility, before work begins. Although the goals contained within each Contract are voluntary, that is, award of the contract is not conditioned upon attainment of the voluntary M/WBE goals, the outreach efforts to provide M/WBEs maximum practicable opportunities are not. For M/WBE Participation Plan Drafting Guidelines, please visit: http://www.wsdot.wa.gov/equalopportunity.

Non-discrimination

Contractors, Bidders, and Proposers shall not create barriers to open and fair opportunities for all businesses including M/WBEs to participate in all State contracts and to obtain or compete for contracts and subcontracts as sources of supplies, equipment, construction and services. In considering offers from and doing business with subcontractors and suppliers, the Contractor shall not discriminate on the basis of race, color, creed, religion, national origin, sex, age, nationality, marital status, or the presence of any mental or physical disability in an otherwise qualified disabled person.

The Contractor shall make the M/WBE Participation General Statement cited previously in this Special Provision a part of all subcontracts and agreements entered into as a result of this contract.

Definitions

When referred to in this contract, the terms Minority, Minority Business Enterprise (MBE), and Women's Business Enterprise (WBE) will be construed to have the following meanings:

Minority means a person who is a citizen or lawful permanent resident of the United States and who is:

(a) Black: having origins in any of the black racial groups of Africa;

(b) Hispanic: of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

(c) Asian American: having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands; or

(d) American Indian or Alaskan Native: having origins in any of the original peoples of North America.

Minority Business Enterprise, Minority-owned Business Enterprise, or MBE means a business organized for profit, performing a commercially useful function, which is owned and controlled by one or more minority individuals or minority business enterprises. Owned and controlled means a business in which one or more minorities or MBE's own at least fifty-one percent (51%), or in the case of a corporation at least fifty-one percent (51%) of the voting stock, and control at least fifty-one percent (51%) of the management and daily business operations of the business.

M/WBE means a minority owned business enterprise, a women-owned business enterprise, and/or a combination minority and women's business enterprise certified by the Office of Minority and Women's Business Enterprises (OMWBE) of the State of Washington.

Women's Business Enterprise, Women-owned Business Enterprise, or WBE means a business organized for profit, performing a commercially useful function, which is owned and controlled by one or more women or women's business enterprises. Owned and controlled means a business in which one or more women or WBE's own at least fifty-one percent (51%) or in the case of a corporation at least fifty-one percent (51%) of the voting stock, and control at least fifty-one percent (51%) of the management and daily business operations of the business. The women owners must be United States citizens or lawful permanent residents.

Minority/Women's Business Enterprise means a minority owned business enterprise, a women-owned business enterprise; and/or a combination

minority and women's business enterprise certified by the OMWBE of the State of Washington.

MBE/WBE Status
A consolidated list of firms accepted as certified by OMWBE is available via the WSDOT Home Page, (WWW.WSDOT.WA.GOV) and a hard copy is available at nominal cost from the OMWBE.

MBE/WBE Goals
The Contracting Agency has established a voluntary goal in the amount of:

*** $$1$$ ***

Further Information
If further information is desired concerning Minority Business Enterprise/Women's Business Enterprise participation, inquiry may be directed to:

External Civil Rights Branch
Office of Equal Opportunity
Washington State Department of Transportation
Transportation Bldg., PO Box 47314
Olympia, WA 98504-7314
or telephone - (360) 705-7085
Fax (360) 705-6801

1-07.12.GR1
Federal Agency Inspection

1-07.12.INST1.GR1
Section 1-07.12 is supplemented with the following:

1-07.12.OPT1.GR1
(March 13, 1995)
Required Federal Aid Provisions
The Required Contract Provisions Federal Aid Construction Contracts (FHWA 1273) and the amendments thereto supersede any conflicting provisions of the Standard Specifications and are made a part of this contract; provided, however, that if any of the provisions of FHWA 1273, as amended, are less restrictive than Washington State Law, then the Washington State Law shall prevail.

The provisions of FHWA 1273, as amended, included in this contract require that the Contractor insert the FHWA 1273 and amendments thereto in each subcontract, together with the wage rates which are part of the FHWA 1273, as amended. Also, a clause shall be included in each subcontract requiring the Subcontractors to insert the FHWA 1273 and amendments thereto in any lower tier subcontracts, together with the wage rates. The Contractor shall also ensure that this section, REQUIRED FEDERAL AID PROVISIONS, is inserted in each subcontract for Subcontractors and lower tier Subcontractors. For this purpose, upon request to the Project Engineer, the Contractor will be provided with extra copies of the FHWA 1273, the amendments thereto, the applicable wage rates, and this Special Provision.

1-07.12.OPT2.FR1

(August 1, 2011)

Indian Preference and Tribal Ordinances

This project is located on the *** $$1$$ ***. It is the Contractor's responsibility to contact the person and/or office listed in this special provision to determine whether any tribal laws or taxes apply. If the tribal laws and taxes do apply, the Contractor shall comply with them in accordance with Section 1-07.1. For informational purposes only, the Work on this project that falls within Tribal Lands is shown on the Summary of Quantities in Group(s) *** $$2$$ ***.

Tribal Employment Rights Ordinances (TEROs), may utilize a variety of tools to encourage Indian employment. These tools may include, but are not limited to, TERO fees, Indian hiring preference, Indian-owned business subcontracting preference and/or an Indian training requirement. Other requirements may be a Tribal business license, a required compliance plan and/or employee registration requirements. Every tribe is different and each may be willing to work cooperatively with the Contractor to develop a strategy that works for both parties. For specific details, the Contractor should contact *** $$3$$ ***.

The state recognizes the sovereign authority of the tribe supports the tribe's efforts to enforce its rightful and legal ordinances and expects the Contractor to comply and cooperate with the tribe. The costs related to such compliance shall be borne solely by the Contractor, who is advised to contact the tribal representative listed above, prior to submitting a bid, to assess the impact of compliance on the project.

Although Indian preference cannot be compelled or mandated by the Contracting Agency, there is no limitation whereby voluntary Contractor or Subcontractor initiated preferences are given, if otherwise lawful. 41 CFR 60-1.5(a)7 provides as follows:

> Work on or near Indian reservations --- It shall not be a violation of the equal opportunity clause for a construction or non-construction Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation in connection with employment opportunities on or near an Indian reservation. The use of the word *near* would include all that area where a person seeking employment could reasonably be expected to commute to and from in the course of a work day. Contractors or Subcontractors extending such a preference shall not, however, discriminate among Indians on the basis of religion, sex, or tribal affiliation, and the use of such a preference shall not excuse a Contractor from complying with the other requirements as contained in the August 25, 1981 Department of Labor, Office of Federal Contract Compliance Programs, Government Contractors Affirmative Actions Requirements.

1-07.13.GR1

Contractor's Responsibility for Work

1-07.13(4).GR1

Repair of Damage

1-07.13(4).INST1.GR1

Section 1-07.13(4) is revised to read:

1-07.13(4).OPT1.GR1

(August 6, 2001)

The Contractor shall promptly repair all damage to either temporary or permanent work as directed by the Engineer. For damage qualifying for relief under Sections 1-07.13(1), 1-07.13(2) or 1-07.13(3), payment will be made in accordance with Section 1-04.4. Payment will be limited to repair of damaged work only. No payment will be made for delay or disruption of work.

1-07.16.GR1

Protection and Restoration of Property

1-07.16(2).GR1

Vegetation Protection and Restoration

1-07.16(2).INST1.GR1

Section 1-07.16(2) is supplemented with the following:

1-07.16(2).OPT1.GR1

(August 2, 2010)

Vegetation and soil protection zones for trees shall extend out from the trunk to a distance of 1 foot radius for each inch of trunk diameter at breast height.

Vegetation and soil protection zones for shrubs shall extend out from the stems at ground level to twice the radius of the shrub.

Vegetation and soil protection zones for herbaceous vegetation shall extend to encompass the diameter of the plant as measured from the outer edge of the plant.

1-07.16(4).GR1

Archaeological and Historical Objects

1-07.16(4).INST1.GR1

Section 1-07.16(4) is supplemented with the following:

1-07.16(4).OPT1.GR1

(December 6, 2004)

The project area potentially contains archaeological or historical objects that may have significance from a historical or scientific standpoint. To protect these objects from damage or destruction, the Contracting Agency, at its discretion and expense, may monitor the Contractor's operations, conduct various site testing and perform recovery and removal of such objects when necessary.

The Contractor may be required to conduct its operations in a manner that will accommodate such activities, including the reserving of portions of the work area for site testing, exploratory operations and recovery and removal of such objects as directed by the Engineer. If such activities are performed by consultants retained by the Contracting Agency, the Contractor shall provide them adequate access to the project site.

Added work necessary to uncover, fence, dewater, or otherwise protect or assist in such testing, exploratory operations and salvaging of the objects as ordered by the

Engineer shall be paid by force account as provided in Section 1-09.6. If the discovery and salvaging activities require the Engineer to suspend the Contractor's work, any adjustment in time will be determined by the Engineer pursuant to Section 1-08.8.

To provide a common basis for all bidders, the Contracting Agency has entered an amount for the item "Archaeological and Historical Salvage" in the Proposal to become a part of the total bid by the Contractor.

1-07.17.GR1

Utilities and Similar Facilities

1-07.17.INST1.GR1

Section 1-07.17 is supplemented with the following:

1-07.17.OPT1.FR1

(April 2, 2007)

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification.

The following addresses and telephone numbers of utility companies known or suspected of having facilities within the project limits are supplied for the Contractor's convenience:

*** $$1$$ ***

1-07.17.OPT2.FR1

(April 2, 2007)

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification.

Public and private utilities, or their Contractors, will furnish all work necessary to adjust, relocate, replace, or construct their facilities unless otherwise provided for in the Plans or these Special Provisions. Such adjustment, relocation, replacement, or construction will be done during the prosecution of the work for this project. It is anticipated that utility adjustment, relocation, replacement or construction within the project limits will be completed as follows:

*** $$1$$ ***

The Contractor shall attend a mandatory utility preconstruction meeting with the Engineer, all affected Subcontractors, and all utility owners and their Contractors prior to beginning onsite work.

The following addresses and telephone numbers of utility companies or their Contractors that will be adjusting, relocating, replacing or constructing utilities within the project limits are supplied for the Contractor's use:

*** $$2$$ ***

*** $$3$$ ***

1-07.18.GR1

Public Liability and Property Damage Insurance

1-07.18.INST1.GR1

Item No. 1 of the first paragraph of Section 1-07.18 is revised to read:

1-07.18.OPT1.FR1

(January 3, 2011)

1. Owners and Contractors Protective (OCP) Insurance providing bodily injury and property damage liability coverage with limits of *** $$1$$ *** per occurrence and, per project, in the aggregate for each policy period, written on Insurance Services Office (ISO) form CG0009 1204, together with Washington State Department of Transportation amendatory endorsement CG 2908 1195 specifying the Contracting Agency, the State, the Governor, the Commission, the Secretary ,the Department and all officers and employees of the State as named insured.

1-07.18.OPT2.GR1

(January 5, 2004)

Item number 1 in the first paragraph of Section 1-07.18 is deleted.

1-07.18.INST2.GR1

Item No. 2 of the first paragraph of Section 1-07.18 is revised to read:

1-07.18.OPT6.GR1

(January 3, 2011)

2. Commercial General Liability (CGL) Insurance written under ISO Form CG0001 or its equivalent with minimum limits of $1,000,000 per occurrence and in the aggregate for each one year policy period. Products and completed operations coverage shall be provided for a period of three years following Substantial Completion of the work.

1-07.18.INST4.GR1

Section 1-07.18 is supplemented with the following:

1-07.18.OPT11.GR1

(January 3, 2011)

Builder's Risk Insurance

Builder's Risk Insurance providing Broad Perils (All Risk) coverage upon any work at the site, to the full insurable value thereof. This insurance shall include the Contractor, its Subcontractors of every tier, and the State of Washington as named insured on the policy. Coverage shall be included for all materials and supplies to be incorporated into the work at the jobsite, while in transit to the jobsite, or while stored away from the jobsite.

1-07.18.OPT14.FR1

(January 3, 2011)

The Contractor shall obtain Contractor's Pollution Liability Insurance (CPL) with minimum "per project" limits of *** $$1$$ *** per occurrence and in the aggregate for claims, including investigation, defense, or settlement costs and expenses for bodily

injury and property damage (including natural resources damages and loss of use of tangible property that has not been physically injured) arising out of:

a. Pollution conditions caused or made worse by the Contractor's performance of the Work, including clean-up costs for a newly caused condition or a historical condition that is made worse; and;

b. The vicarious liability of Subcontractors of any tier.

The Contracting Agency the State, the Governor, the Commission, the Secretary , the Department and all officers and employees of the State as named insured.

1-07.18.OPT16.FR1

(August 7, 2006)

Relations with Railroad

Railroad Company, as used in the following specifications, shall be the railroad company or companies, or railway company or companies specified in these Special Provisions. The following provisions, though referring to a single Railroad Company, shall be applicable to each of the following railroad companies or railway companies:

*** $$1$$ ***

Protection of Railroad Property

The Contractor shall exercise care in all operations and shall, at the Contractor's expense, protect the property of the Railroad Company and the Company's appurtenances, property in its custody, or persons lawfully upon its right of way, from damage, destruction, interference or injury caused by the Contractor's operations. The Contractor shall prosecute the work to not interfere with the Railroad Company or its appurtenances, or any of the Railroad Company's trains or facilities, and shall complete the work to a condition that shall not interfere with or menace the integrity or safe and successful operations of the Railroad Company or its appurtenances, or any of the Railroad Company's trains or facilities.

The Contractor shall not transport equipment, machinery, or materials across the Railroad Company's tracks, except at a public crossing, without the written consent of the Railroad Company.

The Contractor shall keep the right of way and ditches of the Railroad Company open and clean from any deposits or debris resulting from its operations. The Contractor shall be responsible for the cost to clean and restore ballast of the Railroad Company which is disturbed or becomes fouled with dirt or materials when such deposits or damage result from the Contractor's operations, except as provided elsewhere.

The Contractor's work shall be conducted in such a manner that there will be a minimum of interference with the operation of railroad traffic. The Railroad Company will specify what periods will be allowed the Contractor for executing any part of the work in which the Railroad Company's tracks will be obstructed or made unsafe for operation of railroad traffic.

In the event that an emergency occurs in connection with the work specified, the Railroad Company reserves the right to do any and all work that may be necessary to maintain railroad traffic. If the emergency is caused by the Contractor, the Contractor shall pay the Railroad Company for the cost of such emergency work.

Protective services to protect the Railroad Company's facilities, property, and movement of its trains or engines, including railroad flagging and other devices, may be required by the Railroad Company as a result of the Contractor's operations.

The nature and extent of protective services, personnel and other measures required will in all cases be determined by the Railroad Company. Nothing in these specifications will limit the Railroad Company's right to determine and assign the number of personnel, the classes of personnel for protective services, nor other protective measures it deems necessary.

When, in the opinion of the Railroad Company, the services of flaggers or security personnel are necessary for the protection of the Railroad Company's facilities by reason of the Contractor's operations, the Railroad Company will furnish such flaggers or security personnel as may be required. The Contractor shall notify the Railroad Company a minimum of *** $$2$$ *** in advance of whenever the Contractor is about to perform work adjacent to the tracks to enable the Railroad Company to provide flagging or other protective service.

The Railroad Company’s contact is:

*** $$3$$ ***

No act of the Railroad Company in supervising or approving any work shall reduce or in any way affect the liability of the Contractor for damages, expense, or cost which may result to the Railroad Company from the construction of this Contract.

Unless otherwise provided, all personnel assigned by the Railroad Company, other than those engaged in performing work by the Railroad Company as listed under Construction Work by Railroad Company, will be considered protective personnel.

In general, the Railroad Company will furnish protective services:

a. For any excavation below the elevation of the track subgrade, if in the opinion of the Railroad Company's representative, the track or other railroad facilities may be subject to settlement or movement.

   For all work over or adjacent to the track if, in the opinion of the Railroad Company's representative, said work represents a hazard to the Railroad Company.

b. During any clearing, grubbing, grading, or blasting in proximity to the facilities, which in the opinion of the Railroad Company's representative, may endanger or interfere with railroad facilities or operations.

c. When any of the Contractor's operations take place within or near railroad right of way and, in the opinion of the Railroad Company's representative, could endanger railroad facilities or create a hazard to railroad operations. Communications Linemen or Signalmen may be used to protect communications and signal facilities, if deemed necessary by the Railroad Company.

There will be no cost to the Contractor for the railroad protective services unless such services result from the Contractor's failure to comply with the terms and conditions of its contract with the Contracting Agency or with its Contractor's Right of Entry Agreements with the Railroad Companies.

Construction Work by Railroad Company

The work by the Railroad Company as described below will be performed by the Railroad Company with its own forces at no cost to the Contractor:

*** $$4$$ ***

All work which is performed by the Railroad Company at the Contractor's request and which is for the Contractor's benefit or convenience shall be at the Contractor's expense and the Contractor shall reimburse the Railroad Company for all costs for such work.

The Contractor shall cooperate with the Railroad Company and so conduct operations that the necessary reconstruction of its facilities and the removal of existing facilities can be accomplished without interruption of service.

Railroad Protective Liability Insurance

The Contractor 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 Contractor or the Contractor's forces or any of the Contractor's Subcontractors or agents.

The Contractor shall furnish for each Railroad Company the original and three certified copies of a Railroad Protective Liability Insurance Policy, naming the Railroad Company as the insured and providing for protection to the Railroad Company in the manner and form described in the Railroad Protective Liability Form as set forth below.

Said insurance shall be executed by a corporation qualified to write insurance in the State of Washington in form and substance satisfactory to the Railroad Company and shall be delivered to the Engineer. The Engineer will submit the insurance to the Railroad Company for its approval. The Contractor shall not enter upon or use the Railroad Company's property until notified by the Engineer of the Railroad Company's approval. The various blank sections of the Railroad Protective Liability Form shall contain the following information:

Named Insured:

*** $$5$$ ***

Limits of Liability:

The combined single limit of the insurance company's liability under this policy to the insured shall be not less than *** $$6$$ *** for all damages arising out of bodily injuries to or death of any person or persons and for all damages arising out of loss or destruction of or injury or damage to property in any one occurrence and *** $$7$$ *** aggregate during the policy period. Said insurance policy executed by a corporation qualified to write the same in the State of Washington, shall be in form and substance satisfactory to the Railroad Company and shall be delivered to and approved by the Railroad Company prior to the entry upon or use of its property by the Contractor.

All insurance specified above shall be carried until the physical completion date of the contract as described in Section 1-08.5 except as stated herein.

When all the work involving construction activities within or immediately adjacent to the railroad right of way is completed, the Contractor may make a written request to the Engineer to be relieved of the responsibility to continue all or part of the insurance specified above. If the Engineer deems the portion of the work in that area is complete, the Engineer may approve the Contractor's request. However, if for any reason the Contractor resumes or starts any new work in that area (including being ordered to do so by the Engineer), the insurance shall be reinstated by the Contractor before the work is started. If the insurance must be reinstated because of the Contractor's operations or failure of the Contractor to perform all the contract requirements, the costs shall be the responsibility of the Contractor. If the insurance must be reinstated because of changes to the contract, the costs will be considered in accordance with Section 1-04.4.

Other Insurance Requirements
*** $$8$$ ***

Commercial General Liability Insurance
A certificate of insurance providing proof of said Insurance, executed by a corporation qualified to write the same in the State of Washington, in form and substance satisfactory to the Railroad Company, shall be delivered to and approved by the Railroad Company prior to the entry upon or use of the Railroad Company's property by the Contractor.

1-07.18.OPT17.GR1
(August 7, 2006)
Contractor's Right of Entry and Insurance Requirements - BNSF
No work shall commence within BNSF Railway Company (BNSF) right of way until the Contractor has executed, delivered, and received in return the fully executed Contractor's Right-of-Entry Agreement from BNSF, and has obtained all of the insurance required by the Railroad. All work within BNSF's right of way shall be in accordance with BNSF's Contractor Requirements and the Contractor's Right of Entry Agreement (See Appendices).

The Contractor, its Subcontractors or agents, shall at its own expense, obtain and maintain in force all insurance required by BNSF until the completion date of the contract as described in Section 1-08.5 except as stated herein.

When all the work involving construction activities within or immediately adjacent to the Railroad right of way is completed, the Contractor may make a written request to the Engineer to be relieved of the responsibility to continue the insurance required by BNSF. If the Engineer deems the portion of the work in that area is complete, the Engineer may approve the Contractor's request. However, if for any reason the Contractor resumes or starts any new work in that area (including being ordered to do so by the Engineer), the insurance shall be reinstated by the Contractor before the work is started. If the insurance must be reinstated because of the Contractor's activities or failure of the Contractor to perform all the contract requirements, the costs shall be the responsibility of the Contractor. If the insurance must be reinstated because of changes to the contract, the costs will be considered in accordance with Section 1-04.4.

1-07.18.OPT18.GR1

(August 7, 2006)

Contractor's Right of Entry and Insurance Requirements - UPRR

No work shall commence within Union Pacific Railroad right of way until the Contractor has executed, delivered, and received in return the fully executed Contractor's Right-of-Entry Agreement from Union Pacific Railroad, and has obtained all of the insurance required by the Railroad. All work within Union Pacific Railroad's right of way shall be in accordance with the Contractor's Right of Entry Agreement (See Appendixes).

The Contractor, its Subcontractors or agents, shall at its own expense, obtain and maintain in force all insurance required by Union Pacific Railroad until the completion date of the contract as described in Section 1-08.5 except as stated herein.

When all the work involving construction activities within or immediately adjacent to the railroad right of way is completed, the Contractor may make a written request to the Engineer to be relieved of the responsibility to continue the insurance required by Union Pacific Railroad. If the Engineer deems the portion of the work in that area is complete, the Engineer may approve the Contractor's request. However, if for any reason the Contractor resumes or starts any new work in that area (including being ordered to do so by the Engineer), the insurance shall be reinstated by the Contractor before the work is started. If the insurance must be reinstated because of the Contractors activities or failure of the Contractor to perform all the contract requirements, the costs shall be the responsibility of the Contractor. If the insurance must be reinstated because of changes to the contract, the costs will be considered in accordance with Section 1-04.4.

1-07.23.GR1

Public Convenience and Safety

1-07.23(1).GR1

Construction Under Traffic

1-07.23(1).INST1.GR1

Section 1-07.23(1) is supplemented with the following:

1-07.23(1).OPT1.FB1

(March 13, 1995)

During the hours that cleaning and painting operations are actually in progress, traffic may be restricted as follows:

*** $$1$$ ***

Whenever the Contractor's operations require lane reductions restricting the flow of traffic on multiple lanes in the same direction, the Contractor shall furnish, maintain, and operate a sequential arrow sign, for each lane closure, as specified in the Special Provision **SEQUENTIAL ARROW SIGN**.

If the Engineer determines that such lane restrictions are causing traffic congestion, the Contractor shall open all lanes to traffic until the congestion is eliminated.

For movable span structures, the Contractor's operations shall be arranged to permit the opening of the moveable span whenever required by marine traffic.

Bridge sidewalks shall be kept clear and open to maintain safe pedestrian traffic.

1-07.23(1).OPT2.GR1

(January 2, 2012)

Work Zone Clear Zone

The Work Zone Clear Zone (WZCZ) applies during working and nonworking hours. The WZCZ applies only to temporary roadside objects introduced by the Contractor’s operations and does not apply to preexisting conditions or permanent Work. Those work operations that are actively in progress shall be in accordance with adopted and approved Traffic Control Plans, and other contract requirements.

During nonworking hours equipment or materials shall not be within the WZCZ unless they are protected by permanent guardrail or temporary concrete barrier. The use of temporary concrete barrier shall be permitted only if the Engineer approves the installation and location.

During actual hours of work, unless protected as described above, only materials absolutely necessary to construction shall be within the WZCZ and only construction vehicles absolutely necessary to construction shall be allowed within the WZCZ or allowed to stop or park on the shoulder of the roadway.

The Contractor's nonessential vehicles and employees private vehicles shall not be permitted to park within the WZCZ at any time unless protected as described above.

Deviation from the above requirements shall not occur unless the Contractor has requested the deviation in writing and the Engineer has provided written approval.

Minimum WZCZ distances are measured from the edge of traveled way and will be determined as follows:

Regulatory Posted Speed	Distance From Traveled Way (Feet)
35 mph or less	10 *
40 mph	15
45 to 55 mph	20
60 mph or greater	30

* or 2-feet beyond the outside edge of sidewalk

Minimum Work Zone Clear Zone Distance

1-07.23(1).OPT3.GR1

(December 6, 2004)

The Contractor shall enter the highway only through legal movements from existing roads, streets and through other access points specifically allowed by the contract documents.

1-07.23(1).OPT4.GR1

(December 6, 2004)

The portion of Section 1-07.16(1) that prohibits the merging of construction vehicles with public traffic from an access gained through adjacent properties is rescinded, provided the Contractor's submittal is approved as required below.

Access for Construction

The Contractor may enter and leave the traveled way, auxiliary lanes or shoulders at approved locations other than established legal movements. To obtain approval of such an access location, the Contractor shall submit a request to the Engineer. The Contractor's request shall be submitted to the Engineer at least 30 calendar days prior to the time the use of the access will be required. This submittal shall include a vicinity map indicating the interstate stationing at the centerline of the access, distances from the end of ramp tapers of existing interchanges and a traffic control plan conforming with the requirements specified in Section 1-10.2(2). The access shall meet the following requirements:

- Access to and from the worksite adjacent to a multi-lane facility will only be allowed to and from a closed lane.

- The merging point of construction vehicles and public traffic shall provide a Decision Sight Distance for the traveling public of 1,640 ft in urban areas and 1,360 ft in rural areas.

- In urban areas the access shall not be located within 3,280 ft of the end of a ramp taper, or the centerline of a road approach. In rural areas the access shall not be located within 2,720 ft of the end of a ramp taper or the centerline of a road approach.

- Median crossings within 1.5 miles of the access point shall not be used in conjunction with the access.

- No new median crossings shall be created for use in conjunction within 1.5 miles of the access point.

- Short-duration shoulder stops in the construction zone, utilizing light vehicles properly equipped with warning flashers, will be allowed without a lane closure.

- When in use the access location shall have traffic control in place as per Section 1-10. Unauthorized use of the access from adjacent property is to be prohibited by the use of signing and/or flaggers as conditions warrant.

- The continuity of the existing drainage system shall be maintained through the access site.

- Air borne particulates created as a result of using the access shall be effectively controlled.

- The access location shall not adversely affect wetlands or other sensitive areas.

At the completion of the project, the Contractor shall restore the area of the access site to its original, pre-contract, condition. Any damage to the traveled way, shoulders, auxiliary lanes, side slopes or other items caused by the access shall be repaired. All work to comply with this provision or to build, maintain, provide erosion control, control airborne particulates, ensure that drainage continues through the access site, provide traffic control when necessary, remove the temporary access and restore the surrounding area when no longer required for use are the responsibility of the Contractor. The Contractor shall include all related costs in the bid prices of the contract.

1-07.23(1).OPT5.FR1
(August 7, 2006)
Lane closures are subject to the following restrictions:

*** $$1$$ ***

If the Engineer determines the permitted closure hours adversely affect traffic, the Engineer may adjust the hours accordingly. The Engineer will notify the Contractor in writing of any change in the closure hours.

No lane closures will be allowed on a holiday or holiday weekend, or after 12:00 PM (noon) on a day prior to a holiday or holiday weekend. Holidays that occur on Friday, Saturday, Sunday or Monday are considered a holiday weekend.

1-07.24.GR1
Rights of Way

1-07.24.INST1.GR1
Section 1-07.24 is supplemented with the following:

1-07.24.OPT1.FR1

(March 13, 1995)

The Contracting Agency has not completed the acquisition of title to the following described property:

*** $$1$$ ***

The Contractor shall not perform any work within these limits until ordered to do so by the Engineer. The Contracting Agency has estimated that the above described property will be available *** $$2$$ ***.

1-07.INST1.GR1

Section 1-07 is supplemented with the following:

1-07.OPT1.GR1

(July 1, 2009)

Apprentice Utilization

This Contract includes an Apprentice Utilization Requirement as defined in this specification. No less than 15.0% of project Labor Hours shall be performed by Apprentices.

Definitions

For the purposes of this specification the following definitions apply:

1. Apprentice Utilization Requirement is expressed as a percentage of the project Labor Hours performed by Apprentices.

2. Labor Hours are the total hours performed by all workers receiving an hourly wage who are directly employed on the project site including hours performed by workers employed by the prime Contractor and all Subcontractors. Labor Hours do not include hours performed by foremen, superintendents, owners, and workers who are not subject to prevailing wage requirements.

3. Apprentice is a person enrolled in a State-approved Apprenticeship Training Program.

4. State-approved Apprenticeship Training Program is an apprenticeship training program approved by the Washington State Apprenticeship Council.

5. Good Faith Effort is a demonstration that the Contractor has strived to meet the Apprentice Utilization Requirement including but not necessarily limited to the specific steps as described elsewhere in this specification.

Plan

The Contractor shall submit an “Apprentice Utilization Plan” (DOT form 422-115 EF) within 30 days of execution, demonstrating how and when they intend to achieve the Apprentice Utilization Requirement. The plan shall be updated and resubmitted as appropriate as the Work progresses. The intent is to provide the Project Engineer with enough information to track progress in meeting the utilization requirements.

Reporting

The Contractor shall submit a "Statement of Apprentice /Journeyman Participation" (DOT form 422-110 EF) on a monthly basis. The report shall be submitted to the Project Engineer by the last working day of the subsequent month, until the Physical Completion Date. The data reported shall be cumulative to date and consolidated to include the Contractor and all Subcontractors. At the Contractor's request, the Project Engineer may suspend this reporting requirement during periods of minimal or no applicable work activities on the project. The Contractor shall submit documentation of their Good Faith Effort if; (1) they are unable to provide a plan demonstrating how they intend to meet the Apprentice Utilization Requirement; or, (2) the project has been completed without meeting the Apprentice Utilization Requirement.

Contacts

The Contractor may obtain information on State-approved Apprenticeship Training Programs by contacting the Department of Labor and Industries at:

Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530 or by phone at (360) 902-5320.

Compliance

In the event that the Contractor is unable to accomplish the Apprentice Utilization Requirement, the Contractor shall demonstrate that a Good Faith Effort has been made as described elsewhere in this specification. Failure to comply with the requirements as specified may result in reduction or revocation of prequalification as allowed by WAC 468-16-190.

Good Faith Efforts

In fulfilling the Good Faith Effort, the Contractor shall perform and, when appropriate, require its Subcontractors to perform the following steps:

1. Solicit Apprentice(s) from State-approved Apprenticeship Training Program(s)

2. Document the solicitation and, in the event Apprentice(s) are not available, obtain supporting documentation from the solicited program(s).

3. Demonstrate that the plan was updated as required elsewhere in this specification.

4. Provide documentation demonstrating what efforts the Contractor has taken to require Subcontractors to solicit and employ Apprentice(s).

In the event that the preceding steps have been followed, the Contractor may also supplement the Good Faith Efforts documentation with the following documentation:

5. Submit documentation demonstrating successful Apprentice utilization on previous contracts.

6. Submit documentation indicating company wide Apprentice utilization efforts and percentages of attainment.

Payment

Compensation for all costs involved with complying with the conditions of this specification is included in payment for the associated Contract items of work.

1-08.GR1

Prosecution and Progress

1-08.1.GR1

Subcontracting

1-08.1.INST1.GR1

Section 1-08.1 is supplemented with the following:

1-08.1.OPT1.GR1

(October 12, 1998)

Prior to any subcontractor or lower tier subcontractor beginning work, the Contractor shall submit to the Engineer a certification (WSDOT Form 420-004 EF) that a written agreement between the Contractor and the subcontractor or between the subcontractor and any lower tier subcontractor has been executed. This certification shall also guarantee that these subcontract agreements include all the documents required by the Special Provision **Federal Agency Inspection**.

A Subcontractor or lower tier Subcontractor will not be permitted to perform any work under the contract until the following documents have been completed and submitted to the Engineer:

1. Request to Sublet Work (Form 421-012 EF), and
2. Contractor and Subcontractor or Lower Tier Subcontractor Certification for Federal-aid Projects (Form 420-004 EF).

The Contractor's records pertaining to the requirements of this Special Provision shall be open to inspection or audit by representatives of the Contracting Agency during the life of the contract and for a period of not less than three years after the date of acceptance of the contract. The Contractor shall retain these records for that period. The Contractor shall also guarantee that these records of all Subcontractors and lower tier Subcontractors shall be available and open to similar inspection or audit for the same time period.

1-08.1.OPT2.FR1

(March 13, 1995)

Specialty Items

For the purpose of determining the percentage of work that may be subcontracted, the following items on this contract are designated as Specialty Items:

*** $$1$$ ***

1-08.1.OPT3.GR1

(March 13, 1995)

Qualifications of Building Contractor

If the Contractor is not prequalified for building construction or cannot demonstrate satisfactory experience in constructing the general type of building included in the

project, it will be mandatory that the building work be subcontracted to a firm which can meet one or both of these criteria.

1-08.1(1).GR1

Subcontract Completion and Return of Retainage Withheld

1-08.1(1).INST1.GR1

Section 1-08.1(1) is revised to read:

1-08.1(1).OPT1.GR1

(June 27, 2011)

The following procedures shall apply to all subcontracts entered into as a part of this Contract:

Requirements

1. The Prime Contractor or Subcontractor shall make payment to the Subcontractor not later than ten (10) days after receipt of payment from the Contracting Agency for work satisfactorily completed by the Subcontractor, to the extent of each Subcontractor's interest therein.

2. Prompt and full payment of retainage from the Prime Contractor to the Subcontractor shall be made within 30 days after Subcontractor's Work is satisfactorily completed.

3. For purposes of this Section, a Subcontractor's work is satisfactorily completed when all task and requirements of the Subcontract have been accomplished and including any required documentation and material testing .

4. Failure by a Prime Contractor or Subcontractor to comply with these requirements may result in one or more of the following:

    a. Withholding of payments until the Prime Contractor or Subcontractor complies

    b. Failure to comply shall be reflected in the Prime Contractor's Performance Evaluation

    c. Cancellation, Termination, or Suspension of the Contract, in whole or in part

    d. Other sanctions as provided by the subcontractor or by law under applicable prompt pay statutes.

Conditions

This clause does not create a contractual relationship between the Contracting Agency and any Subcontractor as stated in Section 1-08.1. Also, it is not intended to bestow upon any Subcontractor, the status of a third-party beneficiary to the Contract between the Contracting Agency and the Contractor.

Payment

The Contractor will be solely responsible for any additional costs involved in paying retainage to the Subcontractors. Those costs shall be incidental to the respective Bid Items.

1-08.3.GR1

Progress Schedule

1-08.3(1).GR1

General Requirements

1-08.3(1).INST1.GR1

The first sentence of Section 1-08.3(1) is revised to read:

1-08.3(1).OPT1.GR1

(August 6, 2006)

The Contractor shall submit Type C Progress Schedules and Schedule Updates to the Engineer for approval.

1-08.3(2).GR1

Progress Schedule Types

1-08.3(2).INST2.GR1

Section 1-08.3(2) is revised to read:

1-08.3(2).OPT1.GR1

(August 1, 2011)

Type A Progress Schedules are required on all projects that do not contain the bid item for Type B or Type C Progress Schedules. Type B or Type C Progress Schedules are required on all projects that contain the bid item for Type B or Type C Progress Schedule. Weekly Look-Ahead Schedules and Schedule Updates are required on all projects.

1-08.3(2).INST3.GR1

Section 1-08.3(2) is supplemented with the following:

1-08.3(2).OPT2.GR1

(January 2, 2012)

Type C Progress Schedule

Type C Progress Schedules shall conform to all of the requirements of Section 1-08.3(2)B and this Section.

The Contractor shall submit a printed copy of a preliminary Type C Progress Schedule no later than the first working day as defined in Section 1-08.5. The preliminary schedule shall comply with all of these requirements and the requirements of Section 1-08.3(1), except that it may be limited to only those activities occurring within the first 60 working days of the project.

The Contractor shall submit a printed copy of a Type C Progress Schedule no later than 60 calendar days after the date the contract is executed.

Each time that a preliminary schedule, Progress Schedule, or Schedule Update is submitted, the Contractor shall provide the Engineer with an electronic copy (.xer file type extension) of that schedule. Each submitted progress and update schedule shall have a unique file name and date identifier. Regardless of the type of software used, the schedule data provided to the Engineer shall be saved on a CD-ROM in Primavera Project Manager Enterprise Version, P6 6.0 or later version.

Type C Progress Schedules shall display at least the following additional information:

1. A time scaled logic diagram.
2. Activities for traffic detours and closures.
3. Milestones for required delivery of State furnished materials, if any.
4. Activities for State furnished traffic control resources, if any.
5. Activities for fabrication of materials longer than 90 calendar days lead time.
6. Fixed constraints shall be identified on the activity listing, supplemented with a written narrative describing why the constraint exists.
7. Milestones for interim or stage completion dates.
8. Activities for scheduled outages on illumination systems, ITS systems, traffic signal systems and other electrical service outages.
9. Nighttime activities shall be so coded.
10. Activities for all submittals requiring State review, including the allowable review duration.

All calendars used shall be created as project calendars, not global or resource calendars. If multiple calendars are applied to the Progress Schedule, the Contractor shall submit a written narrative describing each one's purpose.

Schedule files shall not contain User Defined Fields (UDF's), all activity codes shall be project level, no resources shall be assigned to activities and no project codes shall be assigned.

If requested by the Engineer, the Contractor shall supplement the Progress Schedule with written explanations for each lead and lag time used, and a written explanation describing the assumed production rates and planned resource allocations to support the activity durations provided in the schedule. The written explanations shall be documented as a notebook topic under "Assumptions and Basis".

1-08.3(3).GR1

Schedule Updates

1-08.3(3).INST1.GR1

Section 1-08.3(3) is revised to read:

1-08.3(3).OPT1.GR1

(January 2, 2012)

The Contractor shall submit a printed copy of a Type C Schedule Update to the Engineer by the first business day of each month, starting the month after the Progress Schedule is accepted, or some other mutually agreed upon submittal time.

In addition to the other requirements of this Section, Schedule Updates shall reflect at least the following information:

1. The actual duration and sequence of as-constructed work activities, including changed work.

2. Approved time extensions.

3. Any construction delays or other conditions that affect the progress of the work.

4. Any modifications to the as-planned sequence or duration of remaining activities, supplemented with a written narrative describing each change and the reason for the change.

5. The physical completion of all remaining work in the remaining contract time.

6. Progress on partially completed activities shall be indicated using percent complete.

Activity numbers on Schedule Updates shall be the same as the Progress Schedule, with the exception of deleted or added activities.

Unresolved requests for time extensions shall be reflected in the Schedule Update by assuming no time extension will be granted, and by showing the effects to follow-on activities necessary to physically complete the project within the currently authorized time for completion.

1-08.3(4).GR1

Measurement

1-08.3(4).INST1.GR1

Section 1-08.3(4) is revised to read:

1-08.3(4).OPT1.GR1

(January 2, 2012)

No specific unit of measurement shall apply to the lump sum item for Type C Progress Schedule.

Schedule Updates will be measured per each for each update submitted and approved per the requirements of Section 1-08.3(3). Schedule updates that are returned for correction will not be measured.

1-08.3(5).GR1

Payment

1-08.3(5).INST1.GR1

Section 1-08.3(5) is revised to read:

1-08.3(5).OPT1.GR1

(December 1, 2008)

Payment will be made in accordance with Section 1-04.1, for the following bid item when it is included in the proposal:

"Type C Progress Schedule", lump sum.

The Lump Sum price for "Type C Progress Schedule" shall be full payment for all costs for furnishing the Type C Progress Schedule and preliminary Type C Progress Schedule.

"Schedule Update", per each.
The unit Contract price per each "Schedule Update" shall be full payment for all costs required to complete the work specified in Section 1-08.3(3).

All costs for providing Weekly Look-Ahead Schedules are considered incidental to the contract and are to be included with other bid items.

1-08.4.GR1

Prosecution of Work

1-08.4.INST1.GR1

The first sentence of Section 1-08.4 is revised to read:

1-08.4.OPT1.FR1

(January 5, 2004)

The Contractor shall commence onsite work on or before *** $$1$$ *** and shall notify the Engineer in writing a minimum of 10 calendar days in advance of the date on which the Contractor intends to begin work.

The Contractor may begin the crushing of mineral aggregates anytime after the execution of the project.

1-08.4.OPT2.GR1

(August 7, 2006)

The Contractor shall begin work no earlier than the begin work date stated in the written notice provided by the Engineer. The Engineer will provide a minimum of 10 calendar days written notice for the date identified as the first working day.

1-08.4.OPT3.FR1

(August 7, 2006)

The Contractor shall begin work no earlier than *** $$1$$ ***.

1-08.5.GR1

Time for Completion

1-08.5.INST1.GR1

The third paragraph of Section 1-08.5 is revised to read:

1-08.5.OPT1.FR1

(August 7, 2006)

Contract time shall begin on the date stated in the written notice provided to the Contractor. In no case shall the beginning of contract time be prior to ***$$1$$*** or later than *** $$2$$ ***.

1-08.5.OPT2.FR1

(August 7, 2006)

Contract time shall begin on the first working day. The first working day shall be *** $$1$$ ***.

1-08.5.INST2.GR1

Section 1-08.5 is supplemented with the following:

1-08.5.OPT7.FR1

(March 13, 1995)

This project shall be physically completed within *** $$1$$ *** working days.

1-08.5.OPT8.FR1

(March 13, 1995)

This project shall be physically completed in its entirety within *** $$1$$ *** working days and the temporary traffic signal portion of the project shall be physically completed within the first *** $$2$$ *** working days.

1-08.5.OPT9.FR1

(December 4, 2006)

This project shall be physically completed within *** $$1$$ *** working days.

Contract time shall begin on the first working day the Contractor starts onsite work or *** $$2$$ ***, whichever occurs first.

1-08.5.OPT10.FR1

(March 13, 1995)

This project shall be physically completed within *** $$1$$ *** working days. Contract time shall commence on the first working day:

1. Following 60 calendar days after contract execution; or,

2. That the Engineer and the Contractor agree to start work after approval of construction materials is obtained, whichever occurs first.

The Contractor is allowed a maximum of 60 calendar days after execution of the contract to obtain approvals for construction materials

1-08.5.OPT11.FR1

(August 4, 2003)

Incentive for Early Completion

It is essential that the Contracting Agency has full and unrestricted use of the facilities at the earliest possible time. As an incentive to the Contractor, the Contracting Agency will pay the Contractor *** $$1$$ *** for each working day remaining in the contract prior to the established *** $$2$$ *** completion date, but not to exceed an amount equal to *** $$3$$ ***.

The days eligible for the incentive will be calculated by subtracting the working days elapsed through the date of *** $$4$$ *** completion from the total working days established in the Special Provision **TIME FOR COMPLETION**.

1-08.6.GR1

Suspension of Work

1-08.6.INST1.GR1

Section 1-08.6 is supplemented with the following:

1-08.6.OPT1.FR1

(August 7, 2006)

Contract time may be suspended for verification of HMA mix designs or for procurement of critical materials (Procurement Suspension). In order to receive a Procurement Suspension, the Contractor shall within 30 calendar days after execution by the Contracting Agency, submit all HMA mix designs according to section 5-04.3(7)A or place purchase orders for all materials deemed critical by the Contracting Agency for physical completion of the contract. The Contractor shall provide a copy of the completed DOT Form 350-042 indicating the date the mix design was submitted, or copies of purchase orders for the critical materials. Such purchase orders shall disclose the purchase order date and estimated delivery dates for such critical material.

The Contractor shall show mix design verification or procurement of the materials listed below as activities in the Progress Schedule. If the approved Progress Schedule indicates that the mix design verification or materials procurement are critical activities, and if the Contractor has provided documentation that mix designs are submitted or purchase orders are placed for the critical materials within the prescribed 30 calendar days, then contract time shall be suspended upon physical completion of all critical work except that work dependent upon the below listed critical materials:

*** $$1$$ ***

Charging of contract time will resume upon the Contractors' receipt of a mix design verification report, delivery of the critical materials to the Contractor, notification that the critical materials are ready for delivery to the Contractor from the Contracting Agency's Materials Laboratory, or *** $$2$$ *** calendar days after execution by the Contracting Agency, whichever occurs first.

No additional Procurement Suspension will be provided if the Contractors HMA mix designs did not verify and are resubmitted.

1-08.9.GR1

Liquidated Damages

1-08.9.INST1.GR1

Section 1-08.9 is supplemented with the following:

1-08.9.OPT1.FR1

(March 13, 1995)

Liquidated damages in the amount of *** $$1$$ *** per working day will be assessed for failure to physically complete the temporary traffic signal portion of the contract within the physical completion time specified. Liquidated damages in an amount based upon the original contract amount and original time, will be assessed for failure to physically complete the entire project within the physical completion time specified. Such damages will accrue separately for each phase or stage of work. In the event damages occur on a concurrent date, the larger of the two damages will apply for such days.

1-08.9.OPT2.FR1

(April 6, 2009)

Delayed completion of *** $$1$$ *** will result in impacts to the traveling public, increase fuel consumption, increase vehicle operating costs, increase pollution, and cause other inconveniences and harm.

Accordingly, the Contractor agrees:

1. To pay *** $$2$$ *** liquidated damages per *** $$3$$ *** for each *** $$4$$ *** prorated to the nearest *** $$5$$ *** that the work is not completed as specified in *** $$6$$ ***.

2. To authorize the Engineer to deduct these liquidated damages from any money due or coming due the Contractor.

1-09.GR1

Measurement and Payment

1-09.2.GR1

Weighing Equipment

1-09.2(1).GR1

General Requirements for Weighing Equipment

1-09.2(1).INST1.GR1

Section 1-09.2(1) is revised to read as follows:

1-09.2(1).OPT1.GR1

(January 3, 2011)

Unless otherwise specified any highway or bridge construction materials to be proportioned or measured and paid for by weight, shall be weighed on scales. The Contractor shall provide, set up, operate and maintain the scales necessary to perform the weighing or shall designate permanently installed, certified commercial scales for the purpose. Each truck to be weighed shall bear a unique identification

number. This number shall be legible and in plain view of both the scale operator and the person receiving the material at the jobsite.

Scales provided or designated by the Contractor shall be accurate to within one-half of one percent of the correct weight throughout the range of use. If platform scales are used, each platform scale shall be able to weigh the entire hauling vehicle or combination of connected vehicles at one time. No part of the vehicle or vehicle combination will be permitted off the platform as it is weighed.

An agent of the scale manufacturer shall test and service any scale before its use at each new site and then at 6-month intervals. The Contractor shall provide the Engineer a copy of the final results after each test.

All initial weighing at the dispatch site or at another site approved by the Engineer shall be performed by a Contractor employee or by another person designated by the Contractor. The designated weigher shall prepare a weigh or load ticket to accompany each load. Each ticket shall contain the truck identification number, the date and time of weighing the load, a description of the material being weighed and the signature or initials of the weigher.

Each weigh or load ticket shall also contain a determination of the net weight of the load. This shall be a reading from any device which weighs as material is loaded or a calculation including gross weight and tare weight when the method of loading does not include weighing. It shall also identify the weighed material. When used, tare weights shall be taken of each hauling vehicle at least once each day. The ticket shall be provided to the inspector at the jobsite immediately after the material is delivered. A record of each day's tare weights shall be furnished to the Project Engineer daily using Form 422-027 EF, or on an alternate form approved by the Project Engineer.

The vehicle operator shall deliver the ticket to the material receiver at the material delivery point. The material delivery point is defined as the location where the material is incorporated into the permanent work.

Except as noted below, all weighing shall be subject to confirmation testing through random checks made with a second, separate scale. The secondary scale shall be described in the contract provisions, either as a designated independent commercial scale or as a platform scale installed by the Contractor at a location named in the provisions. The inspector will select loaded trucks at random and weigh them with the secondary scale. The same trucks will be weighed empty when the tested load has been delivered.

The frequency of confirmation testing will be such that at least one test weekly is performed for each weighed contract item of work being performed during that week.

Confirmation testing will not be routinely conducted for small quantities of weighed material. A small quantity shall be defined as one who's estimated proposal quantity, multiplied by its unit price, has a value of less than $20,000. The inspector may choose to apply confirmation testing to a minor quantity item if, in the inspector's judgment, there is reason to suspect that the ticket weight might be incorrect.

1-09.2(1).INST2.GR1

Section 1-09.2(1) is supplemented with the following:

1-09.2(1).OPT7.FR1

(August 6, 2001)

The Contracting Agency has selected the following independent commercial scale for the purpose of conducting confirmation testing for weighed materials on this project. The Agency will pay any fees required by the owner of the scale. All other costs associated with complying with the confirmation testing requirement shall be borne by the Contractor and shall be included in the bid price for the material being hauled.

*** $$1$$ ***.

1-09.2(1).OPT8.GR1

(January 3, 2011)

The Contractor shall install a platform scale on or near the jobsite at a specific location to be designated by the Engineer. The Contractor shall provide, set up, operate and maintain the scales. Scales shall:

1. Be accurate to within one-half of one percent of the correct weight throughout the range of use;

2. Not include spring balances;

3. Include beams, dials, or other reliable readout equipment;

4. Be arranged so that operators and inspectors can safely and easily see the dials, beams, rods, and operating scale mechanisms;

5. Be built to prevent scale parts from binding, vibrating, or being displaced and to protect all working parts, and

6. Be carefully maintained, with bunkers and platforms kept clear of accumulated materials that could cause errors.

The scale shall be able to weigh, at one time, any hauling vehicle or combination of connected vehicles that will be utilized for weighed materials on the project. No part of a vehicle or vehicle combination will be permitted off the platform as it is weighed.

The scale shall be installed and maintained with the platform level and with rigid bulkheads at either end to prevent binding or shifting. The readout device shall be marked at intervals of no more than 40 pounds. Test records shall show results to the nearest 20 pounds.

Before use at its new location and then at 6-month intervals, the scale shall be: (a) approved under rules of the Washington State Department of Agriculture's Weights and Measures Section, or (b) serviced and tested with at least 10,000 pounds by

an agent of its manufacturer. In either case, the Contractor shall provide the Engineer with a copy of the final test results.

When notified by the Engineer that all confirmation testing has been completed for the project and that the scale is no longer needed, the Contractor shall remove the equipment and restore the site to a satisfactory condition. The scale equipment shall be removed from the jobsite and shall remain the property of the Contractor.

1-09.2(2).GR1

Specific Requirements for Batching and Hopper Scales

1-09.2(2).OPT1.GR1

(August 6, 2001)

Section 1-09.2(2) is deleted.

1-09.2(3).GR1

Specific Requirements for Platform Scales

1-09.2(3).OPT1.GR1

(August 6, 2001)

Section 1-09.2(3) is deleted.

1-09.2(4).GR1

Specific Requirements for Belt Conveyor Scales

1-09.2(4).OPT1.GR1

(August 6, 2001)

Section 1-09.2(4) is deleted.

1-09.2(5).GR1

Measurement

1-09.2(5).INST1.GR1

Section 1-09.2(5) is revised to read as follows:

1-09.2(5).OPT1.GR1

(January 3, 2011)

If confirmation testing shows the initial scale has been underweighing, the on-site representative of the Contractor shall be notified. The Contractor shall not be compensated for any loss from underweighing.

If the initial scale has been overweighing, the on-site representative of the Contractor shall be notified and the Contracting Agency will calculate a price adjustment as follows:

The combined weight of all materials weighed after the last test showing accurate results through the load preceding the next confirmation test shall be calculated. This combined weight will then be reduced by the percentage of weighing error that exceeds one-half of one percent. If subsequent confirmation tests continue to show overweighing, then the highest correction factor calculated from all tests shall be applied to all loads weighed after the

last successful test and before a new confirmation test that shows accurate results.

If the specifications and plans require weight measurement for minor construction items, the Contractor may request permission to convert volume to weight. If the Engineer approves, an agreed factor may be used to make this conversion.

1-09.2(5).INST2.GR1

Section 1-09.2(5) is supplemented with the following:

1-09.2(5).OPT7.GR1

(August 6, 2001)

No specific measurement of a unit will apply to the lump sum item “Confirmation Scale”.

1-09.2(6).GR1

Payment

1-09.2(6).INST1.GR1

Section 1-09.2(6) is revised to read as follows:

1-09.2(6).OPT1.GR1

(January 3, 2011)

Unless otherwise specified, the Contracting Agency will pay for no materials received by weight unless they have been weighed in accordance with the requirements of this section.

Unit contract prices for the various pay items of the project cover all costs related to weighing and proportioning materials for payment. These costs include those for furnishing, installing, certifying, maintaining and operating scales for initial weighing, those for extra haul distance and time involved in complying with confirmation testing requirements, and those for any other related item specified in this section.

1-09.2(6).INST2.GR1

Section 1-09.2(6) is supplemented with the following:

1-09.2(6).OPT7.GR1

(January 3, 2011)

Payment will be made in accordance with Section 1-04.1 for the following bid item when included in the proposal:

“Confirmation Scale,” Lump Sum

The lump sum payment for this item shall be full compensation for all costs related to the procurement, installation, testing, maintenance, operation and removal of the scale in accordance with the provisions.

1-09.3.GR1

Scope of Payment

1-09.3.INST1.GR1

Section 1-09.3 is supplemented with the following:

1-09.3.OPT1.FR1

(February 13, 2012)

Fuel Cost Adjustment

General

The Contracting Agency will make a fuel cost adjustment, either a credit or a payment, for qualifying changes in the index price of on-highway diesel fuel. The adjustment will be applied to partial payments made according to Section 1-09.9.

The adjustment is not a guarantee of full compensation for fuel price changes. Any adjustment provided by this provision shall not obligate the Contracting Agency for any costs due solely to changes in fuel costs beyond the amount adjusted by this provision. The Contracting Agency does not guarantee that fuel will be available at the base fuel cost or monthly fuel cost. No additional adjustment will be made for rates of fuel consumption or actual fuel types that differ from those specified for the purpose of determining the adjustment.

For the purpose of calculating the adjustment, the Base Fuel Cost shall be the *Weekly* fuel price from the ***U.S. Energy Information Administration*** website. The website location and directions are as follows:

- http://www.eia.gov/petroleum/gasdiesel/
- On the web page, click on the ***West Coast less California***, listed under the heading ***U.S On-Highway Diesel Fuel Prices*(dollar per gallon)*** at the lower end of the web page***.***
- In the pull down box labeled ***Period*** pull down ***Weekly.***
- Click on the fuel price history found under the column heading ***View History*** for the line ***Diesel (On-Highway***) ***– All Types***.
- On this web page obtain the nearest weekly fuel cost for the Monday occurring three weeks prior to the date that bids are opened. This weekly fuel cost becomes the Base Fuel Cost and is fixed for the duration of the Contract and will be used in calculating all adjustments.

The Monthly Fuel Cost shall be the most recent *Monthly* fuel price from the U.S. Energy Information Administration website. The website location and directions are as follows:

- http://www.eia.gov/petroleum/gasdiesel/
- On the web page, click on the ***West Coast less California***, listed under the heading ***U.S On-Highway Diesel Fuel Prices*(dollar per gallon)*** at the lower end of the web page***.***
- In the pull down box labeled ***Period*** pull down ***Monthly.***
- Click on the fuel price history found under the column heading ***View History*** for the line ***Diesel (On-Highway***) ***– All Types***.
- On this web page obtain the most current monthly fuel price.

If the specified index ceases to be available for any reason, the Contracting Agency at its discretion will select and begin using a substitute price source or index to establish the Monthly Fuel Cost.

Measurement

No adjustment will be made if the Monthly Fuel Cost is within 10 percent of the Base Fuel Cost. No adjustment will be made for work performed after the authorized Time for Completion.

If the Monthly Fuel Cost is greater than or equal to 110% of the Base Fuel Cost, then:

Adjustment = (Monthly Fuel Cost – (1.10 x Base Fuel Cost)) x Q

If the Monthly Fuel Cost is less than or equal to 90% of the Base Fuel Cost, then:

Adjustment = (Monthly Fuel Cost – (0.90 x Base Fuel Cost)) x Q

Where Q = Σ ((Fuel Usage Factor for each Eligible Bid Item) x (Quantity paid in the current months progress estimate for each Eligible Bid Item)) for all Eligible Bid Items listed below:

Eligible Bid Item	Fuel Usage Factor
*** $$1$$ ***	*** $$2$$ ***
*** $$3$$ ***	*** $$4$$ ***

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item included in the bid proposal:

"Fuel Cost Adjustment", by calculation.

To provide a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor's total bid.

1-09.3.OPT2.GR1

(April 5, 2010)

Steel Cost Adjustment

General

The Contracting Agency will make a steel cost adjustment, either a credit or a payment, for qualifying changes in the index price of raw steel used in the production of specified materials that are incorporated into the permanent Work. The adjustment will be applied to partial payments made according to Section 1-09.9. The adjustment will be applied to the following materials:

- Reinforcing steel conforming to Section 9-07 used in non-proprietary walls, and pedestrian and vehicular bridge Substructure and Superstructure.
- Structural steel conforming to Section 6-03.2 used in pedestrian and vehicular bridge Substructure and Superstructure.
- Soldier Piles

- Permanent steel casings for vertical shafts and horizontal borings and jackings

- Permanent steel casings for concrete piling

The adjustment is not a guarantee of full compensation for steel price changes. Any adjustment provided by this provision shall not obligate the Contracting Agency for any costs due solely to changes in steel costs beyond the amount adjusted by this provision. The Contracting Agency does not guarantee that steel will be available at the base steel cost or monthly steel cost. No additional adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, or storage.

For the purpose of determining the adjustment, the Base Steel Cost shall be the *Engineering News-Record* ***Materials Cost Index for Steel $/CWT*** index value for the month prior to the month that Bids are opened. The Base Steel Cost is fixed for the duration of the Contract and will be used for determining all adjustments.

The Monthly Steel Cost shall be the *Engineering News-Record* ***Materials Cost Index for Steel $/CWT*** index value for the month that the steel is actually shipped from the producing mill. If the specified index ceases to be available for any reason, the Contracting Agency at its discretion will select and begin using a substitute price source or index to establish the Monthly Steel Cost.

For each month that steel material that is specified in this Section is incorporated into the permanent Work or paid for as Materials on Hand, the Contractor shall provide the Engineer with written documentation (such as bills of lading, invoices, or purchase orders) of the actual date and quantity of steel in pounds shipped from the producing mill to the manufacturer and the Contracting Agency contract number that the steel is used in.

Measurement

No adjustment will be made if the Monthly Steel Cost is within 10 percent of the Base Steel Cost. No adjustment will be made for Work performed after the authorized time for completion. No adjustment will be made for any products manufactured from steel having a mill shipping date prior to the date the contract is executed.

If the Monthly Steel Cost is greater than or equal to 110% of the Base Steel Cost, then:

$$\text{Adjustment} = \frac{(\text{Monthly Steel Cost} - (1.1 \times \text{Base Steel Cost})) \times Q}{100}$$

If the Monthly Steel Cost is less than or equal to 90% of the Base Steel Cost, then:

$$\text{Adjustment} = \frac{(\text{Monthly Steel Cost} - (0.90 \times \text{Base Steel Cost})) \times Q}{100}$$

Where Q = total pounds of reinforcing steel and structural steel paid in the current month's progress payment. No adjustment will be provided for quantities of steel exceeding the estimated quantity shown in the Contract, even though the actual

quantities required may deviate from those listed. If the Contract provides no estimated quantities, then the maximum quantity of reinforcing steel or structural steel shall be the quantity determined by the Engineer using WSDOT approved shop drawings and a unit weight of 490-pounds per cubic foot of steel.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item included in the bid proposal:

"Steel Cost Adjustment", by calculation.

To provide a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor's total bid.

No adjustment payment will be provided until the Contractor provides written documentation of the actual date and quantity of steel in pounds shipped from the producing mill to the manufacturer. If the Contractor fails to provide the required documentation, then adjustment credits will be calculated using a shipment date determined by the Engineer in accordance with Section 1-05.1.

1-09.8.GR1

Payment For Material On Hand

1-09.8.INST1.GR1

The last paragraph of Section 1-09.8 is revised to read:

1-09.8.OPT1.GR1

(August 3, 2009)

The Contracting Agency will not pay for material on hand when the invoice cost is less than $2,000. As materials are used in the work, credits equaling the partial payments for them will be taken on future estimates. Each month, no later than the estimate due date, the Contractor shall submit a letter to the Project Engineer that clearly states: 1) the amount originally paid on the invoice (or other record of production cost) for the items on hand, 2) the dollar amount of the material incorporated into each of the various work items for the month, and 3) the amount that should be retained in material on hand items. If work is performed on the items and the Contractor does not submit a letter, all of the previous material on hand payment will be deducted on the estimate. Partial payment for materials on hand shall not constitute acceptance. Any material will be rejected if found to be faulty even if partial payment for it has been made.

1-09.9.GR1

Payments

1-09.9.INST1.GR1

Section 1-09.9 is supplemented with the following:

1-09.9.OPT1.FB1

(March 13, 1995)

The quantity of the following items to be paid for on this project shall be the quantity shown in the Proposal, unless changes are made in accordance with Section 1-04.4

which affect this quantity. The quantity shown in the Proposal will be adjusted by the amount of the change and will be paid for as specified in Section 1-04.4.

*** $$1$$ ***

The quantities in the Proposal are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the quantity even though the actual quantities required may deviate from those listed.

The unit contract price for these items shall be full pay to construct and complete this portion of the work.

1-09.9(1).GR1

Retainage

1-09.9(1).INST1.GR1

Section 1-09.9(1) content and title is deleted and replaced with the following:

1-09.9(1).OPT1.GR1

(June 27, 2011)

Vacant

1-09.11.GR1

Disputes and Claims

1-09.11.INST1.GR1

Section 1-09.11 is revised to read:

1-09.11.OPT1.GR1

(August 2, 2010)

When protests occur during a Contract, the Contractor shall pursue resolution through the Project Engineer. The Contractor shall follow the procedures outlined in Section 1-04.5.

If the negotiations using the procedures outlined in Section 1-04.5 fail to provide satisfactory resolution of protests, then either party, Engineer or Contractor, may refer the dispute to the Disputes Review Board.

1-09.11(1).GR1

Disputes Review Board

1-09.11(1).INST1.GR1

Section 1-09.11(1) is deleted and replaced with the following:

1-09.11(1).OPT1.GR1

(August 2, 2010)

In order to assist in the resolution of disputes arising out of the work of this project, the Contract provides for the establishment of a Disputes Review Board (DRB), hereinafter called the “Board.” The Board is created as part of the disputes

resolution process to be utilized when normal Contracting Agency-Contractor dispute resolution is unsuccessful and prior to the filing of a Section 1-09.11(2) claim.

The Board will consider disputes referred to it and furnish recommendations to the Contracting Agency and Contractor to assist in the resolution of the differences between them. The purpose of the Board response to such issues is to provide nonbinding findings and recommendations designed to expose the disputing parties to an independent view of the dispute.

The Board members will be trained in disputes resolution or have experience in disputes resolution, and be knowledgeable in the type of construction involved in the Project and shall discharge their responsibilities impartially and independently considering the facts and conditions related to the matters under consideration and the provisions of the Contract.

1-09.11(1)A.GR1

Disputes Review Board Membership

1-09.11(1)A.INST1.GR1

Section 1-09.11(1)A is deleted and replaced with the following:

1-09.11(1)A.OPT1.GR1

(April 4, 2011)

The Board shall consist of one member selected by the Contracting Agency and one member selected by the Contractor, with these two members to select the third member. The first two members shall be mutually acceptable to both the Contracting Agency and the Contractor. If one or both of the two members selected are not acceptable to the Contracting Agency or Contractor, another selection shall be made.

The Contracting Agency and Contractor shall each select a member and negotiate an agreement, separate and apart from this contract, with their respective Board member within the first 60 calendar days after execution of the contract.

The agreements with these two Board members shall contain language imposing the “Scope of Work” and “Suggested Administrative Procedures” included in the Appendix to these Special Provisions. These negotiated agreements shall also include clauses that require the respective selected members to immediately pursue selection of a third member. The goal is to obtain a third Board member who will complement the first two by furnishing a needed expertise, which will facilitate the Board's operations.

The Contracting Agency has entered into “standby” agreements with a number of potential third members. The qualifications of these potential members have been reviewed and deemed acceptable by both the State of Washington Department of Transportation and the Associated General Contractors of Washington. The names of these potential members will be provided to the first two members for consideration. If a selection can be made from the standby list, then the Board may be immediately seated with the execution of a

task order under the corresponding standby agreement. Should the first two members decide to select a third member not on the list of standby candidates, then the selected person will be accepted to the Board after he or she executes a standby agreement (Third Party Member Disputes Review Board Consultant Agreement). The acceptable format for this agreement and all accompanying exhibits may be obtained by contacting WSDOT Consulting Services at http://www.wsdot.wa.gov/Business/Consulting/Agreements/DisputesReview or may be obtained from the Project Engineer. The fee for the third member shall be included in a task order, issued by the Project Engineer, after the third member standby agreement is fully executed.

In the event of an impasse in selection of the third member, either the Contracting Agency or the Contractor or both may appeal to the Thurston County Superior Court for selection of a third member by the court from a list or lists submitted to the court by the Contracting Agency and/or the Contractor. An impasse shall be considered to have been reached if the two members appointed by the Contracting Agency and the Contractor to the Board have been unable to appoint the third member in a period of 60 calendar days after the approval of the last of such two members.

In case a member of the Board needs to be replaced, the replacement member will be appointed in the same manner as the replaced member was appointed. The appointment of a replacement Board member will begin promptly upon determination of the need for replacement and shall be completed within 30 calendar days.

Service of a Board member may be terminated at any time with not less than 30 calendar days notice as follows:

1. The Contracting Agency may terminate service of the Contracting Agency appointed member.

2. The Contractor may terminate service of the Contractor appointed member.

3. The third member's services may be terminated by agreement of the other two members.

4. By resignation of the member.

Termination of a member will be followed by appointment of a substitute as specified above.

No member shall have a financial interest in the Contract, except for payments for services on the Board. The Contracting Agency-selected member and the Contractor-selected member shall not have been employed by the party who selected them within a period of 1-year; except that, service as a member of other Disputes Review Boards on other contracts will not preclude a member from serving on the Board for this Contract.

Compensation for the Board members, and the expenses of operation of the Board, shall be shared by the Contracting Agency and Contractor in accordance with the following:

1. The Contracting Agency will compensate directly the wages and travel expense for its selected member.

2. The Contractor shall compensate directly the wages and travel expense for its selected member.

3. The Contracting Agency and Contractor shall share equally in the third member's wages and travel expense, and all of the operating expenses of the Board. These equally shared expenses shall be billed to and paid by the Contracting Agency. The Contractor's share will be deducted from monies due or coming due the Contractor.

4. The Contracting Agency, through the Engineer, will provide administrative services, such as conference facilities and secretarial services, to the Board and the Contracting Agency will bear the costs for this service.

The Contracting Agency and Contractor shall indemnify and hold harmless the Board Members from and against all claims, damages, losses and expenses, including but not limited to attorney’s fees arising out of and resulting from the actions and recommendations of the Board.

1-09.11(1)B.GR1

Disputes Review Board Procedures

1-09.11(1)B.INST1.GR1

Section 1-09.11(1)B is deleted and replaced with the following:

1-09.11(1)B.OPT1.GR1

(August 2, 2010)

The Board, the Contracting Agency, and the Contractor shall develop by agreement the Board's rules of operation and procedures to be followed for the Project. The Agreement shall include the frequency of the Board's visits to the Project and its interactions with the Contracting Agency and the Contractor to keep abreast of the construction development and potential disputes.

In developing the Agreement, the parties shall take into consideration their respective duties and responsibilities set forth in the “Scope of Work” section of their agreements, which is included in the Appendix of these Special Provisions.

The parties may also consider the “Suggested Administrative Procedures” for the Board's operation included in their agreements, which is included in the Appendix of these Special Provisions. These Procedures express, in general terms, the policy for the creation and operation of the Board and are intended to supplement the Special Provisions to the extent that no conflict with such provisions is created.

No dispute shall be referred to the Board unless the Contractor has complied with the procedures of Section 1-04.5. If the dispute is not resolved by the procedures outlined in 1-04.5, then the Board will consider the matter in dispute and provide recommendations concerning:

1. The interpretation of the Contract.

2. Entitlement to additional compensation or time for performance

3. Other subjects mutually agreed by the Contracting Agency and Contractor to be a Board issue.

Procedure for Consideration of Disputes

1. Once a protest has been denied as described in Section 1-04.5, the Board members will be contacted and advised of the existence of the dispute. A hearing will be scheduled to be conducted at the next regular project visit or at such other time, as agreed to by the parties.

2. The Contractor and the Contracting Agency shall each be afforded an opportunity to be heard by the Board and to offer evidence. Either party furnishing any written evidence or documentation to the Board must furnish copies of such information to the other party a minimum of 15 calendar days prior to the date the Board sets to convene the hearing for the dispute. Either party shall produce such additional evidence as the Board may deem necessary to an understanding and determination of the dispute and furnish copies to the other party.

3. After the hearing is concluded, the Board shall meet in private and reach a conclusion supported by two or more members. Its findings and recommendations, together with its reasons shall then be submitted as a written report to both parties. The recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute. The Contract shall be interpreted and construed in accordance with the laws of the State of Washington. The Board shall make every effort to reach a unanimous decision. If this proves impossible, the dissenting member may prepare a minority report.

4. Within 30 calendar days of receiving the Board recommendations, both the Contracting Agency and the Contractor shall respond to the other in writing signifying that the dispute is either resolved or remains unresolved. Although both parties should place weight upon the Board recommendations, the recommendations are not binding.

In the event the Board's recommendations do not lead to resolution of the dispute, all Board records and written recommendations, including any minority reports, will be admissible as evidence in any subsequent litigation.

If the Board’s assistance does not lead to resolution of the dispute, the Contractor must file a claim according to Section 1-09.11(2) before seeking any form of judicial relief.

1-10.GR1

Temporary Traffic Control

1-10.1.GR1

General

1-10.1.INST1.GR1

Section 1-10.1 is supplemented with the following:

1-10.1.OPT1.FR1

(August 2, 2004)

The Contracting Agency will provide the following labor, equipment and/or materials resources to the Contractor for use on the project. The Contractor will notify the Engineer when each resource is to be utilized and will provide adequate notice that will allow any necessary arrangements to be made.

*** $$1$$ ***

1-10.1.OPT2.FR1

(August 2, 2004)

The Contracting Agency has arranged for uniformed law enforcement personnel to participate in the Contractor's traffic control activities. As stated in the last paragraph of Section 1-10.1(2), the responsibility for all traffic control shall remain with the Contractor. Uniformed law enforcement personnel may be utilized to perform the following traffic control tasks:

*** $$1$$ ***

This resource is provided at no additional cost to the Contractor. The value of this resource is assumed to be reflected in the Contractor's bid for Traffic Control. Additional agreement or price adjustment between the Contractor and the Contracting Agency for this resource shall not be necessary.

1-10.2.GR1

Traffic Control Management

1-10.2(1).GR1

General

1-10.2(1).INST1.GR1

Section 1-10.2(1) is supplemented with the following:

1-10.2(1).OPT1.GR1

(December 1, 2008)

Only training with WSDOT TCS card and WSDOT training curriculum is recognized in the State of Washington. The Traffic Control Supervisor shall be certified by one of the following:

The Northwest Laborers-Employers Training Trust
27055 Ohio Ave.

Kingston, WA 98346
(360) 297-3035

Evergreen Safety Council
401 Pontius Ave. N.
Seattle, WA 98109
1-800-521-0778 or
(206) 382-4090

The American Traffic Safety Services Association
15 Riverside Parkway, Suite 100
Fredericksburg, Virginia 22406-1022
Training Dept. Toll Free (877) 642-4637
Phone: (540) 368-1701

1-10.4.GR1

Measurement

1-10.4(1).GR1

Lump Sum Bid for Project (No Unit Items)

1-10.4(1).INST1.GR1

Section 1-10.4(1) is supplemented with the following:

1-10.4(1).OPT1.GR1

(August 2, 2004)

The proposal contains the item “Project Temporary Traffic Control,” lump sum. The provisions of Section 1-10.4(1) shall apply.

1-10.4(2).GR1

Item Bids With Lump Sum for Incidentals

1-10.4(2).INST1.GR1

Section 1-10.4(2) is supplemented with the following:

1-10.4(2).OPT1.GR1

(August 2, 2004)

The bid proposal does not contain the item “Project Temporary Traffic Control,” lump sum. The provisions of Section 1-10.4(2) shall apply.

1-10.4(3).GR1

Reinstating Unit Items With Lump Sum Traffic Control

1-10.4(3).INST1.GR1

Section 1-10.4(3) is supplemented with the following:

1-10.4(3).OPT1.FR1

(August 2, 2004)

The bid proposal contains the item “Project Temporary Traffic Control,” lump sum and the additional temporary traffic control items listed below. The provisions of Section 1-10.4(1), Section 1-10.4(3), and Section 1-10.5(3) shall apply.

*** $$1$$ ***

DIVISION2.GR2

Division 2
Earthwork

2-01.GR2

Clearing, Grubbing, and Roadside Cleanup

2-01.1.GR2

Description

2-01.1.INST1.GR2

Section 2-01.1 is supplemented with the following:

2-01.1.OPT1.FR2

(March 13, 1995)

Clearing and grubbing on this project shall be performed within the following limits:

*** $$1$$ ***

2-01.3.GR2

Construction Requirements

2-01.3(4).GR2

Roadside Cleanup

2-01.3(4).INST1.GR2

Section 2-01.3(4) is supplemented with the following:

2-01.3(4).OPT1.FR2

(January 5, 1998)

*** $$1$$ ***

2-01.5.GR2

Payment

2-01.5.INST1.GR2

The first and second paragraphs of Section 2-01.5 are revised to read:

2-01.5.OPT1.FR2

(January 5, 1998)

Payment will be made in accordance with Section 1-04.1 for the following bid items when they are included in the proposal:

All costs for clearing and grubbing on this project shall be included in the *** $$1$$ ***.

2-02.GR2

Removal of Structures and Obstructions

2-02.1.GR2

Description

2-02.1.INST1.GR2

Section 2-02.1 is supplemented with the following:

2-02.1.OPT1.GR2

(March 13, 1995)

This work shall consist of removing miscellaneous traffic items.

2-02.1.OPT2.FR2

(March 13, 1995)

This work shall consist of removing, handling, and disposing of asbestos in the following areas:

*** $$1$$ ***

2-02.1.OPT3.GR2

(March 13, 1995)

This work shall consist of removing portions of an existing box culvert in preparation for extending the box culvert.

2-02.1.OPT4.GR2

(September 30, 1996)

The Contractor is advised that asbestos may be present on this project.

2-02.3.GR2

Construction Requirements

2-02.3.INST1.GR2

Section 2-02.3 is supplemented with the following:

2-02.3.OPT1.FR2

(February 17, 1998)

Removal of Obstructions

*** $$1$$ ***

2-02.3.OPT2.FR2

(March 13, 1995)

Removing Miscellaneous Traffic Items

The following miscellaneous traffic items shall be removed and disposed of:

*** $$1$$ ***

2-02.3.OPT3.FR2

(August 1, 2005)

Removal and Disposal of Hazardous Material

Hazardous material is suspected to exist on this project. Approximate limits of contamination are identified in the Plans. The site history, prior studies and/or test results indicate a potential for encountering *** $$1$$ ***.

Copies of the environmental reports are available for review at the Engineer's office. All necessary permits for this work will be furnished by the Contracting Agency. The Contractor is responsible for all work, records, and reports required to perform the work described in this section. The Contracting Agency will perform all testing of suspected hazardous or contaminated material.

The Contractor shall notify the Engineer 10 working days prior to beginning work in the area identified in the Plans as contaminated. The Contractor shall notify the Engineer immediately if contamination is discovered in areas other than those identified in the Plans, or is suspected through observations such as an oily sheen or discolored soils that may or may not emit strong chemical odors.

Contaminated Soil and Hazardous Material

The Engineer will determine the limits of excavation required. All material that is designated by the Engineer to be removed shall be handled and stored in a manner that prevents the spread of contamination to adjacent soil or water. Separate stockpiles shall be maintained for known hazardous or contaminated material and for suspected hazardous or contaminated material. The Contractor shall transport hazardous or contaminated material and dispose of it at a permitted facility. The Contractor shall provide the Engineer with a copy of the shipping manifest or bill of lading indicating the amount of material hauled to disposal, and bearing the disposal site operator's confirmation for receipt of the material.

Contaminated Water

All water that is removed from the areas of contamination, including free water that leaches from contaminated soil stockpiles or water that is suspected of being contaminated, shall be collected, handled and stored in a manner that prevents the spread of contamination to adjacent soil or water. The Contractor shall transport contaminated water and dispose of it at a permitted facility. The Contractor shall provide the Engineer with a copy of the shipping manifest or bill of lading indicating the amount of material hauled to disposal, and bearing the disposal site operator's confirmation for receipt of the material.

2-02.3.OPT4.GR2

(September 30, 1996)

Asbestos Handling And Disposal

Prior to and during, the performance of any contract work, the Contractor shall verify that no asbestos containing materials are involved or will be disturbed. When asbestos is encountered, the Contractor shall be responsible for obtaining all permits from, and provide notification to, the Washington State Department of Labor and Industries, the U.S. EPA, the local air pollution control agency, and other permitting and regulatory agencies with jurisdiction over the work involving asbestos as the law requires.

Prior to commencing asbestos related work, the Contractor shall provide the Engineer with written verification of approvals and notifications that have been given and/or obtained from the required jurisdictional agencies, and the Contractor's schedule for all work involving asbestos removal. The schedule shall include the sequencing and scheduling of asbestos related work, and coordination with subcontractors. The Contractor shall notify the Engineer when all approvals have been received and notifications have been made, as required by the agencies involved.

The Contractor shall ensure the safety of all workers, visitors to the site, and the general public in accordance with all applicable laws, rules, and regulations.

The Contractor shall designate a Washington State Certified Asbestos Supervisor (CAS) to personally supervise the asbestos removal and to ensure that the handling and removal of asbestos is accomplished by certified asbestos workers, pursuant to Washington State Department of Labor and Industries standards. The Contractor shall ensure that the removal and disposal of asbestos meets the requirements of EPA regulations 40 CFR Part 61, local health department regulations, and all other applicable regulations.

2-02.3.OPT5.GR2

(September 30, 1996)

Asbestos Handling And Disposal

Prior to performance of any contract work, the Contractor shall obtain all permits from, and provide notification to, the Washington State Department of Labor and Industries, the U.S. EPA, the local air pollution control agency, and other permitting and regulatory agencies with jurisdiction over the work involving asbestos as the law requires.

Prior to commencing asbestos related work, the Contractor shall provide the Engineer with written verification of approvals and notifications that have been given and/or obtained from the required jurisdictional agencies, and the Contractor's schedule for all work involving asbestos removal. The schedule shall include the sequencing and scheduling of asbestos related work, and coordination with subcontractors. The Contractor shall notify the Engineer when all approvals have been received and notifications have been made, as required by the agencies involved.

The Contractor shall ensure the safety of all workers, visitors to the site, and the general public in accordance with all applicable laws, rules, and regulations.

The Contractor shall designate a Washington State Certified Asbestos Supervisor (CAS) to personally supervise the asbestos removal and to ensure that the handling and removal of asbestos is accomplished by certified asbestos workers, pursuant to Washington State Department of Labor and Industries standards. The Contractor shall ensure that the removal and disposal of asbestos meets the requirements of EPA regulation 40 CFR Part 61, local health department regulations, and all other applicable regulations.

2-02.3.OPT6.FB2

(June 26, 2000)

Salvage of Removed Structure Items

All *** $$1$$ *** of the existing bridge or structure being removed shall remain the property of the Contracting Agency.

The Contractor shall transport the specified salvaged items to the following location:

$$2$$

The Contractor shall stack the material where directed by the Engineer. The Contractor shall contact the Engineer at least five working days prior to scheduled delivery of the items to confirm delivery arrangements.

2-02.3(2).GB2

Removal of Bridges, Box Culverts, and other Drainage Structures

2-02.3(2).INST1.GB2

Section 2-02.3(2) is supplemented with the following:

2-02.3(2).OPT1.FB2

(June 26, 2000)

The Contractor shall remove existing Bridge *** $$1$$ *** after routing traffic onto *** $$2$$ ***.

2-02.3(2).OPT2.FB2

(June 26, 2000)

The Contractor shall remove existing Bridge ***$$1$$*** in stages as shown in the Plans.

2-02.3(2).OPT3.FB2

(June 26, 2000)

The Contractor shall remove the following portions of Bridge *** $$1$$ ***, as shown in the Plans:

*** $$2$$ ***

2-02.3(2).OPT4.GB2

(June 26, 2000)

Plans of the existing bridge(s) are available at the Project Engineer's Office for the prospective bidder's inspection.

2-02.3(2).OPT5.GB2

(June 26, 2000)

Bridge Demolition Plan

The Contractor shall submit a bridge demolition plan with working drawings and calculations to the Engineer for approval in accordance with Section 6-01.9, showing the method of removing the existing bridge(s), or portions of bridges, as specified.

The bridge demolition plan shall show support bents, bracing, guys, lifting devices, lifting attachments, the sequence of demolition and removal, the type of equipment to be used in all demolition and removal operations, the location of cranes and barges, the location of support or lifting points, and the weights of structure parts being removed. The plan shall include a crane stability analysis and crane load calculations based on the controlling crane picks of the Contractor’s plan. The plan

shall detail the containment, collection, and disposal of all debris. The plan shall show all stages of demolition.

The Contractor shall not begin removal operations until receiving the Engineer's approval of the bridge demolition plan.

2-02.3(2).OPT6.GB2

(April 3, 2006)

When the bridge removal work includes removal of a truss, and when the Contractor's removal method involves use of a crane or cranes to pick, lift, and remove the truss, the Contractor shall confirm the truss dead load weight prior to beginning the truss removal operation. The operation of confirming the truss dead load shall be performed at both ends of the truss, and shall ensure that the truss is broken free of its support bearings. The Contractor's method of confirming the truss dead load, whether by hydraulic jacks or other means, shall be included in the Contractor's bridge demolition plan submittal.

2-02.3(2).OPT7.FB2

(June 26, 2000)

Removal Limits in Water

The existing piers of Bridge *** $$1$$ *** within the wetted perimeter of the *** $$2$$ *** which do not conflict with new construction shall be removed to elevation *** $$3$$ ***. All broken concrete, and other bridge removal debris shall be removed from the bottom of the *** $$4$$ ***.

2-02.3(2).OPT8.GB2

(August 3, 2009)

Removing Portions of Existing Concrete

Before removing the portions of the existing concrete adjacent to that which is to remain, a 3/4-inch deep saw cut, but no deeper than the existing concrete cover over the steel reinforcing bars, shall be made into the surface of the concrete to form a break line. Care shall be taken to prevent cutting the existing reinforcing steel bars which are to remain.

Care shall be taken in removing concrete to prevent overbreakage or damage to portions of the existing structure which are to remain. Concrete shall be carefully broken away from the steel reinforcing bars which extend from the existing structure. Steel reinforcing bars which extend from the existing members shall be cleaned (defined as exposing the deformed surface of the bar) and spliced with the steel reinforcing bars in the new members unless shown otherwise in the Plans. The Contractor shall protect traffic from falling concrete and debris, in accordance with the debris collection and containment provisions of the bridge demolition plan as approved by the Engineer.

The Contractor shall roughen, clean, and saturate existing concrete surfaces, against which fresh concrete will be placed, in accordance with Section 6-02.3(12)B.

2-02.3(2).OPT9.GB2

(January 4, 2010)

When a portion of existing concrete is to be removed without replacement, care shall be taken to remove to a clean line with a smooth surface of less than 1/16 inch profile obtained by methods of the Contractor's choice with the approval of the Engineer. Steel reinforcing bars shall be cut a minimum of 1-inch behind the final surface. The void left by removal of the steel reinforcing bar shall be coated with epoxy resin and filled with mortar conforming to Section 9-20.4(2). The epoxy resin shall be Type II conforming to Section 9-26.1 with the grade and class as recommended by the resin manufacturer and as approved by the Engineer. The mortar shall consist of cement and fine aggregate mixed in the proportions to match the color of the existing concrete surface as nearly as practicable.

2-02.3(2).OPT10.GB2

Use of Explosives

2-02.3(2).OPT10(A).GB2

(June 26, 2000)

Explosives shall not be used in the demolition.

2-02.3(2).OPT10(B).FB2

(August 1, 2005)

The Contractor may use explosives in the demolition of *** $$1$$ ***.

If explosives are used for any removal operation, the Contractor shall:

1. Conform with Section 1-07.22, including providing notice of the time and duration of the blasting operation to all residents and property owners within the safety zone.

2. Submit a detailed blasting plan to the Engineer for approval.

3. Perform a pre-blast survey to document the pre-blast condition of all structures within the safety zone, and provide copies of the pre-blast survey to the Engineer.

4. Obtain permits and approvals from all applicable governmental agencies.

The blasting plan shall include, but not be limited to, the following:

1. Show all stages of the demolition work.

2. Show details of all “pre-weakening” of the bridge, including locations and extent of the structure modifications.

3. Specify the explosive and charge type and quantity.

4. Specify the firing sequence.

5. Specify the fall direction and fall sequence of the bridge, and show locations and details of all cables and structure attachments used for control.

6. Show details of drill holes and explosive placement.

7. Specify types of ground vibration monitoring equipment and show the locations of such equipment.

8. Specify how noise and shock waves are kept to a minimum.

9. Specify fragment, dust, and debris control.

10. Name, address, and phone number(s) of the licensed explosives expert supervising the operation.

11. Specify safety and security procedures, including, but not limited to, the following:

    a. Methods of storage and transportation.

    b. Measures taken to secure the blasting materials at all times, including all non-working hours.

    c. Measures taken to secure the bridge site at all times during and after installation of all charges and after blasting.

    d. Safeguards against accidental discharge.

    e. Safety zone limits.

    f. Barricade locations.

    g. Location of firing device, warning signals, warning signs.

    h. Communication procedures for notifying the Engineer, nearby residents, and all personnel of impending blasting.

The Contractor shall submit the blasting plan to the Engineer for approval in accordance with Section 1-05.3.

The Contractor shall enlist a licensed, experienced explosives expert to supervise all stages of explosive work, including hole drilling and explosive placement, safety procedures, and blasting operations.

At least five to ten working days prior to the scheduled blast, a pre-blast conference shall be held to discuss the blasting plan, all pre-blast preparations of the bridge, the pre-blast, blast, and post-blast procedures, and the responsibilities and activities of the personnel and equipment involved. Those attending shall include, but not be limited to, the following:

1. (representing the Contractor): The project superintendent, the licensed explosives expert specified to supervise the work, and the work crew leaders responsible for performing the pre-blast and post-blast activities.

2. (representing the Contracting Agency): The Project Engineer, key inspection assistants, and representatives of the WSDOT Construction Office.

Traffic shall not be allowed in the vicinity during blasting operations.

All damage as a result of the Contractor's blasting operations shall be repaired by the Contractor at no additional expense to the Contracting Agency in accordance with Sections 1-07.13 and 1-07.14.

2-02.3(2).OPT11.GB2

(August 6, 2007)

Requirements for Closing Bridge to Traffic Prior to Beginning Removal

The Contractor shall not close the existing bridge to traffic, and shall not begin bridge removal operations, until the following conditions are met:

1. The Contractor has received the Engineer's approval of the bridge demolition plan.

2. The Contractor has received the Engineer's approval of all shop drawings and materials submittals for materials required for the work to be executed during the closure.

3. The Contractor has submitted a report on the status of material delivery to the Engineer. The report shall specify the materials already available at the site, the materials yet to arrive at the site, and the scheduled delivery dates of the materials yet to arrive at the site, with written verification from the supplier or copies of confirmed purchase orders indicating the delivery dates of the materials yet to arrive at the site.

4. The Contractor shall provide an updated progress schedule in accordance with Section 1-08.3 confirming that the scheduled delivery of materials will meet the schedule to complete the work within the allowed time. The Contractor shall supplement the progress schedule with a written narrative describing the assumed production rates and planned resource allocations that support the bridge construction activity durations provided in the progress schedule.

5. The Contractor has received the Engineer's approval to proceed.

2-02.3(2).OPT12.GR2

(June 26, 2000)

Removing Portions of Existing Box Culvert

The Contractor shall remove, to the limits shown in the Plans, the existing wingwalls, wingwall footings, aprons, and parapet walls of the box culvert to be extended.

2-02.3(3).GR2

Removal of Pavement, Sidewalks, Curbs, and Gutters

2-02.3(3).INST1.GR2

Section 2-02.3(3) is supplemented with the following:

2-02.3(3).OPT1.FR2

(September 8, 1997)

The approximate thickness of the *** $$1$$ *** pavement is *** $$2$$ ***.

2-02.4.GR2

Measurement

2-02.4.INST1.GR2

Section 2-02.4 is supplemented with the following:

2-02.4.OPT1.GR2

(December 4, 2006)

Hazardous material excavation including haul will be measured by the cubic yard. All excavated material will be measured in the position it occupied before the excavation was performed. An original ground measurement will be taken using cross-section or digital terrain modeling survey techniques. The original ground will be compared with a survey of the excavation area taken after the work is completed.

2-02.4.OPT2.GR2

(September 8, 1997)

Pavement removal will be measured by the square yard.

2-02.4.OPT3.GR2

(October 25, 1999)

Sidewalk removal will be measured by the square yard.

2-02.4.OPT4.GR2

(September 8, 1997)

Curb removal will be measured by the linear foot.

2-02.5.GR2

Payment

2-02.5.INST1.GR2

Section 2-02.5 is revised by the following:

2-02.5.OPT1.FR2

(June 26, 2000)

Payment will be made in accordance with Section 1-04.1, for the following bid item when it is included in the proposal.

All costs for the removal of structures and obstructions shall be included in *** $$1$$ ***.

2-02.5.INST2.GR2

Section 2-02.5 is supplemented with the following:

2-02.5.OPT7.GR2
(December 4, 2006)
“Hazardous Material Handling And Disposal”, by force account as provided in Section 1-09.6.

All costs associated with storing stockpiled hazardous waste and contaminated soils, collecting, handling and storing contaminated water, loading the stockpiled material into the hauling conveyance for transport to the disposal site, and transporting and disposing of hazardous or contaminated materials at an approved facility will be paid by force account under the item “Hazardous Material Handling And Disposal”.

To provide a common basis for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor’s total bid.

“Hazardous Material Excavation Incl. Haul”, per cubic yard.
The unit contract price for “Hazardous Material Excavation Incl. Haul” shall be full pay for all costs associated with excavating the material designated to be removed, hauling it to the stockpile location, and stockpiling the excavated material.

2-02.5.OPT8.GR2
(September 30, 1996)
"Removing Miscellaneous Traffic Item", lump sum.

2-02.5.OPT9.GB2
(June 26, 2000)
“Removing Existing Bridge _____”, lump sum.

2-02.5.OPT10.GB2
(June 26, 2000)
“Removing Portion of Existing Bridge _____”, lump sum.

2-02.5.OPT11.GR2
(September 30, 1996)
"Removal and Disposal of Asbestos Material", lump sum.

2-02.5.OPT12.GR2
(June 26, 2000)
"Removing Portion of Conc. Box Culv.", lump sum.

The lump sum contract price for "Removing Portion of Conc. Box Culv." shall be full pay for preparing the box culvert for the extension by removing and disposing of all concrete and other debris specified.

2-02.5.OPT13.FR2
(September 30, 1996)
"Removing *** $$1$$ *** Pavement", per square yard.

2-02.5.OPT14.GR2
(September 30, 1996)

Payment for asbestos removal, handling, disposal, cost of permits, and all other work will be as provided in Section 1-04.7, unless such work is explicitly included as a part of another pay item in the contract.

2-02.5.OPT15.GR2
(June 26, 2000)
All costs in connection with removing the box culvert wingwalls, footings, aprons, and parapet wall and disposing of concrete and other debris as specified shall be included in the unit contract prices for the items of work involved in the extension of the box culvert(s).

2-02.5.OPT16.FR2
(November 3, 1999)
"Removing *** $$1$$ *** Sidewalk", per square yard.

2-02.5.OPT17.FR2
(September 8, 1997)
"Removing *** $$1$$ *** Curb", per linear foot.

2-03.GR2
Roadway Excavation and Embankment

2-03.3.GR2
Construction Requirements

2-03.3(2).GR2
Rock Cuts

2-03.3(2).INST1.GR2
Section 2-03.3(2) is supplemented with the following:

2-03.3(2).OPT1.GR2
(April 5, 2010)
Rock Slope Scaling and Removal and Disposal of Rock Slope Scaling Debris
The Contractor shall remove loose rock and soil from the existing rock slope locations shown in the Plans or as specified by the Engineer, and shall remove and dispose of all rock slope scaling debris generated by the work.

Equipment
Rock slope scaling shall be performed with scaling bars, portable hydraulic wedges, air pillows, hand drills, splitters, and other mechanical or hand tools demonstrated to be effective in performing the work to the satisfaction of the Engineer.

Submittals
The Contractor shall submit a rock slope scaling plan to the Engineer for approval in accordance with Section 1-05.3. The rock slope scaling plan shall include, but not be limited to, the following:

1. Documented work experience of all rock slope scaling foremen and scalers scheduled to be working on the project. Rock slope scaling

foremen shall have at least 1,500 hours of documented experience as a rock slope scaler. Rock slope scalers shall have at least 1,000 hours of documented experience as a rock slope scaler.

2. The proposed construction sequence and schedule.

3. The type of tools and equipment to be used for rock scaling purposes.

4. The number of rock slope scaling crews to be employed on the project, with a rock slope scaling crew defined as one qualified foreman and two qualified scalers.

5. Operation plan for collection, removal and disposal of all rock slope scaling debris generated by the rock slope scaling work.

6. Operation plan for protection of roadway surface, railroad facilities, structures, utilities, and other facilities adjacent to the rock slope scaling locations.

7. If the roadway is exposed to the collection of rock slope scaling debris, the submittal shall include the equipment and procedure to be used to clear the roadway for public use between rock slope scaling operations.

The Contractor shall not begin rock slope scaling operations until receiving the Engineer's approval of the rock slope scaling plan.

Rock Slope Scaling Construction Requirements

As a first item of work, the Contractor shall clear the rock slope of trees and woody vegetation within the work zone within 15 feet of the slope crest or as otherwise specified by the Engineer. Clearing shall conform to Sections 2-01.1 and 2-01.3(1), and the requirement that the vegetation shall be close cut, leaving the root wad intact.

The Contractor shall conduct rock slope scaling operations in accordance with the details shown in the Plans, the traffic control restrictions and requirements shown in the Plans and specified in the Special Provisions, and the rock slope scaling plan as approved by the Engineer. The size and work experience of the rock slope scaling crew as defined above shall be maintained at all times.

Rock slope scaling shall begin at the top of the rock slope and work shall proceed down slope, removing loose rock and soil as the work progresses. The extent of rock slope scaling shall be as shown in the Plans and as adjusted in the field by the Engineer.

Rock Slope Scaling Debris Collection and Removal

The Contractor shall collect, remove and dispose of all rock slope scaling debris generated by the work, including all rock debris within the limits of the project present at the base of the slope at the beginning of the project. Ditches

and benches shall be cleared of all rock slope scaling debris and returned to original functional condition as specified by the Engineer

The Contractor shall break up any rocks that are too large to transport into manageable sized pieces for haul.

Rock slope scaling debris collection and removal shall be conducted in accordance with the traffic control restrictions and requirements shown in the Plans and specified in the Special Provisions, and the rock slope scaling plan as approved by the Engineer.

Except when the Plans or Special Provisions specify a Contracting Agency provided site for disposal of all or specific portions of the rock slope scaling debris, all rock slope scaling debris shall be disposed of at a site conforming to Section 2-03.3(7)C.

2-03.3(7).GR2

Disposal Of Surplus Material

2-03.3(7).INST1.GR2

Section 2-03.3(7) is supplemented with the following:

2-03.3(7).OPT1.FR2

(March 13, 1995)

Surplus materials may be disposed of within the Contracting Agency furnished site, as detailed in the Plans. For informational purposes the maximum capacity of this site is *** $$1$$ *** cubic yards, neat line measurement.

2-03.3(7).OPT2.FR2

(March 13, 1995)

Surplus materials may be disposed of by widening embankments at the following locations, as may be designated by the Engineer :

*** $$1$$ ***

For informational purposes the maximum capacity of the embankment widening sites is *** $$2$$ *** cubic yards, neat line measurement

2-03.3(7).OPT3.GR2

(March 13, 1995)

The Contractor is not required to utilize the Contracting Agency provided site(s), and may make arrangements, at the Contractor's expense, for the disposal of waste materials, and shall protect the Contracting Agency from all damages arising from the Contractor's waste disposal operations.

2-03.3(7).OPT4.GR2

(March 13, 1995)

It is anticipated that the waste site(s) provided by the Contracting Agency will not be of sufficient size or capacity to dispose of all excess materials. Therefore, it will be necessary for the Contractor to make arrangements, at the Contractor's expense, for the disposal of excess waste materials and shall protect the

Contracting Agency from all damages that may arise from the waste disposal operations.

2-03.3(14).GR2

Embankment Construction

2-03.3(14)C.GR2

Compacting Earth Embankments

2-03.3(14)C.INST1.GR2

Section 2-03.3(14)C is supplemented with the following:

2-03.3(14)C.OPT1.GR2

(March 13, 1995)

All embankments, except waste embankments, shall be compacted using Method A.

2-03.3(14)I.GB2

Embankments at Bridge And Trestle Ends

2-03.3(14)I.INST1.GB2

Section 2-03.3(14)I is supplemented with the following:

2-03.3(14)I.OPT1.FB2

(March 13, 1995)

The approach embankments at the ends of *** $$1$$ *** shall be constructed *** $$2$$ *** before undertaking the construction of the end piers.

2-03.4.GR2

Measurement

2-03.4.INST1.GR2

Section 2-03.4 is supplemented with the following:

2-03.4.OPT1.GR2

(March 13, 1995)

The embankment widening for guardrail will be measured by the cubic yard, between the original roadway slope and the neat lines of the widened embankment.

2-03.4.OPT2.GR2

(March 13, 1995)

Only one determination of the original ground elevation will be made on this project. Measurement for roadway excavation and embankment will be based on the original ground elevations recorded previous to the award of this contract.

If discrepancies are discovered in the ground elevations which will materially affect the quantities of earthwork, the original computations of earthwork quantities will be adjusted accordingly.

Earthwork quantities will be computed, either manually or by means of electronic data processing equipment, by use of the average end area method or by the finite element analysis method utilizing digital terrain modeling techniques.

Copies of the ground cross-section notes will be available for the bidder's inspection, before the opening of bids, at the Project Engineer's office and at the Region office.

Upon award of the contract, copies of the original ground cross-sections will be furnished to the successful bidder on request to the Project Engineer.

2-03.4.OPT3.GR2
(March 13, 1995)
Only one determination of the original ground elevation will be made on this project. Measurement for roadway excavation and embankment will be based on the original ground elevations recorded previous to the award of this contract. Control stakes will be set during construction to provide the Contractor with all essential information for the construction of excavation and embankments.

If discrepancies are discovered in the ground elevations which will materially affect the quantities of earthwork, the original computations of earthwork quantities will be adjusted accordingly.

Earthwork quantities will be computed, either manually or by means of electronic data processing equipment, by use of the average end area method or by the finite element analysis method utilizing digital terrain modeling techniques.

Copies of the ground cross-section notes will be available for the bidder's inspection, before the opening of bids, at the Project Engineer's office and at the Region office.

Upon award of the contract, copies of the original ground cross-sections will be furnished to the successful bidder on request to the Project Engineer.

2-03.4.OPT4.GR2
(April 5, 2010)
Rock slope scaling will be measured by the crew hour.

Rock slope scaling debris removal including haul will be measured by the cubic yard in the hauling conveyance at the point of removal from the work site.

2-03.5.GR2
Payment

2-03.5.INST1.GR2
Section 2-03.5 is supplemented with the following:

2-03.5.OPT1.GR2
(September 30, 1996)
"Embankment in Place", per cubic yard.

The unit contract price per cubic yard shall be full pay to perform the work as specified, including terracing the existing slope.

2-03.5.OPT2.FR2

(March 13, 1995)

All costs in connection with the preparation of waste sites and waste deposits shall be included in the *** $$1$$ ***.

2-03.5.OPT3.GR2

(April 5, 2010)

"Rock Slope Scaling", per crew hour.

The unit contract price per crew hour for "Rock Slope Scaling" shall be full pay for performing the work as specified.

"Rock Slope Scaling Debris Removal Incl. Haul", per cubic yard.

The unit contract price per cubic yard for "Rock Slope Scaling Debris Removal Incl. Haul" shall be full pay for performing the work as specified, including collection, removal and disposal of all rock debris within the limits of the project present at the base of the slope at the beginning of the project.

All costs in connection with felling of trees and woody vegetation from the site as specified, and collection, removal and disposal of all trees and woody vegetation cut and removed from the slope, shall be included in the lump sum contract price for "Clearing and Grubbing".

2-06.GR2

Subgrade Preparation

2-06.3.GR2

Construction Requirements

2-06.3(1).GR2

Subgrade For Surfacing

2-06.3(1).INST1.GR2

Section 2-06.3(1) is supplemented with the following:

2-06.3(1).OPT1.GR2

(March 13, 1995)

The subgrade shall be trimmed with an automatically controlled machine.

2-06.3(1).OPT2.GR2

(March 13, 1995)

A subgrade trimmer is not required but all portions of Section 2-03 shall apply as though a subgrade trimmer were specified.

2-09.GR2

Structure Excavation

2-09.3.GR2

Construction Requirements

2-09.3(1).GR2

General Requirements

2-09.3(1)C.GR2

Removal of Unstable Base Material

2-09.3(1)C.INST1.GR2

Section 2-09.3(1)C is supplemented with the following:

2-09.3(1)C.OPT1.FB2

(March 13, 1995)

If the soil in the footing excavation *** $$1$$ *** tends to liquify before placement of the concrete footing, the Contractor shall excavate below the plan grade a maximum of 1 foot, as determined by the Engineer, and backfill with gravel backfill for foundations.

2-09.3(1)C.OPT2.GB2

(January 3, 2006)

If unsatisfactory foundation material, as determined by the Engineer, is encountered for placing bridge footings, the foundation material shall be excavated below the footing, and the unsatisfactory material replaced with gravel backfill for foundation Class A, or lean concrete, except, when the maximum design soil pressure is greater than five tons per square foot, lean concrete only shall be used for replacing the unsatisfactory material.

Lean concrete shall meet the requirements of Section 6-02.

The unsatisfactory material shall be removed to a maximum of 3 feet below the bottom of the footing elevation, unless the Engineer directs the Contractor to excavate deeper. Excavations greater than 3 feet below the bottom of the footing may require redesign of the footings and columns, for which the Engineer will furnish revised plans.

2-09.3(3).GR2

Construction Requirements, Structure Excavation, Class A

2-09.3(3)B.GR2

Excavation Using Open Pits – Extra Excavation

2-09.3(3)B.INST1.GR2

Section 2-09.3(3)B is supplemented with the following:

2-09.3(3)B.OPT1.BSP.FB2

(BSP October 13, 2003)

Extra excavation and open pit excavation, as defined in this section, will not be allowed at the following location(s):

*** $$1$$ ***

The Contractor shall shore excavations at the locations specified above in accordance with Section 2-09.3(3)D. The Contractor shall submit shoring plans to the Engineer for approval in accordance with Section 2-09.3(3)D.

2-09.3(3)D.GR2

Shoring And Cofferdams

2-09.3(3)D.INST1.GR2

Section 2-09.3(3)D is supplemented with the following:

2-09.3(3)D.OPT1.GB2

(March 13, 1995)

The Contractor shall protect the existing pavement from damage due to the Contractor's operations and shall shore all excavation adjacent to the existing pavement.

2-09.3(3)D.OPT2.GB2

(August 2, 2010)

The Contractor shall protect the existing track and facilities of the Railroad Company from damage due to the Contractor's operations, and shall shore all excavation adjacent to the existing railroad track. Shoring shall be steel sheet piling designed for a Cooper E-80 loading according to the American Railway Engineering and Maintenance Association (AREMA) Manual For Railway Engineering. Damage to the railroad track or railroad facilities, due to the Contractor's operations, will be repaired by the Railroad at the Contractor's expense.

2-09.3(3)D.OPT3.FB2

(March 13, 1995)

Because of the nearness of the work to the existing *** $$1$$, *** the Contractor shall protect the *** $$2$$ *** during the *** $$3$$ ***.

2-09.4.GR2

Measurement

2-09.4.INST1.GR2

The subsection **Lower Limits** of Section 2-09.4 is supplemented with the following:

2-09.4.OPT1.GB2

(January 4, 2010)

Under girders, at end pier embankments, the lower limit will follow a line parallel to the bottom of the girders and three feet below them.

2-09.5.GR2

Payment

2-09.5.INST1.GR2

Section 2-09.5 is supplemented with the following:

2-09.5.OPT1.GB2

(March 13, 1995)

When lean concrete is used to backfill voids left by the removal of unsatisfactory foundation material, as determined by the Engineer, payment for this work shall be by force account as provided in Section 1-09.6.

To provide a common basis for all bidders, the Contracting Agency has estimated the amount of force account for "Force Account Lean Concrete" and has entered the amount in the Proposal to become a part of the total bid by the Contractor.

2-12.GR2

Construction Geosynthetic

2-12.1.GR2

Description

2-12.1.INST1.GR2

Section 2-12.1 is supplemented with the following:

2-12.1.OPT1.GR2

(November 17, 1997)

Geosynthetic Reinforced Slope

The Contractor shall furnish and construct geosynthetic reinforced slopes in accordance with the details shown in the Plans, these specifications, or as directed by the Engineer.

2-12.2.GR2

Materials

2-12.2(9-03.14).GR2

Borrow

Section 9-03.14 is supplemented with the following:

2-12.2(9-03.14).OPT1.FR2

(November 17, 1997)

Borrow for Geosynthetic Reinforced Slope

All backfill material used in the reinforced soil zone of the geosynthetic reinforced slope shall be free draining, free from organic or otherwise deleterious material and shall conform to the gradation for *** $$1$$ *** borrow, except that the percent passing a No. 200 sieve shall be 7 to 12 percent, and the SE shall be 15 minimum. The material shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The backfill material shall meet the following requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 min.
pH	AASHTO T 289-91	4.5 to 9

Reinforced slope backfill material satisfying these gradation, durability and chemical requirements shall be classified as nonaggressive.

2-12.2(9-07.9).GR2

Cold Drawn Wire

Section 9-07.9 is supplemented with the following:

2-12.2(9-07.9).OPT1.GR2

(November 17, 1997)

Welded wire fabric for the slope facing, including all facing anchor pins and tie-bars, shall conform to the requirements of AASHTO M55. Welded wire fabric, anchor pins, and tie-bars shall be galvanized after fabrication in accordance with ASTM A 641 (2 oz./ft^2 minimum). All damage to galvanizing shall be repaired with formula A-9-73 Galvanizing Repair Paint in accordance with Section 9-08.2.

2-12.2(9-14.2).GR2

Seed

Section 9-14.2 is supplemented with the following:

2-12.2(9-14.2).OPT1.GR2

(November 17, 1997)

The grass seed mix for geosynthetic reinforced slope face shall be as follows:

40% Red Fescue
40% Perennial Rye
10% White Dutch Clover
10% Colonial Bent Grass

2-12.2(9-33.2(2)).GR2

Geosynthetic Properties For Retaining Walls and Reinforced Slopes

Section 9-33.2(2) is supplemented with the following:

2-12.2(9-33.2(2)).OPT1.FR2

(January 2, 2012)

Geosynthetic Properties for Reinforced Slopes

Geotextile reinforcement (primary and secondary) in geosynthetic reinforced slopes shall conform to the properties specified in Tables 7 and 11.

If geogrid reinforcement is used for wrapped face reinforced slope construction, the geotextile material placed at the wall face to retain the backfill material as shown in the Plans shall conform to the properties of Table 7.

Wide strip geosynthetic strengths are minimum average roll values (i.e., the average test results for any sampled roll in a lot shall meet or exceed the values shown in the table). These wide strip strength requirements apply only in the geosynthetic direction perpendicular to the slope face. Wide width tensile strength testing is in conformance with the most recently approved ASTM geosynthetic test procedure (ASTM D4595 for geotextiles, and ASTM D6637 for geogrids), except for geosynthetic sampling and specimen conditioning, which are in accordance with WSDOT Test Methods 914 and 915, respectively.

Table 11: Long-term tensile strength, T_{al}, required for geosynthetic reinforcement used in geosynthetic reinforced slopes.

[3]Slope Location	Vertical Spacing of Primary Reinforcement Layers	Primary Reinforcement Layer Distance from Top of Reinforced slope	[1,2]Minimum Long-Term Tensile Strength, T_{al}, for Primary Reinforcement	[1]Minimum Ultimate Tensile Strength (ASTM D4595 or D6637) for Secondary Reinforcement
$$1$$	***$$2$$***	***$$3$$***	***$$4$$***	1300 lbs/ft.

[1]These long-term tensile strength requirements apply only in the geosynthetic direction perpendicular to the slope face.

[2]T_{al}.shall be determined in accordance with WSDOT Standard Practice T925.

[3]Reinforced slopes ***$$5$$*** are classified as Class ***$$6$$*** structures.

2-12.2(9-33.2(2)).OPT2.GR2

(April 5, 2004)

Geosynthetic Properties for Turf Reinforcement Mat

The turf reinforcement mat shall be a three-dimensional non-degradable polymer mat conforming to the properties indicated in Table 12. All geosynthetic properties are minimum average roll values. The average test results for any sampled roll in a lot shall meet or exceed the values shown in the table.

Table 12: Turf Reinforcement Mat Property Requirements.

Property	Test Method	Minimum Property Requirements
Tensile Strength, Minimum in Machine and X-Machine direction	ASTM D5035	10 lbs/in.
Thickness	ASTM D5199 @ 0.3 psi	0.5 inch
UV Resistance	ASTM D4355 @ 500 hours	70%

2-12.2(9-33.4(1)).GR2

Source Approval

Section 9-33.4(1) is supplemented with the following:

2-12.2(9-33.4(1)).OPT1.GR2

(April 5, 2004)

Geosynthetic Reinforced Slope Primary Reinforcement

Geosynthetic products which are qualified for use in geosynthetic reinforced structures for primary reinforcement (Classes 1, 2, or both) are listed in the current Qualified Products List (QPL).

For geosynthetic products proposed for use as primary reinforcement which are not listed in the current QPL, the Contractor shall submit test information and the

calculations used in the determination of T_{al} performed in accordance with WSDOT Test Method 925 to the Olympia Service Center Materials Laboratory in Tumwater for evaluation. The Contracting Agency will require up to 30 calendar days after receipt of the information to complete the evaluation.

Source approval for reinforced slope primary reinforcement geosynthetic materials listed in the current QPL, or as approved based on data developed and submitted in accordance with WSDOT Test Method 925, will be based on conformance to the applicable values in Tables 7 and 11.

2-12.2(9-33.4(1)).OPT2.GR2

(April 5, 2004)

Geosynthetic Reinforced Slope Secondary Reinforcement

The Contractor shall submit to the Engineer the following information regarding the geosynthetic secondary reinforcement product(s) proposed for use:

Manufacturer's name and current address,
Full product name,
Geosynthetic structure, including fiber/yarn type, and
Geosynthetic polymer type(s).

If the geosynthetic source has not been previously evaluated or included in the QPL, a sample of each proposed geosynthetic shall be submitted to the Olympia Service Center Materials Laboratory in Tumwater for evaluation. A maximum of 14 calendar days will be required for this testing once the samples and required product information arrive at the Materials Laboratory. Source approval will be based on conformance to the applicable values in Tables 7 and 11. Source approval will not be the basis of acceptance of specific lots of material unless the lot sampled can be clearly identified, and the number of samples tested and approved meet the requirements of WSDOT Test Method 914.

2-12.2(9-33.4(1)).OPT3.GR2

(November 17, 1997)

Geosynthetic Reinforced Slope Turf Reinforcement Mat

Approval of source for turf reinforcement mat will be by Manufacturer's Certificate of Compliance.

2-12.2(9-33.4(3)).GR2

Acceptance Samples

Section 9-33.4(3) is supplemented with the following:

2-12.2(9-33.4(3)).OPT1.GR2

(November 17, 1997)

Geosynthetic Reinforced Slope Primary Reinforcement

Geotextile acceptance testing shall meet the requirements of Table 7, and both geotextile and geogrid acceptance testing shall meet the required ultimate tensile strength T_{ult} as provided in the QPL for the selected product(s). If the selected product(s) are not listed in the current QPL, the result of the testing for T_{ult} must be greater than or equal to T_{ult} as determined from the product data submitted and approved by the Olympia Service Center Materials Laboratory during source approval. If the results of the testing show that the reinforced slope primary

geosynthetic reinforcement lot does not meet the specified properties, the roll or rolls which were sampled will be rejected, and additional sampling and testing will be performed as specified.

2-12.2(9-33.4(3)).OPT2.GR2

(April 5, 2004)

Geosynthetic Reinforced Slope Secondary Reinforcement

If the results of the testing show that the reinforced slope secondary reinforcement geosynthetic lot does not meet the properties specified in Table 7 (geotextiles only) and Table 11 (geotextiles and geogrids), the roll or rolls which were sampled will be rejected, and additional sampling and testing will be performed as specified.

2-12.2(9-33.4(3)).OPT3.GR2

(November 17, 1997)

Geosynthetic Reinforced Slope Turf Reinforcement Mat

Acceptance of turf reinforcement mat will be by Manufacturer's Certificate of Compliance.

2-12.2(9-33.4(4)).GR2

Acceptance by Certificate of Compliance

Section 9-33.4(4) is supplemented with the following:

2-12.2(9-33.4(4)).OPT1.GR2

(November 17, 1997)

Reinforced Slope

The Contractor shall provide a Manufacturer's Certificate of Compliance to the Engineer, including polymer type in addition to all information as specified, for all quantities of reinforced slope geosynthetic material, including primary and secondary reinforcement materials, and erosion mat material when specified in the Plans.

2-12.3.GR2

Construction Requirements

2-12.3.INST1.GR2

Section 2-12.3 is supplemented with the following:

2-12.3.OPT1.GR2

(November 17, 1997)

Geosynthetic Reinforced Slope Construction Requirements

Submittals

The Contractor shall submit to the Engineer, a minimum of 14 calendar days prior to beginning construction of each reinforced slope, detailed plans for each reinforced slope and as a minimum, the submittals shall include the following:

1. Detailed reinforced slope plans showing the actual lengths proposed for the geosynthetic reinforcing layers and the locations of each geosynthetic product proposed for use in each of the geosynthetic reinforcing layers.

2. The Contractor's proposed reinforced slope construction method, including any proposed forming systems, types of equipment to be used and proposed erection sequence.

3. Manufacturer's Certificate of Compliance, samples of the reinforced slope geosynthetic(s) and sewn seams for the purpose of acceptance as specified.

4. Details of geosynthetic reinforced slope corner construction, including details of the positive connection between the slope sections on both sides of the corner.

5. Details of terminating a top layer of reinforced slope geosynthetic and backfill due to a changing reinforced slope profile.

Approval of the Contractor's proposed reinforced slope construction details and methods shall not relieve the Contractor of their responsibility to construct the reinforced slopes in accordance with the requirements of these Specifications.

Reinforced Slope Construction

The Contractor shall excavate for the reinforced slope in accordance with Section 2-09, and conforming to the limits and construction stages shown in the Plans.

The Contractor shall direct all surface runoff from adjacent areas away from the reinforced slope construction site.

The Contractor shall begin reinforced slope construction at the lowest portion of the excavation and shall place each layer horizontally as shown in the Plans. The Contractor shall complete each layer entirely before beginning the next layer.

Geotextile splices shall consist of a sewn seam or a minimum 1 ft overlap. Geogrid splices shall consist of adjacent geogrid strips butted together and fastened using hog rings, or other methods approved by the Engineer, in such a manner to prevent the splices from separating during geogrid installation and backfilling. The Contractor shall offset geosynthetic splices in one layer from those in the other layers such that the splices shall not line up vertically. Splices parallel to the slope face will not be allowed, as shown in the Plans.

Primary reinforcing geosynthetic shall be cut to the length shown in the Plans. For geogrids, the end of the primary reinforcing located at the face of the slope shall be cut so that the cut ribs extend no more than 0.6 inch but not less than 0.2 inch from the cross ribs. For geogrids, the length of the reinforcement required as shown in the Plans shall be defined as the distance between the geosynthetic facing and the last geogrid node at the end of the reinforcement in the slope backfill.

The Contractor shall stretch out the geosynthetic in the direction perpendicular to the slope face to ensure that no slack or wrinkles exist in the geosynthetic prior to backfilling. Soil piles or the geosynthetic manufacturer's recommended method shall be used to hold the geosynthetic in place until the specified cover material is placed.

The Contractor shall place fill material on the geosynthetic in lifts such that 6 inches minimum of fill material is between the vehicle or equipment tires or tracks and the geosynthetic at all times. The Contractor shall remove all particles within the backfill material greater than 3 inches in size. Turning of vehicles on the first lift above the geosynthetic will not be permitted. The Contractor shall not end dump fill material directly on the geosynthetic without the prior approval of the Engineer.

Should the geosynthetic be damaged or the splices disturbed, the backfill around the damaged or displaced area shall be removed and the damaged strip of geosynthetic replaced by the Contractor at no expense to the Contracting Agency.

The Contractor shall place and compact the reinforced slope backfill in accordance with the reinforced slope construction sequence detailed in the Plans. The minimum compacted backfill lift thickness of the first lift above each geosynthetic layer shall be 6 inches. The maximum compacted lift thickness anywhere within the reinforced slope shall be 10 inches.

The Contractor shall compact each layer to 95 percent of maximum density. The water content of the reinforced slope backfill shall not exceed the optimum water content by more than 3 percent. The Contractor shall not use sheepsfoot rollers or rollers with protrusions. Rollers which weigh more than 6,000 lbs shall be used with the vibrator turned off. The Contractor may use rollers which weigh 6,000 lbs or less with the vibrator turned on with the prior approval of the Engineer.

The Contractor shall construct slope corners at the locations shown in the Plans, and in accordance with the reinforced slope corner construction sequence and method submitted by the Contractor and approved by the Engineer. Slope angle points with an interior angle of less than 150 degrees shall be considered to be a corner. The slope corner shall provide a positive connection between the sections of the reinforced slope on each side of the corner such that the slope backfill material cannot spill out through the corner at any time during the design life of the reinforced slope. The Contractor shall construct the slope corner such that the reinforced slope sections on both sides of the corner attain the full geosynthetic layer embedment lengths shown in the Plans.

Where required by reinforced slope profile grade, the Contractor shall terminate top layers of reinforced slope geosynthetic and backfill in accordance with the method submitted by the Contractor and approved by the Engineer. The end of each layer at the top of the slope shall be constructed in a manner which prevents slope backfill material from spilling out the face of the slope throughout the life of the reinforced slope. If the profile of the top of the slope changes at a rate of 1V:1H or steeper, this change in top of slope profile shall be considered to be a corner.

Tolerances

The Contractor shall complete the base of the reinforced slope excavation to within plus or minus 3 inches of the staked elevations unless otherwise directed by the Engineer. The Contractor shall place the external slope dimensions to within plus or minus 2 inches of that staked on the ground. The Contractor shall space the reinforcement layers vertically to within plus or minus 1 inch of that shown in the Plans.

The completed reinforced slope(s) shall meet the following tolerances:

	Tolerance
Deviation from the design slope and horizontal alignment for the slope face, when measured along a 10-foot straight edge at the midpoint of each reinforced slope layer, shall not exceed:	5 inches
Deviation from the overall design slope per 10 feet of reinforced slope height shall not exceed:	3 inches

2-12.3.OPT2.FR2

(August 2, 2010)

Turf Reinforced Mat Installation

Splices in the Turf Reinforced Mat shall be butted together and the splice shall be held together with hog rings, or other methods approved by the Engineer, in a manner that will prevent the splice from separating during installation and backfilling.

The face of the reinforced slope shall be cleared of all rocks, dirt clods, vegetation, trash and other obstructions that may cause the mat to bridge the ground surface. The mat shall be unrolled in the direction of water flow with the flat side against the ground.

The turf reinforcement mat shall be anchored at the shoulder of the slope in an anchor trench a minimum of 12 inches deep and 6 inches wide. The anchor trench shall be excavated prior to placing the erosion mat on the slope. Heavy duty steel pins or polyethylene pegs shall be used to anchor the mat to the slope face. Steel pins shall be a minimum 0.2 inch diameter, with a 1.5 inch diameter steel washer secured at the head of the pin. Polyethylene pegs shall be “T” type or have a 1.5 inch diameter washer secured at the head of the peg. All pins or pegs shall be 12 inches long minimum. Hog rings, or other methods approved by the Engineer, shall be used to attach the turf reinforcement mat to the cross ribs of the primary reinforcing at the face of the slope. The ties shall be as durable and strong as the material to which they are tied. The turf reinforcement mat shall be securely attached to the cross ribs by tie(s) centered between the pins or pegs.

Upon completion of the mat installation, *** $$1$$ *** inch(es) of Topsoil Type *** $$2$$ *** shall be spread over the turf reinforcement mat by drop spreader, blower truck, cyclone spreader, or by shovels, rakes, and brooms. The Topsoil shall be lightly raked or brushed into the mat apertures to completely fill the mat thickness. The slope shall be seeded with grass seed by broadcast or hydroseeding in accordance with Sections 8-01 and 9-14, and as specified in the Contract Provisions.

2-12.3.OPT3.GR2

(November 17, 1997)

Geosynthetic Wrapped Slope Facing Construction

The Contractor shall use a temporary form system to minimize sagging of the geosynthetic facing elements during construction. A typical example of a temporary

form system and sequence of reinforced slope construction required when using this form are detailed in the Plans.

Geosynthetic reinforcement splices exposed at the slope face shall prevent loss of backfill material through the face. The splicing material exposed at the slope face shall be as durable and strong as the material to which the splices are tied.

The Contractor shall compact the zone within 3 ft of the slope face without causing damage or distortion to the slope face or reinforcing layers by using light mechanical tampers approved by the Engineer.

The wall face shall be stepped vertically rather than using a battered forming system. Boston Ivy shall be placed in the slope face through the geosynthetic reinforcement layers in the horizontal portion of each step as indicated in the Plans. The first row of ivy plants shall be placed in the bottom layer of the reinforced slope. Rows of plants shall be spaced vertically no more than 16 ft apart. Plants within a row shall be spaced horizontally 6 to 7 ft apart. Holes placed through the reinforcement shall be the minimum size necessary to install the plants.

2-12.3.OPT4.GR2

(November 17, 1997)

Welded Wire Facing Construction

The Contractor shall install welded wire facing as shown in the Plans. Horizontally adjacent facing panels shall be butted together such that no gap between facing panels exists. Butted together facing panel splices shall be offset from each other in adjacent layers so that the splices do not line up with one another from layer to layer.

If secondary geosynthetic reinforcement is specified, secondary reinforcement splices transverse to the slope shall be butted together and the splice shall be held together with hog rings, or other methods approved by the Engineer in the manner that will prevent the splice from separating during geosynthetic installation and backfilling.

The front 3 inches to 6 inches of reinforced slope backfill at the slope face, as shown in the Plans, shall be thoroughly mixed with lime, 16-16-16 fertilizer, and grass seed to create a vegetated face. Lime shall be applied at a rate 6.0 lbs/cy, fertilizer at a rate of 0.7 lbs/cy, and grass seed at a rate of 0.4 lbs/cy.

The Contractor shall compact the zone within one meter of the slope face without causing damage or distortion to the slope face or reinforcing layers by using light mechanical tampers approved by the Engineer. The maximum outward bulge of the face between primary reinforcement layers shall not exceed 3 inches.

2-12.3.OPT5.GR2

(November 17, 1997)

Installing Guardrail Posts in Geosynthetic Reinforced Slopes

The Contractor shall install guardrail posts as shown in the Plans after completing the reinforced slopes. The Contractor shall install the posts in a manner that prevents bulging of the slope face and prevents ripping, tearing, or pulling of the geosynthetic reinforcement. Holes through the geosynthetic reinforcement shall be the minimum size necessary for the post. The Contractor shall demonstrate to the Engineer prior to

beginning guardrail post installation that the installation method will not rip, tear, or pull the geosynthetic reinforcement.

2-12.4.GR2

Measurement

2-12.4.INST1.GR2

Section 2-12.4 is supplemented with the following:

2-12.4.OPT1.FR2

(January 5, 1998)

Geosynthetic reinforced slope will be measured by the square foot of face of completed reinforced slope, measured in the plane of the slope.

$$1$$ borrow including haul will be measured as specified in Section 2-03.4.

Structure excavation Class B including haul will be measured as specified in Section 2-09.4 and to the limits shown in the Plans.

2-12.5.GR2

Payment

2-12.5.INST1.GR2

Section 2-12.5 is supplemented with the following:

2-12.5.OPT1.FR2

(November 17, 1997)

"Geosynthetic Reinforced Slope", per square foot.

“*** $$1$$ *** Borrow Incl. Haul”, per ton or per cubic yard.

“Structure Excavation Class B Incl. Haul”, per cubic yard.

The unit contract price per square foot for "Geosynthetic Reinforced Slope" shall be full pay to perform the work as specified, including compaction of the backfill material, and furnishing and installing the facing materials, plantings, and any temporary forming system used.

DIVISION3.GR3

Division 3
Aggregate Production and Acceptance

3-01.GR3

Production From Quarry and Pit Sites

3-01.2.GR3

Material Sources, General Requirements

3-01.2.INST1.GR3

Section 3-01.2 is supplemented with the following:

3-01.2.OPT1.GR3

(March 13, 1995)

Permits For Pit Operations In King County

The Contractor is advised that King County may require the Contractor to meet any or all of the following listed conditions before considering issuance of a temporary permit for pit operations within King County:

1. Security fences and locking gates shall be installed where deemed necessary by the King County Department of Building. Cable or wire gates are not acceptable.

2. Hours of operation shall be limited to: 7:00 a.m. to 7:00 p.m.

3. Access roads shall be improved and maintained to the satisfaction of the King County Department of Public Works. A haul road agreement for County road maintenance may be required.

   All roads shall be swept, washed, or both, by the Contractor at the Contractor's expense as often as the Department of Building deems necessary.

   Property shall have functional access to an arterial level street.

4. All operations will have to be approved by King County Flood Control for drainage plans, Washington State Department of Ecology, and Puget Sound Air Pollution Control Authority.

   Those properties near or adjacent to any water body shall have written approval from the State of Washington Department of Fisheries.

   The Contractor shall obtain a mining reclamation permit from the State of Washington Department of Natural Resources for sites of over three acres in size of disturbed land or resulting in pit walls more than thirty feet high and steeper than one to one slope.

5. No stockpiling of foreign excavated material is permitted on the site except for those materials to be used in the land rehabilitation of the subject property.

6. No signs other than signs required by Chapter 24.42, King County Zoning Code are authorized as a result of the temporary permit.

7. Plans required:

   a. Scale of Plot Plans

Site Size:	less than 10 acres	1 inch = 50 feet
	10 to 100 acres	1 inch = 100 feet
	over 100 acres	1 inch = 200 feet

   b. Contours

Show existing and proposed contours at 5-foot intervals. If existing and proposed contours are superimposed upon one another it must be clear as to which is which. Plans which incorporate a screening process may be required by the County to distinguish said contours.

Finished contours must show how the property can be used under the existing zoning. Plans showing daylighting of property to road grade or below with high 2:1 slope walls will no longer be permitted within the R, S, or G zones. The plans must contain large terraces which will permit the lot sizes and roads that are permitted within the zone.

c. Sections

Show a minimum of two sections in each direction.

d. Maximum Slope

Cuts shall not be steeper in slope than two horizontal to one vertical unless the owner furnishes a soils engineering or an engineering geology report certifying that the site has been investigated and indicating that the proposed deviation will not endanger any private property or result in the deposition of debris on any public way or interfere with any existing drainage course.

e. Fill Slopes

No fill shall be made which creates an exposed surface steeper in slope than two horizontal to one vertical.

f. Benches on Slopes

There shall be a 10 foot wide bench sloped into the hillside for every 50 feet in height.

g. Setbacks

Material and vegetation shall be left in its natural state:

50 feet from any FP, A, G, S, or R zoned property;

20 foot setback which includes a 6 foot high planted berm along any public right-of-way;

20 feet from M, B, or CG zoned property;

10 feet from QM or FR zoned property.

Plans shall show type of vegetation existing within the buffer zones.

h. Drainage

All drainage facilities shall be designed to carry surface waters to the nearest practical street, storm drain, or natural water-course. Adequate provision shall be made to prevent any surface waters from damaging the face of an excavation or fill. All slopes shall be protected from surface water runoff from above by berms or swales.

The Contractor is further advised that King County may require conditions which are in addition to the foregoing list and that the County may reject permit applications at its discretion because of the proposed operations proximity to schools, residential neighborhoods, hospitals, arterials, or for other environmental conditions.

When there are discrepancies between the requirements of the State and the County the more stringent specifications shall apply.

Should the Contractor fail to comply with any requirements of a temporary permit obtained in the Contracting Agency's name, the Contracting Agency will take the necessary action to meet these requirements and any costs incurred by the Contracting Agency will be deducted from monies due or to become due the Contractor.

3-01.3.GR3

State Furnished Material Sources

3-01.3.INST1.GR3

Section 3-01.3 is supplemented with the following:

3-01.3.OPT1.FR3

(March 13, 1995)

The following source of stockpiled materials is made available at no cost to the Contractor:

Stockpile Site *** $$1$$, a source for $$2$$, *** is located in the *** $$3$$ of Section $$4$$, Township $$5$$ North, Range $$6$$, *** W.M., as shown in the Plans.

3-01.3.OPT2.FR3

(June 26, 2000)

The following source of materials is made available at no cost to the Contractor:

*** $$1$$ Site $$2$$ *** a source for the production of *** $$3$$ *** is located in the *** $$4$$ of Section $$5$$, Township $$6$$ North, Range $$7$$ *** W.M., as shown in the Plans.

In the event that the Contractor proposes to provide these materials from another source, adjustment of quantities shall be made in accordance with Section 3-01.4(1). Such adjustment will be based on the relative specific gravity of the sources. A specific gravity of *** $$8$$ *** for the State-provided source will be used for comparative purposes. The comparative specific gravity of Contractor provided sources will be determined by AASHTO Test Method T-85 on the Saturated Surface Dry Basis by the Headquarters Materials Laboratory.

3-01.6.GR3

Payment

3-01.6.INST1.GR3

The second paragraph of Section 3-01.6 is supplemented with the following:

3-01.6.OPT1.FR3

(June 03, 1996)

If the Contractor elects not to use the Contracting Agency furnished source(s) of material, the following items of work shall not be performed on this project.

*** $$1$$ ***.

If the Contractor submits unit price(s) in the amount of zero for the above item(s) of work that do not have an estimated amount included in the proposal, the Contracting Agency will accept the Contractor's proposal as being notice of the Contractor's intent not to utilize the Contracting Agency furnished source.

After execution of the contract, should the Contractor decide to utilize the source(s) furnished by the Contracting Agency, the Contractor will be permitted to do so, provided that for those items listed above for which zero has been entered on the proposal, the work required shall be performed at the Contractor's expense.

3-01.6.OPT2.FR3

(March 13, 1995)

The Contractor is advised that while use of the Contracting Agency-furnished materials source(s) is not mandatory, the following items of work in *** $$1$$ Site $$2$$ *** must be performed:

*** $$3$$ ***

3-01.6.OPT3.FR3

(March 13, 1995)

The use of *** $$1$$ Site $$2$$ *** is mandatory and that all work in the site shall be performed.

3-02.GR3

Stockpiling Aggregates

3-02.2.GR3

General Requirements

3-02.2(7).GR3

Removing Aggregates From Stockpiles

3-02.2(7).INST1.GR3

Section 3-02.2(7) is supplemented with the following:

3-02.2(7).OPT1.FR3

(March 13, 1995)

Materials for use on this project are being produced and stockpiled under another contract. The material being produced is shown in the Plans as existing in stockpile at the following location:

*** $$1$$ ***

It is expected that the material will be available to the Contractor in ample time for the Contractor's use. However, any delay shall not constitute a claim by the Contractor against the Contracting Agency for additional compensation. Should the Contractor be delayed by reason of insufficient material in the stockpile, the Contractor will be granted an extension of time equal to the time actually lost by reason of such delay.

3-02.2(7).OPT2.FR3
(March 13, 1995)
*** $$1$$ *** are existing in stockpiles at the location and in the amounts shown in the Plans.

The Contractor may obtain material from other sources provided they are approved by the Engineer and provided the Contractor makes all arrangements and pays all expenses required for the acquisition of the materials.

If the Contractor chooses to use the materials existing in stockpiles, the Contractor shall pay promptly to the Treasurer of *** $$2$$ *** County, as may come due, a sum owing at the rates specified below based on the quantity of materials allowed by the Engineer on the final or periodic estimates:

*** $$3$$ ***

3-02.5.GR3
Payment

3-02.5.INST1.GR3
Section 3-02.5 is supplemented with the following:

3-02.5.OPT1.FR3
(March 13, 1995)
The unit contract price per cubic yard for *** $$1$$ *** shall be full pay for the purchase, loading, hauling, and placing of materials provided in stockpile or, if so chosen by the Contractor, for the furnishing, hauling, and placing of materials obtained by the Contractor from an approved source of the Contractor's own choice and acquisition.

Payment of money due the Contractor on the final estimate will not be made until the Engineer has furnished the Secretary of Transportation with a certificate to verify that all sums due *** $$2$$ *** from the Contractor for materials have been paid in full.

3-03.GR3
Site Reclamation

3-03.2.GR3

General Requirements

3-03.2(1).GR3

Contracting Agency-Provided Sites

3-03.2(1).INST1.GR3

Section 3-03.2(1) is supplemented with the following:

3-03.2(1).OPT1.GR3

(March 13, 1995)

Site reclamation will be performed by the Contracting Agency on all sites furnished by the Contracting Agency.

DIVISION4.GR4

Division 4
Bases

4-04.GR4

Ballast and Crushed Surfacing

4-04.3.GR4

Construction Requirements

4-04.3(5).GR4

Shaping and Compaction

4-04.3(5).INST1.GR4

Section 4-04.3(5) is supplemented with the following:

4-04.3(5).OPT1.GR4

(March 13, 1995)

The top surface of the final lift of surfacing material on each mainline roadway shall be trimmed using a trimming machine that maintains grade and transverses slopes automatically, through sensors that respond to reference lines on both edges of each roadway.

The minimum width to be trimmed shall be the travelled way plus sufficient width for the treads of the paving machine.

The trimmed surface shall be smooth and uniform with no chatter or ripples.

4-06.GR4

Asphalt Treated Base

4-06.2.GR4

Materials

4-06.2.INST1.GR4

Section 4-06.2 is supplemented with the following:

4-06.2.OPT1.FR4

(October 25, 1999)

The grade of paving asphalt used in asphalt treated base shall be PG *** $$1$$ *** unless otherwise ordered by the Engineer.

4-06.2.OPT2.FR4

(August 6, 2001)

Asphalt Treated Permeable Base

The grade of paving asphalt used in asphalt treated permeable base shall be PG *** $$1$$ ***, unless otherwise ordered by the Engineer.

Aggregate shall meet the following gradation requirements:

Sieve Size		Percentage Passing
1 1/4"	square	100%
1"	square	85-100%
5/8"	square	45-70%
U.S. No. 4	square	0-12%
U.S. No. 200		0-5.0%
Asphalt Cement, Percent of Total Mixture		1.5-2.5%

(Exact percentage of asphalt to be determined by the Engineer.)

Fracture requirements shall be 90 percent as determined by WAQTC TM-1.

All percentages are by weight.

4-06.3.GR4

Construction Requirements

4-06.3(6).GR4

Spreading and Finishing

4-06.3(6).INST1.GR4

Section 4-06.3(6) is supplemented with the following:

4-06.3(6).OPT1.GR4

(March 13, 1995)

Asphalt Treated Permeable Base

The material shall be placed, using a track-type asphalt paving machine, with the nominal compacted depth of any layer of any course not to exceed 0.75 foot, unless otherwise directed by the Engineer.

The asphalt treated permeable base shall not be cooled with water.

4-06.3(7).GR4

Density

4-06.3(7).INST1.GR4

Section 4-06.3(7) is supplemented with the following:

4-06.3(7).OPT1.GR4

(March 13, 1995)

Asphalt Treated Permeable Base

No density requirements shall apply to asphalt treated permeable base, but the material shall be compacted in accordance with one of the following methods:

1. One complete coverage with a steel-wheeled, 2-axle, tandem roller which will produce an operating weight of not more than 110 pounds per linear inch of steel wheel width. Compaction shall begin when the temperature of the base mixture is less than 250 F and shall be completed before the base mixture is less than 200 F.

2. One complete coverage with a steel-wheeled, 2-axle, tandem roller weighing not less than 8 tons nor more than 12 tons. Compaction shall begin when the temperature of the base mixture is less than 150 F and shall be completed before the base mixture is less than 100 F. Vibratory rollers meeting the above requirements may be used provided the vibratory unit is turned off.

4-06.5.GR4

Payment

4-06.5.INST1.GR4

Section 4-06.5 is supplemented with the following:

4-06.5.OPT1.GR4

(September 30, 1996)

"Asphalt Treated Permeable Base", per ton.

DIVISION5.GR5

Division 5
Surface Treatments and Pavements

5-01.GR5

Concrete Pavement Rehabilitation

5-01.3.GR5

Construction Requirements

5-01.3(1)A.GR5

Concrete Mix Design

5-01.3(1)A.INST1.GR5

Section 5-01.3(1)A is supplemented with the following:

5-01.3(1)A.OPT1.GR5

(April 3, 2006)

Submittals

Prior to beginning any concrete or grinding work, the Contractor shall submit a plan, for the Engineer's review and approval, outlining the procedures to be

used to prevent high pH stormwater or dewatering water from entering surface waters. The plan shall include how the pH of the water will be maintained between pH 6.5 and pH 8.5 prior to being discharged from the project or entering surface waters. The plan shall conform to the requirements of Section 8-01.

5-01.5.GR5

Payment

5-01.5.INST1.GR5

Section 5-01.5 is supplemented with the following:

5-01.5.OPT1.GR5

(April 3, 2006)

All costs associated with the treatment of pH in stormwater or dewatering water that has been in contact with concrete and concrete grindings shall be included in the applicable items of work.

5-02.GR5

Bituminous Surface Treatment

5-02.3.GR5

Construction Requirements

5-02.3(3).GR5

Application of Asphalt Emulsion and Aggregate

5-02.3(3).INST1.GR5

Section 5-02.3(3) is supplemented with the following:

5-02.3(3).OPT1.FR5

(August 6, 2007)

The grades of asphalt emulsion to be used for New Construction bituminous surface treatments shall be *** $$1$$ *** for the prime coat and *** $$2$$ *** for the tack coat.

5-02.3(3).OPT2.FR5

(August 6, 2007)

The grade of asphalt emulsion to be used for bituminous surface treatment Seal Coats shall be *** $$1$$. ***

5-02.4.GR5

Measurement

5-02.4.INST1.GR5

Section 5-02.4 is supplemented with the following:

5-02.4.OPT2.GR5

(March 13, 1995)

The additional cost involved in the construction of bituminous surface treatment for road approach will be measured per each for each road approach treated, regardless of location, length, width or design.

5-02.4.OPT3.GR5

(April 6, 2009)

CRS-2P Cost Price Adjustment

No specific unit of measurement will apply to the calculated item of CRS-2P cost price adjustment.

5-02.5.GR5

Payment

5-02.5.INST1.GR5

Section 5-02.5 is supplemented with the following:

5-02.5.OPT2.GR5

(February 5, 2001)

"Bituminous Surface Treatment For Road Approach", per each.

The unit contract price per each for "Bituminous Surface Treatment For Road Approach" shall be in addition to payments made for the mineral aggregate and asphalt.

5-02.5.OPT3.GR5

(April 6, 2009)

CRS-2P Cost Price Adjustment

The Contracting Agency will make a CRS-2P Cost Price Adjustment, either a credit or a payment, for qualifying changes in the reference cost of asphalt binder. The adjustment will be applied to partial payments made according to Section 1-09.9 for the following bid items when they are included in the proposal:

"Asphalt Emulsion CRS-2P"

The adjustment is not a guarantee of full compensation for changes in the cost of asphalt emulsion CRS-2P. The Contracting Agency does not guarantee that asphalt emulsion CRS-2P will be available at the reference cost.

The Contracting Agency will establish the asphalt binder reference cost twice each month and post the information on the Agency website at: http://www.wsdot.wa.gov/biz/construction/AsphaltIndex.cfm. The reference cost will be determined using posted prices furnished by Poten & Partners, Inc. If the selected price source ceases to be available for any reason, then the Contracting Agency will select a substitute price source to establish the reference cost.

The base cost established for this contract is the reference cost posted on the Agency website for the period immediately preceding the bid opening date.

Adjustments will be based on the most current reference cost for Western Washington or Eastern Washington as posted on the Agency website, depending on where the work is performed. For work completed after all authorized working days are used, the adjustment will be based on the posted reference cost during which contract time was exhausted. The adjustment will be calculated as follows:

No adjustment will be made if the reference cost is within 5% of the base cost.

If the reference cost is greater than or equal to 105% of the base cost, then Adjustment = (Current Reference Cost – (1.05 x Base Cost)) x (Q x 0.65).

If the reference cost is less than or equal to 95% of the base cost, then Adjustment = (Current Reference Cost – (0.95 x Base Cost)) x (Q x 0.65).

Where Q = total tons of Asphalt Emulsion CRS-2P paid in the current month's progress payment.

"CRS-2P Cost Price Adjustment", by calculation.

"CRS-2P Cost Price Adjustment" will be calculated and paid for as described in this section. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the total bid by the Contractor.

5-04.GR5

Hot Mix Asphalt

5-04.1.GR5

Description

5-04.1.INST1.GR5

Section 5-04.1 is supplemented with the following:

5-04.1.OPT1.GR5

(August 1, 2011)

This Work consists of constructing bridge transverse joint seals in accordance with these Special Provisions and the Plans.

5-04.2.GR5

Materials

5-04.2.INST1.GR5

Section 5-04.2 is supplemented with the following:

5-04.2.OPT1.FR5

(January 3, 2011)

ESAL's

The number of ESAL's for the design and acceptance of the HMA shall be *** $$1$$ *** million.

5-04.2.OPT2.GR5

(August 1, 2011)

Bridge transverse joint seals shall be filled with hot poured joint sealant meeting the requirements of Standard Specifications Section 9-04.2(1).

5-04.3.GR5

Construction Requirements

5-04.3.INST1.GR5

Section 5-04.3 is supplemented with the following:

5-04.3.OPT1.BSP.FB5

(BSP August 23, 2010)

Bridges Classified as Unrestricted for Paving

The following bridge(s), located within the paving limits and specified to be paved in this Project, are classified as unrestricted for paving:

*** $$1$$ ***

The above bridge(s) shall conform to all requirements for planing and HMA paving on bridge decks as specified in these Special Provisions, except for the additional requirements specified for bridges classified as restricted for paving.

5-04.3.OPT2.BSP.FB5

(BSP April 4, 2011)

Bridges Classified as Restricted for Paving

The following bridge(s), located within the paving limits and specified to be paved in this Project, are classified as restricted for paving:

*** $$1$$ ***

The above bridge(s) shall conform to all requirements for planing and HMA paving on bridge decks as specified in these Special Provisions, including the following requirements for survey of the existing bridge deck surface, establishing a final grade paving profile, and planing and paving depth tolerances:

Survey of Existing Bridge Deck Surface

Prior to beginning any planing of BST or HMA surfacing on existing bridge decks, or beginning the placement of HMA overlay on existing bridge decks, of bridges classified above as restricted for paving, the Contractor shall complete a survey of the existing bridge deck surface for use in establishing the existing cross section and grade profile elevations, and the depths of existing BST or HMA surfacing when present.

The Contracting Agency will provide the Contractor with primary survey control information consisting of descriptions of two primary control points used for the horizontal and vertical control. Primary control points will be described by reference to the bridge or project specific stationing and elevation datum. The Contracting Agency will also provide horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each centerline alignment included in the project. The Contractor shall provide the Engineer 21 calendar days notice in advance of scheduled bridge deck planing and paving work to allow the Contracting Agency time to provide the primary survey control information.

The Contractor shall verify the primary survey control information furnished by the Contracting Agency, and shall expand the survey control information to include

secondary horizontal and vertical control points as needed for the project. The Contractor's survey records shall include descriptions of all survey control points, including coordinates and elevations of all secondary control points.

The Contractor shall maintain detailed survey records, including a description of the work performed on each shift, the methods utilized to conduct the survey, and the control points used. The record shall be of sufficient detail to allow the survey to be reproduced. A copy of each day's survey record shall be provided to the Engineer within three working days after the end of the shift. The Contractor shall compile the survey information in an electronic file format acceptable to the Contracting Agency (Excel spreadsheet format is preferred). Survey information collected shall include station, offset, and elevation for each lane line and curb line.

Survey information shall be collected at even 20 foot station intervals, and also at the centerline of each bridge expansion joint. For bridge decks with existing BST or HMA surfacing, the survey information shall include the top of surfacing elevation and the depth of surfacing to the concrete bridge deck. The Contractor shall ensure a surveying accuracy to within ± 0.01 feet for vertical control and ± 0.2 feet for horizontal control. The survey shall extend 100’-0” beyond the bridge back of pavement seat.

Voids created by the Contractor’s paving surfacing depth measurements shall be filled by material conforming to Section 9-20 or another surfacing material approved by the Engineer.

Except for the primary survey control information furnished by the Contracting Agency, the Contractor shall be responsible for all calculations, surveying, and measuring required for setting, maintaining and resetting equipment and materials necessary for the construction of the overlay to the final grade profile. The Engineer may post-check the Contractor's surveying, but these spot-checks shall not relieve the Contractor of responsibility for internal survey quality control.

The Engineer will establish the final grade profile, and the maximum planing depths as applicable, based on the Contractor's survey. The maximum planing depth for all planing on a bridge deck shall be the lesser of the following:

1. The planing depth shown in the Plans.

2. The planing depth calculated by the Engineer.

3. For bridge decks specified to receive partial depth removal of existing surfacing, a planing depth at least 0.03 feet above the existing concrete bridge deck

The Engineer will provide the final grade profile and maximum planing depths to the Contractor within three working days after receiving the Contractor's survey information.

The Contractor shall not begin bridge deck surfacing planing and bridge deck paving Work until receiving the final grade paving profile, and maximum planing depths as applicable, from the Engineer.

Planing and HMA Paving Tolerances

The planing depth at a bridge deck, as measured from the final grade profile, shall not exceed the maximum planing depth specified by the Engineer for that bridge deck in accordance with the criteria specified above.

The finish surface of the HMA overlay on bridge decks shall be ± 0.02 feet of the Engineer's final grade paving profile. Final grade paving profile deviations in excess of the specified tolerance and areas of non-conforming surface smoothness shall be corrected in accordance with Section 5-04.3(13).

5-04.3.OPT3.BSP.GB5

(BSP April 4, 2011)

General Requirements for Planing and HMA Paving on Bridge Decks

Partial or Full Depth Removal of Existing Surfacing on Bridge Decks

Bridges specified to receive either partial or full depth removal of existing surfacing from their decks prior to receiving HMA overlay shall be planed in accordance with Section 5-04.3(14) as supplemented in these Special Provisions.

Bridge Deck Repair of Exposed Concrete Bridge Deck

Bridge decks of exposed concrete, either by existing condition or by full depth surfacing removal as shown in the Plans, shall receive bridge deck repair in accordance with Section 6-02.3(10)D as supplemented in these Special Provisions.

Placing Membrane Waterproofing on Exposed Concrete Bridge Deck

Bridge decks of exposed concrete, either by existing condition or by full depth surfacing removal as shown in the Plans, shall, after completion of bridge deck repair as specified above, receive a waterproofing membrane in accordance with Section 6-08 as supplemented in these Special Provisions.

Paving Bridge Decks with HMA

Prior to placing HMA on a bridge deck, the Contractor shall clearly establish sawcut alignment points at both ends of the bridge transverse joint seals to be placed at the bridge ends, and at interior contraction joints, as specified. The sawcut alignment points shall be established in such a manner that they remain functional for use in aligning the sawcut after HMA placement.

5-04.3.OPT8.GR5

(August 1, 2011)

Bridge transverse joint seals shall be constructed at the locations specified in the Plans and in accordance with the Standard Plans.

Hot poured joint sealant shall be installed in accordance with the manufacturer's written recommendations. The Contractor shall submit the manufacturer's written installation procedure to the Engineer prior to installation.

5-04.3(3).GR5

Hot Mix Asphalt Pavers

5-04.3(3).INST1.GR5

Section 5-04.3(3) is supplemented with the following:

5-04.3(3).OPT1.GR5

(March 13, 1995)

Reference lines will be required for both outer edges of the traveled way for each mainline roadway for vertical control in accordance with Section 5-04.3(3).

5-04.3(3)A.GR5

Material Transfer Device/Vehicle

5-04.3(3)A.OPT1.GR5

(August 3, 2009)

Section 5-04.3(3)A is deleted in its entirety.

5-04.3(3)A.INST1.GR5

Section 5-04.3(3)A including title is revised to read:

5-04.3(3)A.OPT2.GR5

(August 1, 2011)

Material Transfer Vehicle

Direct transfer of HMA from the hauling equipment to the paving machine will not be allowed in the top 0.30-feet of the pavement section of hot mix asphalt (HMA) used in traffic lanes with a depth of 0.08-feet or greater. A material transfer vehicle (MTV) shall be used to deliver the HMA from the hauling equipment to the paving machine. HMA placed in irregularly shaped and minor areas such as road approaches, tapers, and turn lanes are excluded from this requirement.

The MTV shall mix the HMA after delivery by the hauling equipment and prior to lay down by the paving machine. Mixing of the HMA shall be sufficient to obtain a uniform temperature throughout the mixture

5-04.3(5).GR5

Conditioning of Existing Surface

5-04.3(5)C.GR5

Crack Sealing

5-04.3(5)C.INST1.GR5

Section 5-04.3(5)C is revised to read:

5-04.3(5)C.OPT1.GR5

(December 6, 2004)

Where shown in the Plans, all cracks and joints 1/4-inch and greater in width shall be cleaned with a stiff-bristled broom and compressed air and then shall be filled with rubberized asphalt joint sealant. Joint sealant material shall conform to the requirements of Section 9-04.2(1) and shall be applied in accordance with the manufacturer's recommendations. These recommendations shall be furnished to the Engineer by the Contractor prior to the start of work and shall include recommended heating time and temperature, allowable storage time and temperatures after initial heating, allowable reheating criteria, and application temperature range.

The cracks shall be completely dry before being filled with the rubberized asphalt. Filling shall be controlled to confine the material within the crack or joint. If, in the opinion of the Engineer, the Contractor's method of filling results in an excessive amount of sealant on the pavement surface, filling shall be stopped and the method changed. Any overflow shall be cleaned from the pavement surface.

5-04.3(5)C.INST2.GR5

The first paragraph of Section 5-04.3(5)C is revised to read:

5-04.3(5)C.OPT7.GR5

(December 6, 2004)

Where shown in the Plans, all cracks and joints 1/4-inch and greater in width shall be cleaned with a stiff-bristled broom and compressed air. Cracks and joints greater than 1/4 inch and less than 3/4 inch in width shall be filled with rubberized asphalt joint sealant. Joint sealant material shall conform to the requirements of Section 9-04.2(1) and shall be applied in accordance with the manufacturer's recommendations. These recommendations shall be furnished to the Engineer by the Contractor prior to the start of work and shall include recommended heating time and temperatures, allowable storage time and temperatures after initial heating, allowable reheating criteria, and application temperature range.

5-04.3(7).GR5

Preparation of Aggregates

5-04.3(7)A.GR5

Mix Design

5-04.3(7)A.INST1.GR5

Section 5-04.3(7)A is supplemented with the following:

5-04.3(7)A.OPT1.GR5

(August 3, 2009)

If the mix design verification submitted for the project delays work on a critical activity then the day(s) from the receipt of the completed mix design from the Contractor until the verification is completed will be unworkable.

5-04.3(8).GR5

Mixing

5-04.3(8)A.GR5

Acceptance Sampling and Testing - HMA Mixture

5-04.3(8)A.INST1.GR5

Section 5-04.3(8)A is supplemented with the following:

5-04.3(8)A.OPT1.FR5

(August 2, 2010)

Commercial Evaluation

The following HMA will be accepted by commercial evaluation:

*** $$1$$ ***

5-04.3(8)A4.GR5

Definition of Sampling Lot and Sublot

5-04.3(8)A4.INST1.GR5

The second sentence in the second paragraph in Section 5-04.3(8)A4 is revised to read:

5-04.3(8)A4.OPT1.FR5

(August 3, 2009)

The sublot size for *** $$1$$ *** shall be 1200-tons. The sublots for other HMA accepted by statistical evaluation shall be determined to provide not less than three uniform-sized sublots with a maximum sublot size of 800-tons.

5-04.3(8)A4.OPT2.FR5

(August 3, 2009)

The sublot size for *** $$1$$ *** shall be 1600-tons. The sublots for other HMA accepted by statistical evaluation shall be determined to provide not less than three uniform-sized sublots with a maximum sublot size of 800-tons.

5-04.3(10).GR5

Compaction

5-04.3(10)B.GR5

Control

5-04.3(10)B1.GR5

General

5-04.3(10)B1.INST1.GR5

The first sentence in Section 5-04.3(10)B1 is revised to read:

5-04.3(10)B1.OPT1.GR5

(August 3, 2009)

HMA mixture accepted by statistical or nonstatistical evaluation that is used in traffic lanes including lanes for ramps, truck climbing, weaving, speed change and shoulders having a specified compacted course thickness greater than 0.10-foot, shall be compacted to a specified level of relative density.

5-04.3(10)B1.INST2.GR5

The second sentence in the second paragraph of Section 5-04.3(10)B1 is revised to read:

5-04.3(10)B1.OPT8.GR5

(August 3, 2009)

Sublots will be uniform in size with a maximum of approximately 120-tons of HMA per sublot; the final sublot of the day may be increased to 180-tons.

5-04.3(10)B1.OPT3.GR5

(August 3, 2009)

Sublots will be uniform in size with a maximum of approximately 160-tons of HMA per sublot; the final sublot of the day may be increased to 240-tons.

5-04.3(10)B1.INST3.GR5

The last sentence in the fourth paragraph in Section 5-04.3(10)B1 is revised to read:

5-04.3(10)B1.OPT14.GR5

(August 3, 2009)

HMA that is used for preleveling shall be compacted with a pneumatic tire roller unless otherwise approved by the Engineer.

5-04.3(12).GR5

Joints

5-04.3(12).INST1.GR5

Section 5-04.3(12) is supplemented with the following:

5-04.3(12).OPT1.GR5

(January 5, 2004)

The HMA overlay shall be feathered to produce a smooth riding connection to the existing pavement.

HMA utilized in the construction of the feathered connections shall be modified by eliminating the coarse aggregate from the mix at the Contractor's plant or the commercial source or by raking the joint on the roadway, to the satisfaction of the Engineer.

5-04.3(13).GR5

Surface Smoothness

5-04.3(13).INST1.GR5

Section 5-04.3(13) is revised to read:

5-04.3(13).OPT1.FR5

(April 24, 2006)

This project will utilize International Roughness Index (IRI) Value as the basis for the bid item, "Smoothness Compliance Adjustment".

The completed surface of all wearing courses shall be of uniform texture, smooth, uniform as to crown and grade, and free from defects of all kinds.

The Contractor shall notify the Engineer when the roadway is ready for testing. Weather permitting; IRI testing will be completed within twenty calendar days of the Contractor notification that the roadway is ready for testing. The Engineer will notify the Contractor of the results within 3 working days after the test is completed.

WSDOT State Materials Laboratory will perform the IRI testing. Upon the completion of the paving operation, and any corrective action, the Engineer will inspect the roadway to ensure it can be driven safely at the posted speed limit. If requested by the Engineer the Contractor shall sweep the roadway immediately prior to testing. If the sweeping is needed as a result of the Contractor's operation it shall be the responsibility and expense of the Contractor.

No testing will be done if the roadway has standing water, if it is raining or other weather conditions exist which are determined by the Engineer to be unsuitable.

The entire length of each through lane, climbing lane, passing lane, bridge approach and bridge deck that is paved with HMA shall be tested from the beginning to the end of the project. Ramps, shoulders and tapers will not be tested and will not be subject to incentive/disincentive adjustments.

Bonuses apply and penalties are waived for bridge structures, approach slabs or both including 100 feet on either side of the bridge structure, approach slabs or both. Corrective action will be required if the IRI exceeds 95 inches per mile.

Existing Conditions

During the last review of this roadway, which was conducted on *** $$1$$ ***, by the Contracting Agency, the following IRI (inches/mile) values were obtained. The IRI values are informational only and are averaged IRI values for 1 mile sections. Additional information may be available for review at the Project Engineer's Office.
***

SR	Begin Milepost	End Milepost	IRI Running Avg NB/EB (Inch/mile)	IRI Running Avg SB/WB (Inch/mile)
$$2$$	$$3$$	$$4$$	$$5$$	$$6$$

***

Corrective Action

The Contractor shall use a 10-foot straightedge, lightweight profilers, California profilographs or other devices approved by the Project Engineer to locate surface irregularities.

Areas showing high spots of more than 1/8 inch in 10 feet, or IRI values greater than 95 inches per mile for Pay Schedule 1 and 2, shall be marked and corrected by one of the following methods:

1. Diamond grinding until the high spot does not exceed 1/8 inch in 10 feet, or a maximum IRI value of 65 inches per mile for Pay Schedule 1 and 75 for Pay Schedule 2.

2. Removal and replacement of the wearing course of HMA.

3. By other method approved by the Project Engineer.

A standard pavement-milling machine will not be allowed for removing high spots.

The Contractor shall determine and mark the exact location of each bump on the pavement before corrective action commences. The area that is repaired/ corrected shall be checked by the Contractor to ensure that the area meets specifications.

Corrective actions or repairs shall not reduce planned pavement thickness by more than 1/4 inch.

All corrective work shall be completed at no additional expense to the Contracting Agency. If, correction of the roadway as listed above will not produce satisfactory results as to smoothness and serviceability, the Engineer may accept the completed pavement and shall deduct from monies due or that may become due to the Contractor the sum of $500.00 for each and every section of single traffic lane 100 feet in length in which any deviations as described above are found. Under the circumstances described above, the decision whether to accept the completed pavement or to require corrections as described above shall be vested entirely in the Engineer.

5-04.3(13).INST2.GR5

The second sentence of Section 5-04.3(13) is deleted and replaced with the following:

5-04.3(13).OPT7.FR5

(March 13, 1995)

The completed surface of the wearing course of the following sections of highway shall not vary more than 1/4 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline:

1. *** $$1$$ ***

The completed surface of the wearing course of all other sections of highway shall not vary more then 1/8 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline.

5-04.3(13).INST3.GR5

The second sentence of Section 5-04.3(13) is revised to read:

5-04.3(13).OPT13.GR5

(January 5, 2004)

The completed surface of the wearing course shall not vary more than 1/4 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline.

5-04.3(14).GR5

Planing Bituminous Pavement

5-04.3(14).INST1.GR5

Section 5-04.3(14) is supplemented with the following:

5-04.3(14).OPT1.FR5

(January 5, 2004)

The Contractor shall perform the planing operations no more than *** $$1$$ *** calendar days ahead of the time the planed area is to be paved with HMA, unless otherwise allowed by the Engineer in writing.

5-04.3(14).OPT2.GR5

(January 5, 2004)

At the start of the planing operation the Contractor shall plane a 500 foot test section to be evaluated by the Engineer for compliance with the surface tolerance requirements. The test section shall have a minimum width of 10 feet. If the planing is in accordance with the surface tolerance requirements, the Contractor may begin production planing. If the planing is not in conformance with the surface tolerance requirements, the Contractor shall make adjustments to the planing operation and then plane another test section.

If at any time during the planing operation the Engineer determines the required surface tolerance is not being achieved, the Contractor shall stop planing. Planing shall not resume until the Engineer is satisfied that specification planing can be produced or until successful completion of another test section. The forward speed during production planing shall not exceed the speed used for the test section.

The completed surface after planing and prior to paving shall not vary more than 1/4 inch from the lower edge of a 10-foot straightedge placed on the surface parallel or transverse to the centerline. The planed surface shall have a matted texture and the difference between the high and low of the matted surface shall not exceed 1/8 inch.

Pavement repair operations, when required, shall be accomplished prior to planing.

5-04.3(14).OPT3.GR5

(March 13, 1995)

Vertical Edge Planing

During planing of bituminous pavement in the travelled lanes, the Contractor shall coordinate the planing and paving operations such that the planed roadway surface shall not remain unpaved at the end of the work day. The Contractor shall have a contingency plan to ensure that no planed areas remain unpaved due to equipment breakdown or other emergency.

5-04.3(14).OPT4.GR5

(August 3, 2009)

Beveled Edge Planing

A beveled edge shall be constructed in areas that will not be paved during the same work shift.

The Contractor shall use a beveled cutter on the mandrel of the planing equipment, or other approved method(s), to eliminate the vertical edge(s). The beveled edge(s) shall be constructed at a 4:1 slope.

5-04.3(14).OPT9.BSP.GB5

(BSP August 23, 2010)

Partial Depth Removal of Existing Surfacing from Bridge Deck

Requirements for All Bridges Receiving Planing of Existing Surfacing

The Contractor shall use a rotary milling machine to remove the specified layer of HMA surfacing to the limits shown in the Plans, except as noted below for surfacing within 12 inches of bridge expansion joints. The rotary milling machine shall conform to Section 1-07.7 with a maximum operating weight of 35 tons.

The top layer of surfacing within 12 inches of the edge of an existing bridge expansion joint header or steel expansion joint assembly without a header, and surfacing inaccessible to the rotary milling machines, shall be removed by hand or by low impact hand tools as approved by the Engineer. Use of rotary milling machines to remove the top layer of surfacing in these areas will not be allowed. All damage to existing expansion joint headers and expansion joint components due to the Contractor's operations shall be repaired in accordance with Section 1-07.13.

If rotary milling operations contact existing bridge deck steel reinforcing bars at any time, the Contractor shall immediately cease planing operations and notify the Engineer. The Contractor shall reduce the planing depth for that bridge deck by 0.02 feet or as otherwise specified by the Engineer, and shall not resume rotary milling operations until completing the appropriate adjustments to the rotary milling machine and receiving the Engineer's approval to proceed.

All bridge deck concrete, bridge deck waterproofing membrane and bridge deck steel reinforcing bar damage due to the Contractor's surfacing removal operations shall be repaired by the Contractor in accordance with the **Repair of Damage to Bridge Decks due to Surfacing Removal Operations** subsection of these Special Provisions.

After planing, the Contractor shall remove all loose and unsound surfacing not firmly bonded to the bridge deck, as specified by the Engineer, using methods and equipment that does not damage the existing concrete bridge deck, as approved by the Engineer.

Additional Requirements for Bridges Classified as Restricted for Paving

After receiving the final grade paving profile and maximum planing depths from the Engineer, the Contractor shall use a rotary milling machine to remove the

specified layer of HMA surfacing to the limits shown in the Plans, in accordance with the following:

1. The rotary milling machine shall have independent grade control to a tolerance of ± 0.02 feet of final grade, and transverse slope control conforming to the tolerance specified in this Section.

2. The rotary milling machine shall have cutting teeth that leave a uniform plane surface at all times. All teeth on the mill head shall be even and maintained during milling to a maximum differential tolerance of 3/8 inch between the shortest and longest tooth, as measured by a straight edge placed the full width of the rotary milling head.

3. All rotary milling machine cutting tips shall remain sharp during milling operations. A tip is considered dull if it is worn close to the lower base of the cutting tip material or if less than 30 percent of the total length of the cutting tip material remains.

4. The depth of surfacing removal at each bridge, as measured to the bottom of the lowest milling groove generated by the rotary milling machine, shall not exceed the maximum planing depth specified for that bridge deck by the Engineer.

Prior to beginning bridge deck surfacing planing operations for each day, and whenever requested by the Engineer, the Contractor shall confirm to the satisfaction of the Engineer that the rotary head cutting teeth are within the specified tolerance for maximum differential tolerance and maximum planing depth.

5-04.3(14).OPT10.BSP.GB5

Full Depth Removal of Existing Surfacing from Bridge Deck
(BSP August 23, 2010)

After completing the survey of the existing bridge deck surface, as specified in Section 5-04.3 as supplemented in these Special Provisions, and receiving the final grade paving profile and maximum planing depths from the Engineer, the Contractor shall remove the existing surfacing from the bridge deck(s) of bridge(s) specified in the Plans to receive complete removal of existing surfacing.

Except as noted below for surfacing within 12 inches of bridge expansion joints, the Contractor shall remove the existing surfacing from the bridge deck by any method (such as road grader, loader bucket, flat edged backhoe bucket, hydromilling, hand tools, etc.) approved by the Engineer that does not damage or remove the existing bridge deck concrete. The Contractor shall submit the proposed methods and equipment to be used to remove the existing surfacing from the bridge deck to the Engineer for approval in accordance with Section 1-05.3

The top layer of surfacing within 12 inches of the edge of an existing bridge expansion joint header or steel expansion joint assembly without a header, and surfacing inaccessible to the rotary milling machines, shall be removed by hand or by low impact hand tools as approved by the Engineer. Use of rotary milling

machines to remove the top layer of surfacing in these areas will not be allowed. All damage to existing expansion joint headers and expansion joint components due to the Contractor's operations shall be repaired in accordance with Section 1-07.13.

The Contractor may use hydromilling equipment to remove existing bridge deck surfacing, provided that the equipment is calibrated to remove the surfacing materials without removing more than 1/8 inch of the cement paste or leaving a striated surface on the bridge deck surface. The Contractor shall conduct a successful demonstration of the hydromill calibration for the Engineer, and shall have received the Engineer's approval, before beginning production removal of existing surfacing from the bridge deck. The Contractor shall monitor the operation of the hydromilling equipment to prevent the unnecessary removal of sound concrete in excess of the surface amount specified.

The Contractor may use rotary milling equipment to remove all or a portion of the existing surfacing from the bridge deck, subject to the restrictions in this Special Provision. Rotary milling equipment may be used to remove up to the maximum planing depth specified by the Engineer, subject to the following requirements:

1. The rotary milling machine shall conform to Section 1-07.7 with a maximum operating weight of 35 tons.

2. The rotary milling machine shall have independent grade control to a tolerance of ± 0.02 feet of final grade, and transverse slope control conforming to the tolerance specified in this Section.

3. The cutting tooth spacing on the rotary milling head shall be less than or equal to 1/4 inch.

4. The rotary milling machine shall have cutting teeth that leave a uniform plane surface at all times. All teeth on the mill head shall be even and maintained during milling to a maximum differential tolerance of 3/8 inch between the shortest and longest tooth, as measured by a straight edge placed the full width of the rotary milling head.

5. All rotary milling machine cutting tips shall remain sharp during milling operations. A tip is considered dull if it is worn close to the lower base of the cutting tip material or if less than 30 percent of the total length of the cutting tip material remains.

6. The depth of surfacing removal at each bridge, as measured to the bottom of the lowest milling groove generated by the rotary milling machine, shall not exceed the maximum planing depth specified for that bridge deck by the Engineer.

Prior to beginning bridge deck surfacing planing operations for that day, and whenever requested by the Engineer, the Contractor shall confirm to the satisfaction of the Engineer that the rotary head cutting teeth are within the specified tolerance for maximum differential tolerance and maximum planing depth.

If the rotary milling equipment does not conform to requirements 2 through 5 above, it may still be used to remove an upper layer of the existing surfacing, but only to a depth of 0.04 feet less than the maximum planing depth specified by the Engineer, and the surfacing left behind shall be removed by other methods and equipment approved by the Engineer that do not damage or remove the existing bridge deck concrete.

If rotary milling operations contact existing bridge deck steel reinforcing bars at any time, the Contractor shall immediately cease planing operations and notify the Engineer. The Contractor shall reduce the planing depth for that bridge deck by 0.02 feet or as otherwise specified by the Engineer, and shall not resume rotary milling operations until completing the appropriate adjustments to the rotary milling machine and receiving the Engineer's approval to proceed.

The existing concrete bridge deck may have ruts in the wheel lines. After planing, the Contractor shall remove all loose and unsound surfacing not firmly bonded to the bridge deck – including surfacing remaining in the wheel line ruts, as specified by the Engineer, using methods and equipment that does not damage the existing concrete bridge deck, as approved by the Engineer. Existing surfacing firmly bonded to the bridge deck after planing operations may remain in place as approved by the Engineer.

All bridge deck concrete and bridge deck steel reinforcing bar damage due to the Contractor's surfacing removal operations shall be repaired by the Contractor in accordance with the **Repair of Damage to Bridge Decks due to Surfacing Removal Operations** subsection of these Special Provisions.

5-04.3(14).OPT11.BSP.GB5

(BSP April 16, 2012)

Repair of Damage to Bridge Decks due to Surfacing Removal Operations

All bridge deck concrete, bridge pavement seat, bridge deck steel reinforcing bar, and bridge deck waterproofing membrane (when specified to remain), damage due to the Contractor's surfacing removal operations shall be repaired by the Contractor in accordance with Section 1-07.13, except that damaged steel reinforcing bars at depths less than 0.02 feet below the maximum surfacing removal depth as specified by the Engineer shall be considered bridge deck repair in accordance with Section 6-02.3(10)D as supplemented in these Special Provisions.

Damage to existing concrete is defined as an area of concrete removed to depths equal to or greater than 0.02 feet below the maximum depth of surfacing removal specified by the Engineer. A single line of removed concrete, caused by one or more extended teeth on a rotary milling machine milling head shall be measured as one square foot of damage per foot of line removal. The Contractor shall mitigate the damaged concrete by the following method:

Damaged areas of concrete shall be repaired by removing the concrete to a depth 3/4 inches around the top steel reinforcing bar and placing bridge deck repair material approved by the Engineer to the maximum surfacing removal depth specified by the Engineer and parallel to the final grade paving profile.

Damage to existing steel reinforcing bar is defined as mill head contact with bars at surfacing removal depths equal to or greater than 0.02 feet below the maximum depth of surfacing removal specified by the Engineer. Damaged steel reinforcing bar shall be repaired as follows:

1. Damage to epoxy coating, when present on existing steel reinforcing bars, shall be repaired in accordance with Section 6-02.3(24)H.

2. Damage to steel reinforcing bar resulting in a section loss less than 20 percent of the bar with no damage to the surrounding concrete shall be left in place and shall be repaired by removing the concrete to a depth 3/4 inches around the top steel reinforcing bar and placing bridge deck repair material approved by the Engineer to the maximum surfacing removal depth specified by the Engineer and parallel to the final grade paving profile.

3. Damage to steel reinforcing bar resulting in a section loss of 20 percent or more in one location, bars partially or completely removed from the bridge deck, or where there is a lack of bond to the concrete, shall be repaired by removing the adjacent concrete and splicing a new bar of the same size. Concrete shall be removed to provide a 3/4 inch minimum clearance around the bars. The splice bars shall extend a minimum of 40 bar diameters beyond each end of the damage.

Damaged waterproofing membrane is defined as cut or ruptured membrane at surfacing removal depths equal to or greater than 0.02 feet below the maximum depth of surfacing removal specified by the Engineer. Damaged waterproofing membranes shall be repaired by removing the surfacing by hand methods to provide an area at least six inches wider than the rupture in all directions. The ruptured area shall be sealed with an approved primer and membrane with at least six inches of overlap with the existing membrane.

5-04.3(16).GR5

Weather Limitations

5-04.3(16).INST1.GR5

The first sentence of Section 5-04.3(16) is revised to read:

5-04.3(16).OPT1.FR5

(August 3, 2009)

HMA for wearing course shall not be placed on any travelled way from *** $$1$$ *** and through March 31st of the following year without written approval from the Engineer.

5-04.3(21).GR5

Asphalt Binder Revision

5-04.3(21).INST1.GR5

Section 5-04.3(21) is revised to read:

5-04.3(21).OPT1.FR5

(August 3, 2009)

The expected percentage of new asphalt binder in the HMA is *** $$1$$ ***. Should the actual percentage of new asphalt binder required by the job mix formula for HMA produced with Agency-provided aggregate vary by more than plus or minus 0.3-percent an adjustment in payment will be made. The adjustment in payment (plus or minus) will be based on the invoice cost to the Contractor. When RAP is used in the production of HMA the adjustment will be reduced by the percentage of RAP. No adjustment will be made when the Contractor elects not to use a Contracting Agency provided source.

5-04.4.GR5

Measurement

5-04.4.INST1.GR5

Section 5-04.4 is supplemented with the following:

5-04.4.OPT1.GR5

(April 24, 2006)

No specific unit of measure will apply to the calculated item of Smoothness Compliance Adjustment.

5-04.4.OPT2.GR5

(September 5, 2006)

No specific unit of measurement will apply to the calculated item of asphalt cost price adjustment.

5-04.4.OPT3.GR5

(August 3, 2009)

No specific unit of measure will apply to the calculated item of Asphalt Binder Revision.

5-04.4.OPT4.GR5

(August 1, 2011)

Bridge transverse joint seal will be measured by the linear foot along its completed line and slope.

5-04.4.OPT8.BSP.GB5

(BSP October 13, 2003)

Removing existing surfacing overlay from bridge decks will be measured by the square yard of bridge deck surface area with removed overlay.

5-04.5.GR5

Payment

5-04.5.INST1.GR5

Section 5-04.5 is supplemented with the following:

5-04.5.OPT1.FR5

(April 24, 2006)

“Smoothness Compliance Adjustment” by calculation.

Quality Assurance Price Adjustments

Section 5-04.5(1) is supplemented with the following:

Price Adjustments for pavement smoothness will be based on the requirements in Section 5-04.3(13).

Price Adjustment for Pavement Smoothness

The final IRI will be determined from the results of the WSDOT State Materials Lab measurements taken after the Engineer accepts the roadway for testing.

Final acceptance and incentive/disincentive payments for pavement smoothness will be made on an IRI value per 0.1 mile in accordance with the following:

Pay Adjustment Schedule

IRI for each 0.10 mi. section	Pay Adjustment Schedule 1	Pay Adjustment Schedule 2	Pay Adjustment Schedule 3
in. / mi.	**$ / 0.10 mi.**	**$ / 0.10 mi.**	**$ / 0.10 mi.**
< 30	600	600	600
30	600	600	600
31	580	580	580
32	560	560	560
33	540	540	540
34	520	520	520
35	500	500	500
36	480	480	480
37	460	460	460
38	440	440	440
39	420	420	420
40	400	400	400
41	380	380	380
42	360	360	360
43	340	340	340
44	320	320	320
45	300	300	300
46	280	280	280
47	260	260	260
48	240	240	240
49	220	220	220
50	200	200	200
51	180	180	180
52	160	160	160
53	140	140	140
54	120	120	120
55	100	100	100
56	80	80	80
57	60	60	60
58	40	40	40
59	20	20	20

60	0	0	0
61	0	0	0
62	0	0	0
63	0	0	0
64	0	0	0
65	0	0	0
66	-20	0	0
67	-40	0	0
68	-60	0	0
69	-80	0	0
70	-100	0	0
71	-120	0	0
72	-140	0	0
73	-160	0	0
74	-180	0	0
75	-200	0	0
76	-220	-20	0
77	-240	-40	0
78	-260	-60	0
79	-280	-80	0
80	-300	-100	0
81	-320	-120	0
82	-340	-140	0
83	-360	-160	0
84	-380	-180	0
85	-400	-200	0
86	-420	-220	0
87	-440	-240	0
88	-460	-260	0
89	-480	-280	0
90	-500	-300	0
91	-520	-320	0
92	-540	-340	0
93	-560	-360	0
94	-580	-380	0
95	-600	-400	0
> 95	* Corrective Action	* Corrective Action	Not Applicable

The pay adjustment schedule for this contract shall be *** $$1$$ ***. For sections greater than 50 feet and less than 0.1-mile, the pay adjustment will be prorated.

5-04.5.OPT2.GR5

(September 8, 2008)

Asphalt Cost Price Adjustment

The Contracting Agency will make an Asphalt Cost Price Adjustment, either a credit or a payment, for qualifying changes in the reference cost of asphalt binder. The adjustment

will be applied to partial payments made according to Section 1-09.9 for the following bid items when they are included in the proposal:

"HMA Cl. ___ PG ___"
"HMA for Approach Cl. ___ PG ___"
"HMA for Preleveling Cl. ___ PG ___"
"HMA for Pavement Repair Cl. ___ PG ___"
"Commercial HMA"

The adjustment is not a guarantee of full compensation for changes in the cost of asphalt binder. The Contracting Agency does not guarantee that asphalt binder will be available at the reference cost.

The Contracting Agency will establish the asphalt binder reference cost twice each month and post the information on the Agency website at:

http://www.wsdot.wa.gov/biz/construction/AsphaltIndex.cfm

The reference cost will be determined using posted prices furnished by Poten & Partners, Inc. If the selected price source ceases to be available for any reason, then the Contracting Agency will select a substitute price source to establish the reference cost.

The base cost established for this contract is the reference cost posted on the Agency website for the period immediately preceding the bid opening date.

Adjustments will be based on the most current reference cost for Western Washington or Eastern Washington as posted on the Agency website, depending on where the work is performed. For work completed after all authorized working days are used, the adjustment will be based on the posted reference cost during which contract time was exhausted. The adjustment will be calculated as follows:

No adjustment will be made if the reference cost is within 5% of the base cost.

If the reference cost is greater than or equal to 105% of the base cost, then
Adjustment = (Current Reference Cost – (1.05 x Base Cost)) x (Q x 0.056).

If the reference cost is less than or equal to 95% of the base cost, then
Adjustment = (Current Reference Cost – (0.95 x Base Cost)) x (Q x 0.056).

Where Q = total tons of all classes of HMA paid in the current month's progress payment.

"Asphalt Cost Price Adjustment", by calculation.

"Asphalt Cost Price Adjustment" will be calculated and paid for as described in this section. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the total bid by the Contractor.

5-04.5.OPT3.GR5

(August 3, 2009)

"Asphalt Binder Revision" by calculation.

"Asphalt Binder Revision" shall be calculated and paid for as described in Section 5-04.3(21).

5-04.5.OPT4.GR5

(August 1, 2011)

"Bridge Transverse Joint Seal", per linear foot, shall be full payment for all costs to perform the Work including saw cutting, cleaning the saw cut joint, and furnishing and installing joint sealant.

5-04.5.OPT8.BSP.GB5

(BSP October 13, 2003)

"Removing Existing Overlay From Bridge Deck", per square yard.

5-04.5.OPT9.BSP.GB5

(BSP September 20, 2010)

"Structure Surveying", lump sum.

5-05.GR5

Cement Concrete Pavement

5-05.3.GR5

Construction Requirements

5-05.3(1).GR5

Concrete Mix Design for Paving

5-05.3(1).INST2.GR5

Section 5-05.3(1) is supplemented with the following:

5-05.3(1).OPT7.GR5

(April 3, 2006)

Submittals

Prior to beginning any concrete work, the Contractor shall submit a plan, for the Engineer's review and approval, outlining the procedures to be used to prevent high pH stormwater or dewatering water from entering surface waters. The plan shall include how the pH of the water will be maintained between pH 6.5 and pH 8.5 prior to being discharged from the project or entering surface waters. The plan shall conform to the requirements of Section 8-01.

5-05.3(17).GR5

Opening to Traffic

5-05.3(17).INST1.GR5

Section 5-05.3(17) is supplemented with the following:

5-05.3(17).OPT1.GR5

(August 2, 2010)

Maturity Testing for Concrete Pavement

The Contractor shall establish a Maturity Value on the approved concrete mix through the use of a testing program following the WSDOT test procedure for estimating concrete strength.

The Contractor shall establish the strength maturity relationship at least 14 days prior to the production pours. The Contractor shall notify the Project Engineer 7 days prior to performing the Strength Maturity Relationship as to the time, date and location where the Strength Maturity Relationship will be performed. The Contractor shall allow WSDOT the opportunity to place maturity loggers in the test cylinders in order to calibrate the WSDOT maturity meter. Referenced Strength Maturity Relationships from previous mix designs shall not be allowed. A Strength Maturity Relationship shall be developed for each mix used on the project.

The Contractor shall be responsible for the installation of the maturity logger/sensors within the concrete pavement pour area. For panel replacements performed under Section 5-01, place a minimum of four loggers/sensors at two different locations. Two in one of the first few panel replacements and two in the last panel replacement of the day, each day. For continuous concrete paving operations performed under Section 5-05, place a minimum of four loggers/sensors, two at the beginning and two at the end of the concrete pour, each day. The Contractor shall maintain the integrity of the logger/sensors and wires during concrete pouring, finishing and curing operations or until the maturity information is no longer needed.

The Contractor shall perform the Quality Control Procedure to Verify the Strength-Maturity Relationship on days 1 and 2 of concrete placement as indicated in the test procedure.

The Contractor shall develop a Quality Control Plan based on the Strength-Maturity Relationship to monitor and provide remedial action to ensure the concrete meets design strengths.

Any alteration in mix proportions or source or type of any material, in excess of those tolerable by batching variability shall require the development of a new strength-maturity relationship prior to its use at the Contractors time and expense. Alterations include a change in type, source, or proportion of cement, fly ash, coarse aggregate, fine aggregate, or admixtures. A change in water-to-cementitious material ratio greater than 5.0 percent requires the development of a new strength-maturity relationship.

Maturity Method Test Procedure

This test method provides a procedure for estimating concrete strength by means of the maturity method. The maturity method is based on strength gain as a function of temperature and time. This method is a modification of ASTM C1074-98 covering the procedures for estimating concrete strength by means of the maturity method.

The maturity method consists of three steps:

- Develop strength-maturity relationship
- Estimate in-place strength
- Verify strength-maturity relationship.

The Nurse-Saul "temperature-time factor (TTF)" maturity index shall be used in this test method, with a datum temperature of 0 °C (32 °F).

Apparatus

- If the maturity meter has input capability for datum temperature, verify that the proper value of the datum temperature has been selected prior to each use.
- Intellirock maturity system (or approved equivalent). This system shall include the logger/sensor, handheld reader, and software.
- The data obtained from the maturity meter shall be unalterable and un-interruptible.
- The same brand and type of maturity meters shall be used in the field as those used to develop and verify the strength-maturity relationship.
- Logger/sensor wire grade shall be larger than or equal to 20 awg.

Contractors Procedure to Develop Strength-Maturity Relationship

Step	Action
1	For every concrete design that will be evaluated by the maturity method, prepare a minimum of 21 cylinders in accordance with FOP for AASHTO T 23. Additional cylinders should be cast to avoid having to repeat the procedure. The mixture proportions and constituents of the concrete shall be the same as those of the job concrete whose strength will be estimated using this practice. The minimum size of each batch shall be approximately 3 m^3 (4 yd^3).
2	Fresh concrete testing for each batch shall include concrete placement temperature, slump, and air content in accordance with FOP for AASHTO T 309, FOP for AASHTO T 119, and FOP for AASHTO T 152.
3	Embed loggers/sensors in at least two cylinders. Loggers/sensors shall be placed 2-4 inches from any surface. Activate the loggers/sensors.
4	Cure the cylinders in accordance with FOP for AASHTO T 23.
5	Perform compression strength tests in accordance with FOP for AASHTO T 22 to target 2,500 psi for opening to traffic. In targeting the opening to traffic requirement and to properly characterize and validate the maturity calibration curve at least three of target cylinder breaks must be broken prior to 2,500 psi. Test three cylinders at each age and compute the average strength. The cylinders with loggers/sensors may be tested if additional cylinders are needed. If a cylinder is obviously defective (for example, out of round, not square, damaged due to handling), the cylinder shall be discarded. If an individual cylinder strength is greater than 10 percent outside the average of three cylinders, the cylinder can be considered defective and be discarded. When two of the three cylinders are defective, a new batch must be evaluated unless additional acceptable cylinders are available.

6	At each test age, record the individual and average values of maturity and strength for each batch on a permanent data sheet
7	Plot the average strengths as a function of the average maturity values, with data points shown. Using a computer spreadsheet program such as Microsoft Excel, calculate a point-to-point interpolation through the data. The resulting curve is the strength-maturity relationship to be used for estimating the strength of the concrete mixture placed in the field. When developing the strength-maturity relationship, the spreadsheet software allows the Contractor to develop the corresponding maturity equation, which defines the strength-maturity relationship. The Engineer should carefully examine the data for “outliers”, faulty cylinder breaks, or faulty maturity readings. The Engineer should use judgment to determine if certain points should be discarded, or retested, or whether the entire strength-maturity relationship should be regenerated.

Contractors Procedure to Estimate In-Place Strength

Step	Action
1	Prior to or at the time of concrete placement, install loggers/sensors at the frequency specified. Loggers/sensors shall be placed a minimum of 2 ft. from a panel edge 4 to 5 inches from the panel surface. Loggers/sensors may be tied to reinforcing steel, but should not be in direct contact with the reinforcing steel or formwork.
2	As soon as practical after concrete placement, connect and activate the maturity meter(s).
3	The Contractor shall provide to the Engineer, prior to the opening the pavement to traffic, encrypted data files (with software to read the files) of the maturity data from the loggers/sensors. Data shall be provided until the maturity is at a value that is equal to or greater than the required strength for that concrete mixture, as determined by the strength-maturity relationship. Additionally, data shall be provided on a record log.

Contractors Quality Control Procedure to Verify Strength-Maturity Relationship

Step	Action

1	At the specified verification interval make a three cylinders in accordance with FOP for AASHTO T 23.
2	Embed a logger/sensor in one cylinder. Loggers/sensors shall be placed 2-4 inches from any surface. Activate the logger/sensor as soon as possible.
3	Cure the cylinders in accordance with FOP for AASHTO T 23.
4	Perform compression strength tests on all three of the cylinders in accordance with FOP for AASHTO T 22 to verify strength and time to reach 2,500 psi for opening to traffic. Compute the average strength of the cylinders. If a cylinder is obviously defective (for example, out of round, not square, damaged due to handling), the cylinder shall be discarded. If any individual cylinder strength is greater than 10 percent outside the average of three cylinders, that cylinder will be considered defective and be discarded. When two of the three cylinders are defective, the verification procedure will have to be repeated starting at step 1.
5	Record on a permanent data sheet the maturity value at the time of compression testing and individual and average strengths established from the cylinder breaks. Also record the predicted strength based on the strength-maturity relationship established for that particular concrete design, and the percent difference between average and predicted values. The strength maturity relationship is verified when the predicted strength established from the average strength maturity relationship and the cylinder breaks are within 10 percent. A copy of the data sheet and an encrypted file for the maturity data shall be provided to the Engineer on a daily basis.

5-05.5.GR5

Payment

5-05.5.INST1.GR5

Section 5-05.5 is supplemented with the following:

5-05.5.OPT1.GR5

(April 3, 2006)

All costs associated with the treatment of pH in stormwater or dewatering water that has been in contact with concrete shall be included in the applicable items of work.

DIVISION6.GR6

Division 6
Structures

6-01.GR6

General Requirements for Structures

6-01.5.GR6

Work Access and Temporary Structures

6-01.5.INST1.GR6

Section 6-01.5 is re-titled and revised to read:

6-01.5.OPT1.BSP.FB6

(BSP July 9, 2007)

Work Access

The Contractor shall construct work access to accommodate all work within the wetted perimeter, or above the environmentally sensitive area, of *** $$1$$ ***, as staked by the Engineer. The Contractor shall construct and remove the work access in accordance with all environmental regulations and permits, including those specified in Sections 1-07.5 and 1-07.6.

Submittals

The Contractor shall submit working drawings of the work access to the Engineer for review and comment.

If the Contractor chooses an access alternative using a work trestle structure, the work access submittal shall include six sets of working drawings and two sets of design calculations prepared in accordance with Section 6-01.9. The Contractor shall design the work access structure to withstand all applicable loads in accordance with accepted design codes. The Contractor shall specify the design code(s) in the design calculations and working drawings.

The Contractor shall include information with the work access submittal on the construction equipment that will use the work access. The Contractor shall specify the type and model of construction equipment to be used, and shall include equipment catalogue cuts with capacities and geometry. The Contractor shall include anticipated wheel or track loads, axle spacings, outrigger geometry and reactions, crane pick angles and reach, and other equipment details.

6-01.5.OPT1(A).BSP.FB6

(BSP July 9, 2007)

Waterway Clearance Requirements

One span of the work access structure shall provide more than *** $$1$$ *** horizontal clearance between supporting piers. The Engineer will specify the location of this span. The bottom of the superstructure of the work access structure shall be at elevation *** $$2$$ *** or higher. All waterborne debris that accumulate against the work access structure shall be removed by the Contractor on a weekly basis or as specified by the Engineer.

6-01.5.OPT1(B).BSP.GB6

(BSP July 9, 2007)

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item:

"Work Access - ___", lump sum.

6-01.5.OPT2.BSP.FB6

(BSP February 27, 2012)

Temporary Bridge

The Contractor shall design, furnish, erect, maintain, and remove a temporary bridge, including substructure, and approaches, in accordance with this Special Provision and the details shown in the Plans.

Geometric and Design Requirements

The temporary bridge shall conform to the following geometric requirements:

1. The temporary bridge shall be an overall minimum length of *** $$1$$ ***.

2. The minimum useable roadway width on the temporary bridge between barriers or railings shall be *** $$2$$ ***.

3. Unless otherwise approved by the Engineer, the profile of the roadway deck shall be as specified in the Plans.

4. The temporary bridge superstructure shall provide a minimum vertical clearance of *** $$3$$ *** to *** $$4$$ ***.

The temporary bridge shall conform to the following design requirements:

1. The temporary bridge, including the barriers or railings, shall be designed in accordance with the latest edition of the AASHTO LRFD Bridge Design Specifications.

2. The vehicular live load used for design shall be 75 percent of HL-93, minimum.

3. The driving surface of the temporary bridge shall be durable, skid resistant deck, with an initial skid number of at least 35 and maintaining a skid number of 26 minimum, in accordance with AASHTO T 242.

4. Notwithstanding the requirements of Section 1-06.1, the materials used by the Contractor to compose the temporary bridge may be used (second hand), provided that the use of such used materials shall be subject to visual inspection and approval by the Engineer. For used (second hand) steel materials where the grade of steel cannot be positively identified, the design stresses for the steel shall conform to Section 6-02.3(17)B.

5. The temporary bridge substructure shall be designed in accordance with the WSDOT *Geotechnical Design Manual* (M46-03).

The approaches to the temporary bridge shall conform to the geometric requirements shown in the Plans. The approaches to the temporary bridge, including but not limited to, slopes, reinforced slopes, and retaining walls, shall be designed in accordance with the WSDOT *Geotechnical Design Manual* (M46-03):

Submittals

The Contractor shall submit six copies of working drawings and two copies of supporting design calculations of the temporary bridge to the Engineer for approval in accordance with Section 6-01.9. The submittal shall include an erection plan and procedure in accordance with Section 6-03.3(7)A.

When retaining walls are shown in the Plans, or are utilized by the Contractor, for construction of the approaches, the Contractor shall submit details of the retaining wall design to the Engineer for approval in accordance with the submittal requirements in this Special Provision, and the specific submittal requirements in the Standard Specifications for the specific type of retaining wall selected.

Construction and Removal

The Contractor shall construct the approaches to the temporary bridge in accordance with the details shown in the Plans. The Contractor shall construct retaining walls associated with the approaches in accordance with the details shown in the Plans and the Contractor's retaining wall design submittal as approved by the Engineer.

The Contractor shall construct the temporary bridge in accordance with the working drawings and erection plan as approved by the Engineer, environmental permit conditions specified in Section 1-07.5 as supplemented in these Special Provisions and as shown in the Plans, and in accordance with the details shown in the Plans. The Contractor shall maintain the temporary bridge, including the driving surface, for the life of the temporary bridge in this project.

All welding, repair welding, and welding inspection, of steel components of the temporary bridge shall conform to the Section 6-03.3(25) and 6-03.3(25)A requirements specified for steel bridges.

After the temporary bridge is no longer needed, or upon request of the Engineer, the Contractor shall remove the temporary bridge and approaches, and shall restore the site to its original natural landscape to the satisfaction of the Engineer. Upon removal, the temporary bridge shall become the property of the Contractor.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item:

> "Temporary Bridge___", lump sum.
> The lump sum contract price for "Temporary Bridge___" shall be full pay for performing the work as specified, including designing, constructing, maintaining and removing the temporary bridge substructure and superstructure and associated paving surface, barriers and railing.
>
> All costs in connection with constructing approaches to the temporary bridge as shown in the Plans and as specified, including design and construction of retaining walls and reinforced slopes, excavation, hauling, placing and compacting embankment, base course, and pavement materials, furnishing and installing geosynthetic materials, and removing the approaches and restoring the site to its original natural landscape, shall be included in the unit

and lump sum contract prices for the bid items associated with construction and removal of the approaches.

6-01.7.GR6

Navigable Streams

6-01.7.INST1.GR6

Section 6-01.7 is supplemented with the following:

6-01.7.OPT1.FB6

(June 26, 2000)

Navigation Lighting System

Description

This work consists of furnishing and installing a complete navigation lighting system, as shown in the Plans.

Materials

The navigation lights shall be the make and model shown in the Plans. All other materials shall conform to Section 9-29.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item:

"Navigation Lighting System ***$$1$$***", lump sum.

6-01.7.OPT2.FB6

(June 26, 2000)

Temporary Navigation Lights

Description

This work consists of furnishing, installing, and maintaining temporary navigation lights as required by the United States Coast Guard, and removing them at the completion of the Contract.

Construction Requirements

The navigation lights shall be battery powered and shall remain the property of the Contractor at the completion of the Contract unless otherwise specified. The Contractor shall maintain the temporary navigation lights for the duration of the Contract.

Payment

All costs in connection with furnishing, installing, maintaining, and removing the temporary navigation lights as specified, and as shown in the Plans, shall be included in the *** $$1$$. ***

6-01.9.GR6

Working Drawings

6-01.9.INST1.GR6

Section 6-01.9 is supplemented with the following:

6-01.9.OPT1.BSP.GB6

(BSP July 12, 2000)

Due to the large number and complexity of the working drawing submittals required for this project, the Engineer will not guarantee response within the 30 calendar day response period, unless the Contractor submits an itemized schedule of working drawing submittal dates.

The Contractor shall submit the submittal schedule within 45 calendar days after contract execution to the Project Engineer, and to the Bridge and Structures Office, Construction Support Engineer, P. O. Box 47340, Olympia, WA 98504-7340.

For each specific working drawing, shop drawing, and calculation set submittal, the submittal schedule shall specify an anticipated submittal date by the Contractor and a return date to the Contractor that conforms to the Contractor's progress schedule submitted in accordance with Section 1-08.3.

The Contractor shall keep this submittal schedule current throughout the contract and shall submit supplemental submittal schedules to the Project Engineer and the Bridge and Structures Office in accordance with Section 1-08.3.

If the Contractor does not provide a submittal schedule as specified, the 30 calendar day response period specified in Sections 1-05.3 and 6-01.9 as supplemented in these Special Provisions will be deleted, and delays to the Contractor related to the Engineer's review time on all working drawing submittals shall not be grounds for additional compensation or extension of time to the Contractor in accordance with Section 1-08.8.

6-02.GR6

Concrete Structures

6-02.2.GR6

Materials

6-02.2.INST1.GR6

Section 6-02.2 is supplemented with the following:

6-02.2.OPT1.GR6

(April 2, 2012)

Resin Bonded Anchors

The resin bonded anchor system shall include the nut, washer, and threaded anchor rod which is installed into hardened concrete with a resin bonding material.

Resin bonding material used in overhead and horizontal application shall be specifically recommended by the resin manufacturer for those applications.

Resin bonding material used in submerged liquid environment shall be specifically recommended by the resin manufacturer for this application.

The resin bonded anchor system shall conform to the following requirements:

1. Threaded Anchor Rod and Nuts

Threaded anchor rods shall conform to ASTM A 193 Grade B7 or ASTM A 449, except as otherwise noted, and be fully threaded. Threaded anchor rods for stainless steel resin bonded anchor systems shall conform to ASTM F 593 and shall be Type 304 unless otherwise specified.

Nuts shall conform to ASTM A 563, Grade DH, except as otherwise noted. Nuts for stainless steel resin bonded anchor systems shall conform to ASTM F 594 and shall be Type 304 unless otherwise specified.

Washers shall conform to AASHTO M 293, and shall meet the same requirements as the supplied anchor rod, except as otherwise noted. Washers for stainless steel resin bonded anchor systems shall conform to ASTM A 240 and the geometric requirements of ANSI B18.22.1 and shall be Type 304 Stainless Steel unless otherwise specified.

Nuts and threaded anchor rods, except those manufactured of stainless steel, shall be galvanized in accordance with AASHTO M 232. Galvanized threaded anchor rods shall be tested for embrittlement after galvanizing, in accordance with Section 9-29.6(5).

Threaded anchor rods used with resin capsules shall have the tip of the rod chiseled in accordance with the resin capsule manufacturer's recommendations. Galvanized threaded rods shall have the tip chiseled prior to galvanizing.

2. Resin Bonding Material
Resin bonding material shall be one of the following:

   a. Vinyl ester resin.

   b. Polyester resin.

   c. Methacrylate resin.

   d. A two component epoxy resin conforming to Type IV ASTM C 881.

3. Ultimate Anchor Tensile Capacity
Resin bonded anchors shall be tested in accordance with ASTM E 488 to have the following minimum ultimate tensile load capacity when installed in concrete having a maximum compressive strength of 6000 pounds per square inch (psi) at the embedment specified below:

Anchor Diameter (inch)	**Tensile Capacity (lbs.)**	**Embedment (inch)**
3/8	7,800	3-3/8
1/2	12,400	4-1/2
5/8	19,000	5-5/8
3/4	27,200	6-3/4
7/8	32,000	7-7/8
1	41,000	9
1-1/4	70,000	11-1/4

The Contractor shall submit items 1 and 2 below to the Engineer for all resin bonded anchor systems. If the resin bonded anchor system and anchor diameter are not listed in the current WSDOT Qualified Products List, the Contractor shall also submit item 3 below to the Engineer.

For resin bonded anchor systems that are installed in a submerged liquid environment the Contractor shall submit items 1, 2, and 4 below. If the resin bonded anchor system and anchor diameter are not listed in the current WSDOT Qualified Products List, the Contractor shall also submit item 3 below to the Engineer.

1 The resin manufacturer's written installation procedure for the anchors.

2. The manufacturer's certificate of compliance for the threaded anchor rod certifying that the anchor rod meets these requirements.

3. Test results by an independent laboratory certifying that the threaded anchor rod system meets the ultimate anchor tensile load capacity specified in the above table. The tests shall be performed in accordance with ASTM E 488.

4. For threaded anchors intended to be installed in submerged liquid environments the Contractor shall submit tests performed by an independent laboratory within the past 24 months which certifies that anchors installed in a submerged environment meet the strength requirements specified in the above table.

6-02.2.OPT2.GB6

(December 2, 2002)

Epoxy Bonding Agent For Surfaces And For Steel Reinforcing Bar Dowels

Epoxy bonding agent for surfaces shall be Type II, as specified in Section 9-26.1. Epoxy bonding agent for steel reinforcing bar dowels shall be either Type I or Type IV, as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the resin manufacturer and approved by the Engineer.

6-02.2.OPT3.GB6

(December 2, 2002)

Epoxy Mortar

Epoxy mortar shall be composed of one part of epoxy bonding agent, Type III, as specified in Section 9-26.1, and two parts of clean, fine grained sand, by volume. The grade and class of epoxy bonding agent shall be as recommended by the resin manufacturer and approved by the Engineer.

6-02.2.OPT4.GB6

(June 26, 2000)

Epoxy Crack Sealing Materials

Epoxy sealing paste shall be a thixotropic compound.

Epoxy injection resin shall be a moisture-insensitive, two-component material capable of restoring the structural integrity of a structure by structurally bonding cracks,

delaminations and hollow planes. Resin formulations shall be hydrophilic with variable viscosity to allow full depth penetration in cracks having a width of 6 mils and greater.

Epoxy injection resin, when mixed with the hardener in accordance with the manufacturer's written instructions, shall cure to a non-shrink solid material. The material shall have a normal curing time of less than 24 hours.

Epoxy injection resin shall have the following physical properties:

Solids Content, by weight (minimum)	98	percent
Viscosity (maximum) at 77F (Brookfield)	700	cps
Compressive Yield Strength (minimum)	12,000	psi
Minimum Flexural Strength (ASTM D 790)	10,000	psi
Bond Strength (minimum)	500	psi

The Contractor shall submit a sample of the material of the epoxy sealing paste and epoxy injection resin to the Engineer together with sufficient directions and technical data for its use. The Contractor shall not begin epoxy crack sealing operations until receiving the Engineer's approval of the materials selected for use, with verification from the WSDOT Materials Laboratory that the materials meet the specified requirements.

The Contractor shall submit to the Engineer a copy of the Materials Safety Data Sheet (MSDS) for each type of epoxy sealing paste and epoxy injection resin.

6-02.2.OPT5.GB6

(January 7, 2008)

Materials for Concrete Surfaces with Exposed Aggregate Finish

Concrete for members and surfaces specified to receive an exposed aggregate finish shall be Class EA. Concrete Class EA shall conform to the following requirements:

28 day compressive strength	3,600	psi (minimum)
Cement	610	pounds per cubic yard
Fine Aggregate Class 1	880	pounds per cubic yard
Coarse Aggregate Grading No. 67	2,160	pounds per cubic yard
Water (maximum)	270	pounds per cubic yard
Water/Cement Ratio (maximum)	0.44	

A Type A water reducing admixture conforming to Section 9-23.6 shall be used in accordance with Section 6-02.3(3). Air content shall conform to Section 6-02.3(2)A.

Mixing water shall be the minimum required for satisfactory placement and shall not exceed the specified amount.

Aggregate weights are based on a specific gravity of 2.67. Adjustments in the mix design will be made by the Engineer as necessary to correct for actual bulk specific

gravity of the aggregates, moisture content of the aggregates, and to ensure proper consistency, workability, and correct cement content per cubic yard of concrete.

The retardant coating for Method 1 shall be selected from the approved products listed in the WSDOT Qualified Products List, latest edition, and shall exhibit the following properties:

1. Retards the set of the surface mortar of the concrete without preventing the concrete to reach the specified 28 day compressive strength.

2. Leaves the aggregate with its original color and luster, and firmly embedded in the concrete matrix.

3. Allows the removal of the surface mortar in accordance with the methods specified in Section 6-02.3(14) as supplemented in these Special Provisions, without the use of acidic washing compounds.

4. Allows for uniform removal of the surface mortar.

If the Contractor proposes use of a retardant coating for Method 1 that is not listed in the current WSDOT QPL, the Contractor shall submit a one quart product sample from a current lot to the Engineer along with supporting product information, MSDS, and a Manufacturer's Certificate of Compliance, in accordance with Section 1-06.3, stating that the product conforms to the above performance requirements. The Contracting Agency will require up to 14 calendar days after receipt of the product sample and product information to complete the evaluation.

6-02.2.OPT6.GB6
(April 2, 2007)
The sealer for surfaces of exposed aggregate concrete shall be a clear, non gloss, penetrating sealer of either a silane, siloxane, or silicone based formulation.

6-02.2.OPT7.GB6
(April 7, 2008)
Fractured Basalt Finish
The fractured basalt finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect

P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT8.GB6

(April 7, 2008)

Fractured Fin Finish

The fractured fin finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT9.GB6

(April 7, 2008)

Fractured Granite Finish

The fractured granite finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products list (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For

approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT10.GB6

(April 7, 2008)

Variable Depth Random Board Finish and 3/4 Inch Random Board Finish

The variable depth random board finish and the 3/4 inch random board finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation

State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The variable depth finish shall utilize an elastomeric form liner, while the ¾ inch depth finish shall use either an elastomeric or a plastic form liner.

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT11.GB6

(April 7, 2008)

Ribbed Finish

The ribbed finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT12.GB6

(April 7, 2008)

Striated Finish

The striated finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT13.GB6

(April 7, 2008)

Ashlar Stone Finish

The ashlar stone finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT14.GB6

(April 7, 2008)

Block Finish

The block finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT15.GB6

(April 7, 2008)

Split Face Finish

The split face finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT16.GB6

(April 7, 2008)

River Rock Finish

The river rock finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

If sent via FedEx:

Washington State Department of Transportation
State Bridge and Structures Architect
7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT17.GB6

(April 5, 2010)

Cascadian Stone Finish

The cascadian stone finish shall be accomplished by the use of either a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition, or a form liner approved by the Engineer as an equal product. For approval of form liners not listed in the current WSDOT QPL, the Contractor shall submit four copies of the request, along with catalogue cuts and other descriptive supporting information, as follows:

1. Two sets to the Project Engineer

2. Two sets, accompanied by a 2 foot square physical sample of the form liner, to the State Bridge and Structures Architect, addressed as follows:

If sent via US Postal Service:

Washington State Department of Transportation
State Bridge and Structures Architect
P. O. Box 47340
Olympia, WA 98504-7340

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7345 Linderson Way SW
Tumwater, WA 98501-6504

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

6-02.2.OPT20.GB6

(August 3, 2009)

Strip Seal Expansion Joint System

The metal components shall conform to ASTM A 36, ASTM A 992, or ASTM A 572, and shall be protected against corrosion by one of the following methods:

1. Zinc metallized in accordance with Section 6-07.3 as supplemented in these Special Provisions.

2. Hot-dip galvanized in accordance with AASHTO M 111.

3. Paint in accordance with Section 6-07.3(9). The color of the top coat shall be Washington Gray. The surfaces embedded in concrete shall be painted only with a shop primer coat of paint conforming to Section 9-08.1(2)C.

The strip seal gland shall be continuous for the full length of the joint with no splices permitted, unless otherwise shown in the Plans.

6-02.2.OPT21.GB6

(June 26, 2000)

Compression Seal Expansion Joint System

Compression seal glands shall be selected from the approved products listed in the WSDOT Qualified Products List, latest edition, and sized as appropriate for the compression seal expansion joints shown in the Plans.

6-02.2.OPT22.GB6

(August 2, 2010)

Modular Expansion Joint System

Structural steel shall conform to ASTM A 36, ASTM A 572 Grade 50, or ASTM A 588. Aluminum components shall not be used.

Stainless steel shall conform to ASTM A 240 Type 304.

Bolts and other hardware shall conform to the requirements of AASHTO M 164 Type 1 or 2 and shall be galvanized in accordance with AASHTO M 232 and Section 9-06.5(3) of the Standard Specifications.

PTFE shall be 100% virgin teflon, woven PTFE fabric, or dimpled PTFE conforming to the requirements of Section 18.8 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims.

Expansion joint strip seals shall conform to the following:

Property	Test Method	Range of Values
Hardness, Durometer A	ASTM D 2240	55 -70
Tensile Strength	ASTM D 412	2000 psi minimum
Elongation at break	ASTM D 412	250%
Compression Set, at 72 hr. at 212F	ASTM D 395	40%

The maximum size of each expansion joint strip seal shall be 3 inches. Box-type seals or seals utilizing double webs will not be acceptable. Seals shall be continuous without splices.

6-02.2.OPT26.BSP.GB6

(BSP October 27, 2008)

Rapid Cure Silicone Sealant

Rapid cure silicone sealant shall be the following product conforming to the following specifications:

Dow Corning 902 RCS Joint Sealant

The joint sealant shall be a rapid cure, 100 percent silicone, low modulus, self-leveling, cold applied, two part formulation, which is compatible with the surfaces to which it is applied. Rapid cure is defined as developing sufficient integrity within eight hours to accommodate both horizontal thermal movements and vertical movements at the joint.

The joint sealant shall not be an acid cure sealant.

The joint sealant shall conform to the following properties:

<u>As Applied</u>

Extrusion rate	MIL S 8802	7 to 19.4 ounces/minute
Specific gravity	ASTM D 1475	1.25 to 1.35
Nonvolatile content		93 percent minimum

<u>As Installed</u>

(at 77F, 50 percent relative humidity, and 48 hours cure)

Skin-over time		20 minutes maximum
Joint elongation	ASTM D 5329*	600 percent minimum
Joint modulus	ASTM D 5329*	3 to 12 psi at 100% elongation

*Section 14 modified as follows:
Pull Rate = two inches/minute
Specimen joint size = 0.5 inches by 0.5 inches by 2 inches

The primer shall be as recommended by the sealant manufacturer.

The Contractor shall deliver the joint sealant to the job site in the sealant manufacturer's original sealed container. Each container shall be marked with the sealant manufacturer's name and lot or batch number. Each lot or batch shall be accompanied by the manufacturer's Materials Safety Data Sheet (MSDS), and Certificate of Compliance, identifying the sealant manufacturer and the lot or batch number, and certifying that the materials conform to the specified requirements.

The backer rod shall be closed cell expanded polyethylene foam as recommended by the sealant manufacturer and approved by the Engineer. The diameter of the backer rod shall be as recommended by the sealant manufacturer for the expansion joint opening at the time of installation.

6-02.2.OPT27.BSP.GB6

(BSP January 4, 2010)

Polyester Concrete

Polyester Resin Binder

The resin shall be an unsaturated isophthalic polyester-styrene co-polymer.

Prior to adding the initiator, the resin shall conform to the following requirements:

Viscosity:	75 to 200 cps (20 rpm at 77F, RVT No. 1 spindle)	ASTM D 2196
Specific Gravity:	1.05 to 1.10 at 77F	ASTM D 1475
Styrene Content:	45% to 50% by weight of polyester styrene resin	ASTM D2369

After adding the initiator, the resin shall conform to the following requirements:

Elongation:	35% minimum w/ thickness 0.25" ± 0.04"	ASTM D 638
Tensile Strength:	2,500 psi minimum w/ thickness 0.25" ± 0.04"	ASTM D 638
Conditioning	18 hours/77F/50% + 5 hours/158F	ASTM D 618
Silane Coupler:	1.0% minimum (by weight of polyester-styrene resin)	

The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter/hardeners shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. MEKP initiators shall be used when the surrounding concrete temperatures are above 60F. A blend of initiators may be used as approved by the Engineer when the surrounding concrete temperature is 50F to 60F.

Polyester resin binder will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance conforming to Section 1-06.3.

High Molecular Weight Methacrylate (HMWM) Resin

In addition to the viscosity and density properties, and the promoter/initiator system, specified in Section 6-09.2, the HMWM resin for polyester concrete shall conform to the following requirements:

Flash Point:	180F minimum	ASTM D 3278
Tack-Free Time:	400 minutes maximum	California Test 551

Prior to adding initiator, the HMWM resin shall have a maximum volatile content of 30 percent, when tested in conformance with ASTM D 2369.

HMWM resin will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance conforming to Section 1-06.3.

Aggregate

The aggregate shall be from a WSDOT approved pit site and shall be thoroughly washed and kiln dried.

The aggregate shall conform to Section 9-03.1, and one of the following combined aggregate gradings:

	Combined Aggregate	
Sieve Size	1/2" Max. % Passing	3/8" Max. % Passing
1/2"	100	100
3/8"	83-100	100
U.S. No. 4	65-82	62-85

U.S. No. 8	45-64	45-67
U.S. No. 16	27-48	29-50
U.S. No. 30	12-30	16-36
U.S. No. 50	6-17	5-20
U.S. No. 100	0-7	0-7
U.S. No. 200	0-3	0-3

Aggregate retained on the U.S. No. 8 sieve shall have a maximum of 25 percent crushed particles. Fine aggregate shall consist of natural sand only.

Aggregate absorption shall not exceed 1.0 percent. The moisture content of the aggregate shall not exceed one half of the aggregate absorption at the time of mixing with the polyester resin binder. The aggregate temperature shall be between 45F and 100F at the time of mixing.

Sand for Abrasive Finish

The sand for abrasive finish shall conform to Section 6-09.2, and the aggregate moisture content requirements specified above.

6-02.2.OPT28.BSP.GB6

(BSP April 7, 2008)

Elastomeric Concrete

Elastomeric concrete shall be one of the following two products conforming to the following specifications:

BASF/Watson Bowman Acme Wabo Crete II

The elastomeric concrete shall be a two component polyurethane combined with a one component manufacturer specified aggregate mixture to form a self-leveling, monolithic mixture capable of forming a monolithic bond to concrete surfaces.

The elastomeric concrete shall conform to the following properties:

<u>Elastomeric Concrete Binder, Cured 7 days at room temperature</u>

Tensile Strength	ASTM D 638	750 psi minimum
Elongation at break	ASTM D 638	200 percent minimum
Type D Durometer Hardness	ASTM D 2240	30-49
Compression Set	ASTM D 395 Method B	50 percent 22 hours at 158F
Tear Resistance	ASTM D 624	80 pounds per inch, minimum at 2 inches per minute
Water Absorption	ASTM D 570	3 percent by weight
Heat Shrinkage	ASTM D 1299	1.6 percent maximum
Oven Aging	ASTM D 638	750 72 hours at 158F
Elongation	ASTM D 638	150 percent minimum

<u>Elastomeric Concrete, Binder and Aggregate Mixture, Fully Cured</u>

Compressive Strength	ASTM D 695	2,200 psi minimum

Resilience at 5 percent deflection	ASTM D 695	90 percent minimum
Slant Shear Bond to concrete		250 psi minimum
Impact Resistance (Ball Drop at 14 days)		
at -20F	ASTM D 3209	No Cracks
at 32F	ASTM D 3209	No Cracks
at 158F	ASTM D 3209	No Cracks
Pot Lift		Ten minutes at 75F

The elastomeric concrete aggregate shall be as specified, gradated, and packaged by the elastomeric concrete manufacturer.

The primer shall be as recommended by the elastomeric concrete manufacturer.

D. S. Brown Delcrete

The elastomeric concrete shall be a two component polyurethane combined with a one component manufacturer specified aggregate mixture to form a self-leveling, monolithic mixture capable of forming a monolithic bond to concrete surfaces.

The elastomeric concrete shall conform to the following properties:

<u>Elastomeric Concrete Binder after conditioning at 100F for 7 days</u>

Tensile strength	ASTM D 638	1,500 psi minimum
Tensile stress	ASTM D 638	500 psi minimum
Elongation	ASTM D 638	200 percent minimum
Type D Durometer hardness	ASTM D 2240	90 ± 3

<u>Elastomeric Concrete Binder after oven aging at 158F for 7 days</u>

Tensile strength	ASTM D 573	1,500 psi minimum
Tensile stress	ASTM D 573	500 psi minimum
Elongation	ASTM D 573	200 percent minimum
Type D Durometer hardness	ASTM D 573	90 ± 3

<u>Elastomeric Concrete Binder and Aggregate Mixture after conditioning at 100F for 7 days</u>

Tensile strength	Note 1	600 psi minimum
Elongation	Note 1	25 percent minimum
Type D Durometer hardness	ASTM D 2240	50 shore D maximum
Compressive stress at 5% deflection	ASTM D 695 and Note 2	800 psi minimum
Resilience at 5 percent deflection	Note 3	70 percent minimum
Impact resistance	Note 4	10 foot-pounds minimum

(Ball drop at -20F)		with no cracks
Dry bond to conc.	Note 5	350 pounds per inch minimum
Wet bond to conc.	Note 5	250 pounds per inch minimum

Note 1: Six inch dumbbell test specimens (with one inch benchmarks) cut from cast film approximately 80 mils thick.

Note 2: Two inch cast cube test specimen. Machine crosshead speed is 0.05 inch per minute. Compressive strength is the maximum load carried by the specimen divided by the original cross-section area. A compressometer is used to make the measurement.

Note 3: Two inch cast cube test specimen. Machine cross head speed is 0.05 inch per minute. Specimen is compressed to the desired amount. Five minutes after the load is removed, the specimen thickness is measured. Percent recovery is determined as follows:

(Deflection + final thickness - initial thickness) / Deflection

Note 4: 2-1/2 inch diameter, 3/8 inch thick, cast disk. Specimens are conditioned four hours at test temperatures. A one pound steel ball is dropped onto the center of the specimen through a plastic guiding tube from an initial height of five feet. The drop is made within ten seconds after removal of the specimen from the exposure condition. The test result is the average of four test specimens.

Note 5: A mortar-briquette half, conforming to ASTM C 190, is sawed in half so that the cut surface area equals approximately one square inch. The cut surface is abrasive blasted (36 mesh). The briquette is placed in a mold and the elastomeric concrete/aggregate mixture is cast against it. The specimen is submerged in water for seven days at room temperature. Using a Rehle Briquette Tester, specimen failure is considered to occur at either the bond interface or within one of the two materials.

The elastomeric concrete aggregate shall be as specified, gradated, and packaged by the elastomeric concrete manufacturer.

The primer shall be as recommended by the elastomeric concrete manufacturer.

The Contractor shall deliver the elastomeric concrete components to the job site in the elastomeric concrete manufacturer's original sealed containers. Each container shall be marked with the sealant manufacturer's name and lot or batch number. Each lot or batch shall be accompanied by the manufacturer's Materials Safety Data Sheet (MSDS), and Certificate of Compliance, identifying the elastomeric concrete manufacturer and the lot or batch number, and certifying that the materials conform to the specified requirements.

6-02.2.OPT33.GB6

(April 7, 2008)

Fabric Pad Bearing

Unless other materials are specified in the Plans, fabric pad bearing assembly components shall conform to the following requirements for those components shown and specified in the Plans:

Steel Plates and Bars

Steel plates and bars (keeper bars, sole plates, backing plates, and masonry plates) shall conform to ASTM A 36 and the dimensions shall conform to the details shown in the Plans. The backing plate and masonry plate surfaces in contact with the pre-formed fabric pad, and the surface within the recess of the backing plate, shall have an average surface roughness of 250 microinches or less. The surface of the sole plate in contact with the stainless steel sheet shall have an average surface roughness of 125 microinches or less. All other steel plate and bar surfaces in contact with other fabric pad bearing components shall have an average surface roughness of 500 microinches or less.

Pre-formed Fabric Pad

Pre-formed fabric pads shall be composed of multiple layers of duck, impregnated and bound with high quality oil resistant synthetic rubber, compressed into resilient pads of uniform thickness. The duck shall be of highest quality cotton or cotton-polyester 50-50 blend, and shall weigh a minimum of eight ounces per square yard. The cotton warp and the filling yarn shall be 2-ply. The cotton-polyester warp and fill shall be single yarn, with a minimum breaking strength by grab method of 150 pounds per inch width (piw) warp, and 140 piw fill. The filling count of the duck shall be 40± 2 threads per inch and the warp count shall be 50 ± 1 threads per inch. The number of plies shall be sufficient to produce the specified thickness, after compression and vulcanization.

The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 psi without any sign of failure after the load is removed. Failure is defined as any breakdown of the component materials or laminations.

The pre-formed fabric pad shall have a shore A hardness of 90±5.

Polytetraflouroethylene (PTFE) Sheet

PTFE shall be 100 percent virgin (unfilled) PTFE, fiberglass fiber filled PTFE, or dimpled PTFE conforming to Section 18.8.2 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims, and the following requirements:

1. PTFE sheet shall be composed of 100 percent virgin (unfilled) polytetrafluoroethylene resin, except where filled PTFE is specified in the Plans.

2. Filled PTFE, when specified in the Plans, shall be composed of PTFE resin uniformly blended with 15 percent maximum fiberglass fiber.

3. The substrate shall limit the flow (elongation) of the confined PTFE to not more than 0.009 inch under a pressure of 2,000 psi for 15 minutes at 78F for a two inch by three inch test sample.

4. Unfilled PTFE shall have a hardness of 50 to 65 Durometer D, at 78F, in accordance with ASTM D 2240.

Stainless Steel Sheet
Stainless steel sheet shall be no less than 14 gage meeting ASTM A 240 Type 304L specifications. Stainless steel in contact with the PTFE shall be polished to a Number 8 mirror finish.

Welded Shear Connectors
Welded shear connectors shall conform to Section 9-06.15.

Bolts, Nuts and Washers
Bolts, nuts and washers shall conform to Section 9-06.5(3), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Anchor Bolts, Nuts and Washers
Anchor bolts, nuts and washers shall conform to Section 9-06.5(4). The top 1'-0", minimum, of the exposed end of the anchor bolts, and the associated nuts and washers, shall be galvanized after fabrication in accordance with AASHTO M 232.

Concrete Inserts
Concrete inserts shall be as specified in the Plans.

Silicone Grease and Epoxy Gel
Silicone grease shall conform to US Navy QPL AS8660-2.

Epoxy gel shall be Type I, Grade 3, Class A, B, or C, conforming to Section 9-26.1.

Submittals of Test Reports, Certifications, and Samples
The Contractor shall submit to the Engineer the following test reports, certifications, and samples for review, testing, and approval, prior to installing the fabric pad bearings:

1. Manufacturer's certificate of compliance for the PTFE, pre-formed fabric pad duck, silicone grease, and epoxy gel.

2. Certified mill test reports for all steel and stainless steel in the bearing assemblies.

3. Certified test reports confirming that the pre-formed fabric pads meet the specified requirements of proof load.

4. Samples of the pre-formed fabric pads, size six inches by six inches by one inch, and PTFE sheet, size six inches by six inches by 1/8 inch, from the production material.

The Engineer will require 15 calendar days to review and test the submitted certificates, test reports, and samples. If all or a portion of the submittal fail to meet the specified requirements, the Contractor shall correct the deficiencies and resubmit to the Engineer. An additional 15 calendar days may be required by the Engineer for review of each resubmittal.

6-02.2.OPT38.BSP.GB6

(BSP April 7, 2008)

High-Load Elastomeric Bearing Pad Assembly

High-load elastomeric bearing pads shall meet all Level I and Level II acceptance criteria as specified in AASHTO M 251.

The Contractor shall perform a Long Duration Compression Load test on high-load elastomeric bearing pads randomly selected from each size and material batch of the production bearings. The Contractor shall test one bearing per lot, minimum, where one lot is defined as ten percent of the total number of production bearings in each size and material batch. The Long Duration Compression Load test shall be as specified in Sections 18.2.5.6 and 18.2.5.7 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims. The Contractor shall submit the test results to the Engineer for approval.

If one of the test bearings fails, all of the bearings of that lot shall be rejected, unless the Contractor elects to test each bearing of the lot, at no additional expense to the Contracting Agency. In lieu of this procedure, the Engineer may require the Contractor to test all bearings of the lot.

Steel bars, plates, and shapes, shall conform to ASTM A 36.

Silicone grease shall conform to US Navy QPL AS8660-2.

Epoxy gel shall conform to Section 9-26.1, Type I, Grade 3, Class A, B, or C.

Bolts shall conform to Section 9-06.5(3).

6-02.2.OPT39.BSP.GB6

(BSP June 4, 2012)

Cylindrical Bearing

Unless other materials are specified in the Plans, cylindrical bearing assembly components shall conform to the following requirements for those components shown and specified in the Plans:

Steel Plates and Bars

Steel plates and bars (base plates, bearing plates, guide bars, masonry plates, and sole plates) shall conform to ASTM A 36, and the dimensions shall comply with the details as shown in the Plans. The surface of the steel plates and bars in contact with stainless steel shall have an average surface roughness of 125 microinches or less. The surface within the recess of steel plates and bars retaining PTFE shall have an average surface roughness of 250 microinches or less. All other steel plate and bar surfaces in contact with other cylindrical bearing assembly components shall have an average surface roughness of 500 microinches or less.

Polytetrafluoroethylene (PTFE)
PTFE shall be 100 percent virgin PTFE, woven PTFE fabric, or dimpled PTFE conforming to Section 18.8.2 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims.

Stainless Steel
Stainless steel sheet shall conform to ASTM A 240 Type 304L. Stainless steel in contact with PTFE shall be polished to a Number 8 mirror finish.

Stainless steel countersunk screws shall be hexagon socket type conforming to ANSI B 18.3 and shall conform to ASTM F 593 Type 304L.

Silicone Grease and Epoxy Gel
Silicone grease shall conform to US Navy QPL AS8660-2.

Epoxy gel shall be Type I, Grade 3, Class A, B, or C, conforming to Section 9-26.1.

Bolts, Nuts and Washers
Bolts, nuts and washers shall conform to Section 9-06.5(3) and shall be galvanized after fabrication in accordance with AASHTO M 232.

Anchor Bolt Assembly
Anchor bolts shall conform to ASTM F 1554 Grade 105, including supplemental requirements S2, S3, and S5. Nuts shall conform to ASTM A 563 Grade DH. Washers shall conform to AASHTO M 293. Bars shall conform to ASTM A 36. Pipe shall conform to ASTM A 53 Grade B Type E or S, black. The upper portion of the anchor bolts, and associated nuts and washers, to six inches minimum below the concrete surface, shall be galvanized after fabrication in accordance with AASHTO M 232.

Resin Filler
Resin filler shall conform to Section 6-02.2 as supplemented in these Special Provisions.

Submittals of Acceptance Test Reports and Certificates
The Contractor shall submit the following production samples, and test reports and certificates, to the Engineer for review, testing, and approval:

1. Manufacturer's certificate of compliance for the PTFE, resin filler, and silicone grease, in accordance with Section 1-06.3.

2. A six inch by six inch by 1/8 inch sample of PTFE taken from the lot of production material.

3. Certified mill test reports for all steel and stainless steel materials incorporated in the bearings.

The Contractor shall not ship the bearings from the fabricator's facility until receiving the Engineer's written approval of all production samples, and test reports and certificates.

6-02.2.OPT40.BSP.GB6

(BSP June 4, 2012)

Disc Bearing

Unless other materials are specified in the Plans, disc bearing assembly components shall conform to the following requirements for those components shown and specified in the Plans:

Steel Plates and Bars

Steel plates and bars (sliding plates, bearing plates, guide bars, masonry plates, and sole plates) shall conform to ASTM A 36, and the dimensions shall comply with the details as shown in the Plans. The surface of the steel plates and bars in contact with stainless steel shall have an average surface roughness of 125 microinches or less. The surface of steel plates in contact with the polyether urethane disc, and the surface within the recess of steel plates and bars retaining PTFE, shall have an average surface roughness of 250 microinches or less. All other steel plate and bar surfaces in contact with other disc bearing assembly components shall have an average surface roughness of 500 microinches or less.

Polyether Urethane

Polyether urethane shall conform to Section 18.3.2.8 and Table 18.3.2.8-1 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims.

Polytetrafluoroethylene (PTFE)

PTFE shall be 100 percent virgin PTFE, woven PTFE fabric, or dimpled PTFE conforming to Section 18.8.2 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims.

Stainless Steel

Stainless steel sheet shall conform to ASTM A 240 Type 304L. Stainless steel in contact with PTFE shall be polished to a Number 8 mirror finish.

Stainless steel countersunk screws shall be hexagon socket type conforming to ANSI B 18.3 and shall conform to ASTM F 593 Type 304L.

Silicone Grease and Epoxy Gel

Silicone grease shall conform to US Navy QPL AS8660-2.

Epoxy gel shall be Type I, Grade 3, Class A, B, or C, conforming to Section 9-26.1.

Bolts, Nuts and Washers

Bolts, nuts and washers shall conform to Section 9-06.5(3) and shall be galvanized after fabrication in accordance with AASHTO M 232.

Anchor Bolt Assembly

Anchor bolts shall conform to ASTM F 1554 Grade 105, including supplemental requirements S2, S3, and S5. Nuts shall conform to ASTM A 563 Grade DH. Washers shall conform to AASHTO M 293. Bars shall conform to ASTM A 36. Pipe shall conform to ASTM A 53 Grade B Type E or S, black. The upper portion of the anchor bolts, and associated nuts and washers, to six inches minimum below

the concrete surface, shall be galvanized after fabrication in accordance with AASHTO M 232

Resin Filler
Resin filler shall conform to Section 6-02.2 as supplemented in these Special Provisions.

Submittals of Acceptance Test Reports and Certificates
The Contractor shall submit the following production samples, and test reports and certificates, to the Engineer for review, testing, and approval:

1. Manufacturer's certificate of compliance for the polyether urethane, PTFE, resin filler, and silicone grease, in accordance with Section 1-06.3.

2. A six inch by six inch by 1/8 inch sample of PTFE taken from the lot of production material.

3. Certified mill test reports for all steel and stainless steel materials incorporated in the bearings.

The Contractor shall not ship the bearings from the fabricator's facility until receiving the Engineer's written approval of all production samples, and test reports and certificates.

6-02.2.OPT41.BSP.GB6
(BSP June 4, 2012)
Spherical Bearing
Unless other materials are specified in the Plans, spherical bearing assembly components shall conform to the following requirements for those components shown and specified in the Plans:

Steel Plates and Bars
Steel plates and bars (base plates, bearing plates, guide bars, keeper bars and plates, masonry plates, and sole plates) shall conform to ASTM A 36, and the dimensions shall comply with the details as shown in the Plans. The surface of the steel plates and bars in contact with stainless steel shall have an average surface roughness of 125 microinches or less. The surface within the recess of steel plates and bars retaining PTFE shall have an average surface roughness of 250 microinches or less. All other steel plate and bar surfaces in contact with other spherical bearing assembly components shall have an average surface roughness of 500 microinches or less.

Polytetrafluoroethylene (PTFE)
PTFE shall be 100 percent virgin PTFE, woven PTFE fabric, or dimpled PTFE conforming to Section 18.8.2 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims.

Stainless Steel
Stainless steel sheet shall conform to ASTM A 240 Type 304L. Stainless steel in contact with PTFE shall be polished to a Number 8 mirror finish.

Stainless steel countersunk screws shall be hexagon socket type conforming to ANSI B 18.3 and shall conform to ASTM F 593 Type 304L.

Silicone Grease and Epoxy Gel

Silicone grease shall conform to US Navy QPL AS8660-2.

Epoxy gel shall be Type I, Grade 3, Class A, B, or C, conforming to Section 9-26.1.

Bolts, Nuts and Washers

Bolts, nuts and washers shall conform to Section 9-06.5(3) and shall be galvanized after fabrication in accordance with AASHTO M 232.

Anchor Bolt Assembly

Anchor bolts shall conform to ASTM F 1554 Grade 105, including supplemental requirements S2, S3, and S5. Nuts shall conform to ASTM A 563 Grade DH. Washers shall conform to AASHTO M 293. Bars shall conform to ASTM A 36. Pipe shall conform to ASTM A 53 Grade B Type E or S, black. The upper portion of the anchor bolts, and associated nuts and washers, to six inches minimum below the concrete surface, shall be galvanized after fabrication in accordance with AASHTO M 232

Resin Filler

Resin filler shall conform to Section 6-02.2 as supplemented in these Special Provisions.

Submittals of Acceptance Test Reports and Certificates

The Contractor shall submit the following production samples, and test reports and certificates, to the Engineer for review, testing, and approval:

1. Manufacturer's certificate of compliance for the PTFE, resin filler, and silicone grease, in accordance with Section 1-06.3.

2. A six inch by six inch by 1/8 inch sample of PTFE taken from the lot of production material.

3. Certified mill test reports for all steel and stainless steel materials incorporated in the bearings.

The Contractor shall not ship the bearings from the fabricator's facility until receiving the Engineer's written approval of all production samples, and test reports and certificates.

6-02.2.OPT46.GB6

Bridge Supported Utilities

6-02.2.OPT46(A).GB6

(June 26, 2000)

Inserts shall be of the type and model specified in the Plans. Inserts shall be galvanized in accordance with AASHTO M 111.

6-02.2.OPT46(B).GB6

(April 30, 2001)

Hanger rods, and associated nuts and washers, shall conform to Section 9-06.5(1), and shall be galvanized in accordance with AASHTO M 232.

Steel bars and plates shall conform to ASTM A 36 and shall be galvanized in accordance with AASHTO M 111.

6-02.2.OPT46(C).GB6

(June 26, 2000)

Horizontal strut bolts, and associated nuts and washers, shall conform to Section 9-06.5(3), and shall be galvanized in accordance with AASHTO M 232.

Pre-formed fabric pads shall be composed of multiple layers of duck, impregnated and bound with high quality oil resistant synthetic rubber, compressed into resilient pads of uniform thickness. The duck shall be of highest quality cotton or cotton-polyester 50-50 blend, and shall weigh a minimum of eight ounces per square yard. The cotton warp and the filling yarn shall be 2-ply. The cotton-polyester warp and fill shall be single yarn, with a minimum breaking strength by grab method of 150 pounds per inch per width (piw) warp, and 140 piw fill. The filling count of the duck shall be 40± 2 threads per inch and the warp count shall be 50 ± 1 threads per inch. The number of plies shall be sufficient to produce the specified thickness, after compression and vulcanizing.

The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 psi without any sign of failure after the load is removed. Failure is defined as any breakdown of the component materials or laminations.

Pre-formed fabric pads shall have a shore A hardness of 90±5.

Pre-formed fabric pads for bridge utility supports will be accepted based on the manufacturer's certificate of compliance that the material furnished conforms to these specifications. The Contractor shall submit the manufacturer's certificate of compliance to the Engineer in accordance with Section 1-06.3.

6-02.2.OPT46(D).GB6

(June 26, 2000)

Pipe rolls or pipe saddles shall be of the type and model specified in the Plans.

6-02.2.OPT46(E).GB6

(April 30, 2001)

Anchor straps shall conform to ASTM A 36 and shall be galvanized after fabrication in accordance with AASHTO M 111.

Anchor bolts, and associated nuts and washers, shall conform to Section 9-06.5(3), and shall be galvanized in accordance with AASHTO M 232.

6-02.2.OPT47.GB6

(April 30, 2001)

Bridge Grate Inlet

Steel in grates, angles, and anchors for bridge grate inlets shall conform to Section 9-05.16.

Pipe straps shall conform to ASTM A 36, and shall be galvanized after fabrication in accordance with AASHTO M 111.

Anchor bolts and associated nuts and washers shall conform to Section 9-06.5(1) and shall be galvanized after fabrication in accordance with AASHTO M 232.

Drain pipe stub shall conform to the Section 9-05.1(2) requirements for zinc coated (galvanized) corrugated steel drain pipe.

Elastomeric expansion joint seal glands shall be selected from the approved products listed in the WSDOT Qualified Products List, latest edition, and sized as appropriate for the bridge grate inlet expansion joint shown in the Plans.

6-02.2.OPT48.GB6

(April 30, 2001)

Bridge Drain Risers

Spacer bars and riser bars for the drain riser assembly shall conform to ASTM A 36.

6-02.2.OPT49.GB6

(August 1, 2011)

Bridge Deck Repair Material

Bridge deck repair material shall be either an ultra-low viscosity, two-part liquid, polyurethane-hybrid polymer concrete, or a pre-packaged cement based repair mortar, as produced by the products specified below:

Ultra-Low Viscosity, Two-Part Liquid, Polyurethane-Hybrid Polymer Concrete

The ultra-low viscosity, two-part liquid, polyurethane-hybrid polymer concrete shall be the following product:

URE-KOTE PF-60
Liquid Concrete, Inc.
P. O. Box 16782
Seattle, WA 98116
(800) 349-1922
FAX: (877) 349-1922
www.liquidconcrete.com

Pre-Packaged Cement Based Repair Mortar

Pre-packaged cement based repair mortar shall be a pre-packaged bridge deck repair mix capable of achieving a cube compressive strength of 3,000 psi in six hours or less. The maximum water soluble chloride ion (CI-) content, expressed as a percentage by dry mass of cement in the pre-packaged bridge deck repair mix, shall be 0.08, in accordance with ASTM C 1218.

The pre-packaged cement based repair mortar mix shall be one of the following products:

Rapid Set DOT Mix
CTS Cement Manufacturing Company
11065 Knott Avenue Suite A
Cypress, CA 90630
(800) 929-3030
FAX: (714) 379-8270
www.ctscement.com

Set 45
BASF Building Systems
889 Valley Park Drive
Shakopee, MN 55379
(800) 433-9517
FAX: (952) 496-6062
www.buildingsystems.basf.com

MBT Thoroc 10-60 Rapid Mortar
BASF Building Systems
889 Valley Park Drive
Shakopee, MN 55379
(800) 433-9517
FAX: (952) 496-6062
www.buildingsystems.basf.com

Alternatively, the Contractor may propose use of a bridge deck repair material other than those specified above. If the Contractor proposes use of a bridge deck repair material not listed above, the Contractor shall submit a Request for Approval of Material (RAM) for the product to the Engineer, accompanied by samples from the lot or lots of pre-packaged mix. The Contractor shall furnish such samples as required by the Engineer, and the Contracting Agency will require up to 14 calendar days to test and evaluate the submittal for compressive strength and chloride ion content.

6-02.2.OPT54.BSP.FB6

(BSP June 26, 2000)

Masonry Materials

Concrete Masonry Units

Concrete masonry units (CMU) shall conform to ASTM C 90, Grade N, Type 1, with a density between 100 and 115 pounds per cubic foot. Shrinkage shall not exceed 0.065 percent.

All CMU's shall contain a water repellent admixture in accordance with the admixture manufacturer's recommendations. The water repellent admixture shall be "Dry-Block System" by W. R. Grace Company, or an approved equal.

All CMU's shall be standard manufactured units with nominal face dimensions of eight inches high and 1'-4" long. The CMU block thickness shall be eight inches,

unless otherwise shown in the Plans. Special shapes shall be provided to complete the work as shown in the Plans.

CMU surface texture and color shall be as follows:

$$1$$

All CMU's shall be of uniform texture and color, obtained from one source. The Contractor shall submit four samples of each type of CMU block specified for use on the project to the Engineer for approval.

The Contractor shall submit a certificate of compliance from the CMU manufacturer to the Engineer, in accordance with Section 1-06.3, certifying compliance with the specified requirements. The submittal shall include test results as required from tests conducted within the previous twelve months.

CMU Grout

CMU grout shall conform to ASTM C 476, with a six sack minimum mix and 3/8 inch aggregate. The CMU grout shall have a minimum 28 day compressive strength of 1,800 psi and a slump of ten inches.

Mortar

Portland cement shall be Type 1 conforming to Section 9-01.2(1).

Masonry cement shall conform to ASTM C 91.

Aggregate shall conform to AASHTO M 45.

Hydrated lime shall conform to ASTM C 207.

Water shall conform to Section 9-25.1.

The mortar shall conform to ASTM C 270, Type S, and shall be mixed in accordance with one of the following mix proportions:

	Alt. 1	Alt. 2
Portland Cement	1 part	1/2 part
Masonry Cement	-	1 part
Hydrated Lime	1/4 to 1/2 part	-
Aggregate	4-1/2 parts	4-1/2 parts

The proportions of damp, loose aggregate for both alternative mixes shall be not less than 2-1/4 times nor greater than 3 times the sum of the volumes of cement and lime used.

The minimum compressive strength at 28 days shall be 1,800 psi.

The mortar mixture shall include a water repellent integral admixture, mixed in accordance with the admixture manufacturer's recommendations. The water repellent integral admixture shall be "Dry-Block System" by W. R. Grace Company, or an approved equal.

To ensure uniform color, texture, and quality, all mortar mix components shall be obtained from one manufacturer for each component, and from one source and producer for each aggregate.

Parge Coating

The parge coating applied to the top of the assembled CMU wall shall be one of the following waterproof cement base coatings:

1. Thoroseal, manufactured by Thoro.
2. Fabriseal, manufactured by Fabrikem.
3. Tamoseal, manufactured by Tamms.

6-02.2.OPT55.BSP.GB6

(BSP August 22, 2011)

Permeon Surface Treatment

The surface aging treatment (Permeon Treatment) shall be one of the following products:

"Permeon Simulated Desert Varnish" as produced by:

Soil Tech
6420 S Cameron Drive Suite 207
Las Vegas, NV 89118
www.soil-tech.com
(702) 873-2023
FAX: (702) 873-0915

"Natina Concrete Formula" as produced by:

Natina Products, LLC
1577 First Street
Coachella, CA 92236
(877) 762-8462
FAX: (866) 420-1708

"Naturock" as produced by:

Livingston Construction, Inc.
P. O. Box 262
Doty, WA 98539
(360) 754-8235

6-02.2.OPT56.BSP.GB6

(BSP June 26, 2000)

Resin Filler

Resin filler shall be a two component, resin and catalyst, liquid thermoset material.

The properties of the resin and catalyst shall be:

1. The components shall be supplied in separate containers.

2. The viscosity of the resin-catalyst mixture shall be 35,000 □ 5,000 cP at 75F immediately after mixing.

3. The flash point shall be 100F minimum.

4. After mixing, the resin-catalyst mixture shall be pourable for a minimum of eight minutes at 60F and shall harden in fifteen minutes maximum. Heating of the mixture after placing to a maximum temperature of 250F is permissible to obtain a full cure.

The properties of the cured resin shall be:

1. The fully cured compressive strength shall be 12,000 psi minimum.

2. The maximum allowable shrinkage shall be 2 percent. To control shrinkage, an inert filler may be used in the resin provided that the viscosity requirements are met.

3. The hardness shall be between 40 and 55 in accordance with ASTM D 2583.

A resin material known to meet the specified requirements herein is used in the wire rope industry for resin socketing.

The Contractor shall submit a Manufacturer's Certificate of Compliance in accordance with Section 1-06.3 to the Engineer for approval prior to using the resin filler.

6-02.2.OPT57.BSP.FB6

(BSP June 26, 2000)

Compression Molded Pad

The compression molded pad shall be of the size and shape shown in the Plans.

The molded bearing pad shall be composed of a compression molded resilient pad of uniform thickness composed of milled rubber and fiber. The rubber shall be natural or synthetic blends. The fiber shall be randomly dispersed to an average content of 40 percent by volume and the maximum fiber length shall be 1-1/2 inches.

The finished pads shall withstand compression loads perpendicular to the plane of the pad of not less than 8,000 psi without any sign of failure after the load is removed. Failure is defined as any breakdown of the component materials or separation of the component materials.

The durometer hardness (shore A) of the finished pads shall be 87 ±5.

The flexibility of the material shall be such that a sample 1/4 inch thick from the same lot as producing the pads shall show no cracks when bent around a 3/4 inch mandrel.

A sample from the lot producing the pads shall exhibit no more than 10 percent change in hardness after heat aging at 158F for 70 hours.

The manufacturer shall certify to the Engineer in writing prior to installation of the pads, that both the flexibility and change in hardness requirements are met.

6-02.2.OPT58.BSP.GB6

(BSP June 11, 2003)

Core Drilled Bridge Deck Drain

Bridge deck drain pipe sleeve shall be any smooth wall, non-perforated, PVC pipe of the diameter and minimum wall thickness specified in the Plans.

Epoxy bonding agent shall be Type II conforming to Section 9-26.1. The grade and class of the epoxy bonding agent shall be as recommended by the bonding agent manufacturer and approved by the Engineer.

6-02.2.OPT60.BSP.GB6

(BSP June 26, 2000)

Seismic Retrofit Materials

Components fabricated and constructed for seismic retrofit work shall conform to the following requirements for those items and components shown and specified in the Plans:

6-02.2.OPT60(A).BSP.GB6

(BSP June 11, 2003)

Concrete shall be Class 4000.

Steel reinforcing bar shall conform to Section 9-07.

Epoxy bonding agent for setting steel reinforcing bar dowels in place shall be either Type I or Type IV, as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the bonding agent manufacturer and approved by the Engineer.

6-02.2.OPT60(B).BSP.GB6

(June 26, 2000)

Steel pipe shall conform to ASTM A 53, Grade B, Type E or S, galvanized. The pipe shall be Schedule 40, except as otherwise specified in the Plans.

PVC pipe shall be any smooth wall, non-perforated, PVC pipe of the diameter and minimum wall thickness or Schedule specified in the Plans.

6-02.2.OPT60(C).BSP.GB6

(BSP January 2, 2012)

Steel bars, plates and shapes shall conform to ASTM A 36, except that structural shapes may conform to ASTM A 992.

Welded shear studs shall conform to Section 9-06.15.

Epoxy bonding agent, where shown in the Plans for bonding steel components to concrete, shall be Type II as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the bonding agent manufacturer and approved by the Engineer.

All steel components and assemblies for seismic restrainers, except as otherwise specified, shall be galvanized after fabrication in accordance with AASHTO M 111.

Bolts, nuts, and washers shall conform to Section 9-06.5(3), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Resin bonded anchors for seismic retrofit components and assemblies shall conform to Section 6-02.3(18) as supplemented in these Special Provisions, and the following requirements:

The resin bonded anchor system shall include the nut, washer, and threaded anchor rod which is installed into hardened concrete with a resin bonding material.

Resin bonding material used in overhead and horizontal application shall be specifically recommended by the manufacturer for those applications.

Resin bonding material used in submerged liquid environment shall be specifically recommended by the resin manufacturer for this application.

The resin bonded anchor system shall conform to the following requirements:

1. Threaded Anchor Rod and Nuts
   Threaded anchor rods shall be fully threaded, shall include the appropriate supplemental requirements for grade and manufacturer's identification, and charpy impact testing (15 foot-pounds minimum at 40F), and shall conform to either ASTM A 193 Grade B7, or ASTM F 1554 Grade 105. Results of the charpy impact testing for the production lot(s) including the anchor rods furnished for seismic retrofit components and assemblies shall be submitted to the Engineer with the manufacturer's certification of compliance in accordance with Section 6-02.3(18) as supplemented in these Special Provisions.

   Nuts shall conform to ASTM A 563, Grade DH.

   Washers shall conform to AASHTO M 293, and shall meet the same requirements as the supplied anchor rod except as otherwise noted.

   Nuts and threaded anchor rods shall be galvanized in accordance with AASHTO M 232. Galvanized threaded anchor rods shall be tested for embrittlement after galvanizing, in accordance with Section 9-29.6(5).

   Threaded anchor rods used with resin capsules shall have the tip of the rod chiseled in accordance with the resin capsule manufacturer's recommendations. Galvanized threaded rods shall have the tip chiseled prior to galvanizing.

2. Resin Bonding Material
   Resin bonding material shall be one of the following:

a. Vinyl ester resin.

b. Polyester resin.

c. Methacrylate resin.

d. A two component epoxy bonding agent conforming to ASTM C 881 Type IV.

3. Ultimate Anchor Tensile Capacity
Resin bonded anchors shall be tested in accordance with ASTM E 488 to have the following minimum ultimate tensile load capacity when installed in concrete having a maximum compressive strength of 6000 pounds per square inch (psi) at the embedment specified below:

Anchor Diameter (inch)	Tensile Capacity (lbs.)	Embedment (inch)
3/8	7,800	3-3/8
1/2	12,400	4-1/2
5/8	19,000	5-5/8
3/4	27,200	6-3/4
7/8	32,000	7-7/8
1	41,000	9
1-1/4	70,000	11-1/4

The Contractor shall submit item 1 and 2 below to the Engineer for all resin bonded anchor systems. If the resin bonded anchor system and anchor diameter are not listed in the current WSDOT Qualified Products List, the Contractor shall also submit item 3 below to the Engineer.

For resin bonded anchor systems that are installed in a submerged liquid environment the Contractor shall submit items 1, 2 and 4 below. If the resin bonded anchor system and anchor diameter are not listed in the current WSDOT Qualified Products List, the Contractor shall also submit item 3 below to the Engineer.

1. The resin manufacturer's written installation procedure for the anchors.

2. The manufacturer's certificate of compliance for the threaded anchor rod certifying that the anchor rod meets the requirements of this Special Provision.

3. Test results by an independent laboratory certifying that the threaded anchor rod system meets the ultimate anchor tensile load capacity specified above. The tests shall be performed in accordance with ASTM E 488.

4. For threaded anchors intended to be installed in submerged liquid environments the Contractor shall submit tests performed by an

independent laboratory within the past 24 months which certifies that anchors installed in a submerged liquid environment meet the strength requirements specified above.

6-02.2.OPT60(D).BSP.GB6

(BSP January 2, 2012)

High-strength steel rods for longitudinal seismic restrainer assemblies shall conform to ASTM F 1554 Grade 105, including Supplemental Requirements S2, S3, and S5. Nuts, and couplers if required, shall conform to ASTM A 563 Grade DH. Washers shall conform to AASHTO M 293.

High-strength steel rods and associated couplers, nuts and washers shall be galvanized after fabrication in accordance with AASHTO M 232.

6-02.2.OPT60(E).BSP.GB6

(BSP June 26, 2000)

Pre-formed fabric pads shall be composed of multiple layers of duck impregnated and bound with high quality oil resistant synthetic rubber compressed into resilient pads of uniform thickness. The duck shall be of highest quality cotton or cotton-polyester 50-50 blend, and shall weigh a minimum of eight ounces per square yard. The cotton warp and the filling yarn shall be 2-ply. The cotton-polyester warp and fill shall be single yarn, with a minimum breaking strength by grab method of 150 pounds per inch per width (piw) warp, and 140 piw fill. The filling count of the duck shall be 40 $\pm$ 2 threads per inch and the warp count shall be 50 $\pm$ 1 threads per inch. The number of piles shall be as required to produce the specified thickness, after compression and vulcanizing.

The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 psi without any sign of failure after the load is removed. Failure is defined as any breakdown of the component materials or laminations.

Pre-formed fabric pads shall have a shore A hardness of 90 $\pm$ 5.

Pre-formed fabric pads for seismic restrainers will be accepted based on the manufacturer's certificate of compliance that the material furnished conforms to these specifications. The Contractor shall submit the manufacturer's certificate of compliance in accordance with Section 1-06.3.

6-02.2.OPT60(F).BSP.GB6

(BSP April 16, 2012)

Column Jacketing Materials

All metal components shall conform to ASTM A 36, and shall be painted in accordance with Section 6-07.3(9), and Section 6-03.3(30) as supplemented in these Special Provisions. Metal surfaces in contact with grout shall be considered in contact with concrete for the purposes of Section 6-07.3(9).

Grout shall conform to the following requirements:

Cement shall conform to Section 9-01.2(1), Type I or II, and shall not contain lumps or other indications of hydration.

The grout shall be a pumpable mix capable of filling the annulus between the concrete column and steel column jacket assembly. The grout shall be free of lumps and undispersed cement, and there shall be no visible evidence of water or air being ejected from the grout vents while pumping the grout in place.

If the Contractor elects to extend the grout, aggregate and fly ash shall be used in accordance with the following requirements. Aggregate shall conform to either Section 9-03.1(2) Class 1 or Class 2, or Section 9-03.1(5) with a maximum aggregate size of 3/8 inch. Fly ash shall conform to Section 9-23.9. The fly ash content shall not exceed 35 percent of the total cementitious material content of the grout.

The grout mix water/cement ratio shall not exceed 0.40.

The grout shall attain a minimum 28 day compressive strength of 4,000 psi.

The Contractor shall submit the grout mix design to the Engineer for approval. The Contractor shall not begin any column jacketing work until receiving the Engineer's approval of the grout mix design.

Mortar shall conform to Section 9-11.3.

Epoxy bonding agent for filling grout voids shall be Type II, as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the bonding agent manufacturer and approved by the Engineer.

6-02.2.OPT61.BSP.GB6

(BSP April 5, 2010)

Precast Prestressed Concrete Stay-In-Place Panels

Concrete shall have an initial strength at strand release, and a 28 day minimum compressive strength, as specified in the Plans.

Prestressing reinforcement shall conform to Section 9-07.10, except that the diameter shall be as specified in the Plans.

Grout shall conform to Section 9-20.3(2).

Leveling bolts shall conform to Section 9-06.5(1), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Backer rod shall be closed cell expanded polyethylene foam.

6-02.2(9-19.1).GR6

Aggregates and Proportioning

The fifth paragraph of Section 9-19.1 is revised to read:

6-02.2(9-19.1).OPT1.BSP.FB6

(BSP August 4, 2003)

Prestressed Concrete Girders

The Contractor shall submit a Contractor-Provided mix design for each design strength of prestressed girder to the Engineer for approval in accordance with Section 6-02.3(2)A, including a Contractor-Provided mix design of high strength concrete for the prestressed girders of *** $$1$$ ***.

Approval of the mix design will not preclude any requirements for the concrete placed in the girders.

The Contractor-Provided mix design for high strength concrete shall conform to the following:

Bridge	Minimum Compressive Strength in psi at 56 days in accordance with AASHTO T 22
*** $$2$$ ***	*** $$3$$ ***

The Contractor may substitute testing for minimum compressive strength at 28 days, provided that the 28 day compressive strength is equal to or greater than 95 percent of the specified 56 day compressive strength.

The Contractor shall test a minimum of three specimens for each of the tests specified. The test specimens for the compressive strength tests shall be four inch by eight inch cylinders cast in molds supplied by the Contractor in accordance with Section 6-02.3(5)D. The Contractor shall include the results of all tests in the high strength concrete mix design submittal to the Engineer.

6-02.3.GR6

Construction Requirements

6-02.3.INST1.GR6

Section 6-02.3 is supplemented with the following:

6-02.3.OPT1.GB6

(August 1, 2011)

Epoxy Crack Sealing

The materials being used may be dermatetic. The Contractor's contact with and use of the materials shall conform to the requirements specified in the MSDS for each material, and all personnel shall be provided with appropriate clothing and protective garments.

All materials shall be stored and protected from ignition sources as recommended by the material manufacturer.

The cracks shall be cleaned of efflorescence, deteriorated concrete and other surface debris, by vacuuming, flushing, routing, sawing or other means as required.

Entry ports shall consist of tubes, tees or other valve devices as recommended by the resin manufacturer. The ports shall be placed at intervals along each crack in accordance with the manufacturer's written instructions for the resin being used. The holes for the entry ports shall be drilled with a hollow bit with an attached vacuum chuck to prevent concrete dust from becoming embedded in the crack.

The exposed crack surfaces and the areas around the entry ports shall be sealed with epoxy sealing paste and cured in accordance with the resin manufacturer's written instructions, to attain a seal capable of withstanding the applied injection pressures.

The Contractor shall furnish the services of a factory trained technical representative to perform the epoxy crack sealing injection.

Injection shall be accomplished with a pressure or injection machine compatible with the resin selected for use and shall begin at the lowest port and continue until there is evidence of the resin at the entry port directly above and adjacent to the port being pumped. When material travel is indicated, the nozzle shall be moved to the port that shows resin. The previously pumped port shall be sealed. Injection shall continue until the crack is completely filled. On wide cracks where resin travel between ports will be rapid, two or more ports may be pumped simultaneously. On exceptionally large cracks, a formulation (dependent upon crack width, ambient temperature, modulus requirements and other variables) of epoxy resin and fine sands shall be used as approved by the Engineer.

After all ports have been pumped and the crack is full, the epoxy resin shall be cured without disturbance in accordance with the resin manufacturer's written instructions as necessary to ensure development of the full bond capacity of the material.

After the epoxy has cured completely, the epoxy sealing paste and port stems shall be ground flush with the original surface of the concrete.

At the discretion of the Engineer, cores shall be taken after the repair is completed to confirm penetration and bonding. The number and locations of such cores will be as specified by the Engineer. These cores shall be submitted to the Engineer for testing in the WSDOT Materials Laboratory.

6-02.3.OPT2.GB6

Bridge Supported Utilities

6-02.3.OPT2(A).GB6

(June 26, 2000)

The Contractor shall furnish and install inserts for the bridge utility supports as shown in the Plans. The Contractor shall verify that the hanger rods freely hang plumb in their inserts, and shall make adjustments to the inserts as necessary and as approved by the Engineer prior to utility installation.

6-02.3.OPT2(B).GB6

(June 26, 2000)

The Contractor shall furnish and install the bridge utility supports, and the utility pipe or conduit pipe, as shown in the Plans.

6-02.3.OPT2(C).FB6

(June 26, 2000)

The Utility Company will furnish material for and install *** $$1$$ ***. The Contractor shall install *** $$2$$ *** furnished by the *** $$3$$ ***.

The Contractor shall notify the utility company a sufficient time in advance and shall cooperate with the utility company in order that the utility furnished items may be installed in the structure.

6-02.3.OPT3.GR6

(April 3, 2006)

Submittals

Prior to beginning any concrete work, the Contractor shall submit a plan, for the Engineer's review and approval, outlining the procedures to be used to prevent high pH stormwater or dewatering water from entering surface waters. The plan shall include how the pH of the water will be maintained between pH 6.5 and pH 8.5 prior to being discharged from the project or entering surface waters. The plan shall conform to the requirements of Section 8-01.

6-02.3.OPT8.BSP.GB6

Seismic Retrofit

6-02.3.OPT8(A).BSP.GB6

(BSP June 26, 2000)

Plans of Existing Bridge

Plans of the existing bridge(s) included in the seismic retrofit work are available at the Project Engineer's Office for the prospective bidder's inspection.

6-02.3.OPT8(B).BSP.GB6

(BSP June 26, 2000)

Seismic Retrofit Demolition Plan

The Contractor shall submit a demolition plan with working drawings to the Engineer for approval in accordance with Section 6-01.9 showing the method of removing the specified portions of the existing bridges required by the seismic retrofit work. The demolition plan shall show the sequence of demolition and removal, the type of equipment to be used in all demolition and removal operations, and details of the methods and equipment used for containment, collection, and disposal of all debris. The plan shall show all stages of demolition. The Contractor shall not begin removal operations until receiving the Engineer's approval of the demolition plan.

6-02.3.OPT8(C).BSP.GB6

(BSP June 11, 2003)

Column Jacket Installation Plan

The Contractor shall submit a column jacket installation plan with working drawings to the Engineer for approval in accordance with Section 6-01.9. The submittal shall include, but not be limited to, the following:

1. Step by step installation procedure.

2. The methods of cleaning and preparing the existing column surfaces prior to installing the column jacket assembly.

3. The methods of containing, collecting, and disposing of the debris generated by cleaning and preparing the existing column surfaces.

4. The methods of containing, collecting, and disposing of all excess grout generated during the grouting process.

5. The locations of grout injection valves, and the methods and materials used to remove them following use, and to fill the void following removal.

6. The method of sealing the gap between the existing column surface and the column jacket assembly prior to grouting.

7. The method and materials used to clamp and brace the column jacket assembly in place during field assembly and grouting.

8. The grout mix, with material sources, and test data from an independent testing laboratory that the proposed mix meets the specified requirements of Section 6-02.2 as supplemented in these Special Provisions.

9. The equipment used to pump the grout and monitor the grout pressure and the quantity of grout injected.

10. The method, materials, and equipment used to fill grout voids within the column jacket assembly, and to finish the exposed surface flush after repair.

11. The method, materials, and equipment used to field repair all damaged primer coatings, and to field apply the intermediate and finish coats of paint.

The Contractor shall not begin column jacket operations, except for field measuring, until receiving the Engineer's approval of the column jacket installation plan.

6-02.3.OPT8(D).BSP.GB6

(BSP June 26, 2000)

Column Jacket Shop Drawings

The Contractor shall submit column jacket shop drawings to the Engineer for approval in accordance with Section 6-03.3(7). The shop drawings shall include, but not be limited to, the following:

1. Plan, elevation, and sections of the jacket system and all components, with all dimensions and tolerances.

2. Field measurements of the existing column(s) as specified.

3. All material designations.

4. Location of horizontal and vertical splices.

5. Location of spacers and method of attachment.

6. Welds and welding procedures.

The Contractor shall not begin fabricating the column jacket components until receiving the Engineer's approval of the column jacket shop drawings.

6-02.3.OPT8(E).BSP.GB6

(BSP September 26, 2005)

Field Measuring Existing Bridge Columns

The Contractor shall field measure the dimensions (diameter, or width and thickness, as appropriate for column shape) of the existing bridge columns receiving column jackets as a first order of work prior to preparing column jacket assembly shop drawings. The following locations shall be field measured as a minimum for each column:

1. Top of footing or footing pedestal.

2. Bottom of crossbeam.

3. Mid-height of column.

The Contractor shall field measure the column height from top of footing or footing pedestal to bottom of crossbeam for each column.

The Contractor shall tabulate these field measured dimensions and submit them to the Engineer along with the column jacket assembly shop drawings.

Where site conditions, such as traffic control requirements or deeply buried foundations, create difficulties for field measuring buried portions of the bridge columns, the Contractor may request a waiver of the pre-fabrication field measuring requirements for specific columns. If the Engineer approves the Contractor's request for a waiver of the pre-fabrication field measuring requirement for specific columns, the Contractor shall:

1. Field measure the diameter, or width and thickness, as appropriate for the column shape, of the above ground portion of the column receiving the waiver, and include the field measurements in the column jacket assembly shop drawings.

2. Fabricate the column jacket to a length exceeding the column height (2'-0" or ten percent of the estimated column height, whichever is greater) based on the original plans and other available site data. The shop drawing details shall specify the column jacket fabrication length, and the assumed column height based on the available information.

3. Submit the method, template, and equipment used to field cut the top of the column jacket assembly at installation.

The Contractor shall submit the request for a waiver of the pre-fabrication field measuring requirement prior to preparing column jacket assembly shop drawings, and shall not submit shop drawings until completing all field measurements still required, and receiving the Engineer's approval of the waiver request.

6-02.3.OPT8(F).BSP.FB6

(BSP June 11, 2003)

The column(s) at the Bridge and Pier location(s) specified below has (have) received a waiver of the pre-fabrication field measuring requirement, and no separate waiver request from the Contractor is required for this (these) specific column(s):

*** $$1$$ ***

However, the Contractor shall conform to all other requirements specified above for columns receiving a waiver of the pre-fabrication field measuring requirement, including field measuring the above ground portion of the column, and submitting the method, template, and equipment used to field cut the column jacket assembly at the site to the Engineer for approval.

6-02.3.OPT8(G).BSP.FB6

(BSP June 26, 2000)

Field Measuring for Seismic Retrofit Components

The Contractor shall field measure dimensions of existing items and members of Bridge No(s). *** $$1$$ *** as a first order of work prior to preparing shop drawings for fabricated steel components and assemblies.

The Contractor shall field measure dimensions of the following items:

*** $$2$$ ***

The Contractor shall tabulate these field measured dimensions and submit them to the Engineer along with the shop drawing submittals for the corresponding steel components and assemblies.

6-02.3.OPT8(H).BSP.GB6

(BSP August 3, 2009)

Removing Portions of Existing Concrete

The Contractor shall remove portions of existing concrete required by the seismic retrofit work as shown in the Plans.

Before removing the portions of the existing concrete adjacent to that which is to remain, a 3/4-inch deep saw cut, but no deeper than the existing concrete cover over the steel reinforcing bars, shall be made into the surface of the concrete to form a break line. Care shall be taken to prevent cutting the existing reinforcing steel bars which are to remain.

Care shall be taken in removing concrete to prevent overbreakage or damage to portions of the existing structure which are to remain. Concrete shall be carefully broken away from the steel reinforcing bars which extend from the existing structure. Steel reinforcing bars which extend from the existing members shall be

cleaned (defined as exposing the deformed surface of the bar) and spliced with the steel reinforcing bars in the new members unless shown otherwise in the Plans. The Contractor shall protect traffic from falling concrete and debris, in accordance with the debris collection and containment provisions of the demolition plan as approved by the Engineer. The Contractor shall dispose of all materials removed by the demolition operations in accordance with Section 2-02.3.

The Contractor shall roughen, clean, and saturate the existing concrete surfaces bonding to the fresh concrete in accordance with Section 6-02.3(12).

6-02.3.OPT8(I).BSP.GB6

(BSP January 4, 2010)

When a portion of existing concrete is to be removed without replacement, care shall be taken to remove to a clean line with a smooth surface of less than 1/16 inch profile obtained by methods of the Contractor's choice with the approval of the Engineer. Steel reinforcing bars shall be cut a minimum of one inch behind the final surface. The void left by the removal of the steel reinforcing bar shall be coated with epoxy bonding agent and filled with mortar conforming to Section 9-20.3(1). The epoxy bonding agent shall be Type II conforming to Section 9-26.1 with the grade and class as recommended by the epoxy bonding agent manufacturer and as approved by the Engineer. The mortar shall consist of cement and fine aggregate mixed in the proportions to match the color of the existing concrete surface as nearly as practicable.

6-02.3.OPT8(J).BSP.GB6

(BSP June 26, 2000)

Drilling Holes and Setting Steel Reinforcing Bars, and Placing Concrete

The Contractor shall drill holes for, and set, steel reinforcing bars into the existing concrete as shown in the Plans in accordance with Section 6-02.3(24)C as supplemented in these Special Provisions.

The Contractor shall form, cast, and cure, the concrete portions of the seismic retrofit work in accordance with Section 6-02.3 and as shown in the Plans.

6-02.3.OPT8(K).BSP.GB6

(BSP June 11, 2003)

Installing and Tensioning High-Strength Steel Bar Reinforcement

The Contractor shall furnish and install high-strength steel bars as shown in the Plans. The hole through existing concrete shall be core drilled and the hole through new concrete shall be formed with a PVC pipe as shown in the Plans. The concrete surface in contact with the high-strength steel bar bearing plate shall be coated with epoxy bonding agent just prior to stressing the high-strength steel bar. After stressing, the high-strength steel bar shall be grouted in accordance with Section 6-02.3(26)H.

6-02.3.OPT8(L).BSP.GB6

(BSP June 11, 2003)

Longitudinal Seismic Restrainers

The Contractor shall submit shop drawings of the steel components of the longitudinal seismic restrainer assemblies to the Engineer for approval in accordance with Section 6-03.3(7).

The Contractor shall core drill holes through the pier diaphragm for the high-strength steel bar as shown in the Plans. The Contractor shall set the PVC pipe in place with epoxy bonding agent as shown in the Plans.

Holes for the resin bonded anchors for the longitudinal seismic restrainer anchorages shall be located and drilled in accordance with Section 6-02.3(18) as supplemented in these Special Provisions, and as follows:

1. The bottom layer of steel reinforcing bars in the slab in the vicinity of the longitudinal seismic restrainer anchorage as shown in the Plans shall be located and marked on the concrete surface.

2. Using the anchorage assembly as a template, the Contractor shall align and slightly shift the anchorage assembly as required so that the holes avoid the existing steel reinforcing bars as much as possible.

3. The Contractor shall drill holes for the resin bonded anchors with the anchorage assembly in position as a template.

4. If, after shifting the anchorage assembly, conflicts still exist between hole locations and existing steel reinforcing bars, the Contractor may, with the Engineer's approval, core drill holes at the conflict locations.

Just prior to final installation of the longitudinal seismic restrainer anchorage assembly, the surface of the concrete in contact with the anchorage assembly shall be coated with epoxy bonding agent.

All longitudinal seismic restrainers at a pier shall be installed so that the free end (the end with the gap as shown in the Plans) shall be on the same side of the pier.

6-02.3.OPT8(M).BSP.GB6

(BSP March 12, 2012)

Column Jacketing

The steel column jacket assembly for each column shown in the Plans shall be fabricated in accordance with the shop drawings as approved by the Engineer.

The Contractor shall excavate and shore as required to expose the column surface below ground to the top of the existing footing or footing pedestal. The surface of the existing column shall be cleaned (defined as removal of surface attachments, dirt, and debris) and prepared in accordance with the column jacket installation plan as approved by the Engineer.

For specific columns for which the Engineer approves a waiver of the pre-fabrication field measuring of the column height dimension, the Contractor shall field measure the column height upon completion of the excavation. The Contractor shall field cut the top of the column jacket assembly using the method, template, and equipment as specified in the pre-fabrication field measuring waiver request submittal as approved by the Engineer. The fabrication, removal, and disposal of the excess column jacket length shall be performed at no additional expense to the Contracting Agency.

The Contractor shall position the steel column jacket around the existing column using spacers to center the assembly. The spacers may be welded to the inside of the jacket and, if used, shall be placed and attached as shown in the shop drawings as approved by the Engineer.

If the Contractor elects to fabricate the column jacket assemblies using the optional horizontal weld joints (performed either as shop welds or field welds), holes shall be drilled at all intersections of vertical weld joints with the horizontal weld joints.

Field welded complete penetration groove welds of the column jacket assemblies shall be inspected in accordance with Section 6-03.3(25)A as supplemented in these Special Provisions.

The Contractor shall install external grout injection valves for use in filling the cavity with grout, installing at least the minimum number of valves as shown in the Plans. The valves shall be spaced such that the grout will uniformly fill the gap between the jacket assembly and the column surface. The grout pump shall be equipped with a pressure gauge to monitor grout pressures. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer shall be capable of continuously agitating the grout.

The production grout compressive strength shall be measured using four inch diameter by eight inch cylinders, cast and cured in accordance with Section 6-02.3(5)H. The cylinders shall attain a 28 day minimum compressive strength of 4,000 psi.

The gap between the column jacket assembly and the existing column surface at the base of the assembly shall be completely sealed in accordance with the column jacket installation plan as approved by the Engineer.

The grouting operation shall begin from the base of the assembly and from the base of each successive lift. The Contractor shall pump grout into the assembly while maintaining a uniform level grout head around the column.

The Contractor shall limit the height of each lift of grout to minimize undulations and displacements of the surface of the column jacket assembly during grouting. For column jacket assemblies of circular (constant radius) cross section, the height of each lift of grout shall be limited to 20 feet maximum, except as otherwise approved by the Engineer. For column jacket assemblies with cross sections of all other shapes, the height of each lift of grout shall be limited to 8 feet maximum.

The Contractor may restrain the column jacket assembly within the specified tolerances during grouting operations by using a bracing system in accordance with the column jacket installation plan as approved by the Engineer. Except as otherwise shown in the Plans, restraints for the bracing system shall not pass through the column. Except when a bracing system is used, placement of the next grout lift shall not begin until the previous grout lift has hardened.

The Contractor shall contain and collect all grout outside the column jacket assembly, in accordance with the column jacket installation plan as approved by

the Engineer, and shall not permit grout to flow onto the shoulder, gutter, or lane, or into drainage structures.

When the assembly is completely grouted to the top, the Contractor shall place mortar conforming to Section 9-20.4(2) over the top of the grout at the top of the assembly, and shall slope the mortar to drain.

All clamps, valves, injection ports, lifting ears, and other attachments shall be removed not less than 24 hours after completing grouting operations at the column. The Contractor shall fill all voids with mortar conforming to Section 9-20.4(2), and shall finish them flush with the exterior surface of the column jacket assembly. The Contractor shall not remove the attachments by flame cutting.

Seven calendar days after completing the grouting of a column jacket assembly, the Engineer will inspect the assembly for voids between the steel casing and the grout. The Contractor shall completely fill all voids detected by the Engineer by injecting epoxy bonding agent into the lowest point of each void and venting at the highest point. The exposed epoxy bonding agent shall be finished flush with the exterior surface of the column jacket assembly.

Steel surfaces with damaged primer coat shall be repaired with field primer in accordance with Section 6-07.3(9). The primer repair shall be followed by application of the intermediate and finish field coats of paint to all exposed steel surfaces in accordance with Section 6-07.3(9) and Section 6-03.3(30) as supplemented in these Special Provisions.

The Contractor shall fill the excavation in accordance with Section 2-09.3(1)E and the following requirements:

1. For backfill supporting roadbed, roadway embankments, or structures, the backfill shall be gravel borrow conforming to Section 9-03.14(1).

2. For backfill in all other situations, the backfill shall be native backfill material, or other backfill material approved by the Engineer, compacted in accordance with Section 2-03.3(14)C, except that the backfill shall be compacted to 80 percent of the maximum density as specified.

6-02.3.OPT9.BSP.GB6

(BSP May 2, 2005)

Polyester Concrete

Mix Design

Polyester concrete shall be composed of the following three components – polyester resin binder, high molecular weight methacrylate (HMWM) resin, and aggregate, in accordance with Section 6-02.2 as supplemented in these Special Provisions.

The Contractor shall prepare and submit the polyester concrete design mix and mixing procedure, including samples of all components for each lot, to the WSDOT Materials Laboratory for testing. The mix design shall include a recommended initiator percentage for the expected application temperature. The Contractor shall

not begin ordering materials for application of the polyester concrete until receiving the Engineer's approval of the polyester concrete design mix and mixing procedure.

Delivery and Storage of Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, and quantity. Each shipment of polyester resin binder and HMWM resin shall be accompanied by a Materials Safety Data Sheet (MSDS).

The material shall be stored to prevent damage by the elements and to ensure the preservation of their quality and fitness for the work. The storage space shall be kept clean and dry, and shall contain a high-low thermometer. The temperatures of the storage space shall not fall below nor rise above that recommended by the manufacturer. Every precaution shall be taken to avoid contact with flame.

Stored materials shall be inspected prior to their use, and shall meet the requirements of these Special Provisions at the time of use.

Any material which is rejected because of failure to meet the required tests or that has been damaged so as to cause rejections shall be immediately replaced at no additional expense to the Contracting Agency.

Sufficient material to perform the entire polyester concrete application shall be in storage at the site prior to any field preparation, so that there shall be no delay in procuring the materials for each day's application.

Material Health and Safety Training and Precautions

The Contractor shall arrange to have the material supplier furnish technical service relating to application of material and health and safety training for personnel who are to handle the polyester concrete and the HMWM resin prime coat.

Appropriate impermeable protective garments shall be used by all workers who may contact the resin or initiators to prevent skin contact. If skin contact occurs, the resin or initiators shall be immediately washed off. Clothing that becomes saturated with resin shall be removed immediately.

Equipment and Containment

All equipment for cleaning the concrete and steel surfaces, and mixing and applying the polyester concrete, shall be submitted to the Engineer for approval.

The HMWM resin, and abrasive blasting materials, shall be contained and restricted to the surface receiving the polyester concrete only, and shall not escape to the surrounding environment. The Contractor shall submit the method and materials used to collect and contain the HMWM resin, and abrasive blasting materials, to the Engineer for approval.

The Contractor shall not begin polyester concrete work, including surface preparation, until receiving the Engineer's approval of the equipment, and the collection and containment system.

Surface Preparation

Using the equipment, material, technique, and procedures established for surface preparation, the concrete and steel surfaces shall be prepared by removing all material which may act as a bond breaker between the surface and the polyester concrete. Surface cleaning shall be by abrasive blasting.

Precautions shall be taken to ensure that no dust or debris leaves the roadway deck and that all traffic is protected from rebound and dust. Appropriate shielding shall be provided as required at no additional expense to the Contracting Agency and shall be as approved by the Engineer.

If the concrete or steel surfaces become contaminated, the contaminated areas shall be recleaned by abrasive blasting at no additional expense to the Contracting Agency.

Application of Prime Coat

Application of the HMWM prime coat and the polyester concrete shall not begin if rain is expected. The area receiving the prime coat shall be dry and had no rain within the past 12 hours. Immediately prior to applying the prime coat, the surfaces shall be swept clean by compressed air to remove accumulated dust and any other loose material.

The concrete bridge deck surface shall be between 50F and 85F when applying the prime coat.

The Contractor shall apply one coat of promoted/initiated wax-free HMWM resin to the prepared concrete and steel surfaces immediately before placing the polymer concrete. The promoted/initiated resin shall be worked into the concrete in a manner to assure complete coverage of the area receiving polyester concrete. A one pint sample of each batch of promoted/initiated HMWM resin shall be retained and submitted to the Engineer at the time of primer application to verify proper catalyzation.

The prime coat shall cure for 30 minutes minimum before beginning placement of the polyester concrete. Placement of the polymer concrete shall not proceed until the Engineer verifies that the HMWM resin was properly promoted and initiated, as evidenced by the HMWM batch sample.

If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed at no additional expense to the Contracting Agency.

Under no circumstances shall any resin run into drains or expansion joints, or otherwise escape the Contractor's collection and containment system.

Mixing Equipment for Polyester Concrete

Polyester concrete shall be mixed in mechanically operated mixers in accordance with the mix design as approved by the Engineer. The mixer size shall be limited to a nine cubic yard maximum capacity, unless otherwise approved by the Engineer.

The aggregate and resin volumes shall be recorded for each batch along with the date of each recording. A printout of the recordings shall be furnished to the Engineer at the end of each work shift.

The Contractor shall prevent any cleaning chemicals from reaching the polyester mix during the mixing operations.

Mixing Components

The polyester resin binder in the polyester modified concrete shall be approximately 12 percent by weight of the dry aggregate. The Contractor shall determine the exact percentage as approved by the Engineer.

The amount of peroxide initiator used shall result in a polyester concrete set time between 30 and 120 minutes during placement as determined by California Test 551, Part 2, “Method of Test For Determination of Set Time of Concrete Overlay and Patching Materials”, by Gilmore Needles. Accelerators or inhibitors may be required as recommended by the polyester resin binder supplier and as approved by the Engineer.

The polyester resin binder shall be initiated and thoroughly blended just prior to mixing the aggregate and binder. The polyester concrete shall be thoroughly mixed prior to placing.

Polyester Concrete Placement

The polyester concrete shall be placed on the liquid or hardened prime coat within two hours of placing the prime coat.

Polyester concrete shall be placed prior to gelling and within 15 minutes following initiation, whichever occurs first. Polyester concrete that is not placed within this time shall be discarded.

The surface temperature of the area receiving the polyester concrete shall be the same as specified above for the HMWM prime coat.

Under no circumstances shall any polyester mixture run into drains or expansion joints, or otherwise escape the Contractor’s collection and containment system.

The polyester concrete shall be consolidated to a relative compaction of not less than 97 percent.

Finished Polyester Concrete Surface

The finished surface of the polyester concrete shall conform to the requirements of Section 6-02.3(10).

The polyester concrete shall be consolidated by means approved by the Engineer. Finishing equipment used shall strike off the polyester concrete to the established grade and cross section. Forms shall be coated with suitable bond release agent to permit ready release of forms.

The polyester concrete shall receive an abrasive sand finish. The sand finish shall be applied by hand immediately after strike-off and before gelling occurs. Sand

shall be broadcast onto the surface to affect a uniform coverage of a minimum of 0.8 pounds per square yard.

The surface texture of polyester concrete surface shall be uniform. The polyester concrete shall be impervious to moisture.

Curing

Traffic and equipment shall not be permitted on the polyester concrete until it has achieved a minimum compressive strength of 2,500 psi as determined by the rebound number per ASTM C 805.

Areas of the polyester concrete that do not totally cure or that fail to attain the specified minimum compressive strength in six hours shall be removed and replaced by the Contractor at no additional expense to the Contracting Agency.

6-02.3.OPT10.BSP.GB6

(BSP January 29, 2007)

Elastomeric Concrete

Elastomeric concrete shall be composed of the following three components – two-component polyurethane resin binder, and aggregate, in accordance with Section 6-02.2 as supplemented in these Special Provisions.

Delivery and Storage of Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, and quantity. Each shipment of polyurethane resin binder shall be accompanied by a Materials Safety Data Sheet (MSDS).

The materials shall be stored in accordance with Section 1-06.4. The storage space shall be kept clean and dry, and shall be equipped with a high-low thermometer. The temperature and relative humidity of the storage space shall not fall below nor rise above that recommended by the manufacturer.

Stored materials shall be inspected prior to their use, and shall meet the requirements of these Special Provisions at the time of use. Materials rejected because of failure to meet the required tests or that have been damaged so as to cause rejection shall be immediately replaced at no additional expense to the Contracting Agency.

Sufficient material to perform the entire elastomeric concrete application shall be in storage at the site prior to any field preparation, so that there shall be no delay in procuring the materials for each day's application.

Material Health and Safety Training and Precautions

The Contractor shall arrange to have the material supplier furnish technical service relating to application of material and health and safety training for personnel who are to handle the elastomeric concrete.

Appropriate impermeable protective garments shall be used by all workers who may contact the resin or initiators to prevent skin contact. If skin contact occurs,

the resin or initiators shall be immediately washed off. Clothing that becomes saturated with resin shall be removed immediately.

Equipment and Containment

All equipment for cleaning the concrete and steel surfaces, and mixing and applying the elastomeric concrete, shall be submitted to the Engineer for approval.

The abrasive blasting materials, shall be contained and restricted to the surface receiving the elastomeric concrete only, and shall not escape to the surrounding environment. The Contractor shall submit the method and materials used to collect and contain the abrasive blasting materials, to the Engineer for approval.

The Contractor shall not begin elastomeric concrete work, including surface preparation, until receiving the Engineer's approval of the equipment, and the collection and containment system.

On-Site Presence of Manufacturer's Technical Representative

The Contractor shall have the services of a qualified elastomeric concrete manufacturer's technical representative physically present at the job site to assist in assuring the proper preparation and application of the elastomeric concrete, provide technical assistance for the use of the elastomeric concrete, train the Contractor's personnel preparing and applying the elastomeric concrete, and to observe and inspect at least the first installation.

The Contractor may substitute one or more Contractor employees in place of the qualified elastomeric concrete manufacturer's technical representative to perform the duties specified above, provided that the following requirements are satisfied:

1. Each of the Contractor's employees substituting for the qualified elastomeric concrete manufacturer's technical representative shall have received training from the elastomeric concrete manufacturer in the proper use and application of the elastomeric concrete.

2. The Contractor has submitted to the Engineer a training certificate letter from the elastomeric concrete manufacturer, signed by the elastomeric concrete manufacturer employee who performed the training, with the names of the Contractor's employees trained, and the date of the training.

Surface Preparation

Using the equipment, material, technique, and procedures established for surface preparation, the concrete and steel surfaces shall be prepared by removing all material which may act as a bond breaker between the surface and the elastomeric concrete, including the removal of all loose, deteriorated, or otherwise unsound concrete. Steel surfaces shall be cleaned and prepared to an SSPC SP-10 surface condition. Surface cleaning shall be by abrasive blasting.

Precautions shall be taken to ensure that no dust or debris leaves the roadway deck and that all traffic is protected from rebound and dust. Appropriate shielding shall be provided as required at no additional expense to the Contracting Agency and shall be in accordance with the collection and containment system submittal as approved by the Engineer.

If the concrete or steel surfaces become contaminated, the contaminated areas shall be recleaned by abrasive blasting at no additional expense to the Contracting Agency.

Freshly placed concrete shall be cured for a minimum of 14 calendar days before application of primer and elastomeric concrete.

Application of Prime Coat

Application of the prime coat and the elastomeric concrete shall not begin if rain is expected. The area receiving the prime coat shall be dry and had no rain within the past 12 hours. Immediately prior to applying the prime coat, the surfaces shall be swept clean by compressed air to remove accumulated dust and any other loose material.

The concrete bridge deck surface shall be between 50F and 85F when applying the prime coat.

The Contractor shall apply primer in accordance with the elastomeric concrete manufacturer's recommendations, and shall limit the extent of primer application to that surface area that can be covered immediately by a layer of elastomeric concrete.

If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed at no additional expense to the Contracting Agency.

Under no circumstances shall any resin run into drains or expansion joints, or otherwise escape the Contractor’s collection and containment system.

Mixing Equipment for Elastomeric Concrete

Elastomeric concrete shall be mixed in mechanically operated mixers in accordance with the mix design as approved by the Engineer. The mixer size shall be as recommended by the elastomeric concrete manufacturer.

Mixing Components

The Contractor shall mix the elastomeric concrete components and the resultant mixture in accordance with the procedure recommended by the elastomeric concrete manufacturer.

Elastomeric Concrete Placement

The elastomeric concrete shall be placed on the liquid prime coat immediately after placing the prime coat. Elastomeric concrete shall be placed in layers not to exceed the maximum depth recommended by the elastomeric concrete manufacturer. At locations deep enough to require placement of multiple layers of elastomeric concrete, each layer shall be fully cured before placement of the next layer. Also, the top of the previous layer shall be roughened as recommended by the elastomeric concrete manufacturer to ensure adhesion between the layers.

Elastomeric concrete shall be placed prior to gelling and within five minutes following initiation, whichever occurs first. Elastomeric concrete that is not placed within this time shall be discarded.

The surface temperature of the area receiving the elastomeric concrete shall be the same as specified above for the prime coat.

Under no circumstances shall any elastomeric concrete mixture run into drains or expansion joints, or otherwise escape the Contractor's collection and containment system.

Finished Elastomeric Concrete Surface
The finished surface of the elastomeric concrete shall conform to the requirements of Section 6-02.3(10).

Finishing tools or equipment used shall strike off the elastomeric concrete to the established grade and cross section. Forms shall be coated with suitable bond release agent to permit ready release of forms.

The finished surface of elastomeric concrete shall receive an abrasive sand finish. The sand finish shall be applied by hand immediately after strike-off and before gelling occurs. Sand shall be broadcast onto the surface to affect a uniform coverage of a minimum of 0.8 pounds per square yard.

The surface texture of elastomeric concrete surface shall be uniform. The elastomeric concrete shall be impervious to moisture.

Curing
Traffic and equipment shall not be permitted on the elastomeric concrete until it has achieved a minimum compressive strength of 2,500 psi as determined by the rebound number per ASTM C 805.

Areas of the elastomeric concrete that do not totally cure or that fail to attain the specified minimum compressive strength in six hours shall be removed and replaced by the Contractor at no additional expense to the Contracting Agency.

6-02.3(2).GR6
Proportioning Materials

6-02.3(2).INST1.GR6
Section 6-02.3(2) is supplemented with the following:

6-02.3(2).OPT1.BSP.GB6
(BSP January 4, 2010)
Expansion Joint Header Concrete
Expansion joint header concrete shall have a minimum compressive strength of 2,500 psi at 12 hours, and 4,000 psi at 28 days, except that, when staging and traffic control requirements for the project allow, the 12 hour time period may be waived provided that the concrete reaches a minimum compressive strength of 2,500 psi prior to the Contractor allowing traffic to pass across the expansion joint.

The maximum water-cement ratio shall be 0.40. The minimum fly ash content shall be ten percent of the total cementitious materials.

Type III cement conforming to Section 9-01.2(1) may be used.

The nominal maximum size aggregate for expansion joint header concrete shall be 3/4 inch.

Section 6-02.3(3) notwithstanding, non-chloride accelerating admixtures conforming to Section 9-23.6 and the following specifications may be used:

Admixture	**Specifications**	
Accelerating	AASHTO M 194 Type C	ASTM C 494 Type C
Water Reducing/ Accelerating	AASHTO M 194 Type E	ASTM C 494 Type E

6-02.3(2)A.GR6

Contractor Mix Design

6-02.3(2)A.INST1.GR6

Section 6-02.3(2)A is supplemented with the following:

6-02.3(2)A.OPT1.BSP.GB6

(BSP April 16, 2012)

All Class 4000D concrete used for bridge decks in this project shall be a project specific performance mix design conforming to the following requirements:

The specified compressive strength of all bridge deck concrete is 4,000 psi.

The minimum cementitious material content per cubic yard specified in this Section will not apply to this mix.

Aggregate shall use combined gradation in accordance with Section 9-03.1(5) with a nominal maximum aggregate size of 1-1/2 inches.

Permeability shall be less than 2,000 coulombs at 56 days in accordance with AASHTO T 277.

Freeze-thaw durability shall be provided by one of the following methods:

1. The concrete shall maintain an air content between 4.5 and 7.5 percent.

2. The concrete shall maintain a minimum air content that achieves a durability factor of 90 percent, minimum, after 300 cycles in accordance with AASHTO T 161, Procedure A. This air content shall not be less than 3.0 percent. Pre-qualification test samples

shall be obtained from concrete batches of a minimum of 3.0 cubic yards.

Scaling shall have a visual rating less than or equal to 1 in accordance with ASTM C 672.

Shrinkage at 28 days shall be less than 320 micro-strain in accordance with AASHTO T 160.

Modulus of elasticity shall be measured in accordance with ASTM C 469.

Density shall be measured in accordance with ASTM C 138.

The Contractor shall submit the project specific mix design on WSDOT Form 350-040, including the information specified in this Section and test results supporting the above requirements. Samples for testing may be obtained from either laboratory or concrete plant batches. If concrete plant batches are used, the minimum batch size shall be 3.0 cubic yards. The Contractor shall submit the project specific mix design to the Engineer at least 30 calendar days prior to the first scheduled placement of the bridge deck concrete.

6-02.3(4).GR6

Ready-Mix Concrete

6-02.3(4)D.GR6

Temperature and Time For Placement

6-02.3(4)D.INST1.GR6

Section 6-02.3(4)D is supplemented with the following:

6-02.3(4)D.OPT1.BSP.GB6

(BSP August 8, 2011)

The concrete temperature of the bridge deck concrete shall remain between 55F and 75F while the concrete is being placed.

6-02.3(5).GR6

Acceptance of Concrete

6-02.3(5)A.GR6

General

6-02.3(5)A.INST1.GR6

Section 6-02.3(5)A is supplemented with the following:

6-02.3(5)A.OPT1.GB6

(June 26, 2000)

Concrete Class EA

Concrete Class EA made in accordance with the Contracting Agency-provided mix will be accepted based on conformance to the requirements specified in Section 6-02.2, as supplemented in these Special Provisions, for proportioning, temperature, and 28 day compressive strength.

6-02.3(6).GR6

Placing Concrete

6-02.3(6)B.GR6

Placing Concrete in Foundation Seals

6-02.3(6)B.INST1.GR6

Section 6-02.3(6)B is supplemented with the following:

6-02.3(6)B.OPT1.GB6

(June 26, 2000)

If, in the opinion of the Engineer, water conditions at the time of construction do not require seals for footing construction, the Engineer may specify that the seals be omitted. In such a case the Contractor shall lower and construct the footing, as shown in the Plans, at the elevation shown in the Plans for the bottom of seal. The height of the pier shaft or columns shall be adjusted accordingly.

No adjustment will be allowed in the unit contract prices for concrete, steel reinforcing bar, and excavation by reason of any increase or decrease in quantities involved due to the deletion of seals.

6-02.3(6)B.OPT2.GB6

(June 26, 2000)

If, in the opinion of the Engineer, water conditions at the time of construction do not require seals for construction, the Engineer may specify that the seals be omitted. In such a case, the Contractor shall excavate only to the bottom of footing elevation and shall construct the footing as shown in the Plans.

No adjustment will be allowed in the unit contract prices for concrete, steel reinforcing bar, and excavation by reason of any increase or decrease in quantities involved due to the deletion of seals.

6-02.3(10).GR6

Bridge Decks and Bridge Approach Slabs

6-02.3(10)D.GR6

Concrete Placement, Finishing, and Texturing

6-02.3(10)D.INST1.GR6

Section 6-02.3(10)D is supplemented with the following:

6-02.3(10)D.OPT1.GB6

(August 4, 2008)

Repairing Slab Left Exposed After Removing Existing Curb or Sidewalk

The concrete exposed by the removal of the existing curb or sidewalk shall be removed to a depth of 1-inch below finished grade or to the top of the existing roadway deck steel reinforcing bars, whichever is less. The Contractor shall not remove concrete below the top of the existing steel reinforcing bars. The

Contractor shall not damage the bond between the existing steel reinforcing bars and the concrete.

After roughening, cleaning and wetting the surface in accordance with Section 6-02.3(12), the Contractor shall place concrete over the surface to the finish grade of the adjacent concrete roadway deck using a modified Class 4000 concrete mix. The maximum aggregate size in the modified Class 4000 concrete mix shall be 3/8 inch. The finished portion of the deck shall have the same texture, slope and grade as that of the existing deck.

6-02.3(10)D.OPT2.GB6

(August 4, 2008

Repairing Slab Left Exposed After Removing Existing Curb and Railbase

After roughening and cleaning the concrete exposed by the removal of the existing curb and railbase, that portion of the exposed surface not covered by the new traffic barrier shall be coated with epoxy mortar and finished to have the same texture, slope and grade as that of the existing deck.

6-02.3(10)D.OPT3.GB6

(August 3, 2009)

Bridge Drain Risers

The Contractor shall submit the method of removing the bridge drain grate nipple extrusion, the method of grinding the existing curb as necessary for bridge drain riser installation, and the method of cleaning the existing drain casting surfaces in contact with the drain risers, to the Engineer for approval. The shop drawings and weld procedures for the drain riser assemblies shall be submitted to the Engineer in accordance with Sections 6-03.3(7) and 6-03.3(25).

The existing bridge drain grate bolt, debris from removing the nipple extrusion and cleaning the drain casting contact surfaces, and all debris in the bridge drain cavity, shall be disposed of in accordance with Section 2-02.3.

After cleaning the bridge drain casting contact surfaces, the Contractor shall install the spacer bars and riser bars of the bridge drain riser assembly as shown in the Plans.

All exposed surfaces of the spacer bars and riser bars following installation shall be painted with two coats of paint conforming to Section 9-08.1(2)F. Each coat shall have a minimum dry film thickness of two mils.

6-02.3(10)D.OPT3(A).GB6

(August 4, 2008)

A minimum of four slotted holes, each 2 inches long and 3/4 inches high, shall be provided on each bridge drain riser. The slotted holes shall be located at the bottom of the riser, two on the traffic side of the assembly and one each on the short ends of the assembly. Risers shall be installed to be flush with the proposed roadway profile and shall maintain uniform contact with the existing drain. This portion of work shall be completed prior to the installation of the membrane waterproofing.

The membrane waterproofing shall extend to the bottom of and all around the bridge drain riser, except that the Contractor shall ensure that the slotted holes of the bridge drain riser assembly remain open and unplugged by the membrane waterproofing. Water seeping under the overlay shall be allowed to drain through the slotted holes and into the bridge drains.

After all the items of work on this project have been completed, the Contractor shall clean and flush all the bridge drains.

6-02.3(10)D.OPT5.GB6

(January 4, 2010)

Plugging Existing Bridge Drain

The Contractor shall submit the method and materials used to plug the existing bridge drains specified in the Plans to be plugged, to the Engineer for approval. The submittal shall include the following:

1. Material used to plug the drain outlet, and method of securing the plug in position.

2. The type of concrete material used to fill the drain cavity.

3. The method used to remove the exposed drainpipe, if removal is specified in the Plans.

All cut, damaged, and exposed metal surfaces to remain, including the drain outlet plug if metal components are used, shall be painted with two coats of paint conforming to Section 9-08.1(2)F. Each coat shall have a minimum dry film thickness of two mils.

When the removal of exposed drainpipe is specified in the Plans, the Contractor shall remove the embedded anchors a minimum of one inch beneath the existing concrete surface. The void left by removal of the embedded anchors shall be coated with epoxy bonding agent and filled with mortar conforming to Section 9-20.4(2). The epoxy bonding agent shall be Type II conforming to Section 9-26.1 with the grade and class as recommended by the epoxy bonding agent manufacturer and as approved by the Engineer. The mortar shall consist of cement and fine aggregate mixed in the proportions to match the color of the existing concrete surface as near as practicable.

All materials removed from the bridge drains specified in the Plans to be plugged shall be disposed of as specified in Section 2-02.3.

6-02.3(10)D.OPT6.GB6

(August 1, 2011)

Bridge Deck Repair

Quality Assurance

The Contractor shall have the services of a manufacturer's technical representative of the bridge deck repair material manufacturer available at the job site to assist in assuring the proper preparation and use of the bridge deck repair material in the bridge deck repair. The manufacturer's

technical representative shall be present at the site at all times while the Contractor is preparing and placing the bridge deck repair material. The manufacturer's technical representative shall be an employee of the bridge deck repair material manufacturer. Recommendations made by the manufacturer's technical representative and approved by the Engineer, shall be followed by the Contractor.

Bridge Deck Preparation

The Contractor, with the Engineer, shall inspect the exposed concrete bridge deck in accordance with Section 6-09.3(6) to establish the extent of bridge deck repair.

All loose and unsound concrete within the repair area shall be removed with jackhammers or chipping hammers no more forceful than the nominal 30 pounds class, or other mechanical means approved by the Engineer, and operated at angles less than 45 degrees as measured from the surface of the deck to the tool. If unsound concrete exists around the existing steel reinforcing bars, or if the bond between concrete and steel reinforcing bar is broken, the Contractor shall remove the concrete to provide a 3/4 inch minimum clearance to the bar. The Contractor shall take care to prevent damage to the existing steel reinforcing bars and concrete to remain.

After removing sufficient concrete to establish the limits of the repair area, the Contractor shall make neat vertical saw cuts and maintain square edges at the boundaries of the repair area. The saw cut depth shall not exceed 3/4 inch or the concrete cover over the top steel reinforcing bars, whichever is less.

The exposed steel reinforcing bars and concrete in the repair area shall be sandblasted and blown clean just prior to placing the bridge deck repair material.

Ultra-Low Viscosity, Two-Part Liquid, Polyurethane-Hybrid Polymer Concrete

The ultra-low viscosity, two-part liquid, polyurethane-hybrid polymer concrete shall be mixed in accordance with the manufacturer's recommendations.

Aggregate shall conform to the gradation limit requirements recommended by the manufacturer. The aggregate and the ultra-low viscosity, two-part liquid, polyurethane-hybrid polymer concrete shall be applied to the repair areas in accordance with the sequence and procedure recommended by the manufacturer.

All repairs shall be float finished flush with the surrounding surface within a tolerance of 1/8 inch of a straight edge placed across the full width and breadth of the repair area.

Pre-Packaged Cement Based Repair Mortar

The pre-packaged cement based repair mortar shall be thoroughly mixed in a batch mixer which mixes materials uniformly throughout the batch, and is of the type and size approved by the Engineer. The mixer shall have a minimum rated capacity of four cubic feet. The batches shall be charged into the mixer such that some water enters before the pre-packaged material. The Contractor shall place all water required for the mix in the drum by the end of the first quarter of the required mixing time of one minute minimum. The volume of water used, including the moisture content of the aggregate extenders, shall not exceed the volume recommended by the pre-packaged cement based repair mortar manufacturer by more than one percent. If the Contractor uses water in excess of the specified maximum limit, the mix will be subject to rejection by the Engineer.

The Contractor may propose shorter mixing times with special mixing equipment by submitting mixing test results to the Engineer for approval. If the Contractor uses heated water, the Engineer may require revising the order of charging to prevent flash setting of the mix.

If the pre-packaged cement based repair mortar does not include aggregate, the Contractor shall extend the mix with aggregate conforming to Section 9-20.2(3). The amount of aggregate used to extend the mix shall be between 50 percent and 100 percent of the maximum volume, by weight, recommended by the pre-packaged cement based repair mortar manufacturer.

All repairs shall be float finished flush with the surrounding surface within a tolerance of 1/8 inch of a straight edge placed across the full width and breadth of the repair area.

Cure

All bridge deck repair areas shall be cured in accordance with the bridge deck repair material manufacturer's recommendations as approved by the Engineer until the bridge deck repair material has attained the specified strength. During curing, all vehicular and foot traffic shall be prohibited on the repaired area.

For those bridge decks receiving a waterproofing membrane and HMA overlay, all deck repair shall be completed prior to placement of the waterproofing membrane.

6-02.3(10)D.OPT12.BSP.GB6

(BSP August 4, 2008)

Core Drilled Bridge Deck Drain

The Contractor shall core drill drain holes through the roadway deck of the bridges and in the locations shown in the Plans and as specified. The Contractor shall grind the concrete bridge deck to provide a taper at the top of the cored hole as shown in the Plans. The Contractor shall contain, collect and dispose of the concrete cores and debris in accordance with Section 2-02.3.

The Contractor shall coat the surfaces of the cored holes with epoxy bonding agent, and shall set a bridge deck drain pipe sleeve in place as shown in the Plans. The Contractor shall demonstrate, to the satisfaction of the Engineer, that the selected method for setting the pipe sleeve completely fills the void between the cored hole surface and the outside diameter of the pipe sleeve with epoxy bonding agent. The Contractor shall take appropriate measures to prevent the epoxy bonding agent from escaping from the void and shall secure the pipe sleeve in position until the epoxy bonding agent is completely cured.

6-02.3(10)D.OPT13.BSP.GB6

(BSP February 13, 2012)

Placing Bridge Deck Concrete

Test Slab Using Bridge Deck Concrete

After the Contractor receives the Engineer's approval of the project specific performance mix design for bridge deck concrete in accordance with Section 6-02.3(2)A as supplemented in these Special Provisions, and at least seven calendar days prior to the first scheduled placement of bridge deck concrete, the Contractor shall construct a test slab using concrete of the approved mix design.

The test slab may be constructed on grade, shall have a minimum thickness of eight inches, shall have minimum plan dimensions of 10 feet along all four edges, and shall be square or rectangular.

During construction of the test slab, the Contractor shall demonstrate concrete sampling and testing, use of the concrete temperature monitoring system, the concrete fogging system, humidity monitoring system, concrete placement system, and the concrete finishing operation. The Contractor shall conduct the demonstration using the same type of equipment to be used for the production bridge decks, except that the Contractor may elect to finish the test slab with a hand-operated strike-board.

After the construction of the test slab and the demonstration of bridge deck construction operations is complete, the Contractor shall remove and dispose of the test slab in accordance with Sections 2-02.3 and 2-03.3(7)C.

Monitoring Concrete Temperature After Placement

The Contractor shall continuously monitor the temperature and curing time of the bridge deck concrete hourly for seven calendar days after placement. The Contractor shall place a minimum of two maturity meter temperature monitoring devices in the bridge deck at locations specified by the Engineer.

The Contractor shall submit the type and model of maturity meter temperature monitoring device, and the associated devices responsible for recording and documenting the temperature and curing time, to the Engineer for approval at least 14 calendar days prior to the scheduled date of the pre-concreting conference for the first bridge deck to be cast.

The placement and operation of the temperature monitoring devices and associated devices will be an agenda item at the pre-concreting conference for the first bridge deck to be cast.

Texturing the Bridge Deck Surface

The Contractor shall texture the surface of the bridge deck as follows:

The Contractor shall texture the bridge deck longitudinally using diamond tipped saw blades mounted on a power driven, self-propelled machine that is specifically designed to texture concrete surfaces. The grooving equipment shall provide grooves that are 1/8" ± 1/64" wide, 3/16" ± 1/16" deep, and spaced at 3/4" ± 1/8".

The Contractor shall submit the type of grooving equipment to be used to the Engineer for approval. The Contractor shall demonstrate to the satisfaction of the Engineer that the method and equipment for texturing the bridge deck as specified are adequate for the intended purpose and will provide satisfactory results. The Contractor shall not begin texturing the bridge deck until receiving the Engineer's approval of the Contractor's method and equipment.

The Contractor shall texture the concrete bridge deck surface in a longitudinal direction, parallel with centerline, between the bridge ends. Texturing in a transverse direction using a metal tined comb is not required. The Contractor shall texture the bridge deck surface to within 6 inches of the centerline of bridge expansion joints, or within 3 inches of expansion joint steel armor, whichever is larger, such that the edge of the textured surface provides a constant offset parallel to the joint centerline.

The Contractor shall contain and collect all concrete dust and debris generated by the bridge deck texturing process, and shall dispose of the collected concrete dust and debris in accordance with all Federal, State, and local regulations.

6-02.3(10)F.GR6

Bridge Approach Slab Orientation and Anchors

6-02.3(10)F.INST1.GR6

Section 6-02.3(10)F is supplemented with the following:

6-02.3(10)F.OPT1.GB6

(August 4, 2008)

The pavement end of the bridge approach slab shall be constructed normal to the roadway center line.

6-02.3(10)F.OPT2.GB6

(August 4, 2008)

The pavement end of the bridge approach slab shall be constructed parallel to the pavement seat.

6-02.3(10)F.OPT3.FB6

(August 4, 2008)

The pavement end of the bridge approach slab shall be constructed parallel to the pavement seat for bridge(s) No. *** $$1$$ ***. The pavement end of the bridge approach slab shall be constructed normal to the roadway center line for bridge(s) No. *** $$2$$ ***.

6-02.3(10)F.OPT4.GB6

(August 4, 2008)

The compression seal shall be a 2-1/2 inch wide gland selected from the approved products listed in the WSDOT Qualified Products List, latest edition.

6-02.3(11).GR6

Curing Concrete

6-02.3(11).INST1.GR6

Section 6-02.3(11) is supplemented with the following:

6-02.3(11).OPT1.BSP.GB6

(BSP August 8, 2011)

Curing Bridge Decks

Equipment

The Contractor's finishing equipment shall include a work platform dedicated to the operation of placing presoaked burlap onto the bridge deck immediately as the surface is finished.

The Contractor shall provide an atmosphere of 90 percent minimum relative humidity above the finished deck, through the use of a fogging apparatus consisting of 1,500 psi pressure washers, or other means.

The Contractor shall monitor the relative humidity of the atmosphere above the finished deck with psychrometers until the deck is covered with burlap.

The Contractor shall submit a bridge deck curing plan, including details of the finishing machine work platform, the fogging apparatus, and the humidity monitoring equipment, to the Engineer for approval at least 14 calendar days prior to the scheduled date of the pre-concreting conference for the first bridge deck to be cast. The bridge deck curing plan and the overall curing operation will be an agenda item at the pre-concreting conference for the first bridge deck to be cast.

Curing

The fogging apparatus shall be in place and charged for fogging prior to beginning concrete placement for the bridge deck.

The Contractor shall presoak all burlap to be used to cover the deck during curing.

Immediately after the finishing machine passes over finished concrete, the Contractor shall implement the following tasks, in accordance with the bridge deck curing plan as approved by the Engineer

1. The Contractor shall apply the presoaked burlap to the top surface to fully cover the deck without damaging the finish. The Contractor shall not apply curing compound.

2. The Contractor shall begin fogging to provide an atmosphere of 90 percent minimum relative humidity above the finished concrete immediately as the final finishing pass is made by the finishing machine.

3. The Contractor shall monitor the relative humidity of the atmosphere above the bridge deck at a level 2 feet above the bridge deck surface.

The Contractor shall continue to keep the burlap wet by fog spraying the burlap covered surface, until the burlap is covered by soaker hoses and white reflective sheeting.

When the bridge deck has achieved initial set (usually four to six hours after placement or when the workers can walk on the deck without damaging the concrete), the Contractor shall place soaker hoses, and cover the burlap with white reflective sheeting. The Contractor shall place the soaker hoses and charge them frequently so as to keep the burlap covering the entire deck wet during the course of curing.

The wet curing regime as described shall remain in place for at least 14 consecutive calendar days.

6-02.3(13).GR6

Expansion Joints

6-02.3(13).INST1.GR6

Section 6-02.3(13) is supplemented with the following:

6-02.3(13).OPT1.GB6

(June 26, 2000)

Strip Seal Expansion Joint System

The Contractor shall submit working drawings of the expansion joint system to the Engineer for approval in accordance with Section 6-03.3(7). These plans shall include but not be limited to the following:

1. Plan, elevation, and sections of the joint system and all components, with dimensions and tolerances.

2. All material designations.

3. Manufacturer's written installation procedure.

4. Corrosion protection system used on the metal components.

5. Locations of welded shear studs, lifting mechanisms, temperature setting devices, and construction adjustment devices.

6. Method of sealing the system to prevent leakage of water through the joint.

The strip seal shall be removable and replaceable.

Other than items shown in the Plans, threaded studs used for construction adjustments are the only items that may be welded to the steel shapes provided they are removed by grinding after use, and the area repaired by application of an approved corrosion protection system.

If the opening between the steel shapes is anticipated to be less than 1-1/2 inches at the time of seal installation, the seal may be installed prior to encasement of the steel shapes in concrete.

After the joint system is installed, the joint shall be flooded with water and inspected, from below the joint, for leakage. If leakage is observed, the joint system shall be repaired by the Contractor, as recommended by the manufacturer and approved by the Engineer, at no additional cost to the Contracting Agency.

6-02.3(13).OPT2.GB6

(June 26, 2000)

Compression Seal Expansion Joint System

The compression seal expansion joint system shall be installed in accordance with the manufacturer's written recommendations. The Contractor shall submit the manufacturer's written installation procedure to the Engineer prior to installing the expansion joint system.

After the joint system is installed, the joint area shall be flooded with water and inspected, from below the joint, for leakage. If leakage is observed, the joint system shall be repaired by the Contractor, as recommended by the manufacturer and approved by the Engineer, at no additional cost to the Contracting Agency.

6-02.3(13).OPT3.FB6

(August 2, 2010)

Modular Expansion Joint System

The Contractor shall design, fabricate, inspect, test, and install a modular, multiple seal expansion joint system in accordance with the geometry and movements shown and specified in the Plans. The modular expansion joint system shall extend continuously across the full width of the bridge deck and up into the traffic barriers as shown in the Plans.

Acceptable Manufacturers

Only manufacturers whose modular expansion joint systems have met the requirements specified in the **Fatigue Resistance Characterization Requirements** subsection of this Special Provision will be permitted to supply modular expansion joint systems. Any testing required to establish the fatigue resistance of all details of a specific proprietary system shall be completed prior to the contract award date. All fatigue testing shall be conducted in accordance with the **Fatigue Testing of Metallic Structural Components and Connections, Durability Testing of Elastomeric Support Bearings** and

Fatigue Testing Laboratory subsections of this Special Provision. Testing shall be completed on any revised details or material substitutions of a previously prequalified system prior to the contract award date.

The following manufacturers are known to have prequalified modular expansion joint system details by completing fatigue testing in accordance with these requirements:

1. The D.S. Brown Company
   P.O. Box 158
   300 E. Cherry Street
   North Baltimore, Ohio 45872-0158
   Tel. (419) 257-3561
   Fax (419) 257-2200

2. Watson Bowman ACME Corporation
   95 Pineview Drive
   Amherst, New York 14228-2166
   Tel. (716) 691-7566
   Fax (716) 691-9239

Manufacturer Qualification Submittal

The expansion joint manufacturer shall have at least three years of experience in designing and manufacturing modular expansion joint systems. The Contractor shall provide written certification of the manufacturer's experience to the Engineer. This certification shall include the location of each bridge, installation date, governmental agency/owner, and the name, address, and telephone number of each owner's/agency's representative.

The Contractor shall submit the name of the selected expansion joint system manufacturer to the Engineer within 10 days of contract award. Once the name of the manufacturer has been submitted to the Engineer, the Contractor shall not select an alternative expansion joint system manufacturer unless the manufacturer demonstrates an inability to meet the requirements of this Special Provision.

Shop Drawings and Design Calculations Submittals

The Contractor shall submit shop drawings and design calculations delineating the expansion joint system to the Engineer for approval prior to fabrication of the joint, in accordance with Sections 6-01.9 and 6-03.3(7) and as noted herein. The Professional Engineer responsible for preparing and stamping the submittal shall be an employee of the expansion joint system manufacturer, and shall hold a valid license in the branch of Civil or Structural Engineering, either in the State of Washington or another state. These submittals shall include, but shall not be limited to, the following:

1. Plan, elevation, and section of the joint system for each movement rating and bridge deck width. All dimensions and tolerances shall be specified.

2. Sections showing all materials composing the expansion joint system with complete details of all individual components including all bolted and welded splices and connections.

3. All ASTM, AASHTO, or other material designations.

4. Installation plan including sequence, lifting mechanisms and locations, details of temporary anchorage during setting, temperature adjustment devices, opening dimensions relative to temperature, installation details at curbs, and seal installation details.

5. Plan for achieving watertightness including details related to performing the watertightness test required in the **Installation** subsection of this Special Provision.

6. Details and material designations pertinent to the corrosion protection system.

7. Requirements and details related to the temporary support of the joint system for shipping, handling, and job site storage.

8. Design calculations for all structural elements including all springs and bearings. The design calculations shall include fatigue design for all structural elements, connections, and splices.

9. Welding procedures in compliance with the current AASHTO/AWS D1.5 Bridge Welding Code.

10. A written maintenance and part replacement plan to facilitate replacement of parts subject to wear. This plan shall include a list of parts, instructions for maintenance inspection, acceptable wear tolerances, methods for determining wear, procedures for replacing worn parts, and procedures for replacing seals.

11. Any required modifications to blockout reinforcing steel to accommodate the expansion joint system.

Documentation, Certifications, and Test Reports Submittals

At the time of shop plan submittal, the Contractor shall submit to the Engineer for approval the following documentation:

1. Documentation that the manufacturer is certified through the AISC Quality Certification Program under the category *Simple Steel Bridge Structures*.

2. Documentation that welding inspection personnel are qualified and certified as welding inspectors under AWS QC1, Standard for Qualification and Certification of Welding Inspectors.

3. Documentation that personnel performing nondestructive testing (NDT) are qualified and certified as NDT Level II under the American

Society for Nondestructive Testing (ASNT) Recommended Practice SNT-TC-1a.

The Contractor shall submit to the Engineer for approval prior to fabrication the following test reports and certificates of compliance:

1. Manufacturer's certificate of compliance for all polytetrafluorethylene (PTFE) sheeting, PTFE fabric, and elastomer.

2. Certified mill test reports for all steel and stainless steel in the expansion joint system assemblies.

3. Certified test reports confirming that the springs and bearings meet the design load requirements.

Upon completion of installation, the Contractor shall submit to the Engineer certification stating that each expansion joint system was installed in accordance with the approved shop plan installation procedure. This certification shall conform to the requirements specified in the **Installation** subsection of this Special Provision.

Method for Temporary Bridging of Construction Loads Submittal
The Contractor shall submit to the Engineer for approval a temporary bridging method for each expansion joint system over which construction traffic is anticipated to cross following its installation. This submittal shall conform to the requirements specified in the **Installation** subsection of this Special Provision.

Quality Assurance Inspection Documentation Submittal
The Contractor shall submit to the Engineer documentation of a Quality Assurance Inspection program performed by an independent inspection agency provided by the manufacturer. The name of the independent inspection agency, details of the proposed quality assurance inspection program including inspection frequency, and all applicable reporting forms shall be submitted to the Engineer for approval prior to the start of fabrication.

Warranty Submittal
Modular expansion joint assembly warranties and guarantees provided by the manufacturer shall be submitted to the Engineer in accordance with Section 1-05.10.

General Design Requirements
The expansion joint system shall be designed and detailed with adequate access to all internal components in order to assure the feasibility of inspection and maintenance activities.

The expansion joint system shall be designed and detailed to minimize concrete cracking above the support boxes. Measures taken shall include, but not be limited to, assuring adequate support box top plate thickness, specifying any additional bridge deck steel reinforcement required, and providing adequate concrete cover.

The expansion joint system and bridge deck steel reinforcement shall be detailed to assure that adequate concrete consolidation can be achieved underneath all support boxes.

The expansion joint seals shall not protrude above the top of the expansion joint system under any service condition. Split extrusions may be used at curb upturns.

The elastomeric or urethane springs and bearings shall be designed to be removable and replaceable. The removal and reinstallation of each strip seal shall be easily accomplished from above the joint with a 1-1/4 inch minimum gap width. These operations shall be viable with a one lane partial closure of the bridge deck.

The expansion joint system shall be designed and detailed to be watertight.

The expansion joint system shall be designed and detailed to accommodate all movements specified in the Plans.

The expansion joint shall be designed and detailed to mitigate the potential for fatigue damage wherever centerbeam field splices are required. Consideration shall be given to reducing support box spacing and optimizing splice location between adjacent support boxes in order to minimize fatigue stress range at field splices.

Design Axle Loads and Impact Factors

The centerbeams, support bars, bearings, connections, and other structural components shall be designed for the simultaneous application of vertical and horizontal loads from a tandem axle. The tandem axle shall consist of a pair of axles spaced four feet apart with vertical and horizontal loads as specified below. The transverse spacing of the wheels shall be six feet. The distribution of the wheel load among centerbeams shall be as specified in the **Distribution of Wheel Loads** subsection of this Special Provision.

The vertical load range for fatigue design shall be a 32.0 kip tandem. This tandem shall be taken as two 16.0 kip axles spaced four feet apart. Only one of these tandem axles must be considered in the design, unless the joint opening exceeds four feet. The load range shall be increased by the dynamic load allowance (Impact Factor) of 75%. Load factors shall be applied in accordance with Table 3.4.1-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims.

The vertical load for strength design shall be a 50.0 kip tandem. This tandem shall be taken as two 25.0 kip axles spaced four feet apart. Only one of these tandem axles must be considered in the design, unless the joint opening exceeds four feet. This load shall be increased by the dynamic load allowance (Impact Factor) of 75%. Load factors shall be applied in accordance with Table 3.4.1-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims.

The horizontal load range for fatigue design shall be *** $$1$$ *** percent of the amplified vertical load range (LL+IM) specified above. For modular expansion joint systems installed on vertical grades in excess of five percent, the horizontal component of the amplified vertical load range (LL+IM) specified above shall be added to this horizontal load range.

The horizontal load for strength design shall be 20 percent of the amplified vertical load (LL+IM) specified above. For modular expansion joint systems installed on vertical grades in excess of five percent, the horizontal component of the amplified vertical load (LL+IM) specified above shall be added to this horizontal load.

Distribution of Wheel Loads

The following table specifies the centerbeam distribution factor as a function of centerbeam top flange width. This factor is the percentage of the design vertical axle load and the design horizontal axle load which shall be applied to an individual centerbeam for the design of that centerbeam and its associated support bars. Distribution factors shall be interpolated for centerbeam top flange widths between those explicitly denoted in the table. In no case shall the distribution factor be taken as less than 50%. The remainder of the load shall be divided equally and applied to the two adjacent centerbeams or edge beams.

Width of Centerbeam Top Flange	Distribution Factor
2.5 inches	50%
3.0 inches	60%
4.0 inches	70%
4.75 inches	80%

Fatigue Limit State Design Requirements

Modular expansion joint system structural members, bolted and welded splices and connections, and attachments shall be designed to resist the Fatigue Limit State load combination specified in Table 3.4.1-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims. The vertical and horizontal load ranges specified in the **Design Axle Loads and Impact Factors** subsection of this Special Provision shall be applied simultaneously. These loads shall be distributed as specified in the **Distribution of Wheel Loads** subsection of this Special Provision.

The nominal stress ranges, Δf, at all fatigue critical details shall be obtained from a structural analysis of the expansion joint system applying the design vertical and horizontal load ranges specified in the **Design Axle Loads and Impact Factors** subsection of this Special Provision and distributed as specified in the **Distribution of Wheel Loads** subsection of this Special Provision. The expansion joint system shall be analyzed with a minimum gap opening corresponding to the midrange configuration (at least half of the maximum gap opening). The design axle load shall be applied as two wheel loads, each having a transverse width of 20 inches.

For each detail under consideration, the wheel loads shall be positioned transversely on a centerbeam to achieve the maximum nominal stress range

at that detail. The vertical and horizontal wheel loads shall be applied as line loads to the top of the centerbeams at their centerlines. The design stress range in the centerbeam-to-support bar connection shall be calculated as specified below. The design nominal stress ranges, Δf, shall be used for fatigue design as specified at the end of this subsection.

Welded or Bolted Single-Support-Bar Systems

The nominal stress range, Δf, in the centerbeam at a welded or bolted stirrup shall be the sum of the longitudinal bending stress ranges at the critical section resulting from vertical and horizontal loading. The effects of stresses in any load-bearing attachments such as the stirrup or yoke shall not be considered when calculating the longitudinal stress range in the centerbeam. For bolted single-support-bar systems, stress ranges shall be calculated using the net section.

The nominal stress range, Δf, in the stirrup or yoke shall be calculated without considering the effects of stresses in the centerbeam. The stress range shall be calculated by assuming a load range in the stirrup equal to 30% of the total vertical reaction force between the centerbeam and the support bar. The effects of horizontal loads may be neglected in the design of the stirrup.

Welded Multiple-Support-Bar Systems

Three locations have been identified as initiation sites for fatigue cracking at a centerbeam-to-support bar welded connection. The types of cracking associated with these three locations are described below. The corresponding equations may be used to calculate the nominal stress range, Δf. For the support bar, either the reduced moment at the critical cross section or the moment at the centerline of the connection may be used in these equations.

Centerbeam Weld Toe Cracking

Centerbeam weld toe cracking is driven by a combination of longitudinal bending stress range, S_{RB}, in the centerbeam, and vertical stress range, S_{RZ}, at the top of the connection weld.

The longitudinal bending stress range, S_{RB}, at the bottom of the centerbeam shall be calculated as:

$$S_{RB} \equiv M_{Vcb} / S_{Xcb} + M_{Hcb} / S_{Ycb}$$

The vertical stress range, S_{RZ}, at the top of the connection weld shall be calculated as:

$$S_{RZ} \equiv R_H \cdot d_{cb} / S_{Wtop} + R_V / A_{Wtop}$$

Support Bar Weld Toe Cracking

Support bar weld toe cracking is driven by a combination of longitudinal bending stress range, S_{RB}, in the support bar and vertical stress range, S_{RZ}, at the bottom of the connection weld.

The longitudinal bending stress range, S_{RB}, at the top of the support bar shall be calculated as:

$$S_{RB} \equiv M_{Vsb} / S_{Xsb} + 0.5 \cdot R_H \cdot (d_{cb} + h_W + 0.5 \cdot d_{sb}) / S_{Xsb}$$

The vertical stress range, S_{RZ}, at the bottom of the connection weld shall be calculated as:

$$S_{RZ} \equiv R_H \cdot (d_{cb} + h_W) / S_{wbot} + R_V / A_{Wbot}$$

Weld Throat Cracking

Weld throat cracking is driven by a vertical stress range at the weld throat.

The vertical stress range, S_{RZ}, at mid-height of the connection weld shall be calculated as:

$$S_{RZ} \equiv R_V / A_{wmid} + R_H \cdot (d_{cb} + 0.5 \cdot h_W) / S_{Wmid}$$

In the above equations:

R_V ≡ vertical reaction at the connection weld
R_H ≡ horizontal reaction at the connection weld
M_{Vcb} ≡ bending moment in the centerbeam due to applied vertical forces
M_{Hcb} ≡ bending moment in the centerbeam due to applied horizontal forces
M_{Vsb} ≡ bending moment in the support bar due to applied vertical forces
S_{Xcb} ≡ section modulus at bottom of the centerbeam about horizontal axis
S_{Ycb} ≡ section modulus of the centerbeam about vertical axis
S_{Xsb} ≡ section modulus at top of the support bar about horizontal axis
A_{Wtop} ≡ area of the weld at the top of the connection
A_{Wmid} ≡ area of the weld at the middle of the connection
A_{Wbot} ≡ area of the weld at the bottom of the connection
S_{Wtop} ≡ section modulus of the weld at the top of the connection
S_{Wmid} ≡ section modulus of the weld at the middle of the connection
S_{Wbot} ≡ section modulus of the weld at the bottom of the connection
h_W ≡ height of the weld
d_{cb} ≡ depth of the centerbeam
d_{sb} ≡ depth of the support bar

The nominal stress range, Δf, at welded multiple-support-bar connection details shall be calculated for each case above as follows:

$$\Delta f \equiv (S^2_{RB} + S^2_{RZ})^{1/2}$$

where

S_{RB} ≡ longitudinal stress range in the centerbeam or support bar, as calculated for each specific case above.
S_{RZ} ≡ vertical stress range in the centerbeam-to-support bar connection weld, as calculated for each specific case above.

To assure an infinite fatigue life, all modular expansion joint system structural members, connections (bolted and welded), splices, and attachments shall satisfy the following:

$$\Delta f \leq F_{TH} / 2$$

where:

$\Delta f \equiv$ the nominal stress range as specified at the beginning of this subsection.

$F_{TH} \equiv$ constant amplitude fatigue threshold (CAFL) as specified in the **Fatigue Resistance Characterization Requirements** subsection of this Special Provision.

Fatigue Resistance Characterization Requirements

The fatigue resistance of all details shall be characterized in terms of the detail categories specified in Table 6.6.1.2.5-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims. Many details composing modular expansion joint systems may clearly correspond to specific structural details depicted in Figure 6.6.1.2.3-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims. In these cases, the applicable fatigue categories specified in Table 6.6.1.2.3-1 may be used for design. In cases where the Engineer establishes that a detail does not clearly correspond to a structural detail depicted in Figure 6.6.1.2.3-1, fatigue testing of specimens exhibiting that detail shall be conducted, in accordance with the **Fatigue Testing of Metallic Structural Components and Connections, Durability Testing of Elastomeric Support Bearings, Fatigue Testing Laboratory** and **Fatigue Testing Reference** subsections of this Special Provision, to establish the appropriate constant amplitude fatigue limit (CAFL) for that detail.

Strength I Limit State Design Requirements

Modular expansion joint system structural steel members, connections (bolted and welded), splices, and attachments shall be designed to resist the Strength I Limit State load combination specified in Table 3.4.1-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims. The vertical and horizontal loads specified in **Design Axle Loads and Impact Factors** subsection of this Special Provision shall be applied simultaneously. These loads shall be distributed as specified in the **Distribution of Wheel Loads** subsection of this Special Provision.

Design Reference

Provisions contained in **Design Axle Loads and Impact Factors, Distribution of Wheel Loads, Fatigue Limit State Design Requirements, Fatigue Resistance of Details,** and **Strength I Limit State Design Requirements** subsections of this Special Provision have been developed from research summarized in National Cooperative Highway Research Program Report 402 "Fatigue Design of Modular Bridge Expansion Joints", National Academy Press, Washington DC, 1997.

Fatigue Testing of Metallic Structural Components and Connections

Methodology

This test procedure is acceptable for, and specifically applicable to, establishing the fatigue resistance of the centerbeam-to-support bar connection in modular expansion joint systems. It is applicable to single-support-bar and multiple-support-bar systems having either welded or bolted centerbeam-to-support bar connections. The same methodology may be applied to establish the fatigue resistance of other modular expansion joint metallic structural component details, including centerbeam splices.

Each fatigue test generates a discrete datum. Each datum comprises an applied constant amplitude nominal stress range, S_r, and the corresponding number of cycles, N, associated with either a predetermined extent of crack propagation, defined as failure, or with termination of the test, defined as runout. Ten data shall be acquired for each connection detail. All data shall be in the very long life range, corresponding as closely to the constant amplitude fatigue limit (CAFL) as practical. Specifically, the number of cycles, N, associated with each datum, shall be no less than one order of magnitude less than N_{min} corresponding to the detail category specific CAFL specified in the **Interpretation of Fatigue Test Data** subsection of this Special Provision. For example, to characterize a detail as Detail Category C, the tested number of cycles, N, shall exceed 4.4×10^5 for each datum.

The constant amplitude nominal stress range shall be calculated at the anticipated initiation location of an incipient crack. Nominal stresses shall be calculated using conventional equations for analyzing bending and axial load. These equations are essentially the same as those used in strength design. The stress concentration effects of a weld, bolt hole, or other local features are not explicitly embodied in the conventional nominal stress equations.

The appropriate AASHTO detail category applicable to fatigue design shall be established by comparing acquired test data to fatigue resistance graphs representing the AASHTO detail categories. The constant amplitude fatigue limit (CAFL) applicable to fatigue design corresponds to the AASHTO detail category fatigue resistance graph representing a lower bound of the experimentally acquired data.

When testing is conducted exclusively in the infinite life regime and more stringent test data scatter requirements are satisfied, a unique CAFL (different from those CAFL corresponding to specific detail categories specified by AASHTO) may be established for fatigue design.

Specimens

Specimens selected for testing shall be full-scale centerbeam and support bar assemblies or subassemblies representative of those installed in field applications. A subassembly is defined as a specimen having the same physical and geometric properties as an assembly but having a reduced number of centerbeams.

Each specimen shall consist of three continuous centerbeam spans over four equally spaced support bars. Centerbeam spans between adjacent support bar centerlines shall be a minimum of 3'-0" and a maximum of 4'-6". Support bar spans shall be a minimum of 3'-0" and a maximum of 3'-8". The centerbeam-to-support bar connection being tested shall be located at the midspan of each support bar.

Any welded or bolted attachments used to secure equidistant springs to a support bar, centerbeam, or stirrup shall be fabricated as an integral part of the specimen. A rigid load path to the test fixture shall be provided to resist any horizontal forces or displacements which would normally be resisted through these attachments in a field installation. Any miscellaneous welded or bolted attachments, including welded attachments used to secure the expansion joint strip seals to the centerbeams, shall also be fabricated as integral parts of the specimen.

Support bars of subassembly specimens that are components of single-support-bar swivel-joist type modular expansion joint systems shall be oriented perpendicular to the longitudinal axis of the centerbeam.

Prior to testing, each specimen shall be visually inspected for any defects, loose fasteners or other aberrations which could plausibly affect the tested fatigue resistance. Defects and flaws shall be defined in accordance with the appropriate governing specification (ASTM A-6, AWS D1.5, etc.). Data acquired from specimens containing such anomalies shall not be excluded from consideration except as permitted in the **Finite Life Regime Testing** subsection of this Special Provision. Any observed anomaly shall also be reported with its corresponding data in the tabular format stipulated in the **Data Reporting for Fatigue Tests** subsection of this Special Provision.

Instrumentation

Each specimen shall be sufficiently instrumented to measure the static nominal strain range within that specimen for a specific applied load range. Best results can generally be obtained when the applied load range for the static calibration tests does not pass through zero load. Strain measurements shall be made at locations sufficiently distant from local effects, such as weld toes or bolt holes, which could significantly influence acquired test data.

As a minimum, eight strain gages shall be installed on the centerbeam top flange in the vicinity of each centerbeam-to-support bar connection. These gages shall be installed in pairs on each side of the connection at distances of one and two times the depth of the centerbeam from the centerline of the connection. Each pair of strain gages shall be located symmetrically about the centerline of the centerbeam. As a minimum, two strain gages shall also be installed on the support bar bottom flange in the vicinity of each centerbeam-to-support bar connection. One of these strain gages shall be installed on each side of the connection at a distance equal to the depth of the support bar from the centerline of the connection.

These strain gages shall be installed along the centerline of the support bar.

Test Fixtures

Test fixtures shall have the capability to adequately support and secure the specimen throughout the duration of the test. The fixture shall be designed and fabricated to such tolerances as required to assure that additional stresses will not be generated in the specimen as a consequence of fixture misalignment. Mismatches resulting from specimen fabrication errors shall be accommodated by shimming or other such means precluding the application of force to the specimen.

Typical elastomeric bearings and springs used to transfer vertical loads from the support bars to the support boxes may be replaced with steel bearings in the test fixture. This modification will enable fatigue testing at higher load ranges and different frequencies than those encountered during normal service conditions.

Load shall be applied through two 10 inch long patches. Each patch shall typically comprise a steel plate and a hard rubber bearing pad placed in contact with the bottom flange of the centerbeam. Each patch shall be located at midspan of each outer span.

In order to assure adequate seating of the specimen to the test fixture, a minimum of 10 kips shall be applied at each patch location. This requirement is waived for tests of single support bar systems conducted using load reversal. Once this load has been applied, all strain measuring devices shall be rebalanced to zero strain while the preload is maintained. An additional load approximately equivalent to the calculated load range shall be applied. Strain ranges shall be measured for the load range from 10 kips to the peak load. Each static calibration test shall be repeated three times while still maintaining a minimum 10 kips load at each load patch. The measured strain ranges from each repetition should vary by no more than 25% from the mean value. If the stress ranges are not repeatable, appropriate modifications shall be made to the test fixture.

Static Calibration Test

Prior to any fatigue resistance testing, a static calibration test shall be performed in order to validate the structural analysis model. The static calibration test shall be performed after attainment of stress range repeatability as described in the **Test Fixtures** subsection of this Special Provision. The structural analysis model shall be considered validated when calculated strain ranges are within ±25% of the measured strain ranges at every strain gage location.

For the purpose of reporting nominal fatigue resistance stress ranges at specific details, stress ranges determined through structural analysis of the model shall be preferred over stress ranges acquired directly from test measurements.

Fatigue Test Procedure

A minimum of ten data points shall be required to establish the fatigue resistance of each detail. The centerbeam-to-support bar connection shall be considered as a single detail.

Several data points may be obtained from a single specimen by repairing the cracked sections of that specimen and resuming testing. Such repairs shall have minimal effect on the stress ranges at unfailed details still being tested. Data points derived from tests in which a repaired detail cracks again shall be discarded.

All data shall be in the very long life range, corresponding as closely to the constant amplitude fatigue limit as practical, but in no case less than 200,000 cycles. Either finite life regime or infinite life regime testing may be conducted. For infinite life regime testing, the number of cycles, N, associated with each of the ten data shall be at least twice the number of cycles, Nmin, designated in the table in the **Interpretation of Fatigue Test Data** subsection of this Special Provision.

Loads shall be applied using hydraulic actuators or other similar loading devices. The magnitude of the vertical load range, ΔP_v, shall be maintained and continuously monitored throughout the duration of the test. Vertical and horizontal load ranges shall be applied to the specimen simultaneously. The horizontal load range shall always be equal to 20% of the vertical load range, ΔP_v. This horizontal-to-vertical load ratio may be maintained by inclining the specimen 11.3 degrees with respect to the horizontal plane and applying load through vertically oriented actuators.

For multiple support bar systems, the loading mechanism shall be either exclusively tension or exclusively compression and shall be applied at a constant amplitude at any desired frequency. The applied load range shall be in a direction such that the reaction force between the centerbeam and support bar is always tensile. The load range shall not pass through zero load. Minimum preload shall be maintained throughout the duration of the test.

Single support bar systems may be loaded using the same procedures as those for multiple support bar systems. If premature stirrup failure occurs, an applied load range of 70% compression and 30% tension may be used.

The load ranges used in the test shall not be so large as to alter the observed failure mode from that which would be observed under service conditions. Under no circumstance shall imposed stress exceed the yield stress of the material in any portion of the specimen. Each specimen shall be tested using at least two different load (stress) ranges.

If infinite life regime testing is conducted, the first load range should be chosen so that the applied stress range is just above the postulated CAFL. The load range in the subsequent test shall be decreased if failure resulted and increased if the test resulted in a runout. A suggested increment in load is such that the stress range is increased or decreased

by 2 ksi. The applicable CAFL shall be selected from those CAFL values corresponding to the AASHTO fatigue categories. The selected CAFL is the one just below the lowest stress range that resulted in cracking.

Fatigue Test Failure Criteria

Welded Centerbeam-to-Support Bar Connections

Centerbeam weld toe cracking originates at or near the centerbeam weld toe, propagates up into the centerbeam at some angle, and grows back over the connection. These cracks typically grow at an angle of about 45 degrees. A specimen shall be considered as failed due to this type of cracking when the crack has grown on any vertical face a length from the point of origin equal to half of the centerbeam depth.

Support bar weld toe cracking originates at or near the support bar weld toe, propagates down into the support bar, and grows back under the connection at some angle, typically about 45 degrees. A specimen shall be considered as failed due to this type of cracking when the crack has grown on any vertical support bar face a length from the point of origin equal to half of the depth of the support bar.

Weld throat cracking originates in the weld throat and typically grows in a plane parallel to the longitudinal axis of the support bar at about mid-depth of the weld throat. A specimen shall be considered as failed due to this type of cracking when a complete fracture of the weld throat has occurred. These cracks have been observed to turn down into the support bar, but only after significant growth. In such instances, the criteria for support bar weld toe cracking shall be applied.

Welded Stirrup Connections

A specimen shall be considered as failed when cracks result in the complete fracture of any stirrup leg or when cracks originating at or near a stirrup weld have grown into any face of the centerbeam a length from the stirrup weld toe equal to half of the centerbeam depth.

Bolted Centerbeam-to-Support Bar Connections

A specimen shall be considered as failed when:

1. Fatigue cracks which have grown out of a bolt hole have resulted in the complete fracture of the tension flange of the centerbeam.

2. Fatigue cracks which have grown out of a bolt hole have extended into any face of the centerbeam web a distance equivalent to half of the centerbeam depth less the centerbeam flange thickness.

3. Any portion of a stirrup fractures completely.

4. Any single bolt fractures completely.

Alternate Criteria for Termination of a Finite Life Regime Fatigue Test
A test may also be terminated when, for a given stress range, the specimen has survived the number of cycles required to plot the data above either a particular fatigue resistance curve or the maximum permitted in the **Finite Life Regime Testing** subsection of this Special Provision. For example, if the applied stress range is 17 ksi and the desired fatigue resistance curve is Category C, then based upon the equation presented in the **Interpretation of Fatigue Test Data** subsection of this Special Provision, the test may be terminated after application of about 900,000 cycles provided that the specimen has not failed based on the above described criteria.

Nominal Stress Range Calculation

Welded Centerbeam-to-Support Bar Systems

The nominal stress range for centerbeam weld toe cracking shall be calculated by taking the square root of the sum of the squares of the longitudinal bending stress range in the centerbeam and the vertical stress range at the top of the weld.

The nominal stress range for support bar weld toe cracking shall be calculated by taking the square root of the sum of the squares of the longitudinal bending stress range in the support bar and the vertical stress range at the bottom of the weld.

The nominal stress range for weld throat cracking shall be the calculated vertical stress range in the throat of the weld.

The nominal stress range in the centerbeam at a welded stirrup shall be calculated as the summation of the longitudinal bending stress ranges at the critical section resulting from vertical and horizontal loading. The entire load range shall be used in the calculation, even if the loading is partly in compression. The effects of stresses in any load-bearing attachments such as the stirrup or yoke shall not be considered when calculating the nominal stress range in the centerbeam.

The load range in the stirrup itself shall be taken as 30% of the total vertical load range carried through the connection. The effect of horizontal forces may be neglected.

Bolted Centerbeam-to-Support Bar Systems

The nominal stress range in the centerbeam shall be taken as the summation of the longitudinal bending stress ranges in the centerbeam resulting from vertical and horizontal loading. Nominal stress ranges shall be calculated using the net section. The effects of stresses in the stirrup shall not be considered when calculating the nominal stress range in the centerbeam.

The nominal load range in the bolt group and the stirrup assembly shall be taken as 30% of the total vertical load range carried through the connection. The effect of horizontal forces may be neglected.

Interpretation of Fatigue Test Data

The experimentally acquired data and graphs representing the fatigue resistance of the detail categories delineated in Section 6.6 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims, shall be juxtaposed on a log-log scale. The equation representing the finite life fatigue resistance of these AASHTO detail categories is:

$$N \equiv A / S^3_{r,eff}$$

where:

N ≡ number of cycles to failure.
$S_{r,eff}$ ≡ nominal effective stress range representing fatigue resistance.
A ≡ constant defined in Table 6.6.1.2.5-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims.

The minimum number of cycles associated with infinite fatigue life, N_{min}, and the corresponding constant amplitude fatigue limit (CAFL) for each AASHTO detail category is designated in the table below.

Detail Category	N_{min} (infinite fatigue life)	CAFL(ksi)
A	1.8×10^6 cycles	24
B	3.0×10^6 cycles	16
B'	3.5×10^6 cycles	12
C	4.4×10^6 cycles	10
C'	2.5×10^6 cycles	12
D	6.4×10^6 cycles	7.0
E	1.2×10^7 cycles	4.5
E'	2.2×10^7 cycles	2.6

Finite Life Regime Testing

The number of cycles, N, to either failure or runout, associated with each of the ten data need not exceed N_{min}, designated in the table in the **Interpretation of Fatigue Test Data** subsection of this Special Provision.

The detail category applicable to fatigue design shall be that corresponding to the highest of the AASHTO detail category fatigue resistance graphs representing a lower bound of all ten experimentally acquired data.

If all but one datum falls above a selected AASHTO S-N curve, that one datum may be discarded and replaced by three new data obtained through additional testing. The additional testing shall be

conducted using the same stress range as that of the discarded datum. The three additional data shall be plotted along with the remaining nine data. The applicable detail category shall be that corresponding to the highest of the AASHTO detail category fatigue resistance graphs representing a lower bound of all twelve data, except as limited in the previous table. For any detail, only one datum may be discarded and subsequently replaced with three additional data for any set of ten original data.

The maximum fatigue resistance of any detail shall not exceed that associated with the fatigue category prescribed in the table below.

Type of Detail	**Maximum Permitted Category**
Welded Multiple Centerbeam-to-Support Bar Connections	C
Weld Stirrup Attachments for Single Support Bar Systems	B
Bolted Stirrup Attachments for Single Support Bar Systems	D
Groove Welded Centerbeam Splices[1]	C
Miscellaneous Welded Connections[2]	C
Miscellaneous Bolted Connections	D

Footnotes:
1. Groove welded full penetration splices may be increased to Category B if weld integrity is verified using non-destructive testing (NDT).
2. Miscellaneous connections include attachments for equidistant devices.

The fatigue resistance for stirrups welded to a centerbeam flange shall not be taken greater than that defined using the fatigue details defined in Section 6.6 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims. The applicable fatigue detail for the centerbeam flange and for the stirrup shall be either a "Longitudinally Loaded Groove-Welded Attachment" or a "Longitudinally Loaded Fillet-Welded Attachment", depending upon the type of connection used.

Infinite Life Regime Testing

The applicable constant amplitude fatigue limit (CAFL) for fatigue design may be selected as the highest CAFL of the AASHTO detail categories representing a lower bound to the experimentally acquired data. The CAFL of the AASHTO detail categories are designated in the table in the **Interpretation of Fatigue Test Data** subsection of this Special Provision.

A unique CAFL (different from the CAFL categories delineated in Section 6.6 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims) may be established if all ten data are within 4 ksi of that unique CAFL.

Data Reporting for Fatigue Tests

Fatigue test results and observations shall be reported in the typical S-N format (logarithm (S) vs. logarithm (N)) with the log of the stress range plotted as the ordinate (y-axis). Additionally, the data shall be reported in tabular format. The table shall contain the following information:

1. Nominal stress range at the specific detail, $S_{r,eff.}$

2. Applied load range for each patch.

3. Number of cycles at initial observation of cracking (for reporting purposes only, not included as S-N data).

4. Number of cycles at failure or termination of the test, N, and the reason for stopping the test (failure or termination).

5. Type of crack as described in the **Fatigue Test Failure Criteria** subsection of this Special Provision. A detailed description of the fatigue crack shall be provided if the observed crack does not resemble any of the crack types described in the **Fatigue Test Failure Criteria** subsection of this Special Provision.

The following information shall also be reported:

1. Expansion joint system type and manufacturer.

2. Drawings depicting shape, size, and dimensions of the specimen.

3. Drawings depicting fixture details, including specimen orientation.

4. Section properties and dimensions of the centerbeam and support bar.

5. Centerbeam-to-support bar connection details:

   a. Weld procedure specifications for welded expansion joint systems.

   b. Bolt size, material specifications, location, and method of tightening for bolted expansion joint systems.

Durability Testing of Elastomeric Support Bearings

This subsection provides guidelines for durability testing of the elastomeric support bearings typically used in modular expansion joint systems. It is not applicable to compression springs, equidistant springs, or other elastomeric components.

Tests shall be performed dynamically on individual bearings. Fatigue life is evaluated by applying a displacement range to each specimen rather than a load or stress range.

Specimens shall comprise full scale bearing components representative of those installed in field applications. PTFE sliding surfaces or materials typically bonded to the elastomeric support bearings shall be fabricated as an integral part of the specimen.

Prior to testing, each specimen shall be visually inspected for any flaws or defects that could plausibly affect fatigue resistance. Any flaws or details shall be defined and recorded. Data obtained from specimens containing such anomalies shall not be excluded from the data set. Observed anomalies shall also be reported with the test data.

Test fixtures shall have the capability to adequately support and secure the specimen throughout the duration of the test. The fixture shall be designed and fabricated to such tolerances as required to assure that additional stresses will not be generated in the specimen as a consequence of fixture misalignment.

Loads shall be applied through hydraulic actuators or other similar loading devices. Fatigue testing shall be performed using displacement control. Displacement and load ranges shall be continuously monitored throughout the duration of the fatigue test to assure that desired displacement range and minimum preload are maintained.

Load shall be applied to the specimen through flat steel plates that are smooth and free of surface corrosion. These plates shall be sufficiently thick to assure even load distribution to the specimen.

Dynamic Stiffness Test

Testing shall be conducted on each specimen to be subjected to fatigue testing in order to establish its dynamic stiffness for at least three different loading frequencies. The maximum of these loading frequencies shall be equal to the service load frequency corresponding to a vehicle traveling at 60 mph. The loading frequency, f, shall be calculated as:

$$f \equiv 0.5 \cdot V / (g + b)$$

where

$V \equiv$ vehicle speed (60 mph at service load)
$g \equiv$ centerbeam gap (assume mid-range configuration)
$b \equiv$ centerbeam width

The load range applied during the dynamic stiffness test shall be that obtained from structural analysis using fatigue wheel load and wheel load distribution factors as specified in the **Design Axle Loads and Impact Factors** and **Distribution of Wheel Loads** subsections of this Special Provision.

Each dynamic stiffness test shall be performed three times. Data from individual tests shall be compared to assure consistency of test results.

Bearing Fatigue Test

A minimum of three fatigue tests shall be required to establish the durability of each type of bearing.

The fatigue test shall be conducted using displacement control. The displacement (strain) range shall be applied using a sine or other smooth waveform at any frequency less than or equal to the service load frequency calculated in the **Dynamic Stiffness Test** subsection of this Special Provision. The magnitude of the applied displacement amplitude, Δ, shall be calculated as:

$$\Delta \equiv R_V / K$$

where

$R_v \equiv$ vertical reaction force at the support bearing as obtained from structural analysis

$K \equiv$ dynamic stiffness of the support bearing as determined in the **Dynamic Stiffness Test** subsection of this Special Provision

A minimum precompression strain shall be maintained in the specimen throughout the duration of the test. This precompression strain shall be approximately equal to that present in a support bearing in a field installation. The magnitude of the applied cyclic strain shall be at least equal to the precompression strain.

The minimum and maximum dynamic load shall be recorded at the beginning of the test. The minimum and maximum dynamic load shall be monitored and periodically recorded throughout the duration of the test.

At the end of each applied displacement cycle, the displacement shall be held at the precompression level for no less than one half of the period of loading in order to facilitate heat dissipation. Artificial air flow devices (electrical fans) may be used to assist heat dissipation. Excessive heat generation will adversely affect the tested fatigue life.

A specimen shall be accepted as having passed the fatigue test criteria after withstanding 2 million cycles of loading without failure.

The following criteria shall constitute failure:

1. The elastomeric material exhibits excessive deterioration or cracking.

2. The measured minimum dynamic load falls to 30% of the initial dynamic load recorded at test initiation.

3. The measured dynamic load range decreases to half of the initial dynamic load range recorded at test initiation.

Data Reporting for Bearing Fatigue Test

Data shall be reported in tabular format and shall contain the following information for each specimen tested:

1. Minimum (precompression) strain, maximum strain, displacement, and load at test initiation.

2. Type of loading impulse (sine wave, ramp, etc.).

3. Number of cycles at initial observation of distress leading to failure (for reporting purposes only, not to be included in the data).

4. Number of cycles at failure.

5. A description of the mode of failure.

The following data shall also be reported for each specimen tested:

1. Bearing type and manufacturer.

2. Drawings depicting shape, size, and dimensions of the specimen including any PTFE sliding surfaces or materials bonded to the specimen.

3. Drawings depicting fixture details, including specimen orientation.

Fatigue Testing Laboratory

Fatigue testing shall be performed by an independent testing laboratory. The following individuals have stated that they have access to facilities capable of performing the fatigue testing:

1. Prof. Charles W. Roeder
   Department of Civil Engineering
   233B More Hall
   University of Washington
   Seattle, WA
   Tel: (206) 543-6199
   Fax: (206) 543-1543

2. Dr. John W. Fisher
   ATLSS Research Center
   Lehigh University
   117 ATLSS Drive
   Bethlehem, PA 18015-4793
   Tel: (215) 758-3535
   Fax: (215) 758-5553

3. Robert J. Conner/Mark D. Bowman
Bowen Laboratory
Purdue University
1040 S. River Road
West Lafayette, IN 47907-2101
Tel: (765) 496-8272
Fax: (765) 494-9886

Fatigue Testing Reference

Provisions contained in the **Fatigue Testing of Metallic Structural Components and Connections** and **Durability Testing of Elastomeric Support Bearings** subsections of this Special Provision have been developed from research summarized in National Cooperative Highway Research Program Report 402 "Fatigue Design of Modular Bridge Expansion Joints", National Academy Press, Washington DC, 1997.

General Fabrication Requirements

The expansion joint systems shall be fabricated consistent with the details, dimensions, material specifications, and procedures delineated in the approved shop plans. All fabrication procedures shall be in conformance with the Standard Specifications and the Special Provisions.

All expansion joint systems shall be fabricated by the same manufacturer.

Metallic attachments used to secure elastomeric seals to the centerbeams, if welded to the centerbeams and edge beams, shall be welded continuously along both their top and bottom edges.

PTFE Sliding Surfaces

All PTFE shall be bonded under controlled conditions and in strict accordance with written instructions provided by the PTFE manufacturer.

All PTFE surfaces shall be smooth and free of bubbles after completion of bonding operations.

Stainless Steel Sliding Surfaces

All stainless steel sliding surfaces in contact with PTFE shall be polished to a Number 8 mirror finish.

Each stainless steel sheet shall be welded to the steel backing plate in accordance with current AWS specifications. The stainless steel sheet shall be clamped to provide full contact with the steel backing plate during welding. The welds shall not protrude above the sliding surface of the stainless steel sheet.

Corrosion Protection

All steel surfaces, except those surfaces beneath stainless steel sheet, those to be bonded to PTFE, or those in direct contact with strip seals, shall be protected against corrosion by one of the following methods:

1. Zinc metallized in accordance with Section 6-07.3 as supplemented in these Special Provisions.

2. Hot-dip galvanized in accordance with AASHTO M 111.

3. Painted in accordance with Section 6-03.3(30) as supplemented in these Special Provisions. The color of the final coat shall be Washington Gray. The surfaces embedded in concrete shall be painted only with a shop coat of inorganic zinc silicate paint.

Inspection

Each expansion joint system shall be subjected to and shall pass three levels of inspection in order to be accepted. These three levels are Quality Control Inspection, Quality Assurance Inspection, and Final Inspection. The manufacturer shall provide both Quality Control Inspection and Quality Assurance Inspection. The Contractor shall provide access to the Engineer for the Final Inspection.

Quality Control Inspection

Quality control inspection shall be provided by the manufacturer on a full time basis during the fabrication process of all major components to assure that the materials and workmanship meet or exceed the minimum requirements of the contract. Quality control inspection shall be performed by an entity having a line of responsibility distinctly different from that of the manufacturer's fabrication department.

Quality Assurance Inspection

Quality assurance inspection shall be performed by an independent inspection agency provided by the manufacturer. Quality assurance inspection is not required to be full time inspection, but shall be performed during all phases of the manufacturing process.

Final Inspection

Final inspection of each expansion joint system will be performed by the Engineer at the job site immediately prior to installation. The Contractor shall provide an accessible work area for this inspection. During final inspection, the Engineer will inspect each expansion joint system for proper alignment, complete bond between expansion joint strip seals and steel components, and proper steel stud placement.

There shall be no bends or kinks in the steel components, except as required to follow bridge deck grades and as specifically detailed on the approved shop plans. Straightening of unintended bends or kinks will not be permitted. Any expansion joint system exhibiting bends or kinks, other than those shown on the approved shop plans, shall be removed from the job site and replaced with a new expansion joint system at the expense of the Contractor. Expansion joint strip seals not fully bonded to the steel shall be fully bonded at the expense of the Contractor.

Studs will be visually inspected and will be struck lightly with a hammer. Any stud which does not have a complete end weld or does not emit

tintinnabulation when struck lightly with a hammer shall be replaced. Any stud located more than one inch, in any direction, from the location specified on the shop plans shall be carefully removed and a new stud shall be welded in the proper location. All stud replacements shall be at the expense of the Contractor.

Acceptance

Each expansion joint system shall pass all three levels of inspection delineated in the **Inspection** subsection of this Special Provision to qualify for acceptance. Any expansion joint system which fails any one of the three levels of inspection shall be replaced or repaired at no expense to the Contracting Agency and to the satisfaction of the Engineer. Any proposed remedial procedures shall be submitted to the Engineer for approval before implementation.

The Contractor shall ascertain that the manufacturer has met the fatigue resistance characterization and prequalification requirements of the **Acceptable Manufacturers** and all **Submittals** subsections of this Special Provision applicable to the specific expansion joint system being installed. The Contractor shall be responsible for any additional costs and/or time delays associated with selection of an alternative expansion joint system incurred as a result of noncompliance with these requirements, including the failure of the manufacturer to retest revised details or material substitutions of a previously prequalified system.

Shipping and Handling

The expansion joint system shall be delivered to the job site and stored in accordance with the manufacturer's approved shop plans.

Lifting mechanisms, temperature adjustment devices, and temporary anchorages shall not be welded to the centerbeams or edge beams.

Damage to the expansion joint system during shipping or handling shall be just cause for rejection of the expansion joint system.

Damage to the corrosion protection system shall be repaired to the satisfaction of the Engineer.

Installation

A qualified installation technician shall be present at the job site to assure proper installation of each expansion joint system. This technician shall be a full time employee of the manufacturer of the specific expansion joint system being installed. The Contractor shall comply with all recommendations made by the expansion joint manufacturer's installation technician as approved by the Engineer. Each expansion joint system manufacturer's installation technician shall certify to the Engineer that the approved installation procedures were followed. All certifications to the Engineer shall be in writing and shall be signed and dated by the manufacturer's installation technician.

Each expansion joint system shall be installed in strict accordance with the manufacturer's approved shop plans as stipulated in the **Shop Drawings and**

Design Calculations Submittal subsection of this Special Provision and the recommendations of the manufacturer's installation technician. All centerbeam welded field splices shall be performed by a certified welder under the direct supervision of the manufacturer's qualified installation technician as specified above. The weld procedure shall have been submitted by the manufacturer and approved in accordance with the **Shop Drawings and Design Calculations Submittal** subsection of this Special Provision. The welder shall have been trained and certified for performing those approved specific welds in accordance with the current AASHTO/AWS D1.5 Bridge Welding Code.

Each permanently installed expansion joint system shall match exactly the finished bridge deck profile and grades.

The Contractor shall exercise care at all times to protect each expansion joint system from damage. The Contractor shall protect concrete blockouts and supporting systems from damage and construction traffic prior to installation of the expansion joint systems. After installation, construction loads shall not be allowed on the expansion joint systems. The Contractor shall submit to the Engineer for approval a proposed method of bridging over each expansion joint system to accommodate any construction traffic.

Each expansion joint system shall be set to a gap width corresponding to the ambient temperature at the time of setting. This information is specified in the Plans and shall also be specified on the approved shop plans. Any mechanical devices supplied by the joint system manufacturer, for the purpose of setting the expansion joint system to the proper gap width, will remain the property of the manufacturer. When no longer required, the devices shall be returned to the manufacturer.

All forms and debris that may impede movement of the expansion joint systems shall be removed.

Each expansion joint system shall be tested for watertightness after installation. The Contractor shall flood each completely installed expansion joint system with water to a minimum depth of three inches for a duration of at least one hour. If leakage is observed, the expansion joint system shall be repaired to the satisfaction of the Engineer at the Contractor's expense. The repair procedure shall be prepared by the expansion joint system manufacturer and shall be submitted to the Engineer for approval. After repairs are completed, the expansion joint shall be retested for leakage.

6-02.3(13).OPT7.BSP.GB6

Expansion Joint Modification

6-02.3(13).OPT7(A).BSP.GB6

(BSP June 26, 2000)

Plans of Existing Bridge Expansion Joint

Plans of the existing bridge(s), including expansion joint details, are available at the Project Engineer's Office for the prospective bidder's inspection.

6-02.3(13).OPT7(B).BSP.GB6

(BSP June 26, 2000)

Expansion Joint Demolition Plan

The Contractor shall submit a demolition plan with working drawings to the Engineer for approval in accordance with Section 6-01.9 showing the method of removing the specified portions of the existing bridge expansion joints. The demolition plan shall show the sequence of demolition and removal, the type of equipment to be used in all demolition and removal operations, and details of the methods and equipment used for containment, collection, and disposal of all debris. The plan shall show all stages of demolition. The Contractor shall not begin removal operations until receiving the Engineer's approval of the demolition plan.

6-02.3(13).OPT7(C).BSP.GB6

(BSP June 26, 2000)

Joint Preparation and Installation Procedure

The Contractor shall submit the sealant manufacturer's recommended joint preparation and installation procedure to the Engineer for approval. The Contractor shall not begin preparing the bridge expansion joints for installing the sealant until receiving the Engineer's approval of the joint preparation and installation procedure.

6-02.3(13).OPT7(D).BSP.FB6

(BSP June 26, 2000)

Field Measuring Existing Bridge Expansion Joints

The Contractor shall field measure the following dimensions of the existing bridge expansion joints of Bridge No(s). *** $$1$$ ***:

1. Length along the roadway surface and the horizontal and vertical surfaces of the concrete curb.

2. Opening width at both curb lines and at the centerline of the roadway surface.

The Contractor shall tabulate these field measured dimensions and submit them to the Engineer along with the rapid cure silicone sealant joint preparation and installation procedure, or the strip seal expansion joint assembly shop drawings, as applicable for the specific bridge expansion joint.

6-02.3(13).OPT7(E).BSP.FB6

(BSP January 29, 2007)

Removing Portions of Existing Bridge Expansion Joints

The Contractor shall remove all concrete, expansion joint materials, overlay, dirt and debris at the bridge expansion joints of Bridge No(s). *** $$1$$ *** within the blockout dimensions shown in the Plans.

Before removing the portions of the existing concrete adjacent to that which is to remain, a 3/4-inch deep saw cut, but no deeper than the existing concrete cover over the steel reinforcing bars, shall be made into the surface of the concrete to form a break line. Care shall be taken to prevent cutting the existing reinforcing steel bars which are to remain.

The Contractor shall remove concrete in the vicinity of the bridge expansion joints using the following power driven tools:

1. Jack hammers no heavier than the nominal 30 pound class.

2. Chipping hammers no heavier than the nominal 15 pound class.

No other power driven equipment shall be used to remove concrete in the vicinity of the bridge expansion joints. The power driven tools shall be operated at angles less than 45 degrees as measured from the surface of the deck to the tool.

Care shall be taken in removing concrete to prevent overbreakage or damage to portions of the existing structure which are to remain. Concrete shall be carefully broken away from the steel reinforcing bars which extend from the existing structure. Steel reinforcing bars which extend from the existing members shall be cleaned (defined as exposing the deformed surface of the bar) and spliced with the steel reinforcing bars in the new members unless shown otherwise in the Plans. The Contractor shall protect traffic from falling concrete and debris, in accordance with the debris collection and containment provisions of the demolition plan as approved by the Engineer. The Contractor shall dispose of all materials removed from the bridge expansion joints in accordance with Section 2-02.3.

The Contractor shall roughen the existing concrete surfaces bonding to the header material. For polymer concrete headers, polyester concrete headers, or elastomeric concrete headers, the Contractor shall clean and prepare all existing concrete surfaces bonding to the header in accordance with the ***Polymer Concrete*** or ***Polyester Concrete*** or ***Elastomeric Concrete*** subsection, respectively, to Section 6-02.3 as supplemented in these Special Provisions. For concrete headers, the Contractor shall clean and prepare all existing concrete surfaces bonding to the header in accordance with Section 6-02.3(12).

6-02.3(13).OPT7(F).BSP.GB6

(BSP June 26, 2000)

Drilling Holes and Setting Steel Reinforcing Bars

The Contractor shall drill holes for, and set, steel reinforcing bars into the existing concrete as shown in the Plans in accordance with Section 6-02.3(24)C as supplemented in these Special Provisions.

6-02.3(13).OPT7(G).BSP.GB6

(BSP January 29, 2007)

Placing Polyester Concrete or Elastomeric Concrete Headers

The Contractor shall form the polyester concrete or the elastomeric concrete headers in accordance with either the ***Polyester Concrete*** or the ***Elastomeric Concrete*** subsection to Section 6-02.3 as supplemented in these Special Provisions. The Contractor shall remove all forms from the bridge expansion joints after casting and curing the polyester concrete or the elastomeric concrete headers.

6-02.3(13).OPT7(H).BSP.GB6

(BSP January 4, 2010)

Placing Concrete Headers

The Contractor shall form, cast, and cure, the concrete headers in accordance with Section 6-02.3 and as shown in the Plans. The Contractor shall remove all forms from the bridge expansion joints after casting and curing the concrete headers. The concrete headers shall have attained a minimum compressive strength of 2,500 psi before the Contractor may allow traffic to pass across the expansion joint.

6-02.3(13).OPT7(I).BSP.GB6

(BSP August 3, 2009)

Placing Expansion Joint Sealant

The Contractor shall have the services of a qualified sealant manufacturer's technical representative physically present at the job site to assist in assuring the proper installation of the rapid cure silicone sealant, provide technical assistance for the use of the joint sealant, train the Contractor's personnel installing the joint sealant, and to observe and inspect the installation of at least the first complete joint.

The joint sealant shall not be placed against fresh concrete (excluding polymer concrete, polyester and elastomeric concrete) until at least seven days after concrete placement.

The Contractor shall clean the bridge expansion joints of all forms, dirt, form oil, grease, and other deleterious material. The Contractor shall clean and prepare the entire joint surface receiving the joint sealant in accordance with the joint preparation procedure as approved by the Engineer, and as recommended by the sealant manufacturer's technical representative, including two stage abrasive blasting surface preparation and compressed air cleaning. All steel surfaces to be in contact with the joint sealant shall be cleaned to an SSPC-SP10 condition. The joint receiving the sealant shall be sound, clean, dry, and frost free.

The Contractor shall apply the primer, as recommended by the sealant manufacturer, to all surfaces to be in contact with the joint sealant. On steel surfaces, the primer shall be dry to the touch prior to applying the joint sealant. On concrete surfaces, the primer shall cure at least 60 minutes prior to applying the joint sealant.

After the cleaned and prepared joint has received the Engineer's approval for joint dimensions, alignment, and preparation, the Contractor shall prime the bridge expansion joint surfaces, place the backer rod, and place the rapid cure silicone sealant in accordance with the joint installation procedure as approved by the Engineer, and as recommended by the sealant manufacturer's technical representative.

If the joint width at the time of installation is less than 3/8 inch or greater than three inches, the Contractor shall not proceed with the expansion joint modification until the installation procedure is revised as recommended by the

sealant manufacturer's technical representative and as approved by the Engineer.

After installing the rapid cure silicone sealant, the Contractor shall flood the joint area with water and test the joint for leakage. If leakage is detected, the bridge expansion joint system shall be repaired by the Contractor, as recommended by the sealant manufacturer and approved by the Engineer, at no additional expense to the Contracting Agency.

6-02.3(13).OPT7(J).BSP.GB6

(BSP August 3, 2009)

Placing Expansion Joint Sealant

The Contractor shall have the services of a qualified sealant manufacturer's technical representative physically present at the job site to assist in assuring the proper installation of the rapid cure silicone sealant, provide technical assistance for the use of the joint sealant, train the Contractor's personnel installing the joint sealant, and to observe and inspect the installation of at least the first complete joint.

Prior to scarifying the concrete deck for the modified concrete overlay, the Contractor shall remove all expansion joint materials and debris from the existing expansion joints, and shall dispose of these materials and debris as specified in Section 2-02.3.

Prior to placing the modified concrete overlay, the Contractor shall install a temporary form as shown in the Plans to fill the expansion joint gap. The temporary form shall preserve the expansion joint gap during the modified concrete overlay placement, and shall not damage the joint or the concrete overlay upon removal. The Contractor shall submit the type of temporary form material, and the method of installation and removal, to the Engineer for approval. The Contractor shall not begin modified concrete overlay placement operations until receiving the Engineer’s approval of the temporary form submittal.

The joint sealant shall not be placed against fresh concrete (including concrete overlay except for polyester concrete overlay) until at least seven days after concrete placement.

After placing the modified concrete overlay and rounding the corner of the overlay at the joints with a 1/4 inch radius, the Contractor shall clean the bridge expansion joints of all temporary forms, dirt, form oil, grease, and other deleterious material. The Contractor shall clean and prepare the entire joint surface receiving the joint sealant in accordance with the joint preparation procedure as approved by the Engineer, and as recommended by the sealant manufacturer's technical representative, including two stage abrasive blasting surface preparation and compressed air cleaning. All steel surfaces to be in contact with the joint sealant shall be cleaned to an SSPC-SP10 condition. The joint receiving the sealant shall be sound, clean, dry, and frost free.

The Contractor shall apply the primer, as recommended by the sealant manufacturer, to all surfaces to be in contact with the joint sealant. On steel

surfaces, the primer shall be dry to the touch prior to applying the joint sealant. On concrete surfaces, the primer shall cure at least 60 minutes prior to applying the joint sealant.

After the cleaned and prepared joint has received the Engineer's approval for joint dimensions, alignment, and preparation, the Contractor shall prime the bridge expansion joint surfaces, place the backer rod, and place the rapid cure silicone sealant in accordance with the joint installation procedure as approved by the Engineer, and as recommended by the sealant manufacturer's technical representative.

If the joint width at the time of installation is less than 3/8 inch or greater than three inches, the Contractor shall not proceed with the expansion joint modification until the installation procedure is revised as recommended by the sealant manufacturer's technical representative and as approved by the Engineer.

After installing the rapid cure silicone sealant, the Contractor shall flood the joint area with water and test the joint for leakage. If leakage is detected, the bridge expansion joint system shall be repaired by the Contractor, as recommended by the sealant manufacturer and approved by the Engineer, at no additional expense to the Contracting Agency.

6-02.3(14).GR6

Finishing Concrete Surfaces

6-02.3(14).INST1.GR6

Section 6-02.3(14) is supplemented with the following:

6-02.3(14).OPT1.GB6

(June 26, 2000)

Exposed Aggregate Finish

Submittals

The Contractor shall submit the following items to the Engineer for approval:

1. Written description of the equipment to be used and procedure to be followed in producing the exposed aggregate finish.

2. Two copies each of the manufacturer’s written instructions for applying the retardant coating and the clear sealer.

3. Type of nozzle, nozzle pressure, type and gradation of abrasive, blasting techniques, safety procedures, and containment methods and procedures used with all abrasive blasting and water blasting operations.

4. The method and materials used to collect, contain, and dispose of the concrete surface mortar removed from the finish surface, and the chemical agent residue and abrasives used to remove the concrete surface mortar.

5. A sample panel, equal to the size of one traffic barrier panel minimum, cast in a vertical position on the site and constructed in accordance with the procedure submitted to the Engineer.

The Contractor shall not begin construction of the concrete members with exposed aggregate finish until receiving the Engineer's approval of the sample panel and the other submittals specified above.

Producing Exposed Aggregate Finish

The Contractor shall produce all exposed aggregate concrete in accordance with procedure and equipment approved by the Engineer. The exposed aggregate shall achieve the same final effect as demonstrated on the sample panel approved by the Engineer.

Formwork shall be cleaned, reconditioned, and repaired before each use. Formwork with repairs, patches or defects which, in the opinion of the Engineer, would result in adverse effects to the concrete finish shall not be used.

Forms and form joints shall remain completely watertight. Butt joints and joints between form units used on surfaces which are to receive an exposed aggregate finish shall be tongue and grooved, or splined and shall be sealed with a caulking compound approved by the Engineer.

As an alternative to using tongue and grooved or splined joints, a closed cell polyvinylchloride foam sealer of 3/16 inch thickness with pressure-sensitive adhesive on one or both sides may be used to seal the butt joints between form units, as approved by the Engineer. The foam sealer shall be recessed by an amount such that when the form units are compressed to their final position, the foam sealer will be flush with the face of the form units. Adjacent formwork panels, if used, shall be in line and no offset shall occur between panels.

Forms for the exposed aggregate surface for members not yet supporting loads, including the members own load, may be removed as required to effect the exposed aggregate surface, provided the concrete has a minimum age of twelve hours and is of sufficient strength and hardness so as not to be damaged by the form removal operations and provided that curing and protection operations are maintained.

Removal of forms on the remaining concrete surfaces shall be in accordance with Section 6-02.3(17)N.

After the forms are stripped, the surface mortar shall be removed from the areas specified to receive the exposed aggregate finish.

The exposed aggregate finish shall be obtained by either one or a combination of the two following methods as necessary to provide the specified exposed aggregate finish:

Method 1 - Retardant Coating

A retardant coating as specified for Method 1 in Section 6-02.2 as supplemented in these Special Provisions shall be applied to the formwork where concrete surfaces with exposed aggregate finish are shown in the Plans.

For cast-in-place concrete the retardant shall have an effective life of not less than the length of time required for the Class EA concrete to be in place prior to the removal of forms plus 12 hours.

For slip-formed traffic barrier the retardant shall have an effective life of not less than 24 hours. The Contractor shall remove the surface mortar two to three hours after applying the retardant coating.

Retardant shall be applied in accordance with the manufacturer's instructions to remove the surface mortar.

The sealer and form release agent used on the form shall be compatible with the retardant and shall not react with the retardant to produce an undesirable effect on the exposed aggregate finish. The sealer and form release agent to be used on the form shall be as recommended by the manufacturer of the retardant and approved by the Engineer.

Surface mortar shall be removed using one of the following methods:

1. Light abrasive blasting

2. Washing with water under pressure, avoiding excessive pressure which loosens individual aggregate particles.

3. A combination of both methods.

Method 2 - Abrasive Blasting

As soon as forms are stripped, the exposed aggregate areas shall be abrasive blasted to remove the surface mortar. For slip-formed traffic barrier this shall be done once the concrete has attained a minimum age of 12 hours and is of sufficient strength and hardness to prevent damage.

Adjacent materials and finishes shall be protected from dust, dirt and other damage during abrasive blasting operations. Corners and edge of patterns shall be carefully blasted using back-up boards to maintain a uniform corner or edge line.

The abrasive blast finishing shall be done in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish on each surface or area of work.

The type and gradation of abrasive grit used, the type of nozzle, nozzle pressure, and blasting techniques shall be as specified in the Contractor's submittal as approved by the Engineer, and as required to expose the aggregate.

The Contractor shall be responsible for safety of the workers and shall equip each with air-fed helmets. The Contractor shall provide suitable enclosures for the collection of grit and dust from the abrasive blasting operation.

After receiving the Engineer's approval of the exposed aggregate finish, a 10 percent muriatic acid wash shall be applied to the exposed aggregate surfaces. Surfaces shall be flushed thoroughly with water following a 5 to 10 minute interaction period between the acid solution and the surface.

All stains and streaks on the exposed aggregate surface shall be removed before applying the clear sealer.

6-02.3(14).OPT2.GB6

(June 26, 2000)

Containment

The Contractor shall exercise care and use suitable means to collect and dispose of abrasives and chemical agents, and the resulting concrete surface mortar debris used in or resulting from the finishing of the exposed aggregate surfaces to prevent their entry into the environment surrounding the structure.

6-02.3(14).OPT3.GB6

(April 2, 2007)

Applying the Clear Sealer

Two seal coatings of the clear sealer specified in Section 6-02.2 as supplemented in these Special Provisions shall be applied to the exposed aggregate surfaces in accordance with manufacturer's recommended procedure as approved by the Engineer.

6-02.3(14).OPT4.GB6

(June 26, 2000)

General Requirements for Concrete Surface Finishes Produced by Form Liners

Horizontal and vertical joints shall be spliced in accordance with the manufacturer's printed instructions. A copy of these printed instructions shall be submitted to the Engineer prior to placement of the form liners. The Contractor shall not place concrete against the form liners until receiving the Engineer's approval of the forms and splices.

Horizontal splicing of ABS and plastic form liners to achieve the required height is not permitted and there shall be no horizontal joints. The concrete formed with ABS and plastic form liners shall be given a light sandblast to remove the glossy finish.

Side forms, traffic barrier forms, and pedestrian barrier forms using these form liners may be removed after 24 hours provided a water reducing admixture approved by the Engineer is used in the concrete, and the concrete reaches 1,400 psi minimum compressive strength before form removal. Concrete in load supporting forms utilizing these form liners shall be cured in accordance with Section 6-02.3(17)N. Once the forms are removed, the Contractor shall treat the

joint areas by patching or light sandblasting as required by the Engineer to ensure that the joints are not visible.

Form liners shall be cleaned, reconditioned, and repaired before each use. Form liners with repairs, patches, or defects which, in the opinion of the Engineer, would result in adverse effects to the concrete finish shall not be used.

Care shall be taken to ensure uniformity of color throughout the textured surface. A change in form release agent will not be allowed.

All surfaces formed by the form liner shall also receive a Class 2 surface finish. Form ties shall be a type that leaves a clean hole when removed. All spalls and form tie holes shall be filled as specified for a Class 2 surface finish.

6-02.3(14).OPT5.GB6

(April 7, 2008)

Fractured Basalt Finish

Fractured basalt finish form liners shall be placed with the pillars and joints normal to grade for barrier applications and vertical for all other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel height and width dimensions are 8 feet by 2 feet, respectively.

6-02.3(14).OPT6.GB6

(June 26, 2000)

Fractured Fin Finish

Form liners shall be placed with fins and joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

6-02.3(14).OPT7.GB6

(June 26, 2000)

Fractured Granite Finish

Form liners shall be placed with the joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

6-02.3(14).OPT8.GB6

(April 7, 2008)

Variable Depth Random Board Finish and 3/4 Inch Random Board Finish

Form liners shall be placed with board lines and joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

6-02.3(14).OPT9.GB6

(June 26, 2000)

Random Board Finish

The 3/4 inch random board finish for concrete surfaces specified in the Plans to receive such a finish shall be achieved with reusable wooden forms conforming to Section 6-02.3(17)J and the texture pattern shown in the Plans. ABS, plastic, or elastomeric form liners shall not be used.

The texture pattern shall be accomplished with 3/4 inch thick battens in varying widths applied to the surface of the forms. The edge of all battens shall be sloped 15 degrees to facilitate form removal.

The Contractor shall submit a concrete panel test section, with the 3/4 inch random board texture to be used, to the Engineer for approval. The test section shall be constructed using the forms and materials intended to construct the permanent structures. The test section shall be composed of two ten foot by ten foot form sections which shall be assembled to make a ten foot by 20 foot concrete surface section, and shall include the wall top treatment, and one horizontal joint treatment. The Contractor shall not form any concrete elements specified to receive 3/4 inch random board finish until receiving the Engineer's approval of the test section.

All cracks, holes, slits, gaps, and apertures in forms shall be plugged and caulked with molding plaster to remain completely watertight and withstand the pressures of concrete placement. Joints between the form units shall be sealed with silicone or latex caulking compound. Butt joints may be sealed with non-absorptive sponge tape. Construction joints and expansion joints shall be incorporated into the pattern of the face treatment.

Forms and form ties shall be designed to permit removal without damaging the finish. Prying against the face of the concrete will not be allowed. After removing the forms, the Contractor shall treat the joint areas by patching or light sandblasting as required by the Engineer to ensure that the joints are not visible.

Storage of formwork and form materials shall be in a manner to prevent damage or distortion. Any damage to formwork during placing, removal, or storage shall be repaired by the Contractor as no additional expense to the Contracting Agency.

Form liners shall be cleaned, reconditioned, and repaired before each use. Form liners with repairs, patches, or defects which, in the opinion of the Engineer, would result in adverse effects to the concrete finish shall not be used.

Care shall be taken to ensure uniformity of color throughout the textured surface. A change in form release agent will not be allowed.

All surfaces with the 3/4 inch random board finish shall also receive a Class 2 surface finish. Form ties shall be a type that leaves a clean hole when removed. All spalls and form tie holes shall be filled as specified for a Class 2 surface finish.

6-02.3(14).OPT10.GB6

(August 6, 2007)

Ribbed Finish

Form liners shall be placed with fins and joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

6-02.3(14).OPT11.GB6

(August 6, 2007)

Striated Finish

Form liners shall be placed with fins and joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

6-02.3(14).OPT12.GB6

(August 6, 2007)

Ashlar Stone Finish

Form liners shall be placed with the faux mortar joints and formliner joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

6-02.3(14).OPT13.GB6

(August 6, 2007)

Block Finish

Form liners shall be placed with the faux mortar joints and formliner joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

6-02.3(14).OPT14.GB6

(April 7, 2008)

Split Face Finish

Form liners shall be placed with the joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel height and width dimensions are 8 feet by 6 feet, respectively.

6-02.3(14).OPT15.GB6

(April 7, 2008)

River Rock Finish

Form liners shall be placed with the joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 4 feet in height provided that the minimum form liner panel height and width dimensions are 4 feet by 8 feet, respectively.

6-02.3(14).OPT16.GB6

(April 5, 2010)

Cascadian Stone Finish

Form liners shall be placed with joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 4 feet in height provided that the minimum form liner panel height and width dimensions are 4 feet and 8 feet respectively.

No partial rocks will be allowed in the finished pattern. Adjust horizontal and vertical joints as needed.

Form ties shall be a type that leaves a clean hole when removed. All spalls and form tie holes shall be filled as specified for a Class 2 surface finish.

6-02.3(14).OPT25.BSP.GB6

(BSP August 22, 2011)

Permeon Treatment

The Contractor shall apply surface aging treatment (Permeon Treatment) to all concrete surfaces specified in the Plans to receive permeon treatment. The Contractor shall use Federal Standard 595 Color Number 30219 as the target color. The target color is intended as a reference for hue, and is not intended as a reference for opacity or luster. The Contractor is advised that this target color is based on the following concentration formula and application rate for each of the following products:

Product	Concentration Formula	Application Rate
"Permeon Simulated Desert Varnish" produced by Soil Tech	5:1	5.5 to 6.5 square yards per gallon
"Natina Concrete Formula" produced by Natina Products, LLC	1:1	22 to 23 square yards per gallon
"Naturock" produced by Livingston Construction, Inc.	5:1	5.5 to 6.5 square yards per gallon

The permeon treatment shall be applied only by personnel approved by the manufacturer to apply the product. The Contractor shall furnish certificates of approval from the manufacturer, for the personnel scheduled to perform the work, to the Engineer prior to beginning the treatment operation.

The concrete shall be cured for the time period recommended by the manufacturer and as approved by the Engineer, prior to receiving the permeon treatment coating.

The Contractor shall clean and prepare the concrete surfaces and remove all curing compounds and other foreign substances and materials from the surface specified to receive the permeon treatment. The Contractor shall perform the cleaning and preparation in accordance with the recommendations of the manufacturer for the use of the treatment product.

The Contractor shall apply the permeon treatment to the surfaces specified, in accordance with the recommendations of the manufacturer for the use of the treatment product.

The Contractor shall prevent permeon treatment from reaching surfaces not specified to receive the permeon treatment.

The Contractor shall prevent pigmented sealer from reaching surfaces that have received permeon treatment, using preventive measures as approved by the Engineer. Should pigmented sealer reach surfaces that have received permeon treatment, the pigmented sealer shall be removed and the permeon treatment repaired as approved by the Engineer in accordance with Section 1-07.13.

6-02.3(14)C.GR6

Pigmented Sealer for Concrete Surfaces

6-02.3(14)C.INST1.GR6

Section 6-02.3(14)C is supplemented with the following:

6-02.3(14)C.OPT1.GB6

(April 6, 2009)

The color of the pigmented sealer shall be Washington Gray.

6-02.3(14)C.OPT2.GB6

(April 6, 2009)

The color of the pigmented sealer shall be Mt. St. Helens Gray.

6-02.3(14)C.OPT3.GB6

(April 6, 2009)

The color of the pigmented sealer shall be Mt. Baker Gray.

6-02.3(14)C.OPT4.GB6

(April 6, 2009)

The color of the pigmented sealer shall be Cascade Green.

6-02.3(14)C.OPT5.FB6

(April 6, 2009)

The color for the following structure feature(s) shall match the specified color(s):

Structure and Feature	Pigmented Sealer Color
*** $$1$$ ***	*** $$2$$ ***

6-02.3(17).GR6

Falsework and Formwork

6-02.3(17)C.GR6

Falsework and Formwork at Special Locations

6-02.3(17)C.INST1.GR6

Section 6-02.3(17)C is supplemented with the following:

6-02.3(17)C.OPT1.GB6

(June 26, 2000)

The Contractor shall obtain permission from the Railroad Company and the Washington Utilities and Transportation Commission for the Contractor's falsework openings over railroad tracks. The Contractor shall notify the Railroad Company at least 10 working days prior to erecting falsework over a track, and shall include the dimensions of the opening and the duration of the restricted clearance in the submittal.

6-02.3(17)K.GR6

Concrete Forms on Steel Spans

6-02.3(17)K.INST1.GR6

The first paragraph of Section 6-02.3(17)K is revised to read as follows:

6-02.3(17)K.OPT1.GB6

(August 4, 2010)

Except as otherwise specified, concrete forms on all steel structures shall be removable and shall not remain in place. Where needed, the forms shall have openings for truss or girder members. Each opening shall be large enough to leave at least 1-1/2 inches between the concrete and steel on all sides of the steel member after the forms have been removed. Unit contract prices cover all costs related to these openings.

Permanent metal forms may be used to form that portion of the concrete slab inside the webs of the steel box girders, subject to the following requirements:

1. Metal forms shall be 18 gage minimum thickness, zinc coated, steel sheet conforming to ASTM A 653 Coating Designation G 210. All accessories shall conform to ASTM A 36 or Section 9-06.1 with a zinc coating of 2.0 ounces per square foot.

2. Forms shall be designed by the Contractor to support the plastic concrete, metal forms, steel reinforcing bars, and a construction live load of 60 pounds per square foot. Deflection of the metal form shall not exceed 1/360 of the span. Camber of the metal form shall not exceed the anticipated deflection. The working unit stress shall not exceed 0.725 of the specified yield strength of the metal form material.

3. The metal forms shall provide for the full depth of the deck slab above the uppermost portions of the form. Bottom transverse steel

reinforcing bars of the deck slab shall be at least 1 inch clear of the metal forms at all points. Forms or supports shall not be welded to girder flanges.

4. The deck slab concrete shall be placed continuously between the transverse construction joints shown in the Plans, except in an emergency when the Engineer approves interrupting the concrete placement. In such an emergency, the Contractor shall construct a transverse joint at the bottom of a flute and shall field drill 1/4 inch weep holes through the metal form at 12 inch centers along the line of the joint.

5. All zinc coating on exposed metal form damaged or removed during construction shall be repaired with one coat of paint conforming to Section 9-08.1(2)B, two mils minimum dry film thickness.

6. Should the Engineer determine that inspection of the underside of the hardened slab is warranted, the Contractor shall remove at least one section of metal form in each span at no extra cost to the Contracting Agency. If excessive honeycomb or other defects are found, the Contractor shall, if required by the Engineer, remove additional form sections at no additional expense to the Contracting Agency, and shall revise concrete placing methods as required to produce sound concrete. All unacceptable concrete shall be removed or repaired as approved by the Engineer.

7. Complete layout, details, and a description of materials, for the permanent metal forms shall be included in the Contractor's falsework and formwork submittal as specified in Section 6-02.3(16).

8. No adjustment will be made to the lump sum contract price for "Bridge Deck - ____" for additional quantities of materials required because of the use of the permanent forms.

6-02.3(18).GR6

Placing Anchor Bolts

6-02.3(18).INST1.GR6

Section 6-02.3(18) is supplemented with the following:

6-02.3(18).OPT1.GR6

(January 3, 2011)

Resin Bonded Anchors

The embedment depth of the anchors shall be as specified in the Plans. If the embedment depth of the anchor is not specified in the Plans then the embedment depth shall be as specified in the table of minimum and maximum torque below.

The anchors shall be installed in accordance with the resin manufacturer's written procedure.

Holes shall be drilled as specified in the Plans. Holes may be drilled with a rotary hammer drill when core drilling is not specified in the Plans. If holes are core drilled, the sides of the holes shall be roughened with a rotary hammer drill after core drilling.

Holes shall be prepared in accordance with the resin manufacturer's recommendations and shall meet the minimum requirements as specified herein. Holes drilled into concrete shall be thoroughly cleaned of debris, dust, and laitance prior to installing the threaded rod and resin bonding material. Holes shall not have any standing liquid at the time of installation of the threaded anchor rod.

The anchor nuts shall be tightened to the following torques when the embedment equals or exceeds the minimum embedment specified.

Anchor Diameter (inch)	Minimum Torque (ft-lbs)	Maximum Torque (ft-lbs)	Minimum Embedment (Inch)
3/8	12	18	3-3/8
1/2	22	35	4-1/2
5/8	55	80	5-5/8
3/4	106	140	6-3/4
7/8	165	190	7-7/8
1	195	225	9
1-1/4	370	525	11-1/4

When the anchor embedment depth is less than the minimum values specified, the anchor nuts shall be tightened to the torque values specified in the Plans, or as recommended by the resin bonded anchor system manufacturer and approved by the Engineer.

6-02.3(19).GR6

Bridge Bearings

6-02.3(19)A.GR6

Elastomeric Bearing Pads

6-02.3(19)A.INST1.GR6

Section 6-02.3(19)A is supplemented with the following:

6-02.3(19)A.OPT1.BSP.GB6

(BSP June 26, 2000)

High-Load Elastomeric Bearing Pad Assembly

The Contractor shall install all bearings level, unless otherwise shown in the Plans.

The Contractor shall measure the slope of the top surface of the bearing and the contact surface of the bridge superstructure. If the difference in slope between these surfaces exceeds 0.005 radians, the Contractor shall adjust the surfaces to within this tolerance by shimming, grouting, or other method as approved by the Engineer.

The Contractor shall set the sole plate with epoxy gel just before setting the superstructure in place on the bearing. The Contractor shall spread a thin uniform film of silicone grease on the top surface of the sole plate in contact with the epoxy gel to prevent bonding of the sole place to the epoxy gel. The Contractor shall grease the bolts attaching the sole plate to the superstructure to prevent bonding and allow for future removal. The Contractor shall apply epoxy gel to the bottom surface of the superstructure and immediately bolt the sole plate in place to obtain a level surface at the bottom of the sole plate. The Contractor shall set the superstructure in place on the bearing before the epoxy gel has cured, squeezing out excess epoxy gel. The Contractor shall immediately remove all excess epoxy gel and grease. After the epoxy gel has cured, the Contractor shall tighten the sole plate attachment bolts.

6-02.3(19)B.GR6

Bridge Bearing Assemblies

6-02.3(19)B.INST1.GR6

Section 6-02.3(19)B is supplemented with the following:

6-02.3(19)B.OPT1.GB6

(August 3, 2009)

Fabric Pad Bearing

The fabric pad bearing consists of an upper unit and a lower unit. The upper unit consists of a stainless steel sheet and either a single sole plate or upper and lower sole plates, as shown in the Plans. The lower unit consists of a polytetrafluoroethylene (PTFE) sheet, a backing plate, and a pre-formed fabric pad, and may also include keeper bars and a masonry plate, as shown in the Plans. Lower unit components of transverse restrainer bearings and transverse stop bearings shall be as shown in the Plans. The upper and lower units shall be supplied by a single bearing manufacturer.

Shop Drawings

The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 6-03.3(7). These drawings shall include but not be limited to the following information:

1. Plan and elevation of the assembled bearing and each of the components showing dimensions and tolerances.

2. Complete details of all components and sections showing all materials incorporated into the bearing.

3. All AASHTO, ASTM or other material designations.

4. Bearing manufacturer's recommendations and procedures for bearing assembly shipment and storage.

The Contractor shall not begin fabricating the fabric pad bearings until receiving the Engineer’s approval of the shop drawings.

Flatness and Manufacturing Tolerances

Flatness of bearing surfaces shall be determined by the following method:

1. A precision straightedge, longer than the nominal dimension to be measured shall be placed in contact with the surface to be measured as parallel to it as possible.

2. A feeler gauge having an accuracy equal to the tolerance allowed ± .001 inch, shall be selected and inserted under the straightedge.

3. Surfaces are acceptable for flatness if the feeler gauge does not pass under the straightedge.

4. In determining the flatness, the straightedge may be located in any position on the surface being measured.

Flatness tolerances shall be defined as follows:

1. Class A tolerance = 0.001 x nominal dimension

2. Class B tolerance = 0.002 x nominal dimension

3. Class C tolerance = 0.005 x nominal dimension

(Nominal dimension shall be taken as the actual dimension of the plate or sheet under the straightedge, in inches.)

Manufacturing tolerances for the bearings are as follows:

PTFE Sheet

Plan dimensions:	Total nominal design area -0, +1/8"
Thickness:	-0", + 1/64"
Flatness:	Class A tolerance, both surfaces

Pre-formed Fabric Pad

Plan dimension:	-0", +3/16"
Thickness:	-1/16", +3/16"
Surface finish:	For pre-formed fabric pads fabricated from multiple layers, all pad edges shall be free of visible horizontal displacement between the individual layers.

Stainless Steel Sheet

Plan dimensions:	-0", +3/16"
Flatness:	Class A tolerance, both surfaces

Sole Plate

Plan dimensions:	-0", +3/16"
Thickness:	-1/16", +3/16"

Flatness:	Class A tolerance, side in contact with the stainless steel sheet or sole plate Class C tolerance, side in contact with epoxy gel, grout, or concrete

Backing Plate

Plan dimensions:	-0", +3/16"
Thickness:	-0", +3/16"
Width and length of recess:	-0", +1/16", of PTFE sheet size
Flatness:	Class A tolerance, both surfaces

Masonry Plate

Plan dimension:	-0", +3/16"
Thickness:	-0", +3/16"
Flatness:	Class A Tolerance, side in contact with pre-formed fabric pad. Class C tolerance, free side or side in contact with grout.

Keeper Bar

Length:	±1/8"
Section dimensions:	±1/16”
Flatness:	Class A Tolerance, side in contact with masonry plate.
Bar to bar tolerance:	±1/32"

Bars shall be not more than 1/32” out of parallel

Overall Height

Total thickness:	-0, +10 percent

Special Fabrication Requirements

When the following components are shown in the Plans as part of the fabric pad bearing assembly, the following special fabrication requirements shall apply:

PTFE

PTFE shall be 1/8 inch thick unless otherwise noted in the Plans. PTFE shall be recessed and bonded to a depth of one half the PTFE sheet thickness into the backing plate. The exposed height of the PTFE shall not be less than 3/64 inch.

Dimpled PTFE, if shown in the Plans, shall be unfilled and have a minimum thickness of 3/16 inch. Dimples shall be placed in a 1/2 inch grid and shall have a depth of 1/16 inch.

The PTFE sheet shall be recessed and chemically bonded to the supporting steel plate or bar. Bonding shall be performed under controlled conditions and in accordance with the written instructions of the PTFE manufacturer.

Following the bonding operation, the PTFE surface shall be smooth and free from bubbles. Filled PTFE shall be polished after the bonding operation is complete, in accordance with AASHTO LRFD Bridge Construction Specification Section 18.8.3.2.2, current edition and latest interims.

Stainless Steel

The stainless steel sheet shall be seal welded all around to the supporting steel plate or bar by the gas tungsten-arc welding (GTAW) process in accordance with current AWS specifications. The stainless steel sheet shall be clamped down to have full contact with the sole plate during welding. The welds shall not protrude beyond the sliding surface of the stainless steel sheet.

Keeper Bars

Each keeper bar shall be fabricated from a single steel plate. The keeper bars shall be connected to the masonry plate either by welding or by bolting, as shown in the Plans.

Corrosion Protection

Steel surfaces, except as otherwise specified, shall be painted in accordance with Section 6-07.3(9), and Section 6-03.3(30) as supplemented in these Special Provisions. The surfaces of all welds fastening stainless steel to structural steel shall be painted as specified for structural steel. Stainless steel shall not be painted. The second and third coats of paint shall be applied after the fabric pad bearing assembly has been erected in its final position with the anchor bolt nuts installed.

Bearing Component Assembly, Shipping, and Storage

Each bearing, except for upper sole plate components embedded into cast-in-place concrete superstructures, shall be fully assembled at the manufacturing plant and delivered to the construction site as a complete unit, ready for installation. The units shall be held together with removable restraints so that the sliding surfaces are not damaged.

All bearing assemblies shall be marked with the following information prior to shipping:

1. Location of the bearing, including the pier and the specific location along the pier.

2. Direction arrow pointing in the ahead on station direction.

The above information shall be marked on the top plate of the upper unit of the bearing assembly. The marks shall be permanent and shall be visible after bearing installation.

The bearing assemblies shall have centerlines marked on both upper and lower units for checking alignment in the field.

The bearing assemblies shall be shipped in light-proof, moisture-proof and dust-proof containers.

Bearing Assembly Field Inspection

Field inspection of a representative number of bearing assemblies will be performed by the Engineer. The Contractor shall provide a clean, dry and enclosed area at the site, spacious enough for the field inspection activities. The Contractor shall disassemble and reassemble the bearings for inspection by the Engineer. The disassembly and reassembly of the bearings shall be in accordance with the bearing manufacturer's written procedure and in the presence of the Engineer.

Bearings that fail the inspection shall be replaced or repaired by the Contractor, as approved by the Engineer, at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Assembly Installation

The sliding surfaces shall be finished true, lubricated and installed level, or installed as shown in the Plans for transverse restrainer bearings and transverse stop bearings.

PTFE sheet shall not be greased, except as otherwise noted. A thin uniform film of silicone grease shall be applied to the entire dimpled PTFE sheet before installation (all dimples shall be filled with grease).

For cast-in-place concrete superstructures, the fabric pad bearing upper unit shall be anchored to the structure as shown in the Plans. For precast concrete superstructures with fabric pad bearing upper units consisting of upper and lower sole plates, the upper sole plate shall be cast into and anchored to the precast concrete member as shown in the Plans.

The upper unit of fabric pad bearings for steel superstructures, and the lower sole plate assemblies for precast concrete superstructures shall be set with epoxy gel as specified below just before setting the superstructure in place.

The sole plate top surface in contact with the epoxy gel shall receive a thin uniform film of silicone grease, to prevent bonding to the epoxy gel. The anchor bolts and insert threads shall be greased to prevent bonding and allow future removal. The Contractor shall apply the epoxy gel by troweling it into the concrete recess, or onto the bottom of the steel superstructure or upper sole plate surface, and immediately bolt the upper unit of the bearing in place to obtain a level surface.

Before the epoxy gel has cured, the superstructure shall be set in place, squeezing out excess epoxy gel while filling the entire recess. Excess epoxy and grease shall be removed immediately. Special care shall be exercised at all times to ensure protection of the stainless steel and PTFE surfaces from coming in contact with concrete, epoxy gel, or any other

foreign matter. After the epoxy gel has cured, the anchor bolts shall be tightened to snug tight.

The grout pad, and masonry plate when shown in the Plans, shall be installed level. When shown with a masonry plate, the grout pad shall be pressure installed starting at the middle of the masonry plate.

All forms and debris that tend to interfere with the free action of the bearing assemblies shall be removed at the time falsework and forms are removed.

6-02.3(19)B.OPT6.BSP.GB6

(BSP September 27, 2004)

Transverse Stop Bearing

All material and construction requirements for the transverse stop bearings shall conform to those specified for **Fabric Pad Bearing**, in Sections 6-02.2 and 6-02.3(19)B as supplemented in these Special Provisions.

6-02.3(19)B.OPT7.BSP.GB6

(BSP June 4, 2012)

Cylindrical Bearing

Bearing Types

The cylindrical bearings shall be one of the following types, with bridge specific modifications, if any, as shown in the Plans:

Guided Cylindrical Bearings

Each guided cylindrical bearing shall consist of an upper, a middle, and a lower unit. The lower unit shall be a masonry plate welded to a cylindrically curved convex upper surface base plate. The convex upper surface shall be stainless steel. The middle unit shall be a bearing plate with a cylindrically curved concave lower surface and a flat upper surface.

Polytetrafluoroethylene (PTFE) sheets shall be bonded to the upper and lower surfaces of the middle unit. The upper unit shall be a sole plate to which guide bars, if shown in the Plans, shall be attached. The lower surface of the sole plate between the guide bars shall have stainless steel sheet welded to it. The interspace between the guide bars and the bearing plate shall be provided with stainless steel sheet against PTFE. The stainless steel sheet shall be welded to the guide bars and the PTFE sheet shall be mechanically fastened to the bearing plate.

Fixed Cylindrical Bearings

Each fixed cylindrical bearing shall consist of an upper and lower unit. The lower unit shall be a masonry plate welded to a cylindrically curved convex upper surface base plate. The convex upper surface shall be of stainless steel. The upper unit shall be a sole plate welded to a cylindrically curved, concave lower surface bearing plate. Polytetrafluoroethylene (PTFE) sheet shall be bonded to the concave surface.

Design Requirements

The Contractor shall design the bearing assemblies based on the current AASHTO LRFD Bridge Design Specifications, including latest interims, and also based on the following:

1. The bearing assembly design requirements for loads, movements, and rotations shall be as shown in the Plans.

2. The bearing assembly shall be removable and replacable by raising the bridge superstructure 1/4 inch maximum. The bearing shall be held in place by recessing the upper and lower keeper plates and by providing recessed bolted keeper bars on the side of bearing removal.

3. The area of the PTFE surface shall be designed so that the contact pressure does not exceed the maximum contact pressure specified in Table 14.7.2.4-1 of the AASHTO LRFD Bridge Design Specifications. The contact stress shall be determined at the strength limit state as specified in Section 14.7.2.4 of the AASHTO LRFD Bridge Design Specifications.

4. The minimum coefficient of friction on PTFE surfaces used for design shall be those corresponding to 68F in Table 14.7.2.5-1 of the AASHTO LRFD Bridge Design Specifications.

5. The anchorage of the sole plates, masonry plates, and guide bars to the supporting structural element shall be designed for the maximum horizontal design force per bearing shown in the Plans, or 10 percent of the maximum unfactored vertical design force per bearing, whichever is greater.

6. The sole and masonry plates shall have leveling capabilities.

7. The guide bars shall maintain all guided components within the guides at all points of translation and rotation of the bearing.

Submittals

Design Calculations

The Contractor shall submit design calculations for all the bearing components, including the base plates, bearing plates, sole plates, masonry plates, keeper plates and bars, and anchor bolts to the Engineer for approval in accordance with Section 6-02.3(16). The design calculations shall accompany the shop plans.

The calculations shall provide, but not be limited to the following information:

1. Bending stresses in the plates due to bearing pressure at maximum design load and eccentricity.

2. Concrete bearing pressure under the plates at maximum bearing pressure and eccentricity.

3. Bearing clearances at maximum load and rotation. The calculated clearances shall include the effects of anticipated initial set and modified center of rotation.

4. Design of all connections and mating surfaces.

5. Compressive stress on all sliding surfaces at maximum and minimum design loads, including rotation.

6. The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the calculations.

Bearing Manufacturer Requirements

The cylindrical bearing manufacturer shall have a minimum of three years experience in fabrication of cylindrical bearings, and shall meet additional testing requirements as specified in this Special Provision.

The Contractor shall submit the name of the cylindrical bearing manufacturer with a certification of cylindrical bearing manufacturing experience to the Engineer for approval. The certification of experience shall include a list of at least three cylindrical bearing installations performed by the bearing manufacturer on previous projects. The list shall include the following information for each installation:

1. Project Name and Location (Bridge name and highway number).

2. Date of installation.

3. Governmental Agency/Owner.

4. Name, address, and phone number of the Governmental Agency's/Owner's representative.

The Contractor shall not begin preparation of the design calculations and shop plans until receiving the Engineer's written approval of the bearing manufacturer's certification of experience.

Shop Drawings

The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 6-03.3(7). These drawings shall include but not be limited to the following information:

1. Bearing schedule identifying location and bearing type as described in subsection **Bearing Types** of this Special Provision.

2. Minimum and maximum horizontal and vertical service loads.

3. Magnitude and direction of movements at all bearing support points.

4. Minimum and maximum rotation capacity.

5. Construction rotation requirements.

6. Plan and elevation of the assembled bearing and each of the components showing dimensions and tolerances.

7. Complete details of all components and sections showing all materials incorporated into the bearing.

8. All AASHTO, ASTM, and other material designations.

9. All surface finishes.

10. Bearing manufacturer's recommendations and procedures for bearing assembly shipment, storage, and installation.

The Contractor shall not begin fabricating the cylindrical bearings until receiving the Engineer's approval of the shop drawings.

Shop Inspection

The manufacturer shall provide for inspection, as specified in the **Bearing Inspection and Acceptance** subsection of this Special Provision. Inspection during the fabrication process shall ensure that the materials and workmanship meet the requirements of the contract.

Quality Assurance Inspection and Final Shop Inspection shall be performed by an independent inspection entity approved by the Engineer. The Contractor shall submit the name, address, phone number and contact person of the inspection entity performing the required certified shop inspection of the bearings to the Engineer for approval. The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the inspection entity for certified shop inspection.

Bearing Testing Procedure

The Contractor shall submit the name, address, phone number, and contact person of the testing entity performing the required bearing testing specified in **Bearing Testing** subsection of this Special Provision to the Engineer for approval.

The testing entity shall be one of the following:

1. An independent testing agency.

2. The cylindrical bearing manufacturer, with independent verification by the inspection entity performing the certified shop inspection of the bearings.

The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the testing entity.

Bearing Assembly Inspection Reports and Certificates

The Contractor shall submit the daily inspection reports of the independent inspection entity performing the required certified shop inspection to the Engineer for approval. The daily inspection reports shall report on the shop fabrication and testing activities relating to the bearing assemblies, and their conformance to the specification requirements.

The Contractor shall submit written documentation from the bearing manufacturer certifying that the bearing assemblies have been manufactured in full compliance with the specification requirements.

The Contractor shall not ship the bearing assemblies from the fabricator's facility until receiving the Engineer's approval of the certified shop inspection daily inspection reports and the bearing manufacturer's certificate of compliance.

Flatness and Manufacturing Tolerances

Flatness of bearing surfaces shall be determined by the following method:

1. A precision straightedge, longer than the nominal dimension to be measured shall be placed in contact with the surface to be measured as parallel to it as possible.

2. A feeler gauge having an accuracy of □ 0.001 inches equal to the tolerance allowed shall be selected and inserted under the straightedge.

3. If the feeler gauge does not pass under the straightedge, the surfaces shall be acceptable for flatness.

4. In determining the flatness, the straightedge may be located in any position on the surface being measured.

Flatness tolerances shall be defined as follows:

1. Class A tolerance = 0.001 x nominal dimension

2. Class B tolerance = 0.002 x nominal dimension

3. Class C tolerance = 0.005 x nominal dimension

(Nominal dimension shall be taken as the actual dimension of the plate or sheet under the straightedge, in inches.)

Manufacturing tolerances for the bearings are as follows:

Sole, Bearing, Base, and Masonry Plate

Plan dimensions	
Greater than 30 inches:	-0.00, +3/16 inch
30 inches or less:	-0.00, +1/8 inch
Thickness:	-1/32, +1/8 inch
Flatness:	Class A tolerance, side in contact with steel or PTFE Class C tolerance, side in contact with grout or concrete

Guide Bar

Length:	± 1/8 inch
Section dimensions:	± 1/16 inch
Flatness:	Class A tolerance, side in contact with steel
Bar to bar tolerance:	± 1/32 inch

Bars shall be not more than 1/32” out of parallel

PTFE Sheet

Plan dimensions:	Total nominal design area –0, +5 percent
Thickness:	-0.00, +1/64 inch
Flatness:	Class A tolerance
PTFE Recess:	Length and width –0.00, +0.04 inch

Stainless Steel Sheet

Flatness:	Class A tolerance

Curved Surfaces

Convex Radius:	-0.01, +0.00 inch
Concave Radius:	-0.00, +0.01 inch

Overall Height

Total thickness:	-1/16, +3/16 inch

The edges of all components shall be broken by grinding so that there are no sharp edges.

Special Fabrication Requirements

When the following components are shown in the Plans as part of the cylindrical bearing assembly, the following special fabrication requirements shall apply:

Sole Plate and Masonry Plate

The sole plate and masonry plate shall be 3/4 inches minimum thickness, unless otherwise shown in the Plans.

PTFE Sheet

The thickness of solid PTFE sheet shall be a minimum of 1/8 inch and a maximum of 3/16 inch. Solid PTFE sheet shall be recessed for a depth equal to one-half of its thickness into the material it is bonded to.

The thickness of woven PTFE fabric, if used, shall be a minimum of 1/16 inch and a maximum of 1/8 inch.

Dimpled PTFE, if shown in the Plans, shall be unfilled and shall have a maximum thickness of 3/16 inch. Dimples shall be placed on a 1/2 inch grid and have a depth of 1/16 inch.

The PTFE sheet shall be recessed and chemically bonded to the supporting steel plate or bar. The woven PTFE sheet shall be mechanically bonded to the supporting steel plate or bar by using an interlocking grid. Bonding shall be performed under controlled conditions and in accordance with the written instructions of the PTFE manufacturer.

Following the bonding operation, the PTFE surface shall be smooth and free from bubbles. Filled PTFE shall be polished after the bonding operation is complete, in accordance with AASHTO LRFD Bridge Construction Specification Section 18.8.3.2.2, current edition and latest interims.

Stainless Steel Sheet

The stainless steel sliding surface shall completely cover the PTFE surface in all operating positions plus one additional inch in all directions.

The stainless steel shall be 14 gage thick for the main sliding surfaces and 10 gage thick for the guide bars.

The curved surfaces that receive stainless steel shall be weld overlaid to produce a surface chemistry equivalent to ASTM A 240 Type 304L stainless steel.

Stainless steel welded overlay on the curved surface shall be a minimum of 3/32 inch thick after welding, grinding, and polishing.

The stainless steel sheet shall be seal welded all around to the supporting steel plate or bar by the gas tungsten arc welding (GTAW) process in accordance with current AWS specifications. The stainless steel sheet shall be clamped down to have full contact with the supporting steel plate or bar during welding. The welds shall not protrude beyond the sliding surface of the stainless steel sheet.

Guide Bar

Each guide bar shall be fabricated from a single steel plate. The guide bars shall be connected to the cylindrical bearing assembly by recessing and bolting. The stainless steel sheet shall be welded to the guide bar before attaching the guide bar to the cylindrical bearing assembly. The space between the guide bar and the guided component shall be 3/16 inch ± 1/16 inch.

Corrosion Protection

Steel surfaces, except as otherwise specified below, shall be painted in accordance with Section 6-07.3(9), and Section 6-03.3(30) as supplemented in these Special Provisions. The weld surfaces fastening stainless steel to structural steel shall be painted as specified for structural steel. Stainless steel shall not be painted. Galvanized fastening hardware (anchor bolts, bolts, nuts and washers) shall be painted in accordance with Section 6-07.3(11)A.

All coats of paint as specified in Section 6-07.3(9)A for steel surfaces shall be applied in the shop. After the cylindrical bearing assembly has been erected in its final position with the anchor bolt nuts installed, all surfaces with damaged paint shall be repaired in accordance with Section 6-07.3(9)I.

All coats of paint as specified in Section 6-07.3(11)A for galvanized fastening hardware shall be applied after the cylindrical bearing assembly has been erected in its final position with the anchor bolt nuts installed. The Contractor shall prepare the galvanized surfaces for painting in accordance with Section 6-07.3(11)A except only hand or power tool cleaning methods shall be used.

The embedded pipe assembly, when shown in the Plans, shall not be painted.

Bearing Testing

The Contractor shall provide for testing of the bearings. The testing shall be performed by the testing entity submitted by the Contractor and approved by the Engineer as specified in the **Bearing Testing Procedure** subsection of this Special Provision.

All testing specified by this Special Provision performed by the bearing manufacturer shall be witnessed by the inspection entity performing the certified shop inspection of the bearings.

When fabrication of the bearings is complete, a Wear and Damage Characteristics test shall be performed either on bearing assemblies randomly selected from the production bearings, or on an equal number of prototype bearings with a minimum design capacity of 1,000 kips. One bearing per lot shall be tested where one lot is defined as the smaller of the following:

1. 25 cylindrical bearing assemblies.

2. The total quantity of cylindrical bearing assemblies specified in the contract.

The Wear and Damage Characteristics test shall be performed on the selected test bearing assemblies as follows:

1. The bearing shall be subjected to 5,000 cycles of rotation (2.0 degrees each direction from level, 4.0 degrees total rotation) under the specified vertical dead load plus live load.

2. After completing the load cycles, the bearing shall be disassembled and inspected for wear and damage. A 1/64 inch reduction in PTFE thickness, or damage to the bearing, shall be cause for rejection of the bearing assembly.

3. The test bearing shall show no signs of defects and failure while under load, and after disassembly and inspection.

Failure of the test bearing will result in rejection of all bearings.

The testing requirements specified above may be waived for bearing manufacturers with at least three years of cylindrical bearing fabrication experience provided:

1. The bearing manufacturer, through the Contractor, shall submit certified test results from a previous installation of cylindrical bearings of similar design and load capacity to the Engineer for approval. This submittal shall accompany the design calculation and shop plan submittal.

2. The tests performed on the previously installed bearings satisfy the requirements specified above.

3. All test requirements not performed on and not satisfied by the previously installed bearings shall be performed on and satisfied by a test bearing in this contract through a Wear and Damage Characteristics test as specified above.

The test bearing may be used as a production bearing provided:

1. The test results meet with the approval of the Engineer.

2. The test bearing was selected from the production bearings.

3. All PTFE in the test bearing assembly shall be replaced with new PTFE.

Bearing Inspection and Acceptance

Three levels of inspection shall be satisfied before the bearings are accepted. These are: Quality Control Inspection, Quality Assurance

Inspection, and Final Shop Inspection. The manufacturer shall provide for both Quality Control and Quality Assurance Inspection. The manufacturer shall provide access for the Final Shop Inspection. The three levels of inspection are described below:

1 Quality Control Inspection
During the fabrication process of all major components, the manufacturer shall provide full time Quality Control Inspection to ensure that the materials and workmanship meet or exceed the minimum requirements of the contract. Quality Control Inspection shall be the responsibility of the manufacturer's quality control group, which shall be independent of the fabrication group.

2. Quality Assurance Inspection
Quality Assurance Inspection shall be performed by the independent inspection entity performing the certified shop inspection, as submitted by the Contractor and approved by the Engineer. The independent inspection entity, the proposed Quality Assurance Inspection Program, and the forms to be used for the Quality Assurance Program shall be submitted to the Engineer for approval prior to the start of fabrication. Quality Assurance Inspection is not required to be full time inspection, but shall be done at all phases of the manufacturing process. The frequency of inspection shall be included in the Quality Assurance Inspection Program.

3. Final Shop Inspection
Prior to shipping the bearings to the job site, a representative number of bearings shall be inspected by the independent inspection entity at the manufacturer's facility. The manufacturer shall provide a clean, dry, and enclosed area for the bearing inspection. The manufacturer shall disassemble and reassemble the bearings for inspection by the independent inspection entity. The independent inspection entity shall certify that the bearings have been inspected, and that the bearings have been manufactured in full compliance with the contract requirements.

The bearings shall satisfy each of the three levels of inspection described above before they will be accepted. Bearings that fail any one of the three levels of inspection shall be replaced or repaired as approved by the Engineer at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Component Assembly, Shipping, and Storage

Each bearing, except bearing components welded to the bottom flange of steel girders, shall be fully assembled at the manufacturing plant and delivered to the construction site as a complete unit, ready for installation. The units shall be held together with removable restraints so that the sliding surfaces are not damaged. Softeners shall be placed under the

restraints to protect all painted surfaces. The Contractor shall not damage the painted surfaces while shipping, storing and installing the bearing assemblies.

All bearing assemblies shall be marked with the following information prior to shipping:

1. Location of the bearing, including the pier and the specific location along the pier.

2. Direction arrow pointing in the ahead on station direction.

The above information shall be marked on the top plate of the upper unit of the bearing assembly. The marks shall be permanent and shall be visible after bearing installation.

The bearing assemblies shall have centerlines marked on both upper and lower units for checking alignment in the field.

The bearing assemblies shall be shipped in light-proof, moisture-proof and dust-proof containers.

Bearing Assembly Field Inspection

Field inspection of a representative number of bearings assemblies will be performed by the Engineer. The Contractor shall provide a clean, dry and enclosed area at the site, spacious enough for the field inspection activities. The Contractor shall disassemble and reassemble the bearings for inspection by the Engineer. The disassembly and reassembly of the bearings shall be in accordance with the bearing manufacturer's written procedure and in the presence of the Engineer.

Bearings that fail the inspection shall be replaced or repaired by the Contractor, as approved by the Engineer, at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Assembly Installation

The Contractor shall install the cylindrical bearing assembly in accordance with the installation procedure included with the shop drawing submittal as approved by the Engineer.

PTFE sheet shall not be greased, except as otherwise noted. A thin uniform film of silicone grease shall be applied to the entire dimpled PTFE sheet before installation (all dimples shall be filled with grease).

For cylindrical bearing assemblies with PTFE and stainless steel components, the Contractor shall take special care at all times to ensure protection of the PTFE and stainless steel surfaces from coming in contact with concrete and any other foreign matter.

When bearing assemblies are supporting steel superstructure, the interface between the sole plate and the steel girder flange (or the upper and lower sole plates when separate) shall be set with epoxy gel just before setting the superstructure in place. The (lower) sole plate surface in contact with the epoxy gel shall receive a thin uniform film of silicone grease, to prevent bonding to the epoxy gel. The threads of the sole plate clamping bolts shall be greased to prevent bonding and allow future removal. The Contractor shall apply the epoxy gel by troweling it onto the bottom surface of the steel girder flange or the upper sole plate welded to the steel girder flange and shall immediately bolt the (lower) sole plate in place to obtain a level surface.

Before the epoxy gel has cured, the superstructure shall be set in place, squeezing out the excess epoxy gel while filling the interface between the steel surfaces. Excess epoxy and grease shall be removed immediately. After the epoxy gel has cured, the sole plate clamping bolts shall be tightened to snug tight.

6-02.3(19)B.OPT8.BSP.GB6

(BSP June 4, 2012)

Disc Bearing

Bearing Types

The disc bearings shall be one of the following types, with bridge specific modifications, if any, as shown in the Plans:

Guided Disc Bearings

Each guided disc bearing shall consist of an upper and a lower unit. The lower unit consists of a masonry bearing plate and an upper bearing plate, with a polyether urethane disc between the plates. A polytetrafluoroethylene (PTFE) sheet is bonded to the upper bearing plate.

The upper unit consists of a sole plate, a top sliding plate, and a stainless steel sheet welded to the bottom side of the top sliding plate. Guide bars, if shown in the Plans, shall be attached to the top sliding plate.

The interspace between the guide bars of the upper unit and the upper bearing plate of the lower unit shall be provided with stainless steel sheet against PTFE. The stainless steel sheet shall be welded to the guide bars and the PTFE sheet shall be mechanically fastened to the upper bearing plate of the lower unit.

Fixed Disc Bearings

Each fixed disc bearing shall consist of an upper and a lower unit. The lower unit consists of a masonry bearing plate and an upper bearing plate, with a polyether urethane disc between the plates. A polytetrafluoroethylene (PTFE) sheet is bonded to the upper bearing plate.

The upper unit consists of a sole plate, and a stainless steel sheet welded to the bottom side of the sole plate.

Design Requirements

The Contractor shall design the bearing assemblies based on the current AASHTO LRFD Bridge Design Specifications, including latest interims, and also based on the following:

1. The bearing assembly design requirements for loads, movements, and rotations shall be as shown in the Plans.

2. The bearing assembly shall be removable and replacable by raising the bridge superstructure 1/4 inch maximum. The bearing shall be held in place by recessing the upper and lower keeper plates and by providing recessed bolted keeper bars on the side of bearing removal.

3. The area of the polyether urethane disc shall be designed for a unfactored stress of 5,000 psi $\pm$ 5 percent at full dead load and live load.

4. The area of the PTFE surface shall be designed so that the contact pressure does not exceed the maximum contact pressure specified in Table 14.7.2.4-1 of the AASHTO LRFD Bridge Design Specifications. The contact stress shall be determined at the strength limit state as specified in Section 14.7.2.4 of the AASHTO LRFD Bridge Design Specifications.

5. The minimum coefficient of friction on PTFE surfaces used for design shall be those corresponding to 68F in Table 14.7.2.5-1 of the AASHTO LRFD Bridge Design Specifications.

6. The anchorage of the sole plates, masonry plates, and guide bars to the supporting structural element shall be designed for the maximum horizontal design force per bearing shown in the Plans, or 10 percent of the maximum unfactored vertical design force per bearing, whichever is greater.

7. The sole and masonry plates shall have leveling capabilities.

8. The guide bars shall maintain all guided components within the guides at all points of translation and rotation of the bearing.

Submittals

Design Calculations

The Contractor shall submit design calculations for all the bearing components, including the polyether urethane disc, shear pin, bearing plates, sole plates, masonry plates, guide bars, and anchor bolts to the Engineer for approval in accordance with Section 6-02.3(16). The design calculations shall accompany the shop plans.

The calculations shall provide, but not be limited to the following information:

1. Bending stresses in the plates due to bearing pressure at maximum design load and eccentricity.

2. Concrete bearing pressure under the plates at maximum bearing pressure and eccentricity.

3. Bearing clearances at maximum load and rotation. The calculated clearances shall include the effects of anticipated initial set and modified center of rotation.

4. Shear stress in the shear pin at maximum horizontal load.

5. Design of all connections and mating surfaces.

6. Compressive stress on all sliding surfaces at maximum and minimum design loads, including rotation.

The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the calculations.

Bearing Manufacturer Requirements

The disc bearing manufacturer shall have a minimum of three years experience in fabrication of disc bearings, and shall meet additional testing requirements as specified in this Special Provision.

The Contractor shall submit the name of the disc bearing manufacturer with a certification of disc bearing manufacturing experience to the Engineer for approval. The certification of experience shall include a list of at least three disc bearing installations performed by the bearing manufacturer on previous projects. The list shall include the following information for each installation:

1. Project Name and Location (Bridge name and highway number).

2. Date of installation.

3. Governmental Agency/Owner.

4. Name, address, and phone number of the Governmental Agency's/Owner's representative.

The Contractor shall not begin preparation of the design calculations and shop plans until receiving the Engineer's written approval of the bearing manufacturer's certification of experience.

Shop Drawings

The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 6-03.3(7). These drawings shall include but not be limited to the following information:

1. Bearing schedule identifying location and bearing type as described in subsection **Bearing Types** of this Special Provision.

2. Minimum and maximum horizontal and vertical service loads.

3. Magnitude and direction of movements at all bearing support points.

4. Minimum and maximum rotation capacity.

5. Construction rotation requirements.

6. Plan and elevation of the assembled bearing and each of the components showing dimensions and tolerances.

7. Complete details of all components and sections showing all materials incorporated into the bearing.

8. All AASHTO, ASTM, and other material designations.

9. All surface finishes.

10. Bearing manufacturer's recommendations and procedures for bearing assembly shipment, storage, and installation.

The Contractor shall not begin fabricating the disc bearings until receiving the Engineer's approval of the shop drawings.

Shop Inspection

The manufacturer shall provide for inspection, as specified in the **Bearing Inspection and Acceptance** subsection of this Special Provision. Inspection during the fabrication process shall ensure that the materials and workmanship meet the requirements of the contract.

Quality Assurance Inspection and Final Shop Inspection shall be performed by an independent inspection entity approved by the Engineer. The Contractor shall submit the name, address, phone number and contact person of the inspection entity performing the required certified shop inspection of the bearings to the Engineer for approval. The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the inspection entity for certified shop inspection.

Bearing Testing Procedure

The Contractor shall submit the name, address, phone number, and contact person of the testing entity performing the required bearing testing specified in **Bearing Testing** subsection of this Special Provision to the Engineer for approval.

The testing entity shall be one of the following:

1. An independent testing agency.

2. The disc bearing manufacturer, with independent verification by the inspection entity performing the certified shop inspection of the bearings.

The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the testing entity.

Bearing Assembly Inspection Reports and Certificates

The Contractor shall submit the daily inspection reports of the independent inspection entity performing the required certified shop inspection to the Engineer for approval. The daily inspection reports shall report on the shop fabrication and testing activities relating to the bearing assemblies, and their conformance to the specification requirements.

The Contractor shall submit written documentation from the bearing manufacturer certifying that the bearing assemblies have been manufactured in full compliance with the specification requirements.

The Contractor shall not ship the bearing assemblies from the fabricator’s facility until receiving the Engineer’s approval of the certified shop inspection daily inspection reports and the bearing manufacturer’s certificate of compliance.

Flatness and Manufacturing Tolerances

Flatness of bearing surfaces shall be determined by the following method:

1. A precision straightedge, longer than the nominal dimension to be measured shall be placed in contact with the surface to be measured as parallel to it as possible.

2. A feeler gauge having an accuracy of □ 0.001 inches equal to the tolerance allowed shall be selected and inserted under the straightedge.

3. If the feeler gauge does not pass under the straightedge, the surfaces shall be acceptable for flatness.

4. In determining the flatness, the straightedge may be located in any position on the surface being measured.

Flatness tolerances shall be defined as follows:

1. Class A tolerance = 0.001 x nominal dimension

2. Class B tolerance = 0.002 x nominal dimension

3. Class C tolerance = 0.005 x nominal dimension

(Nominal dimension shall be taken as the actual dimension of the plate or sheet under the straightedge, in inches.)

Manufacturing tolerances for the bearings are as follows:

Polyether Urethane Disc

Diameter:	± 1/8 inch
Thickness:	-0, + 1/16 inch
Flatness:	Class B tolerance

Discs shall be manufactured from a single piece.

Sole, Bearing, Masonry, and Sliding Plate

Plan dimensions	
Greater than 30 inches:	-0.00, +3/16 inch
30 inches or less:	-0.00, +1/8 inch
Thickness:	-1/32, +1/8 inch
Flatness:	Class A tolerance, side in contact with steel, polyether urethane disc, or PTFE
	Class C tolerance, side in contact with grout or concrete

Guide Bar

Length:	± 1/8 inch
Section dimensions:	± 1/16 inch
Flatness:	Class A tolerance, side in contact with steel
Bar to bar tolerance:	± 1/32 inch

Bars shall be not more than 1/32” out of parallel

PTFE Sheet

Plan dimensions:	Total nominal design area –0, +5 percent
Thickness:	-0.00, +1/64 inch
Flatness:	Class A tolerance
PTFE Recess:	Length and width –0.00, +0.04 inch

Stainless Steel Sheet

Flatness:	Class A tolerance

Overall Height

Total thickness:	-1/16, +3/16 inch

The edges of all components shall be broken by grinding so that there are no sharp edges.

Special Fabrication Requirements

When the following components are shown in the Plans as part of the disc bearing assembly, the following special fabrication requirements shall apply:

Sole Plate and Masonry Plate

The sole plate and masonry plate shall be 3/4 inches minimum thickness, unless otherwise shown in the Plans.

PTFE Sheet

The thickness of solid PTFE sheet shall be a minimum of 1/8 inch and a maximum of 3/16 inch. Solid PTFE sheet shall be recessed for a depth equal to one-half of its thickness into the material it is bonded to.

The thickness of woven PTFE fabric, if used, shall be a minimum of 1/16 inch and a maximum of 1/8 inch.

Dimpled PTFE, if shown in the Plans, shall be unfilled and shall have a maximum thickness of 3/16 inch. Dimples shall be placed on a 1/2 inch grid and have a depth of 1/16 inch.

The PTFE sheet shall be recessed and chemically bonded to the supporting steel plate or bar. The woven PTFE sheet shall be mechanically bonded to the supporting steel plate or bar by using an interlocking grid. Bonding shall be performed under controlled conditions and in accordance with the written instructions of the PTFE manufacturer.

Following the bonding operation, the PTFE surface shall be smooth and free from bubbles. Filled PTFE shall be polished after the bonding operation is complete, in accordance with AASHTO LRFD Bridge Construction Specification Section 18.8.3.2.2, current edition and latest interims.

Stainless Steel Sheet

The stainless steel sliding surface shall completely cover the PTFE surface in all operating positions plus one additional inch in all directions.

The stainless steel shall be 14 gage thick for the main sliding surfaces and 10 gage thick for the guide bars.

The stainless steel sheet shall be seal welded all around to the supporting steel plate or bar by the gas tungsten arc welding (GTAW) process in accordance with current AWS specifications. The stainless steel sheet shall be clamped down to have full contact with

the supporting steel plate or bar during welding. The welds shall not protrude beyond the sliding surface of the stainless steel sheet.

Guide Bar

Each guide bar shall be fabricated from a single steel plate. The guide bars shall be connected to the disc bearing assembly by recessing and bolting. The stainless steel sheet shall be welded to the guide bar before attaching the guide bar to the disc bearing assembly. The space between the guide bar and the guided component shall be 3/16 inch ± 1/16 inch.

Corrosion Protection

Steel surfaces, except as otherwise specified below, shall be painted in accordance with Section 6-07.3(9), and Section 6-03.3(30) as supplemented in these Special Provisions. The weld surfaces fastening stainless steel to structural steel shall be painted as specified for structural steel. Stainless steel shall not be painted. Galvanized fastening hardware (anchor bolts, bolts, nuts and washers) shall be painted in accordance with Section 6-07.3(11)A.

All coats of paint as specified in Section 6-07.3(9)A for steel surfaces shall be applied in the shop. After the disc bearing assembly has been erected in its final position with the anchor bolt nuts installed, all surfaces with damaged paint shall be repaired in accordance with Section 6-07.3(9)I.

All coats of paint as specified in Section 6-07.3(11)A for galvanized fastening hardware shall be applied after the disc bearing assembly has been erected in its final position with the anchor bolt nuts installed. The Contractor shall prepare the galvanized surfaces for painting in accordance with Section 6-07.3(11)A except only hand or power tool cleaning methods shall be used..

The embedded pipe assembly, when shown in the Plans, shall not be painted.

Bearing Testing

The Contractor shall provide for testing of the bearings. The testing shall be performed by the testing entity submitted by the Contractor and approved by the Engineer as specified in the **Bearing Testing Procedure** subsection of this Special Provision.

All testing specified by this Special Provision performed by the bearing manufacturer shall be witnessed by the inspection entity performing the certified shop inspection of the bearings.

When fabrication of the bearings is complete, a Proof Load test shall be performed either on bearing assemblies randomly selected from the production bearings, or on an equal number of prototype bearings with a minimum design capacity of 400 kips. One bearing per lot shall be tested where one lot is defined as the smaller of the following:

1. 25 disc bearing assemblies.

2. The total quantity of disc bearing assemblies specified in the contract.

The Proof Load test shall be performed on the selected test bearing assemblies as follows:

1. A proof load of 150 percent of the design capacity of the bearing shall be applied at the maximum design bearing rotation for a duration of six hours.

2. A bevel plate with a taper equal to the maximum design bearing rotation shall be used to simulate the specified bearing rotation.

3. After completing the specified load duration, the bearing shall be disassembled and inspected for wear and damage.

4. The test bearing shall show no signs of defects and failure while under load, and after disassembly and inspection.

Failure of the test bearing will result in rejection of all bearings.

The testing requirements specified above may be waived for bearing manufacturers with at least three years of disc bearing fabrication experience provided:

1. The bearing manufacturer, through the Contractor, shall submit certified test results from a previous installation of disc bearings of similar design and load capacity to the Engineer for approval. This submittal shall accompany the design calculation and shop plan submittal.

2. The tests performed on the previously installed bearings satisfy the requirements specified above.

3. All test requirements not performed on and not satisfied by the previously installed bearings shall be performed on and satisfied by a test bearing in this contract through a Wear and Damage Characteristics test as specified above.

The test bearing may be used as a production bearing provided:

1. The test results meet with the approval of the Engineer.

2. The test bearing was selected from the production bearings.

3. All PTFE in the test bearing assembly shall be replaced with new PTFE.

Bearing Inspection and Acceptance

Three levels of inspection shall be satisfied before the bearings are accepted. These are: Quality Control Inspection, Quality Assurance Inspection, and Final Shop Inspection. The manufacturer shall provide for both Quality Control and Quality Assurance Inspection. The manufacturer shall provide access for the Final Shop Inspection. The three levels of inspection are described below:

1 Quality Control Inspection
During the fabrication process of all major components, the manufacturer shall provide full time Quality Control Inspection to ensure that the materials and workmanship meet or exceed the minimum requirements of the contract. Quality Control Inspection shall be the responsibility of the manufacturer's quality control group that shall be independent of the fabrication group.

2. Quality Assurance Inspection
Quality Assurance Inspection shall be performed by the independent inspection entity performing the certified shop inspection, as submitted by the Contractor and approved by the Engineer. The independent inspection entity, the proposed Quality Assurance Inspection Program, and the forms to be used for the Quality Assurance Program shall be submitted to the Engineer for approval prior to the start of fabrication. Quality Assurance Inspection is not required to be full time inspection, but shall be done at all phases of the manufacturing process. The frequency of inspection shall be included in the Quality Assurance Inspection Program.

3. Final Shop Inspection
Prior to shipping the bearings to the job site, a representative number of bearings shall be inspected by the independent inspection entity at the manufacturer's facility. The manufacturer shall provide a clean, dry, and enclosed area for the bearing inspection. The manufacturer shall disassemble and reassemble the bearings for inspection by the Independent Inspection Agency. The independent inspection entity shall certify that the bearings have been inspected, and that the bearings have been manufactured in full compliance with the contract requirements.

The bearings shall satisfy each of the three levels of inspection described above before they will be accepted. Bearings that fail any one of the three levels of inspection shall be replaced or repaired as approved by the Engineer at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Component Assembly, Shipping, and Storage

Each bearing, except bearing components welded to the bottom flange of steel girders, shall be fully assembled at the manufacturing plant and delivered to the construction site as a complete unit, ready for installation.

The units shall be held together with removable restraints so that the sliding surfaces are not damaged. Softeners shall be placed under the restraints to protect all painted surfaces. The Contractor shall not damage the painted surfaces while shipping, storing and installing the bearing assemblies.

All bearing assemblies shall be marked with the following information prior to shipping:

1. Location of the bearing, including the pier and the specific location along the pier.

2. Direction arrow pointing in the ahead on station direction.

The above information shall be marked on the top plate of the upper unit of the bearing assembly. The marks shall be permanent and shall be visible after bearing installation.

The bearing assemblies shall have centerlines marked on both upper and lower units for checking alignment in the field.

The bearing assemblies shall be shipped in light-proof, moisture-proof and dust-proof containers.

Bearing Assembly Field Inspection

Field inspection of a representative number of bearings assemblies will be performed by the Engineer. The Contractor shall provide a clean, dry and enclosed area at the site, spacious enough for the field inspection activities. The Contractor shall disassemble and reassemble the bearings for inspection by the Engineer. The disassembly and reassembly of the bearings shall be in accordance with the bearing manufacturer's written procedure and in the presence of the Engineer.

Bearings that fail the inspection shall be replaced or repaired by the Contractor, as approved by the Engineer, at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Assembly Installation

The Contractor shall install the disc bearing assembly in accordance with the installation procedure included with the shop drawing submittal as approved by the Engineer.

PTFE sheet shall not be greased, except as otherwise noted. A thin uniform film of silicone grease shall be applied to the entire dimpled PTFE sheet before installation (all dimples shall be filled with grease).

For disc bearing assemblies with PTFE and stainless steel components, the Contractor shall take special care at all times to ensure protection of

the PTFE and stainless steel surfaces from coming in contact with concrete and any other foreign matter.

When bearing assemblies are supporting steel superstructure, the interface between the sole plate and the steel girder flange (or the upper and lower sole plates when separate) shall be set with epoxy gel just before setting the superstructure in place. The (lower) sole plate surface in contact with the epoxy gel shall receive a thin uniform film of silicone grease, to prevent bonding to the epoxy gel. The threads of the sole plate clamping bolts shall be greased to prevent bonding and allow future removal. The Contractor shall apply the epoxy gel by troweling it onto the bottom surface of the steel girder flange or the upper sole plate welded to the steel girder flange and shall immediately bolt the (lower) sole plate in place to obtain a level surface.

Before the epoxy gel has cured, the superstructure shall be set in place, squeezing out the excess epoxy gel while filling the interface between the steel surfaces. Excess epoxy and grease shall be removed immediately. After the epoxy gel has cured, the sole plate clamping bolts shall be tightened to snug tight.

6-02.3(19)B.OPT9.BSP.GB6

(BSP June 4, 2012)

Spherical Bearing

Bearing Types

The spherical bearings shall be one of the following types, with bridge specific modifications, if any, as shown in the Plans:

Fixed Spherical Bearings With External Restrainer

Each bearing shall consist of an upper, a middle, and a lower unit. The lower unit shall be a masonry plate, a bottom keeper plate, and a circular base plate with spherically curved concave upper surface. The base plate shall be recessed into the bottom keeper plate. Polytetrafluoroethylene (PTFE) shall be recessed and bonded to the upper concave surface of the base plate.

The middle unit shall be a bearing plate with a spherically curved convex lower surface and a flat upper surface. The convex lower surface shall be stainless steel. Polytetrafluoroethylene (PTFE) sheets shall be recessed and bonded to the upper surface of the middle unit.

The upper unit shall be a sole plate with a cylindrical cavity machined out of it. Walls of the cavity shall form the external restrainer. The lower surface of the sole plate inside the cavity shall have stainless steel sheet welded to it.

Guided Spherical Bearings With External Restrainer

Each bearing shall consist of an upper, a middle, and a lower unit. Lower and middle units shall be as specified for the fixed spherical bearings with external restrainer.

The upper unit shall be a sole plate to which guide bars, if shown in the Plans, shall be recessed and bolted. The lower surface of the steel plate between the guide bars shall have stainless steel welded to it.

Restraining effect shall be accomplished by installing a restraining plate in between the lower unit and the guide bars. Restraining plate shall be a flat plate with a circular hole in the middle. Different surfaces of the restraining plate shall be compatible with the mating surfaces. Polytetrafluoroethylene (PTFE) sheets shall be recessed and bonded to the upper, lower, and other sides (mating with the guide bars) of the restraining plate. The stainless steel sheets shall be welded to the sides of the guide bars mating with the restraining plate.

Fixed Spherical Bearings Without External Restrainer

Each bearing shall consist of an upper and lower unit. The lower unit shall be a masonry plate and a circular base plate with spherically curved convex upper surface. The base plate shall be recessed into and welded to the masonry plate. The convex upper surface shall be stainless steel.

The upper unit shall be a sole plate and a circular bearing plate with spherically curved, concave lower surface. The bearing plate shall be recessed and welded to the sole plate. Polytetrafluoroethylene (PTFE) sheet shall be recessed and bonded to the concave surface.

Guided Spherical Bearings Without External Restrainer

Each bearing shall consist of an upper, a middle, and a lower unit. The lower unit shall be a masonry plate, a bottom keeper plate, and a circular base plate with a spherically curved convex upper surface. The base plate shall be recessed into the bottom keeper plate. The convex upper surface of the base plate shall be stainless steel.

The middle unit shall be a bearing plate with a spherically curved concave lower surface and a flat upper surface. Polytetrafluoroethylene (PTFE) sheets shall be recessed and bonded to the upper and lower surfaces of the middle unit.

The upper unit shall be a sole plate and a top keeper plate to which guide bars, if shown in the Plans, shall be recessed and bolted. The lower surface of the top keeper plate between the guide bars shall have stainless steel sheet welded to it. The interspace between the guide bars and the middle unit bearing plate shall be provided with a stainless steel sheet against PTFE. The stainless steel sheet shall be welded to the guide bars and the PTFE sheet shall be recessed and mechanically bonded to the middle unit bearing plate.

Multi-Directional Spherical Bearings Without External Restrainer

Each bearing shall consist of an upper, a middle, and a lower unit. The lower unit shall be a masonry plate, a bottom keeper plate, and a circular base plate with a spherically curved convex upper surface. The base plate shall be recessed into the bottom keeper plate. The convex upper surface of the base plate shall be stainless steel.

The middle unit shall be a bearing plate with a spherically curved concave lower surface and a flat upper surface. Polytetrafluoroethylene (PTFE) sheets shall be recessed and bonded to the upper and lower surfaces of the middle unit.

The upper unit shall be a sole plate and a top keeper plate. The lower surface of the sole plate shall have stainless steel sheet welded to it.

Design Requirements

The Contractor shall design the bearing assemblies based on the current AASHTO LRFD Bridge Design Specifications, including latest interims, and also based on the following:

1. The bearing assembly design requirements for loads, movements, and rotations shall be as shown in the Plans.

2. The bearing assembly shall have an external restrainer when the horizontal design force of a design load combination exceeds 25 percent of the simultaneous vertical design force. The external restrainer shall be capable of withstanding the full horizontal design force as shown in the Plans.

3. The bearing assembly shall be removable and replacable by raising the bridge superstructure 1/4 inch maximum. The bearing shall be held in place by recessing the upper and lower keeper plates and by providing recessed bolted keeper bars on the side of bearing removal.

4. The area of the PTFE surface shall be designed so that the average bearing pressure does not exceed the maximum contact pressure specified in Table 14.7.2.4-1 of the AASHTO LRFD Bridge Design Specifications. The contact stress shall be determined at the strength limit state as specified in Section 14.7.2.4 of the AASHTO LRFD Bridge Design Specifications.

5. The mechanical interlock of the solid or woven PTFE sheets to the steel substrates shall be sufficient to develop a horizontal force equal to 10 percent of the maximum unfactored vertical load for bearings with an external restrainer, and 25 percent of the maximum unfactored vertical load for bearings without an external restrainer.

6. The minimum coefficient of friction on PTFE surfaces used for design shall be those corresponding to 68F in Table 14.7.2.5-1 of the AASHTO LRFD Bridge Design Specifications.

7. The anchorage of the sole plates, masonry plates, and guide bars to the supporting structural element shall be designed for the maximum unfactored horizontal design force per bearing shown in the Plans, or 10 percent of the maximum unfactored vertical design force per bearing, whichever is greater.

8. The sole and masonry plates shall have leveling capabilities.

9. The guide bars shall maintain all guided components within the guides at all points of translation and rotation of the bearing.

Submittals

Design Calculations

The Contractor shall submit design calculations for all the bearing components, including the base plates, bearing plates, sole plates, masonry plates, keeper plates and bars, and anchor bolts to the Engineer for approval in accordance with Section 6-02.3(16). The design calculations shall accompany the shop plans.

The calculations shall provide, but not be limited to the following information:

1. Bending stresses in the plates due to bearing pressure at maximum design load and eccentricity.

2. Concrete bearing pressure under the plates at maximum bearing pressure and eccentricity.

3. Bearing clearances at maximum load and rotation. The calculated clearances shall include the effects of anticipated initial set and modified center of rotation.

4. Design of all connections and mating surfaces.

5. Compressive stress on all sliding surfaces at maximum and minimum design loads, including rotation.

The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the calculations.

Bearing Manufacturer Requirements

The spherical bearing manufacturer shall have a minimum of three years experience in fabrication of spherical bearings, and shall meet additional testing requirements as specified in this Special Provision.

The Contractor shall submit the name of the spherical bearing manufacturer with a certification of spherical bearing manufacturing

experience to the Engineer for approval. The certification of experience shall include a list of at least three spherical bearing installations performed by the bearing manufacturer on previous projects. The list shall include the following information for each installation:

1. Project Name and Location (Bridge name and highway number).

2. Date of installation.

3. Governmental Agency/Owner.

4. Name, address, and phone number of the Governmental Agency's/Owner's representative.

The Contractor shall not begin preparation of the design calculations and shop plans until receiving the Engineer's written approval of the bearing manufacturer's certification of experience.

Shop Drawings

The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 6-03.3(7). These drawings shall include but not be limited to the following information:

1. Bearing schedule identifying location and bearing type as described in subsection **Bearing Types** of this Special Provision.

2. Minimum and maximum horizontal and vertical service loads.

3. Magnitude and direction of movements at all bearing support points.

4. Minimum and maximum rotation capacity.

5. Construction rotation requirements.

6. Plan and elevation of the assembled bearing and each of the components showing dimensions and tolerances.

7. Complete details of all components and sections showing all materials incorporated into the bearing.

8. All AASHTO, ASTM, and other material designations.

9. All surface finishes.

10. Bearing manufacturer’s recommendations and procedures for bearing assembly shipment, storage, and installation.

The Contractor shall not begin fabricating the spherical bearings until receiving the Engineer's approval of the shop drawings.

Shop Inspection

The manufacturer shall provide for inspection, as specified in the **Bearing Inspection and Acceptance** subsection of this Special Provision. Inspection during the fabrication process shall ensure that the materials and workmanship meet the requirements of the contract.

Quality Assurance Inspection and Final Shop Inspection shall be performed by an independent inspection entity approved by the Engineer. The Contractor shall submit the name, address, phone number and contact person of the inspection entity performing the required certified shop inspection of the bearings to the Engineer for approval. The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the inspection entity for certified shop inspection.

Bearing Testing Procedure

The Contractor shall submit the name, address, phone number, and contact person of the testing entity performing the required bearing testing specified in **Bearing Testing** subsection of this Special Provision to the Engineer for approval.

The testing entity shall be one of the following:

1. An independent testing agency.

2. The spherical bearing manufacturer, with independent verification by the inspection entity performing the certified shop inspection of the bearings.

The Contractor shall not begin bearing fabrication until receiving the Engineer's written approval of the testing entity.

Bearing Assembly Inspection Reports and Certificates

The Contractor shall submit the daily inspection reports of the independent inspection entity performing the required certified shop inspection to the Engineer for approval. The daily inspection reports shall report on the shop fabrication and testing activities relating to the bearing assemblies, and their conformance to the specification requirements.

The Contractor shall submit written documentation from the bearing manufacturer certifying that the bearing assemblies have been manufactured in full compliance with the specification requirements.

The Contractor shall not ship the bearing assemblies from the fabricator's facility until receiving the Engineer's approval of the

certified shop inspection daily inspection reports and the bearing manufacturer's certificate of compliance.

Flatness and Manufacturing Tolerances

Flatness of bearing surfaces shall be determined by the following method:

1. A precision straightedge, longer than the nominal dimension to be measured shall be placed in contact with the surface to be measured as parallel to it as possible.

2. A feeler gauge having an accuracy of □ 0.001 inches equal to the tolerance allowed shall be selected and inserted under the straightedge.

3. If the feeler gauge does not pass under the straightedge, the surfaces shall be acceptable for flatness.

4. In determining the flatness, the straightedge may be located in any position on the surface being measured.

Flatness tolerances shall be defined as follows:

1. Class A tolerance = 0.001 x nominal dimension

2. Class B tolerance = 0.002 x nominal dimension

3. Class C tolerance = 0.005 x nominal dimension

(Nominal dimension shall be taken as the actual dimension of the plate or sheet under the straightedge, in inches.)

Manufacturing tolerances for the bearings are as follows:

Sole, Bearing, Base, and Masonry Plate, and Keeper Plate and Bar

Plan dimensions

Greater than 30 inches:	-0.00, +3/16 inch
30 inches or less:	-0.00, +1/8 inch
Thickness:	
Unmachined:	-1/32, + 1/8 inch
Both Faces Machined:	± 0.01 inch
One Face Machined:	± 0.02 inch
Flatness:	Class A tolerance, side in contact with steel or PTFE Class C tolerance, side in contact with grout or concrete

The maximum gap between the external restrainer and the circular base plate, and the walls of a recess and a recessed plate shall be 0.04 inches.

Spherically Curved Surfaces

Radii:	± 1 percent, surfaces shall be parallel to each other.
Profile of Spherical Surfaces:	± 0.0002D h" or ± 1/128", whichever is greater, where D = length of chord (in inches) between the ends of the PTFE surface in the direction of rotation, and h = projection of the PTFE (in inches) above the top of the confining recess.

Guide Bar

Length:	± 1/8 inch
Section dimensions:	± 1/16 inch
Flatness:	Class A tolerance, side in contact with steel
Bar to bar tolerance:	± 1/32 inch

Bars shall be not more than 1/32" out of parallel

PTFE Sheet

Plan dimensions:	Total nominal design area –0, +5 percent
Thickness:	-0.00, +1/64 inch
Flatness:	Class A tolerance
PTFE Recess:	Length and width –0.00, +0.04 inch

Stainless Steel Sheet

Flatness:	Class A tolerance

Overall Height

Total thickness:	-1/16, +3/16 inch

The edges of all components shall be broken by grinding so that there are no sharp edges.

Special Fabrication Requirements

When the following components are shown in the Plans as part of the spherical bearing assembly, the following special fabrication requirements shall apply:

Sole Plate and Masonry Plate

The sole plate and masonry plate shall be 3/4 inches minimum thickness, unless otherwise shown in the Plans.

PTFE Sheet

The thickness of solid PTFE sheet shall be a minimum of 1/8 inch and a maximum of 3/16 inch. Solid PTFE sheet shall be recessed for a depth equal to one-half of its thickness into the material it is bonded to.

The thickness of woven PTFE fabric, if used, shall be a minimum of 1/16 inch and a maximum of 1/8 inch.

Dimpled PTFE, if shown in the Plans, shall be unfilled and shall have a maximum thickness of 3/16 inch. Dimples shall be placed on a 1/2 inch grid and have a depth of 1/16 inch.

The PTFE sheet shall be recessed and chemically bonded to the supporting steel plate or bar. The woven PTFE sheet shall be mechanically bonded to the supporting steel plate or bar by using an interlocking grid. Bonding shall be performed under controlled conditions and in accordance with the written instructions of the PTFE manufacturer.

Following the bonding operation, the PTFE surface shall be smooth and free from bubbles. Filled PTFE shall be polished after the bonding operation is complete, in accordance with AASHTO LRFD Bridge Construction Specification Section 18.8.3.2.2, current edition and latest interims.

Stainless Steel Sheet

The stainless steel sliding surface shall completely cover the PTFE surface in all operating positions plus one additional inch in all directions.

The stainless steel shall be 14 gage thick for the main sliding surfaces and 10 gage thick for the guide bars.

The curved surfaces that receive stainless steel shall be weld overlaid to produce a surface chemistry equivalent to ASTM A 240 Type 304L stainless steel.

Stainless steel welded overlay on the curved surface shall be a minimum of 3/32 inch thick after welding, grinding, and polishing.

The stainless steel sheet shall be seal welded all around to the supporting steel plate or bar by the gas tungsten arc welding (GTAW) process in accordance with current AWS specifications. The stainless steel sheet shall be clamped down to have full contact with the supporting steel plate or bar during welding. The welds shall not protrude beyond the sliding surface of the stainless steel sheet.

Guide Bar

Each guide bar shall be fabricated from a single steel plate. The guide bars shall be connected to the spherical bearing assembly by recessing and bolting. The stainless steel sheet shall be welded to the guide bar before attaching the guide bar to the spherical bearing assembly. The space between the guide bar and the guided component shall be 3/16 inch $\pm$ 1/16 inch.

Corrosion Protection

Steel surfaces, except as otherwise specified below, shall be painted in accordance with Section 6-07.3(9), and Section 6-03.3(30) as

supplemented in these Special Provisions. The weld surfaces fastening stainless steel to structural steel shall be painted as specified for structural steel. Stainless steel shall not be painted. Galvanized fastening hardware (anchor bolts, bolts, nuts and washers) shall be painted in accordance with Section 6-07.3(11)A.

All coats of paint as specified in Section 6-07.3(9)A for steel surfaces shall be applied in the shop. After the spherical bearing assembly has been erected in its final position with the anchor bolt nuts installed, all surfaces with damaged paint shall be repaired in accordance with Section 6-07.3(9)I.

All coats of paint as specified in Section 6-07.3(11)A for galvanized fastening hardware shall be applied after the spherical bearing assembly has been erected in its final position with the anchor bolt nuts installed. The Contractor shall prepare the galvanized surfaces for painting in accordance with Section 6-07.3(11)A except only hand or power tool cleaning methods shall be used..

The embedded pipe assembly, when shown in the Plans, shall not be painted.

Bearing Testing

The Contractor shall provide for testing of the bearings. The testing shall be performed by the testing entity submitted by the Contractor and approved by the Engineer as specified in the **Bearing Testing Procedure** subsection of this Special Provision.

All testing specified by this Special Provision performed by the bearing manufacturer shall be witnessed by the inspection entity performing the certified shop inspection of the bearings.

When fabrication of the bearings is complete, a Wear and Damage Characteristics test shall be performed either on bearing assemblies randomly selected from the production bearings, or on an equal number of prototype bearings with a minimum design capacity of 1,000 kips. One bearing per lot shall be tested where one lot is defined as the smaller of the following:

1. 25 spherical bearing assemblies.

2. The total quantity of spherical bearing assemblies specified in the contract.

The Wear and Damage Characteristics test shall be performed on the selected test bearing assemblies as follows:

1. The bearing shall be subjected to 5,000 cycles of rotation (2.0 degrees each direction from level, 4.0 degrees total rotation) under the specified vertical dead load plus live load.

2. After completing the load cycles, the bearing shall be disassembled and inspected for wear and damage. A 1/64 inch reduction in PTFE thickness, or damage to the bearing, shall be cause for rejection of the bearing assembly.

3. The test bearing shall show no signs of defects and failure while under load, and after disassembly and inspection.

Failure of the test bearing will result in rejection of all bearings.

The testing requirements specified above may be waived for bearing manufacturers with at least three years of spherical bearing fabrication experience provided:

1. The bearing manufacturer, through the Contractor, shall submit certified test results from a previous installation of spherical bearings of similar design and load capacity to the Engineer for approval. This submittal shall accompany the design calculation and shop plan submittal.

2. The tests performed on the previously installed bearings satisfy the requirements specified above.

3. All test requirements not performed on and not satisfied by the previously installed bearings shall be performed on and satisfied by a test bearing in this contract through a Wear and Damage Characteristics test as specified above.

The test bearing may be used as a production bearing provided:

1. The test results meet with the approval of the Engineer.

2. The test bearing was selected from the production bearings.

3. All PTFE in the test bearing assembly shall be replaced with new PTFE.

Bearing Inspection and Acceptance

Three levels of inspection shall be satisfied before the bearings are accepted. These are: Quality Control Inspection, Quality Assurance Inspection, and Final Shop Inspection. The manufacturer shall provide for both Quality Control and Quality Assurance Inspection. The manufacturer shall provide access for the Final Shop Inspection. The three levels of inspection are described below:

1 Quality Control Inspection

During the fabrication process of all major components, the manufacturer shall provide full time Quality Control Inspection to ensure that the materials and workmanship meet or exceed the minimum requirements of the contract. Quality Control Inspection shall be the responsibility of the manufacturer's quality

control group, which shall be independent of the fabrication group.

2. Quality Assurance Inspection
Quality Assurance Inspection shall be performed by the independent inspection entity performing the certified shop inspection, as submitted by the Contractor and approved by the Engineer. The independent inspection entity, the proposed Quality Assurance Inspection Program, and the forms to be used for the Quality Assurance Program shall be submitted to the Engineer for approval prior to the start of fabrication. Quality Assurance Inspection is not required to be full time inspection, but shall be done at all phases of the manufacturing process. The frequency of inspection shall be included in the Quality Assurance Inspection Program.

3. Final Shop Inspection
Prior to shipping the bearings to the job site, a representative number of bearings shall be inspected by the independent inspection entity at the manufacturer's facility. The manufacturer shall provide a clean, dry, and enclosed area for the bearing inspection. The manufacturer shall disassemble and reassemble the bearings for inspection by the independent inspection entity. The independent inspection entity shall certify that the bearings have been inspected, and that the bearings have been manufactured in full compliance with the contract requirements.

The bearings shall satisfy each of the three levels of inspection described above before they will be accepted. Bearings that fail any one of the three levels of inspection shall be replaced or repaired as approved by the Engineer at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Component Assembly, Shipping, and Storage
Each bearing, except bearing components welded to the bottom flange of steel girders, shall be fully assembled at the manufacturing plant and delivered to the construction site as a complete unit, ready for installation. The units shall be held together with removable restraints so that the sliding surfaces are not damaged. Softeners shall be placed under the restraints to protect all painted surfaces. The Contractor shall not damage the painted surfaces while shipping, storing and installing the bearing assemblies.

All bearing assemblies shall be marked with the following information prior to shipping:

1. Location of the bearing, including the pier and the specific location along the pier.

2. Direction arrow pointing in the ahead on station direction.

The above information shall be marked on the top plate of the upper unit of the bearing assembly. The marks shall be permanent and shall be visible after bearing installation.

The bearing assemblies shall have centerlines marked on both upper and lower units for checking alignment in the field.

The bearing assemblies shall be shipped in light-proof, moisture-proof and dust-proof containers.

Bearing Assembly Field Inspection

Field inspection of a representative number of bearings assemblies will be performed by the Engineer. The Contractor shall provide a clean, dry and enclosed area at the site, spacious enough for the field inspection activities. The Contractor shall disassemble and reassemble the bearings for inspection by the Engineer. The disassembly and reassembly of the bearings shall be in accordance with the bearing manufacturer's written procedure and in the presence of the Engineer.

Bearings that fail the inspection shall be replaced or repaired by the Contractor, as approved by the Engineer, at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Assembly Installation

The Contractor shall install the spherical bearing assembly in accordance with the installation procedure included with the shop drawing submittal as approved by the Engineer. After installation, the orientation of the spherically curved units shall be ± 1/2 degree from level.

PTFE sheet shall not be greased, except as otherwise noted. A thin uniform film of silicone grease shall be applied to the entire dimpled PTFE sheet before installation (all dimples shall be filled with grease).

For spherical bearing assemblies with PTFE and stainless steel components, the Contractor shall take special care at all times to ensure protection of the PTFE and stainless steel surfaces from coming in contact with concrete and any other foreign matter.

When bearing assemblies are supporting steel superstructure, the interface between the sole plate and the steel girder flange (or the upper and lower sole plates when separate) shall be set with epoxy gel just before setting the superstructure in place. The (lower) sole plate surface in contact with the epoxy gel shall receive a thin uniform film of silicone grease, to prevent bonding to the epoxy gel. The threads of the sole plate clamping bolts shall be greased to prevent bonding and allow future removal. The Contractor shall apply the epoxy gel by troweling it onto the bottom surface of the steel girder flange or the upper sole plate welded to

the steel girder flange and shall immediately bolt the (lower) sole plate in place to obtain a level surface.

Before the epoxy gel has cured, the superstructure shall be set in place, squeezing out the excess epoxy gel while filling the interface between the steel surfaces. Excess epoxy and grease shall be removed immediately. After the epoxy gel has cured, the sole plate clamping bolts shall be tightened to snug tight.

6-02.3(20).GR6

Grout for Anchor Bolts and Bridge Bearings

6-02.3(20).INST1.GR6

Section 6-02.3(20) is supplemented with the following:

6-02.3(20).OPT1.FB6

(June 26, 2000)

Grout placed at the following locations shall conform to the requirements of this section.

*** $$1$$ ***

6-02.3(24).GR6

Reinforcement

6-02.3(24)C.GR6

Placing and Fastening

6-02.3(24)C.INST1.GR6

Section 6-02.3(24)C is supplemented with the following:

6-02.3(24)C.OPT1.GB6

(June 26, 2000)

Drilling Holes for, and Setting, Steel Reinforcing Bar Dowels

Where called for in the Plans, holes shall be drilled into existing concrete to the size and dimension shown in the Plans. The Contractor may use any method for drilling the holes provided the method selected does not damage the concrete and the steel reinforcing bar that is to remain. Core drilling will be required when specifically noted in the Plans.

The Contractor shall exercise care in locating and drilling the holes to avoid damage to existing steel reinforcing bars and concrete. Location of the holes may be shifted slightly with the approval of the Engineer in order to avoid damaging the existing steel reinforcing bars. All damage caused by the Contractor's operations shall be repaired by the Contractor at no cost to the Contracting Agency and the repair shall be as approved by the Engineer.

Steel reinforcing bars shall be set into the holes noted in the Plans with epoxy resin. The holes shall be blown clean with dry compressed air before placing the resin.

The Contractor shall demonstrate, to the satisfaction of the Engineer, that the method used for setting the steel reinforcing bars completely fills the void between the steel reinforcing bar and the concrete with epoxy resin. Dams shall be placed at the front of the holes to confine the epoxy and shall not be removed until the epoxy has cured in the hole.

6-02.3(24)C.OPT2.GR6

(June 26, 2000)

Drilling Holes for, and Setting, Dowels for Conc. Box Culvert Extension

After removing the specified portions of the box culvert, the Contractor shall drill 1-3/8 inch diameter holes into the exposed concrete face for the placement of #9 dowel bars between the existing concrete and the box culvert extension. The holes shall be 12 inches deep, minimum, and shall be spaced at 12 inch centers. The #9 dowels shall be of sufficient length to provide a 2'-0" minimum extension into the box culvert extension.

6-02.3(24)D.GR6

Splicing

6-02.3(24)D.INST1.GR6

Section 6-02.3(24)D is supplemented with the following:

6-02.3(24)D.OPT1.BSP.GB6

(BSP January 2, 2012)

Splicing of Hoop Reinforcement for Columns and Shafts

When the Plans show steel reinforcement bar hoops as the confinement reinforcement for columns and shafts, the hoops shall be spliced by one of the following methods:

1. Welded direct butt splice.

2. Resistance butt weld.

3. Mechanical splice, if shown in the plans, conforming to Section 6-02.3(24)F as supplemented in these Special Provisions, provided that concrete cover and steel reinforcing bar clearance requirements are met for the splice.

4. Welded lap splice if shown in the Plans, welded in accordance with Section 6-02.3(24)E as supplemented in these Special Provisions, with job control testing in accordance with Section 6-02.3(24)G as supplemented in these Special Provisions.

Hoop reinforcement for columns shall be fabricated in the shop. Weld splicing of hoop reinforcement for shafts shall be completed prior to assembly of the shaft steel reinforcing bar cage. Mechanical splicing of hoop reinforcement may be accomplished in the field during assembly of the steel reinforcing bar cage.

The Contractor shall stagger the placement of the hoop reinforcement splices as shown in the Plans. For columns with interlocking hoops, the hoop reinforcement splices shall be located in the column interior.

Hoop Reinforcement Splice Testing Requirements

The Contractor shall designate in writing a splicing Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of all hoop reinforcement splicing including the inspection of materials and workmanship performed by the Contractor and all subcontractors, and submitting, receiving, and approving all correspondence, required submittals, and reports regarding hoop reinforcement splicing to and from the Engineer.

Qualification testing and testing of production sample splices shall be performed at an independent qualified testing laboratory at no additional expense to the Contracting Agency. The laboratory shall have the following:

1. Proper facilities, including a tensile testing machine capable of breaking full size samples of steel reinforcing bar splices.

2. Operators who have received formal training for performing the testing requirements of ASTM A 370.

3. A record of annual calibration of testing equipment performed by an independent third party that has standards that are traceable to the National Institute of Standards and Technology and a formal reporting procedure, including published test forms.

Nondestructive testing for welded direct butt splices may be performed where the hoops are fabricated.

For the purpose of production testing, a lot of hoop reinforcement splices is defined as one of the following:

1. 150, or fraction thereof, of the same type of mechanical splices used for each bar diameter and each bar deformation pattern that is used in the work, or

2. 150, or fraction thereof, of complete joint penetration butt welded splices or resistance butt welded splices for each bar diameter used in the work.

The Engineer will select the splices which will compose the lot and also the splices within each lot to be tested.

The Contractor may negotiate a reduced sampling rate or increased lot size provided production control and job control testing demonstrates a splice rejection rate satisfactory to the Engineer.

Whenever a lot of splices is rejected, the rejected lot and subsequent lots of splices shall not be used in the work until the following requirements are met:

1. The QCM performs a complete review of the Contractor's quality control process for these splices.

2. A written report is submitted to the Engineer describing the cause of failure of the splices in this lot and provisions for preventing similar failures in future lots.

3. The Engineer has provided the Contractor with written notification that the report is acceptable.

Splice Qualification Report

The Contractor shall submit a Splice Qualification Report. This report shall include splice material information, names of the operators who will be performing the splicing, and descriptions of the positions, locations, equipment, and procedures that will be used in the splice work.

The Splice Qualification Report shall also include certifications from the fabricator for qualifications of operators and procedures based on sample tests performed no more than two years before submitting the report. Each operator shall be certified by performing two sample splices for each bar size of each splice type that the operator will be performing in the work. For deformation-dependent types of splice devices, each operator shall be certified by performing two additional samples for each bar size and deformation pattern that will be used in the work.

Qualification sample splices shall be tested by an independent qualified testing laboratory and shall conform to the appropriate production test criteria. The Splice Qualification Report shall include the certified test results for all qualification sample splices.

The QCM shall review and approve the Splice Qualification Report before submitting it to the Engineer for approval. The Contractor shall allow 14 calendar days for the review and approval of a complete report before performing any hoop reinforcement splicing operations.

Splice Test Criteria

Resistance butt weld and mechanical splice samples shall be destructively tested as follows. Production control and quality assurance sample splices shall be tensile tested in accordance with ASTM A 370.

The Contractor shall supply additional materials for all destructive production control and quality assurance testing.

Samples shall achieve at least 125 percent of the specified yield strength of the bar. In addition, either necking of the bar or a plateau of the stress-strain curve shall be evident at rupture regardless of whether the bar breaks inside or outside the splice.

Production control samples of welded direct butt splices shall be sampled, radiographically inspected, and repaired as described in the **Nondestructive Splice Tests** subsection of Section 6-02.3(24)E as supplemented in these

Special Provisions. Quality assurance samples shall be destructively tested as described above.

Production Control Test Requirements for Splices

Production control tests shall be performed for all hoop reinforcement splices used in the work. A production control test for resistance butt welds and mechanical splices shall consist of testing four sets of sample splices removed from each lot of completed splices.

After the splices in a lot have been completed, the QCM shall notify the Engineer in writing that the splices in this lot conform to the specifications and are ready for testing.

After notification has been received, the Engineer will randomly select the four sample splices to be removed from the lot to be tested by an independent qualified testing laboratory.

At least one week before sample testing, the Contractor shall notify the Engineer in writing of the date and location of the testing.

If three or more sample splices from a lot conform to the requirements of the **Sample Test Criteria** subsection of this Special Provision, all splices in the lot represented by the test will be considered acceptable.

If only two of the four sample splices from a lot conform to the requirements of the **Splice Test Criteria** subsection of this Special Provision, the Engineer shall select an additional set of four samples for re-test from the same lot of splices. Should any of the four sample splices from this additional test fail to conform to these requirements, all splices in the lot will be rejected.

Should only one sample splice from a lot conform to the requirements of the **Splice Test Criteria** subsection of this Special Provision, all splices in the lot will be rejected.

Welded direct butt splice defects shall be repaired as described in the **Nondestructive Splice Tests** subsection of Section 6-02.3(24)E as supplemented in these Special Provisions.

Reporting Test Results

A Production Control Test Report for all testing performed on each lot shall be prepared by the independent testing laboratory performing the testing and submitted to the QCM for review and approval. The report shall be signed by an engineer who represents the laboratory and is licensed as a Civil Engineer under Title 18 RCW, State of Washington. The report shall include, as a minimum, the following information for each test:

1. Contract number.

2. Dates received and tested.

3. Lot number.

4. Bar diameter, hoop diameter, and bar length.

5. Type of splice.

6. Brand and type of mechanical splice.

7. Length of test specimen.

8. Physical condition of the test sample splice and description of break and location in relation to splice.

9. Any noticeable defects.

10. Ultimate tensile strength of each splice.

11. Results of radiographic inspection for welded direct butt splices.

The QCM shall review, approve, and forward each Production Control Test Report to the Engineer for review before the splices represented by the report are encased in concrete. The Engineer will have three working days to review each Test Report and respond in writing after a complete report has been received.

6-02.3(24)E.GR6

Welding Reinforcing Steel

6-02.3(24)E.INST1.GR6

Section 6-02.3(24)E is supplemented with the following:

6-02.3(24)E.OPT1.BSP.GB6

(BSP June 26, 2000)

Where epoxy-coated steel reinforcing bars are specified to be spliced by welding, the epoxy coating shall be left off or removed from the end six inches of each bar being welded. After the welding is complete, the Contractor shall apply epoxy patching material to the uncoated portions of the bar in accordance with Section 6-02.3(24)H.

6-02.3(24)E.OPT2.BSP.GB6

(BSP January 4, 2010)

Splicing Requirements for Hoop Reinforcement

Welded Direct Butt Splices

Welded direct butt splices shall be complete joint penetration butt welds conforming to ANSI/AWS D1.4 figure 3.2 and 6-02.3(24)E. Split pipe backing shall not be used.

Thermite welding is not allowed.

Weld procedures to be used in making welded direct butt splices, and the welders performing the welds, shall be qualified by tests performed by the Contractor on sample splices of the type to be used, before making

splices to be incorporated into the work. Evidence of prior qualifications shall conform to Section 6-02.3(24(E).

Nondestructive Splice Tests

Radiographic examinations shall be performed on 25 percent of all complete joint penetration butt welded splices from a lot as defined in the **Hoop Reinforcement Splice Testing Requirements** subsection of Section 6-02.3(24)D as supplemented in these Special Provisions. The Engineer will select the splices within each lot to be radiographically examined. All splices shall be 100 percent visually inspected.

All required radiographic examinations shall be performed by the Contractor in accordance with ANSI/AWS D1.4 and this Special Provision.

Before radiographic examination, welds shall conform to ANSI/AWS D1.4 Section 4.4. Radiographic acceptance shall be in accordance with ANSI/AWS D1.4 Table 4.1. Acceptance criteria for bar size #7 shall be the same as for bar size #8.

Should more than 12 percent of the splices which have been radiographically examined in any lot be defective, an additional 25 percent of the splices, selected by the Engineer from the same lot, shall be radiographically examined. Should more than 12 percent of the cumulative total of splices tested from the same lot be defective, all remaining splices in the lot shall be radiographically examined.

Additional radiographic examinations performed due to the identification of defective splices shall be performed at no additional expense to the Contracting Agency.

All defects shall be repaired in accordance with ANSI/AWS D1.4, latest edition.

The Contractor shall notify the Engineer in writing a minimum of 48 hours before performing any radiographic examinations.

The radiographic procedure used shall conform to ANSI/AWS D1.1, ANSI/AWS D1.4 Section 7.9, and the following:

1. Two exposures shall be made for each splice. For each of the two exposures, the radiation source shall be centered on each bar to be radiographed. The first exposure shall be made with the radiation source placed at zero degrees from the top of the weld and perpendicular to the weld root and identified with a station mark of "0". The second exposure shall be at 90 degrees to the "0" station mark and shall be identified with a station mark of "90". When obstructions prevent a 90 degree placement of the radiation source for the second exposure, and when approved in writing by the Engineer, the source may be rotated, around the centerline of the steel reinforcing bar, a maximum of 25 degrees.

2. If more than one weld is to be radiographed during one exposure, the angle between the root line of each weld and the direction to the radiation source shall not be less than 65 degrees.

3. Radiographs shall be made by either X-ray or gamma ray. Radiographs made by X-ray or gamma rays shall have densities of not less than 2.3 nor more than 3.5 in the area of interest. A tolerance of 0.05 in density is allowed for densitometer variations. Gamma rays shall be from the iridium 192 isotope and the emitting specimen shall not exceed 0.18 inches in the greatest diagonal dimension.

4. The radiographic film shall be placed perpendicular to the radiation source at all times; parallel to the root line of the weld unless source placement determines that the film shall be turned; and as close to the root of the weld as possible.

5. The minimum source to film distance shall be maintained so as to ensure that all radiographs maintain a maximum geometric unsharpness of 0.020 at all times, regardless of the size of the steel reinforcing bars.

6. Penetrameters shall be placed on the source side of the bar and perpendicular to the radiation source at all times. One penetrameter shall be placed in the center of each bar to be radiographed, perpendicular to the weld root, and adjacent to the weld. Penetrameter images shall not appear in the weld area.

7. When radiography of more than one weld is being performed per exposure, each exposure shall have a minimum of one penetrameter per bar, or three penetrameters per exposure. When three penetrameters per exposure are used, one penetrameter shall be placed on each of the two outermost bars of the exposure, and the remaining penetrameter shall be placed on a centrally located bar.

8. An allowable weld buildup of 0.16 inch may be added to the total material thickness when determining the proper penetrameter selection. No image quality indicator equivalency will be accepted. Wire penetrameters or penetrameter blocks shall not be used.

9. Penetrameters shall be sufficiently shimmed using a radiographically identical material. Penetrameter image densities shall be a minimum of 2.0 and a maximum of 3.6.

10. Radiographic film shall be Class 1, regardless of the size of the steel reinforcing bars.

11. Radiographs shall be free of film artifacts and processing defects, including, but not limited to, streaks, scratches, pressure marks or marks made for the purpose of identifying film or welding indications.

12. Each splice shall be clearly identified on each radiograph and the radiograph identification and marking system shall be established between the Contractor and the Engineer before radiographic inspection begins. Film shall be identified by lead numbers only; etching, flashing or writing in identifications of any kind will not be permitted. Each piece of film identification information shall be legible and shall include, as a minimum, the following information:

    a. The Contractor's name.

    b. The name of the nondestructive testing firm.

    c. Contract number.

    d. Date of the test.

    e. Initials of the radiographer.

    f. Part number.

    g. Weld number.

    The letter "R" and repair number shall be placed directly after the weld number to designate a radiograph of a repaired weld.

13. Radiographic film shall be developed within a time range of one minute less to one minute more than the film manufacturer's recommended maximum development time. Sight development will not be allowed.

14. Processing chemistry shall be done with a consistent mixture and quality, and processing rinses and tanks shall be clean to ensure proper results. Records of all developing processes and any chemical changes to the developing processes shall be kept and furnished to the Engineer upon request. The Engineer may request, at any time, that a sheet of unexposed film be processed in the presence of the Engineer to verify processing chemical and rinse quality.

15. The results of all radiographic interpretations shall be recorded on a signed certification and a copy kept with the film packet.

Technique sheets prepared in accordance with ASME Boiler and Pressure Vessels Code Section V Article 2 Section T-291 shall also contain the

developer temperature, developing time, fixing duration and all rinse times.

The Contractor shall maintain the radiographs and the radiographic inspection report(s) in the shop until the Engineer reviews them or request them to be sent to the Materials Engineer, Department of Transportation, PO Box 47365, Olympia, WA 98504-7365, within two working days following this request. The Contractor shall mail the film and two copies of the radiographic inspection report. If the Engineer reviews them in the shop then the film and reports shall be released to the Engineer for permanent record keeping at that time. Adequate facilities and equipment shall be provided the Engineer for examining film, if performed in the shop.

If the Engineer does not review the film and reports in the shop, within ten working days of completion of the lot, all reports and film shall be sent to the Materials Engineer, Department of Transportation, PO Box 47365, Olympia, WA 98504-7365. The Contractor shall mail the film and two copies of the radiographic inspection report.

Resistance Butt Welded Splices

Shop produced resistance butt welds shall be produced by a fabricator and equipment approved by WSDOT to perform this operation.

Before manufacturing steel reinforcing bar hoops using resistance butt welding, the Contractor shall submit the fabricator's quality control manual for the fabrication of hoops to the Engineer for approval. The quality control manual shall include, but not be limited to, the following:

1. The pre-production procedures for the qualification of material and equipment.

2. The methods and frequencies for performing quality control procedures during production.

3. The calibration procedures and calibration frequency for all equipment.

4. The welding procedure specification for resistance welding.

5. The method for identifying and tracking lots.

Welded Lap Splices

Welded lap splices, if shown in the Plans, shall be fabricated in the shop or at the jobsite prior to assembling into the steel reinforcing cage. All production splices shall be 100 percent visually inspected for weld quality, size and length. Job control samples shall be selected in accordance with Section 6-02.3(24)G.

6-02.3(24)F.GR6

Mechanical Splices

6-02.3(24)F.INST1.GR6

Section 6-02.3(24)F is supplemented with the following:

6-02.3(24)F.OPT1.BSP.GB6

(BSP January 4, 2010)

Mechanical Splices

Mechanical splices used to splice hoop reinforcement for columns and shafts shall be or have been qualified to the minimum requirements of the **Splice Test Criteria** subsection of Section 6-02.3(24)D as supplemented in these Special Provisions.

All operators installing mechanical splices shall be qualified by testing as described in the **Splice Qualification Report** subsection of Section 6-02.3(24)D as supplemented in these Special Provisions.

6-02.3(24)G.GR6

Job Control Testing

6-02.3(24)G.INST1.GR6

Section 6-02.3(24)G is supplemented with the following:

6-02.3(24)G.OPT1.BSP.GB6

(BSP January 2, 2012)

Quality Assurance Test Requirements for Hoop Reinforcement Splices

Job control samples shall be sent to the WSDOT HQ Materials Testing Laboratory for quality assurance testing. Hoop splice samples shall be prepared by the Contractor so as not to disturb the character of the splice. The sample shall be 5'-6" in length or as specified by the Engineer, with the splice centered on the specimen. Each end of the hoop splice sample shall be straightened a minimum of 12 inches to accommodate the tensile testing machine.

6-02.3(25).GR6

Prestressed Concrete Girders

6-02.3(25)B.GR6

Casting

6-02.3(25)B.INST1.GR6

The second paragraph of Section 6-02.3(25)B is revised to read:

6-02.3(25)B.OPT1.BSP.GB6

(BSP August 4, 2003)

The Contractor shall fabricate all prestressed concrete girders using the Contractor-Provided mix design appropriate for the design strength specified for each girder in accordance with Sections 6-02.3(2)A and 9-19.1 as supplemented in these Special Provisions, and as approved by the Engineer. The temperature of the concrete when placed shall be between 50F and 90F.

6-02.3(25)E.GR6

Contractors Control Strength

6-02.3(25)E.INST1.GR6

Section 6-02.3(25)E is supplemented with the following:

6-02.3(25)E.OPT1.BSP.FB6

(BSP August 4, 2003)

For the prestressed girders of ***$$1$$***, the Contractor may substitute compressive strength testing at 28 days provided that the 28 day compressive strength is equal to or greater than 95 percent of the required 56 day compressive strength.

6-02.3(25)M.GR6

Shipping

6-02.3(25)M.INST1.GR6

The first paragraph of Section 6-02.3(25)M is revised to read as follows:

6-02.3(25)M.OPT1.BSP.FB6

(BSP August 4, 2003)

After the girder has reached its 28-day design strength, or 95 percent of the 56 day design strength for the girders of *** $$1$$ ***, and the fabricator believes it to comply with the specification, the girder and a completed Certification of Compliance, signed by a Precast/Prestressed Concrete Institute Technician or a professional engineer, acceptable to the Contracting Agency, shall be submitted to the Engineer for inspection. If the Engineer finds the certification and the girder to be acceptable, the Engineer will stamp the girder “Approved for Shipment”.

6-02.3(25)M.INST2.GR6

The third paragraph of Section 6-02.3(25)M is supplemented with the following:

6-02.3(25)M.OPT6.BSP.FB6

(BSP August 4, 2003)

The Contractor is advised that, because of the higher compressive design strengths required for the production prestressed concrete girders of *** $$1$$ ***, it will take longer than the usual time for these girders to reach sufficient strength for shipping. The Contractor shall take this into account when preparing schedules for this portion of the work.

6-02.3(26).GR6

Cast-in-Place Prestressed Concrete

6-02.3(26).INST1.GR6

The third paragraph of Section 6-02.3(26) is revised to read as follows:

6-02.3(26).OPT1.GB6

(January 4, 2010)

Before tensioning, the Contractor shall remove all side forms from the girders. The Contractor shall not release the falsework supporting the superstructure, and shall

not place construction loads and other live loads on the superstructure, until the job-cured 2-inch grout cubes, fabricated in accordance with WSDOT TM 813, reach a minimum compressive strength of 800 psi in accordance with WSDOT FOP for AASHTO T 106.

6-02.3(28).GR6

Precast Concrete Panels

6-02.3(28).INST1.GR6

Section 6-02.3(28) is supplemented with the following:

6-02.3(28).OPT1.GR6

(April 2, 2012)

Precast Reinforced Concrete Three Sided Structures

Manufacturing Plant Quality Control Program

The manufacturing plant of precast reinforced concrete three sided structures shall be certified by one of the organizations specified in Section 6-02.3(28).

Design Criteria

The precast reinforced concrete three sided structures shall be designed in accordance with the WSDOT *Geotechnical Design Manual (M46-03)* and the current AASHTO LRFD Bridge Design Specifications, including an HL-93 vehicular live load. For precast reinforced concrete three sided structures located at sites corresponding to a peak ground acceleration of 0.3g or greater, the Section 12.6.1 exemption from seismic loading shall not apply, and such three sided structures shall be designed for seismic loads in accordance with other provisions of the current AASHTO LRFD Bridge Design Specifications. Wingwalls and headwalls associated with precast reinforced concrete three sided structures shall be designed in accordance with the *WSDOT Geotechnical Design Manual (M46-03)* and Chapter 11 of the current AASHTO LRFD Bridge Design Specifications, including seismic loads.

Precast reinforced concrete three sided structures shall be precast rigid frames with monolithic upper corners internally reinforced for moment and shear resistance, except as otherwise noted. Connecting separate and individually precast concrete panels together to form the specified three sided frame geometry may be acceptable provided the following additional requirements are satisfied:

1. The structure system shall provide moment and shear resistance from the lateral load from backfill placed full width and full height at one side only of the three sided structure.

2. The structure system receives the approval of the Bridge and Structures Office and the Hydraulics Office.

Approved Products

The following products are approved for use as precast reinforced concrete three sided structures with spans less than 26 feet, when designed, fabricated, and constructed in accordance with Section 6-02.3(28) as supplemented in these Special Provisions:

Product Name	Fabricator
Three Sided Bridge	Utility Vault Company P.O. Box 588 Auburn, WA 98071-0588 (253) 839-3500 1-800-892-1538 Fax: (253) 735-4201
Three Sided Hydraulic Structure	Central Pre-Mix Prestress Company P.O. Box 3366 Spokane, WA 99220-3366 (509) 533-0267 Fax: (509) 534-3013
Pre- Cast 3 - Sided Bridge	Granite Precasting & Concrete, Inc. 4116 Bakerview Spur Bellingham, WA 98226 (800) 808-2251 Fax: (360) 671-0780
CrownSpan	Hanson Pipe & Precast, Inc. P. O. Box 11305 755 NE Columbia Boulevard Portland, OR 97211 (800) 452-0339 Fax: (503) 206-0603

6-02.3(28).OPT1(A).GR6

(April 3, 2006)

CON/SPAN Bridge Systems:	CONTECH Arch Technologies, Inc. DBA Bridge Tek 34617 11th Place S Suite 106 Federal Way, WA 98003 (253) 874-4777 (800) 344-2102 FAX: (253) 874-4333 Attention: Michael Blank

6-02.3(28)A.GR6

Shop Drawings

6-02.3(28)A.INST1.GR6

The third paragraph of Section 6-02.3(28)A is supplemented with the following:

6-02.3(28)A.OPT1.GR6

(August 1, 2011)

Precast Reinforced Concrete Three Sided Structures

For three sided structures, the Contractor shall submit two sets of design calculations to the Bridge and Structures Engineer with the eight sets of shop drawings submitted for the Engineer's approval.

The Contractor shall affirm with the design calculations submitted with the shop drawings for the Engineer's approval, that the three sided structure conforms to the specified design criteria. The design calculations shall include, but not be limited to, analysis of the following elements:

1. Flexure (substructure and superstructure).
2. Compression in the walls.
3. Shear (substructure and superstructure).
4. Factored bearing pressure versus factored soil bearing resistance for all appropriate limit states.
5. Deflection.
6. Minimum and maximum reinforcement ratios.
7. Distribution of flexural reinforcement.
8. Fatigue.
9. Live load distribution.

For three sided structures, in addition to items 1 through 6 under shop drawing content requirements, the following shop drawing details shall be submitted:

1. Footing and slab base details.
2. Wingwall and cutoff wall details.
3. Erection and backfill procedure.
4. Complete, site specific, itemized bar list for all steel reinforcement.

All design calculations and shop drawings for the precast reinforced concrete three sided structures shall be stamped and signed by a Professional Engineer in accordance with Section 6-01.9.

6-02.3(28)A.INST2.GR6

The list included in the third paragraph of Section 6-02.3(28)A is supplemented with the following:

6-02.3(28)A.OPT6.BSP.GB6

(BSP April 5, 2010)

7. Construction sequence and method of forming the precast prestressed concrete stay-in-place panels.

8. Details of additional reinforcement, if any, provided at lifting and support locations.

9. Method and equipment used to support the precast prestressed concrete stay-in-place panels during storage, transporting, and erection.

10. Method used to identify the precast prestressed concrete stay-in-place panel's location for calculating its position accounting for profile grade and transverse slope, and for ensuring correct placement during erection.

11. Erection sequence, including the method of lifting the panels, placing and adjusting the panels to proper alignment and grade, and supporting the panels during leveling and grouting operations.

12. Method for forming the grout pad on the exterior face of the prestressed concrete girder flange, if an alternative method is proposed, and at the interior face of the stay-in-place panel to the dimensions detailed in the Plans.

6-02.3(28)B.GR6

Casting

6-02.3(28)B.INST1.GR6

Section 6-02.3(28)B is supplemented with the following:

6-02.3(28)B.OPT1.GR6

(April 30, 2001)

Precast Reinforced Concrete Three Sided Structure

The precast reinforced concrete three sided structure fabricator shall notify the Washington State Department of Transportation Materials and Fabrication Inspection Section at least five working days in advance of beginning fabrication of the structures for this project.

Whenever the minimum finished backfill depth above the top of the structure is less than 1'-0", either all steel reinforcing bars in the span unit shall be epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3, or the minimum concrete cover dimension from the face of concrete to the face of the top mat of steel reinforcing bars shall be 2-1/2".

Whenever the minimum concrete cover dimension from the face of concrete to the face of the top mat of steel reinforcing bars is less than 1-1/2", the top mat of steel reinforcing bars in the span unit shall be epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3.

The Contractor may strip forms from precast reinforced concrete three sided structures after the concrete reaches a minimum compressive strength of 3,000 psi, provided the precast reinforced concrete three sided structure remains in the casting bed in accordance with Section 6-02.3(28)G as supplemented in these Special Provisions. All damage from stripping is the Contractor's responsibility.

6-02.3(28)B.OPT6.BSP.GB6

(BSP April 5, 2010)

Strand slippage (withdrawal) in excess of 0.06-inches at each end of precast prestressed concrete stay-in-place panels will be subject to evaluation by the Engineer for possible rejection. The Contractor shall, with at least one panel for each lot of ten production panels, cut all strands flush with the panel

immediately upon removing the panel from the forms, and shall visibly mark the panel for periodic inspection by the Engineer.

The Contractor shall cast a sufficient number of precast prestressed concrete stay-in-place panels to cover 105 percent of the quantity required by the design shown in the Plans. The additional precast prestressed concrete stay-in-place forms shall be available for use as replacement panels for panels damaged during handling, storage, and erection. All panels not incorporated into the bridge deck, including additional panels cast but not used, and all damaged panels, shall remain property of the Contractor and be disposed of in accordance with Section 2-02.3.

6-02.3(28)E.GR6

Finishing

6-02.3(28)E.INST1.GR6

Section 6-02.3(28)E is supplemented with the following:

6-02.3(28)E.OPT1.GR6

(January 7, 2002)

Precast Reinforced Concrete Three Sided Structures

The Contractor shall finish all exposed surfaces of the structure with a Class 2 finish.

The Contractor shall mark the following information, using waterproof paint, on the inside of a vertical leg of each section of the structure:

Design Loads
Span and Rise dimension
Job Number
Fabrication Date
Manufacturer's Name and Trademark

6-02.3(28)E.OPT6.BSP.GB6

(BSP April 5, 2010)

The Contractor shall furnish a Class 2 surface finish, as specified in Section 6-02.3(14)B, on all surfaces of the precast prestressed concrete stay-in-place panels, except as otherwise noted. The top surface of all panels shall receive a textured finish in accordance with Section 6-02.3(10), except that the depth of striations shall be 1/4-inch, and shall be spaced 3/4 to 1 inch apart. Areas of mortar buildup more than 1/4 inch above the top surface of the panel shall be removed.

6-02.3(28)F.GR6

Tolerances

6-02.3(28)F.INST1.GR6

Section 6-02.3(28)F is supplemented with the following:

6-02.3(28)F.OPT1.BSP.GB6

(BSP April 5, 2010)

The precast prestressed concrete stay-in-place panels shall not exceed the following scalar tolerances:

Length and Width:	± 1/8 inch
Thickness:	+ 1/8, -0 inch
Location of strands (measured from centerline of panel to centerline of strand):	± 1/16 inch
Camber (either upward or downward) at time of placement on structure:	± 1/4 inch in ten feet

Precast prestressed concrete stay-in-place panels with tolerances exceeding those specified above, or with hairline cracks visibly apparent radiating from the strand at the end of the panel and extending more than three inches along the panel will be subject to evaluation by the Engineer for possible rejection.

6-02.3(28)G.GR6

Handling and Storage

6-02.3(28)G.INST1.GR6

Section 6-02.3(28)G is supplemented with the following:

6-02.3(28)G.OPT1.GR6

(April 30, 2001)

Precast Reinforced Concrete Three Sided Structures

The Contractor shall not move three sided structure sections from the casting bed into storage until the concrete reaches a minimum compressive strength of 70 percent of the final design strength specified in the shop drawing and design calculation submittal.

The Contractor shall pick, move, and store the three sided structure sections in the cast position until the concrete reaches a minimum compressive strength equal to the final design strength specified in the shop drawing and design calculation submittal.

6-02.3(28)G.OPT6.BSP.GB6

(BSP April 5, 2010)

Precast prestressed concrete stay-in-place panels shall be maintained in a flat and level position, without any twisting, at all times. Panels shall be supported at approximately 1’-3” from the panel ends and at the midpoint. Supports shall be placed transverse to the prestressed strands and shall extend the full width of the panel.

Unloading and reloading at a site other than the bridge site will be permitted only under the direct supervision of the Engineer. The panels shall not be stacked, unless otherwise approved by the Engineer. If such permission is granted, the panel supports shall be in the same vertical plane and shall be of sufficient height to prevent damage to the lifting bar loops. The Contractor shall have received the Engineer’s verification that the bottom panel of the

stack is flat and level, without any twisting, prior to stacking additional panels. The Contractor shall not stack panels on top of adjacent girders of the structure.

6-02.3(28)H.GR6

Shipping

6-02.3(28)H.INST1.GR6

Section 6-02.3(28)H is supplemented with the following:

6-02.3(28)H.OPT1.GR6

(April 30, 2001)

Precast Reinforced Concrete Three Sided Structure

Prior to shipping, the precast reinforced concrete three sided structure fabricator shall furnish the Inspector a complete documentation package for each structure.

The documentation package shall include the following information for each structure:

1. Concrete batch tickets.
2. Concrete cylinder break results.
3. Material certifications.
4. Copies of all changes from the Plans and Specifications.

6-02.3(28)I.GR6

Erection

6-02.3(28)I.INST1.GR6

Section 6-02.3(28)I is supplemented with the following:

6-02.3(28)I.OPT1.GR6

(August 3, 2009)

Precast Reinforced Concrete Three Sided Structures

The Contractor shall erect and backfill precast reinforced concrete three sided structures in accordance with the erection sequence specified in the shop drawings approved by the Engineer, and the construction equipment restrictions specified in Section 6-02.3(25)O.

Adjacent precast units shall be connected by welding the weld-tie anchors in accordance with Section 6-02.3(25)O. The weld-tie anchor spacing shall not exceed 6’-0”. After connecting the weld-tie anchors, the Contractor shall paint the exposed metal surfaces with one coat of field primer conforming to Section 9-08.1(2)F. Keyways shall be filled with grout conforming to Section 6-02.3(25)O.

6-02.3(28)I.OPT6.BSP.GB6

(BSP April 5, 2010)

The precast prestressed concrete stay-in-place panels shall be at least 60 days old at the time of placing bridge deck concrete. The Contractor shall place the panels atop the prestressed girders as shown in the Plans, adjusting

the leveling bolts as required to match the level of adjacent panels and accommodate camber.

The grout pad shall be placed after the panels have been fully adjusted for grade and camber. The exposed portion of the grout pad forms that are intended to be left in place permanently shall be tinted to match the color of the adjacent concrete surfaces and shall be secured with an approved adhesive or other method as approved by the Engineer.

Prior to placing the bridge deck steel reinforcing bars and concrete, the Contractor shall place a backer rod at the intersection between panels as shown in the Plans. All intersections between panels shall be sealed to prevent leakage of slurry during concrete placement. Prior to placing the bridge deck concrete, the surface of the panels shall be cleaned of all foreign materials and fully saturated with water.

6-02.4.GR6

Measurement

6-02.4.INST1.GR6

Section 6-02.4 is supplemented with the following:

6-02.4.OPT1.FB6

(August 2, 2010)

*** $$1$$ *** contains the following approximate quantities of materials and work:

*** $$2$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for *** $$3$$ *** even though the actual quantities required may deviate from those listed.

6-02.4.OPT2.FB6

(June 26, 2000)

Expansion joint system *** $$1$$ *** seal - superstr. will be measured by the linear foot along its completed line and slope.

6-02.4.OPT3.FB6

(August 2, 2010)

Modular expansion joint system contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the applicable modular expansion joint system

lump sum contract price even though the actual quantities required may deviate from those listed.

6-02.4.OPT7.BSP.GB6

(BSP June 26, 2000)

Expansion joint modification will be measured by the linear foot of expansion joint modified along it's completed line and slope.

6-02.4.OPT8.BSP.FB6

(BSP June 26, 2000)

Expansion joint modification contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for "Expansion Joint Modification" even though the actual quantities required may deviate from those listed.

6-02.4.OPT13.FB6

(June 26, 2000)

*** $$1$$ *** bearing - superstr. will be measured per each for each bearing assembly furnished and installed.

6-02.4.OPT18.BSP.GB6

(BSP September 27, 2004)

Transverse stop bearing will be measured per each for each bearing assembly furnished and installed.

6-02.4.OPT19.BSP.GB6

(BSP June 26, 2000)

High-load elastomeric bearing pads will be measured per each for each bearing pad assembly furnished and installed in the bridge.

6-02.4.OPT24.GB6

(August 1, 2011)

Epoxy crack sealing will be measured by the linear foot along the sealed crack at the concrete surface.

No specific unit of measurement will apply to the force account item of "Force Account Epoxy Crack Sealing Cores".

6-02.4.OPT25.GB6

(June 26, 2000)

Bridge grate inlet will be measured per each for each bridge grate inlet constructed.

6-02.4.OPT26.GB6

(June 26, 2000)

Modify bridge drain will be measured per each for each bridge drain modified.

6-02.4.OPT27.GB6

(June 26, 2000)

Plugging existing bridge drain will be measured per each for each bridge drain plugged.

6-02.4.OPT32.BSP.GB6

(BSP June 26, 2000)

Core drilled bridge deck drain will be measured per each for each bridge deck drain core drilled and completed with a pvc pipe sleeve.

6-02.4.OPT37.GB6

(June 26, 2000)

Bridge deck repair will be measured by the cubic foot of pre-packaged concrete material placed in the repaired bridge deck, based upon a bag count of material required to produce the material actually used in the repair. When pre-packaged mix is extended with aggregate, the volumetric basis for payment will be determined on the basis of the bag count plus the absolute volume of aggregate extender actually used. Material wasted or unused will not be included. The yield of the pre-packaged concrete material per bag shall be determined under production conditions.

6-02.4.OPT42.BSP.GB6

(BSP January 12, 2009)

Bridge deck repair will be measured by the square foot of surface area of deck concrete removed, with the measurement taken at the plane of the top mat of steel reinforcing bars.

6-02.4.OPT43.BSP.GB6

(BSP June 26, 2000)

Longitudinal seismic restrainer will be measured per each for each restrainer furnished and installed.

6-02.4.OPT44.BSP.GB6

(BSP June 26, 2000)

Seismic retrofit contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for “Seismic Retrofit - _____” even though the actual quantities required may deviate from those listed.

6-02.4.OPT45.BSP.GB6

(BSP June 26, 2000)

Column jacketing contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective

bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for “Column Jacketing - _____” even though the actual quantities required may deviate from those listed.

6-02.4.OPT46.BSP.GB6
(BSP December 5, 2005)
Prestressed concrete girder will be measured by the linear foot of girder specified in the Proposal, including adjustments to the Plan quantity made in accordance with Section 1-04.4.

6-02.4.OPT47.BSP.GB6
(BSP April 7, 2008)
Permeon treatment will be measured by the square yard of concrete surface area receiving the treatment, as shown in the Plans

6-02.5.GR6
Payment

6-02.5.INST1.GR6
The first bid item under Section 6-02.5 is supplemented with the following:

6-02.5.OPT1.GB6
(June 26, 2000)
All costs in connection with furnishing and applying epoxy mortar to the concrete surfaces as specified shall be included in the unit contract price per cubic yard for “Conc. Class _____”. If the concrete is to be paid for other than by class of concrete then the costs shall be included in the applicable adjacent item of work.

6-02.5.OPT2.FB6
(June 26, 2000)
All costs in connection with producing *** $$1$$ *** finish on concrete surfaces as specified shall be included in the unit contract price per cubic yard for “Conc. Class _____”. If the concrete is to be paid for other than by class of concrete then the costs shall be included in the applicable adjacent item of work.

6-02.5.OPT3.GR6
(April 3, 2006)
All costs in connection with the treatment of high pH stormwater or dewatering water as specified shall be included in the unit contract price per cubic yard for “Conc. Class _____”. If the concrete is to be paid for other than by class of concrete then the costs shall be included in the applicable adjacent item of work.

6-02.5.INST2.GR6
The third bid item under Section 6-02.5 is supplemented with the following:

6-02.5.OPT9.FB6
(June 26, 2000)
All costs in connection with *** $$1$$ *** shall be included in the lump sum contract price for “Superstructure - _____”.

6-02.5.INST3.GR6
The fifth and sixth bid items under Section 6-02.5 are supplemented with the following:

6-02.5.OPT15.GB6
(June 26, 2000)
All costs in connection with drilling holes in concrete and setting steel reinforcing bar dowels with epoxy resin as specified shall be included in the unit contract price per pound for “St. Reinf. Bar _____” or “Epoxy-Coated St. Reinf. Bar _____” as applicable. If the steel reinforcing bars are to be paid for other than by type of bar then the costs shall be included in the applicable adjacent item of work.

6-02.5.OPT20.BSP.GB6
(BSP June 26, 2000)
The contract quantity specified for “Steel Reinf. Bar for Bridge” includes the quantity for the epoxy-coated steel reinforcing bars located in the substructure of the bridge(s) included in this project. All costs in connection with furnishing and installing epoxy-coated steel reinforcing bars in bridge substructure as specified shall be included in the unit contract price per pound for “Steel Reinf. Bar for Bridge”.

6-02.5.INST4.GR6
Section 6-02.5 is supplemented with the following:

6-02.5.OPT25.GR6
(April 28, 1997)
“Precast Reinf. Conc. Three Sided Structure No. ___”, lump sum.

The lump sum contract price for “Precast Reinf. Conc. Three Sided Structure No. ___” shall be full pay for performing the work as specified, including footings, slab bases, wingwalls, and cutoff walls.

6-02.5.OPT26.FB6
(August 2, 2010)
“Bridge Deck - _____”, lump sum.
The lump sum contract price for “Bridge Deck - _____” shall be full pay for constructing the reinforced concrete portions of the steel bridge superstructure, including *** $$1$$ ***.

6-02.5.OPT27.GB6
(June 26, 2000)
“Expansion Joint System _____ - Superstr.”, per linear foot.

6-02.5.OPT28.GB6
(August 2, 2010)
"Modular Expansion Joint System - Superstr.", lump sum.
"Modular Expansion Joint System ___", lump sum.
The lump sum contract prices for "Modular Expansion Joint System - Superstr." and "Modular Expansion Joint System ___" shall be full pay for performing the work as specified, including design, fabrication, testing, inspection and installation of modular expansion joint system assemblies.

6-02.5.OPT32.BSP.GB6
(BSP June 26, 2000)
"Expansion Joint Modification", per linear foot.

6-02.5.OPT33.BSP.GB6
(BSP June 26, 2000)
"Expansion Joint Modification ___", lump sum.

6-02.5.OPT38.GB6
(June 26, 2000)
"_____ Bearing - Superstr.", per each.

6-02.5.OPT43.BSP.GB6
(BSP September 27, 2004)
"Transverse Stop Bearing", per each.

6-02.5.OPT44.BSP.GB6
(BSP June 26, 2000)
"High-Load Elastomeric Bearing Pad - _____", per each.

The unit contract price per each for "High-Load Elastomeric Bearing Pad - _____" shall be full pay for furnishing, testing, and installing the bearing assemblies as specified, including all work required to adjust the bearing assemblies to their correct position following installation.

6-02.5.OPT49.GB6
(August 1, 2011)
"Epoxy Crack Sealing", per linear foot.

Payment for taking and submitting cores to the Engineer for testing, as specified by the Engineer, will be by force account in accordance with Section 1-09.6. For the purpose of providing a common Proposal for all Bidders, the Contracting Agency has entered an amount for the item "Force Account Epoxy Crack Sealing Cores" in the bid proposal to become a part of the total bid by the Contractor.

6-02.5.OPT50.GB6
(June 26, 2000)
"Bridge Grate Inlet", per each.

6-02.5.OPT51.GB6
(June 26, 2000)
"Modify Bridge Drain", per each.

6-02.5.OPT52.GB6
(June 26, 2000)
"Plugging Existing Bridge Drain", per each.

6-02.5.OPT53.FB6
(June 26, 2000)
All costs in connection with *** $$1$$ *** bridge drains as specified shall be included in the unit contract price per square yard for *** $$2$$ ***.

6-02.5.OPT58.BSP.GB6
(BSP June 26, 2000)
“Core Drilled Bridge Deck Drain”, per each.

6-02.5.OPT59.BSP.FB6
(BSP June 26, 2000)
All costs in connection with constructing the core drilled bridge deck drains as specified shall be included in the ***$$1$$***.

6-02.5.OPT64.GB6
(June 26, 2000)
“Bridge Deck Repair”, per cubic foot.
The unit contract price per cubic foot for "Bridge Deck Repair" shall be full pay for performing the work as specified, including removing all loose and unsound concrete, and mixing, placing (except for any necessary soffit forming), finishing and curing the pre-packaged concrete.

6-02.5.OPT65.GB6
(June 26, 2000)
Payment for "Bridge Deck Repair" will be by force account as provided in Section 1-09.6.

For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Bridge Deck Repair" in the bid proposal to become a part of the total bid by the Contractor.

6-02.5.OPT70.BSP.GB6
(BSP January 12, 2009)
"Bridge Deck Repair", per square foot.
The unit contract price per square foot for "Bridge Deck Repair" shall be full pay for performing the work as specified, including removing and disposing of the concrete within the repair area and furnishing, placing, finishing, and curing the repair concrete.

6-02.5.OPT71.BSP.GB6
(BSP June 26, 2000)
“Longitudinal Seismic Restrainer”, per each.

6-02.5.OPT72.BSP.GB6
(BSP June 26, 2000)
“Seismic Retrofit - _____”, lump sum.

6-02.5.OPT73.BSP.GB6
(BSP June 26, 2000)
“Column Jacketing - _____”, lump sum.

6-02.5.OPT74.BSP.GB6
(BSP November 5, 2006)
“Prestressed Conc. Girder ___”, per linear foot.
The unit contract price per linear foot for “Prestressed Conc. Girder ___” shall be full pay for performing the work as specified, including shop drawing submittals, fabrication,

storage, handling, shipping, erection (including all site preparation and restoration activities necessary for erection equipment access and support), furnishing and removing oak block wedges, furnishing and removing temporary bracing, and furnishing and cutting temporary strands. For deck bulb tee girders and PCPS members, all work related to equalizing girder camber, connecting weld-ties, and grouting keyways, shall also be included. For spliced prestressed concrete girders, all work related to cast-in-place concrete closures and post-tensioning shall be included. Payment will be made based on the quantity specified in the Proposal, unless changes are made to this quantity in accordance with Section 1-04.4, in which case the quantity specified in the Proposal will be adjusted by the amount of the change and will be paid for in accordance with Section 1-04.4.

6-02.5.OPT75.BSP.GB6

(BSP August 4, 2008)

"Permeon Treatment", per square yard.

The unit contract price per square yard for "Permeon Treatment" shall be full pay for performing the work as specified, including all surface protection and treatment containment measures.

6-02.5.OPT91.FB6

(June 26, 2000)

Bridge and Structures Minor Items

For the purpose of payment, such bridge and structures items as *** $$1$$ *** etc., for which there is no pay item included in the proposal, are considered as bridge and structures minor items. All costs in connection with furnishing and installing these bridge and structures minor items as shown and noted in the Plans and as outlined in these specifications and in the Standard Specifications shall be included in the *** $$2$$ ***

6-02.5.OPT92.FB6

(June 26, 2000)

Bridge Supported Utilities

All costs in connection with placing *** $$1$$ *** through the superstructure of *** $$2$$ *** as shown in the Plans, including all *** $$3$$ ***, shall be included in the *** $$4$$. ***

6-02.5.OPT93.GB6

(June 26, 2000)

No additional compensation will be made by reason of any delay or other expense to the Contractor caused by coordination with the utility company or by installing utility company furnished items. However, any unavoidable delays to the Contractor caused by coordination with the utility company or resulting from installing utility company furnished items will be adjusted in accordance with Section 1-08.8.

6-03.GR6

Steel Structures

6-03.2.GR6

Materials

6-03.2.INST1.GR6
Section 6-03.2 is supplemented with the following:

6-03.2.OPT1.BSP.GB6
(BSP June 11, 2003)
Structural high strength steel shall conform to ASTM A 709, Grade HPS 70W, with supplementary requirements S83 and S84 as applicable.

The Contractor is advised that quenched and tempered ASTM A 709 Grade HPS 70W steel plates are limited to a 50 foot maximum delivery length from the mill.

As an alternative, Grade HPS 70W thermo-mechanical-controlled-processing (TMCP) steel plates with a minimum specified yield point of 70 ksi are also available from the manufacturer in limited thicknesses, and may be directly substituted for the quenched and tempered product.

6-03.2.OPT2.BSP.GB6
(BSP June 4, 2012)
Pin Bearing
Unless other materials are specified in the Plans, pin bearing assembly components shall conform to the following requirements for those components shown and specified in the Plans:

Steel Plates and Bars
Steel plates and bars (base plate, bearing plate, sole plate, and guide bar) shall conform to ASTM A 36, and the dimensions shall comply with the details as shown in the Plans. The surface of pin bearing assembly steel components in contact with stainless steel and with the bearing block shall have an average surface roughness of 125 microinches or less. The surface within the recess of steel plates and bars retaining PTFE shall have an average surface roughness of 250 microinches or less. All other base plate, bearing plate, sole plate, and guide bar surfaces in contact with other pin bearing assembly components shall have an average surface roughness of 500 microinches or less.

Polytetrafluoroethylene (PTFE)
PTFE shall be 100 percent virgin PTFE, woven PTFE fabric, or dimpled PTFE conforming to Section 18.8.2 of the AASHTO LRFD Bridge Construction Specifications, current edition and latest interims.

Stainless Steel
Stainless steel sheet shall conform to ASTM A 240 Type 304L. Stainless steel in contact with PTFE shall be polished to a Number 8 mirror finish.

Stainless steel countersunk screws shall be hexagon socket type conforming to ANSI B 18.3 and shall conform to ASTM F 593 Type 304L.

Silicone Grease
Silicone grease shall conform to US Navy QPL AS8660-2.

Bolts, Nuts and Washers

Bolts, nuts and washers shall conform to Section 9-06.5(3) and shall be galvanized after fabrication in accordance with AASHTO M 232.

Anchor Bolt Assembly

Anchor bolts shall conform to ASTM F 1554 Grade 105, including supplemental requirements S2, S3, and S5. Nuts shall conform to ASTM A 563 Grade DH. Washers shall conform to AASHTO M 293. Bars shall conform to ASTM A 36. Pipe shall conform to ASTM A 53 Grade B Type E or S, black. The upper portion of the anchor bolts, and associated nuts and washers, to six inches minimum below the concrete surface, shall be galvanized after fabrication in accordance with AASHTO M 232

Resin Filler

Resin filler shall conform to Section 6-02.2 as supplemented in these Special Provisions.

Bearing Blocks and Keeper Rings

Bearing block forgings shall conform to Section 9-06.11, including AASHTO M 102 Supplemental Requirement S4. The grade shall be Grade F. The bearing block forging surfaces in contact with other pin bearing assembly components shall have an average surface roughness of 125 microinches or less. All other bearing block forging surfaces shall have an average surface roughness of 500 microinches or less.

Keeper ring forgings shall conform to Section 9-06.11 and the grade shall be Grade H. All keeper ring surfaces shall have an average surface roughness of 125 microinches or less.

Pin Assembly

Pins shall conform to ASTM A 276, UNS Designation 21800. Nuts shall conform to ASTM A 563 Grade DH. Nuts with a thread diameter equal to or less than six inches shall have a minimum Rockwell Hardness of HRc 24. Nuts with a thread diameter greater than six inches shall have a Rockwell Hardness between HRc 20 and HRc 30. Washers shall conform to ASTM A 572 Grade 50. Cotter pins shall be stainless steel. The pin surfaces in contact with the bearing blocks shall have an average surface roughness of 125 microinches or less.

Submittals of Acceptance Test Reports and Certificates

The Contractor shall submit the following production samples, and test reports and certificates, to the Engineer for review, testing, and approval:

1. Manufacturer's certificate of compliance for the PTFE, resin filler, and silicone grease, in accordance with Section 1-06.3.

2. A six inch by six inch by 1/8 inch sample of PTFE taken from the lot of production material.

3. Certified mill test reports for all steel and stainless steel materials incorporated in the bearings.

The Contractor shall not ship the bearings from the fabricator's facility until receiving the Engineer's written approval of all production samples, and test reports and certificates.

6-03.3.GR6

Construction Requirements

6-03.3.INST1.GR6

Section 6-03.3 is supplemented with the following:

6-03.3.OPT1.BSP.FB6

(BSP January 7, 2002)

Structural steel fabricators for *** $$1$$ *** shall be certified under the AISC Quality Certification Program, Major Steel Bridges Category, with endorsement F, Fracture Critical. Prior to approval for fabrication, the results of the latest AISC certification review shall be submitted to the Engineer.

6-03.3.OPT2.BSP.GB6

(BSP June 4, 2012)

Pin Bearing

Shop Drawings

The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 6-03.3(7). These drawings shall include but not be limited to the following information:

1. Plan and elevation of the assembled bearing and each of the components showing dimensions and tolerances.

2. Complete details of all components and sections showing all materials incorporated into the bearing.

3. All AASHTO, ASTM or other material designations.

4. All surface finishes.

5. Bearing manufacturer's recommendations and procedures for bearing assembly shipment, storage, and installation.

The Contractor shall not begin fabricating the pin bearings until receiving the Engineer's approval of the shop drawings.

Shop Inspection

The manufacturer shall provide for inspection. Inspection during the fabrication process shall ensure that the materials and workmanship meet the requirements of the contract. Inspection shall be performed by an independent inspection entity approved by the Engineer.

The Contractor shall submit the name, address, phone number and contact person of the inspection entity performing the required certified shop inspection of the bearings to the Engineer for approval. The Contractor shall not begin bearing

fabrication until receiving the Engineer's written approval of the inspection entity for certified shop inspection.

Flatness and Manufacturing Tolerances

Flatness of bearing surfaces shall be determined by the following method:

1. A precision straightedge, longer than the nominal dimension to be measured shall be placed in contact with the surface to be measured as parallel to it as possible.

2. A feeler gauge having an accuracy of □ 0.001 inches equal to the tolerance allowed shall be selected and inserted under the straightedge.

3. If the feeler gauge does not pass under the straightedge, the surfaces shall be acceptable for flatness.

4. In determining the flatness, the straightedge may be located in any position on the surface being measured.

Flatness tolerances shall be defined as follows:

1. Class A tolerance = 0.001 x nominal dimension

2. Class B tolerance = 0.002 x nominal dimension

3. Class C tolerance = 0.005 x nominal dimension

(Nominal dimension shall be taken as the actual dimension of the plate or sheet under the straightedge, in inches.)

Manufacturing tolerances for the bearings are as follows:

Base Plate, Bearing Plate and Sole Plate

Plan dimensions

Greater than 30 inches:	-0.00, +3/16 inch
30 inches or less:	-0.00, +1/8 inch
Thickness:	-1/32, +1/8 inch
Flatness:	Class A tolerance, side in contact with steel or PTFE Class C tolerance, side in contact with grout or concrete

Guide Bar

Length:	± 1/8 inch
Section dimensions:	± 1/16 inch
Flatness:	Class A tolerance, side in contact with steel or PTFE
Bar to bar tolerance:	± 1/32 inch

Bars shall be not more than 1/32" out of parallel

PTFE Sheet

Plan dimensions:	Total nominal design area –0, +5 percent
Thickness:	-0.00, +1/64 inch
Flatness:	Class A tolerance
PTFE Recess:	Length and width –0.00, +0.04 inch

Stainless Steel Sheet

Flatness:	Class A tolerance

Bearing Block

Plan dimensions:	-0.00, +1/8 inch
Thickness:	±0.015 inch
Groove radius for pin:	As shown in the Plans

Keeper ring grooves in bearing blocks

Radius, inner and outer:	±0.005 inch
Depth of groove:	±0.010 inch

Keeper Ring

Radius, inner and outer:	±0.010 inch
Thickness:	±0.030 inch

Pin

Length, shldr. to shldr.:	+0.000, -0.020 inch
Diameter:	As shown in the Plans

Overall Height

Total thickness:	-1/16, +3/16 inch

The edges of all components shall be broken by grinding so that there are no sharp edges.

Special Fabrication Requirements

When the following components are shown in the Plans as part of the pin bearing assembly, the following special fabrication requirements shall apply:

PTFE Sheet

PTFE shall be 1/8 inch thick unless otherwise noted in the Plans. PTFE shall be recessed and bonded to a depth of one half the PTFE sheet thickness into the backing plate. The exposed height of the PTFE shall not be less than 3/64 inch.

Dimpled PTFE, if shown in the Plans, shall be unfilled and have a minimum thickness of 3/16 inch. Dimples shall be placed in a 1/2 inch grid and shall have a depth of 1/16 inch.

The PTFE sheet shall be recessed and chemically bonded to the supporting steel plate or bar. The woven PTFE sheet shall be mechanically bonded to the supporting steel plate or bar. Bonding shall be performed under controlled conditions and in accordance with the written instructions of the PTFE manufacturer.

Following the bonding operation, the PTFE surface shall be smooth and free from bubbles. Filled PTFE shall be polished after the bonding operation is complete, in accordance with AASHTO LRFD Bridge Construction Specification Section 18.8.3.2.2, current edition and latest interims.

Stainless Steel Sheet

The stainless steel sheet shall be seal welded all around to the supporting steel plate or bar by the gas tungsten arc welding (GTAW) process in accordance with current AWS specifications. The stainless steel sheet shall be clamped down to have full contact with the supporting steel plate or bar during welding. The welds shall not protrude beyond the sliding surface of the stainless steel sheet.

Guide Bar

Each guide bar shall be fabricated from a single steel plate. The guide bars shall be bolted to the pin bearing assembly as shown in the Plans. The stainless steel sheet shall be welded to the guide bar before attaching the guide bar to the pin bearing assembly. The space between the guide bar and the guided component shall be 3/16 inch ± 1/16 inch.

Corrosion Protection

Steel surfaces, except as otherwise specified below, shall be painted in accordance with Section 6-07.3(9), and Section 6-03.3(30) as supplemented in these Special Provisions. The surfaces of all welds fastening stainless steel to structural steel shall be painted as specified for structural steel. Stainless steel shall not be painted. Galvanized fastening hardware (anchor bolts, bolts, nuts and washers) shall be painted in accordance with Section 6-07.3(11)A.

All coats of paint as specified in Section 6-07.3(9)A for steel surfaces shall be applied in the shop. After the pin bearing assembly has been erected in its final position with the anchor bolt nuts and pin nuts installed, all surfaces with damaged paint shall be repaired in accordance with Section 6-07.3(9)I.

All coats of paint as specified in Section 6-07.3(11)A for galvanized fastening hardware shall be applied after the pin bearing assembly has been erected in its final position with the anchor bolt nuts installed. The Contractor shall prepare the galvanized surfaces for painting in accordance with Section 6-07.3(11)A except only hand or power tool cleaning methods shall be used..

The embedded pipe assembly, when shown in the Plans, shall not be painted.

The following items shall be painted only with one shop applied coat of inorganic zinc primer in accordance with Section 6-07.3(9):

1. The keeper rings.

2. The keeper ring groove surface in the bearing blocks.

The following items and surfaces shall not be painted, but shall instead be coated with #2 extreme pressure grease:

1. The machined surfaces of the bearing blocks that contact the pin and keeper rings.

2. All surfaces of the pins.

3. The threads of the pin nuts.

The primer paint coated keeper rings shall be coated with #2 extreme pressure grease prior to final bearing assembly.

Bearing Assembly Inspection Reports and Certification

The Contractor shall submit the daily inspection reports of the independent inspection entity performing the required certified shop inspection to the Engineer for approval. The daily inspection reports shall report on the shop fabrication and testing activities relating to the bearing assemblies, and their conformance to the specification requirements.

The Contractor shall submit written documentation from the bearing manufacturer certifying that the bearing assemblies have been manufactured in full compliance with the specification requirements.

The Contractor shall not ship the bearing assemblies from the fabricator's facility until receiving the Engineer's approval of the certified shop inspection daily inspection reports and the bearing manufacturer's certificate of compliance.

Bearing Component Assembly, Shipping, and Storage

Each bearing shall be fully assembled at the manufacturing plant and delivered to the construction site as a complete unit, ready for installation. The units shall be held together with removable restraints so that the sliding surfaces are not damaged. Softeners shall be placed under the restraints to protect all painted surfaces. The Contractor shall not damage the painted surfaces while shipping, storing and installing the bearing assemblies.

All bearing assemblies shall be marked with the following information prior to shipping:

1. Location of the bearing, including the pier and the specific location along the pier.

2. Direction arrow pointing in the ahead on station direction.

The above information shall be marked on the top plate of the upper unit of the bearing assembly. The marks shall be permanent and shall be visible after bearing installation.

The bearing assemblies shall have centerlines marked on both upper and lower units for checking alignment in the field.

The bearing assemblies shall be shipped in light-proof, moisture-proof and dust-proof containers.

Bearing Assembly Field Inspection

Field inspection of a representative number of bearings assemblies will be performed by the Engineer. The Contractor shall provide a clean, dry and enclosed area at the site, spacious enough for the field inspection activities. The Contractor shall disassemble and reassemble the bearings for inspection by the Engineer. The disassembly and reassembly of the bearings shall be in accordance with the bearing manufacturer's written procedure and in the presence of the Engineer.

Bearings that fail the inspection shall be replaced or repaired by the Contractor, as approved by the Engineer, at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

6-03.3(7).GR6

Shop Plans

6-03.3(7)A.GR6

Erection Methods

6-03.3(7)A.INST1.GR6

The list in the second paragraph of Section 6-03.3(7)A is supplemented with the following:

6-03.3(7)A.OPT1.BSP.GB6

(BSP July 12, 2000)

8. If the Contractor selects a girder launching method as the erection procedure, the Contractor shall submit plan details of the nose beam, roller assemblies, jacks, blocking, tow lines and control lines, and shall prepare an erection procedure that describes the method and equipment involved in the launching procedure, the elevation and alignment control and corrective measures enforced during the launching process, the methods of monitoring and adjusting the tow line and control line loads during the launching process, and the spare jacks, tow lines, control lines, and other critical field erection equipment provided to ensure a continuous and safe operations.

6-03.3(7)A.OPT2.BSP.GB6

(BSP July 12, 2000)

8. The method and equipment used to drill holes, and ream existing rivet holes following rivet removal, through and in the existing gusset plates and steel members.

6-03.3(11).GR6

Workmanship and Finish

6-03.3(11).INST1.GR6

Section 6-03.3(11) is supplemented with the following:

6-03.3(11).OPT1.BSP.GB6

(BSP January 7, 2002)

All fabrication shall conform to the latest edition of the AASHTO Guide Specifications for Highway Bridge Fabrication with HPS 70W Steel, except as modified by these Special Provisions.

Short term application of heat for purposes of heat curving, heat straightening, camber and sweep adjustment, or other reasons, shall conform to Sections 6-03.3(10) and 6-03.3(18), and is limited to 1,100F maximum.

6-03.3(15).GR6

Planing of Bearing Surfaces

6-03.3(15).INST1.GR6

Section 6-03.3(15) is supplemented with the following:

6-03.3(15).OPT1.GB6

(June 26, 2000)

Where mill to bear is specified in the Plans, the bearing end of the stiffener shall be flush and square with the flange and shall have at least 75 percent of this area in contact with the flange.

6-03.3(18).GR6

Built Members

6-03.3(18).INST1.GR6

Section 6-03.3(18) is supplemented with the following:

6-03.3(18)OPT1.BSP.GB6

(BSP July 12, 2000)

Heat Curving

The Contractor may use heat curving methods to fabricate specific steel components, subject to the following requirements:

1. The steel components shall either be flange plates of welded steel plate girders, or top flange plates and longitudinal bottom flange stiffeners of welded steel box girders.

2. The horizontal curvature measured to the centerline of the steel component shall be greater than or equal to 500 feet, except that the horizontal curvature dimension shall be greater than or equal to 1,000 feet if the steel component thickness exceeds 3 inches or the steel component width exceeds 30 inches. Steel components not meeting these geometric requirements shall be sheared or flame-cut to the specified geometry.

3. The Contractor submits a heat curving plan to the Engineer and receives the Engineer's approval of the submittal.

4. The heat curving operations shall conform to the approved heat curving plan and the requirements of this Section.

5. All heat curving shall be performed in the fabricator's shop or facility.

Submittals

The Contractor shall submit a heat curving plan to the Engineer in accordance with Section 6-03.3(7) along with the steel member fabrication shop drawings. The heat curving plan shall include, but not be limited to, the following:

1. The methods of preparing the steel components for heat curving.

2. The methods of handling and supporting the steel components during heat curving operations.

3. The heating torches and tips to be used.

4. The heating procedure and pattern to be used.

5. The temperature measuring devices to be used to monitor the temperature of the steel component.

6. The cooling methods to be used.

The Contractor shall not begin heat curving operations until receiving the Engineer's approval of the heat curving plan.

Equipment

Heat curving shall be performed using large multiorifice (rosebud) heating torches selected as appropriate to promote heating efficiency and to prevent unnecessary distortion. The torches and tips shall be as specified in the heat curving plan as approved by the Engineer.

Process

All flange butt welds for the steel component shall be completed prior to heat curving. All web butt welds shall be completed prior to connecting the web to the flange. All heat curving operations shall be completed prior to connecting the web to the flange, and prior to shop painting.

The steel components shall be handled and supported as specified in the heat curving plan as approved by the Engineer.

Only truncated triangular heating patterns shall be used. The base of the triangle shall be the edge of the steel component that is to be concave after heat curving. The heating patterns shall be spaced uniformly along the full length of both edges of the steel component to produce a circular, not parabolic, curvature. The heating patterns shall be adjusted as necessary to produce the specified curvature, compensating for differences in steel component thickness and width. Care shall be taken when heating relatively thin, wide plates to guard against buckling.

The heat curving process shall bring the temperature of the steel within the specified pattern to between 1,000F and 1,100F as rapidly as possible without overheating the steel. The heating torches shall be manipulated to prevent general and localized overheating. Heat measurements shall be made after the heating flame has been removed from the steel component.

Heat procedures that raise the temperature of any portion of the steel component above 1,100F shall be considered destructive heating. Destructive heating shall be cause for rejection of the steel component, subject to the Engineer's evaluation. Steel components damaged by destructive heating and subject to rejection may have the damaged portion repaired or replaced by the Contractor at no additional cost to the Contracting Agency, subject to the Engineer's approval of the repair and post-repair testing procedures. The repaired steel component may be accepted subject to successful post-repair testing and the Engineer's approval.

Quenching with water or water and air will not be permitted. Cooling with dry compressed air will be permitted after the steel component has cooled to 600F.

6-03.3(25).GR6

Welding and Repair Welding

6-03.3(25).INST1.GR6

Section 6-03.3(25) is supplemented with the following:

6-03.3(25).OPT1.BSP.GB6

(BSP September 25, 2002)

Welding Requirements for ASTM A 709 Grade HPS 70W Steel

All welding shall conform to the latest edition of the AASHTO Guide Specifications for Highway Bridge Fabrication with HPS 70W Steel.

Use of the ESAB ENi4 electrode in combination with Lincoln Mil800H flux will not be allowed.

Only submerged arc and shielded metal arc welding processes will be permitted. Consumable handling requirements shall be in accordance with AWS D1.5, Sections 12.6.5 and 12.6.6, except that SAW consumables shall meet the hydrogen control level of H4 as discussed in AWS D1.5, Section 12, Article 12.6.2. SMAW consumables shall meet either H4 or H8 except the higher preheat and interpass temperatures as noted in Table 3 of the AASHTO Guide Specifications for Highway Bridge Fabrication with HPS 70W Steel apply to H8 conditions.

Filler metals used to make single pass fillet welds for web to flange applications, and for attaching stiffeners and connection plates to webs and flanges, shall conform to AWS D1.5, Table 4.1 for ASTM A 709 Grade 50W base metal. Filler metals for single pass fillet welds need not meet the requirements for exposed bare applications.

Filler metals used for all complete penetration groove welds connecting Grade HPS 70W plate to ASTM A 709 Grade 50W plate may conform to the requirements for welding Grade 50W base metal, or may conform to the requirements for welding Grade HPS 70W base metal as listed below.

Filler metals used for all complete penetration groove welds connecting Grade HPS 70W plates shall conform to the requirements for HPS 70W base metal as follows:

Submerged Arc Welding process:

Wire	LA85 by Lincoln Electric Company
Flux	MIL800HPNi by Lincoln Electric Company

Shielded Metal Arc Welding process:

Matching	E9018MR*
Undermatching	E7018MR*

* the designator MR, for moisture resistant coating, is required for all SMAW electrodes used for welding HPS 70W steels.

The Contractor may request approval of alternative consumables in lieu of the above filler metals for SAW. The request for approval shall include documentation of successful welding in accordance with the AWS D1.5 Bridge Welding Code, and include diffusible hydrogen tests as described in AWS D1.5, Article 12.6.2 indicating the deposited weld metal under proposed fabrication shop conditions has a diffusible hydrogen level equivalent to H4 or less.

If specified in the Plans, additional weld procedure qualification tests shall measure the Charpy V-notch toughness of the coarse grained area of the heat affected zone (HAZ). The notch in the specimens shall be carefully located in the coarse grained area of the HAZ, as determined by macroetching the specimens prior to machining and testing. The toughness requirement for the HAZ shall be the same as the weld metal.

All procedure qualification tests shall be ultrasonically tested in accodance with AWS D1.5-96, Section 6, Part C. Evaluation shall conform to AWS D1.5-96, Table 9.1, Ultrasonic Acceptance - Rejection Criteria - Tensile Stress. Indications found at the interface of the backing bar may be disregarded, regardless of the defect rating.

The Engineer shall be allowed to witness all welding procedure specification qualification tests.

In general, post weld heat treatment shall not be required. The use of such post weld heat treatment shall require additional qualification testing.

Whenever magnetic particle testing is done, only the yoke technique will be allowed, as described in Section 6.7.6.2 of the AASHTO/ AWS D1.5 Bridge Welding Code, modified to test using alternating current only. The prod technique will not be allowed.

6-03.3(25).OPT2.BSP.GB6

(BSP May 17, 2004)

Narrow Gap Improved-Electroslag Welding (NGI-ESW) Procedure

The NGI-ESW procedure may be used for groove welds in bridge members and member components up to four inches thick subject to the following requirements:

In members subject to applied tensile stress under any loading condition, the NGI-ESW procedure may be used provided:

1. The NGI-ESW procedure is qualified in accordance with the AASHTO/AWS D1.5M/D1.5:2002 Section 5.13 and 5.14 procedure qualification tests, and satisfies the following criteria:

    a. Weld Metal: 20 foot-pounds at 0F.

    b. HAZ: 15 foot-pounds at 40F.

2. The application is limited to AASHTO temperature Zone I and Zone II.

The NGI-ESW procedure qualified for welding of tension members will be considered as also qualified for compression members without additional testing.

The NGI-ESW procedure shall not be used for fracture-critical members.

NGI-ESW shall be used only with AASHTO M 270 Grades 36, 50 and 50W steel, and ASTM A 709 Grades 36, 50 and 50W steel.

Oscillation is not permitted in the NGI-ESW procedure, unless qualified by test and approved by the Engineer.

Preheat is not required for NGI-ESW.

Welding Procedure Specification (WPS) Submittal

The welding procedure specification submittal for NGI-ESW shall include, but not be limited to, the following:

1. Process type (eg. NGI-ESW).

2. Guide design (eg. wing or web type), number of wires, and material used for the guide (eg. AISI 1008 steel).

3. Flux type, including the amount added initially, and the subsequent flux feed rate.

4. Joint details, such as the joint gap dimension and the plate thickness(es).

5. Base metal.

6. AWS electrode designation, composition, diameter, manufacturer, product name, type (eg. tubular metal power cored).

7. Wire feed speed.

8. Type and polarity of current (eg. DC electrode positive (DCEP)).

9. Current and voltage.

10. Power source characteristics (eg. constant voltage and 100 percent duty cycle rating at 1500 amps).

11. Details of water-cooled shoes such as reinforcement groove dimensions and coolant flow rate.

12. Type of sealing material used to prevent slag run-outs.

13. Accessories used within the weld zone (eg. type of insulating tape used to brace the consumable guide).

Qualification Testing

The Contractor shall provide the opportunity for Contracting Agency representatives and NCI-ESW development personnel from the Oregon Graduate Institute of Science and Technology or the equipment manufacturer to witness all qualification testing.

Toughness Revisions to AASHTO/AWS D1.5M/D1.5:2002 Table 4.2

To utilize NGI-ESW, the following revisions to Table 4.2 are required:

<u>Non-Tension Members</u>

Grade 36	NGI-ESW = 20 foot-pounds at 0F	Zones I & II
Grade 50	NGI-ESW = 20 foot-pounds at 0F	Zones I & II
Grade 50W	NGI-ESW = 20 foot-pounds at 0F	Zones I & II

<u>Tension Members</u>

Grade 36	NGI-ESW = 20 foot-pounds at 0F	Zones I & II
Grade 50	NGI-ESW = 20 foot-pounds at 0F	Zones I & II
Grade 50W	NGI-ESW = 20 foot-pounds at 0F	Zones I & II

<u>HAZ of Tension and Reversal Members</u>

CVN toughness of the heat-affected zones (on both sides of the narrow gap improved-electroslag weld) shall meet or exceed 15 foot-pounds at 40F.

Electrode

Electrode wire for NGI-ESW shall be FES70-EWTX with a maximum diameter of 3/32 inch. Electrode wire shall conform to the following chemistry requirements:

Element	Percent by Weight (maximum unless range is specified)

C	0.03
Mn	1.0 – 1.4
Si	0.3 – 0.45
Ni	2.7 – 3.2
Mo	0.25 – 0.45
Ti	0.01 – 0.04
Al	0.01
S	0.015
P	0.015
V	0.005
B	0.0005
Cu	0.01
Nb	0.01

The electrode wire chemistry shall be evaluated by a melt button of the electrode, analyzed by spectrometer. If the spectrometer accuracy for low carbon and sulfur content is not adequate, additional analyzing of these elements may be accomplished by other methods.

The electrode shall be analyzed for diffusible hydrogen by the GMAW process shielded by 100 percent argon at 40 – 50 CFH. The maximum diffusible hydrogen shall be 4 ml per 100 grams.

The electrode wire material shall have a tensile strength of 70 to 95 ksi, a minimum yield strength of 50 ksi, a minimum elongation of 22 percent, and minimum charpy V-notch toughness of 20 foot-pounds at 0F.

Electrode wire shall be dry and free of contamination from dirt, grease, rust and other foreign material. Electrodes shall be received in undamaged moisture-resistant packages. Electrodes shall be protected against contamination and damage during shipment and storage. Electrodes in packages damaged during shipment and storage shall be discarded and not used. Electrode packages shall remain effectively sealed against moisture until the electrode is required for use. When removed from the protective packaging and installed on the welding machines, care shall be taken to protect the electrodes from deterioration and damage. When welding is suspended for more than eight hours, the electrodes shall be removed from the welding machines and stored in accordance with the electrode manufacturer's recommendations.

Consumable Guides

The comsumable guide chemical composition shall conform to the following maximum limits:

Element	Percent by Weight
C	0.06
Mn	1.0
Si	0.6
Cr	0.1

Ni	0.23
Mo	0.03
Al	0.05
Cu	0.05
Ti	0.05
S	0.02
P	0.02

Consumable guides shall be dry and free of contamination from dirt, grease, rust, and other foreign material, and shall be in suitable condition for use. Consumable guides shall be received in undamaged moisture-resistant packages. Consumable guides shall be protected against contamination and damage during shipment and storage. After removal from the package, the consumable guides shall be protected and stored to remain free of rust, moisture, and other contaminants that may affect welding properties.

The distance from the edge of the consumable guide to the surface of the weld plate shall be not less than 1/4 inch nor greater than 7/8 inch. The distance from the center of the electrode wire to the surface of the weld plate shall be not less than 1/2 inch nor greater than 1-1/4 inch. For consumable guides designed for multiple electrodes, the electrode separation (center to center) shall not exceed two inches.

The electrode wire passage shall be a diameter or width of 0.105 inches ± 0.008 inches to allow proper current transfer from the electrode wire.

Configurations of consumable guides for NGI-ESW shall be in accordance with Figure R1 as shown in Plans, or equivalent, subject to successful qualification testing.

The purposes of the wing (single wire) and web (dual wire) guide arrangements are to: (1) reduce solidification cracking susceptibility by distributing the heat across the weld pool and increase the weld w/d (width/depth) ratio, (2) increase current-carrying capacity of the electrode-guide assembly, and (3) stiffen the guide assembly.

The consumable guides shown in Figure R1 (A through E) are suggested designs for equal-thickness butt joints and for transition thickness butt joints. For example, the designs shown in Figures R1 A and B may be used for ESW with single electrode arrangements for either 1-1/4 inch equal-thickness butt joints, or 1-1/4 to 2 inch transition-thickness butt joints. In a second example, the designs shown in Figures R1 A, C and D may be used for 2 inch equal-thickness butt joints.

Root Face and Adjacent Faying Surface Preparation

Surfaces of the plate within one inch of the weld joint, and all surfaces on which weld metal will be deposited, shall be free of mill scale, corrosion and other contaminants. The groove preparation for NGI-ESW shall be square with a root opening of 3/4 inch ±1/8 inch.

Starting Sump and Run-off Tabs

The starting sump and run-off tab area shall have at least the same dimensions as those used for procedure qualification. The sump depth shall be not less than three inches. Tack welds joining steel tabs and steel sumps to the plates shall be placed within the joint being welded in order to completely remelt and incorporate the tack welds during the subsequent ESW process. If tack welds on permanent base metal are not remelted, the tack welds, and a 1/8 inch deep layer of the base metal under the tack welds, shall be removed to remove the heat-affected zone. Grade 50W sumps and run-off tabs shall be used for welding Grade 50W material. Grade 50 or 50W sumps and run-off tabs may be used for welding Grade 50 and Grade 36 material. Grade 36 sumps and run-off tabs shall be used only for welding Grade 36 material.

Flux Basicity and Condition

The basicity of flux used for NGI-ESW shall be neutral to ensure uniform weld metal composition throughout the length of weld. Fused fluxes will be required. Flux shall be dry and free of contamination from dirt, grease mill scale, or other foreign material. Flux shall be received in moisture-resistant packaging that can be stored under normal conditions for at least six months without affecting the welding characteristics or weld properties of the flux. Flux supplied by the manufacturer in a sealed package may be dispensed for use without drying if that use occurs within four hours of opening the package. Flux that has been exposed for more than four hours shall be conditioned at 250F for at least two hours prior to welding, or as recommended by the manufacturer, and stored at the same temperature until dispensed for use. Flux from packages damaged in transit or in handling shall be discarded. Flux that has been wet shall not be used.

Insulators

Insulators shall be kept dry and free of contamination from dirt, grease and other foreign material. Insulators shall be stored in sealed packages or according to the insulator manufacturer's guidelines. The material composition of the insulators shall be compatible with the flux for NGI-ESW and shall not affect mechanical properties of the weld.

Retaining Shoes

The portions of retaining shoes in contact with molten metal and base metal adjacent to the weld shall be (1) made of copper and (2) water cooled. Copper shoes shall fit tightly on the plate surface to prevent slag leakage. Only dry refractory material shall be used to fill shoe-to-plate gaps. Water-based sealers shall be limited to reinforcing previously placed tape along the outside edges of the shoes to prevent slag leakage.

Procedure for Electroslag Welding

Using the NGI-ESW procedure, welds shall be started in such a manner as to permit sufficient heat buildup for complete fusion of the weld metal to the groove faces of the joint before the weld leaves the sump. Restarts will not be allowed between the end of the weld and three inches from the beginning of the weld. If the weld cannot be completed, it shall be removed to at least 1/8 inch beyond the widest part of the weld nugget and rewelded.

Flux Additions and Slag Depth Control

After the NGI-ESW process has been established, flux additions shall be continuously regulated using an automatic feeding device. The slag pool depth qualified in the PQR shall be maintained. Slag depletion shall be monitored through current fluctuations on a continuous current and voltage chart recorder (or similar recording equipment). Alternatively, this process may be automated.

WPS Pretest and WPS Qualification

A WPS pretest is a WPS qualification test in accordance with AASHTO/AWS D1.5M/D1.5:2002 Section 5.12 and Figure 5.1 by someone other than the Contractor, but used by the Contractor as a basis for preparing WPS's. WPS pretests will not be permitted for NGI-ESW welds subject to tensile stress.

AASHTO/AWS D1.5M/D1.5:2002 Figure 5.2 shall be used for NGI-ESW qualification. If transition joints between thick and thin members are made, the PQT shall be conducted on the thinner of the two plates.

Inspection

Testing of welds made by NGI-ESW for compression members shall be in accordance with AASHTO/AWS D1.5M/D1.5:2002 Section 6. All welds deposited by NGI-ESW subjected to applied tensile stress shall be 100 percent tested using both radiographic and ultrasonic methods, and evaluated in accordance with AASHTO/AWS D1.5M/D1.5:2002.

Repair Welding

Repair welding of electroslag welds deposited on compression members shall be in accordance with AASHTO/AWS D1.5M/D1.5:2002, except as otherwise noted. Repair of NGI-ESW welds carrying applied tensile stresses shall be conducted in accordance with AASHTO/AWS D1.5M/D1.5:2002 Section 12.17 with the following exception.

> Welds having defects prohibited by AASHTO/AWS D1.5M/D1.5:2002 Section 6.26 shall be repaired in accordance with an approved procedure using a qualified weld process, or the entire weld shall be removed to at least 1/8 inch beyond the widest part of the weld nugget and rewelded. If the depth of detectable cracks is within 1/4 inch of the weld centerline and if the cracking is longer than 15 percent of the weld length (not including the run-on and run-off tabs), the weld shall not be repaired, but instead shall be removed to at least 1/8 inch beyond the widest part of the weld nugget and shall be rewelded. The widest part of the weld may be estimated by cutting 1/2 inch beyond the visible reinforcement for tension members.

Weld Specimens, Type and Number of Tests for NGI-ESW

Weld metal specimens deposited by NGI-ESW and subject to applied tensile stress shall be prepared for mechanical testing in accordance with Figure R2 as shown in the Plans, and AASHTO/AWS D1.5M/D1.5:2002 Table 5.5, plus additional CVN testing of the heat-affected zone (HAZ).

HAZ Specimens, Type and Number of Tests for NGI-ESW

For all compression members including NGI-ESW of compression members, CVN testing of the HAZ is not required. However, for welds deposited by NGI-ESW on tension members, additional CVN tests of the HAZ shall be performed to qualify the process. The CVN tests for the HAZ shall be the following:

1. Five specimens shall be removed from the quarter-thickness section of the HAZ on each side of the procedure qualification welded joint in accordance with Figures R2 and R3 as shown in the Plans.

2. The weld fusion line shall be revealed by etching the transverse-to-weld section.

3. The notch location shall be in the base metal within 1/16 inch from the weld fusion line. If the weld curvature does not permit the entire notch to be placed within 1/16 inch from the fusion line, then one end of the notch shall be placed on the fusion line while the remaining portion of the notch extends away from the fusion line into the base metal.

If different grades of steel such as 36 and 50 or 50 and 50W are joined by NGI-ESW, the procedure qualification tests shall be conducted on the same two grades of steel. If transition joints between thick and thin members are made, the WPS shall be conducted on the same joint preparation (having the same thicknesses and joint transition slope). The heat affected zone CVN toughness specimens shall be extracted from both sides of the transition joint.

Test Results Required for NGI-ESW

Weld Metal

Eight specimens at mid-thickness location of the weld center shall be tested as shown in AASHTO/AWS D1.5M/D1.5:2002 Table 5.5. The highest and lowest values shall be discarded and the remaining six values shall be averaged. For tests to be successful, the average of the remaining six CVN test values shall meet or exceed the minimum energy value of 20 foot-pounds at 0F for welds subject to applied tensile stress. No more than two of the remaining six specimens may have an impact energy value less than the minimum specified, and none of the remaining six specimens shall have an impact energy value less than 2/3 of the minimum specified. If the NGI-ESW process is used for a compression member, the requirements are the same as those for conventional ESW as specified in AASHTO/AWS D1.5M/D1.5:2002 Table 4.2.

HAZ

For CVN toughness determination in welds carrying applied tensile stress, five specimens taken at the quarter-thickness location of the weld, in accordance with Figure R2 as shown in the Plans, shall be tested. The highest and lowest values shall be disregarded and the remaining three values shall be averaged. For tests to be successful, the average of the remaining three CVN test values shall meet or exceed the minimum CVN energy values of 15 foot-pounds at 40F. No more than one of the three remaining specimens shall have an impact energy value less than the

minimum specified and none of the three remaining specimens shall have a value less than 2/3 of the minimum specified value.

References

The following documents are listed as reference for qualification testing and production welding:

D1.5 Bridge Welding Code Proposed Revisions to Include Narrow-Gap Improved Electroslag Welding

Procedural Information on Narrow-Gap Improved Electroslag Welding
Report No. FHWA-SA-96-050

Training Manual for Narrow-Gap Improved Electroslag Welding

A Step-by-Step Presentation of Basic Skills Required for Assembly and Welding
Report No. FHWA-SA-96-051

Process Operational Guide for Narrow-Gap Improved Electroslag Welding

Procedural Information on Narrow-Gap Improved Electroslag Welding
Report No. FHWA-SA-96-052

Technical Information Guide for Narrow-Gap Improved Electroslag Welding

Metallurgical Background for Narrow-Gap Improved Electroslag Welding Procedure
Report No. FHWA-SA-96-053

In the event of conflicts between the references listed above and this Special Provision, this Special Provision shall govern.

6-03.3(25)A.GR6

Welding Inspection

6-03.3(25)A.INST1.GR6

Section 6-03.3(25)A is supplemented with the following:

6-03.3(25)A.OPT1.BSP.GB6

(BSP July 12, 2000)

Column Jacket Weld Inspection

Field welded complete penetration groove welds of steel column jacket assemblies shall be inspected as follows:

<u>Vertical complete penetration groove welds</u>

A minimum of 30 percent of each welded joint within one column jacket diameter of the top and bottom of each column shall be ultrasonically inspected when the plate thickness is greater than 5/16 inch, and shall be magnetic particle inspected when the plate thickness is 5/16 inch or less.

If any rejectable flaws are found, 100 percent of the weld within that one column jacket diameter shall be similarly inspected.

The largest column jacket cross section diameter shall constitute one column jacket diameter.

All welds shall be 100 percent visually inspected.

Horizontal complete penetration welds

All welds shall be 100 percent visually inspected.

Inspection and weld repairs shall be the responsibility of the Contractor. Welding shall be inspected in accordance with AWS D1.1, current edition.

Quality control for field welding shall be performed by a certified welding inspector (CWI) independent of the Contractor and welding subcontractors. The Contractor shall not begin welding until receiving approval of the joint fit-up from the CWI. The CWI shall randomly monitor intermediate stages of welding. All final welds shall be 100 percent visually inspected and approved by the CWI.

The CWI's daily reports and nondestructive testing reports indicating compliance with contract requirements shall be submitted to the Engineer upon completion of the last column jacket in the Contract.

6-03.3(27).GR6

High Strength Bolt Holes

6-03.3(27)B.GR6

Reamed and Drilled Holes

6-03.3(27)B.INST1.GR6

The second sentence of the first paragraph of Section 6-03.3(27)B is revised to read:

6-03.3(27)B.OPT1.BSP.FB6

(BSP July 12, 2000)

Reamers and drills shall be directed mechanically, non hand-held, except as otherwise noted. The Contractor may ream and drill holes through *** $$1$$ *** of Bridge No(s) *** $$2$$ *** using hand-held reamers and drills, provided that the method and equipment used conforms to the erection plan as approved by the Engineer in accordance with Section 6-03.3(7)A as supplemented in these Special Provisions. Unless otherwise shown in the Plans, all holes reamed and drilled for bolted connections with existing gusset plates and steel members shall be 1/16 inch larger than the bolt diameter specified in the Plans for the connection.

6-03.3(28).GR6

Shop Assembly

6-03.3(28)A.GR6

Method of Shop Assembly

6-03.3(28)A.INST1.GR6

Section 6-03.3(28)A is supplemented with the following:

6-03.3(28)A.OPT1.GB6

(August 4, 2003)

The girders shall also be shop assembled either completely or progressively in the transverse direction. The transverse shop assembly shall consist of a minimum of two adjacent girders, with pier diaphragms, intermediate diaphragms and cross bracing, and temporary bracing between girders at the end of the shop assembly (longitudinally). Staging of the transverse shop assembly shall proceed along with the longitudinal shop assembly. Each next stage of the transverse shop assembly shall be assembled to one of the previous transverse shop assemblies, repositioned if necessary, and pinned to ensure accurate alignment. Unless otherwise specified, the girders shall be blocked or supported in the no-load position.

6-03.3(28)B.GR6

Check of Shop Assembly

6-03.3(28)B.INST1.GR6

Section 6-03.3(28)B is supplemented with the following:

6-03.3(28)B.OPT1.GB6

(June 26, 2000)

If an assembly or stage of assembly is not approved by the Engineer, deficiencies shall be corrected and the assembly or stage of assembly shall be resubmitted to the Engineer for approval.

6-03.3(30).GR6

Painting

6-03.3(30).INST1.GR6

Section 6-03.3(30) is supplemented with the following:

6-03.3(30).OPT1.FB6

(August 3, 2009)

Paint for the new steel shall be applied in accordance with Section 6-07.3(9). The color of the top coat, when dry, shall match *** $$1$$ ***.

6-03.3(30).OPT6.BSP.FB6

(BSP August 3, 2009)

The Contractor shall paint all galvanized structural steel components of the following specified items in accordance with Section 6-07.3(11):

*** $$1$$ ***

The color of the top coat, when dry, shall match *** $$2$$ ***.

6-03.3(37).GR6

Setting Steel Bridge Bearings

6-03.3(37).INST1.GR6

Section 6-03.3(37) is supplemented with the following:

6-03.3(37).OPT1.BSP.GB6

(BSP September 27, 2004)

Pin Bearing Assembly Installation

The Contractor shall install the pin bearing assembly in accordance with the installation procedure included with the shop drawing submittal as approved by the Engineer.

The top surface of the pin bearing assembly in contact with the steel girder shall receive a thin uniform film of silicone grease, and the bolt threads connecting the pin bearing assembly to the steel girder shall be greased, to prevent bonding and allow for future removal.

PTFE sheet shall not be greased, except as otherwise noted. A thin uniform film of silicone grease shall be applied to the entire dimpled PTFE sheet before installation (all dimples shall be filled with grease).

For pin bearing assemblies with PTFE and stainless steel components, the Contractor shall take special care at all times to ensure protection of the PTFE and stainless steel surfaces from coming in contact with concrete and any other foreign matter.

6-03.3(38).GR6

Placing Superstructure

6-03.3(38).INST1.GR6

Section 6-03.3(38) is supplemented with the following:

6-03.3(38).OPT1.GB6

(June 26, 2000)

All concrete located below the permanent location of the steel girders shall be completely covered to protect the concrete from staining from rusty water.

The Contractor shall submit a concrete surface protection plan to the Engineer for approval. The submittal shall include, but not be limited to, describing all material components of the surface protection system, including material specifications and thicknesses of all components, dimensions of all sub-units and details of how the sub-units are assembled to create the combined system, the method of installing the system, including all means of fastening the system to or holding the system against the concrete surfaces, the methods of maintaining the system in place during superstructure construction, and the methods of repairing damage to the system during superstructure construction.

The Contractor shall not begin steel erection operations until receiving the Engineer's approval of the concrete surface protection plan, and completing installation of the concrete surface projection plan.

Removal of the concrete surface protection system will be performed by Contracting Agency forces at a later date.

6-03.3(39).GR6

Swinging the Span

6-03.3(39).INST1.GR6

Section 6-03.3(39) is supplemented with the following:

6-03.3(39).OPT1.GB6

(June 26, 2000)

The Contractor shall measure and submit to the Engineer camber values at the points indicated in the Plans at each of the following times:

1. After the spans are swung.

2. After roadway slab placement.

6-03.4.GR6

Measurement

6-03.4.INST1.GR6

Section 6-03.4 is supplemented with the following:

6-03.4.OPT1.FB6

(August 6, 2007)

Structural low alloy steel contains the following approximate steel quantities:

Bridge	Quantity
*** $$1$$ ***	*** $$2$$ ***

6-03.4.OPT6.BSP.GB6

(BSP September 27, 2004)

Pin bearing - superstr. will be measured per each for each bearing assembly furnished and installed.

6-03.5.GR6

Payment

6-03.5.INST1.GR6

The second bid item under Section 6-03.5 is supplemented with the following:

6-03.5.OPT1.GB6

(August 6, 2007)

All costs in connection with furnishing and installing steel girder pipe railing as shown in the Plans shall be included in the lump sum contract price for “Structural Low Alloy Steel”.

6-03.5.INST2.GR6

Section 6-03.5 is supplemented with the following:

6-03.5.OPT7.FB6

(June 26, 2000)

All costs in connection with furnishing, installing, and maintaining the concrete surface protection system as specified shall be included in the *** $$1$$ ***.

6-03.5.OPT12.BSP.GB6

(BSP September 27, 2004)

“Pin Bearing – Superstr.”, per each.

6-04.GR6

Timber Structures

6-04.3.GR6

Construction Requirements

6-04.3(1).GR6

Storing and Handling Material

6-04.3(1).INST1.GR6

Section 6-04.3(1) is supplemented with the following:

6-04.3(1).OPT1.GB6

(March 6, 2000)

The Contractor shall provide and maintain a water pump or pumps, and associated equipment adequate for use in fire control, on the project at all times. This requirement does not relieve the Contractor of responsibility as specified in Section 1-07.14.

6-04.3(1).OPT2.GB6

(August 1, 2011)

After removing the existing timber deck and prior to installing the replacement timber deck, the Contractor shall clean the top contact surfaces of the supporting timber and steel stringers and floorbeams. After cleaning, the top contact surfaces shall be prepared as follows:

Steel Supporting Members

The top flanges of the steel stringers and floor beams shall be uniformly covered in a manner approved by the Engineer with a heavy coat of hot asphalt binder conforming to AASHTO M 320.

Timber Supporting Members

The Contractor shall furnish and install asphalt roofing felt over the top contact surface of all timber stringers, bridging, and blocking. The asphalt roofing felt shall be attached to the timber with 7/8 inch long galvanized roofing nails spaced at 2’-0” centers, unless otherwise shown in the Plans. The asphalt roofing felt shall weigh at least 65 pounds per one-hundred square feet and extend at least 2 inches on each side of the member being covered.

6-04.5.GR6

Payment

6-04.5.INST1.GR6

Section 6-04.5 is supplemented with the following:

6-04.5.OPT1.FB6

(March 6, 2000)

All costs in connection with providing and maintaining fire control equipment at the construction and material storage site as specified shall be included in the *** $$1$$ ***.

6-04.5.OPT2.FB6

(March 6, 2000)

All costs in connection with cleaning and preparing the top contact surfaces of the supporting timber and steel members as specified prior to redecking shall be included in the *** $$1$$ ***.

6-05.GR6

Piling

6-05.2.GR6

Materials

6-05.2.INST1.GR6

Section 6-05.2 is supplemented with the following:

6-05.2.OPT1.BSP.GB6

(BSP August 2, 2010)

Micropiles

Materials for micropiles shall consist of the following:

Admixtures for grout shall conform to Section 9-23.6. Admixtures that control bleed, improve flowability, reduce water content, and retard set may be used in the grout, subject to the review and acceptance of the Engineer. Admixtures shall be compatible with the grout and mixed in accordance with the manufacturer's recommendations. Expansive admixtures shall only be added to the grout used for filling sealed encapsulations and anchorage covers. Accelerators are not permitted. Admixtures containing chlorides are not permitted.

All cement shall be Portland cement conforming to Section 9-01.2(1), except that the Types shall be II, III or V.

Centralizers and spacers shall be fabricated from schedule 40 PVC pipe or tube, steel, or material non-detrimental to the reinforcing steel. Wood shall not be used. Centralizers and spacers shall be securely attached to the reinforcement; sized to position the reinforcement within 3/8 inch of plan location from center of micropile; sized to allow grout tremie pipe insertion to the bottom of the drillhole; and sized to allow grout.to freely flow up the drillhole and casing and between adjacent reinforcing bars.

Encapsulation (double corrosion protection) shall be shop fabricated using high-density, corrugated polyethylene tubing conforming to the requirements of AASHTO M 252 with a nominal wall thickness of 1/32 inch. The inside annulus between the reinforcing bars and the encapsulating tube shall be a minimum of 1/4 inch and be fully grouted with grout as defined below.

Epoxy coating shall conform to Section 9-07.3. The minimum thickness of coating applied electrostatically to the reinforcing steel shall be 10 mil. Bend test requirements are waived. Bearing plates and nuts encased in the micropile concrete footing need not be epoxy coated.

Fine aggregate for sand-cement grout shall be sand conforming to AASHTO M 45.

Grout shall be a neat cement or sand/cement mixture with a minimum seven day compression strength of 4,000 psi in accordance with Section 9-20.3(2). Grout shall provide one inch minimum cover over bare or epoxy coated bars (excluding bar couplers) or 1/2 inch minimum cover over the encapsulation of encapsulated bars.

Steel pipe casing for micropiles shall have the diameter and at least the minimum wall thickness shown on the approved working drawings. Steel pipe micropiles shall conform to ASTM A 252, Grade 2 or 3, including tolerances for pipe diameter, edge alignment, end match marking, roundness and straightness and conform to the steel micropile splice welding requirements specified herein. The carbon equivalency (CE) as defined in AWS D 1.1, Section Xl 5.1, shall not exceed 0.45. The sulfur content shall not exceed 0.05 percent.

Steel pipe shall not be joined by welded lap splicing. Steel pipe seams and splices shall be complete penetration welds. Partial welds of steel pipe may be restored to complete penetration welds in conformance with AWS D1.1.

The manufacturer or fabricator of steel piling shall furnish a certificate of compliance in accordance with Section 1-06.3 stating that the piling being supplied conforms to these specifications. The certificate of compliance shall include test reports for tensile and chemical tests. Samples for testing shall be taken from the base metal, steel, coil or from the manufactured or fabricated piling. The certificate of compliance shall be in English units.

Welded circumferential joints in pipe shall develop the strength of the pipe section. Threaded pipe joints shall develop at least the nominal resistance used in the design of the micropile.

Structural steel plates and shapes for micropile top attachments shall conform to either ASTM A 36 or ASTM A 572 Grade 50.

Reinforcing steel shall be deformed bars in accordance with Sections 9-07.4 or 9-07.11. When a bearing plate and nut are required to be threaded onto the top end of reinforcing bars for the micropile top to footing anchorage, the threading may be continuous spiral deformed ribbing provided by the bar deformations or may be cut into a reinforcing bar. If threads are cut into a reinforcing bar, the next larger bar number designation from that shown on the Plans shall be provided, at no

additional cost to the Contracting Agency. Reinforcing bars for micropiles shall be epoxy coated in accordance with Section 6-02.3(24)H and 9-07.3.

Bar tendon couplers, if required, shall develop the ultimate tensile strength of the bars without evidence of any failure.

6-05.2(9-10.5).GR6

Steel Piling

Section 9-10.5 is supplemented with the following:

6-05.2(9-10.5).OPT1.BSP.GB6

(BSP August 22, 2011)

Furnishing St. Piling

For this project, the Section 6-05.3(5) prohibition against spiral welded steel pile casings does not apply, and the steel pipe piling may be either longitudinal seam or helical (spiral) seam submerged-arc welded pipe, provided that the requirements of this Special Provision are met.

Steel pipe piling shall conform to API 5L Grade X46, latest edition. Alternatively, steel pipe piling may conform to ASTM A 252 Grade 3 provided that the chemical composition conforms to a prequalified base metal classification listed in Table 3.1 of the AWS D1.1/D1.1M, latest edition, Structural Welding Code. The grade of pipe piling shall meet or exceed the grade specified above or as shown in the Plans.

The Contractor shall submit a manufacturer's certification of compliance, conforming to Section 1-06.3 and accompanied by certified mill test reports, including chemical analysis and carbon equivalence, for each heat of steel used to fabricate the steel pipe piling.

6-05.3.GR6

Construction Requirements

6-05.3.INST1.GR6

Section 6-05.3 is supplemented with the following:

6-05.3.OPT1.BSP.FB6

(BSP January 3, 2011)

Micropiles

General Requirements

The Contractor is responsible for furnishing of all design, materials, products, accessories, tools, equipment, services, transportation, labor and supervision, and manufacturing techniques required for design, installation and testing of micropiles and micropile top attachments for this project.

The Contractor shall select the micropile type, size, micropile top attachment, installation means and methods, shall estimate the ground to grout bond value, and shall determine the required grout bond length and final micropile diameter. The Contractor shall design and install micropiles that will develop the load capacities specified in the Plans. The micropile load capacities shall be verified by verification and proof load testing, and shall meet the test acceptance criteria specified in this Special Provision.

Contractor's Experience Requirements And Submittal

The micropile Contractor shall be experienced in the construction and load testing of micropiles and have successfully constructed at least three projects in the last five years involving construction totaling at least 50 micropiles of equal or greater capacity than required for this project.

The micropile Contractor shall have previous micropile drilling and grouting experience in soil/rock similar to project conditions. The Contractor shall submit construction details, structural details and load test results for at least three previous successful micropile load tests from different projects of similar scope to this project.

A Professional Engineer, licensed under Title 18 RCW State of Washington, employed by the micropile Contractor and having experience in the construction of at least three completed micropile projects over the past five years of similar scope to this project, shall supervise the work. The Contractor shall not use consultants or manufacturers' representatives to satisfy the supervising Engineer requirements of this section. The on-site foremen and drill rig operators shall also have experience on at least three projects over the past five years installing micropiles of equal or greater capacity than required for this project.

The micropile Contractor shall design the micropile system. The micropile system shall be designed by a Professional Engineer, licensed under Title 18 RCW State of Washington, with experience in the design of at least three successfully completed micropile projects over the past five years, with micropiles of equal or greater capacity than required in these plans and specifications. The micropile designer may be either an employee of the Contractor or a separate Consultant designer meeting the specified experience requirements.

At least 30 calendar days before the planned start of micropile construction, the Contractor shall submit in writing the completed project reference list, including a brief project description with the owner’s name and current phone numbers. The Contractor shall also submit a personnel list for the micropile system designer, supervising project Engineer, drill rig operators and on-site foremen to be assigned to the project. The personnel list shall contain a summary of each individual’s experience and be complete enough for the Engineer to determine whether each individual satisfies the required qualifications. The Engineer will approve or reject the Contractor's qualifications within 15 calendar days after receipt of a complete submission Additional time required due to incomplete or unacceptable submittals will not be cause for time extension or impact or delay claims. All costs associated with incomplete or unacceptable submittals shall be borne by the Contractor.

Work shall not be started, nor materials ordered, until the Engineer's written approval of the Contractor's experience qualifications is given. The Engineer may suspend the Work if the Contractor uses non-approved personnel. If work is suspended, the Contractor shall be fully liable for all resulting costs and. no adjustment in contract time will result from the suspension.

Definitions

Admixture: Substance added to the grout to control bleed and/or shrinkage, improve flowability, reduce water content, or retard setting time.

Alignment Load (AL): A minimum initial load (5 percent DL maximum) applied to micropile
during testing to keep the testing equipment correctly positioned.

Bonded Length: The length of the micropile that is bonded to the ground and conceptually to transfer the applied axial loads to the surrounding soil or rock. Also known as the load transfer length.

Bond-breaker: A sleeve placed over the steel reinforcement to prevent load transfer.

Casing: Steel tube introduced during the drilling process in overburden soil to temporarily stabilize the drill hole. This is usually withdrawn as the micropile is grouted although in certain types of micropiles, some casing is permanently left in place to provide added micropile reinforcement.

Centralizer: A device to support and position the reinforcing steel in the drill hole and/or so that a minimum grout cover is provided.

Coupler: The means by which the micropile load capacity can be transmitted from one partial of reinforcement to another.

Creep Movement: The movement that occurs during the creep test of a micropile under constant load.

Design Load (DL): The design load expected to be applied to the micropile during its service life. The design load (DL) is as specified in the bridge Plans.

Encapsulation: A corrugated or deformed tube protecting the reinforcing steel against corrosion.

Free (unbonded) length: The designed length of the micropile that is not bonded to the surrounding ground or grout.

Micropile: A small-diameter, bored, cast-in-place composite pile, in which the applied load is resisted by steel reinforcement, cement grout and frictional grout/ground bond.

Maximum Test Load: The maximum load to which the micropile is subjected during testing. The load shall be *2.5 x* DL for verification load tests and 1.67 *x* DL for proof load tests.

Nominal Grout-to-Ground Bond Strength: The estimated ultimate geotechnical unit grout-to-ground bond strength selected for use in design. Same as $\alpha_{\text{Bond Nominal Strength}}$ (SLD and LFD).

Overburden: Material, natural or placed, that may require cased drilling methods to provide an open borehole to underlying strata.

Post-grouting: The injection of additional grout into the load transfer length of a micropile after the primary grout has set. Also known as regrouting or secondary grouting.

Primary Grout: Portland-cement-based grout injected into the micropile hole prior to or after the installation of the reinforcement to direct the load transfer to the surrounding ground along the micropile.

Proof Load Test: Incremental loading of a production micropile, recording the total movement at each increment.

Reinforcement: The steel component of the micropile that accepts and/or resists applied loadings.

Sheathing: Smooth or corrugated piping or tubing that protects the reinforcing steel against corrosion.

Spacer: A device to separate elements of a multiple-element reinforcement to ensure full bond development of each steel element.

Verification Load Test: Non-production micropile load test performed to verify the design of the micropile system and the construction methods proposed, prior to installation of production micropiles.

Water: Water used in the grout mix shall conform to AASHTO T 26 and shall be potable, clean, and free from substances that may be injurious to cement and steel.

Referenced Codes and Standards

The following publications form a part of this specification to the extent indicated by the references. The latest publication as of the issue date of this specification shall govern, unless indicated otherwise.

1. American Society for Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), and WSDOT Standard Specifications

ASTM Specification	WSDOT Std. Spec. Section, or AASHTO Specification or Test	
A 36, A 572		Structural Steel
	9-07.9	Cold-Drawn Steel Wire
A 252		Welded and Seamless Steel Pipe
	9-07.3	Deformed Steel Reinforcing Bar
	9-07.11	High-Strength Steel Reinforcing Bar

	9-07.4	Epoxy -Coated Steel Reinf. Bar
	M 80	Concrete Aggregate
	T 106	Compressive Strength of Hydraulic Cement Mortar
	T 133	Density of Hydraulic Cement
	M 45	Aggregate for Masonry Mortar
	9-01.2(1)	Portland Cement
	9-23.6	Chemical Admixtures for Concrete
D 1784		Polyvinyl Chloride (PVC) Pipe (Class 13464-B)
D 3350	M 252	Polyethylene Corrugated Tubing
	9-25.1	Water for Concrete

2. American Welding Society (AWS) AWS/D1.1/D1.1M Structural Welding Code-Steel and AWS/D1.2 Structural Welding Code-Reinforcing Steel.

3. American Petroleum Institute (API) 5CT Specification for casing and tubing

Construction Site Survey
The Contractor shall conform to Sections 1-02.4 and 1-07.18.

Micropile Design Requirements
The micropiles shall be designed to meet the specified loading conditions, as shown in the Plans and the working drawings as approved by the Engineer. The Contractor shall design the micropiles in accordance with the Service Load Design (SLD) design method, and shall design the micropile top to footing connections using Load Factor Design (LFD) design method.

Steel pipe used for micropile permanent casing shall incorporate an additional 1/16 inch thickness of sacrificial steel for corrosion protection. Where required as shown in the Plans, corrosion protection of the internal steel reinforcing bars, consisting of either encapsulation (double corrosion protection), epoxy coating, or grout, shall be provided in accordance with Section 6-05.2 as supplemented in these Special Provisions. Where permanent casing is used for a portion of the micropile, encapsulation shall extend at least five feet into the casing.

Micropile Design Submittals
At least 30 calendar days before the planned start of micropile structure construction, the Contractor shall submit complete design calculations and working drawings to the Engineer for approval in accordance with Section 6-01.9. The submittal shall include all details, dimensions, quantities, ground profiles, and cross-sections necessary to construct the micropile structure. The Contractor shall verify the limits of the micropile structure and ground survey data before preparing the detailed working drawings.

Design Calculations
Design calculations shall include, but not be limited to, the following items:

1. A written summary report which describes the overall micropile design, and its compatibility with the anticipated subsurface conditions as described by the contract test hole boring logs, the Summary of Geotechnical Conditions provided in the Appendix to the Special Provisions, and the geotechnical report(s) prepared for this project.

2. Applicable code requirements and design references.

3. Micropile structure critical design cross-section(s) geometry including soil strata and piezometric levels and location, magnitude and direction of design applied loadings, including slope or external surcharge loads.

4. Design criteria including, soil shear strengths (friction angle and cohesion), unit weights, and ground-grout bond values and micropile drillhole diameter assumptions for each soil strata.

5. Partial safety factors/strength factors (for Service Load Design) or load factors (for Load Factor Design) used in the design of the ground-grout bond values, surcharges, soil/rock and material unit weights, steel, grout, and concrete materials.

6. Design calculation sheets with the project number, micropile structure location, designation, date of preparation, initials of designer and checker, and page number at the top of each page. An index page shall be included with the design calculations.

7. Design notes including an explanation of any symbols and computer programs used in the design.

8. Other design calculations.

Working Drawings

The Contractor shall submit working drawings in accordance with Section 6-01.9.

The working drawings shall include all information required for the construction and quality control of the piling. Working drawings shall include, but not be limited to, the following items:

1. A plan view of the micropile structure identifying:

    a. A reference baseline and elevation datum.

    b. The offset from the construction centerline or baseline to the face of the micropile structure at all changes in horizontal alignment.

    c. Beginning and end of micropile structure stations.

    d. Right-of-way and permanent or temporary construction easement limits, location of all known active and abandoned existing utilities, adjacent structures or other potential interference. The centerline of any drainage structure or

drainage pipe behind, passing through, or passing under the micropile structure.

e. Subsurface exploration locations shown on a plan view of the proposed micropile structure alignment with appropriate reference base lines to fix the locations of the explorations relative to the micropile structure.

2. An elevation view of the micropile structure(s) identifying:

a. Elevation view showing micropile locations and elevations; vertical and horizontal spacing; batter and alignment and the location of drainage elements (if applicable).

b. Existing and finish grade profiles both behind and in front of the micropile structure.

3. Design parameters and applicable codes.

4. General notes for constructing the micropile structure including the overall construction sequence, micropile installation sequence at each footing, means and methods to prevent damage to existing adjacent piles and micropiles, and other special construction requirements.

5. A listing of the summary of quantities on the elevation drawing of each micropile structure showing pay item estimated quantities.

6. Micropile structure typical sections including micropile spacing and inclination; minimum drillhole diameter; pipe casing and reinforcing bar sizes and details; splice types and locations; centralizers and spacers; grout bond zone and casing plunge lengths and corrosion protection details; and connection details to the substructure footing, anchorage, plates, etc.

7. A typical detail of verification and production proof test micropiles defining the micropile length, minimum drillhole diameter, inclination, and load test bonded and unbonded test lengths.

8. Details, dimensions, and schedules for all micropiles, casing and reinforcing steel, including reinforcing bar bending details.

9. Details and dimensions for micropile structure appurtenances such as barriers, coping, drainage gutters, fences, etc. (if applicable).

10. Details for constructing micropile structures around drainage facilities (if applicable).

11. Details for terminating micropile structures and adjacent slope construction (if applicable).

The Contractor shall revise the approved working drawings when plan dimensions are changed due to field conditions or for other reasons. Within 30 days after completion of the work, submit as-built drawings to the Engineer.

The Contractor shall also provide revised design calculations signed by the approved Registered Professional Engineer for all design changes made during the construction of the micropile structure.

Construction Submittals

The Contractor shall prepare and submit to the Engineer, for review of completeness, 5 copies of the following for the micropile system or systems to be constructed:

1. Detailed step-by-step description of the proposed micropile construction procedure, including personnel, installation tolerances, testing, and equipment to assure quality control. This step-by-step procedure shall be shown on the working drawings in sufficient detail to allow the Engineer to monitor the construction and quality of the micropiles.

2. Discussion of how the Contractor's construction methods accommodate and are compatible with the anticipated subsurface conditions as described in the contract test hole boring logs, the Summary of Geotechnical Conditions provided in the Appendix to the Special Provisions, and the geotechnical report(s) prepared for this project.

3. Proposed start date and time schedule and micropile installation schedule providing the following:

   Micropile number
   Micropile design load
   Type and size of reinforcing steel
   Minimum total bond length
   Total micropile length
   Micropile top footing attachment

4. If welding of casing is proposed, the Contractor shall submit the proposed welding procedure for approval by the Engineer.

5. Manufacturer's information, model, size, and type of equipment to be used for installing micropiles, with appropriate manufacturer's literature for review. Include detailed description of the drilling equipment and methods proposed to be used to provide drillhole support and prevent detrimental ground movements.

6. Information on headroom and space requirements for installation equipment that verify the proposed equipment can perform at the site. Plan describing how surface water, drill flush, and excess waste grout will be controlled, contained, collected, and disposed of.

7. Certified mill test reports for the reinforcing steel and for the casing used in micropile installation. The ultimate strength, yield strength, elongation,

and material properties composition shall be included. Tag sample verification may be substituted in place of certified mill test reports for micropile casing.

8. Proposed Grouting Plan. The grouting plan shall include complete descriptions, details, and supporting calculations for the following:

    a. Grout mix design and type of materials to be used in the grout including certified test data and trial batch reports.

    b. Grouting equipment, including capacity and relation to the grouting demand and working conditions as well as provisions for back-up equipment and spare parts.

    c. Types and sizes of grout hoses, connections, and grout delivery systems.

    d. Methods and equipment for placing, positioning, and supporting the steel pipe casing and reinforcing bars.

    e. Methods and equipment for accurately monitoring and recording the grout depth, grout volume and grout pressure as the grout is being placed.

    f. Procedures and schedules for grout batching, mixing, and pumping including provisions for handling drilling fluid and for post grouting.

    g. Grouting rate calculations, when requested by the Engineer. The calculations shall be based on the initial pump pressures or static head on the grout and losses throughout the placing system, including anticipated head of drilling fluid to be displaced.

    h. Contingency procedures for handling blockage of ducts or equipment breakdowns.

    i. Estimated curing time for grout to achieve specified strength. Previous test results for the proposed grout mix completed within one year of the start of grouting may be submitted for initial verification and acceptance and start of production work. During production, grout shall be tested in accordance with the **Grout Testing** subsection of this Special Provision.

    j. Procedure and equipment for Contractor monitoring of grout quality.

9. Detailed plans for the proposed micropile load testing method. This shall include all drawings, details, and structural design calculations necessary to clearly describe the proposed test method, reaction load system capacity and equipment setup, types and accuracy of apparatus to be used for applying and measuring the test loads and micropile top

movements in accordance with the **Micropile Load Tests** subsection of this Special Provision.

10. Calibration reports and data for each test jack, pressure gauge and master pressure gauge and electronic load cell to be used. The calibration tests shall have been performed by an independent testing laboratory, and tests shall have been performed within 90 calendar days of the date submitted. Testing shall not commence until the Engineer has reviewed and accepted the jack, pressure gauge, master pressure gauge and electronic load cell calibration data.

11. Discussion of the Contractor's contingency plan if a verification load test or a proof load test fails.

Work shall not begin until the construction submittals have been received, reviewed, and accepted in writing by the Engineer. The Contractor shall provide submittal items 1 through 6 at least 21 calendar days prior to initiating micropile construction and submittal items 7 through 11 at least 7 days prior to start of micropile load testing or incorporation of the respective materials into the work. The Contractor shall allow the Engineer 7 calendar days to review the construction submittals after a complete set has been received. Additional time required due to incomplete or unacceptable submittals shall not be cause for delay or impact claims. All costs associated with incomplete or unacceptable Contractor submittals shall be the responsibility of the Contractor.

Pre-construction Meeting

A pre-construction meeting will be scheduled by the Engineer and held prior to the start of micropile construction. The Engineer, prime Contractor, micropile specialty Contractor, and excavation Contractor shall attend the meeting. Attendance is mandatory. The pre-construction meeting will be conducted to clarify the construction requirements for the work, to coordinate the construction schedule and activities, and to identify contractual relationships and delineation of responsibilities amongst the prime Contractor and the various Subcontractors - specifically those pertaining to excavation for micropile structures, anticipated subsurface conditions, micropile installation and testing, micropile structure survey control and site drainage control.

Site Drainage Control

The Contractor shall control and properly dispose of drill flush and construction related waste, including excess grout, in accordance with Section 1-07.5(3) as supplemented in these Special Provisions and all applicable local codes and regulations. The Contractor shall provide positive control and discharge of all surface water that will affect construction of the micropile installation. The Contractor shall maintain all pipes or conduits used to control surface water during construction. The Contractor shall repair damage caused by surface water in accordance with Section 1-07.13. Upon substantial completion of the work, the Contractor shall remove surface water control pipes or conduits from the site. Alternatively, with the approval of the Engineer, pipes or conduits that are left in place may be fully grouted and abandoned or left in a way that protects the structure and all adjacent facilities from migration of fines through the pipe or conduit and potential ground loss.

Excavation

The Contractor shall coordinate the work and the excavation so the micropile structures are safely constructed. The Contractor shall perform the micropile construction and related excavation in accordance with the Plans and approved submittals.

Micropile Allowable Construction Tolerances

The centerline of piling shall not be more than 3 inches from indicated plan location.

The micropile shall be plumb within 2 percent of total-length plan alignment.

The top elevation of micropile shall be plus 1 inch or minus 2 inch maximum from vertical elevation indicated.

The centerline of reinforcing steel shall not be more than 1/2 inch from indicated location.

Micropile Installation

The micropile Contractor shall select the drilling method, the grouting procedure, and the grouting pressure used for the installation of the micropiles. The micropile Contractor shall also determine the micropile casing size, final drillhole diameter and bond length, and central tendon reinforcement steel sizing necessary to develop the specified load capacities and load testing requirements. The micropile Contractor is also responsible for estimating the grout take. There will be no extra payment for grout overruns. The bond zone for micropiles shall be below the following elevations:

*** $$1$$ ***

Drilling

The drilling equipment and methods shall be suitable for drilling through the conditions to be encountered, without causing damage to any overlying or adjacent structures or services. The drillhole shall be open along its full length to at least the design minimum drillhole diameter prior to placing grout and reinforcement. Temporary casing or other approved method of micropile drillhole support will be required in caving or unstable ground to permit the micropile shaft to be formed to the minimum design drillhole diameter. The Contractor's proposed method(s) to provide drillhole support and to prevent detrimental ground movements shall have received the approval of the Engineer. Detrimental ground movement is defined as movement which requires remedial repair measures. Use of drilling fluid containing bentonite is not allowed.

Ground Heave or Subsidence

During construction, the Contractor shall observe the conditions in the vicinity of the micropile construction site on a daily basis for signs of ground heave or subsidence. The Contractor shall immediately notify the Engineer if signs of movements are observed. The Contractor shall immediately suspend or modify drilling or grouting operations if ground heave or subsidence is observed, if the micropile structure is adversely affected, or if adjacent structures are damaged from the drilling or grouting. If the Engineer determines that the movements require

corrective action, the Contractor shall take corrective actions necessary to stop the movement or perform repairs.

When due to the Contractor's methods or operations or failure to follow the specified/approved construction sequence, as determined by the Engineer, the costs of providing corrective actions will be borne by the Contractor in accordance with Section 1-07.13. When due to differing site conditions, as determined by the Engineer, the costs of providing corrective actions will be addressed in accordance with Section 1-04.4.

Pipe Casing and Reinforcing Bars Placement and Splicing

Reinforcement may be placed either prior to grouting or placed into the grout - filled drillhole before temporary casing (if used) is withdrawn. Reinforcement surface shall be free of deleterious substances such as soil, mud, grease or oil that might contaminate the grout or coat the reinforcement and impair bond. Micropile cages and reinforcement groups, if used, shall be sufficiently robust to withstand the installation and grouting process and the withdrawal of the drill casings without damage or disturbance.

The Contractor shall check micropile top elevations and adjust all installed micropiles to the planned elevations.

Permanent casing shall be installed to the following minimum tip elevations:

*** $$2$$ ***

Centralizers and spacers shall be provided at 10 feet centers maximum spacing. The upper and lower most centralizer shall be located a maximum of 5 feet from the top and bottom of the micropile. Centralizers and spacers shall permit the free flow of grout without misalignment of the reinforcing bar(s) and permanent casing. The central reinforcement bars with centralizers shall be lowered into the stabilized drill hole and set. The reinforcing steel shall be inserted into the drill hole to the desired depth without difficulty. Partially inserted reinforcing bars shall not be driven or forced into the hole. The Contractor shall redrill and reinsert reinforcing steel when necessary to facilitate insertion.

Lengths of casing and reinforcing bars to be spliced shall be secured in proper alignment and in a manner to avoid eccentricity or angle between the axes of the two lengths to be spliced. Splices and threaded joints shall meet the requirements of Section 6-05.2 as supplemented in these Special Provision. Threaded pipe casing joints shall be located at least two casing diameters (OD) from a splice in any reinforcing bar. When multiple bars are used, bar splices shall be staggered at least 1 foot.

Grouting

Micropiles shall be primary grouted the same day the load transfer bond length is drilled. The Contractor shall complete the load transfer bond length drilling and primary grouting of a micropile before beginning work on another micropile in the same footing or pile cap.

Prior to grouting, the drillhole shall be flushed with water and/or air to remove drill cuttings. The Contractor shall use a neat cement grout or a sand cement grout with a minimum seven day unconfined compressive strength of 4000 psi. Admixtures, if used, shall be mixed in accordance with manufacturer's recommendations.

The grouting equipment shall be colloidal mixers only (paddle mixers and other non-colloidal types of mixers shall not be used), and shall produce a grout free of lumps and undispersed cement. Contractor shall have means and methods of measuring the grout quantity and pumping pressure during the grouting operations. The grout pump shall be equipped with a pressure gauge to monitor grout pressures. A second pressure gauge shall be placed at the point of injection into the micropile top. The pressure gauges shall be capable of measuring pressures of at least 150 psi or twice the actual grout pressures used, whichever is greater. The grout shall be kept in agitation prior to mixing. Grout shall be placed within one hour of mixing. The grouting equipment shall be sized to enable each micropile to be grouted in one continuous operation.

The grout shall be injected from the lowest point of the drill hole and injection shall continue until uncontaminated grout flows from the top of the micropile. The grout may be pumped through grout tubes, casing, hollow-stem augers, or drill rods. Temporary casing, if used, shall be extracted in stages ensuring that after each length of casing is removed the grout level is brought back up to the ground level before the next length is removed. Additional grout shall be placed by the use of a tremie pipe at all times. The tremie pipe shall always extend below the level of the existing grout in the drillhole. The grout pressures and grout takes shall be controlled to prevent excessive heave or fracturing of rock or soil formations. Upon completion of grouting, the grout tube may remain in the hole, but must be filled with grout.

If the Contractor elects to use a postgrouting system, working drawings and details shall be submitted to the Engineer for review in accordance with the **Construction Submittals** subsection of this Special Provision.

Grout Testing

Grout within the micropile verification and proof test micropiles shall attain the minimum specified seven day design compressive strength prior to load testing. Previous test results for the proposed grout mix completed within one year of the start of work may be submitted for initial verification of the required compressive strengths for installation of pre-production verification test micropiles and initial production micropiles. During placement of initial verification micropiles, proof test micropiles, and production micropiles, micropile grout will be sampled and tested by the Engineer for compressive strength in accordance with WSDOT Test Method 813 and AASHTO T 106 at a frequency of no less than one set of three 2 inch grout cubes from each grout plant each day of operation or per every 10 micropiles, whichever occurs more frequently. The compressive strength will be the average of the 3 cubes tested.

If a compressive strength test fails, the Engineer may require the Contractor to proof test some or all of the production micropiles installed since the last grout batch that met the specified compressive strength.

Grout consistency, as measured by grout density, shall be tested by the Contractor just prior to the start of micropile grouting in accordance with API RP-13B-1 at a frequency of at least one test per micropile. For the grout to be approved for use, the specific gravity reported by the test shall be between 1.8 and 1.9. The Contractor's grout consistency test equipment shall be calibrated by an independent testing laboratory. The Contractor shall not use test equipment greater than 180-calendar days past the most recent calibration date, until such equipment is recalibrated by an independent testing laboratory.

Micropile Installation Records

The Contractor shall prepare and submit to the Engineer full-length installation records for each micropile installed. The records shall be submitted within the same work shift that micropile installation is completed. The data shall be recorded in the micropile installation log. A separate log shall be provided for each micropile.

Micropile Load Tests

The Contractor shall perform verification and proof testing of micropiles at the locations specified in this Special Provision or as otherwise specified by the Engineer, and shall perform tension load testing in accordance with ASTM D 3689, except as modified by this Special Provision. All load testing shall be performed in tension.

While completed production micropiles may be used as part of the reaction frame for proof load testing, no reaction bearing elements of the load test frame for verification and proof load testing of micropiles shall bear on existing footing or other structure elements of the existing viaduct.

Verification Load Tests

The Contractor shall perform pre-production verification micropile load testing to verify the design of the micropile system and the construction methods proposed prior to installing any production micropiles. Sacrificial verification test micropiles shall be constructed in conformance with the working drawing submittal as approved by the Engineer. A verification test micropile shall be installed at each of the following locations:

*** $$3$$ ***

Verification load tests shall be performed to verify that the Contractor installed micropiles will meet the required compression and tension load capacities and load test acceptance criteria and to verify that the length of the micropile load transfer bond zone is adequate. The micropile verification load test results shall verify the Contractor's design and installation methods, and be reviewed and accepted by the Engineer prior to the installation of production micropiles.

The drilling-and-grouting method, casing length and outside diameter, reinforcing bar lengths, and depth of embedment for the verification test micropile(s) shall be identical to those specified for the production micropiles at the given locations. The verification test micropile structural steel sections shall be sized to safely resist the maximum test load. The maximum verification and proof test loads applied to the micropile shall not exceed 80 percent of the structural capacity of the micropile structural elements, to include steel yield in tension.

The jack shall be positioned at the beginning of the test such that unloading and repositioning during the test will not be required.

Testing Equipment and Data Recording

Testing equipment shall include dial gauges, dial gauge support, jack and pressure gauge, electronic load cell, and a reaction frame. The load cell is required only for the creep test portion of the verification test. The Contractor shall provide a description of test setup and jack, pressure gauge and load cell calibration curves in accordance with the **Working Drawings** subsection of this Special Provision. Additionally, the Contractor shall not use test jacks, pressure gauges and master pressure gauges, and electronic load cells greater than 90 calendar days past their most recent calibration date, until such items are recalibrated by an independent testing laboratory.

The Contractor shall design the testing reaction frame to be sufficiently rigid and of adequate dimensions such that excessive deformation of the testing equipment does not occur. The Contractor shall align the jack, bearing plates, and stressing anchorage such that unloading and repositioning of the equipment will not be required during the test.

The Contractor shall apply and measure the test load with a hydraulic jack and pressure gauge. The pressure gauge shall be graduated in 75 psi increments or less. The jack and pressure gauge shall have a pressure range not exceeding twice the anticipated maximum test pressure. Jack ram travel shall be sufficient to allow the test to be done without resetting the equipment. The Contractor shall monitor the creep test load hold during verification tests with both the pressure gauge and the electronic load cell. The Contractor shall use the load cell to accurately maintain a constant load hold during the creep test load hold increment of the verification test.

The Contractor shall measure the micropile top movement with a dial gauge capable of measuring to 1 mil (0.001 inch). The dial gauge shall have a travel sufficient to allow the test to be done without having to reset the gauge. The Contractor shall visually align the gauge to be parallel with the axis of the micropile and support the gauge independently from the jack, micropile or reaction frame. The Contractor shall use two dial gauges when the test setup requires reaction against the ground or single reaction micropiles on each side of the test micropile.

The required load test data will be recorded by the Engineer.

Verification Test Loading Schedule

The Contractor shall test the verification micropiles designated for tension load testing to a maximum test load of 2.5 times the micropile Design Load shown in the Plans or the working drawing submittal as approved by the Engineer. The verification micropile load tests shall be made by incrementally loading the micropile in accordance with the following cyclic load schedule:

AL = Alignment Load DL = Design Load

LOAD	HOLD TIME

AL	1 minute
0.25 DL	1 minute
0.50 DL	1 minute
AL	1 minute
0.25 DL	1 minute
0.50 DL	1 minute
0.75 DL	1 minute
1.00 DL	1 minute
AL	1 minute
0.25 DL	1 minute
0.50DL	1 minute
0.75 DL	1 minute
1.00DL	1 minute
0.25 DL	1 minute
0.50 DL	1 minute
*0.*75 DL	1 minute
1.00DL	1 minute
1.25DL	1 minute
1.50DL	1 Minute
1.67 DL	60 minutes (Creep Test Load Hold)
1.75 DL	1 minute
2.00 DL	1 minute
2.25 DL	1 minute
2.50 DL	10 minutes (Maximum Test Load)
AL	1 minute

The test load shall be applied in increments of 25 percent of the DL load. Each load increment shall be held for a minimum of 1 minute. Micropile top movement shall be measured at each load increment. The load-hold period shall start as soon as each test load increment is applied. The verification test micropile shall be monitored for creep at the 1.67 Design Load (DL). Micropile movement during the creep test shall be measured and recorded at 1, 2, 3, 4, 5, 6, 10, 20, 30, 50, and 60 minutes. The alignment load shall not exceed 5 percent of the DL load. Dial gauges shall be reset to zero after the initial AL is applied.

The acceptance criteria for micropile verification load tests are:

1. The micropile shall sustain the first tension 1.67DL test load with no more than 0.50 inch total vertical movement at the top of the micropile, relative to the position of the top of the micropile prior to testing.

2. At the end of the 1.67 DL creep test load increment, test micropiles shall have a creep rate not exceeding 0.03125 inch/log cycle time (1 to 10 minutes) or 0.0625 inch/log cycle time (6 to 60 minutes). The creep rate shall be linear or decreasing throughout the creep load hold period.

3. Failure does not occur at the 2.5 DL maximum test load. Failure is defined as load at which attempts to further increase the test load simply result in continued micropile movement.

The Engineer will provide the Contractor written confirmation of the micropile design and construction within three working days of the completion of the verification load tests. This written confirmation will either confirm the capacities and bond lengths specified in the working drawing submittal as approved by the Engineer or will reject the micropiles based upon the verification test results.

Verification Test Micropile Rejection

If a verification tested micropile fails to meet the acceptance criteria, the Contractor shall modify the design, the construction procedure, or both. These modifications may include modifying the installation methods, increasing the bond length, or changing the micropile type. Any modification that necessitates changes to the structure will require the Engineer's prior review and acceptance. Any modifications of design or construction procedures or cost of additional verification test micropiles and load testing shall be at no additional expense to the Contracting Agency. At the completion of verification testing, test micropiles shall be removed down to an elevation two feet below finished ground line, except as otherwise specified by the Engineer.

Proof Load Tests

A minimum of two successful proof load tests shall be completed at each footing at micropile locations as specified by the Engineer. Additional proof tests will be required if modifications are made in the micropile installation methods subsequent to the first production micropile.

Proof Test Loading Schedule

Test micropiles designated for proof testing shall be tension proof load tested to a maximum test load of 1.67 times the micropile Design Load shown in the Plans or the working drawings as approved by the Engineer. Proof tests shall be conducted by incrementally loading the micropile in accordance with the following schedule, to be used for both compression and tension loading:

AL = Alignment Load DL = Design Load

LOAD	HOLD TIME
AL	1 minute
0.25 DL	1 minute
0.50 DL	1 minute
0.75 DL	1 minute
1.00DL	1 minute
1.25DL	1 minute
1.50DL	1 minute
DL	10 or 60 minute
AL	1 minute

Depending on performance, either a 10 minute or 60 minute creep test shall be performed at the 1.67 DL Maximum Test Load. Where the micropile top movement between 1 and 10 minutes exceeds 0.03125 inch, the Maximum Test Load shall be maintained an additional 50 minutes. Movements shall be recorded at 1, 2, 3, 5, 6, 10, 20, 30, 50 and 60 minutes. The alignment load shall not exceed 5 percent of DL. Dial gauges shall be reset to zero after the initial AL is applied.

The acceptance criteria for micropile proof load tests are:

1. The micropile shall sustain the tension maximum test load applied (1.67 DL) with no more than 0.50 inch total vertical movement at the top of the micropile, relative to the position of the top of the micropile prior to testing.

2. At the end of the 1.67 DL creep test load increment, test micropiles shall have a creep rate not exceeding 0.03125 inch/log cycle time (1 to 10 minutes) or 0.0625 inch/log cycle time (6 to 60 minutes). The creep rate shall be linear or decreasing throughout the creep load hold period.

Proof Test Micropile Rejection

If a proof-tested micropile fails to meet the acceptance criteria, the Contractor shall proof test another micropile within that footing as selected by the Engineer. For failed micropiles and further construction of subsequent micropiles, the Contractor shall modify the design, the construction procedure, or both. These modifications may include installing replacement micropiles, incorporating micropiles at not more than 50 percent of the maximum load attained, post grouting, modifying installation methods, increasing the bond length, or changing the micropile type. Any modification that necessitates changes to the structure design will require the Engineer's prior review and acceptance.

6-05.3(5).GR6

Manufacture of Steel Piles

6-05.3(5).INST1.GR6

Section 6-05.3(5) is supplemented with the following:

6-05.3(5).OPT1.BSP.GB6

(BSP April 5, 2010)

Furnishing St. Piling

Welding for ASTM A 252 pipe shall conform to AWS D1.1/D1.1M, latest edition, Structural Welding Code, except that all weld filler metal shall be low hydrogen material selected from Table 4.1 in AASHTO/AWS D1.5M/D1.5:2008 Bridge Welding Code. All seams and splices shall be complete penetration welds.

Welding and joint geometry for the seam shall be qualified in accordance with AWS D1.1/D1.1M, latest edition, Structural Welding Code. The Contractor may submit documentation of prior qualification to the Engineer to satisfy this requirement. Dimensional tolerances for wall thickness, diameter and weight shall conform to the material specification that the steel pipe piling is manufactured under, except that the radial offset in the weld seams, height of the weld seam, and misalignment of the weld beads, shall not exceed the limits specified in API 5L, latest edition, Sections 9.13.1, 9.13.2, and 9.13.3, respectively. The wall thickness shall not be less than 95 percent of the specified nominal thickness. The ends of the steel pipe piles shall conform to dimensional tolerance and fit-up requirements of Section 5.22.3.1 of the AWS D1.1/D1.1M, latest edition, Structural Welding Code.

Skelp splices shall not be located within 12 inches of a girth shop or field weld. All skelp splices shall be 100 percent radiographically or ultrasonically inspected in

accordance with either API 5L Annex E Section E.4 or E.5, or Table 6.2 and Chapter 6 Part E, F or G in AWS D1.1/D1.1M, latest edition, Structural Welding Code. Additionally, at least five percent of the pipe seam at each end, and one pipe diameter length of seam centered on any skelp splice intersection, shall be inspected as specified above. Repairs shall conform to Section 5.26 of the AWS D1.1/D1.1M, latest edition, Structural Welding Code, using approved repair and weld procedures. All seams and splices shall be 100 percent visually inspected in accordance with the acceptance criteria in Table 6.1 of the AWS D1.1/D1.1M, latest edition, Structural Welding Code.

Each length of steel pipe pile shall be marked with paint stencil, no closer than six inches to the end of the pipe, with the name of the manufacturer, material specification and grade of pipe, steel heat number, nominal pipe diameter, and wall thickness.

6-05.3(6).GR6

Splicing Steel Casings and Steel Piles

6-05.3(6).INST1.GR6

Section 6-05.3(6) is supplemented with the following:

6-05.3(6).OPT1.BSP.GB6

(BSP April 5, 2010)

Furnishing St. Piling

Welding procedure submittals for shop and field girth splices shall be accompanied by certified mill test reports, including chemical analysis and carbon equivalence. Welding procedure submittals shall include the joint geometry.

Ends of steel pipe piling shall be prepared for splicing in accordance with AWS D1.1/D1.1M, latest edition, Structural Welding Code.

All splices shall be complete penetration groove welds using continuous backing rings of 1/4 inch minimum thickness. Tack welds shall be located in the root of the complete penetration groove weld.

Shop splices shall be 100 percent visually and ultrasonically inspected in accordance with Tables 6.1 and 6.2 acceptance criteria in AWS D1.1/D1.1M, latest edition, Structural Welding Code. Repairs for shop and field splices shall conform to Section 5.26 of AWS D1.1/D1.1M, latest edition, Structural Welding Code, using approved repair and weld procedures.

Field splice welds and welders shall be further qualified, tested and inspected as follows:

1. Welder qualification shall be performed on sample full girth sections of steel pipe pile to be used, in the same position and using the same weld joint as for production pile splicing. At the Contractor's option, these tests may be performed on the test piles during test pile installation.

2. Weld qualification tests shall be conducted in the presence of the Contractor's CWI and a representative of the Contracting Agency.

3. Field welded test joints for welder qualification shall be inspected as specified above for shop splices.

4. Production pile field splices shall be inspected as specified above for shop splices, within the limits designated for UT inspection as shown in the Plans. All welds shall be 100 percent visually inspected. The Engineer and the Contractor's CWI reserve the right to request UT inspection of splices in any pile location.

Field weld inspection and weld repairs shall be the responsibility of the Contractor. Quality control for field welding shall be conducted by an AWS Certified Welding Inspector (CWI). The Contractor shall not begin pile splicing operations until receiving the CWI's approval of the joint fit-up. The CWI shall inspect 100 percent of all field welds in accordance with the criteria and requirements specified above. All field splices shall have received the CWI's approval prior to Engineer acceptance.

The CWI shall prepare a report documenting the results of the non destructive quality control inspection of all field welds, and shall submit the report to the Engineer within five working days of the completion of the final pile splice in the project or as otherwise requested by the Engineer.

6-05.3(10).GR6

Test Piles

6-05.3(10).INST1.GR6

Section 6-05.3(10) is supplemented with the following:

6-05.3(10).OPT1.FB6

(March 6, 2000)

The Contractor shall furnish and drive *** $$1$$ *** test piles at the following locations or at locations designated by the Engineer:

*** $$2$$ ***

The *** $$3$$ *** test piles shall be driven in the location of permanent piles and the number of permanent *** $$4$$ *** piles required for this project has been reduced by the appropriate number.

6-05.3(11).GR6

Driving Piles

6-05.3(11)D.GR6

Achieving Minimum Tip Elevation and Bearing

6-05.3(11)D.INST1.GR6

Section 6-05.3(11)D is supplemented with the following:

6-05.3(11)D.OPT1.FB6

(March 6, 2000)

The *** $$1$$ *** piling shall be driven to at least the following tip elevation:

*** $$2$$ ***

6-05.3(11)D.OPT2.GB6

(March 6, 2000)

The areas where piles are to be driven are adjacent to highly developed areas. It is essential that vibration and noise resulting from pile driving be held to a minimum. Unless otherwise approved by the Engineer, pile driving shall be done during regular daytime working hours. The Contractor shall select pile driving equipment which will minimize noise and vibration. When, in the opinion of the Engineer, noise or vibration are excessive, the Contractor will be required to use a hammer that does not exceed the minimum specifications by more than 10 percent for the type and capacity of piling being driven. If pre-boring, jetting, or other special methods are not specified elsewhere in the contract and are ordered by the Engineer to reduce noise or vibration, such change in method shall be considered a change, subject to the terms of Section 1-04.4.

6-05.3(11)D.OPT3.FB6

(March 6, 2000)

The *** $$1$$ *** piles *** $$2$$ *** shall be placed in prebored holes drilled to elevation ***$$3$$***.

The holes shall be of adequate diameter to isolate the pile from skin friction. The hole around the pile due to oversize boring shall be filled with dry sand or pea gravel as approved by the Engineer after the pile is placed.

6-05.3(11)D.OPT4.FB6

(March 6, 2000)

The *** $$1$$ *** piles ***$$2$$*** shall be prebored to elevation *** $$3$$ ***.

The diameter of the preboring shall be adjusted to provide for full contact between the pile casing and the surrounding soil without shattering the soil formation. It is estimated that the required diameter for preboring will be approximately 1 inch less than the pile diameter; however, the diameter shall be adjusted by the Contractor as directed by the Engineer to accomplish the results described above. Jetting will not be permitted. The Contractor shall follow preboring immediately with the placing of the pile casing to prevent sloughing into the excavated hole.

6-05.3(11)D.OPT9.BSP.FB6

(BSP August 22, 2005)

The Contractor is advised that overdriving is anticipated for piles driven at the following location(s):

Location(s)	Approx. Magnitude of Overdriving Anticipated to Reach Minimum Tip Elev.

*** $$1$$ *** *** $$2$$ ***

The Contractor shall size the hammer and pile to accommodate overdriving of this magnitude and not result in premature refusal or pile damage.

6-05.4.GR6

Measurement

6-05.4.INST1.GR6

Section 6-05.4 is supplemented with the following:

6-05.4.OPT1.FB6

(March 6, 2000)

Measurement for preboring for *** $$1$$ *** pile will be per linear foot of hole drilled.

6-05.4.OPT6.BSP.GB6

(BSP August 2, 2010)

Micropiles will be measured per each, for each micropile installed and accepted.

Micropile verification load testing will be measured per each for each successfully completed and accepted micropile verification load test.

Micropile proof load testing will be measured per each for each successfully completed and accepted micropile proof load test.

6-05.5.GR6

Payment

6-05.5.INST1.GR6

Section 6-05.5 is supplemented with the following:

6-05.5.OPT1.FB6

(March 6, 2000)

“Preboring For ***$$1$$*** Pile”, per linear foot.

The unit contract price per linear foot for “Preboring For ***$$2$$*** Pile” shall be full pay for performing the work as specified, including removal and disposal of excavated soils from preboring, and backfilling.

6-05.5.OPT6.BSP.GB6

(August 2, 2010)

“Micropile”, per each.

The unit contract price per each for "Micropile" shall be full pay for performing the work as specified, including drilling the hole for the micropile, furnishing, and placing the casing, steel reinforcing bar, grout (including grout overruns), and micropile top attachments.

“Micropile Verification Load Testing”, per each.

“Micropile Proof Load Testing”, per each.

The unit contract price per each for “Micropile Verification Load Testing” and “Micropile Proof Load Testing” shall be full pay for performing the work as specified, including furnishing and installing verification load test micropiles, performing all additional verification load tests and proof load tests required due to previous test failures, performing all design and construction procedure modifications of design or construction procedures required as a result of the load test results, and providing any increase in strength of the verification test micropile elements above the strength required for the production micropiles.

6-06.GR6

Bridge Railings

6-06.2.GR6

Materials

6-06.2.INST1.GR6

Section 6-06.2 is supplemented with the following:

6-06.2.OPT1.GB6

(January 5, 2004)

Chain link fence fabric shall conform to the Section 9-16.1(1)B requirements for Type 1 fence.

Fittings, fabric bands, stretcher bars, tie wire, and other fence hardware, shall conform to Section 9-16.1.

Pipe for posts and longitudinal members shall conform to ASTM A 53, Grade B, Type E or S, galvanized, and shall be Schedule 40 unless otherwise shown in the Plans.

Steel bars, plates, and shapes shall conform to ASTM A 36, and shall be galvanized in accordance with AASHTO M 111, except that structural shapes may conform to ASTM A 992.

Bolts, nuts, and washers shall conform to Section 9-06.5(3), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Resin bonded anchors shall conform to Section 6-02.2 as supplemented in these Special Provisions.

6-06.2.OPT2.GB6

(March 6, 2000)

Epoxy resin shall conform to Section 9-26.1.

6-06.2.OPT7.BSP.GB6

(BSP December 29, 2008)

Tamper Proof Nuts for steel Bridge Railing Type BP

Tamper proof nuts for steel Bridge Railing Type BP shall be one of the following products from one of the following manufacturers:

Vandlgard-Nut VCN151-6 (zinc)
Manufactured by Local Supplier

Simi Fastening Systems	Northwest Fasteners Inc.
4615 Industrial St. Bldg. No. 1-P	15127 Washington Avenue SW
Simi Valley, CA 93063	Lakewood, WA 98498
(800) 959-8256	(253) 582-1671
FAX (805) 581-9162	FAX (253) 581-3131
www.simifast.com	

Trigroove Nut ZTRN37C (Zamak 5 zinc alloy AC41A)
Breakaway Nut ZNB37C (Zamak 5 zinc alloy AC41A)

Manufactured by	Local Supplier
Screw & Supply Inc.	Tacoma Screw Products Inc.
1712 Church Street	2001 Center Street
Holbrook, NY 11741	Tacoma, WA 98409
(800) 223-1316	(800) 562-8192
FAX (631) 567-3057	FAX (253) 272-2719
www.screwsupply.com	

Spanner Nut 1N.386 (zinc alloy)
Manufactured by
TamperProof Screw Company Inc.
30 Laurel Street
Hicksville, NY 11801
(516) 931-1616
FAX (516) 931-1654
www.tamperproof.com

Trident Tamper Resistant Nut 37CNTNZ (Zamak 5 zinc alloy AC41A)
Breakaway Nut 37CNBAWZ (Zamak 5 zinc alloy AC41A)
Breakaway Nut 37CNBAWS (stainless steel alloy 304)
Manufactured by
Tanner Bolt & Nut Company
4302 Glenwood Road
Brooklyn, NY 11210
(800) 456-2658
FAX (888) 434-3215
www.tannerbolt.com

6-06.2.OPT8.BSP.FB6

(BSP March 12, 2012)

Bridge Railing Type Snow Fence and Bridge Railing Type Wire Fabric Fence

Wire fabric shall be 6.5 gage diameter, 2 inch square wire mesh conforming to ASTM F 2453 Type 2 and galvanized after fabrication in accordance with AASHTO M 111.

HSS tubes shall conform to ASTM A 500, Grade B.

Steel bars, plates, and shapes shall conform to either ASTM A 36 or ASTM A 992.

HSS tube caps shall conform to ASTM A 53 Grade B Type E or S, or may be fabricated from material conforming to ASTM A 36.

HSS tubes, HSS tube caps, and steel bars, plates, and shapes, shall be galvanized after fabrication in accordance with AASHTO M 111.

Bolts, anchor bolts, threaded welded studs, nuts, and washers shall conform to Section 9-06.5(3), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Button head bolts (with a slot in the head as shown in the Plans) shall conform to ASTM F 593, Type 304. Button head bolt nuts shall conform to ASTM F 594, Type 304. Button head bolt washers shall conform to ASTM A 240 Type 304 stainless steel and the geometric requirements of ANSI B18.22.1.

Resin bonded anchors shall conform to Section 6-02.2 as supplemented in these Special Provisions.

Thread locking agent shall be an anaerobic single-component adhesive conforming to ASTM D 5363 Group 2 Class 1 Grade 1.

All tubes, pipes, bars, plates, shapes, wire fabric, and hardware, shall be shop painted or powder coated after galvanizing in accordance with Section 6-07.3(11). The color of the finish coat, when dry, shall match the color *** $$1$$ ***.

6-06.3.GR6

Construction Requirements

6-06.3(2).GR6

Metal Railings

6-06.3(2).INST1.GR6

Section 6-06.3(2) is supplemented with the following:

6-06.3(2).OPT1.GB6

(March 6, 2000)

Bridge Railing Type Chain Link Fence

The Contractor shall install anchor bolts for each post anchorage as shown in the Plans. Alternatively, the Contractor may install resin bonded anchors at each post anchorage, in accordance with Section 6-02 as supplemented in these Special Provisions.

Longitudinal members shall be connected to the steel posts as shown in the Plans.

The Contractor shall install the chain link fence fabric in accordance with Section 8-12.3(1)D, except as otherwise noted. The chain link fence fabric shall be fastened to the posts and longitudinal members at a maximum spacing of 14 inches.

6-06.3(2).OPT2.GB6

(March 6, 2000)

Bridge Railing Type Chain Link Fence

The post blockouts shall be formed with a steel sleeve of the diameter and thickness specified in the Plans. The steel sleeve shall be galvanized after fabrication in accordance with AASHTO M 111. The Contractor shall fill the bottom portion of the railing post with expanded polystyrene as shown in the Plans.

The Contractor shall install the steel posts in the post blockouts as shown in the Plans. The posts shall be installed vertically, set in position with epoxy resin, and braced to maintain the vertical position until the epoxy resin hardens.

Longitudinal members shall be connected to the steel posts as shown in the Plans.

The Contractor shall install the chain link fence fabric in accordance with Section 8-12.3(1)D, except as otherwise noted. The chain link fence fabric shall be fastened to the posts and longitudinal members at a maximum spacing of 14 inches.

6-06.3(2).OPT7.BSP.GB6

(BSP March 12, 2012)

Bridge Railing Type Snow Fence and Bridge Railing Type Wire Fabric Fence

The railing shall be fabricated and installed in accordance with the shop drawings approved by the Engineer. The railing panels shall be installed level, and the railing posts shall be installed plumb.

The Contractor shall install anchor bolts for each post anchorage as shown in the Plans. Alternatively, the Contractor may install resin bonded anchors at each post anchorage, in accordance with Section 6-02.3(18) as supplemented in these Special Provisions.

Just prior to fastening the railing panels to the posts, the Contractor shall fully coat the threads of the button head bolt with thread locking agent. The Contractor shall complete the connection by snug-tightening the nut while preventing the button head from turning. “Snug-tightening” in this application is defined as the full effort of a person using a hand tool to turn the nut while the button head is restrained.

After completing erection, the Contractor shall repair all metal surfaces with damaged paint or powder coatings and exposed metal with a field repair coating in accordance with Section 6-07.3(9)I and Section 6-07.3(11)A (for paint) or Section 6-07.3(11)B (for powder coating). The color of the finish coat of the field repair coating, when dry, shall match the color specified in Section 6-06.2 as supplemented in these Special Provisions.

6-06.5.GR6

Payment

6-06.5.INST1.GR6

Section 6-06.5 is supplemented with the following:

6-06.5.OPT1.FB6

(March 6, 2000)

All costs in connection with constructing Bridge Railing Type *** $$1$$ *** shall be included in the *** $$2$$ ***.

6-07.GR6

Painting

6-07.1.GR6

Description

6-07.1.INST1.GR6

Section 6-07.1 is supplemented with the following:

6-07.1.OPT1.FB6

(August 3, 2009)

This work shall consist of cleaning and painting all exposed metal surfaces of Bridge No(s). *** $$1$$ ***, in accordance with Section 6-07.3(10), except as otherwise noted below.

Portions of the structure(s) excluded from this work include:

*** $$2$$ ***

6-07.1.OPT2.FB6

(August 3, 2009)

This work shall consist of cleaning and painting the exposed timber surfaces of Bridge No(s). *** $$1$$ ***, in accordance with Section 6-07.3(13) as supplemented in these Special Provisions and as specified below:

*** $$2$$ ***

6-07.3.GR6

Construction Requirements

6-07.3.INST1.GR6

Section 6-07.3 is supplemented with the following:

6-07.3.OPT1.GB6

(August 1, 2011)

Metallic Coatings

General Requirements

This specification covers the requirements for thermal spray metallic coatings, with and without additional paint coats, as a means to prevent corrosion.

The coating system consists of surface preparation by wash cleaning and abrasive blast cleaning, thermal spray application of a metallic coating using a material made specifically for that purpose, and, when specified, shop primer coat or shop primer coat plus top coat in accordance with Section 6-07.3(11)A. The system also includes inspection and acceptance requirements.

Reference Standards

SSPC-SP 10	Near-White Blast Cleaning
SSPC CS 23.00	Guide for Thermal Spray Metallic Coating Systems
AWS Committee on Thermal Spraying	Thermal Spraying – Practice, Theory, and Application
ASTM-C-633	Test Method for Adhesive or Cohesive Strengths of Flame-Sprayed Coatings

ASTM D 4417	Standard Test Methods for Field Measurement of Surface Profile of Blast-Cleaned Steel
ASTM D 6386	Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
ASTM D 4541	Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ANSI/AWS C2.18	Guide for the Protection of Steel with Thermal Sprayed Coatings of Aluminum, Zinc and their Alloys and Composites

Quality Assurance

A representative sample of each lot of the coating material used shall be submitted to the Engineer for analysis prior to use. Zinc shall have a minimum purity of 99.9 percent. Zinc Aluminum 85/15 wire shall be 14 to 16 percent maximum aluminum.

The thermal sprayed coating shall have a uniform appearance. The coating shall not contain any blisters, cracks, chips or loosely adhering particles, oil or other surface contaminants, nodules, or pits exposing the substrate.

The thermal spray coating shall adhere to the substrate with a minimum bond of 700 psi. The Contractor's QA program shall include thermal spray coating bond testing.

The Engineer may cut through the coating with a knife or chisel. If upon doing so, any part of the coating lifts away from the base metal 1/4 in. or more ahead of the cutting blade without cutting the metal, then the bond is considered not effective and is rejected.

Coated areas which have been rejected or damaged in the inspection procedure described shall have the defective sections blast cleaned to remove all of the thermal sprayed coating and shall then be recoated. Before resubmittal and inspection, those sections where coating has not reached the required thickness shall be sprayed with additional metal until that thickness is achieved.

Submittals

The Contractor shall submit to the Engineer, prior to abrasive blast cleaning, a 12 inch square steel plate, of the same material and approximate thickness of the steel to be coated, blasted clean in accordance with the **Surface Preparation** subsection of this Special Provision. The sample plate will be checked for specified angular surface pattern, the abrasive grit size and type used, and the procedure used. This plate shall be used as the visual standard to determine the acceptability of the cleaned surface. In the event the Contractor's cleaning operation is inferior to the sample plate, the Contractor shall be required to correct the cleaning operation to do a job comparable to the specimen submitted.

At the same time as submitting the abrasive blast cleaned steel plate sample, the Contractor shall submit to the Engineer, a second 12 inch square steel plate of the same material and thickness, cleaned and thermal spray coated in accordance with the same processes and with the same equipment as intended for use in applying the thermal spray coatings for this project. The Engineer may request additional

cleaned and thermal spray coated samples to be produced and submitted coincident with thermal spray coating of the items specified in the Plans to receive thermal spray coatings.

Surface Preparation

Surface irregularities (e.g., sharp edges and/or carburized edges, cracks, delaminations, pits, etc.) interfering with the application of the coating shall be removed or repaired, prior to wash cleaning. Thermal cut edges shall be ground to reduce hardness to attain the surface profile required from abrasive blast cleaning.

All dirt, oil, scaling, etc. shall be removed prior to blast cleaning. All surfaces shall be wash cleaned with either clean water at 8000 psi or water and detergent at 2000 psi with two rinses with clean water.

The surface shall be abrasive blast cleaned to near white metal (SSPC-SP 10). The surface profile shall be measured using a surface profile comparator, replica tape, or other method suitable for the abrasive being used in accordance with ASTM D 4417.

Where zinc coatings up to and including 0.009 inch thick are to be applied, one of the following abrasive grits shall be used with pressure blast equipment to produce a 3.0 mils AA anchor tooth pattern:

1. Aluminum oxide or silicon carbide
   mesh size: SAE G-25 to SAE G-40

2. Hardened steel grit
   mesh size: SAE G-25 to SAE G-40

3. Garnet, flint, or crushed nickel or black beauty coal slag
   mesh size: SAE G-25 to SAE G-50

Where zinc coatings greater than 0.010 inch thick are to be applied, one of the following abrasive grits shall be used with pressure blast equipment to produce a 5.0 mils AA anchor tooth pattern:

1. Aluminum oxide or silicon carbide
   mesh size: SAE G-18 to SAE G-25

2. Hardened steel grit
   mesh size: SAE G-18 to SAE G-25

3. Garnet, flint, or crushed nickel or black beauty coal slag
   mesh size: SAE G-18 to SAE G-25

The pressure of the blast nozzle, as measured with a needle probe gauge, with pressure type blasting equipment shall be as follows:

1. With aluminum oxide, silicon carbide, flint, or slag - 50 psi minimum and 60 psi maximum.

2. With garnet or steel grit - 75 psi minimum.

The pressure at the blast nozzle, with siphon blasting (suction blasting), shall be as follows:

1. With aluminum oxide, silicon carbide, flint, or slag - 75 psi maximum.

2. With garnet or steel grit - 90 psi maximum.

The abrasive blast stream shall be directed onto the substrate surface at a spray angle of 75 to 90 degrees, and moved side to side. The nozzle to substrate distance shall be 4 to 12 inches.

Application of Metallic Coating

No surface shall be sprayed which shows any sign of condensed moisture or which does not comply with the **Surface Preparation** subsection of this Special Provision. If rust bloom occurs within the holding time between abrasive blast cleaning and thermal spraying, the surface shall be reblasted at a blast angle as close to perpendicular to the surface as possible to achieve a 2.0 to 4.0 mil anchor tooth pattern. Thermal spraying shall not take place when the relative humidity is 90% or greater, when the steel temperature is less than 5F above the dew point, or when the air or steel temperature is less than 40F.

Clean, dry air shall be used with not less than 50 psi air pressure at the air regulator. Not more than 50 feet of 3/8 in. ID hose shall be used between the air regulator and the metallizing gun. The metallizing gun shall be started and adjusted with the spray directed away from the work. During the spraying operation and depending upon the equipment being used, the gun shall be held as close to perpendicular as possible to the surface from 5 to 8 inches from the surface of the work.

Manual spraying shall be done in a block pattern, typically 2 feet by 2 feet square. The sprayed metal shall overlap on each pass to ensure uniform coverage. The specified thickness of the coating shall be applied in multiple layers. In no case are fewer than two passes of thermal spraying, overlapping at right angles, acceptable.

At least one single layer of coating shall be applied within 4 hours of blasting and the surface shall be completely coated to the specified thickness within 8 hours of blasting.

The minimum coating thickness shall be 6 mils unless otherwise shown in the Plans.

Applications of Shop Coats and Field Coats

The surface shall be wiped clean with solvent immediately before applying the wash primer. The wash primer shall have a low viscosity appropriate for absorption into the thermal spray coating, and shall be applied within 8 hours after completion of thermal spraying or before oxidation occurs. The dry film thickness of the wash primer shall not exceed 0.5 mils or be less than 0.3 mils. It shall be applied using an appropriate spray gun except in those areas where brush or roller application is

necessary. The subsequent shop primer or field coats shall be applied no less than one-half hour after a wash primer.

The shop primer coat, when specified, shall be applied in accordance with Section 6-07.3(11)A and the paint manufacturer's recommendations.

All field coats, when specified, shall be applied in accordance with Section 6-07.3(11)A and the paint manufacturer's recommendations. The color of the top coat shall conform to Section 6-03.3(30) as supplemented in these Special Provisions.

6-07.3(10).GR6

Painting Existing Steel Structures

6-07.3(10).INST1.GR6

Section 6-07.3(10) is supplemented with the following:

6-07.3(10).OPT1.FB6

(August 3, 2009)

The Contractor *** $$1$$ *** paint the existing utility company conduits attached to the structure, such as sewer, water, gas and telephone. The Contractor shall protect the utilities from damage due to operations on the bridges.

6-07.3(10).OPT2.GB6

(August 3, 2009)

Light fixtures and lenses, including navigation, aircraft, flag pole luminaire, and luminaire light fixtures and lenses, shall not be painted and shall be kept clean from paint. The Contractor shall remove all paint from the light fixtures and lenses due to the painting operation.

6-07.3(10).OPT3.GB6

(August 3, 2009)

A portion of the work involved in this project is located over or near railroad facilities. The Contractor shall exercise great care in all operations in order that no interruptions or damage will occur to the railroad trains or facilities. The Contractor shall contact the Railroad Company regarding the times and the conditions under which cleaning and painting work over or adjacent to railroad tracks may be accomplished.

6-07.3(10).OPT4.GB6

(August 3, 2009)

In the cleaning operation, particular attention shall be paid to cleaning the grid deck. Any means approved by the Engineer, in addition to flushing, as required to clean dirt, oil and grease from the grid surfaces in accordance with SSPC-SP 1 shall be used.

6-07.3(10)A.GR6

Containment

6-07.3(10)A.INST1.GR6

Section 6-07.3(10)A is supplemented with the following:

6-07.3(10)A.OPT1.GB6

(August 3, 2009)

The Contractor shall adequately protect all gears, machinery, mechanical equipment, electrical equipment, navigation and clearance light lenses, motors, sheaves and cables and all other equipment which might become damaged by and during the cleaning and painting operations. Should the Contractor's operation foul or otherwise contaminate the lubricated surfaces, the Contractor shall, if directed by the Engineer, clean and relubricate the surfaces at the Contractor's expense.

6-07.3(10)D.GR6

Surface Preparation Prior to Overcoat Painting

6-07.3(10)D.INST1.GR6

Section 6-07.3(10)D is supplemented with the following:

6-07.3(10)D.OPT1.FB6

(April 5, 2010)

The following steel surfaces of Bridge No(s). *** $$1$$ *** shall receive surface preparation in accordance with SSPC SP1 followed by cleaning with compressed air conforming to ASTM D 4285 only:

*** $$2$$ ***

6-07.3(10)E.GR6

Surface Preparation - Full Paint Removal

6-07.3(10)E.INST1.GR6

Section 6-07.3(10)E is supplemented with the following:

6-07.3(10)E.OPT1.FB6

(April 5, 2010)

The following steel surfaces of Bridge No(s). *** $$1$$ *** shall receive full paint removal surface preparation in accordance with this Section:

*** $$2$$ ***

6-07.3(10)I.GR6

Paint Color

6-07.3(10)I.INST1.GR6

Section 6-07.3(10)I is supplemented with the following:

6-07.3(10)I.OPT1.FB6

(August 3, 2009)

The color of the top coat, when dry, shall match *** $$1$$ ***.

6-07.3(10)N.GR6

Field Coating Application Methods

6-07.3(10)N.INST1.GR6

Section 6-07.3(10)N is supplemented with the following:

6-07.3(10)N.OPT1.GB6

(August 3, 2009)

Spray painting will be permitted for the application of paint to the surfaces of the steel grid roadway decking and steel grid catwalks, provided every precaution or means necessary to prevent any damage due to spraying operations or from wind borne paint is taken, provided further that if satisfactory results are not, in the opinion of the Engineer, obtained with the spraying application, the Contractor shall revert to the use of brushes. In the event spray painting is used on the steel grid roadway decking, the application shall be made only from the underside of the roadway, and then only at such times as traffic has been diverted to other lanes. A protective covering shall be placed immediately over areas of the roadway decking being spray painted to prevent damage from wind borne paint.

6-07.3(11).GR6

Painting or Powder Coating of Galvanized Surfaces

6-07.3(11).INST1.GR6

Section 6-07.3(11) is supplemented with the following:

6-07.3(11).OPT1.FB6

(August 3, 2009)

The color of the finish coat, when dry, shall match *** $$1$$ ***

6-07.5.GR6

Payment

6-07.5.INST1.GR6

Section 6-07.5 is supplemented with the following:

6-07.5.OPT1.GB6

(August 2, 2010)

All costs in connection with producing the metallic coatings as specified shall be included in the unit contract price for the applicable item or items of work.

6-08.GR6

Waterproofing

6-08.1.GR6

Description

6-08.1.INST1.GR6

Section 6-08.1 is supplemented with the following:

6-08.1.OPT1.GB6

(January 3, 2011)

This work consists of furnishing and placing an approved waterproofing membrane system over a properly prepared concrete bridge deck prior to placing the HMA overlay.

The waterproofing membrane system shall consist of an impermeable sheet membrane that prevents passage of water from the overlay surfacing to the bridge deck substrate. The system shall also include a primer to bond the membrane to the bridge deck substrate, regardless of bridge deck temperature, except for circumstances when the waterproofing membrane system manufacturer specifically prohibits the use of a primer.

6-08.2.GR6

Materials

6-08.2.INST1.GR6

Section 6-08.2 is supplemented with the following:

6-08.2.OPT1.GB6

(January 3, 2011)

Primer for Membrane Waterproofing (Deck Seal)

The membrane waterproofing (deck seal) primer shall be compatible for use with the membrane manufacturer's sheet membrane, and shall be appropriate for bonding the sheet membrane to the bridge deck surface.

6-08.2(9-11.2).GR6

Waterproofing Fabric

Section 9-11.2 is supplemented with the following:

6-08.2(9-11.2).OPT1.GB6

(January 2, 2012)

Membrane waterproofing (deck seal) sheet membrane shall conform to ASTM D 6153 Type III, and the following additional material properties:

Property	Specification	Minimum Value
Minimum Tensile Stress (At tear or breaking load for Thin Polymer Sheets)	ASTM D 882	50 pounds per inch
Minimum Grab Tensile Strength (At breaking load for Geotextiles and Fabric)	ASTM D 4632	50 pounds
Minimum Puncture Capacity (For Thin Polymer Sheets, Geotextiles and Fabric)	ASTM E 154	200 pounds

Membrane waterproofing (deck seal) sheet membrane will be accepted based on manufacturers certificate of compliance that the material furnished conforms to these specifications. The Contractor shall submit the manufacturer's certificate of compliance to the Engineer in accordance with Section 1-06.3.

6-08.3.GR6

Construction Requirements

6-08.3(2).GR6

Preparation of Surface

6-08.3(2).INST1.GR6

Section 6-08.3(2) is supplemented with the following:

6-08.3(2).OPT1.GB6

(January 3, 2011)

Preparation of Bridge Deck

The entire bridge deck and the sides of the curb and expansion joint headers to the height of the HMA overlay shall be essentially free of all foreign material such as dirt, grease, etc. Prior to applying the primer or sheet membrane, all dust and loose material shall be removed from the bridge deck with compressed air. All surface defects such as spalled areas, cracks, protrusions, holes, sharp edges, ridges, etc., and other imperfections greater than 3/8 inch that will decrease the effectiveness of the membrane by puncturing, stretching, etc., shall be corrected prior to application of the membrane.

Weather and Moisture Limitations

Work shall not be done during wet weather conditions, or when the bridge deck and ambient air temperatures are below 50F. The bridge deck shall be surface-dry at the time of the application of the primer or sheet membrane.

The Engineer may order work to be suspended in accordance with Section 1-08.6 because of the above weather and moisture limitations.

New Concrete Areas

All areas of the bridge deck that have less than 28 day old concrete shall be allowed to cure for a period of time recommended by the membrane manufacturer or as specified by the Engineer before application of the membrane.

Concrete Protection

The Contractor shall use care to protect all concrete surfaces from damage. Any damage to exposed surfaces shall be repaired in accordance with Section 1-07.13.

6-08.3(3).GR6

Application of Waterproofing

6-08.3(3).INST1.GR6

Section 6-08.3(3) is supplemented with the following:

6-08.3(3).OPT1.GB6

(January 3, 2011)

Membrane Waterproofing (Deck Seal)

The primer and membrane waterproofing shall extend from the bridge deck up onto the curb face and expansion joint header face the thickness of the HMA overlay. Special care shall be used at the curb face and expansion joint header face to see that the membrane adheres to the vertical surface.

The Contractor shall not begin application of membrane waterproofing deck seal to the bridge deck until demonstrating, to the satisfaction of the Engineer, that all labor, equipment, and materials necessary to apply the membrane and HMA overlay are either on hand or readily available to complete the work in a timely manner.

The primer shall be applied to the cleaned concrete surfaces at the rate and according to the procedure recommended by the membrane manufacturer. All surfaces to be covered by the membrane shall be thoroughly and uniformly coated with primer. Precautionary measures shall be taken to ensure that pools and thick layers of primer are not left on the deck surface to scum over. Drying time prior to applying the membrane shall normally be as recommended by the manufacturer, however, the membrane shall not be applied until substantially all volatile material has dissipated from the primer.

The prefabricated membrane shall be applied to the primed curb and bridge deck surfaces by either hand methods or mechanical applicators. Membrane application shall begin at the bridge deck low point and continue in a shingled pattern so that any water which accumulates will drain toward the curb and the bridge deck drains (if present) without accumulation against the membrane seams. Each strip shall be overlapped a minimum of six inches or as recommended by the manufacturer. An adhesive or a wide tipped torch to cause tackiness shall be used, if necessary, to assure a good seal of the joints. Hand rollers or other satisfactory pressure apparatus shall be used on the applied membrane to assure firm and uniform contact with the primed concrete surfaces.

Any torn or cut areas, or narrow overlaps, shall be patched using a satisfactory adhesive and by placing sections of the membrane over the defective area in such a manner that the patch extends at least six inches beyond the defect. The patch shall be rolled or firmly pressed onto the surface.

The fabric shall be neatly cut and contoured at all joints as specified by the Engineer.

After the membrane waterproofing application has been completed, the membrane shall be cut with two right angle cuts at all bridge deck drains (if present). The cuts shall be made to the inside diameter of the bridge deck drain outlet, after which the corners of the membrane waterproofing shall be turned down into the drains and laid in a coating of asphalt binder.

The waterproofing membrane will be visually inspected by the Engineer for uniformity of application, tears, punctures, bonding, bubbles, wrinkles and other defects as described in the membrane manufacturer's literature. All such deficiencies shall be repaired as recommended by the membrane manufacturer and approved by the Engineer prior to placement of the HMA overlay.

6-08.3(4).GR6

Protection Course

6-08.3(4).INST1.GR6

Section 6-08.3(4) is supplemented with the following:

6-08.3(4).OPT1.GB6

(January 3, 2011)

General Membrane Protection

The membrane material shall be protected from damage due to the paving operations. The method of membrane protection shall be as recommended by the manufacturer of the membrane system and approved by the Engineer.

No traffic or equipment except that required for the actual waterproofing and paving operations will be permitted to travel or rest on the membrane waterproofing until it is covered by the HMA overlay.

HMA Overlay

The membrane manufacturer's recommendations shall be thoroughly considered in the application of the HMA overlay particularly as to the type of paving machine, laydown temperature of the HMA, protection of membrane while paving, rolling temperature and technique, and other items unique to each membrane. Differences in application procedure shall be resolved by the Engineer and the Engineer's decision shall be final. Vibratory rollers shall not be used on bridge decks.

6-08.4.GR6

Measurement

6-08.4.INST1.GR6

Section 6-08.4 is supplemented with the following:

6-08.4.OPT1.GB6

(March 6, 2000)

Membrane waterproofing will be measured by the square yard of the bridge deck and curb which is satisfactorily sealed and accepted.

6-08.5.GR6

Payment

6-08.5.INST1.GR6

Section 6-08.5 is supplemented with the following:

6-08.5.OPT1.GB6

(August 2, 2004)

"Membrane Waterproofing (Deck Seal)", per square yard.

The unit contract price per square yard for "Membrane Waterproofing (Deck Seal)" shall be full pay for performing the work as specified, including repairing any damaged or defective waterproofing membrane and damaged HMA overlay.

6-08.5.OPT2.FB6

(January 3, 2011)

All costs in connection with furnishing and applying membrane waterproofing (deck seal) shall be included in the *** $$1$$ ***.

6-09.GR6

Modified Concrete Overlays

6-09.2.GR6

Materials

6-09.2.INST1.GR6

Section 6-09.2 is supplemented with the following:

6-09.2.OPT7.BSP.GB6

(BSP September 9, 2002)

Special Materials for Rapid Set Latex Modified Concrete

Cement shall be Rapid Set Cement as manufactured by CTS Cement Manufacturing Company of Cypress, CA at (800) 929-3030. The material shall be of recent manufacture (within the past 12 months) and shall be free of lumps.

Latex admixture shall be DOW Modifier A as manufactured by DOW Chemical Company of Midland, MI at (800) 447-4369, conforming to the material properties specified in Section 6-09.2 for latex admixture.

Food grade citric acid may be used as a retarder admixture.

6-09.2.OPT8.BSP.GB6

(BSP January 3, 2011)

Materials for Polyester Concrete

Polyester Resin Binder

The resin shall be an unsaturated isophthalic polyester-styrene co-polymer.

Prior to adding the initiator, the resin shall conform to the following requirements:

Viscosity:	75 to 200 cps (20 rpm at 77F, RVT No. 1 spindle)	ASTM D 2196
Specific Gravity:	1.05 to 1.10 at 77F	ASTM D 1475
Styrene Content:	45% to 50% by weight of polyester styrene resin	ASTM D2369

After adding the initiator, the resin shall conform to the following requirements:

Elongation:	35% minimum w/ thickness 0.25" ± 0.04"	ASTM D 638
Tensile Strength:	2,500 psi minimum w/ thickness 0.25" ± 0.04"	ASTM D 638
Conditioning	18 hours/77F/50% + 5 hours/158F	ASTM D 618
Silane Coupler:	1.0% minimum (by weight of polyester-styrene resin)	

The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter/hardeners shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. MEKP initiators shall be used when the surrounding concrete temperatures are above 60F. A blend of initiators may be used as approved by the Engineer when the surrounding concrete temperature is 50F to 60F.

Polyester resin binder will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance conforming to Section 1-06.3.

High Molecular Weight Methacrylate (HMWM) Resin

In addition to the viscosity and density properties, and the promoter/initiator system, already specified in this Section, the HMWM resin for polyester concrete overlays shall conform to the following requirements:

Flash Point:	180F minimum	ASTM D 3278
Tack-Free Time:	400 minutes maximum	California Test 551

Prior to adding initiator, the HMWM resin shall have a maximum volatile content of 30 percent, when tested in conformance with ASTM D 2369.

HMWM resin will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance conforming to Section 1-06.3.

Aggregate

The aggregate shall be from a WSDOT approved pit site and shall be thoroughly washed and kiln dried.

The aggregate shall conform to Section 9-03, and one of the following combined aggregate gradings:

Combined Aggregate

Sieve Size	1/2" Max. % Passing	3/8" Max. % Passing
1/2"	100	100
3/8"	83-100	100
U.S. No. 4	65-82	62-85
U.S. No. 8	45-64	45-67
U.S. No. 16	27-48	29-50
U.S. No. 30	12-30	16-36
U.S. No. 50	6-17	5-20
U.S. No. 100	0-7	0-7
U.S. No. 200	0-3	0-3

Aggregate retained on the U.S. No. 8 sieve shall have a maximum of 25 percent crushed particles. Fine aggregate shall consist of natural sand only.

Aggregate absorption shall not exceed 1.0 percent. The moisture content of the aggregate shall not exceed one half of the aggregate absorption at the time of mixing with the polyester resin binder. The aggregate temperature shall be between 45F and 100F at the time of mixing.

Sand for Abrasive Finish

The sand for abrasive finish shall conform to Section 6-09.2, and the aggregate moisture content requirements specified above.

6-09.3.GR6

Construction Requirements

6-09.3(1).GR6

Equipment

6-09.3(1).INST1.GR6

Section 6-09.3(1) is supplemented with the following:

6-09.3(1).OPT1.BSP.GB6

(BSP December 2, 2002)

Mobile Mixer for Polyester Concrete

The mixer shall be equipped to be calibrated to automatically proportion and blend all components of the specified mix on a continuous or intermittent basis as required by the finishing operation, and shall discharge mixed material directly into the finishing machine.

The mixer shall be equipped with a metering device that automatically measures and records the aggregate volumes and the corresponding resin volumes. The metering device shall have a readout display gage visible at all times, and shall be capable of printing out the volumes being recorded for each material.

The aggregate and resin volumes shall be recorded at no greater than five minute intervals along with the date of each recording. A printout of the recordings shall be furnished to the Engineer at the end of each work shift.

The Contractor shall prevent any cleaning chemicals from reaching the polyester mix during the overlay applications.

6-09.3(1)H.GR1

Mobile Mixer for Latex Modified Concrete

6-09.3(1)H.INST1.GR6

Section 6-09.3(1)H is supplemented with the following:

6-09.3(1)H.OPT1.BSP.GB6

(BSP September 9, 2002)

The capacity of the mobile mixer and bulk material handling systems for rapid set latex modified concrete shall be six cubic yards per hour, minimum.

6-09.3(2).GR6

Submittals

6-09.3(2).INST1.GR6

Section 6-09.3(2) is supplemented with the following:

6-09.3(2).OPT1.BSP.GB6

(BSP April 7, 2008)

Submittals for Polyester Concrete

The Contractor shall submit the following items to the Engineer for approval in accordance with Section 6-01.9:

1. The type of shot blasting machine selected by the Contractor for use in this project to scarify concrete surfaces.

2. The method and materials used to contain, collect, and dispose of all concrete debris generated by the scarifying process, including provisions for protecting adjacent traffic from flying debris.

3. The qualifications of on-site supervisors, mobile mixer operators, and finishing machine operators, in accordance with Section 6-09.3(8) as supplemented in these Special Provisions.

4. The polyester concrete mix design in accordance with Section 6-09.3(3) as supplemented in these Special Provisions.

5. Samples, as specified below, shall be submitted to the Engineer at least 15 working days prior to placing the polyester overlay:

    a. One gallon minimum of the polyester resin binder.

    b. One pint minimum of the HMWM resin.

    c. 100 pounds minimum of aggregate.

    d. Representative samples from each lot of prepackaged deck repair material and aggregate extenders, if selected for use in this project, as specified in Section 6-09.3(3) as supplemented in these Special Provisions.

6. The method and materials used to contain HMWM resin and polyester concrete within the deck area specified to receive the overlay.

7. Paving equipment specifications and details of the screed rail support system, including details of anchoring the rails and providing rail continuity.

The Contractor shall not begin scarifying operations until receiving the Engineer's approval of Items 1 and 2. The Contractor shall not begin placing polyester concrete overlay until receiving the Engineer's approval of Items 3 through 7.

6-09.3(3).GR6

Concrete Overlay Mixes

6-09.3(3).INST1.GR6

Section 6-09.3(3) is supplemented with the following:

6-09.3(3).OPT1.GB6

(January 7, 2002)

The Contractor may use either fly ash modified concrete (FMC), latex modified concrete (LMC), or microsilica modified concrete (MMC) for the concrete overlay. The Contractor shall select one type of concrete for the overlay, provide a mix for the selected concrete to the Engineer in accordance with Item 5 of Section 6-09.3(2), and use that type for the total concrete overlay operation. Use of a combination of types will not be allowed.

6-09.3(3).OPT2.GB6

(January 7, 2002)

The Contractor may use either fly ash modified concrete (FMC), or latex modified concrete (LMC) for the concrete overlay. The Contractor shall select one type of concrete for the overlay, provide a mix for the selected concrete to the Engineer in accordance with Item 5 of Section 6-09.3(2), and use that type for the total concrete overlay operation. Use of a combination of types will not be allowed. Use of microsilica modified concrete (MMC) will not be allowed.

6-09.3(3).OPT3.GB6

(January 7, 2002)

The Contractor shall use latex modified concrete (LMC) for the total concrete overlay operation, and shall provide a concrete mix to the Engineer in accordance with Item 5 of Section 6-09.3(2). Use of fly ash modified concrete (FMC) or microsilica modified concrete (MMC) will not be allowed.

6-09.3(3).OPT8.BSP.GB6

(BSP September 9, 2002)

Rapid Set Latex Modified Concrete

The Contractor shall use rapid set latex modified concrete for the total concrete overlay operation, in accordance with the following mix design. Use of latex modified concrete (LMC), fly ash modified concrete (FMC) or microsilica modified concrete (MMC) will not be allowed.

Rapid set latex modified concrete shall be a workable mix, uniform in composition and consistency. Mix proportions per cubic yard shall be as follows:

Rapid Set Cement	658	LB.
DOW Modifier A Latex Admixture	208	LB.
Fine Aggregate	1,700	LB.
Coarse Aggregate	1,300	LB.
Water	162	LB.
Air	4 to 7	percent

The moisture content and water limit specifications for latex modified concrete in Section 6-09.3(3)E shall also apply.

6-09.3(3).OPT9.BSP.GB6

(BSP December 2, 2002)

Polyester Concrete

The Contractor shall use polyester concrete for the total concrete overlay operation. Use of latex modified concrete (LMC), fly ash modified concrete (FMC) or microsilica modified concrete (MMC) will not be allowed.

Polyester concrete shall consist of the following three components – polyester resin binder, HMWM resin, and combined aggregate, in accordance with Section 6-09.2 as supplemented in these Special Provisions. The Contractor shall submit the mix design for the polyester concrete to the Engineer for approval. The mix design shall include a recommended initiator percentage for the expected application temperature. The polyester resin binder shall be approximately 12 percent by weight of the dry combined aggregate. The Contractor shall not begin the trial overlay of the polyester concrete, as specified in Section 6-09.3(8) as supplemented in these Special Provisions, until receiving the Engineer's approval of the polyester concrete mix design.

6-09.3(3).OPT10.BSP.GB6

(BSP December 2, 2002)

Deck Repair Concrete for Polyester Concrete Overlays

Patching concrete for further deck preparation in accordance with Section 6-09.3(6) shall be the polyester concrete mix used for the overlay.

6-09.3(4).GR6

Storing and Handling

6-09.3(4).INST1.GR6

Section 6-09.3(4) is supplemented with the following:

6-09.3(4).OPT1.BSP.GB6

(BSP December 2, 2002)

Storing and Handling of Polyester Concrete Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, quantity, and mixing ratio. Each shipment of polyester resin binder and HMWM resin shall be accompanied by a Materials Safety Data Sheet (MSDS).

The material shall be stored to prevent damage by the elements and to ensure the preservation of their quality and fitness for the work. The storage space shall be kept clean and dry, and shall contain a high-low thermometer. The temperatures of the storage space shall not fall below nor rise above that recommended by the manufacturer. Every precaution shall be taken to avoid contact with flame.

Stored materials shall be inspected prior to their use, and shall meet the requirements of these Special Provisions at the time of use.

Any material which is rejected because of failure to meet the required tests or that has been damaged so as to cause rejections shall be immediately replaced at no additional expense to the Contracting Agency.

Sufficient material to perform the entire polyester concrete overlay application shall be in storage at the site prior to any field preparation, so that there shall be no delay in procuring the materials for each day's application.

Appropriate impermeable protective garments shall be used by all workers who may contact the resin or initiators to prevent skin contact. If skin contact occurs, the resin or initiators shall be immediately washed off. Clothing that becomes saturated with resin shall be removed immediately.

All personnel working with the polyester concrete shall be issued suitable approved organic vapor respirators in addition to other appropriate protection equipment.

6-09.3(5).GR6

Scarifying Concrete Surface

6-09.3(5).INST1.GR6

Section 6-09.3(5) is supplemented with the following:

6-09.3(5).OPT1.GB6

(January 7, 2002)

The Contractor may use either a rotary milling machine, hydro-demolition machine, or shot blasting machine for scarifying concrete surfaces. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

6-09.3(5).OPT2.GB6

(January 7, 2002)

The Contractor may use either a hydro-demolition machine or shot blasting machine for scarifying concrete surfaces. The use of a rotary milling machine will not be allowed. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

6-09.3(5).OPT7.BSP.GB6

(BSP September 9, 2002)

The Contractor shall use a hydro-demolition machine for scarifying concrete surfaces. The use of a rotary milling or shot blasting machines will not be allowed. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

6-09.3(5).OPT8.BSP.GB6

(BSP September 9, 2002)

The Contractor shall use a shot blasting machine for scarifying concrete surfaces. The use of a rotary milling or hydro-demolition machines will not be allowed. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

6-09.3(5).OPT9.BSP.GB6

(BSP December 2, 2002)

The scarification depth for all concrete decks receiving polyester concrete overlay shall be 1/4 inch, and all references to scarification depth in Sections 6-09.3(5)A and 6-09.3(5)B shall be revised accordingly.

6-09.3(5).OPT10.BSP.GB6
(BSP September 9, 2002)
Steel reinforcing bars used in deck repair operations, in accordance with Sections 6-09.3(5)F and 6-09.3(6)B, shall be epoxy-coated in accordance with Section 6-02.3(24)H.

6-09.3(6).GR6
Further Deck Preparation

6-09.3(6)B.GR6
Deck Repair Preparation

6-09.3(6)B.INST1.GR6
Section 6-09.3(6)B is supplemented with the following:

6-09.3(6)B.OPT1.BSP.GB6
(BSP August 4, 2008)
The Contractor shall not remove the bottom two inches of the existing concrete deck, unless otherwise directed by the Engineer. If, for any reason, this requirement is not met and the existing concrete bridge deck is punctured by the removal operations, the Contractor shall form the bottom surface prior to placing the patching concrete. The Contractor shall submit the method and materials to be used for such forming to the Engineer for approval in accordance with Section 6-02.3(16).

6-09.3(6)C.GR6
Placing Deck Repair Concrete

6-09.3(6)C.INST1.GR6
Section 6-09.3(6)C is supplemented with the following:

6-09.3(6)C.OPT1.BSP.GB6
(BSP September 9, 2002)
Patching concrete for bridge decks receiving rapid set latex modified concrete overlay shall be rapid set latex modified concrete only. Concrete Class M shall not be used.

6-09.3(6)C.OPT2.BSP.GB6
(BSP December 2, 2002)
Placing Patching Concrete For Polyester Concrete Overlay
Patching concrete shall be polyester concrete, as specified in Section 6-09.3(3) as supplemented in these Special Provisions. Concrete Class M shall not be used.

Polyester concrete for deck repair shall be placed and cured in accordance with Sections 6-09.3(11) and 6-09.3(13), respectively, as supplemented in these Special Provisions.

All deck repair material that fails to achieve a minimum compressive strength of 3,000 psi in six hours as verified by the rebound number determined in accordance with ASTM C 805 shall be removed and replaced with new deck repair material by the Contractor, at no additional expense to the Contracting Agency.

6-09.3(8).GR6

Quality Assurance

6-09.3(8).INST1.GR6

Section 6-09.3(8) is supplemented with the following:

6-09.3(8).OPT1.BSP.GB6

(BSP September 9, 2002)

Quality assurance for all rapid set latex modified concrete work shall conform to Section 6-09.3(8)B, and the following:

Rapid set latex modified concrete will not be tested for slump.

The Contractor shall make arrangements to have a qualified technical representative of CTS Cement Manufacturing Company present at the bridge site throughout all rapid set latex modified concrete overlay work, including surface preparation, mixing, placing, screeding, and curing. The qualified technical representative shall be an employee of CTS Cement Manufacturing Company.

The Contractor shall submit the name, current phone number, and experience qualifications of the qualified technical representative of CTS Cement Manufacturing Company to the Engineer for approval, along with the other submittals specified in Section 6-09.3(2). The submittal shall include a listing of the rapid set latex modified concrete overlay project on which the individual has served as a qualified technical representative, and shall include a description of the project, the name of the project's Owner or Contracting Agency, and the name and current phone number of the project's Owner's or Contracting Agency's contact person.

The Contractor shall not begin rapid set latex modified concrete operations until receiving the Engineer's approval of the qualified technical representative submittal.

All recommendations made by the qualified technical representative, and approved by the Engineer, shall be adhered to by the Contractor.

6-09.3(8).OPT2.BSP.GB6

(BSP September 9, 2002)

Rapid Set Latex Modified Concrete Trial Overlay

The Contractor shall place a trial overlay of rapid set latex modified concrete using the equipment selected by the Contractor and the production mix and procedure specified in Section 6-09.3 as supplemented in these Special Provisions. The

Contractor shall notify the Engineer of the time and location of the trial overlay at least seven calendar days prior to the scheduled trial overlay.

The trial overlay shall be placed on a previously cast and cured concrete pad at a location selected by the Contractor. The plan area of the concrete pad shall be 12 feet minimum in width and 15 feet minimum in length.

The Contractor shall clean the concrete pad surface, mix, place, finish, and cure the rapid set latex modified concrete overlay, and check the trial overlay for bond, in accordance with Section 6-09.3 as supplemented in these Special Provisions, except as otherwise noted. The Contractor need not scarify the concrete surface and perform further deck preparation on the concrete pad surface provided that all other conditions of Section 6-09.3(7) are satisfied. The trial overlay shall be 12 feet wide, 15 feet long, and 1-1/2 inches thick.

The Contractor shall not begin construction operations at the bridge site receiving the rapid set latex modified concrete overlay until receiving the Engineer's approval of the completed trial overlay.

After receiving the Engineer's approval of the completed trial overlay, the concrete pad and trial overlay shall become the Contractor's property and shall be removed and disposed of in accordance with Section 2-02.3.

6-09.3(8).OPT3.BSP.GB6

(BSP December 2, 2002)

Quality Assurance For Polyester Concrete Overlay

The Contractor shall arrange to have the suppliers of the polyester resin binder and HMWM resin furnish technical service relating to application of material and health and safety training for personnel who are to handle the polyester concrete and the HMWM resin prime coat.

On-site supervisors, and all personnel operating the mobile mixer and finishing machines, shall have successful previous experience in mixing and placing polyester concrete overlay. Documentation of project experience with polyester concrete overlay shall include the name and location of the project, the Contracting Agency of the project, the area quantity of overlay placed, and the name and current phone number of the Contracting Agency's contact person for the referenced project.

6-09.3(8).OPT4.BSP.GB6

(BSP January 27, 2003)

Polyester Concrete Trial Overlay

The Contractor shall place a trial overlay of polyester concrete using the equipment selected by the Contractor and the production mix and procedure as approved by the Engineer in accordance with Section 6-09.3(3). The Contractor shall notify the Engineer of the time and location of the trial overlay at least seven calendar days prior to the scheduled trial overlay.

The trial overlay shall be placed on a previously cast and cured concrete pad at a location selected by the Contractor. The plan area of the concrete pad shall be 12 feet minimum in width and 15 feet minimum in length.

The Contractor shall clean the concrete pad surface, mix, place, finish, and cure the polyester concrete overlay, and check the trial overlay for bond, in accordance with Section 6-09.3 as supplemented in these Special Provisions, except as otherwise noted. The Contractor need not scarify the concrete surface and perform further deck preparation on the concrete pad surface provided that all other conditions of Section 6-09.3(7) are satisfied. The trial overlay shall be 12 feet wide, 15 feet long, and 3/4 inches thick.

The Contractor shall perform three pull-off tests on the trial overlay in accordance with American Concrete Institute 503R - Appendix A. The Contractor shall record the pull-off test results and the amount of (if any) failure into the base concrete, and shall provide written documentation of the test results to the Engineer.

The Contractor shall not begin placing polyester concrete overlay at the bridge site(s) receiving the polyester concrete overlay until receiving the Engineer's approval of the completed trial overlay.

After receiving the Engineer's approval of the completed trial overlay, the concrete pad and trial overlay shall become the Contractor's property and shall be removed and disposed of in accordance with Section 2-02.3.

6-09.3(9).GR6

Mixing Concrete for Concrete Overlay

6-09.3(9).INST1.GR6

Section 6-09.3(9) is supplemented with the following:

6-09.3(9).OPT1.BSP.GB6

(BSP September 9, 2002)

Mixing of concrete for rapid set latex modified concrete work shall conform to Section 6-09.3(9)B, and the following:

If food grade citric acid is used as a retarder, it shall be mixed into a solution with water. The solution shall not be added directly to the latex admixture. The solution shall be added to a separate admixture tank for dispensing into the rapid set latex modified overlay mix.

6-09.3(9).OPT2.BSP.GB6

(BSP January 27, 2003)

Mixing Polyester Concrete

Polyester concrete shall be mixed in mobile mixers conforming to Section 6-09.3(1) as supplemented in these Special Provisions, and in accordance with the mix design approved by the Engineer.

The polyester resin binder in the polyester concrete shall be approximately 12 percent by weight of the dry aggregate. The Contractor shall determine the exact percentage as approved by the Engineer.

The amount of peroxide initiator used shall result in a polyester concrete set time between 30 and 120 minutes during placement as determined by California Test

551, Part 2, “Method of Test For Determination of Set Time of Concrete Overlay and Patching Materials”, by Gilmore Needles. Accelerators or inhibitors may be required as recommended by the polyester resin binder supplier and as approved by the Engineer.

The polyester resin binder shall be initiated and thoroughly blended just prior to mixing the aggregate and binder. The polyester concrete shall be thoroughly mixed prior to placing.

6-09.3(10).GR6

Overlay Profile and Screed Rails

6-09.3(10).INST1.GR6

Section 6-09.3(10) is supplemented with the following:

6-09.3(10).OPT1.BSP.GB6

(BSP January 27, 2003)

The minimum thickness of polyester concrete overlay shall be 3/4 inches, except as otherwise shown in the Plans or adjusted by the Engineer.

6-09.3(11).GR6

Placing Concrete Overlay

6-09.3(11).INST1.GR6

Section 6-09.3(11) is supplemented with the following:

6-09.3(11).OPT1.BSP.GB6

(BSP September 9, 2002)

Placing Rapid Set Latex Modified Concrete Overlay

Placing rapid set latex modified concrete overlay shall conform to all requirements of this section, including those specific for latex modified concrete overlay, except as otherwise noted.

After the lane or strip to be overlaid with rapid set latex modified concrete overlay has been prepared and immediately before placing the concrete, it shall be thoroughly soaked and kept continuously wet with water for a minimum period of two hours prior to placement of the concrete.

The allowable temperature range of the concrete deck receiving the rapid set latex modified concrete shall be between 45F and 70F.

The Contractor shall conform to the transverse bulkhead placement requirements whenever rapid set latex modified concrete placement is stopped for a period of 20 minutes or more. Further placement is permitted only after a period of 24 hours unless a gap is left in the lane or strip.

Rapid set latex modified concrete shall not be placed against the edge of an adjacent lane or strip that is less than four hours old.

6-09.3(11).OPT2.BSP.GB6

(BSP April 7, 2008)

Placing Polyester Concrete Overlay

Application of the HMWM prime coat and the polyester concrete overlay shall not begin if rain is expected. The area receiving the prime coat shall be dry and had no rain for at least 24 hours. Immediately prior to applying the prime coat, the surface receiving the prime coat shall be swept clean by compressed air to remove accumulated dust and any other loose material. If the surface receiving the HMWM prime coat and polyester concrete has been exposed to moisture within the previous 12 hours, it shall be thoroughly dried using a heat lance prior to placement of the HMWM prime coat.

The concrete bridge deck surface temperature shall be between 50F and 85F when the prime coat is applied.

The prepared concrete surface shall receive one coat of promoted/initiated wax-free HMWM resin. The promoted/initiated HMWM resin primer shall be worked into the concrete in a manner to effect complete coverage of the area. A one pint sample of each batch of promoted/initiated HMWM resin shall be retained and submitted to the Engineer at the time of primer application to verify proper catalyzation. Under no circumstances shall any resin be allowed to run into drains and expansion joints, or otherwise escape the Contractor's collection and containment system.

If the HMWM primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed at no additional expense to the Contracting Agency.

The HMWM prime coat shall cure for a minimum of 30 minutes before placing the polyester concrete overlay. Placement of the polymer concrete shall not proceed until the Engineer verifies that the HMWM resin was properly promoted and initiated, as evidenced by the HMWM batch sample.

The polyester concrete shall be placed on the liquid or hardened HMWM prime coat within two hours of placing the prime coat. Polyester concrete shall be placed prior to gelling and within 15 minutes following initiation, whichever occurs first. Polyester concrete that is not placed within this time shall be discarded.

If, for any reason, polyester concrete is not placed over the prime coat within the two hour time limit, the Contractor shall apply a fresh coat of HMVM resin primer immediately followed by an abrasive sand finish coating. The abrasive sand finish shall be broadcast onto the surface to affect a uniform coverage of a minimum of 0.8 pounds per square yard. Prior to applying the polyester concrete overlay, the surface shall be re-cleaned in accordance with Section 6-09.3(7).

Expansion joints shall be adequately isolated prior to placing the overlay as approved by the Engineer. Saw cutting at bridge expansion joints will not be allowed.

The surface temperature of the area receiving the polyester concrete shall be the same as specified above for the HMWM prime coat.

The polyester concrete shall be consolidated to a relative compaction of not less than 97 percent.

6-09.3(12).GR6

Finishing Concrete Overlay

6-09.3(12).INST1.GR6

Section 6-09.3(12) is supplemented with the following:

6-09.3(12).OPT1.BSP.GB6

(BSP September 9, 2002)

Neither latex admixture nor water shall be applied to the surface of the rapid set latex modified concrete overlay to assist in finishing the top surface.

6-09.3(12).OPT2.BSP.GB6

(BSP August 1, 2005)

Finishing Polyester Concrete Overlay

The finished surface of the polyester concrete overlay shall conform to Section 6-02.3(10).

The polyester concrete shall be struck off to the established grade and cross section and consolidated to the required compaction. No further texturing and grooving of the finish overlay surface will be required. Forms shall be coated with suitable bond release agent to permit ready release of forms.

The polyester concrete overlay shall receive an abrasive sand finish. The sand finish shall be applied immediately after overlay strike-off and before gelling occurs.

The surface texture of polyester concrete surface shall be uniform and shall have a friction number of not less than 35 as determined by ASTM E 274.

After initial finishing, the polyester overlay may require grinding of rough areas as determined by the Engineer. The grinding shall be done in a manner that will not damage the existing bridge deck. Rotary milling machines are not allowed.

The Contractor shall demonstrate to the satisfaction of the Engineer that the method and equipment for grinding the polyester overlay are adequate for the intended purpose and will provide satisfactory results. The removal shall not commence until the Contractor receives the Engineer's approval of the grinding equipment.

The bridge deck areas specified by the Engineer to receive grinding shall be ground in a longitudinal direction. The grinding equipment shall use diamond tipped saw blades mounted on a power driven, self-propelled machine that is specifically designed to texture concrete surfaces. The grinding equipment shall have a blade spacing to provide grooves that are between 0.10 and 0.15 inches wide. The land area between the grooves shall be approximately 0.125 inches.

The Contractor shall contain, collect, and dispose of all concrete debris generated by the grinding operation in accordance with Item 2 of the polyester concrete submittal in Section 6-09.3(2) as supplemented in these Special Provisions.

Prior to opening the overlay area to vehicular traffic the finished overlay shall be power swept to remove excess loose aggregate and abrasive sand. The Contractor shall demonstrate to the satisfaction of the Engineer that the power broom equipment will not damage the finished overlay. Any damage to the finished overlay caused by the power broom shall be repaired at no additional expense to the Contracting Agency.

6-09.3(13).GR6

Curing Concrete Overlay

6-09.3(13).INST1.GR6

Section 6-09.3(13) is supplemented with the following:

6-09.3(13).OPT1.BSP.GB6

(BSP September 9, 2002)

Special Curing Requirements For Rapid Set Latex Modified Concrete

Once in place the burlap shall be lightly fog sprayed with water. A separate layer of white, reflective type polyethylene sheeting shall immediately be placed over the wet burlap. The concrete shall then be wet cured by keeping the burlap wet until the concrete reaches the specified minimum compressive strength for traffic load of 3,000 psi. Upon reaching the specified minimum compressive strength for traffic load, the polyethylene sheeting shall be removed and the bridge opened to traffic.

6-09.3(13).OPT2.BSP.GB6

(BSP December 2, 2002)

Curing Polyester Concrete

Traffic and equipment shall not be permitted on the polyester overlay for at least four hours and until the polyester overlay has reached a minimum compressive strength of 3,000 psi as verified by the rebound number determined in accordance with ASTM C 805.

Areas in the polyester concrete that do not totally cure, or that fail to attain the minimum compressive strength specified above, shall be removed and replaced with new polyester concrete material by the Contractor, at no additional expense to the Contracting Agency.

6-09.3(14).GR6

Checking For Bond

6-09.3(14).INST1.GR6

Section 6-09.3(14) is supplemented with the following:

6-09.3(14).OPT1.BSP.GB6

(BSP December 2, 2002)

Checking Polyester Concrete For Bond

After the requirements for curing have been met, the entire overlaid surface shall be sounded by the Contractor, in a manner approved by and in the presence of the

Engineer, to ensure total bond of the concrete to the bridge deck. Polyester concrete in unbonded areas shall be removed and replaced with polyester concrete by the Contractor, at no additional expense to the Contracting Agency.

All cracks, except those that are significant enough to require removal as determined by the Engineer, shall be thoroughly filled and sealed with HMWM resin. Cracks 1/16 inch and greater in width shall receive two applications of HMWM resin. Immediately following the application of HMWM resin, the wetted surface shall be coated with sand for abrasive finish.

6-09.3(14).OPT2.BSP.GB6
(BSP April 7, 2008)
For this project, after the requirements for curing have been met, the entire overlaid surface shall be sounded by the Contractor, in a manner approved by and in the presence of the Engineer, to ensure total bond of the concrete to the bridge deck. Concrete in unbonded areas shall be removed and replaced by the Contractor with the same modified concrete as used in the overlay at no additional expense to the Contracting Agency. All cracks, except those that are significant enough to require removal, shall be thoroughly filled and sealed as specified in Section 6-09.3(12).

6-09.4.GR6
Measurement

6-09.4.INST1.GR6
Section 6-09.4 is supplemented with the following:

6-09.4.OPT1.BSP.GB6
(BSP September 9, 2002)
All specifications for measurement and waste of latex modified concrete shall also apply to rapid set latex modified concrete.

6-09.4.OPT2.BSP.GB6
(BSP December 2, 2002)
Polyester concrete overlay will be measured by the square yard of overlay surface actually placed, finished, and cured.

6-09.4.OPT3.BSP.GB6
(BSP August 4, 2008)
Further deck preparation for Type 1 deck repair and for Type 2 deck repair will be measured by the square foot of surface area of deck concrete removed in accordance with Section 6-09.3(6).

6-09.5.GR6
Payment

6-09.5.INST1.GR6
The second bid item under Section 6-09.5 is supplemented with the following:

6-09.5.OPT1.BSP.GB6
(BSP September 9, 2002)

All costs in connection with providing the services of the qualified technical representative of CTS Cement Manufacturing Company shall be included in the unit contract price per cubic foot for “Modified Conc. Overlay”.

6-09.5.INST2.GR6
Section 6-09.5 is supplemented with the following:

6-09.5.OPT6.BSP.GB6
(BSP September 9, 2002)
“Rapid Set Latex Modified Concrete Trial Overlay”, lump sum.
The lump sum contract price for “Rapid Set Latex Modified Concrete Trial Overlay” shall be full pay for performing the work as specified, including establishing a location for the trial overlay, and construction, removal, and disposal of the concrete pad and trial overlay.

6-09.5.OPT7.BSP.GB6
(BSP December 2, 2002)
“Polyester Concrete Trial Overlay”, lump sum.
The lump sum contract price for “Polyester Concrete Trial Overlay” shall be full pay for performing the work as specified, including establishing a location for the trial overlay, and construction, removal, and disposal of the concrete pad and trial overlay.

6-09.5.OPT8.BSP.GB6
(BSP December 2, 2002)
“Force Account Grinding Polyester Conc. Overlay”, force account.
Grinding polyester concrete overlay as specified will be paid by force account in accordance with Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Force Account Grinding Polyester Conc. Overlay" in the bid proposal to become a part of the total bid by the Contractor.

6-09.5.OPT9.BSP.GB6
(BSP December 2, 2002)
“Polyester Concrete Overlay”, per square yard.
The unit contract price per square yard for “Polyester Concrete Overlay” shall be full pay for performing the work as specified, including placing, finishing, and curing the overlay, and checking for bond.

6-09.5.OPT10.BSP.GB6
(BSP January 12, 2009)
"Further Deck Preparation For Type 1 Deck Repair", per square foot.
The unit contract price per square foot for "Further Deck Preparation for Type 1 Deck Repair" shall be full pay for performing the work as specified at deck repair locations conforming to the Section 6-09.3(6)C definition for Type 1 deck repairs, including removing and disposing of the concrete within the repair area.

"Further Deck Preparation For Type 2 Deck Repair", per square foot.
The unit contract price per square foot for "Further Deck Preparation for Type 2 Deck Repair" shall be full pay for performing the work as specified at all deck repair locations conforming to the Section 6-09.3(6)C definition for Type 2 deck repairs, including

removing and disposing of the concrete within the repair area and furnishing, placing, finishing, and curing the repair concrete.

Except as otherwise noted, all costs in connection with furnishing and placing replacement steel reinforcing bars alongside existing steel reinforcing bars in deck repair areas, conforming to the damage or section loss definitions as specified in the Plans, shall be included in the unit contract price per square foot for "Further Deck Preparation For Type 2 Deck Repair". All costs in connection with furnishing and placing replacement steel reinforcing bars damaged by scarifying operations shall conform to Section 6-09.3(5)F.

6-09.5.OPT11.BSP.GB6
(BSP April 7, 2008)
"Force Account Forms For Full Depth Deck Repair", force account
Payment for "Force Account Forms For Full Depth Deck Repair" will be by force account in accordance with Section 1-09.6. For the purpose of providing a common proposal to all bidders, the Contracting Agency has entered an amount for the item "Force Account Forms For Full Depth Deck Repair" in the bid proposal to become a part of the total bid by the Contractor.

6-10.GR6
Concrete Barrier

6-10.3.GR6
Construction Requirements

6-10.3(5).GR6
Temporary Concrete Barrier

6-10.3(5).INST1.GR6
Section 6-10.3(5) is supplemented with the following:

6-10.3(5).OPT1.GR6
(March 13, 1995)
Delineators shall be placed on the traffic face of the barrier 6 inches from the top and spaced a maximum of 40 feet on tangents and 20 feet through curves.

Reflector color shall be white on the right of traffic and yellow on the left of traffic.

The Contractor shall maintain, replace, and clean the delineators when ordered by the Engineer.

6-10.3(6).GR6
Placing Concrete Barrier

6-10.3(6).INST1.GR6
Section 6-10.3(6) is supplemented with the following:

6-10.3(6).OPT1.GR6
(March 13, 1995)

Precast barrier intended for permanent placement may be used at temporary locations and will be considered temporary barrier until installed at a permanent location.

Barrier damaged while being used at a temporary location shall not be reused at a permanent location even though it has been repaired, and when no longer required at a temporary location, shall become the property of the Contractor and removed from the project.

6-10.5.GR6

Payment

6-10.5.INST1.GR6

Section 6-10.5 is supplemented with the following:

6-10.5.OPT1.GR6

(April 28, 1997)

The following paragraph is added immediately following the bid item, “Temporary Conc. Barrier”:

The unit contract price per linear foot for "Temporary Conc. Barrier" shall include all costs for furnishing, placing, maintaining, replacing, and cleaning barrier delineation.

6-10.5.OPT2.FB6

(March 6, 2000)

All costs in connection with constructing *** $$1$$ *** barrier shall be included in the *** $$2$$ ***.

6-12.GR6

Noise Barrier Walls

6-12.2.GR6

Materials

6-12.2.INST1.GR6

Section 6-12.2 is supplemented with the following:

6-12.2.OPT1.GB6

(April 2, 2012)

Precast Concrete Noise Barrier Walls

Grout for encapsulating dowel bars shall conform to Section 6-02.3(26)H.

Grout pads at the bases of precast concrete panels shall conform to Section 6-02.3(20).

Base plates and anchor bolt templates shall conform to ASTM A 36. Base plates shall be corrosion protected by one of the following methods:

1. One coat of paint conforming to Section 9-08.1(2)F.

2. Galvanized after fabrication in accordance with AASHTO M 111.

3. Galvanized after fabrication in accordance with AASHTO M 298, Class 5, Type 1.

Anchor rods shall conform to ASTM F 1554 Grade 55. Nuts shall conform to ASTM A 563. Washers shall conform to AASHTO M 293, except that plate washers conforming to ASTM A 36 may be used. Nuts and washers, and a minimum of 1'-0" of the exposed end of the anchor rod, shall be corrosion protected by one of the following methods:

1. One coat of paint conforming to Section 9-08.1(2)F.

2. Galvanized after fabrication in accordance with AASHTO M 232.

3. Galvanized after fabrication in accordance with AASHTO M 298, Class 5, Type 1.

The cone head end, 1'-0" minimum, of steel reinforcing Bar B, as identified in the Standard Plans, shall be painted with one coat paint conforming to Section 9-08.1(2)F.

The sealant system for the vertical joint between precast concrete panels shall consist of a polyurethane sealant conforming to ASTM C 920 Type S Grade NS Class 25 Use M and a closed cell foam backer rod conforming to ASTM C 1330 Type C. The polyurethane sealant shall be tested for compatibility with the closed cell foam backer road in accordance with ASTM C 1087.

6-12.2.OPT2.FB6

(January 2, 2012)

Masonry Noise Barrier Walls

Concrete masonry units (CMU's) shall conform to ASTM C 90, Grade N, Type 1. Concrete masonry units shall have a density between 100 and 115 pounds per cubic foot. Shrinkage shall not exceed 0.065 percent.

CMU's will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance conforming to Section 1-06.3. The Manufacturer's Certificate of Compliance shall include test results, conducted within the previous twelve months, as required to document compliance with the material requirements specified in these Special Provisions.

The concrete masonry unit faces shall be nominal 8 by 16 inches with thicknesses as specified in the Plans. Concrete masonry unit surface texture and color shall be as follows:

*** $$1$$ ***

Special shapes shall be provided to complete the work as specified in the Plans.

The Contractor shall submit four samples of each type of concrete masonry unit block specified for use on the project to the Engineer for approval.

Grout for concrete masonry units shall conform to ASTM C 476 for fine grout.

Mortar for concrete masonry units shall conform to ASTM C 270, Type S. The color shall be natural gray. The Contractor shall mix the mortar in a mechanical mixer of one sack minimum capacity for a minimum of three minutes after all materials have been added before using the mortar.

Masonry sealer shall be a silane based water repellent selected from one of the following, or an approved equal:

1. Baracade Silane 40, manufactured by Euclid.
2. Enviroseal 20, manufactured by BASF.
3. Florok Enviro-Shield 40, manufactured by Chargar.

The Contractor shall submit two copies of the manufacturer's recommended masonry sealer application procedure to the Engineer for approval.

The parge coating applied to the top of the masonry wall shall be a waterproof cement-base coating selected from one of the following, or an approved equal:

1. Conproseal, manufactured by Chargar.
2. Thoroseal, manufactured by BASF.
3. Tamoseal, manufactured by Euclid.

The sealant system for the vertical expansion joints shall consist of a polyurethane sealant conforming to Section 9-04.2(3) and a closed cell foam backer rod conforming to Section 9-04.2(3)A.

6-12.2.OPT3.FB6

(August 3, 2009)

Noise Barrier Wall Access Door

Access door frames shall be formed of 16 gauge steel to size and dimensions shown in the Plans. The access door frame head and jamb members shall be mitered, securely welded, and ground smooth. Each head shall have two anchors and each jamb shall have three anchors. The hinges shall be reinforced with 1/4 inch by 12 inch plate, width equal to the full inside width of the frame.

Access doors shall be full flush 1-3/4 inch thick seamless doors with a honeycomb core. Door faces shall be constructed with smooth seamless 18 gauge roller-levered, cold-rolled steel sheet. The vertical edges shall be neat interlocked hemmed edge seam. The top and bottom of the door shall be enclosed with 16 gauge channels. Mortise and reinforcement for locks and hinges shall be 10 gauge steel.

Each access door shall have three hinges. Access door hinges shall be stainless steel, 4-1/2 inches square, with stainless steel ball bearing and non-removable pins.

Each access door shall have two pull plates. The pull plates shall be stainless steel, with a grip handle of one inch diameter and 8 to 10 inches in length.

Access door deadbolt locks shall be capable of accepting a Best CX series core. The Contractor shall furnish and install a spring loaded construction core lock with each lock. The Engineer will furnish the permanent Best CX series core for the Contractor to install at the conclusion of the project.

Paint for exposed metal surfaces of access doors and frames, except for stainless steel surfaces, shall be in accordance with Section 6-07.3(9). The top coat, when dry, shall match *** $$1$$ ***.

6-12.3.GR6

Construction Requirements

6-12.3(1).GR6

Submittals

6-12.3(1).INST1.GR6

Section 6-12.3(1) is supplemented with the following:

6-12.3(1).OPT1.GB6

(April 5, 2004)

The Contractor shall submit a field survey of the existing groundline along each noise barrier wall alignment. The Contractor shall obtain field topographical information for the existing ground within ten feet of the noise barrier wall alignment, except as further limited by the Contracting Agency Right of Way and construction easements for this project. The Contractor shall ensure a vertical survey accuracy of 0.1 foot. The Contractor shall establish horizontal survey control at ten foot intervals, or at six inches differential vertical elevation from the adjacent point on the alignment, whichever is less.

The Contractor shall submit the field survey, including all field notes, to the Engineer. If the Engineer confirms that the groundline condition along the noise barrier wall alignment at the time of construction requires revisions to the noise barrier wall details shown in the Plans, the Engineer will provide revised noise barrier wall Plan details to the Contractor within 14 calendar days.

The Contractor shall complete the field survey as a first item of noise barrier wall work, and shall not begin any other noise barrier wall work, including preparation of precast concrete wall panel shop drawings, until receiving the Engineer's response to the field survey submittal.

6-12.3(6).GR6

Precast Concrete Panel Fabrication and Erection

6-12.3(6).INST1.GR6

Section 6-12.3(6) is supplemented with the following:

6-12.3(6).OPT1.FB6

(April 5, 2004)

The Contractor shall form a *** $$1$$ *** finish, as specified in the Plans and Section 6-02.3(14) as supplemented in these Special Provisions, on the surface of the precast concrete panel facing the traffic side.

The Contractor shall form a *** $$1$$ *** finish, as specified in the Plans and Section 6-02.3(14) as supplemented in these Special Provisions, on the surface of the precast concrete panel facing the residential area, except as otherwise noted.

The surfaces of the pilaster shall receive either a Class 2 surface finish in accordance with Section 6-02.3(14)B, if pigmented sealer is being applied, or a Class 1 surface finish in accordance with Section 6-02.3(14)A, if pigmented sealer is not being applied.

6-12.3(7).GR6

Masonry Wall Construction

6-12.3(7).INST1.GR6

Section 6-12.3(7) is supplemented with the following:

6-12.3(7).OPT1.GB6

(April 6, 2009)

Masonry Wall Workmanship

The Contractor shall construct the masonry wall in accordance with the standards of masonry installation specified in Chapter 21 of the International Building Code.

All masonry wall construction workers shall be thoroughly trained and experienced in the necessary crafts, shall be completely familiar with the specified requirements and methods needed for proper completion of the work, and shall be supervised at the construction site at all times by the supervising journeyman masons as approved by the Engineer.

Sample Masonry Wall Panel

The Contractor shall demonstrate workmanship by constructing a 48 inch by 48 inch sample panel of each type of masonry wall for the Engineer's approval. The sample panel shall be constructed by the supervising journeyman mason specified by the Contractor and as approved by the Engineer. The sample panel shall show the general construction and appearance of the installed concrete masonry units. The Contractor shall submit the sample panel to the Engineer for approval, and shall not proceed with masonry wall construction until receiving the Engineer's approval of the sample panel. The Contractor shall construct the sample panel on a transportable platform, and shall relocate the sample panel as directed by the Engineer as construction progresses.

If any of the supervising journeyman masons are replaced during the project, each replacement supervising journeyman mason shall construct another sample panel as a requirement for being approved by the Engineer for the supervising position.

The Contractor shall construct all masonry walls in accordance with the quality of the sample panel approved by the Engineer. All masonry wall construction not consistent with the quality of the approved sample panel shall be reconstructed by the Contractor at no additional cost to the Contracting Agency.

The Contractor shall maintain the sample panel at the project site until all the noise barrier walls are approved and accepted by the Engineer, at which time all sample panels shall become the property of the Contractor and shall be disposed of in accordance with Section 2-02.3.

General Requirements

All masonry materials stored on the project site shall be stored off the ground and protected from weather. Concrete masonry units that are chipped, cracked, or spalled on the faces or edges shall not be used.

The Contractor shall lay up all walls in running bond, unless otherwise shown in the Plans, and all walls shall be plumb, level, and true to the lines and dimensions as shown in the Plans. All head and bed joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.

Mortar

Mortar joints shall be of uniform thickness, ½ inch maximum. The Contractor shall not change coursing or bonding after beginning work on a wall. The Contractor shall tool all joints flush with adjacent surfaces to a dense brushed finish. The split face side of wall shall have a concave smooth joint. The scored split faces shall have a rake joint to match the depth of the scores.

Temperature

When air temperatures fall below 40F, grout mixing water and aggregate shall be heated to produce a grout temperature between 40F and 120F. While grouting the concrete masonry units, and for at least 24 hours after grouting the units, the Contractor shall maintain the temperature of the concrete masonry units above freezing. When atmospheric temperatures fall below 20F, the Contractor shall erect enclosures around the concrete masonry units being grouted, and shall maintain the enclosures for at least 24 hours after grouting the units.

The Contractor shall not perform masonry wall work when the air temperature is below 40F on a falling thermometer, or when it is likely that the temperature will fall below 40F before the mortar has set, except when appropriate provisions have been made to heat and enclose the concrete masonry units and the work area as approved by the Engineer. The Contractor may begin masonry wall work at 34F on a rising thermometer.

Grouting Cells

Cells with steel reinforcing bars shall be grouted solid and compacted. Vertical cells with steel reinforcing bars shall be aligned and filled to provide a continuous unobstructed opening of the dimensions indicated, but in no case less than two inches by three inches. The Contractor shall provide cleanout openings at the bottom of all cells to be filled at each stage of grout placement where the height of grout placement is greater than four feet. The Contractor shall remove all overhanging mortar and other obstructions and debris from the insides of the cells being grouted. The Contractor shall seal all cleanouts, after the Engineer has inspected and approved the cells. The Contractor shall place grout in lifts of eight feet or less.

Top Course

The Contractor shall cover the tops of all exposed walls not being worked on with a waterproof membrane, secured in place. All unfinished work shall be stepped back for joining to new work. Toothing shall not be performed.

The top course shall be a solid grouted bond beam unit. The Contractor shall apply a parge coat to the top of the wall.

Cleaning Exposed Surfaces

The Contractor shall clean all exposed masonry at the end of each day's work. After final pointing, the Contractor shall remove all mortar spots and droppings. The Contractor shall cut out all defective joints and repoint the joints solidly with mortar. The Contractor shall protect all work from damage, stain, and discoloring.

The Contractor shall perform additional final cleaning prior to applying the pigmented sealer. The Contractor shall remove all large particles of mortar before wetting the wall. The Contractor shall saturate the concrete masonry units with clean water and shall flush all loose mortar and dirt from the wall surface. The Contractor shall scrub the wall surface with a stiff brush and a masonry cleaning solution, in accordance with the cleaning solution manufacturer's instructions. The Contractor shall thoroughly wash the wall surface of all cleaning solution, dirt, and mortar crumbs with clean pressurized water. The Contractor shall not use acid cleaning solutions to clean the wall surface. The Contractor shall protect all wall surfaces adjacent to the sections of wall being cleaned.

Masonry Sealer

All exposed masonry surfaces shall receive two coats of masonry sealer, applied to either one foot minimum below finish ground line or to the base of the bottom row of masonry blocks, whichever is higher, from one of the masonry sealer products specified in Section 6-12.2 as supplemented in these Special Provisions. The masonry sealer shall be applied in accordance with the manufacturer’s recommendations.

6-12.5.GR6

Payment

6-12.5.INST1.GR6

Section 6-12.5 is supplemented with the following:

6-12.5.OPT1.GB6

(April 5, 2004)

All costs in connection with performing the field survey of the existing groundline of the noise barrier wall alignment, and submitting the field survey to the Engineer, shall be included in the lump sum contract price for “Structure Surveying”.

6-13.GR6

Structural Earth Walls

6-13.2.GR6

Materials

6-13.2.INST1.GR6

Section 6-13.2 is supplemented with the following:

6-13.2.OPT1.GB6

(August 3, 2009)

Welded Wire Faced Structural Earth Wall Materials

Welded Wire Mats and Backing Mats

Welded wire fabric for welded wire mats, welded wire form facing units, and backing mats shall conform to AASHTO M 32, and shall be fabricated from smooth wire fabric conforming to AASHTO M 55.

The minimum clear opening dimension of the backing mat, or the combination of welded wire form facing unit with geosynthetic wall facing wrap, shall not exceed the minimum particle size of the wall facing backfill as specified below.

Welded wire fabric for welded wire mats, welded wire form facing units, and backing mats shall be galvanized after fabrication in accordance with either ASTM A 641 (two ounces minimum per square foot) or AASHTO M 111. All damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Backfill for Welded Wire Faced Structural Earth Wall

All backfill material within the structural earth wall reinforced zone shall be free draining, free from organic or otherwise deleterious material.

Backfill material within the reinforced zone, except for the wall facing backfill placed immediately behind the wall face, as shown in the Plans and the structural earth wall working drawings as approved by the Engineer, shall conform to Section 9-03.14(1).

The coarse, granular material used for the wall facing backfill placed immediately behind the wall face, as shown in the Plans, shall conform to the following gradation requirements:

1. The minimum particle size shall be no less than the width of the minimum opening dimension in the backing mat or the geosynthetic wall facing wrap.

2. The maximum particle size shall be no greater than six inches for welded wire reinforced walls, and no greater than four inches for geosynthetic reinforced walls.

All material within the structural earth wall reinforced zone shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The material shall meet the following aggregate durability requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 percent min.

All material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
Resistivity	WSDOT Test Method 417	3,000 ohm-cm, min.
pH	WSDOT Test Method 417	5 to 10 (w/ wire reinf.)
pH	WSDOT Test Method 417	4.5 to 9 (w/ geogrid reinf.)
Chlorides	AASHTO T 291	100 ppm max.
Sulfates	AASHTO T 290	200 ppm max.

If the resistivity of the backfill material equals or exceeds 5,000 ohm-cm, the specified chloride and sulfate limits may be waived.

Proprietary Materials

Hilfiker Welded Wire Retaining Wall (WWW) System

Welded wire fabric wire size for backing mats shall be W2.1 minimum for wall face backing layers of 1'-6" maximum thickness, and shall be W2.9 minimum for wall face backing layers between 1'-6" and 2'-0".

Construction geotextile for wall facing shall conform to the requirements in Section 9-33.1 for Construction Geotextile for Underground Drainage, Moderate Survivability, Class A.

Tensar Wire Form Retaining Wall System

Wire support struts shall conform to AASHTO M 32, and shall be galvanized after fabrication in accordance with either ASTM A 641 (two ounces minimum per square foot) or AASHTO M 111. All damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Geosynthetic connection rods shall be manufactured from high-density polyethylene with either fiberglass inclusions or oriented polypropylene, as recommended by Tensar Earth Technologies, Inc.

Geosynthetic separating the wall facing backfill from the welded wire faced structural earth wall backfill shall conform to the requirements in Section 9-33.1 for Construction Geotextile for Underground Drainage, Moderate Survivability, Class A.

Tensar Geogrid Materials

Geogrid reinforcement and geosynthetic wall facing wrap shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of T_{al} and T_{ult} as listed in the QPL for the products used shall meet or exceed the values required for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637 for multi-rib specimens.

For geogrid reinforcement and geosynthetic wall facing wrap, the ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer.

The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A “lot” shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were samples will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than –20F and greater than 122F.

6-13.2.OPT2.GB6

(April 12, 2012)

Precast Concrete Panel Faced Structural Earth Wall Materials

General Materials

Concrete Leveling Pad

Leveling pad concrete shall be commercial concrete in accordance with Section 6-02.3(2)B.

Backfill for Precast Concrete Panel Faced Structural Earth Wall

All backfill material within the structural earth wall reinforced zone shall be free draining, free from organic or otherwise deleterious material.

Backfill material within the reinforced zone shall conform to Section 9-03.14(1), except that the maximum particle size for walls with geogrid reinforcement shall not exceed 1-1/4 inches.

All material within the structural earth wall reinforced zone shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The material shall meet the following aggregate durability requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 percent min.

For walls with metallic soil reinforcement, all material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
Resistivity	WSDOT Test Method 417	3,000 ohm-cm, min.
pH	WSDOT Test Method 417	5 to 10
Chlorides	AASHTO T 291	100 ppm max.
Sulfates	AASHTO T 290	200 ppm max.

If the resistivity of the backfill material equals or exceeds 5,000 ohm-cm, the specified chloride and sulfate limits may be waived.

For walls with geogrid soil reinforcement, all material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
pH	WSDOT Test Method 417	4.5 to 9

Wall backfill material satisfying these gradation, durability, and chemical requirements shall be classified as nonaggressive.

Proprietary Materials

ARES Modular Panel Wall System

Tensar Geogrid Materials

Geogrid reinforcement shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of T_{al} and T_{ult} as listed in the QPL for the products used shall meet or exceed the values required for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637 for multi-rib specimens.

The ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer.

The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another. The maximum deviation of the cross-rib from being perpendicular to the longitudinal rib (skew) shall be no more than 1 inch in 5 feet of geogrid width. The maximum deviation of the cross-rib at any point from a line perpendicular to the longitudinal ribs located at the cross-rib (bow) shall be 0.5 inches.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A “lot” shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were samples will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than –20F and greater than 122F.

Rubber bearing pads shall be a type and grade as recommended by Tensar Earth Technologies, Inc.

Geosynthetic joint cover for all horizontal and vertical joints shall be a non-woven geosynthetic as recommended by Tensar Earth Technologies, Inc. Adhesive used to attach the geosynthetic to the rear of the precast concrete facing panel shall be as recommended by Tensar Earth Technologies, Inc.

Reinforced Earth Wall

Reinforcing strips shall be shop fabricated from hot rolled steel conforming to ASTM A 572 Grade 65 or approved equal, and shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of Formula A-9-73 paint conforming to Section 9-08.2.

Bolts and nuts shall conform to Section 9-06.5(3), and shall be galvanized in accordance with AASHTO M 232.

Rubber bearing pads shall be a type and grade as recommended by the Reinforced Earth Company.

Vertical joint filler between panels, when specified in the structural earth wall working drawings, shall be two inch square, flexible open cell polyether foam strips, Grade UU-34, as recommended by the Reinforced Earth Company.

Filter fabric joint cover for all horizontal and vertical joints, when specified in the structural earth wall working drawings, shall be a pervious woven polypropylene filter fabric as recommended by the Reinforced Earth Company. Adhesive used to attach the fabric material to the rear of the precast concrete facing panel shall be as recommended by the Reinforced Earth Company.

Reinforced Soil Wall

Reinforcing mesh shall be shop fabricated of cold drawn steel wire conforming to AASHTO M 32, and shall be welded into finished mesh fabric conforming to AASHTO M 55. Reinforcing mesh shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Retained Earth Wall

Tie strips shall be shop fabricated from hot rolled steel conforming to ASTM A 570 Grade 50 or approved equal, and shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

The embed loops and connector bars shall be fabricated of steel wire conforming to AASHTO M 32, and shall be galvanized after fabrication in accordance with AASHTO M 111.

Filter fabric joint cover for all horizontal and inclined joints shall be a monofilament filter fabric as recommended by Foster Geotechnical. Adhesive used to attach the fabric to the rear of the precast concrete facing panel shall be as recommended by Foster Geotechnical.

6-13.2.OPT3.GB6

(April 2, 2012)

Concrete Block Faced Structural Earth Wall Materials

General Materials

Concrete Block

Acceptability of the blocks will be determined based on the following:

1. Visual inspection.

2. Compressive strength tests, conforming to Section 6-13.3(4).

3. Water absorption tests, conforming to Section 6-13.3(4).

4. Manufacturer's Certificate of Compliance in accordance with Section 1-06.3.

5. Freeze-thaw tests conducted on the lot of blocks produced for use in this project, as specified in Section 6-13.3(4).

6. Copies of results from tests conducted on the lot of blocks produced for this project by the concrete block fabricator in accordance with the quality control program required by the structural earth wall manufacturer.

The blocks shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength conforms to the 28-day requirements, and when all other acceptability requirements specified above are met.

Testing and inspection of dry cast concrete blocks shall conform to ASTM C 140, and shall include block fabrication plant approval by WSDOT prior to the start of block production for this project.

Mortar

Mortar shall conform to ASTM C 270, Type S, with an integral water repellent admixture as approved by the Engineer. The amount of admixture shall be as recommended by the admixture manufacturer. To ensure uniform color, texture, and quality, all mortar mix components shall be obtained from one manufacturer for each component, and from one source and producer for each aggregate.

Metallic Soil Reinforcement

Reinforcing strips shall be composed of welded wire fabric strips conforming to AASHTO M 55 with wire conforming to AASHTO M 32, and attached to block connector plates conforming to ASTM A 36. Reinforcing strips and block connector plates shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Geosynthetic Soil Reinforcement

Geogrid reinforcement shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of T_{al} and T_{ult} as listed in the QPL for the products used shall meet or exceed the values required for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637, for multi-rib specimens.

The ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer.

The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another. The maximum deviation of the cross-rib from being perpendicular to the longitudinal rib (skew) shall be no more than 1 inch in 5 feet of geogrid width. The maximum deviation of the cross-rib at any point from a line perpendicular to the longitudinal ribs located at the cross-rib (bow) shall be 0.5 inches.

The gap between the connector and the bearing surface of the connector tab cross-rib shall not exceed 0.5 inches. A maximum of 10 percent of connector tabs may have a gap between 0.3 inches and 0.5 inches. Gaps in the remaining connector tabs shall not exceed 0.3 inches.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A “lot” shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were sampled will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than –20F and greater than 122F.

Drainage Geosynthetic Fabric

Drainage geosynthetic fabric shall be a non-woven geosynthetic conforming to the requirements in Section 9-33.1, for Construction Geotextile for Underground Drainage, Moderate Survivability, Class B.

Backfill for Concrete Block Faced Structural Earth Wall

All backfill material within the structural earth wall reinforced zone shall be free draining, free from organic or otherwise deleterious material.

Backfill material within the reinforced zone shall conform to Section 9-03.14(1), except that the maximum particle size for walls with geogrid reinforcement shall not exceed 1-1/4 inches.

All material within the structural earth wall reinforced zone shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, Portland Cement concrete rubble, or asphaltic concrete rubble. The material shall meet the following aggregate durability requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 percent min.

For walls with metallic soil reinforcement, all material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
Resistivity	WSDOT Test Method 417	3,000 ohm-cm, min.
pH	WSDOT Test Method 417	5 to 10
Chlorides	AASHTO T 291	100 ppm max.
Sulfates	AASHTO T 290	200 ppm max.

If the resistivity of the backfill material equals or exceeds 5,000 ohm-cm, the specified chloride and sulfate limits may be waived.

For walls with geogrid soil reinforcement, all material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
pH	WSDOT Test Method 417	4.5 to 9

Wall backfill material satisfying these gradation, durability, and chemical requirements shall be classified as nonagressive.

Proprietary Materials

KeySystem I Wall

Block alignment pins shall be fiberglass conforming to the requirements of Keystone Retaining Wall Systems, Inc.

Block connector pins shall conform to AASHTO M 32, and shall be galvanized after fabrication in accordance with AASHTO M 111.

Landmark Retaining Wall

Lock bars shall be made of a rigid polyvinyl chloride polymer conforming to the following requirements:

Property	Value	Specification
Specific Gravity	1.4 minimum	ASTM D 792
Tensile Strength at yield	2,700 psi minimum	ASTM D 638

Lock bars shall remain sealed in their shipping containers until placement into the wall. Lock bars exposed to direct sunlight for a period exceeding two months shall not be used for construction of the wall.

Mesa Wall

Block connectors for block courses with geogrid reinforcement shall be glass fiber reinforced high-density polypropylene conforming to the following minimum material specifications:

Property	Specification	Value
Polypropylene	ASTM D 4101 Group 1 Class 1 Grade 2	73 ± 2 percent
Fiberglass Content	ASTM D 2584	25 ± 3 percent
Carbon Black	ASTM D 4218	2 percent minimum
Specific Gravity	ASTM D 792	1.08 ± 0.04
Tensile Strength at yield	ASTM D 638	8,700 ± 1,450 psi
Melt Flow Rate	ASTM D 1238	0.37 ± 0.16 ounces/10 min.

Block connectors for block courses without geogrid reinforcement shall be glass fiber reinforced high-density polyethylene (HDPE) conforming to the following minimum material specifications:

Property	Specification	Value
HDPE	ASTM D 1248 Type III Class A Grade 5	68 ± 3 percent
Fiberglass Content	ASTM D 2584	30 ± 3 percent
Carbon Black	ASTM D 4218	2 percent minimum
Specific Gravity	ASTM D 792	1.16 ± 0.06
Tensile Strength at yield	ASTM D 638	8,700 ± 725 psi
Melt Flow Rate	ASTM D 1238	0.11 ± 0.07 ounces/10 min.

6-13.2.OPT3(A).GB6

(January 4, 2010)

Allan Block Wall

Wall backfill material placed in the open cells of the precast concrete blocks and placed in the one to three foot zone immediately behind the precast concrete blocks shall conform to Section 9-03.12(4).

Geogrid reinforcement shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of T_{al} and T_{ult} as listed in the QPL for the products used shall meet or exceed the values required for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637, for multi-rib specimens.

The ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A "lot" shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were samples will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than 20°F and greater than 122°F.

6-13.3.GR6

Construction Requirements

6-13.3.INST1.GR6

Section 6-13.3 is supplemented with the following:

6-13.3.OPT1.GB6

(April 4, 2011)

Welded Wire Faced Structural Earth Wall

Welded wire faced structural earth walls shall be constructed of only one of the following wall systems.

The Contractor shall make arrangements to purchase the welded wire mats, welded wire form facing units, geogrid reinforcement, backing mats, facing elements, fasteners, geosynthetic connection rods, construction geotextile for wall facing, and all necessary incidentals from the source identified for each wall system:

Hilfiker Welded Wire Retaining Wall (WWW) System

Hilfiker is a registered trademark of Hilfiker Retaining Walls.

Hilfiker Retaining Walls
1902 Hilfiker Lane
Eureka, CA 95503-5711
(707) 443-5093
FAX (707) 443-2891
www.hilfiker.com

Tensar Wire Form Retaining Wall System

Tensar is a registered trademark of Tensar Corporation

Tensar Corporation
2500 Northwinds Parkway Suite 500
Atlanta, GA 30009
(770) 344-2090
FAX (678) 281-8546
www.tensarcorp.com

6-13.3.OPT2.GB6

(April 12, 2012)

Precast Concrete Panel Faced Structural Earth Wall

Precast concrete panel faced structural earth walls shall be constructed of only one of the following wall systems. The Contractor shall make arrangements to purchase the precast concrete panels, soil reinforcement, attachment devices, joint filler, and all necessary incidentals from the source identified with each wall system:

ARES Modular Panel Wall System

ARES Modular Panel Wall System is a registered trademark of Tensar Corporation

Tensar Corporation
2500 Northwinds Parkway Suite 500
Atlanta, GA 30009
(770) 344-2090
FAX (678) 281-8546
www.tensarcorp.com

Reinforced Earth Wall

Reinforced Earth is a registered trademark of the Reinforced Earth Company.

The Reinforced Earth Company
88 Inverness Circle East Suite E-101
Englewood, CO 80112
(303) 790-1481
FAX (303) 790-1461
www.reinforcedearth.com

Reinforced Soil Wall

Reinforced Soil is a registered trademark of Hilfiker Retaining Walls.

Hilfiker Retaining Walls
1902 Hilfiker Lane
Eureka, CA 95503-5711
(707) 443-5093
FAX (707) 443-2891
www.hilfiker.com

Retained Earth Wall

Retained Earth is a registered trademark of Reinforced Earth Company.

The Reinforced Earth Company
88 Inverness Circle East Suite E-101
Englewood, CO 80112
(303) 790-1481
FAX (303) 790-1461
www.reinforcedearth.com

6-13.3.OPT3.GB6

(April 2, 2012)

Concrete Block Faced Structural Earth Wall

Concrete block faced structural earth walls shall be constructed of only one of the following wall systems. The Contractor shall make arrangements to purchase the concrete blocks, soil reinforcement, attachment devices, joint filler, and all necessary incidentals from the source identified with each wall system:

Mesa Wall

Mesa Wall is a registered trademark of Tensar Corporation

Tensar Corporation
2500 Northwinds Parkway Suite 500
Atlanta, GA 30009
(770) 334-2090
FAX (678) 281-8546
www.tensarcorp.com

Landmark Retaining Wall System

Landmark Retaining Wall System is a registered trademark of Anchor Wall Systems, Inc.

Anchor Wall Systems, Inc.
5959 Baker Road, Suite 390
Minnetonka, MN 55345-5996
(877) 295-5415
FAX (952) 979-8454
www.anchorwall.com

KeySystem I Wall

KeySystem I is a registered trademark of Keystone Retaining Wall Systems, Inc.

Keystone Retaining Wall Systems, Inc.
4444 West 78th Street
Minneapolis, MN 55435
(952) 897-1040
FAX (952) 897-3858
www.keystonewalls.com

6-13.3.OPT3(A).GB6

(January 4, 2010)

Allan Block Wall

Allan Block Wall is a registered trademark of the Allan Block Corporation

Allan Block Corporation
5300 Edina Industrial Blvd. Suite 100
Edina, MN 55439
(800) 899-5309
(FAX (952) 835-0013

6-13.3(2).GR6

Submittals

6-13.3(2).INST1.GR6

Section 6-13.3(2) is supplemented with the following:

6-13.3(2).OPT1.FB6

(January 3, 2011)

The following geotechnical design parameters shall be used for the design of the structural earth wall(s):

Wall Name or No.: *** $$1$$ ***

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	***$$2$$***	***$$3$$***	***$$4$$***
Friction Angle (deg)	***$$5$$***	***$$6$$***	***$$7$$***
Cohesion (psf)	***$$8$$***	***$$9$$***	***$$10$$***

For the Service Limit State, the wall shall be designed to accommodate a differential settlement of *** $$11$$ *** per 100 feet of wall length.

For the Extreme Event I Limit State, the wall shall be designed for a horizontal seismic acceleration coefficient k_h of *** $$12$$ *** g and a vertical seismic acceleration coefficient k_v of *** $$13$$ *** g.

6-13.3(2).OPT1(A).FB6

(January 4, 2010)

For construction of Allan Block Walls, the Contractor shall submit working drawings with supporting design calculations in accordance with Section 6-01.9, and conforming to the following design specifications:

1. AASHTO LRFD Bridge Design Specifications, current edition and latest interims.

2. WSDOT Bridge Design Manual LRFD, current edition.

3. WSDOT Geotechnical Design Manual, current edition.

The submittal shall identify the geosynthetic reinforcement product, selected from those listed in Appendix D of the current WSDOT QPL and conforming to Section 6-13.2 as supplemented in these Special Provisions, for use as geosynthetic reinforcement for the wall.

6-13.3(4).GR6

Precast Concrete Facing Panel and Concrete Block Fabrication

6-13.3(4).INST1.GR6

Section 6-13.3(4) is supplemented with the following:

6-13.3(4).OPT1.GB6

(April 12, 2012)

Specific Fabrication Requirements for Precast Concrete Panel Faced Structural Earth Walls

ARES Modular Panel Wall System

The concrete mix for precast concrete facing panels shall be a Contractor mix design in accordance with Section 6-02.3(2)A, producing a minimum compressive strength at 28 days of 4,500 psi. The Contractor mix design for precast concrete facing panels shall not include Type III cement unless otherwise approved by the Engineer.

The slot opening for geogrid attachment in precast concrete facing panels shall be 1/8 inch minimum. The Contractor shall test the slot opening of each concrete panel using a feeler gauge furnished by Tensar Earth Technologies, Inc. Concrete panels with slot dimension deviations that allow the feeler gauge to be pulled out of the slot shall be rejected.

6-13.3(5).GR6

Precast Concrete Facing Panel and Concrete Block Erection

6-13.3(5).INST1.GR6

Section 6-13.3(5) is supplemented with the following:

6-13.3(5).OPT2.GB6

(April 2, 2012)

Specific Erection Requirements for Precast Concrete Block Faced Structural Earth Walls

Landmark Retaining Wall

When placing each course of concrete blocks, the Contractor shall pull the blocks towards the front face of the wall until the male key of the bottom face of the upper block contacts and fits into the female key of the top face of the supporting block below.

A maximum gap of 1/8-inch is allowed between adjacent concrete blocks, except for the base course set of concrete blocks placed on the leveling pad. A maximum gap of 1-inch is allowed between adjacent base course concrete blocks, provided geosynthetic reinforcement for drains is in place over the gap at the back face of the concrete blocks.

Lock bars shall be installed in the female key of the top face of all concrete block courses receiving geogrid reinforcement. Gaps between adjacent lock bars in the key shall not exceed 3-inches. The lock bar shall be installed flat side up, with the angled side to the back of the concrete block, as shown in the shop drawings.

Geogrid reinforcement shall be placed and connected to concrete block courses specified to receive soil reinforcement. The leading edge of the geogrid reinforcement shall be maintained within 1-inch of the front face of the supporting concrete blocks below. Geogrid panels shall be abutted for 100 percent backfill coverage with less than a 4-inch gap between adjacent panels.

Backfill shall be placed and compacted level with the top of each course of concrete blocks, and geogrid reinforcement placed and connected to concrete block courses specified to receive soil reinforcement, before the Contractor may continue placing the next course of concrete blocks.

Mesa Wall

For all concrete block courses receiving geogrid reinforcement, the fingers of the block connectors shall engage the geogrid reinforcement apertures, both in the connector slot in the block, and across the block core. For all concrete block courses with intermittent geogrid coverage, a #3 steel reinforcing bar shall be placed, butt end to butt end, in the top block groove, with the butt ends being placed at a center of a concrete block.

6-14.GR6

Geosynthetic Retaining Walls

6-14.2.GR6

Materials

6-14.2(9-33.2(2)).GR6

Geosynthetic Properties For Retaining Walls and Reinforced Slopes

Section 9-33.2(2) is supplemented with the following:

6-14.2(9-33.2(2)).OPT1.FB6

(August 7, 2006)

Geosynthetic Properties For Temporary Geosynthetic Retaining Walls

Wide strip geosynthetic strengths provided in Table 10 are minimum average roll values. The average test results for any sampled roll in a lot shall meet or exceed the values shown in the table. These wide strip strength requirements apply only in the geosynthetic direction perpendicular to the wall face. The test procedures specified in the table are in conformance with the most recently approved ASTM geosynthetic test procedures, except for geosynthetic sampling and specimen conditioning, which are in accordance with WSDOT Test Methods 914 and 915, respectively.

Table 10: Wide strip tensile strength required for the geosynthetic reinforcement used in geosynthetic retaining walls.

Wall Location	Vertical Spacing of Reinforcement Layers	Reinforcement Layer Distance from Top of Wall	Minimum Tensile Strength Based on ASTM D4595 for Geotextiles and ASTM D6637 for Geogrids
$$1$$	***$$2$$***	***$$3$$***	***$$4$$***

6-15.GR6

Soil Nail Walls

6-15.2.GR6

Materials

6-15.2.INST1.GR6

Section 6-15.2 is supplemented with the following:

6-15.2.OPT1.GB6

(April 2, 2012)

Permanent Soil Nail Materials and Components

A soil nail system is a structural system used to transfer tensile loads to soil. A soil nail system may also be specified in the Plans as a nail. A soil nail system includes all steel reinforcing bars, anchorage devices, grout, coatings, sheathings and couplers if used.

The Contractor shall either select a soil nail system from the Qualified Products List, or submit the following information to the Engineer for approval:

1. Catalogue cuts or Manufacturer's Certificates of Compliance for centralizers and grout admixtures.

2. Manufacturer's Certificate of Compliance for bearing plates, nuts, steel reinforcing bars, tendon encapsulation tubing, and welded shear studs. The Manufacturer's Certificate of Compliance for the nuts shall confirm compliance with the specified strength requirements.

If the Contractor selects a permanent soil nail system from the Qualified Products List (QPL), the Contractor shall submit, to the Engineer, a certificate from the permanent soil nail system fabricator/supplier confirming that the material specifications of the permanent soil nail system components as furnished conform to those specified in the QPL submittal as approved by WSDOT.

Component Material Specifications

Bearing plates shall conform to ASTM A 36, ASTM A 529, ASTM A 536, ASTM A 572, ASTM A 588, or AASHTO M 270.

Centralizers shall be fabricated from plastic, steel, or material which is nondetrimental to the prestressing steel. Wood shall not be used.

Grout shall be a neat cement grout or a sand-cement grout conforming to Section 9-20.3(4). The compressive strength for the grout shall be as required by the soil nail manufacturer and as approved by the Engineer. Grout components shall be as follows:

Admixtures shall conform to the requirements of Section 9-23.6. Expansive admixtures and accelerators will not be permitted. Admixtures shall be mixed in accordance with the manufacturer's recommendations.

Aggregates shall conform to the requirements of Section 9-03.

Cement shall conform to the requirements of Section 9-01, and shall not contain lumps or other indications of hydration.

Nuts shall conform to either ASTM A 563, Grade B, Hexagonal, ASTM A 536 Grade 100-70-03, ASTM A 29 Grades 12L14, 1215, or C1045, AASHTO M 169 Grades 1117 or 12L14, ASTM A 513 Type 5 Grade 1026, ASTM A 521 Class CF, ASTM A 897 Grade 125/80/10M, or ASTM A 519 Grade 1026, and shall be capable of developing 100 percent of the GUTS of the soil nail. The nuts shall be fitted, where necessary, with a special wedge washer or spherical seat such that the nut bears uniformly on the bearing plate.

Washers shall conform to either AASHTO M 293, ASTM A 536 Grade 80-55-06 or ASTM A 47 Grade 32510.

Soil nails shall be deformed steel reinforcing bars conforming to AASHTO M 31, Grade 60 minimum, and Section 9-07.2. All soil nails, except those specified in the Plans to be encapsulated, shall be epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3. The soil nails shall be of the type and size specified in the Plans. The soil nails shall not be spliced. The soil nails shall be threaded at the bearing plate end a minimum of six inches. The threading shall be continuous spiral deformed ribbing. Alternatively, threads may be cut into the soil nail if the bar

size is increased to the next larger size from the size specified in the Plans at no additional cost to the Contracting Agency.

Tendon encapsulation, when specified in the Plans to provide additional corrosion protection, shall be fabricated from one of the following:

1. High density corrugated polyethylene (PE) tubing conforming to the requirements of ASTM D 3350 Class PE335520C or Class PE335400C, ASTM D 1248, and AASHTO M 252 and having a nominal wall thickness of 40 mils.

2. Corrugated, polyvinyl chloride (PVC) tubing conforming to ASTM D 1784, Class 13464-B, and having a nominal wall thickness of 40 mils.

The soil nails shall be centralized within the sheathing with a minimum 0.2 inch grout cover over the soil nail inside the sheath. The encapsulation shall be constructed at the factory under controlled conditions. Field construction of the encapsulation will not be permitted.

Welded shear studs shall conform to Section 9-06.15, and shall be welded in accordance with Section 6-03.3(25).

6-15.3.GR6

Construction Requirements

6-15.3(8).GR6

Soil Nail Testing And Acceptance

6-15.3(8)A.GR6

Verification Testing

6-15.3(8)A.INST1.GR6

Section 6-15.3(8)A is supplemented with the following:

6-15.3(8)A.OPT1.FB6

(April 5, 2004)

Soil nail verification tests shall be conducted as follows:

Verification Test Limits	Soil Nail Row	Number of Successful Verification Tests Required
$$1$$	***$$2$$***	***$$3$$***

6-17.GR6

Permanent Ground Anchors

6-17.1.GR6

Description

6-17.1.INST1.GR6

Section 6-17.1 is supplemented with the following:

6-17.1.OPT1.GB6
(January 4, 2010)
This work also consists of furnishing, installing, stressing and testing rock bolts and rock dowels.

6-17.2.GR6
Materials

6-17.2.INST1.GR6
Section 6-17.2 is supplemented with the following:

6-17.2.OPT1.GB6
(August 1, 2011)
Permanent Ground Anchor Materials and Components
A permanent ground anchor system is a structural system used to transfer tensile loads to soil or rock. A permanent ground anchor system may also be specified in the Plans as an anchor, a ground anchor, or a tieback. A permanent ground anchor system includes all prestressing steel, anchorage devices, grout, coatings, sheathings and couplers if used.

The Contractor shall either select a permanent ground anchor system from the Qualified Products List or submit the following information to the Engineer for approval:

1. Catalogue cuts or Manufacturer's Certificates of Compliance for anchorage covers, bond breaker, centralizers, corrosion inhibiting grease, end caps, grout admixtures, and strand tendon spacers.

2. Manufacturer's Certificates of Compliance for anchor heads, anchor head wedges, bar tendon nuts, bar tendon couplers, tendon encapsulation tubing, trumpet assemblies, and bar tendons or strand tendons. The Manufacturer's Certificates of Compliance for the anchorhead wedges (grippers), and bar tendon nuts and couplers, shall confirm compliance with the specified strength requirements.

If the Contractor selects a permanent ground anchor system from the Qualified Products List (QPL), the Contractor shall submit, to the Engineer, a certificate from the permanent ground anchor system fabricator/supplier confirming that the material specifications of the permanent ground anchor system components as furnished conform to those specified in the QPL submittal as approved by WSDOT.

Component Material Specifications
Anchorage covers shall have a minimum thickness of 0.20 inches and shall conform to either ASTM A 53 for pipe, or ASTM A 500 for tubing, or ASTM A 36, ASTM A 529, ASTM A 572, ASTM A 588, or AASHTO M 270 for fabricated steel.

Anchorheads shall conform to either ASTM A 36, AASHTO M 169 Grades 1040 or 1045, ASTM A 521 Grade 1045, ASTM A 576 Grade 1045, or ASTM A 536 Grade 80-55-06.

Bearing plates shall conform to either ASTM A 36, ASTM A 572, ASTM A 588, AASHTO M 270, ASTM A 529, or ASTM A 536.

Anchorhead wedges (grippers) shall conform to AASHTO M 169 Grade 12L14, case hardened 0.012 to 0.015 inches deep to Rockwell C 59 to 65.

Bar tendon nuts shall conform to either ASTM A 29 Grade C1045, ASTM A 521 Class CF, AASHTO M 169 Grades 1117 or 1144, or ASTM A 536 Grade 100-70-03, and shall be capable of developing 100 percent of the GUTS of the bar tendon.

Bondbreaker shall conform to the requirements of Section 4.7 of the Post-Tensioning Institute “Recommendations for Prestressed Rock and Soil Anchors”, Fourth Edition - 2004, and shall be fabricated from a smooth plastic tube or pipe having the following properties:

1. Resistant to chemical attack from aggressive environments, grout or grease;
2. Resistant to aging by ultra-violet light;
3. Fabricated from material nondetrimental to the tendon;
4. Capable of withstanding abrasion, impact, and bending during handling and installation;
5. Enable the tendon to elongate during testing and stressing; and
6. Allow the tendon to remain unbonded after lock-off.

Centralizers shall be fabricated from plastic, steel, or material which is nondetrimental to the prestressing steel. Wood shall not be used.

Corrosion inhibiting grease shall conform to the requirements of Section 3.2.5 of the Post-Tensioning Institute, "Specification For Unbonded Single Strand Tendons".

Couplers for bar tendons, if required, shall be furnished by the manufacturer of the bar tendons and shall be AASHTO M 169 Grades 1045, 1117 or 1144, ASTM A 519 Grade 1026, or equivalent steel developing 100 percent of the GUTS of the bar tendon without evidence of any failure. Couplers shall be placed in the bond zone. Couplers for strand tendons will not be allowed.

End caps shall conform to ASTM D 3350 Class PE324420C, Class PE334410C, or Class PE335400C, ASTM D 1248, and AASHTO M 252, ASTM D 1784 Class 1346B, ASTM A 653, or ASTM A 36.

Grout shall be a neat cement grout or a sand-cement grout conforming to Section 9-20.3(4). The compressive strength for the grout shall be as required by the tieback manufacturer and as approved by the Engineer. Grout components shall be as follows:

Admixtures shall conform to the requirements of Section 9-23.6. Expansive admixtures shall only be added to the grout used for filling sealed encapsulations, trumpets and anchorage covers. Accelerators will not be permitted. Admixtures shall be compatible with prestressing steels and mixed in accordance with the manufacturer's recommendations.

Aggregates shall conform to the requirements of Section 9-03.

Cement shall conform to the requirements of Section 9-01, and shall not contain lumps or other indications of hydration.

Prestressing steel shall consist of either bar tendons with an ultimate tensile strength of 150 ksi conforming to AASHTO M 275 Type II, or strand tendons with an ultimate tensile strength of 270 ksi conforming to AASHTO M 203. The Contractor shall submit certified mill test results and typical stress-strain curves along with samples from each heat, properly marked, for the prestressing steel to the Engineer. The typical stress-strain curve shall be obtained by approved standard practices. The guaranteed ultimate strength, yield strength, elongation, and composition shall be specified.

Strand tendon spacers shall be fabricated from plastic, steel, or material which is nondetrimental to the prestressing steel. Wood shall not be used.

Tendon encapsulation, when specified in the Plans to provide additional corrosion protection, shall be fabricated from one of the following:

1. High density corrugated polyethylene (PE) tubing conforming to the requirements of ASTM D 3350 Class PE334410C, Class PE335520C or Class PE335400C, ASTM D 1248, and AASHTO M 252 and having a nominal wall thickness of 40 mils or greater.

2. Corrugated, polyvinyl chloride (PVC) tubing conforming to ASTM D 1784, Class 13464-B, and having a nominal wall thickness of 40 mils or greater.

Trumpet providing the transition from the bearing plate to the unbonded length corrosion protection shall be fabricated from a steel pipe or tube conforming to the requirements of ASTM A 53 for pipe or ASTM A 500 for tubing. The trumpet shall have a minimum wall thickness of 0.20 inches, and shall be seal welded to the bearing plate. The seal weld shall be visually inspected only, in accordance with Section 6-03.3(25)A.

6-17.2.OPT2.GB6

(January 4, 2010)

Rock Bolt and Rock Dowel Materials

Rock bolts shall be deformed continuously threaded steel reinforcement bars conforming to either Section 9-07.2 or Section 9-07.11 (Grade 60 or better), and shall be capable of being post-tensioned to the design loads, performance test loads, and proof test loads specified.

Rock dowels shall be deformed continuously threaded steel reinforcement bars conforming to either Section 9-07.2 or Section 9-07.11, being Grade 60 or better with a minimum nominal diameter of 1-inch (#8 bar) for Type 1 rock dowels, and being Grade 75 or better with a minimum nominal diameter of 1.41-inches (#11 bar) for Type 2 rock dowels.

Anchor bar steel for rock bolts and dowels shall be provided with either epoxy coating or hot dip galvanizing for corrosion protection. Epoxy coating shall be applied in accordance with Section 9-07.3 and Section 6-02.3(24)H to a minimum coating thickness of 10 mils, plus or minus 2 mils. Epoxy coating patch material, compatible with the epoxy coating and inert in the grout selected for use, shall be furnished with each shipment of epoxy-coated rock bolts and rock dowels. Hot dip galvanizing shall conform to AASHTO M 232 and shall have a minimum thickness of 3.9 mils.

Bearing plates shall be galvanized, 1/4 inch minimum thickness and not less than 4-inches square, and shall conform to ASTM A 36.

Nuts shall be galvanized and conform to either AASHTO M 291 Grade B, hexagonal, or Section 9-07.11. Washers shall be galvanized and conform to AASHTO M 293.

Grout shall be a non-shrink cementitious product conforming to ASTM C-1107.

6-17.3.GR6

Construction Requirements

6-17.3.INST1.GR6

Section 6-17.3 is supplemented with the following:

6-17.3.OPT1.GB6

(January 4, 2010)

Rock Bolt and Rock Dowel Construction Requirements

Rock Bolt and Rock Dowel Installation Experience Requirements

The Contractor's foreman supervising the rock bolt and rock dowel work shall have installed a minimum of 3,000 linear feet of post-tensioned rock bolts or rock dowels on a minimum of five projects within the past five years.

The Contractor's rock bolt and rock dowel drill operators shall have installed a minimum of 1,000 linear feet of post-tensioned rock bolts or rock dowels on a minimum of three projects within the past five years.

The Contractor shall submit a list documenting the rock bolt and rock dowel work experience of the foreman and drill operators working on the project to the Engineer for approval in accordance with Sections 1-05.3 and 6-17.3(2).

Rock Bolt and Rock Dowel Submittals

The Contractor shall submit a rock bolt and rock dowel plan to the Engineer for approval in accordance with Section 6-01.9. The rock bolt and rock dowel plan shall include, but not be limited to, the following:

1. The proposed construction sequence and schedule.

2. The proposed drilling method and equipment.

3. The proposed drill hole diameter.

4. The minimum bond zone length for the rock bolts.

5. The proposed anchor steel/tendon, couplers, bearing plate, anchor nut, flat washer, and beveled washer specifications, including manufacturer's data sheets, catalogue cuts and mill certificates. Documentation shall also be furnished that the size of nut and bearing plate selected for rock bolts are capable of developing 95 percent of the minimum Guaranteed Ultimate Tensile Strength (GUTS) of the rock bolt, and conform to the static strength requirements of Section 4.3 of the Post-Tensioning Institute "Recommendations for Prestressed Rock and Soil Anchors".

6. The proposed grout mix design, including manufacturer's data sheets and catalogue cuts and the procedures for placing the grout.

7. The proposed corrosion protection for the rock bolt and rock dowel systems.

8. The proposed stressing procedures and stressing equipment.

9. The proposed construction method for upwardly inclined anchors.

10. The proposed equipment for measuring and recording the volume of grout injected for production rock bolts and rock dowels.

11. The calibration data for each load cell, test jack, pressure gauge and master pressure gauge to be used in the proof testing, in accordance with the calibration requirements specified in Section 6-17.3(3).

The Contractor shall not begin rock bolt and rock dowel operations until receiving the Engineer's approval of the rock bolt and rock dowel plan.

Rock Bolt and Rock Dowel Preconstruction Conference

A rock bolt and rock dowel preconstruction conference may be held at the discretion of the Engineer in accordance with Section 6-17.3(4).

Rock Bolt and Rock Dowel Storage and Handling

Rock bolt and rock dowel storage and handling shall conform to the Section 6-17.3(6) requirements for permanent ground anchor tendons.

Field handling procedures for epoxy-coated rock bolts and rock dowels shall conform to Sections 6-02.3(24)H, including providing padding between contact points during storage and lifting, and covering epoxy-coated rock bolts and rock dowels to minimize ultraviolet exposure.

Rock Bolt and Rock Dowel Grout

Grout shall be composed of proven, non-shrink materials meeting the requirements of ASTM C-1107, and capable of permanently developing the bond and internal strength necessary for the specified rock bolt and rock dowel load. If requested by the Engineer, a sample of the grout shall be provided for Contracting Agency testing.

The use of epoxy or polyester resin as bonding agents will not be allowed.

Rock Bolt and Rock Dowel Installation

General Requirements

The Contractor shall install rock bolts and rock dowels at the location and orientation specified by the Engineer, and in accordance with the rock bolt and rock dowel plan approved by the Engineer. For rock bolts, the Engineer will designate the required minimum unbonded length. For rock dowels, the Engineer will designate the minimum anchor length.

The rock bolts and rock dowels shall be installed within five degrees of the orientation angle specified by the Engineer. Unless otherwise specified by the Engineer, the angle of installation shall be perpendicular to the rock face and inclined slightly downward at the rock bolt and rock dowel location.

If the axis of the rock anchor is not within five degrees of perpendicular to the rock face at the anchor location, or within the angle provided by the beveled washer, or if the rock beneath the bearing plate is not sound, a bearing pad approved by the Engineer shall be constructed so that the rock anchor is not bent when the nut is torqued to tension the bar.

In all cases, at least three-quarters of the bearing plate shall be in contact with the rock face. For rock surfaces of weak or highly weathered rock, the bearing plate shall be a minimum of 8-inches square. The bearing plate shall have a central hole large enough to fit easily over the anchor while maximizing the average bearing surface for the washer and the nut. Spherical seating of the nut is not required. Beveled washers shall be used to accommodate all non-perpendicular installations.

The use of hand drills for advancing the hole will not be allowed without the written approval of the Engineer and demonstrated effectiveness by the Contractor. The drill hole shall be sized to provide a minimum of 1/2 inches of grout cover around the rock bolt or rock dowel. The Contractor shall flush the drill hole of all drill cuttings and debris with compressed air prior to installing the rock bolt or rock dowel. Holes determined by the Engineer to be unacceptable for rock bolt and rock dowel installation shall be re-drilled by the Contractor at no additional expense to the Contracting Agency.

Rock bolts and rock dowels shall not be precut at the factory to lengths shown in the Plans, but rather shall be delivered to the job site in bulk lengths and field cut to the appropriate lengths. Each rock bolt and rock dowel shall be fitted with a bearing plate and nut. Prior to placing rock bolts and rock dowels in the drilled holes, all mill scale, flaking rust and grease shall be removed from the rock bolt and rock dowel.

Centralizers shall be placed along the rock bolt or rock dowel at ten foot minimum centers prior to grouting, with a minimum of one centralizer per rock bolt or rock dowel and the lowest centralizer located within 12 inches of the end of the rock bolt or rock dowel.

The grout equipment shall produce a grout free of lumps and undispersed cement. The pump shall be equipped with a pressure gauge near the discharge end to monitor grout pressures. The grouting equipment shall be

sized to enable the grout to be pumped in one continuous operation. The grout shall be injected from the lowest point of the drill hole. Sufficient grout shall be placed in the drill hole to ensure full encapsulation of the rock bolt or rock dowel. The volume of grout injected, and the corresponding grout injection pressure, for each production rock bolt and rock dowel shall be measured using the methods and equipment specified in the rock bolt and rock dowel plan as approved by the Engineer.

The entire length of the rock bolt and rock dowel shall be corrosion-protected with grout. Unprotected portions of the anchor bar and any damaged galvanizing on the bearing plates, nuts and washers shall be painted in accordance with Section 6-07.3(10)P with one coat of galvanizing repair paint conforming to Section 9-08.1(2)B.

Specific Rock Dowel Requirements

The Contractor shall embed and install Type 1 rock dowels to hold a 25 kip design load. When the grout has reached final set, the Contractor shall install the bearing plate, washers and nut. The nut shall be torqued to a nominal 100 foot-pounds to ensure proper seating against the rock face. The end of the completed rock dowel shall be trimmed to within six-inches of the rock face.

Specific Rock Bolt Requirements

The Contractor shall select the type of rock bolt and construction method to be used. The Contractor shall embed and install rock bolts to hold the design load specified in the Plans. The rock bolt shall be sized so that the design load does not exceed 60 percent of the minimum guaranteed ultimate tensile strength (GUTS) of the rock bolt. In addition, the rock bolt shall be sized so that the maximum test load does not exceed 80 percent of the minimum GUTS of the rock bolt.

6-17.3(8).GR6

Testing And Stressing

6-17.3(8).INST1.GR6

Section 6-17.3(8) is supplemented with the following:

6-17.3(8).OPT1.GB6

(January 4, 2010)

Rock Dowel Proof Testing

At the discretion of the Engineer, up to five percent, but not less than three installed production rock dowels as selected by the Engineer shall be proof tested. The Contractor shall conduct the proof test, and the Engineer will interpret the results.

The rock dowel shall be tensioned to 25 kips for Type 1 rock dowels, with a calibrated hollow-ram hydraulic jack using a bar extension and coupler attached to the rock dowel. The test load specified for the particular type of rock dowel shall be held for ten minutes. If no loss of load occurs over the ten minute hold period, the rock dowel is acceptable.

The Engineer may require additional proof testing above the specified five percent maximum if rock dowels fail the proof testing. All failed rock dowels shall be

replaced with an additional rock dowel installed in a separate hole at no additional expense to the Contracting Agency.

Rock Bolt Testing

The Contractor shall conduct rock bolt testing in accordance with the requirements specified in this Section for permanent ground anchors, including testing equipment, and test load monitoring, recording and documentation.

Rock Bolt Performance Testing

At the Engineer's discretion, the Contractor shall conduct up to three performance tests to demonstrate the effectiveness of the construction method for each rock bolt design, and when a significant change is proposed in the construction method.

Rock bolts shall be tensioned to 120 percent of the design load of the rock bolt for a holding time period of not more than 60 minutes. The Contractor shall monitor the test load and shall document the results in accordance with the requirements specified in this Section for permanent ground anchors.

The Engineer will analyze the rock bolt performance test results and determine whether the rock bolt is acceptable. A rock bolt is acceptable if both the following conditions are satisfied:

1. The total elastic movement obtained at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the stressing length.

2. The rock bolt carries the maximum test load with a creep rate that does not exceed 0.04 inches between one and ten minutes, or 0.08 inches per log cycle of time between the six and 60 minute readings.

If the Contractor fails to successfully achieve these testing criteria, the Engineer may require additional rock bolt performance tests to be completed at no additional expense to the Contracting Agency.

Production rock bolting shall not begin until the Contractor has completed performance testing of the design rock bolts and the test results have been accepted by the Engineer.

Rock Bolt Proof Testing

Each production rock bolt shall be proof tested. Proof testing shall consist of tensioning the rock bolt to 120 percent of the design load and holding that load for ten minutes. If no loss of load occurs in this time period, the rock bolt is accepted. If a rock bolt fails this proof test, the rock bolt shall be replaced with an additional rock bolt installed in a separate hole.

After tensioning and achieving a successful rock bolt proof test, the load shall be locked off at 100 percent of the design load and the remaining portion of the rock bolt grouted, if appropriate. The end of the completed rock bolt shall be trimmed to within six inches of the rock face.

Upon acceptance by the Engineer, the Contractor shall permanently stamp or etch the bearing plate of or otherwise label each rock bolt with a unique number assigned by the Engineer, the installation date, the stressing load, and the total anchor length.

6-17.3(8)A.GR6

Verification Testing

6-17.3(8)A.INST1.GR6

Section 6-17.3(8)A is supplemented with the following:

6-17.3(8)A.OPT1.GB6

(August 1, 2011)

Verification tests shall be performed to verify the design of the anchor system. These ground anchor test results shall verify the Contractor's design and be approved by the Engineer prior to ordering anchor material for the tieback retaining walls. The tests shall be performed on sacrificial test anchors. A minimum of two successful verification tests shall be conducted. The locations shall be close to the anchor location of the production anchors. The test locations shall be selected by the Contractor and approved by the Engineer, except where specific permanent ground anchor rows between specific station limits are shown in the Plans.

Verification test anchors shall be constructed using the same procedures and anchor geometry (drill hole diameter, bond length, unbounded length) as the production anchors.

The anchor tested shall be loaded to 150 percent of the factored design load (FDL). The prestressing tendon shall be proportioned such that the maximum stress does not exceed 80 percent of the ultimate strength of the steel. The jack shall be positioned at the beginning of the test such that unloading and repositioning of the jack during the test will not be required.

The verification tests shall be made by incrementally loading the anchors in accordance with the following schedule.

AL - Anchor Alignment Load
FDL - Factored Design Load

Load	Hold Time
AL	1 Min.
0.25FDL	10 Min.
0.50FDL	10 Min.
0.75FDL	10 Min.
1.00FDL	10 Min.
1.15FDL	60 Min.
1.25FDL	10 Min.
1.50FDL	10 Min.
AL	1 Min.

The test load shall be applied in increments of 25 percent of the factored design load. Each load increment shall be held for at least 10 minutes. Measurement of anchor movement shall be obtained at each load increment. The load-hold period shall start as soon as the test load is applied and the anchor movement, with respect to a fixed reference, shall be measured and recorded at 1 minute, 2, 3, 4, 5, 6, 10, 20, 30, 40, 50, and 60 minutes.

The verification test will be considered successful if the anchor meets the criteria for a performance tested ground anchor in Section 6-17.3(9), and in addition, a pull-out failure does not occur at the 1.50FDL maximum load.

The Engineer will give the Contractor a written order concerning ground anchor construction within seven working days after completion of the verification tests. This written order will either confirm the bond lengths as shown in the Contractor's plans for ground anchors or reject the anchors based upon the result of the verification tests.

6-17.3(8)B.GR6

Performance Testing

6-17.3(8)B.INST1.GR6

The performance test schedule following the second paragraph of Section 6-17.3(8)B is revised to read:

6-17.3(8)B.OPT1.GB6

(January 3, 2011)

Performance Test Schedule

Load
AL
0.25FDL
AL
0.25FDL
0.50FDL
AL
0.25FDL
0.50FDL
0.75FDL
AL
0.25FDL
0.50FDL
0.75FDL
1.00FDL
AL
0.25FDL
0.50FDL
0.75FDL
1.00FDL
1.15FDL
AL

Jack to lock-off load

Where: AL - is the alignment load
FDL - is the factored design load.

6-17.3(8)C.GR6

Proof Testing

6-17.3(8)C.INST1.GR6

The proof test schedule following the first paragraph of Section 6-17.3(8)C is revised to read:

6-17.3(8)C.OPT1.GB6

(January 3, 2011)

Proof Test Schedule

Load

AL
0.25FDL
0.50FDL
0.75FDL
1.00FDL
1.15FDL
Jack to lock-off load

Where: AL - is the alignment load
FDL - is the factored design load

6-17.4.GR6

Measurement

6-17.4.INST1.GR6

Section 6-17.4 is supplemented with the following:

6-17.4.OPT1.GB6

(January 4, 2010)

Rock bolts will be measured by the linear foot of rock bolt (unbonded plus bonded length) installed, successfully proof tested, and accepted.

Rock dowels will be measured by the linear foot of rock dowel installed and accepted.

6-17.5.GR6

Payment

6-17.5.INST1.GR6

Section 6-17.5 is supplemented with the following:

6-17.5.OPT1.GB6

(January 4, 2010)

"Rock Bolt", per linear foot.
The unit contract price per linear foot for "Rock Bolt" shall be full pay for performing the work as specified, including all performance and proof testing, and all grout injection up to 200 percent of that calculated at each production rock bolt location.

"Rock Dowel Type _", per linear foot.
The unit contract price per linear foot for "Rock Dowel Type _" shall be full pay for performing the work as specified, including all proof testing, and all grout injection up to 200 percent of that calculated at each production rock dowel location.

"Force Account Rock Bolt & Rock Dowel Grout Exceedance", force account.
Payment for "Force Account Rock Bolt & Rock Dowel Grout Exceedance", for all grout injection over 200 percent of that calculated at each production rock bolt and rock dowel location, will be by force account as provided in Section 1-09.6. Wasted grout will not be measured for payment.

For the purposes of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Force Account Rock Bolt & Rock Dowel Grout Exceedance" in the bid proposal to become a part of the total bid by the Contractor.

6-18.GR6
Shotcrete Facing

6-18.2.GR6
Materials

6-18.2.INST1.GR6
Section 6-18.2 is supplemented with the following:

6-18.2.OPT1.GB6
(August 1, 2005)
Shotcrete Facing
Portland cement shall be Type I or II in accordance with Section 9-01.2(1).

Air entrainment shall be 6.0 percent, ± 1.5 percent.

Water for mixing and curing shall be clean and free from substances which may be injurious to concrete or steel, and shall be free of elements which would cause staining.

Aggregate for shotcrete shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
1/2 inch	100
3/8 inch	90 to 100
U.S. No. 4	70 to 85
U.S. No. 8	50 to 70
U.S. No. 16	35 to 55
U.S. No. 30	20 to 35
U.S. No. 50	8 to 20

U.S. No. 100	2 to 10
U.S. No. 200	0 to 2.5

6-18.2.OPT2.GB6

(April 5, 2004)

Coloration for Shotcrete Facing Finishing Alternative C

If shotcrete facing finishing Alternative C is specified, the Contractor shall provide shotcrete coloration for finishing the sculptured shotcrete to match the color of the natural surroundings. Approval of the final appearance of the coloration will be based on the pre-production test panel. Approval of the long-term properties of the coloration material shall be based on a manufacturer's certification which verifies the following to be true about the product:

1. Resistance to alkalis in accordance with ASTM D 543.

2. Demonstrates no change in coloration after 1,000 hours of testing in accordance with ASTM D 822.

3. Does not oxidize when tested in accordance with ASTM D 822.

4. Demonstrates resistance to gasoline and mineral spirits when tested in accordance with ASTM D 543.

Additionally, the certification shall provide the product name, proposed mix design and application method, and evidence of at least one project where the product, using the proposed mix and application method, was applied and which has provided at least five years or more of acceptable durability and color permanency.

6-18.2.OPT3.GB6

(April 5, 2010)

Fiber Reinforcement for Shotcrete Facing

Fiber reinforcement for shotcrete facing shall be either steel fibers or macro synthetic fibers.

Steel fibers shall be cold drawn, deformed steel Type 1 or Type 4 fibers conforming to ASTM A 820 with a minimum tensile strength of 120 ksi. Steel fibers shall have a length between 1.0 and 1.50 inches and shall have a length to diameter ratio of less than 80. The steel fibers used shall be manufactured specifically for shotcrete applications.

Macro synthetic fibers shall be deformed polyolefin Type 3 fibers conforming to ASTM C 1116. Macro synthetic fibers shall have a length between 1.0 and 2.0 inches and shall be between 0.02 and 0.04 inches in diameter. The macro synthetic fibers used shall be manufactured specifically for shotcrete applications.

Fiber reinforcement will be accepted based on the manufacturer's certificate of compliance, furnished to the Engineer in accordance with Section 1-06.3, that the material furnished conforms to these Specifications.

6-18.3.GR6

Construction Requirements

6-18.3.INST1.GR6
Section 6-18.3 is supplemented with the following:

6-18.3.OPT1.GB6

(April 5, 2010)

Shotcrete Facing for Rock/Soil Slope Stabilization

Qualifications of Contractor's Personnel

The shotcrete crew members shall have work experience conforming to Section 6-18.3(4), except that the nozzle operators and pumping equipment operators shall have placed a minimum of 100 cubic yards of shotcrete on a minimum of three projects of similar slope heights and orientations as in this project within the last five years.

All nozzle operators shall be qualified by test in accordance with Section 6-18.3(4).

Testing

Pre-production and production testing shall conform to Section 6-18.3(3) and the following additional requirements:

Fiber reinforcement shall be included in the shotcrete mix used for all pre-production and production testing.

The Contractor shall make at least two 12 inch square production test panels, where one section is defined as one day's placement. One additional 12 inch square production test panel shall be made whenever a nozzle operator or equipment is changed during the daily work period.

In addition to compressive strength testing, cores taken from the pre-production and production test panels will be tested for density, absorption and voids in accordance with ASTM C 642.

Absorption shall not exceed 8 percent and void content shall not exceed 17 percent.

Mix Design

Unless otherwise specified in the Plans, the fiber reinforced shotcrete used for rock/soil slope stabilization shall have a minimum compressive strength of 2,500 psi at seven days and 4,000 psi at 28 days.

Microsilica shall be included in the shotcrete mix, but shall not exceed 8 percent by mass of the mix.

The minimum steel fiber content in the shotcrete mix shall be 100 pounds per cubic yard. The minimum macro synthetic fiber content in the shotcrete mix shall be 10 pounds per cubic yard.

Surface Preparation

Immediately prior to shotcrete application, rock and soil surfaces within the section being shot shall be scaled of all loose material and be thoroughly cleaned by use of air or water jets or other means approved by the Engineer. Shotcrete shall not be placed on any surface which is frozen, spongy, or where there is free water. The

surface receiving shotcrete shall be dampened not more than one hour prior to shotcrete application.

Alignment Control

Thickness control pins shall conform to Section 6-18.3(6) and shall be placed on a maximum five foot square grid pattern.

Drainage

Unless otherwise shown in the Plans, weep holes shall be provided throughout the shotcrete facing at 10-foot centers maximum, horizontal and vertical. The weep holes shall consist of 24-inch long, two inch diameter Schedule 40 PVC slotted drain pipe placed within predrilled holes and sloped to drain. The weep hole drains shall be installed prior to placement of the shotcrete facing. The weep hole drains shall extend one to three inches beyond the final finished surface of the shotcrete facing. During placement of the shotcrete facing, the exposed open ends of the weep hole drains shall be covered or plugged to prevent shotcrete intrusion. The Contractor shall remove the covers or plugs after completing shotcrete placement.

Prefabricated drainage mat, if shown in the Plans or specified by the Engineer, shall be placed on the slope face prior to placement of the shotcrete facing in accordance with Section 6-15.3(7) and the details shown in the Plans, and shall be secured to the slope face by methods approved by the Engineer to ensure permanent and full contact with the slope.

Anchor Bars

Unless otherwise shown in the Plans, steel reinforcing bar anchor bars shall be placed at approximately 10-foot centers maximum, horizontal and vertical. The bars shall be L shaped #5 bars with the short leg measuring 8 inches and the long leg 24 inches. The bars shall be placed in 1-1/4 inch diameter, 24-inch deep holes. The bars shall be set either with grout conforming to Section 9-20.3, or with Type II epoxy bonding agent conforming to Section 9-26.1, with the grade and class as recommended by the epoxy bonding agent manufacturer and as approved by the Engineer. The bars shall be placed such that the short leg of the L shaped bar points upward and is approximately 1-1/2 inches clear of the slope surface.

Mixing of Production Fiber Reinforced Shotcrete

Fiber reinforced shotcrete can be mixed by either a dry mix or wet mix process. If the dry mix process is selected, the fiber reinforcement used shall only be steel fibers. If the wet mix process is selected, the fiber reinforcement may be either steel fibers or macro synthetic fibers.

The method and equipment used for batch mixing shall be as submitted in accordance with Section 6-18.3(1) and as approved by the Engineer. The frequency and procedure for equipment inspection, cleaning and maintenance shall be as recommended by the equipment manufacturer and as approved by the Engineer.

Dry Mix Process

The cement and aggregate shall be batched by weight. Pre-dampening shall be done prior to flow into the main hopper and immediately after flow out of the packaging in order to ensure that the premix will flow at a uniform rate (without

slugs) through the main hopper, delivery hose and nozzle to form uniform shotcrete free of dry pockets. Pre-dampened cement and aggregate mix shall not be used if allowed to stand more than 90 minutes.

Wet Mix Process

The batching and mixing shall conform to ASTM C 94.

Batching and Mixing Fiber Reinforcement

If fiber addition takes place in the field after batching and mixing the shotcrete, the procedure used to add the fibers to the shotcrete mix shall be demonstrated by the Contractor for the Engineer's approval. Production application of fiber reinforced shotcrete shall not begin until the Contractor receives the Engineer's approval of the procedure for adding fibers to the shotcrete mix.

If fibers are added during the batching and mixing process, a screen having a mesh of 1.5 to 2.5 inches shall be used to prevent any fiber balls from entering the shotcrete line. Batching through a screen will not be required if the Contractor successfully demonstrates to the Engineer that fiber balls are not being formed.

Fibers shall not be added to the dry or wet mix at a rate faster than they can be blended with the other ingredients without forming balls or clumps. Bulk fibers showing a tendency to tangle together shall pass through a vibrating screen or be carefully sifted into the mix so that they enter the mix as individual elements and not as clumps.

Shotcrete Application

Shotcrete application shall conform to Section 6-18.3(7) and the following requirements:

Unless otherwise shown in the Plans, the minimum finished thickness of the shotcrete facing shall be four inches.

Shotcrete shall be applied from the lower portion of the area upwards to prevent rebound from accumulating on surfaces yet to be covered. Rebound, defined as shotcrete constituents that fail to adhere to the applied surface, shall not be worked into the finished shotcrete facing and shall not be salvaged or recycled for inclusion in later batches.

Shotcrete application shall be suspended if any of the following conditions are present:

1. High winds prevent proper application of the shotcrete.

2. The ambient temperature is, or is forecast to be, outside the temperature range of 40F to 90F during placement or initial curing.

3. Rain or seepage is washing cement out of the freshly placed shotcrete or is causing sloughs in the work.

Construction joints shall be tapered over a minimum distance of 12 inches to the thin edge. Square construction joints will not be permitted.

Shotcrete Finishing

Unless otherwise shown in the Plans or specified in the Special Provisions, the shotcrete facing shall be finished in accordance with Finish Alternative A in Section 6-18.3(8). Colorization, if required, shall conform to the requirements specified in Section 6-18.2 as supplemented in these Special Provisions.

6-18.4.GR6

Measurement

6-18.4.INST1.GR6

Section 6-18.4 is supplemented with the following:

6-18.4.OPT1.GB6

(April 5, 2010)

Shotcrete facing for rock/soil slope stabilization will be measured by the cubic yard of shotcrete placed.

6-18.5.GR6

Payment

6-18.5.INST1.GR6

Section 6-18.5 is supplemented with the following:

6-18.5.OPT1.GB6

(April 5, 2010)

"Shotcrete Facing For Rock/Soil Slope Stabilization", per cubic yard.

The unit contract price per cubic yard for "Shotcrete Facing For Rock/Soil Slope Stabilization" shall be full pay for performing the work as specified, including pre-production and production testing, surface preparation, weep hole drains, steel anchor bars, and shotcrete, mixing, application, curing and finishing, and, if required, shotcrete colorization.

6-19.GR6

Shafts

6-19.2.GR6

Materials

6-19.2(9-36.2(2)).GR6

Shaft Slurry

Synthetic Slurry

Section 9-36.2(2) is supplemented with the following:

6-19.2(9-36.2(2)).OPT1.GB6

(January 2, 2012)

Salt water shall not be used with synthetic slurry for shafts. Fresh water only shall be used.

6-19.3.GR6

Construction Requirements

6-19.3(2).GR6

Submittals

6-19.3(2).INST1.GR6

Section 6-19.3(2) is supplemented with the following:

6-19.3(2).OPT1.GB6

(January 2, 2012)

Crosshole Sonic Log Testing Organization and Personnel Submittal

At least seven calendar days prior to beginning shaft construction, the Contractor shall electronically submit the name of the independent testing organization, and the names of the personnel, conducting the crosshole sonic log tests to the Engineer for approval. The submittal shall include documentation that the qualifications specified below are satisfied. The independent testing organization and the testing personnel shall meet the following minimum qualifications:

1. The testing organization shall have performed crosshole sonic log tests on a minimum of three deep foundation projects in the last two years.

2. Personnel conducting the tests for the testing organization shall have a minimum of one year experience in crosshole sonic log testing and interpretation.

6-19.3(3).GR6

Shaft Excavation

6-19.3(3).INST1.GR6

Section 6-19.3(3) is supplemented with the following:

6-19.3(3).OPT1.GB6

(January 2, 2012)

Variations in the bearing layer elevation from that shown in the Plans are anticipated. The Contractor shall have equipment on-site capable of excavating an additional 20 percent of depth below that shown in the Plans.

6-19.3(3)B.GR6

Temporary and Permanent Shaft Casing

6-19.3(3)B.INST1.GR6

Section 6-19.3(3)B is supplemented with the following:

6-19.3(3)B.OPT1.FB6

(January 2, 2012)

The Contractor shall furnish and install casings as follows:

Bridge No. and Pier number or Wall name and	Casing Type	Elev. Of Bottom of Required Casing (feet)	Upper and Lower Elevation Limits for Concurrent Casing

Station Limits	Placement with Excavation
*** $$1$$ *** *** $$2$$ ***	*** $$3$$ *** *** $$4$$ ***

When installing required temporary or required permanent casings between the upper and lower elevation limits specified above, the casing shall be advanced prior to or concurrently with the excavation. Excavation in advance of the casing tip shall not exceed *** $$5$$ *** feet, except that in no case shall shaft excavation and casing placement extend below the bottom of shaft excavation as shown in the Plans.

6-19.3(3)B.OPT2.GB6

(January 2, 2012)

Shaft casing shall be equipped with cutting teeth or a cutting shoe, and installed by either rotating or oscillating the casting. Installing the casing by vibratory means will not be allowed.

6-19.3(3)B4.GR6

Temporary Telescoping Shaft Casing

6-19.3(3)B4.INST1.GR6

The second paragraph of Section 6-19.3(3)B4 is revised to read as follows:

6-19.3(3)B4.OPT1.GB6

(January 2, 2012)

Temporary telescoping casing will not be allowed for bridge end pier shafts.

6-19.3(3)I.GR6

Required Use of Slurry in Shaft Excavation

6-19.3(3)I.INST1.GR6

Section 6-19.3(3)I is supplemented with the following:

6-19.3(3)I.OPT1.GB6

(January 2, 2012)

If the Contractor is utilizing casing that is adequately sealed into competent soils such that the water cannot enter the excavation, the Contractor may, with the Engineer's approval, continue excavation in wet soils without slurry provided the water level within the casing does not rise or exhibit flow.

6-19.3(4).GR6

Slurry Installation Requirements

6-19.3(4)A.GR6

Slurry Technical Assistance

6-19.3(4)A.INST1.GR6

Section 6-19.3(4)A is supplemented with the following:

6-19.3(4)A.OPT1.FB6

(January 2, 2012)

The slurry manufacturer's representative shall be present during construction and completion of the first shaft excavated at the following specific shaft sites:

*** $$1$$ ***

6-19.3(5).GR6

Assembly and Placement of Reinforcing Steel

6-19.3(5).INST1.GR6

Section 6-19.3(5) is supplemented with the following:

6-19.3(5).OPT1.GB6

(January 2, 2012)

For those shafts with a specified minimum penetration into the bearing layer and no specified tip elevation, the Contractor shall furnish each shaft steel reinforcing bar cage, including access tubes for crosshole sonic log testing in accordance with Section 6-19.3(6), 20 percent longer than specified in the Plans. The Contractor shall add the increased length to the bottom of the cage. The Contractor shall trim the shaft steel reinforcing bar cage to the proper length prior to placing it into the excavation. If trimming the cage is required and access tubes for crosshole sonic log testing are attached to the cage, the Contractor shall either shift the access tubes up the cage, or cut the access tubes provided that the cut tube ends are adapted to receive the watertight cap as specified.

6-19.3(7).GR6

Placing Concrete

6-19.3(7)D.GR6

Requirements for Placing Concrete Underwater

6-19.3(7)D.INST1.GR6

Section 6-19.3(7)D is supplemented with the following:

6-19.3(7)D.OPT1.GB6

(January 2, 2012)

The Contractor may use a tremie instead of a concrete pump, subject to the following conditions:

1. The tremie shall have a hopper at the top that empties into a watertight tube at least eight inches in diameter.

2. The discharge end of the tube on the tremie shall include a device to seal out water while the tube is first filled with concrete.

6-19.3(9).GR6

Nondestructive Testing of Shafts (Crosshole Sonic Log (CSL) Testing)

6-19.3(9)A.GR6

Schedule of CSL Testing

6-19.3(9)A.INST1.GR6

The first paragraph of Section 6-19.3(9)A is revised to read as follows:

6-19.3(9)A.OPT1.GB6

(January 2, 2012)

The Contractor shall provide for crosshole sonic log testing and analysis on all completed shafts designated for testing by the Engineer. The testing and analysis shall be performed by the independent testing organization submitted by the Contractor and approved by the Engineer in accordance with Section 6-19.3(2) as supplemented in these Special Provisions.

6-19.3(9)C.GR6

Engineer's Final Acceptance of Shafts

6-19.3(9)C.INST1.GR6

Section 6-19.3(9)C is revised to read as follows:

6-19.3(9)C.OPT1.GB6

(January 2, 2012)

The Contractor shall submit the results and analysis of the crosshole sonic log testing for each shaft tested to the Engineer for approval. The Engineer will determine final acceptance of each shaft, based on the crosshole sonic log test results and analysis for the tested shafts, and will provide a response to the Contractor within three working days after receiving the test results and analysis.

6-19.4.GR6

Measurement

6-19.4.INST1.GR6

The ninth and tenth paragraphs of Section 6-19.4 are revised to read as follows:

6-19.4.OPT1.GB6

(January 2, 2012)

Steel reinforcing bar for shaft will be measured by the computed weight of all the steel reinforcing bar for the shaft to the design depth shown in the Plans plus the weight required to extend the shaft reinforcement by 20 percent in length as specified in Section 6-19.3(3) as supplemented in these Special Provisions. Bracing for steel reinforcing bar cages shall be considered incidental to this item of work.

CSL access tube will be measured by the linear foot of tube required based on the design depth shown in the Plans plus the length required to extend the shaft reinforcement by 20 percent in length as specified in Section 6-19.3(3) as supplemented in these Special Provisions.

6-19.4.INST2.GR6

Section 6-19.4 is supplemented with the following:

6-19.4.OPT2.GB6
(January 2, 2012)
CSL test will be measured once per shaft tested.

6-19.4.OPT3.GB6
(January 2, 2012)
Fresh water for shaft slurry will be measured in accordance with Section 2-07.4.

6-19.5.GR6
Payment

6-19.5.INST1.GR6
Section 6-19.5 is supplemented with the following:

6-19.5.OPT1.GB6
(January 2, 2012)
“CSL Test”, per each.

6-19.5.OPT2.GB6
(January 2, 2012)
“Fresh Water for Shaft Slurry”, per M gal.

DIVISION7.GR7

Division 7
Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits

7-02.GR7
Culverts

7-02.2.GR7
Materials

7-02.2.INST1.GR7
Section 7-02.2 is supplemented with the following:

7-02.2.OPT1.GR7
(April 4, 2011)
Precast Reinf. Conc. Box Culvert
Materials for precast reinforced concrete box culvert elements shall conform to ASTM C 1433.

Grout shall conform to Section 9-20.3(2).

7-02.2.OPT2.GR7
(April 4, 2011)
Precast Reinf. Conc. Split Box Culvert
Portland cement shall conform to Section 9-01.

Aggregate for portland cement concrete shall conform to Section 9-03.1.

Steel reinforcing bar, wire, and mesh shall conform to Section 9-07.

Concrete curing materials and admixtures shall conform to Section 9-23.

Water shall conform to Section 9-25.1.

Elastomeric gaskets shall conform to ASTM D 1056 Type 2 Class C Grade 1.

Grout shall conform to Section 9-20.3(2).

7-02.3.GR7

Construction Requirements

7-02.3.INST1.GR7

Section 7-02.3 is supplemented with the following:

7-02.3.OPT1.GR7

(April 2, 2007)

Precast Reinf. Conc. Box Culvert

Precast reinforced concrete box culverts shall conform to ASTM C 1433 and the details shown in the Plans.

Precast reinforced concrete attachments to the box culverts, such as headwalls and baffles, shall be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, 17th Edition – 2002, Chapters 6 and 8, load factor design method. The design vehicular live load shall be HS-20.

Concrete for all precast reinforced concrete box culvert elements shall attain a minimum 28 day compressive strength of 4,000 psi. Concrete cover from the face of any concrete surface to the face of any steel reinforcement shall be 1 inch minimum.

The Contractor shall submit six sets of shop drawings, with two sets of supporting design calculations for all precast reinforced concrete attachments to the box culverts, to the Engineer in accordance with Sections 6-01.9 and 6-02.3(28)A. In addition to items 1 through 6 under the Section 6-02.3(28)A requirements for shop drawing content, the following shop drawing details shall also be submitted:

1. Erection and backfill procedure.

2. Complete, site specific, itemized bar list for all reinforcing steel.

The Contractor shall erect and backfill precast reinforced concrete box culverts, with associated precast reinforced concrete attachments, in accordance with the erection sequence specified in the shop drawings as approved by the Engineer.

7-02.3.OPT2.GR7

(April 2, 2012)

Precast Reinf. Conc. Split Box Culvert

Design Criteria

The Contractor shall design the precast reinforced concrete split box culvert including all precast reinforced concrete attachments to the box culverts such as headwalls and baffles, in accordance with the AASHTO LRFD Bridge Design Specifications, latest edition and current interims in effect on the Bid advertising date. The design vehicular live load shall be HL-93.

Concrete for precast reinforced concrete split box culverts, including all precast reinforced concrete attachments to the box culverts, shall attain a minimum 28 day compressive strength of 4,000 psi. Concrete cover from the face of any concrete surface to the face of any steel reinforcement shall be 1 inch minimum.

Submittals

The Contractor shall submit six sets of shop drawings, with two sets of supporting design calculations, to the Engineer in accordance with Sections 6-01.9 and 6-02.3(28)A. In addition to items 1 through 6 under the Section 6-02.3(28)A requirements for shop drawing content, the following shop drawing details shall also be submitted:

1. Erection and backfill procedure.

2. Complete, site specific, itemized bar list for all reinforcing steel.

Culvert Section Fabrication

The Contractor shall fabricate the precast elements of the precast reinforced concrete split box culvert (consisting of “U” shaped base elements with “lid” panels and staggered base and lid joints as shown in the Plans) in accordance with Section 6-02.3(28), and the shop drawings as approved by the Engineer.

The precast reinforced concrete split box culvert fabricator shall notify the Washington State Department of Transportation Materials and Fabrication Inspection Section at least five working days in advance of beginning fabrication of the precast elements for this project.

The Contractor may strip forms from precast reinforced concrete split box culvert sections after the concrete reaches a minimum compressive strength of 3,000 psi, provided the precast reinforced concrete split box culvert remains in the casting bed until the concrete reaches a minimum compressive strength of 70 percent of the final design strength specified in the shop drawing and design calculation submittal. All damage from stripping is the Contractor’s responsibility.

The Contractor shall pick, move, and store the precast reinforced concrete split box culvert elements in the cast position until the concrete reaches a minimum compressive strength equal to the final design strength specified in the shop drawing and design calculation submittal.

Prior to shipping, the precast reinforced concrete split box culvert fabricator shall furnish the Inspector a complete documentation package for each culvert. The documentation package shall include the following information for each culvert:

1. Concrete batch tickets

2. Concrete cylinder break results.

3. Material certifications.

4. Copies of all changes from the Plans and Specifications.

The following information shall be legibly and permanently marked on one inside face of each "U" shaped element by indentation, waterproof paint, or other means approved by the Engineer:

1. Box section span and rise dimensions, minimum and maximum design earth cover dimensions, and vehicular live load for design (HL-93).

2. WSDOT Contract Number and date of fabrication.

3. Name or trademark of the fabricator.

Culvert Excavation and Bedding Preparation
All excavated material shall be disposed of in accordance with Section 2-09.3(1)D.

If water is present within the excavation, the Contractor shall dewater the excavated area before placing the bedding material. The Contractor shall submit a dewatering plan to the Engineer for approval, and shall not begin culvert excavation until receiving the Engineer's approval of the dewatering plan.

The culvert bedding, consisting of the backfill elements shown in the Plans, shall be placed and compacted in accordance with Section 7-08.3(1)C.

Culvert Erection
The Contractor shall erect and backfill precast reinforced concrete split box culverts in accordance with the erection sequence specified in the shop drawings as approved by the Engineer, and the construction equipment restrictions specified in Section 6-02.3(25)O.

Elastomeric gaskets shall be installed at all joints between precast elements, and shall be in full contact with both precast elements at the joint prior to the remainder of the joint being completely filled with grout that conforms to Section 9-20.3(3).

7-02.4.GR7
Measurement

7-02.4.INST1.GR7
Section 7-02.4 is supplemented with the following:

7-02.4.OPT1.FR7
(April 2, 2007)
"Precast Reinf. Conc. Box Culvert No. __" contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for "Precast Reinf. Conc. Box Culvert No. __" even though the actual quantities required may deviate from those listed.

7-02.4.OPT2.FR7
(April 2, 2007)
"Precast Reinf. Conc. Split Box Culvert No. __" contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for "Precast Reinf. Conc. Split Box Culvert No. __" even though the actual quantities required may deviate from those listed.

7-02.5.GR7
Payment

7-02.5.INST1.GR7
Section 7-02.5 is supplemented with the following:

7-02.5.OPT1.GR7
(April 2, 2007)
"Precast Reinf. Conc. Box Culvert No. __", lump sum.
The lump sum contract price for "Precast Reinf. Conc. Box Culvert No. __" shall be full pay for performing the work as specified, including designing, fabricating, and erecting the precast concrete elements for the culvert.

7-02.5.OPT2.GR7
(April 2, 2007)
"Precast Reinf. Conc. Split Box Culvert No. __", lump sum.
The lump sum contract price for "Precast Reinf. Conc. Split Box Culvert No. __" shall be full pay for performing the work as specified, including designing, fabricating, and erecting the precast concrete elements for the culvert.

DIVISION8.GR8

Division 8
Miscellaneous Construction

8-01.GR8

Erosion Control and Water Pollution Control

8-01.3.GR8

Construction Requirements

8-01.3(1).GR8

General

8-01.3(1).INST1.GR8

The tenth paragraph of Section 8-01.3(1) is revised to read:

8-01.3(1).OPT1.GR8

(January 25, 2010)

Erodible Soil Eastern Washington

Erodible soil not being worked whether at final grade or not, shall be covered within the following time period using an approved soil cover practice:

July 1 through September 30	30 days
October 1 through June 30	15 days

8-01.3(1).INST2.GR8

Section 8-01.3(1) is supplemented with the following:

8-01.3(1).OPT7.FR8

(April 1, 2002)

Offsite Stormwater

Stormwater is known to enter the project site at the following locations:

*** $$1$$ ***

The Contractor shall, prior to disruption of the normal water course, intercept the offsite stormwater and pipe it either through or around the project site in such a manner that it is not combined with onsite stormwater and it is discharged at its pre-construction outfall point in such a manner that there is no increase in erosion below the site.

The method for performing this work shall be included in the Contractor's temporary erosion control plan.

8-01.3(1).OPT8.FR8

(April 1, 2002)

Side Slope Treatment

Slopes shall be compacted within *** $$1$$ *** days of exposure of a new section of cut and construction of a new portion of an embankment.

8-01.3(1)A.GR8

Submittals

8-01.3(1)A.INST1.GR8

Section 8-01.3(1)A is supplemented with the following:

8-01.3(1)A.OPT1.GR8

(April 3, 2006)

Prior to beginning any concrete or grinding work, the Contractor shall submit a plan, for the Engineer's review and approval, outlining the procedures to be used to prevent high pH stormwater or dewatering water from entering surface waters. The plan shall include how the pH of the water will be maintained between pH 6.5 and pH 8.5 prior to being discharged from the project or entering surface waters.

8-01.3(2).GR8

Seeding, Fertilizing and Mulching

8-01.3(2)B.GR8

Seeding and Fertilizing

8-01.3(2)B.INST1.GR8

Section 8-01.3(2)B is supplemented with the following:

8-01.3(2)B.OPT1.FR8

(December 4, 2006)

Grass seed, of the following composition, proportion, and quality shall be applied at the rates shown below on all areas requiring roadside seeding within the project:

Kind and Variety of Seed in Mixture by Common Name and (Botanical name)	Pounds Pure Live Seed (PLS) Per Acre
*** $$1$$	$$
$$	$$
$$	$$
Total Pounds PLS Per Acre	$$ ***

Seeds shall be certified "Weed Free," indicating there are no noxious or nuisance weeds in the seed.

8-01.3(2)B.OPT2.FR8

(January 3, 2011)

Grass seed of the following composition, proportion, and quality shall be applied at the rates shown below on all areas requiring roadside seeding within the project:

Kind and Variety of Seed in Mixture by Common Name and (Botanical name)	Pounds Pure Live Seed (PLS) Per Acre
*** $$1$$	$$
$$	$$
$$	$$
Total Pounds PLS Per Acre	$$ ***

Source Identified seed shall be fourth generation or earlier. Non-Source Identified seed shall meet or exceed Washington State Department of Agriculture Certified Seed Standards and be from within the *** $$3$$ *** Ecoregion(s) as defined by the US Environmental Protection Agency (EPA) and shown at:

http://www.wsdot.wa.gov/publications/fulltext/Roadside/eco_regions_v9.jpg

Seeds shall be certified "Weed Free," indicating there are no noxious or nuisance weeds in the seed.

8-01.3(2)B.OPT3.GR8

(January 3, 2006)

Grass seed shall be a commercially prepared mix, made up of low growing species which will grow without irrigation at the project location, and approved by the Engineer. The application rate shall be two pounds per 1000 square feet.

8-01.3(2)B.OPT4.FR8

(January 3, 2006)

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** $$1$$ *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** $$2$$ *** pounds per acre.

Soluble Potash as K_2O - *** $$3$$ *** pounds per acre.

*** $$4$$ *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

8-01.3(2)B.OPT5.FR8

(January 3, 2006)

First Application of Fertilizer

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** $$1$$ *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** $$2$$ *** pounds per acre.

Soluble Potash as K_2O - *** $$3$$ *** pounds per acre.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

Second Application of Fertilizer

A second application of fertilizer shall be applied during the period of March 1 to April 15 or November 15 to December 15. In no instance shall the second application of fertilizer occur less than 90 days after the first fertilizer application.

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** $$4$$ *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** $$5$$ *** pounds per acre.

Soluble Potash as K_20 - *** $$6$$ *** pounds per acre.

*** $$7$$ *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

8-01.3(2)B.OPT6.GR8

(January 3, 2006)

Fertilizer shall be a commercially prepared mix of 10-20-20 and shall be applied at the rate of 10 pounds per 1000 square feet.

8-01.3(2)B.OPT7.FR8

(January 3, 2006)

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N – *** $$1$$ *** pounds per acre.

Sulfur – *** $$2 $$ ***pounds per acre.

*** $$3$$ *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

8-01.3(2)C.GR8

Liming

8-01.3(2)C.INST1.GR8

Section 8-01.3(2)C is supplemented with the following:

8-01.3(2)C.OPT1.FR8

(January 3, 2006)

Lime shall be applied at the rate of *** $$1$$ *** pounds per acre.

8-01.3(2)D.GR8

Mulching

8-01.3(2)D.INST1.GR8

Section 8-01.3(2)D is supplemented with the following:

8-01.3(2)D.OPT1.FR8

(August 2, 2010)

*** $$1$$ *** shall be applied at a rate of *** $$2$$ *** pounds per acre.

8-01.5.GR8

Payment

8-01.5.INST1.GR8

Section 8-01.5 is supplemented with the following:

8-01.5.OPT1.GR8

(April 3, 2006)

All costs associated with the treatment of pH in high pH stormwater or dewatering water shall be included in the applicable concrete, grinding or sawcutting items of work.

8-02.GR8

Roadside Restoration

8-02.1.GR8

Description

8-02.1.INST1.GR8

Section 8-02.1 is supplemented with the following:

8-02.1.OPT1.GR8

(December 6, 2004)

This work shall consist of removing and disposing of buried man-made or manufactured debris that may be encountered during soil amendment incorporation or during excavation for irrigation systems included in the contract. Such debris shall be removed to a maximum depth of two feet. The excavated debris shall be removed from the project site to an approved disposal facility.

8-02.2.GR8

Materials

8-02.2.INST1.GR8

Section 8-02.2 is supplemented with the following:

8-02.2.OPT1.GR8

(January 3, 2011)

Conservation Grade Plant Material

Conservation grade plant material is defined as healthy plants that do not meet aesthetic standards as defined in ASNS. The plants have healthy, well-developed roots and in all other ways meet standards for healthy and vigorous growth. However, these plants may have multiple leaders, damaged or missing leaders, Y crotches, bent branches, or other unusual shapes or forms. These plants may be used where shown in the plans.

8-02.2(9-14).GR8

Erosion Control and Roadside Planting

8-02.2(9-14).INST1.GR8

Section 9-14 is supplemented with the following:

8-02.2(9-14).OPT1.FR8

(January 3, 2011)

Weed Barrier Mats

Weed Barrier Mats shall be 3 feet square. They shall be made of UV stabilized geotextile colored with carbon black and shall provide a minimum of 3 years of weed control. Weed Barrier Mats shall be 2.5 mils thick with a minimum of 400 micropores per square inch. Staples shall be a minimum of 11 gauge wire and be *** $$1$$ *** inches in length.

Acceptance will be based on a catalog cut.

8-02.2(9-14.4).GR8

Mulch and Amendments

8-02.2(9-14.4(8)).GR8

Compost

Section 9-14.4(8) is supplemented with the following:

8-02.2(9-14.4(8)).OPT1.GR8

(January 3, 2010)

Acceptance will be based upon a visual examination of the compost and US Composting Council Seal of Testing Assurance (STA) certified laboratory test results dated within 90 calendar days of the application.

8-02.3.GR8

Construction Requirements

8-02.3(5).GR8

Planting Area Preparation

8-02.3(5).INST1.GR8

Section 8-02.3(5) is supplemented with the following:

8-02.3(5).OPT1.FR8

(August 2, 2004)

After the initial planting area weed control, soil placement, grading, and the installation of irrigation lines are completed, and prior to planting, all designated planting areas shall be covered with compost.

Prior to placement of compost, the application methods shall be approved by the Engineer.

Compost shall not be placed when a condition exists, such as frozen or water saturated soil, that may be detrimental to successful application or soil structure.

The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

Compost shall be uniformly and evenly placed in all designated areas at the rate of *** $$1$$ *** cubic yards per acre.

8-02.3(5).OPT2.FR8

(August 2, 2004)

After the initial planting area weed control, soil placement, and grading are completed, and prior to the installation of irrigation lines and planting, all designated planting areas shall be covered with compost.

Prior to placement and incorporation of compost, the application and incorporation methods shall be approved by the Engineer.

Compost shall not be placed when a condition exists, such as frozen soil or water saturated soil, that may be detrimental to successful application, incorporation, or soil structure.

The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

Compost shall be uniformly and evenly placed in all designated areas at the rate of *** $$1$$ *** cubic yards per acre.

After placement of the compost, the Contractor shall incorporate the layer uniformly into the existing soil to a depth of *** $$2$$ *** inches.

8-02.3(5).OPT3.FR8

(August 2, 2010)

After initial area weed control, grading, and soil placement are completed, all soil shall be covered with compost.

Prior to the placement and incorporation of compost, the application and incorporation methods shall be approved by the Engineer.

Compost shall not be placed when a condition exists, such as frozen or water saturated soil that may be detrimental to successful application, incorporation, or soil structure.

The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

Compost shall be uniformly and evenly placed in all designated areas to a depth of *** $$1$$ *** inches.

After placement of the compost, the Contractor shall incorporate the layer uniformly into the existing soil to a depth of *** $$2$$ *** inches.

8-02.3(5).OPT4.GR8

(December 6, 2004)

Removal of Buried Man-Made Debris

The Contractor shall remove and dispose of the debris as ordered by the Engineer.

8-02.3(11).GR8

Bark or Wood Chip Mulch

8-02.3(11).INST1.GR8

Section 8-02.3(11) is supplemented with the following:

8-02.3(11).OPT1.FR8

(April 2, 2012)

Bark mulch or wood chip mulch shall be placed to a uniform non-compacted depth of *** $$1$$ *** over all planting areas.

Bark or wood chip mulch shall not be placed in areas of standing or flowing water.

8-02.4.GR8

Measurement

8-02.4.INST2.GR8

The first paragraph of Section 8-02.4 is revised as follows:

8-02.4.OPT2.GR8

(April 2, 2012)

Topsoil and soil amendments will be measured by the cubic yard in the haul conveyance at the point of delivery. Bark or wood chip mulch will be measured by the acre along the grade and slope of the area covered immediately after application. Bark or Wood Chip Mulch spread or incorporated outside of the designated area will not be measured for payment.

8-02.4.INST3.GR8
The seventh paragraph of Section 8-02.4 is revised as follows:

8-02.4.OPT6.GR8
(August 2, 2010)
Compost will be measured by the acre by ground slope measurement or through the use of design data of the area composted immediately after application. Compost spread or incorporated outside of the designated area will not be measured or paid for.

8-02.5.GR8
Payment

8-02.5.INST1.GR8
Section 8-02.5 is supplemented with the following:

8-02.5.OPT1.GR8
(August 7, 2006)
"___ Compost", per cubic yard.
The unit contract price per cubic yard for "___ Compost" shall be full pay for furnishing, spreading, and incorporating the compost into the soil.

8-02.5.OPT2.GR8
(December 6, 2004)
“Removal of Buried Man-Made Debris” by force account as specified in Section 1-09.6. The payment for removal of buried man-made debris shall be full compensation for all costs for the specified work to include removing, loading, hauling, and all associated disposal costs.

To provide a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor’s total bid.

8-02.5.OPT3.GR8
(August 2, 2010)
“Compost, per acre.”
The unit price per acre shall be full pay for furnishing, spreading and incorporating the compost into the existing soil.

8-02.5.OPT4.GR8
(April 2, 2012)
"Bark or Wood Chip Mulch", per acre.
The unit Contract price per acre for "Bark or Wood Chip Mulch" shall be full pay for all Costs for the Work including furnishing and applying bark or wood chip mulch.

8-10.GR8

Guide Posts

8-10.1.GR8

Description

8-10.1.INST1.GR8

Section 8-10.1 is supplemented with the following:

8-10.1.OPT1.GR8

(April 1, 2002)

This Work shall consist of furnishing and installing barrier delineators on concrete barrier when barrier runs concurrent with guide post locations.

8-10.2.GR8

Materials

8-10.2.INST1.GR8

Section 8-10.2 is supplemented with the following:

8-10.2.OPT1.GR8

(April 1, 2002)

Barrier delineators shall consist of a flat plastic reflector lens or reflective sheeting attached to a housing or bracket to facilitate the mounting of the delineator on concrete traffic barrier. The reflective surface shall be rectangular or trapezoidal shape with a minimum area of 9 square inches for reflectors and 12 square inches for reflective sheeting. The housing or bracket can be flexible or rigid, molded from a durable plastic or other durable material approved by the engineer. Barrier delineators shall be one sided for single direction or two sided for bi-directional.

Reflectors shall be acrylic or polycarbonate and shall conform to AASHTO M 290. Reflectors shall equal or exceed the following minimum values of specific intensity:

Observation Angle (Degrees)	Entrance Angle (Degrees)	Specific Intensity cd/ft-c	
		White	Yellow
0.1	0	126	75
0.1	20	50	30

Reflective sheeting for barrier delineators shall be type III, IV, V or VII and selected from approved materials listed in the Qualified Products List.

8-10.3.GR8

Construction Requirements

8-10.3.INST1.GR8

Section 8-10.3 is supplemented with the following:

8-10.3.OPT1.GR8

(April 1, 2002)

Barrier delineators shall be placed on the traffic face of the barrier six inches down from the top. Spacing shall be as shown in the plans. Delineator color shall be white on the right of traffic and yellow on the left of traffic. The surface of the barrier where the delineator is applied shall be free of dirt, curing compound, moisture, paint, or any other material that would adversely affect the bond of the adhesive. Install delineators with an adhesive recommended by the manufacturer.

8-10.3.OPT2.GR8

(April 1, 2002)

Barrier delineators shall be placed on the top of the barrier. Spacing shall be as shown in the plans. Delineator color shall be white on the right of traffic and yellow on the left of traffic. The surface of the barrier where the delineator is applied shall be free of dirt, curing compound, moisture, paint, or any other material that would adversely affect the bond of the adhesive. Install delineators with an adhesive recommended by the manufacturer.

8-10.4.GR8

Measurement

8-10.4.INST1.GR8

Section 8-10.4 is supplemented with the following:

8-10.4.OPT1.GR8

(April 1, 2002)

Barrier delineators will be measured by the unit for each delineator furnished and installed.

8-10.5.GR8

Payment

8-10.5.INST1.GR8

Section 8-10.5 is supplemented with the following:

8-10.5.OPT1.GR8

(April 1, 2002)

"Barrier Delineator", per each

8-11.GR8

Guardrail

8-11.1.GR8

Description

8-11.1.INST1.GR8

Section 8-11.1 is supplemented with the following:

8-11.1.OPT1.GR8

(April 6, 2009)

High-Tension Cable Barrier System (3 and 4 Cable)

This work consists of supplying and constructing high-tension cable barrier systems (cable, posts, compensating devices, fittings, and hardware), terminals, and transitions in conformity with the lines and grades as staked.

8-11.2.GR8

Materials

8-11.2.INST1.GR8

Section 8-11.2 is supplemented with the following:

8-11.2.OPT1.GR8

(April 6, 2009)

High-Tension Cable Barrier System (3 Cable)

Furnish high-tension 3-cable barrier system, terminals, and transitions that meet the requirements of NCHRP Report 350 Test Level 3 that are designed for a minimum cable tension of 3,000-pounds at an ambient air temperature of 70 degrees F, and are documented as acceptable for use on the National Highway System by the Federal Highway Administration. The maximum post spacing allowed shall be 17.0-feet. All fittings and connecting hardware shall have a minimum breaking strength of 36,000-pounds. The maximum post spacing allowed shall limit vehicular dynamic deflection to the value shown in the plans. Approved high tension 3-cable barrier systems are shown on the Qualified Products List.

Furnish shop drawings and installation procedures to the Engineer a minimum of 10-days prior to the beginning of any installation work on the system. The drawings shall specify all components used in the entire cable barrier system as well as the post spacing required to achieve the required maximum vehicular deflections.

If a manufacturer's product which is not on the QPL is proposed, furnish shop drawings and installation procedures to the Engineer a minimum of 20-days prior to the beginning of any installation work on the system. The system will be accepted based on a Supplier's Certificate of Compliance. Provide a Supplier's Certificate of Compliance that is a contract specific letter from the supplier stating the system is NCHRP 350 Test Level 3 compliant. Also include a copy of the FHWA acceptance letter for this product. The system will not be allowed in the project if the FHWA has not approved this system.

8-11.2.OPT2.GR8

(August 3, 2009)

High-Tension Cable Barrier System (4 Cable)

Furnish high-tension 4-cable barrier system, terminals, and transitions that meet the requirements of NCHRP Report 350 Test Level 3 or 4 that are designed for a minimum cable tension of 3,000-pounds at an ambient air temperature of 70 degrees F, and are documented as acceptable for use on the National Highway System by the Federal Highway Administration. The maximum post spacing allowed shall be 17.0-feet. All fittings and connecting hardware shall have a minimum breaking strength of 36,000-pounds. The maximum post spacing allowed shall limit vehicular dynamic deflection to the value shown in the plans. Approved high tension 4-cable barrier systems are shown

on the Qualified Products List. Only 4-cable systems with a top cable height of not less than 35-inches and a bottom cable height of not more than 19-inches will be acceptable.

Furnish shop drawings and installation procedures to the Engineer a minimum of 10-days prior to the beginning of any installation work on the system. The drawings shall specify all components used in the entire cable barrier system as well as the post spacing required to achieve the required maximum vehicular deflections.

If a manufacturer's product which is not on the QPL is proposed, furnish shop drawings and installation procedures to the Engineer a minimum of 20-days prior to the beginning of any installation work on the system. The system will be accepted based on a Supplier's Certificate of Compliance. Provide a Supplier's Certificate of Compliance that is a contract specific letter from the supplier stating the system is NCHRP 350 Test Level 3 or 4 compliant. Also include a copy of the FHWA acceptance letter for this product. The system will not be allowed in the project if the FHWA has not approved this system.

8-11.2(9-16.3).GR8

Beam Guardrail

8-11.2(9-16.3(2)).GR8

Posts and Blocks

8-11.2(9-16.3(2)).INST1.GR8

Section 9-16.3(2) is supplemented with the following:

8-11.2(9-16.3(2)).OPT1.BSP.GB8

(BSP February 22, 2001)

Shear plates and backing plates shall conform to ASTM A 36, and shall be galvanized after fabrication in accordance with AASHTO M 111.

8-11.2(9-16.3(2)).OPT2.BSP.GB8

(BSP January 4, 2010)

Grout for post bases shall conform to Section 9-20.3(2).

8-11.2(9-16.3(2)).OPT3.BSP.GB8

(BSP October 13, 2003)

Steel angles connecting the timber blockout to the existing steel truss members shall conform to either ASTM A 36 or ASTM A 992, and shall be galvanized in accordance with AASHTO M 111.

8-11.2(9-16.3(2)).OPT4.BSP.GB8

(BSP November 5, 2006)

HSS steel tubing shall conform to ASTM A 500 Grade B, and shall be galvanized after fabrication in accordance with AASHTO M 111.

Steel bars, plates, and shapes shall conform to ASTM A 36, and shall be galvanized after fabrication in accordance with AASHTO M 111, except that structural shapes may conform to ASTM A 992.

Galvanized sheet metal shall conform to ASTM A 526, Coating Designation G 235.

Paving bulkheads, timber blocking, and custom cut shims shall be Douglas Fir-Larch No. 2 or better, and shall be treated as specified in this Section.

Rubberized asphalt shall conform to Section 9-04.10.

8-11.2(9-16.3(4)).GB8

Hardware

Section 9-16.3(4) is supplemented with the following:

8-11.2(9-16.3(4)).OPT1.BSP.GB8

(BSP July 12, 2000)

Resin bonded anchors shall conform to Sections 6-02.2 and 6-02.3(18) as supplemented in these Special Provisions.

8-11.2(9-16.3(4)).OPT2.BSP.GB8

(BSP July 12, 2000)

Lag screws shall conform to Section 9-06.22.

8-11.3.GR8

Construction Requirements

8-11.3.INST1.GR8

Section 8-11.3 is supplemented with the following:

8-11.3.OPT1.GR8

(January 4, 2010)

Box Culvert Guardrail Steel Post

The Contractor shall remove surfacing materials from the top of the box culvert and shall determine the length of the posts and 7/8 inch diameter high strength bolts. The Engineer will verify the dimensions before the posts may be fabricated.

All surfacing material must be removed from the box culverts in an area extensive enough to allow installation of the baseplate. Before the grout that conforms to Section 9-20.3(2) is placed, the concrete surface shall be thoroughly cleaned of all dirt, oil and debris.

The posts shall be installed to the box culvert in accordance with Standard Plan C-10.

After the posts are installed on the box culverts, the excavated areas shall be backfilled and compacted in 6-inch lifts. Compaction shall be accomplished with three passes with a mechanical tamper.

8-11.3.OPT2.FR8

(April 6, 2009)

High-Tension Cable Barrier System (3 and 4 Cable)

A manufacturer's representative, or an installer who has been trained and certified by the unit's manufacturer, shall supervise assembly and installation at all times. Provide a copy of the installer's certification to the Engineer prior to installation.

Assemble and install high-tension cable barrier according to the manufacturer's recommendations. This shall include the connection to guardrail and the transition and terminal sections identified in the Plans. Submit any Contractor proposed modification in barrier location, type, terminal or transition to the Engineer for approval a minimum of 10-days prior to any work in the affected section.

Unless otherwise stated in the Plans, all posts shall be a socket type assembly; with the actual cable barrier post being inserted into a sleeve encased in a cast in place or precast reinforced concrete post foundation and will be installed as recommended by the manufacturer. On every 6th-post, install yellow retro-reflective sheeting that conforms to AASHTO M268 Type 4 adhesive sheeting on both sides of the post.

Terminal Placement

Unless otherwise stated in the Plans, the foundations for the high tension cable barrier terminals shall be cast in place or precast concrete and shall be installed in accordance with manufacturer's recommendations. If a precast concrete foundation is installed, the bottom of the unit shall have a full and even bearing on the surface under it. If there is a need for backfilling an excavation for the concrete foundation, backfill the excavation in accordance with Section 2-09.3(1) E. Delineate the anchor posts for approach traffic with Type 3 lateral clearance markers (object markers) that are made with type III or type IV sheeting.

Additional High-Tension Cable Barrier Components

Furnish and deliver one complete set of High-Tension Cable Barrier to each of the Contracting Agency sites listed below:

*** $$1$$ ***

Include the following components with each complete set:

One-hundred line posts and all associated hardware including but not limited to spacers, connectors, straps, caps and covers. If the system has a special post to accommodate turnbuckles, then 5 of the line posts shall be these special posts.

Twenty sockets except when concrete sockets are used.

One 50 foot long section of cable used for the contract.

Three cable splices and 3 turnbuckle assemblies for a 3-cable system or 4 cable splices and 4 turnbuckle assemblies for a 4-cable system (1-assembly consists of a left and right hand threaded end with a turnbuckle).

One tension measuring device as recommended by the manufacturer.

One anchor post designed for use with the foundations installed.

Ten line terminal posts and all associated hardware.

Provide 48-hours notice to both the Engineer and the maintenance contact listed above prior to delivery. Damaged items will not be accepted and shall be replaced at no cost to the Contracting Agency.

8-11.3.OPT3.GR8

(August 6, 2007)

Beam Guardrail Type 31 NB

The Contractor shall furnish and install a W-beam guardrail system with a top rail height of 31 inches that does not use rail element blockouts. This system shall be documented as acceptable for use on the National Highway System by Federal Highway Administration. In addition, the system shall meet the requirements of NCHRP Report 350 test level 3, and the maximum dynamic deflection shall be 3-feet 6-inches.

Assemble and install Beam Guardrail Type 31NB according to the manufacturer's recommendations. Connect the new system to existing transitions and terminal sections identified in the Plans.

This system will be accepted based on a Manufacturer's Certificate of Compliance conforming to Section 1-06.3

8-11.3(1).GR8

Beam Guardrail

8-11.3(1).INST1.GR8

Section 8-11.3(1) is supplemented with the following:

8-11.3(1).OPT1.GR8

(April 5, 2010)

This project may contain a mixture of steel and wood posts. The bidder is advised that post selection will be as detailed in the plans and these specifications.

8-11.3(1)A.GR8

Erection of Posts

8-11.3(1)A.INST1.GR8

Section 8-11.3(1)A is supplemented with the following:

8-11.3(1)A.OPT1.BSP.GB8

(BSP February 9, 2009)

Timber Blockouts for Beam Guardrail Type Thrie Beam

The Contractor shall cut and trim the timber blocks as necessary to conform to the shape of the existing concrete baluster rail, and to align the beam guardrail element, as shown in the Plans.

When the specified timber blockout spacing places a block at an existing concrete end post or intermediate post, the Contractor shall drill holes into the existing concrete end posts as shown in the Plans and as follows. The Contractor may use any method for drilling the holes provided the method selected does not shatter or damage the concrete adjacent to the holes, or damage the existing steel reinforcement to remain. Location of blockout assemblies may be shifted slightly within the tolerance specified in the Plans in

order to reduce the risk of damage to existing steel reinforcing bars. Once a blockout assembly position is established, damage to existing steel reinforcing bars caused by subsequent core drilling operations at that assembly location is acceptable, provided that the Contractor coats the exposed surface of the damaged steel reinforcing bar with epoxy bonding agent, and allows the epoxy bonding agent to dry before inserting the anchor for the blockout assembly into the drilled hole. The epoxy bonding agent used for coating damaged steel reinforcing bars shall be Type II conforming to Section 9-26.1, with the grade and class as recommended by the epoxy bonding agent manufacturer and as approved by the Engineer.

8-11.3(1)A.OPT2.BSP.GB8

(BSP January 16, 2012)

Steel Posts for Beam Guardrail Type Thrie Beam

The Contractor shall field measure the dimension of the existing curb above the existing wearing surface at each curb line for each bridge receiving beam guardrail Type Thrie Beam. The field measured dimensions, and all adjustments to the field measurements required by planing and paving operations included in this project, shall be included in the steel post assembly shop drawings submitted to the Engineer for approval in accordance with Section 8-11.3(1)F.

The Contractor shall drill holes into the existing concrete curb or railbase as shown in the Plans and as follows. Except where core drilling is specified in the Plans, the Contractor may use any method for drilling the holes provided the method selected does not shatter or damage the concrete adjacent to the holes, or damage the existing steel reinforcement to remain. Location of posts and base plate assemblies may be shifted slightly within the tolerance specified in the Plans in order to reduce the risk of damage to existing steel reinforcing bars. Once a post or base plate assembly position is established, damage to existing steel reinforcing bars caused by subsequent core drilling operations at that assembly location is acceptable.

8-11.3(1)A.OPT3.BSP.GB8

(BSP August 3, 2009)

Beam Guardrail Type WP Thrie Beam

The Contractor shall field measure the depth of the existing ballast and wearing course at both wheel guard lines, and shall include the dimensions at both wheel guard lines in the steel post mounting bracket shop drawings submitted to the Engineer for approval in accordance with Section 8-11.3(1)E.

The Contractor shall remove the existing ballast and wearing course to the top of existing timber deck in the vicinity of the steel post anchorage locations, and shall dispose of the removed surfacing materials in accordance with Section 2-02.3.

As shown in the Plans, the Contractor shall place a timber block beneath the timber deck at each steel post anchorage location and against the existing exterior timber stringer.

The Contractor shall install the steel post anchorage assembly, including the deck plate, distribution plate, bearing plate, base plate, backing plate, and HSS steel tube post, as shown in the Plans. Timber deck shims shall be cut and trimmed as necessary to align the top of the vertical webs of the steel post anchorage 1/2 inch below the top of the surrounding wearing course surfacing, in accordance with the existing timber deck transverse slope and existing ballast and wearing course depth specified in the shop drawings as approved by the Engineer.

The Contractor may field drill holes through the steel components in accordance with Section 6-03.3(27) except as otherwise noted. The Contractor shall identify all holes to be field drilled in the steel fabrication shop drawings submitted to the Engineer for approval. The Contractor may field drill the holes using hand held drills provided that the Contractor submits the method and equipment used to the Engineer for approval, and that the Contractor receives the Engineer's approval of the submittal prior to beginning hand drilling. The Contractor shall repair all galvanized steel surfaces damaged by field drilling operations by painting the damaged areas with one coat of paint conforming to Section 9-08.1(2)B.

The Contractor shall replace all existing ballast and wearing course removed in the vicinity of the steel post anchorage locations to the top of the surrounding surfacing. The Contractor shall fill the void with a surfacing material approved by the Engineer.

8-11.3(1)B.GR8

Erection of Rail

8-11.3(1)B.INST1.GR8

Section 8-11.3(1)B is supplemented with the following:

8-11.3(1)B.OPT1.GR8

(August 6, 2007)

Snow load rail and post washers shall be used in construction of Type 1, Type 2, and Type 31 W-beam guardrail.

8-11.3(1)B.OPT6.BSP.GB8

(BSP July 12, 2000)

Field Measuring to Existing Type 3 Anchors

The Contractor shall field measure the dimension from the centerline of the existing Type 3 anchors specified for reuse to the end of the existing concrete curb and railbase or concrete baluster railing end blocks of the adjacent bridge. The Contractor shall submit these dimensions to the Engineer along with a working drawing showing the arrangement of the thrie beam guardrail elements and approach guardrail elements relative to the existing Type 3 anchors and concrete curb and railbase or concrete baluster railing end blocks for each bridge as applicable.

8-11.3(1)B.OPT7.BSP.GB8

(BSP August 3, 2009)

Attaching Beam Guardrail Type Thrie Beam to Timber Blockouts

The Contractor shall fasten the thrie beam element to the timber blockout assemblies such that the steel shear plates fit snug against the surface forming the opening through the concrete baluster rail.

The Contractor may field drill the holes through the thrie beam elements in accordance with Section 6-03.3(27), except as otherwise noted. The Contractor may field drill the holes using hand held drills provided that the Contractor submits the method and equipment used to the Engineer for approval, and that the Contractor received the Engineer's approval of the submittal prior to beginning hand drilling.

The Contractor shall repair all galvanized steel surfaces damaged by field drilling operations by painting the damaged areas with one coat of paint conforming to Section 9-08.1(2)B.

8-11.3(1)B.OPT8.BSP.GB8

(BSP July 12, 2000)

Thrie Beam Expansion Joint Element

Where beam guardrail Type Thrie Beam crosses bridge expansion joints, the Contractor shall place a thrie beam expansion section element conforming to Standard Plan C-1a.

8-11.3(1)B.OPT9.BSP.GB8

(BSP August 3, 2009)

Beam Guardrail Type WP Thrie Beam

The Contractor may field drill the holes through the thrie beam elements in accordance with Section 6-03.3(27), except as otherwise noted. The Contractor may field drill the holes using hand held drills provided that the Contractor submits the method and equipment used to the Engineer for approval, and that the Contractor received the Engineer's approval of the submittal prior to beginning hand drilling.

The Contractor shall repair all galvanized steel surfaces damaged by field drilling operations by painting the damaged areas with one coat of paint conforming to Section 9-08.1(2)B.

After completing the beam guardrail retrofit and replacing the surfacing at the steel post anchorage locations on the bridge up to the level of the surrounding surfacing, the Contractor shall install the sheet metal water barrier, when the water barrier is shown in the Plans. A bonding layer of rubberized asphalt shall be applied to the surfacing contact area immediately prior to installing the water barrier assembly. The direction of overlap of adjacent water barrier segments shall be as directed by the Engineer.

8-11.3(1)D.GR8

Removing Guardrail and Guardrail Anchor

8-11.3(1)D.INST1.GR8

Section 8-11.3(1)D is supplemented with the following:

8-11.3(1)D.OPT1.BSP.GB8

(BSP July 12, 2000)

Beam Guardrail Type WP Thrie Beam

The Contractor shall remove the existing bridge guardrail posts and railing, the existing timber wheel guards, all associated fasteners, and the existing ballast and wearing course in the vicinity of the steel post anchorage assemblies of the bridges being retrofitted with beam guardrail Type WP Thrie Beam as shown in the Plans

The items specified above shall be removed as follows:

1. The Contractor shall remove the existing timber wheel guards before beginning the beam guardrail retrofit work.

2. The Contractor shall not remove any section of the existing bridge railing system on the bridge until completing the beam guardrail retrofit within that section of the bridge, except as otherwise specified. The Contractor may remove portions of the existing bridge railing system on the bridge which conflict with the anchorages, posts, and rail elements of the retrofit, provided:

    a. The Contractor installs as much of the beam guardrail retrofit as possible in the section that does not conflict with the existing bridge railing system elements.

    b. After removing the conflicting element of the existing bridge railing system, the Contractor shall immediately complete the beam guardrail retrofit in the section.

    c. The Contractor receives the Engineer's approval for removing the conflicting element of the existing bridge railing system before proceeding.

8-11.3(1)G.GR8

Guardrail Construction Exposed to Traffic

8-11.3(1)G.INST1.GR8

Section 8-11.3(1)G is supplemented with the following:

8-11.3(1)G.OPT1.BSP.GB8

(BSP July 12, 2000)

Beam Guardrail Type WP Thrie Beam

Whenever the Contractor is not actively working on the beam guardrail retrofit, the Contractor shall ensure that all guardrail ends are securely fastened to the rail posts and existing bridge railing system, as approved by the Engineer, including temporary terminal end sections as required. The Contractor shall conduct retrofit operations such that no gaps occur between the existing bridge railing system and the beam guardrail retrofit at any time.

Working drawings detailing the temporary connections between the existing guardrail system and the thrie beam guardrail system, and the temporary terminal end sections, shall be submitted to the Engineer for approval in accordance with Section 6-01.9. The Contractor shall not begin thrie beam retrofit operations until receiving the Engineer's approval of the temporary connections submittal.

8-11.4.GR8

Measurement

8-11.4.INST1.GR8

Section 8-11.4 is supplemented with the following:

8-11.4.OPT1.GR8

(March 13, 1995)

Box culvert guardrail steel posts will be measured per each, for each post installed.

8-11.4.OPT2.GR8

(April 6, 2009)

Measurement of either type of high-tension cable barrier (3 Cable or 4 Cable) will be by the linear foot along the line of the completed barrier from end to end including transition sections, terminals, cable barrier to guardrail terminals, foundations, sockets, concrete, compensating devices, tensioning device, slip base post, sleeves, caps, and all hardware.

No specific unit of measurement will apply to the lump sum item "Additional High-Tension Cable Barrier Components". The lump sum measurement will include all of the items furnished and delivered to the maintenance yard.

8-11.5.GR8

Payment

8-11.5.INST1.GR8

The first bid item under Section 8-11.5 is supplemented with the following:

8-11.5.OPT1.BSP.GB8

(BSP July 12, 2000)

All costs in connection with removing and disposing of existing bridge railing components as specified shall be included in the unit contract price per linear foot for "Beam Guardrail Type WP Thrie Beam".

8-11.5.INST2.GR8

Section 8-11.5 is supplemented with the following:

8-11.5.OPT6.GR8

(September 30, 1996)

"Box Culvert Guardrail Steel Post Type ___", per each.

The unit contract price per each for "Box Culvert Guardrail Steel Post Type ___" shall be full pay for completing the installation of the posts, including furnishing, placing and compacting the backfill material.

8-11.5.OPT7.GR8
(April 6, 2009)
“High-Tension Cable Barrier System (3 Cable)”, per linear foot.
“High-Tension Cable Barrier System (4 Cable)”, per linear foot.
“Additional High-Tension Cable Barrier Components”, lump sum.

The unit contract price per linear foot for “High-Tension Cable Barrier (3 Cable or 4 Cable)” shall be full pay to complete the work as specified.

8-11.5.OPT8.GR8
(April 6, 2009)
The lump sum contract price for “Additional High-Tension Cable Barrier Components” shall be full pay to complete the work as specified for either a 3 Cable or 4 Cable system.

8-12.GR8
Chain Link Fence and Wire Fence

8-12.2.GR8
Materials

8-12.2.INST1.GR8
Section 8-12.2 is supplemented with the following:

8-12.2.OPT1.FR8
(August 3, 2009)
Coated Chain Link Fence
Chain link fence fabric shall be hot-dip galvanized with a minimum of 0.8 ounce per square foot of surface area.

Fencing materials shall be coated with an ultraviolet-insensitive plastic or other inert material at least 2 mils in thickness. Any pretreatment or coating shall be applied in accordance with the manufacturer's written instructions. The Contractor shall provide the Engineer with the manufacturer's written specifications detailing the product and method of fabrication. The color shall match Federal Standard 595 color number *** $$1$$ ***, or be as approved by the Engineer.

Samples of the coated fencing materials shall be approved by the Engineer prior to installation on the project.

The Contractor shall supply the Engineer with 10 aerosol spray cans containing a minimum of 14 ounces each of paint of the color specified above. The touch-up paint shall be compatible with the coating system used.

8-12.2.OPT6.BSP.GB8

(BSP January 2, 2012)

Cable Fence

Steel pipe shall conform to ASTM A 53, Grade B, Type E or S.

Steel bars, plates, and shapes shall conform to ASTM A 36.

Steel components shall be galvanized after fabrication in accordance with AASHTO M 111.

Resin bonded anchors shall conform to Section 6-02.2 as supplemented in these Special Provisions.

Spelter sockets and turnbuckles shall conform to the size and breaking strength requirements specific in the Plans, shall be compatible with the wire rope selected by the Contractor, and shall be galvanized after fabrication in accordance with AASHTO M 232.

Wire rope shall conform to ASTM A 603 with Class A weight zinc-coated wires throughout.

8-12.3.GR8

Construction Requirements

8-12.3.INST1.GR8

Section 8-12.3 is supplemented with the following:

8-12.3.OPT1.BSP.GB8

Cable Fence

8-12.3.OPT1(A).BSP.GB8

(BSP September 8, 2003)

The Contractor shall field measure the slope of the top of the existing retaining wall at each location of cable fence end post and intermediate brace. The field measured slope data shall be tabulated and included in the cable fence shop drawings sent to the Engineer for approval.

8-12.3.OPT1(B).BSP.GB8

(BSP January 2, 2012)

The Contractor shall submit shop drawings of the cable fence to the Engineer for approval in accordance with Section 6-03.3(7). The shop drawings shall include, but not be limited to, the following:

1. Plan, elevation, and section views of the cable fence and all components, with dimensions and tolerances.

2. Material designations for all components.

3. Socketing procedure for the spelter sockets.

4. Erection plan for installing the posts, installing and connecting the cable to the posts, and tensioning the cable.

The Contractor shall install resin bonded anchors in accordance with Section 6-02.3(18) as supplemented in these Special Provisions.

The cable shall be tensioned to 400 pounds with six inches minimum of take up still available in the turnbuckle.

8-12.3.OPT1(C).BSP.GB8
(BSP August 3, 2009)
After erecting the cable fence posts, but prior to installing the cable, the Contractor shall clean, prepare, and paint all exposed galvanized surfaces in accordance with Section 6-07.3(11)A. The color of the finish coat, when dry, shall match Federal Standard 595 Color No. 20045.

8-12.4.GR8
Measurement

8-12.4.INST1.GR8
Section 8-12.4 is supplemented with the following:

8-12.4.OPT1.BSP.GB8
(BSP September 8, 2003)
Cable fence will be measured by the linear foot along the line and slope at the base of the completed fence.

8-12.5.GR8
Payment

8-12.5.INST1.GR8
Section 8-12.5 is supplemented with the following:

8-12.5.OPT1.GR8
(April 1, 2002)
“Coated Chain Link Fence Type ___”, per linear foot.
Payment for clearing of fence line for “Coated Chain Link Fence Type ___” shall be in accordance with Section 2-01.5.
“Coated End, Gate, Corner, Pull Post for Chain Link Fence”, per each.
“Double 14 Ft. Coated Chain Link Gate”, per each.
“Double 20 Ft. Coated Chain Link Gate”, per each.
“Single 6 Ft. Coated Chain Link Gate”, per each.

8-12.5.OPT6.BSP.GB8
(BSP September 8, 2003)
“Cable Fence”, per linear foot.

8-13.GR8
Monument Cases

8-13.1.GR8

Description

8-13.1.INST1.GR8

Section 8-13.1 is deleted and replaced by the following:

8-13.1.OPT1.GR8

(March 13, 1995)

This work shall consist of furnishing and placing monument cases, covers, and pipes in accordance with the Standard Plans and these Specifications, in conformity with the lines and locations shown in the Plans or as staked by the Engineer.

8-13.2.GR8

Materials

8-13.2.INST1.GR8

Section 8-13.2 is supplemented with the following:

8-13.2.OPT1.GR8

(March 13, 1995)

The pipe shall be Schedule 40 galvanized pipe.

8-13.3.GR8

Construction Requirements

8-13.3.INST1.GR8

The last paragraph of Section 8-13.3 is revised to read:

8-13.3.OPT1.GR8

(March 13, 1995)

The Engineer will be responsible for placing the concrete core and tack or wire inside the pipe.

8-13.4.GR8

Measurement

8-13.4.INST1.GR8

Section 8-13.4 is deleted and replaced by the following:

8-13.4.OPT1.GR8

(March 13, 1995)

Measurement of monument case, cover, and pipe will be by the unit for each monument case, cover, and pipe furnished and set.

8-13.5.GR8

Payment

8-13.5.INST1.GR8

Section 8-13.5 is supplemented with the following:

8-13.5.OPT1.GR8

(April 28, 1997)

"Monument Case, Cover, and Pipe", per each.

8-14.GR8

Cement Concrete Sidewalks

8-14.3.GR8

Construction Requirements

8-14.3.INST1.GR8

Section 8-14.3 is supplemented with the following:

8-14.3.OPT1.GR8

(April 4, 2011)

The Contractor shall request a pre-meeting with the Engineer to be held 2 to 5 working days before any work can start on cement concrete sidewalks, curb ramps or other pedestrian access routes to discuss construction requirements. Those attending shall include:

1. The Prime Contractor and Subcontractor in charge of constructing forms, and placing, and finishing the cement concrete.

2. Project Engineer (or representative) and Project Inspectors for the cement concrete sidewalk, curb ramp or pedestrian access route Work.

Items to be discussed in this meeting shall include, at a minimum, the following:

1. Slopes shown on the Plans.

2. Inspection

3. Traffic control

4. Pedestrian control, access routes and delineation

5. Accommodating utilities

6. Form work

7. Installation of detectable warning surfaces

8-15.GR8

Riprap

8-15.4.GR8

Measurement

8-15.4.INST1.GR8

Section 8-15.4 is supplemented with the following:

8-15.4.OPT1.GR8
(August 6, 2007)
Streambed sediment and streambed cobbles will be measured by the ton.

8-15.4.OPT2.GR8
(August 6, 2007)
Streambed sediment and streambed cobbles will be measured by the cubic yard in the hauling conveyance at the point of delivery.

8-15.4.OPT3.GR8
(March 13, 1995)
Special excavation will be measured by the cubic yard. Quantities will be computed to the neat lines from the top of the seals to the existing stream bed or ground line for the area outside the limits of structure excavation.

8-15.4.OPT4.GR8
(August 6, 2007)
Streambed boulders and habitat boulders will be measured per each.

8-15.4.OPT5.GR8
(February 5, 2001)
The last paragraph in Section 8-15.4 is deleted.

8-15.5.GR8
Payment

8-15.5.INST1.GR8
The first sentence of the second paragraph of Section 8-15.5 is revised to read:

8-15.5.OPT1.GR8
(March 13, 1995)
The unit contract price per ton or cubic yard for the class or kind of riprap specified shall be full pay for furnishing all labor, tools, equipment, and materials required to construct the riprap, including excavation.

8-15.5.INST2.GR8
Section 8-15.5 is supplemented with the following:

8-15.5.OPT6.GR8
(August 6, 2007)
"Streambed Sediment", per ton.
“Streambed Cobbles”, per ton.

8-15.5.OPT7.GR8
(August 6, 2007)
"Streambed Sediment", per cubic yard.
“Streambed Cobbles”, per cubic yard.

8-15.5.OPT8.GR8
(September 30, 1996)
"Special Excavation", per cubic yard.

8-15.5.OPT9.GR8

(August 6, 2007)

“Streambed Boulder”, per each.

“Habitat Boulder”, per each.

8-16.GR8

Concrete Slope Protection

8-16.3.GR8

Construction Requirements

8-16.3(2).GR8

Placing Semi-Open Concrete Masonry Units

8-16.3(2).INST1.GR8

Section 8-16.3(2) is supplemented with the following:

8-16.3(2).OPT1.GR8

(December 19, 2005)

The Contractor shall round and treat the areas between the bridge end slopes and the edges of the shoulders to the satisfaction of the Engineer.

Upon completion of the installation of the units, the voids shall be filled full with top soil. All excess fill shall be removed and the exposed concrete surfaces swept clean. The slope protection shall be seeded to grass in accordance with Section 8-01.3(2)A.

8-16.5.GR8

Payment

8-16.5.INST1.GR8

Section 8-16.5 is supplemented with the following:

8-16.5.OPT1.GR8

(September 30, 1996)

"Semi-Open Conc. Masonry Slope Protection", per square yard.

8-20.GR8

Illumination, Traffic Signal Systems, and Electrical

8-20.2.GR8

Materials

8-20.2.INST1.GR8

Section 8-20.2 is supplemented with the following:

8-20.2.OPT1.BSP.GB8

(BSP April 5, 2010)

Traffic Signal Standard Foundation Shaft Casing

All permanent casing shall be a smooth wall non corrugated structure of steel base metal. All permanent casing shall be of ample strength to resist damage and deformation from transportation and handling, installation stresses, and all pressures and forces acting on the casing. The casing shall be clean prior to placement in the excavation. The permanent casing may be telescoped, but the outside diameter of the casing shall not be less than the specified diameter of the shaft.

8-20.2(9-29.6).GR8

Light And Signal Standards

Section 9-29.6 is supplemented with the following:

8-20.2(9-29.6).OPT1.GR8

(January 2, 2012)

Light Standards with Type 1 Luminaire Arms

Lighting standards shall be fabricated in conformance with the methods and materials specified on the pre-approved Plans listed below, provided the following requirements have been satisfied:

(a) Light source to pole base distance (H1) shall be as noted in the Plans. Verification of H1 distances by the Engineer, prior to fabrication, is not required. Fabrication tolerance shall be ± 6 inches.

(b) All other requirements of the Special Provisions have been satisfied.

Pre-Approved Plan	Fabricator	Mounting Hgt.
Drawing No. DB00654 Rev. G Sheets 1, 2, 3 & 4	Valmont Ind. Inc.	30', 35', 40' & 50'
Drawing No. W3721-1 Rev. H & W3721-2 Rev. C	Ameron Pole Prod. Div.	40' & 50'
Drawing No. NWS 3510 Rev. 1 or NWS 3510B Rev. 1	Northwest Signal Supply, Inc.	25', 30', 35', 40', 45' & 50'
Drawing WS-SL-01 Revision 7 Sheets 1 & 2 of 2	American Pole Structures, Inc.	25', 30', 35', 40', 45', 50'
Drawing 71035-B39 Rev. R9.1 Sheets 1 & 2 of 2, and B100-B335 Rev. R1	Union Metal Corp	40'
Drawing 71035-B50 Rev. R2.1 Sheets 1, 2 & 3 and B100-B335 Rev. R1	Union Metal Corp.	50'

Drawing 71035-B47 Rev. R3 Sheet 1 of 1 Elbow Mounting Detail	Union Metal Corp	40’, 50’
Drawing No. WSDOT-LP-01 Rev. 4, Sheets 1 and 2 or WSDOT - LP-01-BE Rev 3 Sheets 1 and 2 or WSDOT - LP-01-C8B Rev 2	West Coast Engineering Group	25’, 30’, 35’, 40’, 45’, and 50’
Drawing No. 10-31-RWP-1 Rev. 4 Sheets 1, 2 & 3	KW Industries	25, 30, 35, 40, 45, 50
Drawing No. 10-31-RWP-3 Rev. 2 (Bridge Mount Details)	KW Industries	

8-20.2(9-29.6).OPT2.GR8

(January 2, 2012)

Light Standards with Type 1 Luminaire Arms

Lighting standards shall be fabricated in conformance with the methods and materials specified on the pre-approved plans listed below, provided the following requirements have been satisfied:

(a) Mounting heights shall be as specified in the Plans.

(b) Light source to pole base distances (H1) shall be determined or verified by the Engineer prior to fabrication. Fabrication tolerance shall be □6 inches.

(c) All other requirements of the Special Provisions have been satisfied.

Pre-Approved Plan	Fabricator	Mounting Hgt.
Drawing No. DB00654 Rev.G Sheets 1, 2, 3 & 4	Valmont Ind. Inc.	30', 35’, 40' & 50'
Drawing No. W3721-1 Rev. H & W3721-2 Rev. C	Ameron Pole Prod. Div.	40' & 50'
Drawing No. NWS 3510 Rev. 1 or NWS 3510B Rev. 1	Northwest Signal Supply, Inc.	25', 30', 35', 40', 45' & 50'
Drawing WS-SL-01 Revision 7 Sheets 1 & 2 of 2	American Pole Structures, Inc.	25', 30', 35', 40', 45', 50'
Drawing 71035-B39 Rev. R9.1 Sheets 1 & 2 of 2 and	Union Metal Corp	40'

B100-B335 Rev. R1		
Drawing 71035-B50 Rev. R2.1 Sheets 1, 2 & 3 and B100-B335 Rev. R1	Union Metal Corp	50’
Drawing 71035-B47 Rev. R3 Sheet 1 of 1 Elbow Mounting Detail	Union Metal Corp.	40’, 50’
Drawing No. WSDOT-LP-01 Rev. 4, Sheets 1 and 2 or WSDOT - LP-01-BE Rev 3 Sheets 1 and 2 or WSDOT - LP-01-C8B Rev 2	West Coast Engineering Group	25’, 30’, 35’, 40’, 45’, and 50’
Drawing No. 10-31-RWP-1 Rev. 4 Sheets 1,2 & 3	KW Industries	25, 30, 35, 40, 45, 50
Drawing No. 10-31-RWP-3 Rev. 2 (Bridge Mount Details)	KW Industries	

8-20.2(9-29.6).OPT3.GR8

(January 2, 2012)

Light Standards with Type 2 Luminaire Arms

Lighting standards shall be fabricated in conformance with the methods and materials specified on the pre-approved Plans listed below, provided the following requirements have been satisfied:

(a) Light source to pole base distance (H1) shall be as noted in the Plans. Verification of H1 distances by the Engineer, prior to fabrication, is not required. Fabrication tolerance shall be □6 inches.

(b) All other requirements of the Special Provisions have been satisfied.

Pre-Approved Plan	Fabricator	Mounting Hgt.
Drawing No. DB00653 Rev. G Sheets 1, 2, 3 & 4	Valmont Ind. Inc.	30', 35’,40' & 50'
Drawing No. W3720-1 Rev. F & W3720-2 Rev. C	Ameron Pole Prod. Div.	40' & 50'
Drawing No. NWS 3510 Rev. 1 or NWS 3510B Rev. 1	Northwest Signal Supply, Inc.	25', 30', 35', 40', 45' & 50'
Drawing WS-SL-02 Rev. 7 Sheets 1 & 2 of 2	American Pole Structures, Inc.	25', 30', 35', 40', 45', 50'

Drawing No. WSDOT-LP-02 Rev. 3, Sheets 1 and 2 or WSDOT - LP-01-BE Rev 3 Sheets 1 and 2 or WSDOT - LP-01-C8B Rev 2	West Coast Engineering Group	25’, 30’, 35’, 40’, 45’, and 50’
Drawing No. 10-31-RWP-2 Rev. 5 Sheet 1, 2, & 3	KW Industries	25’, 30’, 35’, 40’ 45’ and 50’

8-20.2(9-29.6).OPT4.GR8

(January 2, 2012)

Light Standards with Type 2 Luminaire Arms

Lighting standards shall be fabricated in conformance with the methods and materials specified on the pre-approved Plans listed below, provided the following requirements have been satisfied:

(a) Light source to pole base distance (H1) shall be as noted in the Plans. Verification of H1 distances by the Engineer, prior to fabrication, is not required. Fabrication tolerance shall be □6 inches.

(b) All other requirements of the Special Provisions have been satisfied.

Pre-Approved Plan	Fabricator	Mounting Hgt.
Drawing No. DB00653 Rev. G Sheets 1, 2, 3 & 4	Valmont Ind. Inc.	30',35’, 40' & 50'
Drawing No. W3720-1 Rev. F & W3720-2 Rev. C	Ameron Pole Prod. Div.	40' & 50'
Drawing No. NWS 3510 Rev. 1 or NWS 3510B Rev. 1	Northwest Signal Supply, Inc.	25', 30', 35', 40', 45' & 50'
Drawing WS-SL-02 Rev. 7 Sheets 1 & 2 of 2	American Pole Structures, Inc.	25', 30', 35', 40', 45', 50'
Drawing No. WSDOT-LP-02 Rev. 3, Sheets 1 and 2 or WSDOT - LP-01-BE Rev 3 Sheets 1 and 2 or WSDOT - LP-01-C8B Rev 2	West Coast Engineering Group	25’, 30’, 35’, 40’, 45’, and 50’
Drawing No. 10-31-RWP-2 Rev. 5 Sheet 1,2, & 3	KW Industries	25’, 30’, 35’, 40’ 45’ and 50’

8-20.2(9-29.6).OPT5.GR8

(January 2, 2012)

Traffic Signal Standards

Traffic signal standards shall be furnished and installed in accordance with the methods and materials noted in the applicable Standard Plans, pre-approved plans, or special design plans.

All welds shall comply with the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Welding inspection shall comply with Section 6-03.3(25)A Welding Inspection.

Hardened washers shall be used with all signal arm connecting bolts instead of lockwashers. All signal arm AASHTO M 164 connecting bolts tightening shall comply with Section 6-03.3(33).

Traffic signal standard types and applicable characteristics are as follows:

Type PPB Pedestrian push button posts shall conform to Standard Plan J-20.10 or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
Valmont Ind. Inc.	DB00655 Rev. J Sheet's 1, 2 & 3
Ameron Pole Prod. Div.	M3723 Rev. G
Union Metal Corp.	TA-10035 Rev. R6 Sht. 1
West Coast Engineering Group	WSDOT-PP-01 Rev. 1
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type PS Pedestrian signal standards shall conform to Standard Plan J-20.16 or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
Valmont Ind. Inc.	DB00655 Rev.J Sht. 1, 2 & 3
Ameron Pole Prod. Div.	M3723 Rev. G or W3539 Rev. B

Union Metal Corp.	TA-10025 Rev. R17 Sht. 1 & 2
West Coast Engineering Group	WSDOT-PP-02 Rev. 1
American Pole Structures, Inc.	WS-PP-03 Rev. 1D
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type I

Type I vehicle signal standards shall conform to Standard Plan J-21.15 or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
Valmont Ind. Inc.	DB00655 Rev. J Sht. 1 2 & 3
Ameron Pole Prod. Div	M3723 Rev. G or W3539 Rev. B
Union Metal Corp.	TA-10025 Rev. R17 Sht. 1 & 2
West Coast Engineering Group	WSDOT-PP-02 Rev. 1
American Pole Structures, Inc.	WS-PP-03 Rev. 1D
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type FB

Type FB flashing beacon standard shall conform to Standard Plan J-21.16 or the following pre-approved plan:

Fabricator	Drawing No.
Union Metal Corp	50200-B58 Rev. R6 Sht. 1 & 2
Valmont Ind. Inc.	DB00655 Rev.J Sht. 1 2 & 3
Ameron Pole Prod. Div.	W3539 Rev. B

Northwest Signal Supply, Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type RM

Type RM ramp meter standard shall conform to Standard Plan J-22.15 or the following pre-approved plan:

Fabricator	Drawing No.
Union Metal Corp	50200-B58 Rev. R6 Sht. 1 & 2
Valmont Ind. Inc.	DB00655 Rev. J Sht. 1 2 & 3
Ameron Pole Prod. Div.	W3539 Rev. B
Northwest Signal Supply, Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type CCTV

Type CCTV camera pole standards shall conform to one of the following pre-approved Plans:

Fabricator	Drawing No.
Valmont Industries, Inc.	DB 00759 Rev. L
Ameron Pole Product Div.	W6CCTV1 Rev D
West Coast Engineering Group	AP-WSDOT-CP-01-Rev. 3
American Pole Structures, LLC	WS-CP-01 Rev. 1C Sht. 1 & 2
Union Metal Corporation	Drawing No. P33-B318, R10 Sheets 1, 2 of 2
Union Metal Corporation	Drawing No. P33-B323, Rev. 3 Sheets 1, 2 of 2
Northwest Signal Supply,Inc.	Drawing No. NWS 3545 (For Type CCTV)
KW Industries	Drawing No. 10-200-CAM-1 Rev. 6, Sheets 1 and 2

Type II

Characteristics:

Luminaire mounting height	N.A.
Luminaire arms	N.A.
Luminaire arm length	N.A.

Signal arms	One Only

Type II standards shall conform to one of the following pre-approved plans, provided all other requirements noted herein have been satisfied. Maximum (x) (y) (z) signal arm loadings in cubic feet are noted after fabricator.

Signal Arm Length (max)	Fabricator-(x) (y) (z)	Drawing No.
65 ft.	Valmont Ind. Inc.-(2894)	DB00625-Rev.R, Shts. 1, 2,3 & 4
65 ft.	Union Metal Corp. (2900)	71026-B86 Rev. R9 Shts. 1, 2, & 3
65 ft.	Ameron Pole-(2900) Prod. Div.	W3724-1 Rev. I & W3724-2 Rev. F
65 ft.	Northwest Signal-(2802) Supply Inc.	NWS 3500 Rev. 3 or NWS 3500B Rev. 3
45 ft.	American Pole(1875) Structures, Inc.	WS-T2-L Rev. 8 Sheet 1 & 2 of 2
65 ft.	American Pole (2913) Structures, Inc.	WS-T2-H Rev. 8 Sheets 1 & 2 of 2
65 ft.	KW Industries	10-200-TSP-4 Rev. 4, Sheets 1, 2, and 3
65 ft	West Coast Engineering Group	WSDOT-TS-01 Rev. 3 Sheets 1, 2, and 3
65 ft.	Maico Industries (2894)	WSDOTMA Rev. 3 Sheets 1, 2 and 3

Type III Characteristics:

Luminaire mounting height	30 ft., 35 ft., 40 ft., or 50 ft.
Luminaire arms	One Only
Luminaire arm type	Type 1
Luminaire arm length (max.)	16 ft.
Signal arms	One Only

Type III standards shall conform to one of the following pre-approved plans, provided all other requirements noted herein have been satisfied. Maximum (x) (y) (z) signal arm loadings in cubic feet are noted after fabricator.

Signal Arm Length (max)	Fabricator-(x) (y) (z)	Drawing No.
65 ft.	Valmont Ind. Inc.-(2947)	DB00625-Rev.R, Shts. 1, 2, 3 & 4 and"J" luminaire arm
65 ft.	Union Metal Corp. (2900)	71026-B87 Rev. R11 Shts. 1, 2 & 3
65 ft.	Ameron Pole-(2900) Prod. Div.	W3724-1 Rev. I & W3724-2 Rev. F and "J" luminaire arm
65 ft.	Northwest Signal-(2802) Supply Inc.	NWS 3500 Rev. 3 or NWS 3500B Rev. 3
45 ft.	American Pole (1875) Structures, Inc.	WS-T3J-L, Rev. 11 Sheets 1 & 2 of 2
65 ft.	American Pole (2913) Structures, Inc.	WS-T3J-H, Rev. 10 Sheets 1 & 2 of 2
65 ft	West Coast Engineering Group	WSDOT-TS-01 Rev. 3 Sheets 1, 2, and 3
65 ft.	Maico Industries (2947)	WSDOTMA Rev. 3 Sheets 1, 2 and 3 and "J" luminaire arm
65 ft.	KW Industries	10-200-TSP-3 Rev. 5, Sheets 1, 2, and 3

Type IV

Type IV strain pole standards shall be consistent with details in the plans and Standard Plan J-7c or one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3520 Rev. 1or NWS 3520B Rev. 1,
Valmont Industries, Inc.	DB006885, Rev. A Sheets 1 and 2
Ameron Pole	M3650 Rev. D

Prod. Div.	
Union Metal Corp.	EA-10224 Rev. R13 Sheet 1 of 1
American Pole Structures, Inc.	9000-12-037 Rev. A
Maico Industries	WA-SP-4 Rev.2, Sheets 1 and 2 of 2
KW Industries	10-200-SP-1 Rev. 4, Sheets 1 and 2
KW Industries	10-200-SP-2 Rev. 5, Sheets 1 and 2

Type V Type V combination strain pole and lighting standards shall be consistent with details in the plans and Standard Plan J-7c or one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3520 Rev. 1 or NWS 3520B Rev. 1
Valmont Industries, Inc.	DB006885, Rev. A Sheets 1 and 2
Ameron Pole Prod. Div.	M3650 Rev. D
Union Metal Corp.	EA-10225, Rev. R13 Shts. 1 & 2
American Pole Structures, Inc.	9020-12-007 Rev. B
Maico Industries	WA-SP-5 Rev. 2 , Sheets 1, 2 & 3 and "J" luminaire arm

The luminaire arm shall be Type 1, 16 foot maximum and the luminaire mounting height shall be 40 feet or 50 feet as noted in the plans.

Type SD Type SD standards require special design. All special design shall be based on the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and pre-approved plans and as follows:

1. A 90 mph wind loading shall be used.

2. The Design Life and Recurrence Interval shall be 50 years for luminaire support structures.

3. Fatigue design shall conform to AASHTO Section 11, Table 11-1 using fatigue category III.

Complete calculations for structural design, including anchor bolt details, shall be prepared by a Professional Engineer, licensed under Title 18 RCW, State of Washington, in the branch of Civil or Structural Engineering or by an individual holding valid registration in another state as a civil or structural Engineer.

All shop drawings and the cover page of all calculation submittals shall carry the Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration. The cover page shall include the contract number, contract title, and sequential index to calculation page numbers. Two copies of the associated design calculations shall be submitted for approval along with shop drawings.

Details for handholes and luminaire arm connections are available from the Bridges and Structures Office.

Foundations for various types of standards shall be as follows:

Type PPB	As noted on Standard Plan J-20.10.
Type PS	As noted on Standard Plan J-21.10.
Type I	As noted on Standard Plan J-21.10.
Type FB	As noted on Standard Plan J-21.10.
Type RM	As noted on Standard Plan J-21.10.
Type CCTV	As noted in the Plans.
Type II	As noted in the Plans.
Type III	As noted in the Plans.
Type IV	As noted in the Plans and Standard Plan J-7c.
Type V	As noted in the Plans and Standard Plan J-7c.
Type SD	As noted in the Plans.

8-20.2(9-29.6).OPT6.GR8

(January 2, 2012)

Traffic Signal Standards

Traffic signal standards shall be furnished and installed in accordance with the methods and materials noted in the applicable Standard Plans, pre-approved plans, or special design plans.

All welds shall comply with the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Welding inspection shall comply with Section 6-03.3(25)A Welding Inspection.

Hardened washers shall be used with all signal arm connecting bolts instead of lockwashers. All signal arm AASHTO M 164 connecting bolts tightening shall comply with Section 6-03-3(33).

Traffic signal standard types and applicable characteristics are as follows:

Type PPB Pedestrian push button posts shall conform to Standard Plan J-20.10 or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
Valmont Ind. Inc.	DB00655 Rev. J Sheets 1, 2 and 3
Ameron Pole Prod. Div.	M3723 Rev. G
Union Metal Corp.	TA-10035 Rev. R6 Sht. 1
West Coast Engineering Group	WSDOT-PP-01 Rev. 1
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type PS Pedestrian signal standards shall conform to Standard Plan J-20.16 or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
Valmont Ind. Inc.	DB00655 Rev. J Sht. 1 2 & 3
Ameron Pole Prod. Div.	M3723 Rev. G or W3539 Rev. B
Union Metal Corp.	TA-10025, Rev. R17 Sht. 1 & 2
West Coast Engineering Group	WSDOT-PP-02 Rev. 1
American Pole Structures, Inc.	WS-PP-03 Rev. 1D
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type I

Type I vehicle signal standards shall conform to Standard Plan J-21.15 or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
Valmont Ind. Inc.	DB00655 Rev. J Sht. 1 2 & 3
Ameron Pole Prod. Div.	M3723 Rev. G or W3539 Rev. B
Union Metal Corp.	TA-10025 Rev. R17 Sht. 1 & 2
West Coast Engineering Group	WSDOT-PP-02 Rev. 1
American Pole Structures, Inc.	WS-PP-03 Rev. 1D
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type FB

Type FB flashing beacon standard shall conform to Standard Plan J-21.16 or the following pre-approved plan:

Fabricator	Drawing No.
Valmont Ind. Inc.	DB00655 Rev. J Sht. 1 2 & 3
Union Metal Corp.	50200-B58 Rev. R6 Sht 1 & 2
Ameron Pole Prod. Div.	W3539 Rev. B
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type RM

Type RM ramp meter standard shall conform to Standard Plan J-22.15 or the following pre-approved plan:

Fabricator	Drawing No.
Valmont Ind. Inc.	DB00655 Rev. J Sht. 1 2 & 3

Union Metal Corp.	50200-B58 Rev. R6 Sht. 1 & 2
Ameron Pole Prod. Div.	W3539 Rev. B
Northwest Signal Supply Inc.	NWS 3540 Rev. 1 and NWS 3540B Rev. 1
KW Industries	10-200-PED-1 Rev. 7, Sheets 1, 2 and 3

Type CCTV Type CCTV camera pole standards shall conform to one of the following pre-approved Plans:

Fabricator	Drawing No.
Valmont Industries, Inc.	DB 00759 Rev. J
Ameron Pole Product Div.	W6CCTV1 Rev. D
West Coast Engineering Group	AP-WSDOT-CP-01 Rev. 3
American Pole Structures, LLC	WS-CP-01 Rev. 1C Sht. 1 & 2
Union Metal Corporation	Drawing No. P33-B318, R10, Sheets 1, 2 of 2
Union Metal Corporation	Drawing No. P33-B323, Rev. 3 Sheets 1, 2 of 2
KW Industries	Drawing No. 10-200-CAM-1 Rev. 6, Sheets 1 and 2
Northwest Signal Supply, Inc.	Drawing No. NWS 3545 (For Type CCTV)

Type II Characteristics:

Luminaire mounting height	N.A.
Luminaire arms	N.A.
Luminaire arm length	N.A.
Signal arms	One Only

Type II standards shall conform to one of the following pre-approved plans, provided all other requirements noted herein have been satisfied. Maximum (x) (y) (z) signal arm loadings in cubic feet are noted after fabricator.

Signal Arm Length (max)	Fabricator-(x) (y) (z)	Drawing No.
65 ft.	Valmont Ind. Inc.-(2894)	DB00625-Rev.R Shts. 1, 2. 3& 4
65 ft.	Union Metal Corp. (2900)	71026-B86 Rev. R9 Shts. 1, 2 & 3

65 ft.	Ameron Pole-(2900)	W3724-1 Rev. I & W3724-2 Rev. F
65 ft.	Northwest Signal-(2802) Supply Inc.	NWS 3505 Rev. 3 or NWS 3505B Rev. 3
45 ft.	American Pole (1875) Structures, Inc.	WS-T2-L Rev.8 Sheet 1 & 2 of 2
65 ft.	American Pole (2913) Structures, Inc.	WS-T2-H Rev. 8 Sheet 1 & 2 of 2
65 ft.	KW Industries	10-200-TSP-4 Rev. 4, Sheets 1, 2, and 3
65 ft	West Coast Engineering Group	WSDOT-TS-01 Rev. 3 Sheets 1, 2, and 3
65 ft.	Maico Industries (2894)	WSDOTMA Rev. 3 Sheets 1, 2 and 3

Type III Characteristics:

Luminaire mounting height	30 ft., 35 ft., 40 ft., or 50 ft.
Luminaire arms	One Only
Luminaire arm type	Type 2
Luminaire arm length (max.)	16 ft.
Signal arms	One Only

Type III standards shall conform to one of the following pre-approved plans, provided all other requirements noted herein have been satisfied. Maximum (x) (y) (z) signal arm loadings in cubic feet are noted after fabricator.

Signal Arm Length (max)	Fabricator-(x) (y) (z)	Drawing No.
45 ft.	American Pole (1875) Structures, Inc.	WS-T3J-L, Rev. 11 Sheets 1 & 2 of 2
65 ft.	Valmont Ind. Inc.-(2947)	DB00625-Rev. R, Shts. 1, 2, 3 & 4 and "T" luminaire arm
65 ft.	Northwest Signal-(2802) Supply Inc.	NWS 3505 Rev. 3 or NWS 3505B Rev. 3
65 ft.	Ameron Pole-(2900)	W3724-1 Rev. I &

	Prod. Div.	W3724-2 Rev. F and "T" luminaire arm
65 ft	West Coast Engineering Group	WSDOT-TS-01 Rev. 3 Sht.1, 2.& 3
65 ft.	Maico Industries (2947)	WSDOTMA Rev. 3 Sheets 1, 2 and 3 and "T" luminaire arm
65 ft.	KW Industries	10-200-TSP-3 Rev. 5, Sheets 1, 2, and 3
65ft	Union Metal Corp.	71026-B87 R11 Sheets 1, 2, and 3
65 ft.	American Pole (2913) Structures, Inc.	WS-T3J-H, Rev. 10 Sheets 1 & 2 of 2

Type IV Type IV strain pole standards shall be consistent with details in the Plans and Standard Plan J-7c or one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3525 Rev. 1 or NWS 3525B Rev. 1
Valmont Industries, Inc.	DB006885, Rev. A Sheets 1 and 2
Ameron Pole Prod. Div.	M3650 Rev. D
Union Metal Corp.	EA-10224, Rev. R13 Sheet 1 of 1
American Pole Structures, Inc.	9000-12-037 Rev. A
Maico Industries	WA-SP-4 Rev. 2, Sheets 1 and 2 of 2

Type V Type V combination strain pole and lighting standards shall be consistent with details in the Plans and Standard Plan J-7c or one of the following pre-approved plans:

Fabricator	Drawing No.
Ameron Pole Prod. Div.	M3650 Rev.D
Northwest Signal Supply Inc.	NWS 3525 Rev. 1 or NWS 3525B Rev. 1

Maico Industries	WA-SP-5 Rev. 2, Sheets 1, 2 & 3 and "T" luminaire arm
Valmont Industries, Inc.	DB006885, Rev. A Sheets 1 and 2

The luminaire arm shall be Type 2, 16 foot maximum and the luminaire mounting height shall be 40 feet or 50 feet as noted in the Plans.

Type SD

Type SD standards require special design. All special design shall be based on the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and pre-approved plans and as follows:

1. A 90 mph wind loading shall be used.
2. The Design Life and Recurrence Interval shall be 50 years for luminaire support structures.
3. Fatigue design shall conform to AASHTO Section 11, Table 11-1 using fatigue category III.

Complete calculations for structural design, including anchor bolt details, shall be prepared by a Professional Engineer, licensed under Title 18 RCW, State of Washington, in the branch of Civil or Structural Engineering or by an individual holding valid registration in another state as a civil or structural Engineer.

All shop drawings and the cover page of all calculation submittals shall carry the Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration. The cover page shall include the contract number, contract title, and sequential index to calculation page numbers. Two copies of the associated design calculations shall be submitted for approval along with shop drawings.

Details for handholes and luminaire arm connections are available from the Bridges and Structures Office.

Foundations for various types of standards shall be as follows:

Type PPB	As noted on Standard Plan J-20.10.
Type PS	As noted on Standard Plan J-21.10.
Type I	As noted on Standard Plan J-21.10.
Type FB	As noted on Standard Plan J-21.10.
Type RM	As noted on Standard Plan J-21.10.
Type CCTV	As noted in the Plans.
Type II	As noted in the Plans.
Type III	As noted in the Plans.

Type IV	As noted in the Plans and Standard Plan J-7c.
Type V	As noted in the Plans and Standard Plan J-7c.
Type SD	As noted in the Plans.

8-20.2(1).GR8

Equipment List And Drawings

8-20.2(1).INST1.GR8

Section 8-20.2(1) is supplemented with the following:

8-20.2(1).OPT1.GR8

(March 13, 1995)

Pole base to light source distances (H1) for lighting standards with pre-approved plans shall be as noted in the Plans.

Pole base to light source distances (H1) for lighting standards without pre-approved plans will be furnished by the Engineer as part of the final approved shop drawings, prior to fabrication.

8-20.2(1).OPT2.GR8

(March 13, 1995)

Pole base to light source distances (H1) for lighting standards with pre-approved plans will be determined or verified by the Engineer at the request of the Contractor prior to fabrication.

Pole base to light source distances (H1) for lighting standards without pre-approved plans and for combination traffic signal and lighting standards will be furnished by the Engineer as part of the final approved shop drawings prior to fabrication.

8-20.2(1).OPT3.GR8

(March 13, 1995)

If traffic signal standards, strain pole standards, or combination traffic signal and lighting standards are required, final verified dimensions including pole base to signal mast arm connection point, pole base to light source distances (H1), mast arm length, offset distances to mast arm mounted appurtenances, and orientations of pole mounted appurtenances will be furnished by the Engineer as part of the final approved shop drawings prior to fabrication.

8-20.3.GR8

Construction Requirements

8-20.3(4).GR8

Foundations

8-20.3(4).INST1.GR8

Section 8-20.3(4) is supplemented with the following:

8-20.3(4).OPT1.BSP.FB8

(BSP August 1, 2011)

Shafts For Signal Standard Foundations

Shaft foundations for the traffic signal standards at the following location(s) shall be constructed in accordance with the following requirements:

*** $$1$$ ***

Submittals

Contractor Project Reference and Personnel Experience Submittal

Prior to the start of shaft construction, the Contractor shall electronically submit a project reference list to the Engineer for approval verifying the successful completion by the Contractor of at least three separate shaft foundation projects within the past five years with drilled shafts of diameters and depths similar to or larger than those shown in the Plans, and ground conditions similar to those identified in the Contract. A brief description of each listed project shall be provided along with the name and current phone number of the project owner or the owner's Contractor.

Prior to the start of shaft construction, the Contractor shall electronically submit a list identifying the on-site supervisors, and drill rig operators potentially assigned to the project to the Engineer for approval. On-site supervisors shall have a minimum two years' experience in supervising construction of shaft foundations, and drill rig operators shall have a minimum one year experience in construction of shaft foundations. The list shall contain a brief description of each individual's experience.

The Engineer will approve or reject the Contractor's qualifications and field personnel within 10 working days after receipt of the submission. Work shall not be started on any drilled shaft until the Contractor's qualifications and field personnel are approved by the Engineer. The Engineer may suspend the shaft construction if the Contractor substitutes unapproved personnel. The Contractor shall be fully liable for the additional costs resulting from the suspension of work and no adjustments in contract time resulting from the suspension of work will be allowed.

Shaft Installation Narrative Submittal

The Contractor shall electronically submit a shaft installation narrative for approval by the Engineer. The narrative shall reference available subsurface data provided in the contract test hole boring logs, and the geotechnical report(s) prepared for this project. This narrative shall provide the following information in a single complete submittal:

1. Proposed overall construction operation sequence.

2. Description, size and capacities of specific equipment that will be available on site, including but not limited to cranes, drills, auger, bailing buckets, final cleaning equipment and drilling unit. The narrative shall describe why the equipment was selected, and describe equipment suitability to the anticipated site conditions and work methods. The narrative shall include a project history

of the drilling equipment demonstrating the successful use of the equipment on shafts of equal or greater size in similar soil/rock conditions. The narrative shall also include details of shaft excavation and cleanout methods.

3. Details of the method(s) to be used to ensure shaft stability (i.e., prevention of caving, bottom heave, etc. using casing, slurry, or other means) during excavation (including pauses and stops during excavation) and concrete placement. Casing dimensions and detailed procedures for permanent casing installation, and methods of advancing permanent casing with the excavation in accordance with this Special Provision, shall be provided.

4. Description and details of the storage and disposal plan for excavated material and slurry (if applicable).

5. Description of the method used to fill or eliminate all voids below the top of shaft between the permanent shaft casing and surrounding soil.

6. Reinforcing steel shop drawings, details of reinforcement placement, including bracing, centering, and lifting methods, and the method to assure the reinforcing cage position is maintained during construction.

7. Details of concrete placement, including operational procedures for pumping methods.

8. Description of the material (either CDF or granular material) used to temporarily backfill a shaft excavation during a stoppage of the excavation operation, as well as the method used to place and remove the material.

The Engineer will evaluate the shaft installation narrative for conformance with the Plans, Specifications and Special Provisions within the review time specified in Section 6-01.9.

The project reference and personnel experience submittal and the shaft installation narrative submittal shall be in electronic pdf format, and all documents in each pdf shall be legible. All submittals shall be prepared jointly by the Contractor and any subcontractors that will be performing the work.

Work shall not begin until all the required submittals have been approved in writing by the Engineer. All procedural approvals given by the Engineer will be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work.

Quality Assurance

Shafts shall be constructed so that the center at the top of the shaft is within four inches of the Plan location. Shafts shall be within 1.5 percent of plumb.

Shaft steel reinforcing bar placement tolerances shall conform to Section 6-02.3(24)C.

A shaft preconstruction conference shall be held at least five working days prior to the Contractor beginning any shaft construction work at the site to discuss construction procedures, personnel, and equipment to be used, and other elements of the approved shaft installation plan as specified elsewhere in this Special Provision. Those attending shall include:

1. (representing the Contractor) The superintendent, on site supervisors, and all foremen in charge of excavating the shaft, placing the casing and slurry as applicable, placing the steel reinforcing bars, and placing the concrete.

2. (representing the Contracting Agency) The Project Engineer, key inspection personnel, and representatives from the WSDOT State Construction Office and Materials Laboratory Geotechnical Division.

If the Contractor proposes a significant revision of the approved shaft installation plan, as determined by the Engineer, the Engineer may require an additional conference be held before any additional shaft construction operations are performed.

Shaft Excavation

Shafts shall be excavated to the required depth as shown in the Plans. Shaft excavation operations shall conform to this Special Provision and the shaft installation narrative as approved by the Engineer. Once the excavation operation has been started, the excavation shall be conducted in a continuous operation until the excavation of the shaft is completed, except for pauses and stops as noted, using approved equipment capable of excavating through the type of material expected.

Pauses, defined as momentary interruptions of the excavation operation, will be allowed only for casing splicing, tooling changes, slurry maintenance, and removal of obstructions. Shaft excavation operation interruptions not conforming to this definition shall be considered stops.

During stops, the Contractor shall stabilize the shaft excavation to prevent bottom heave, caving, head loss, and loss of ground, in accordance with item 3 of the shaft installation narrative. For stops exceeding 65 hours, the Contractor shall stabilize the excavation by backfilling in accordance with item 8 of the shaft installation narrative. The Contractor shall backfill the hole to a minimum of five feet above the bottom of casing. Backfilling of shafts with casing fully seated into rock, as determined by the Engineer, will not be required.

If slurry is present in the shaft excavation, the Contractor shall conform to the requirements in the **Slurry** subsection of this Special Provision regarding the maintenance of the slurry and the minimum level of drilling slurry throughout the stop, and shall recondition the slurry to the required slurry properties prior to recommencing shaft excavation operations.

Permanent casing advanced during excavation operations is required full depth for all traffic signal standard shaft foundation locations specified at the beginning of this Special Provision. Excavation in advance of the casing tip shall not exceed three feet. In no case shall shaft excavation and casing placement extend below the bottom of shaft excavation as shown in the Plans.

The Contractor shall conduct casing installation operations and shaft excavation operations such that the adjacent soil outside the casing and shaft excavation for the full height of the shaft is not disturbed. Disturbed soil is defined as soil whose geotechnical properties have been changed from those of the original in-situ soil, and whose altered condition adversely affects the structural integrity of the shaft foundation.

The Contractor shall use appropriate means such as a cleanout bucket or air lift to clean the bottom of the excavation of all shafts. No more than two inches of loose or disturbed material shall be present at the bottom of the shaft just prior to placing concrete.

The excavated shaft shall be inspected and approved by the Engineer prior to proceeding with construction. The bottom of the excavated shaft shall be sounded with an airlift pipe, a tape with a heavy weight attached to the end of the tape, or other means acceptable to the Engineer to determine that the shaft bottom meets the requirements in the Contract.

When obstructions are encountered, the Contractor shall notify the Engineer promptly. An obstruction is defined as a specific object (including, but not limited to, boulders, logs, and man made objects) encountered during the shaft excavation operation which prevents or hinders the advance of the shaft excavation. When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of advance of the shaft drilling equipment being significantly reduced relative to the rate of advance for the portion of the shaft excavation in the geological unit that contains the obstruction, then the Contractor shall remove, break-up, or push aside, the obstruction under the provisions of Section 8-20.5 as supplemented in these Special Provisions. The method of dealing with such obstructions, and the continuation of excavation shall be as proposed by the Contractor and approved by the Engineer.

Excavation shall conform to the specified outside diameter of the shaft. After the casing has been filled with concrete, all void space occurring between the casing and shaft excavation shall be filled with a material which approximates the geotechnical properties of the in-situ soils, in accordance with item 5 of the shaft installation narrative as approved by the Engineer.

Slurry

If the Contractor uses slurry in shafts installed below groundwater the slurry level in the excavation shall be maintained above the groundwater level the greater of the following dimensions, except as otherwise noted for the special requirements for all stops in shaft excavation operations:

1. Not less than ten feet,

2. Dimension as required to provide and maintain a stable hole.

The Contractor shall provide casing, or other means, as necessary to meet these requirements.

The slurry level shall be maintained above all unstable zones a sufficient distance to prevent bottom heave, caving or sloughing of those zones.

Throughout all stops in shaft excavation operations as defined in the **Shaft Excavation** subsection of this Special Provision, the Contractor shall monitor and maintain the slurry level in the excavation the greater of the following elevations:

1. No lower than the water level elevation outside the shaft.

2. Elevation as required to provide and maintain a stable hole.

The Contractor shall demonstrate to the satisfaction of the Engineer that stable conditions are being maintained. If the Engineer determines that stable conditions are not being maintained, the Contractor shall immediately take action to stabilize the shaft. The Contractor shall submit a revised shaft installation narrative which addresses the problem and prevents future instability. The Contractor shall not continue with shaft construction until the damage which has already occurred is repaired in accordance with the specifications, and until receiving the Engineer's approval of the revised shaft installation narrative.

The Contractor shall dispose of the slurry and slurry-contacted spoils as specified in the shaft installation narrative as approved by the Engineer, and in accordance with the following requirements:

1. Water slurry with no additives may be infiltrated to uplands within the confines of the Contracting Agency Right Of Way for the project, provided that the groundline at the disposal site is at least five feet above the current water table, and that disposal operations conform to the temporary erosion and sedimentation control (TESC) requirements established for this project. For the purposes of water slurry disposal, upland is defined as an area that has no chance of discharging directly to waters of the State, including wetlands or conveyances that indirectly lead to wetlands or waters of the State.

   Spoils in contact with the slurry may be disposed of as clean fill.

2. Synthetic slurry and water slurry with polymer-based additives shall be contained and disposed of by the Contractor at an approved facility. Spoils in contact with synthetic slurry or water slurry with polymer-based additives shall be contained and disposed of by the Contractor at an approved waste facility. Prior to beginning shaft excavation operations, the Contractor shall coordinate with the waste

facility operator and the Jurisdictional Health Department (JHD) to determine requirements for shaft spoils disposal at the facility. The Contractor shall submit the location of the waste facility requirements for disposal of shaft spoils (as approved by the waste facility operator and the JHD), copies of any permits required and obtained, and any associated test results to the Engineer prior to disposal. The Contractor shall stockpile spoils on 6-mil plastic and cover with 6-mil plastic to protect from runoff until approval from the waste facility operator.

Assembly And Placement Of Steel Reinforcing Bars

The steel reinforcing bar cage shall be rigidly braced to retain its configuration during handling and construction. Individual or loose bars will not be permitted. The Contractor shall show bracing and any extra reinforcing steel required for fabrication of the cage in the shop drawings.

The reinforcement shall be carefully positioned and securely fastened to provide the minimum clearances listed below, and to ensure that no displacement of the steel reinforcing bars occurs during placement of the concrete. The Contractor shall submit details of the steel reinforcing bar cage centralizers along with the shop drawings required by item 6 of the shaft installation narrative. The reinforcing steel centralizers shall be placed at least at the quarter points around the circumference of the steel reinforcing bar cage, and located vertically at least at the 1/4 and 3/4 points of the shaft length below the shaft cap.

The Contractor shall place bars as shown in the Plans with minimum concrete cover of three inches for shafts with diameters of three feet or less, and four inches for shafts with diameters greater than three feet.

Placing Concrete

Shaft concrete shall be Class 4000P. Concrete placement shall commence immediately after completion of excavation by the Contractor and inspection by the Engineer. If slurry is used, testing immediately prior to commencing concrete placement shall show a maximum sand content of 1.0 percent, in accordance with API 13B-1 Section 5. Concrete placement shall continue in one operation to the top of the shaft, or as shown in the Plans.

During concrete placement, the Contractor shall monitor, and minimize, the difference in the level of concrete inside and outside of the steel reinforcing bar cage. The Contractor shall conduct concrete placement operations to maintain the differential concrete head as 1'-0" maximum.

When placing concrete in the dry, only the top five feet of concrete shall be vibrated. The amount and extent of vibration shall be sufficient to assure concrete flow to the outside of the shaft with full consolidation without causing segregation to occur. Vibration of the top five feet of concrete does not affect the maximum slump allowed for the concrete class specified.

If water is not present, the concrete shall be deposited through the center of the reinforcement cage by a method which prevents segregation of aggregates

and splashing of concrete on the reinforcement cage. The concrete shall be placed such that the free-fall is vertical down the center of the shaft without hitting the sides, the steel reinforcing bars, or the steel reinforcing bar cage bracing. The Section 6-02.3(6) restriction for 5'-0" maximum free-fall shall not apply to placement of Class 4000P concrete into a shaft.

When placing concrete underwater, including when water in a shaft excavation exceeds three inches in depth, the Contractor shall place the concrete by pressure feed using a concrete pump with a watertight tube having a minimum diameter of four inches. The discharge end of the tube on the concrete pump shall include a device to seal out water while the tube is first filled with concrete. Alternatively, the Contractor may use a plug that is inserted in the hopper of the concrete pump and travels through the tremie to keep the concrete separated from the water and slurry. Concrete placement by gravity feed is not allowed.

Throughout the underwater concrete placement operation, the discharge end of the tube shall remain submerged in the concrete at least five feet and the tube shall always contain enough concrete to prevent water from entering. The concrete placement shall be continuous until the work is completed, resulting in a seamless, uniform shaft.

Before placing any fresh concrete against concrete deposited in water or slurry, the Contractor shall remove all scum, laitance, loose gravel and sediment on the upper surface of the concrete deposited in water or slurry and chip off any high spots on the upper surface of the existing concrete that would prevent the steel reinforcing bar cage from being placed in the position required by the Plans.

The Contractor's construction operation in the vicinity of a drilled shaft excavation with freshly placed concrete and curing concrete shall conform to Section 6-02.3(6)D.

Casing Removal

Tops of permanent casings for the shafts shall be removed to at least six inches beneath finish groundline, unless otherwise specified by the Engineer.

8-20.3(8).GR8

Wiring

8-20.3(8).INST1.GR8

Section 8-20.3(8) is supplemented with the following:

8-20.3(8).OPT1.GR8

(March 13, 1995)

Field Wiring Chart

501	AC+ Input	516-520 Railroad Pre-empt
502	AC- Input	5A1-5D5 Emergency Pre-empt
503-510	Control-Display	541-580 Coordination
511-515	Sign Lights	581-599 Spare

Movement Number	1	2	3	4	5	6	7	8	9
Vehicle Head									
Red	611	621	631	641	651	661	671	681	691
Yellow	612	622	632	642	652	662	672	682	692
Green	613	623	633	643	653	663	673	683	693
Spare	614	624	634	644	654	664	674	684	694
Spare	615	625	635	645	655	665	675	685	695
AC-	616	626	636	646	656	666	676	686	696
Red Auxiliary	617	627	637	647	657	667	677	687	697
Yellow Auxiliary	618	628	638	648	658	668	678	688	698
Green Auxiliary	619	629	639	649	659	669	679	689	699
Pedestrian Heads & Dets.									
Hand	711	721	731	741	751	761	771	781	791
Man	712	722	732	742	752	762	772	782	792
AC-	713	723	733	743	753	763	773	783	793
Detection	714	724	734	744	754	764	774	784	794
Common-Detection	715	725	735	745	755	765	775	785	795
Spare	716	726	736	746	756	766	776	786	796
Spare	717	727	737	747	757	767	777	787	797
Spare	718	728	738	748	758	768	778	788	798
Spare	719	729	739	749	759	769	779	789	799
Detection									
AC+	811	821	831	841	851	861	871	881	891
AC-	812	822	832	842	852	862	872	882	892
Common-Detection	813	823	833	843	853	863	873	883	893
Detection A	814	824	834	844	854	864	874	884	894
Detection B	815	825	835	845	855	865	875	885	895
Loop 1 Out	816	826	836	846	856	866	876	886	896
Loop 1 In	817	827	837	847	857	867	877	887	897
Loop 2 Out	818	828	838	848	858	868	878	888	898
Loop 2 In	819	829	839	849	859	869	879	889	899
Supplemental Detection									
Loop 3 Out	911	921	931	941	951	961	971	981	991
Loop 3 In	912	922	932	942	952	962	972	982	992
Loop 4 Out	913	923	933	943	953	963	973	983	993
Loop 4 In	914	924	934	944	954	964	974	984	994
Loop 5 Out	915	925	935	945	955	965	975	985	995
Loop 5 In	916	926	936	946	956	966	976	986	996
Loop 6 Out	917	927	937	947	957	967	977	987	997
Loop 6 In	918	928	938	948	958	968	978	988	998
Spare	919	929	939	949	959	969	979	989	999

8-20.3(14).GR8

Signal Systems

8-20.3(14).INST1.GR8

Section 8-20.3(14) is supplemented with the following:

8-20.3(14).OPT1.GR8

(January 3, 2011)

Uninterruptible Power Supply (UPS)

The UPS system shall provide traffic signal system battery backup power in the event of loss or failure of normal utility power. The UPS system shall be constructed for full on line configuration (line interactive type), providing automatic voltage regulation and power conditioning when under normal utility power. The transfer from utility power to battery power and vise versa shall not interfere with the normal operation of the connected traffic signal controller including conflict monitor and any other peripheral devices within the traffic controller assembly.

The completely assembled UPS system, including enclosure, shall be obtained by the Contractor from the following manufacturer:

Alpha Technologies, Inc.
3767 Alpha Way
Bellingham, WA 98226
Phone: 360 647 2360
Email: alpha@alpha.com
http://www.alpha.com

The UPS system shall include the following equipment:

Type 332 Cabinet

The enclosure cabinet shall be a CALTRANS approved Type 332 cabinet with the following:

Items 2, 4 and 5 of the first paragraph of Section 9-29.13(7)E shall be provided with the cabinet. Green construction cores shall be installed for each cabinet core lock.

The cabinet shall be provided with a breaker panel with two 15 amp, 120 volt, single pole breakers, one each for the fan and the lights.

Item M of Section 9-29.13(7)C shall be provided with the cabinet.

Construction shall be of 0.125-inch sheet aluminum (5052 alloy), with mill finish. The aluminum shall not be anodized and the exterior shall not be painted.

A thermostatically controlled cooling fan, with a minimum CFM of three times the cabinet volume shall be installed at the top of the cabinet.

Three battery shelves shall be furnished. Each shelf shall be capable of supporting two Alpha (220 GOLD-HP) batteries. A minimum of two and one half inches of side clearance and six inches of overhead clearance is required for each battery.

A minimum of 12 inches of clearance shall be maintained between the bottom rack and the bottom of the cabinet.

Generator Transfer Switch and Enclosure

The UPS Type 332 cabinet shall include a transfer switch enclosure of identical materials, dimensions and installation methods as the police panel type enclosure identified in the first paragraph of Section 9-29.13(7)E except that the enclosure door shall include a spring loaded construction core lock capable of accepting a Best 6-pin CX series core. The core lock shall be installed with a green construction core. Upon contract completion, two master keys for the construction core shall be delivered to the Engineer. The transfer switch enclosure shall be installed at the same location normally occupied by the police panel enclosure.

The transfer switch enclosure shall contain the following generator transfer switch equipment:

One NEMA L5-30P Flanged Inlet generator connector

One Utility power “ON” indicator light. The indicator light shall be labeled”Utility”.

One generator power “ON” indicator light. The indicator light shall be labeled “Generator”.

Two 30 amp, 120 volt, single pole, single phase, circuit breakers. One circuit breaker shall be labeled “Generator” and the other circuit breaker shall be labeled “Utility”. Both labels shall be engraved phenolic name plates.

The enclosure shall include a mechanical lock out feature that prevents the Utility circuit breaker and the Generator circuit breaker from being in the ON position at the same time. The circuit breakers shall be capable of being independently switched.

The conductors from the generator transfer switch enclosure to the rack mounted automatic transfer switch shall be enclosed in nylon mesh sleeve.

The enclosure door shall be labeled with the letters “GTS”.

UPS Internal Components

The following equipment shall be furnished and mounted to the EIA rack.

Alpha - #017-201-31 Controller Power Module - FXM 2000 w/SNMP module

Alpha - # 020-168-25 Automatic Transfer Switch (UATS)

Alpha – # 740-755-21 Surge Suppressor Assembly, 120/240VAC

Alpha – # 740-748-23 Receptacle Plate Assembly

The following equipment shall be installed on the battery shelves:

Alpha - # 220 GOLD-HP GXL Battery (Four batteries shall be provided)

Alpha - #012-306-21 Alpha Guard Battery Management System

Alpha - #740-648-27 Battery Cable kit

Maintenance and Operations Manual(s)
Two Maintenance and Operations Manuals from Alpha Technologies shall be provided for each cabinet.

UPS Cabinet Acceptance Testing
The UPS cabinet shall be tested at the Washington State Department of Transportation Materials Laboratory located in Tumwater, Washington, prior to final delivery. The tests shall check the operation of each individual component as well as the overall operation of the system.

The Contractor shall designate a qualified representative for these tests. Notification of this representative shall be submitted for approval, in writing, to the State Materials Laboratory, 14 calendar days prior to any equipment deliveries. The Engineer shall also receive a copy of this notification, which includes the representative's name, address, and telephone number. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative. These communications and actions shall include, but not be limited to, all notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

The State Materials Laboratory testing process will consist of the following three separate stages:

a. Delivery and Assembly
b. Demonstration and Documentation
c. Performance Test

Testing will follow in the correct order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

Stage 1 Delivery and Assembly
Prior to delivery of the UPS cabinet to the State Materials Laboratory, all components and equipment, including the batteries shall be fully installed in the cabinet and the cabinet operations shall be successfully tested by the Contractor’s representative.

After the cabinet has been successfully tested, the batteries shall be removed from the cabinet and the cabinet and batteries shall be delivered, independently, to the State Materials Laboratory. Upon delivery to the State Materials Laboratory, the batteries shall be reinstalled in the cabinet and the cabinet shall be made fully operational by the Contractor’s representative.

All components for the complete UPS system, including the necessary test equipment, shall be assembled and ready for demonstration within ten working days of delivery to the Materials Laboratory. The systems shall simulate the operations as installed in the field.

The Contractor shall provide labor, equipment, and materials necessary to assemble all UPS equipment, including battery installation, and make ready for demonstration.

Stage 2 Documentation and Demonstration

Documentation

All documentation shall be furnished with the UPS equipment prior to the start of testing. The documents to be supplied shall consist of the following:

a. A complete set of documents which shall include:
    1. Serial numbers when applicable.
    2. Wiring diagrams for all equipment furnished. One set per cabinet.
    3. Complete operations and maintenance manuals. Two sets per cabinet.
    b. A description of the functions and the capabilities of individual components and of the overall UPS system.

Demonstration

The Contractor shall provide the following:

a. A presentation on how to operate the system

b. A complete and thorough demonstration to show that all components of the UPS system are in good condition and operating properly.

The demonstration shall be performed by the Contractor's representative in the presence of State Materials personnel.

Stage 3 Unit Performance Test

The unit performance test will be conducted by State Personnel to determine if each and every UPS cabinet assembly performs correctly.

The performance test shall include the testing of the following specifications:

Battery Discharge Rate
Battery Recharge Rate
Power Transfer Rate

Test results shall be within the manufacturers recommended values in order for the tests to be considered successful.

Equipment Failure or Rejection

All component or system failures shall be documented. This documentation shall provide the following information:

a. A detailed description of the failure.
b. The steps undertaken to correct the failure.
c. A list of parts that were replaced, if any.

All failed or rejected equipment shall be removed from the Materials Laboratory within three working days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory, by the contractor and delivered to sites as designated elsewhere in this contract.

UPS Cabinet Field Testing

After installation, the Contractor shall field test the UPS system to ensure the system operates in accordance with plans, specifications and manufacturer's instructions. The test shall ensure that that all components are operational within manufacturer's tolerances. The Contractor shall provide a testing procedure to the Engineer for approval. The testing procedure shall provide for operational testing of the following:

UPS Power Module
Surge Suppressor
Automatic Transfer Switch
Generator Power Transfer Switch

The field test shall demonstrate the loss of utility power and the switch over to battery power without interference with the normal operation of the connected traffic signal controller including conflict monitor and any other peripheral devices within the traffic controller assembly.

8-20.3(14)A.GR8

Signal Controllers

8-20.3(14)A.INST1.GR8

Section 8-20.3(14)A is supplemented with the following:

8-20.3(14)A.OPT1.GR8

(August 2, 2010)

Testing

All signal control equipment shall be tested at the Washington State Department of Transportation Materials Laboratory located in Tumwater, Washington, prior to final delivery. The tests shall check the operation of each individual component as well as the overall operation of the system.

The Contractor shall designate a qualified representative for these tests. Notification of this representative shall be submitted for approval, in writing, to the State Materials Laboratory, 14 calendar days prior to any equipment deliveries. The Engineer shall also receive a copy of this notification, which includes the representative's name, address, and telephone number. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative.

These communications and actions shall include, but not be limited to, the following:

All notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

The State Materials Laboratory testing process will consist of the following four separate stages:

a. Delivery and Assembly
b. Demonstration and Documentation
c. Performance Test
d. Operational Test

Testing will follow in the correct order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

Stage 1 Delivery Assembly
All components for the complete traffic control systems, including the necessary test equipment, shall be assembled and ready for demonstration within ten working days of delivery to the Materials Laboratory. The systems shall simulate the operations as installed in the field.

Equipment and prerequisites necessary to complete this stage shall include:

a. Detection Simulator:
The detection simulator shall provide at least one detector per phase and variable traffic volumes. One simulator shall be required for every two controllers tested.

b. Communications Network:
Locations, specified for coordinating communications equipment and cable, shall be completely wired to provide an operational communications system between all local and master controllers.

The Contractor shall provide labor, equipment, and materials necessary to assemble all control equipment complete and ready for demonstration. Materials and equipment used for this stage that are not required for field installation shall remain the property of the Contractor. Failure to complete this stage within ten working days will result in rejection of the entire system.

Stage 2 Demonstration and Documentation
This stage shall be completed within seven working days following the completion of Stage 1. Failure to do so shall result in rejection of the entire shipment.

All documentation shall be furnished with the control equipment prior to the start of testing. If corrections to any document are deemed necessary by the State, the Contractor shall submit this updated version prior to the final approval by the State Materials Laboratory. The documents to be supplied shall consist of or provide the following:

a. A Complete accounting of all the control and test equipment required.

b. A complete set of documents which shall include:

1. Serial numbers when applicable.

2. Written certification that equipment of the same make and model has been tested according to NEMA Environmental Standards and Test Procedures, and has met or exceeded these standards. The certificate shall include equipment model number and where, when, and by whom the tests were conducted. This certificate shall accompany each shipment of controllers.

3. Reproducible mylar wiring diagrams and two blue-tone prints for each controller and cabinet supplied. The sheet size shall be 24 inches by 36 inches.

4. Wiring diagrams for all auxiliary equipment furnished. One set per cabinet.

5. Complete operations and maintenance manuals including complete and correct software listing and flow charts. One set of operations and maintenance manuals per cabinet; at least four but no more than ten. Five sets of software listings and flow charts.

6. Complete operations and maintenance manuals for all auxiliary equipment. One set per cabinet.

c. A description of the functions and the capabilities of individual components and of the overall control system.

d. A presentation on how to operate the system.

e. A complete and thorough demonstration to show that all components of the control system are in good condition and operating properly, and proof that the controller and cabinet are functioning correctly.

f. Detailed instructions for installing and operating the controller(s), including explanations on the use of all features of the controller(s).

g. The operational and maintenance manuals for each traffic signal controller supplied including as a minimum, but not to be limited to the following:

1. Detailed instructions for maintaining all hardware components, controller, and auxiliary equipment.

2. A complete parts list detailing all manufacturer's identification codes.

3. Detailed wiring diagrams and schematics indicating voltage levels and pictorial description, part name, and location for all hardware components, controller, and auxiliary equipment.

The demonstration shall include the following:

a. Phasing per plans and all phase timing.

b. Detection including any special detector functions.

c. Conflict Monitor and Load Switches.

d. Special Coordination including communication equipment.

This demonstration shall be performed by the Contractor in the presence of State Materials personnel. The Contractor shall supply any item not accounted for within five working days of the accounting. Controllers and cabinets that remain incomplete five working days after notification shall be rejected and returned freight collect to the Contractor.

Stage 3 Unit Performance Test
A minimum of ten working days shall be allowed for one or two cabinet assemblies and five working days for each additional assembly.

The unit performance test will be conducted by State Personnel to determine if each and every controller cabinet assembly complies with NEMA Environmental Standards as stated in NEMA publication No. TS 1-1976, Part 2.

Any unit submitted, whose failure has been corrected, shall be retested from the beginning of this stage.

Stage 4 Operational Test
All control and auxiliary equipment shall operate without failure for a minimum of ten consecutive days. If an isolated controller is specified, it shall operate as an isolated controller. If a coordinated system is specified, it shall operate as a total coordinated system with the master and all local controllers operating in all coordinated modes.

If any failure occurs during this stage, all equipment for this stage shall be restarted following completion of repairs.

Equipment Failure Or Rejection

Equipment failures shall be defined as set forth in NEMA Publication No. TS 1-1976. Failure of load switches, detector amplifiers, and conflict monitors shall not result in rejection of the controller or cabinet. However, the Contractor shall stock, as replacements, approximately 30 percent more than the total for these three items. All excess material shall remain the property of the Contractor following completion of all tests.

If a failure occurs during Stages 3 or 4, repairs shall be made and completed within ten working days following notification of the malfunction. The Contractor shall have the option of making onsite repairs or repair them at a site selected by the Contractor. Failure to complete repairs within the allotted time shall result in rejection of the controller or cabinet assembly under test.

A total of two failures will be allowed from the start of Stage 3 to the end of Stage 4. If three failures occur during this time period, the equipment will be rejected. New equipment of different serial numbers submitted as replacement shall be received by the Materials Laboratory for testing under Stage 3 within ten working days following notification of rejection. Failure to meet this requirement within the allotted time will result in rejection of the entire system. Software errors will be considered as failures and, if not corrected within ten working days, the entire system will be subject to rejection. Following rejection of any equipment, the Contractor shall be responsible for all costs incurred. This shall include but not be limited to all shipping costs.

When the traffic control program is supplied by the State, the Contractor shall prove that any failures are, in fact, caused by that program and not the hardware.

All component or system failures, except load switches and detector amplifiers, shall be documented. This documentation shall be submitted prior to commencing the test or stage in which the failure was found and shall provide the following information:

a. A detailed description of the failure.
b. The steps undertaken to correct the failure.
c. A list of parts that were replaced, if any.

Upon completion of the tests, the equipment will be visually inspected. If material changes are observed which adversely affect the life of the equipment, the cause and conditions shall be noted. The Contractor will immediately be given notice to correct these conditions. If not repaired within ten working days of notification, the equipment will be subject to rejection. A final accounting shall be made of all equipment prior to approval.

All failed or rejected equipment shall be removed from the Materials Laboratory within three working days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory and delivered to sites as designated elsewhere in this contract.

Guarantees
Guarantees and warranties shall be in accordance with Section 1-05.10.

8-20.5.GR8
Payment

8-20.5.INST1.GR8
Section 8-20.5 is supplemented with the following:

8-20.5.OPT1.BSP.GB8
(BSP September 8, 2003)
"Removing Traffic Signal Shaft Obstructions", estimated.
Payment for removing obstructions, as defined in Section 8-20.3(4) as supplemented in these Special Provisions, will be made for the changes in shaft construction methods necessary to remove the obstruction. The Contractor and the Engineer shall evaluate the effort made and reach agreement on the equipment and employees utilized, and the number of hours involved for each. Once these cost items and their duration have been agreed upon, the payment amount will be determined using the rate and markup methods specified in Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Removing Traffic Signal Shaft Obstructions" in the bid proposal to become a part of the total bid by the Contractor.

If the shaft construction equipment is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then standby payment for the idled equipment will be added to the payment calculations. If labor is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then all labor costs resulting from Contractor labor agreements and established Contractor policies will be added to the payment calculations.

The Contractor shall perform the amount of obstruction work estimated by the Contracting Agency within the original time of the contract. The Engineer will consider a time adjustment and additional compensation for costs related to the extended duration of the shaft construction operations, provided:

1. the dollar amount estimated by the Contracting Agency has been exceeded, and

2. the Contractor shows that the obstruction removal work represents a delay to the completion of the project based on the current progress schedule provided in accordance with Section 1-08.3.

8-21.GR8

Permanent Signing

8-21.2.GR8

Materials

8-21.2(9-06.16).GR8

Roadside Sign Structures

Section 9-06.16 is supplemented with the following:

8-21.2(9-06.16).OPT1.GR8

(January 3, 2011)

Perforated Steel Square Sign Post System

Where noted in the Plans, steel sign post systems shall be square, pre-punched galvanized steel tubing, that are NCHRP 350 Test Level 3 Certified and FHWA approved. The steel sign post system shall include all anchor sleeves, and other hardware required for a complete sign installation.

System Acceptance

Systems listed in the current QPL will be accepted per the QPL approval code. Systems not listed in the QPL will be accepted based on a Supplier's Certificate of Compliance. The Supplier's Certificate of Compliance will be a contract specific letter from the supplier stating the system is NCHRP 350 Test Level 3 compliant.

8-21.2(9-28.14).GR8

Sign Support Structures

Section 9-28.14 is supplemented with the following:

8-21.2(9-28.14).OPT1.BSP.GB8

(BSP August 1, 2011)

Sign Structure Foundation Shaft Casing And Slurry

All temporary casing shall be a smooth wall non corrugated structure of steel base metal. All temporary casing shall be of ample strength to resist damage and deformation from transportation and handling, installation and extraction stresses, and all pressures and forces acting on the casing. The temporary casing shall be capable of being removed without deforming and causing damage to the completed shaft, and without disturbing the surrounding soil.

The temporary casing shall be clean prior to placement in the excavation. The temporary casing may be telescoped, but the outside diameter of the temporary casing shall not be less than the specified diameter of the shaft.

Slurry for shaft foundations shall be either synthetic slurry or water slurry, conforming to the following requirements:

Synthetic Slurries

Synthetic slurries shall be used in conformance with the manufacturer's recommendations, and the quality control plan specified in Section 8-21.3(9)F as supplemented in these Special Provisions. The sand content of synthetic slurry prior to final cleaning and immediately prior to placing concrete shall be less than 1.0 percent, in accordance with API 13B-1, Section 5.

Water Slurry

Water without site soils may be used as slurry when casing is used for the entire length of the drilled hole. Use of water slurry without full length casing may only be used with the approval of the Engineer. Water slurry shall conform to the following requirements:

Property	Test	Requirement
Density (pcf)	Mud Weight (Density) API 13B-1, Section 1	65 max.
Sand Content (percent)	Sand API 13B-1, Section 5	1.0 max.

Slurry temperature shall be at least 40F when tested.

8-21.2(9-28.14).OPT6.GR8

(January 3, 2011)

Manufacturers for Steel Roadside Sign Supports

The Standard Plans lists several steel sign support types. These supports are patented devices and many are sole-source. All of the sign support types listed below are acceptable when shown in the Plans.

Steel Sign Support Type	Manufacturer
Type TP-A & TP-B	Transpo Industries, Inc.
Type PL, PL-T & PL-U	Northwest Pipe Co.
Type AS	Transpo Industries, Inc.
Type AP	Transpo Industries, Inc.
Type ST 1, ST 2, ST 3, & ST 4	Ultimate Highway Products, Allied Tube & Conduit, Inc., Northwest Pipe, Inc.
Type SB-1, SB-2, & SB-3	Ultimate Highway Products, Xcessories Squared Development and Manufacturing Incorporated, Northwest Pipe, Inc.

8-21.2(9-28.14(2)).GR8

Steel Structures and Posts

Section 9-28.14(2) is supplemented with the following:

8-21.2(9-28.14(2)).OPT1.BSP.GB8

(BSP January 2, 2012)

Monotube Sign Structures

Structural steel, except for cover plates, anchor rod templates and as otherwise shown in the Plans, shall conform to either ASTM A 572 Grade 50, or ASTM A 588. Cover plates shall conform to ASTM A 36.

Handhole cover screws shall conform to ASTM F 593, Grade 1.

Sign bracket bolts, nuts, and washers shall conform to Section 9-06.5(1).

Monotube splice bolts, mounting beam rods, and associated nuts and washers, shall conform to the Section 9-06.5(3) requirements for AASHTO M 164, and shall be galvanized after fabrication in accordance with AASHTO M 232. Tension control bolts conforming to ASTM F 1852 may be used as monotube splice bolts, and if used shall be galvanized after fabrication in accordance with ASTM B 695 Class 55 Type I.

Anchor rods shall conform to ASTM F 1554 Grade 105, including supplemental requirements S2, S3, and S5. Nuts shall conform to ASTM A 563 Grade DH. Washers shall conform to AASHTO M 293. Anchor rods shall be galvanized a minimum of 1'-0" at the exposed end in accordance with AASHTO M 232. Nuts and washers shall be galvanized in accordance with AASHTO M 232.

8-21.2(9-28.14(2)).OPT2.BSP.GB8

(BSP August 5, 2002)

Tubular and pipe steel shall conform to either ASTM A 53 Grade B Type E or S, or ASTM A 500 Grade B. The wall thickness or pipe schedule shall be as shown in the Plans.

8-21.3.GR8

Construction Requirements

8-21.3(9).GR8

Sign Structures

8-21.3(9)A.GR8

Fabrication of Steel Structures

8-21.3(9)A.INST1.GR8

Section 8-21.3(9)A is supplemented with the following:

8-21.3(9)A.OPT1.BSP.GB8

(BSP August 3, 2009)

Monotube Sign Structures

Bolted Connections

All bolted connections shall be made using the direct tension indicator method, except as otherwise specified.

The Contractor may use tension control bolts at all monotube splice locations, subject to the following conditions:

1. The tension control bolts shall incorporate a design feature intended to either indirectly indicate, or to automatically provide, the bolt tension as specified in Table 3 of Section 6-03.3(33).

2. The Contractor shall submit the tension control bolt system to the Engineer for approval, including but not limited to bolt capacities, type of bolt, nut, and washer lubricant, method of packaging and protection of the lubricated bolt, installation equipment, calibration equipment, and installation procedures.

3. Verification testing of the tension control bolt system shall be performed at the job site in a device capable of indicating the actual bolt tension. A representative sample of not less than three bolt and nut assemblies of each diameter, length, and grade, used for structure assembly shall be tested. The test assembly shall include the type of washers specified for the structure, and the bolt, nut, and washers shall be arranged in the device as specified in the Plans for the structure. The test assembly shall use the lubricated bolts as supplied by the manufacturer.

4. The verification testing shall demonstrate that each bolt develops a tension not less than the tension specified in Table 3 of Section 6-03.3(33).

5. The tension control bolt manufacturer's installation procedure shall be followed for installation of bolts in the verification testing device, in all calibration devices, and in all structure connections.

6. Upon receiving the Engineer's approval of the verification testing results, the Contractor shall assemble the bolts in the splice locations as follows:

    a. All bolts, nuts, and washers shall be lubricated as supplied by the manufacturer and as tested during verification testing.

    b. All bolts shall be initially tightened sufficiently to bring all plies of the splice joint into firm contact but without yielding or fracturing the tension control or tension indicator element of the bolts.

    c. All bolts shall be tightened further, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened bolts. In some cases, proper tensioning of the bolts may require more than one cycle of systematic partial tightening prior to final yield or fracture of the tension control or tension indicator element of each bolt.

d. If yield or fracture of the tension control or tension indicator element of a bolt occurs prior to the final tightening cycle, that bolt shall be replaced with a new one.

7. Additional field verification testing shall be performed as requested by the Engineer.

8. All bolts and connecting hardware shall be stored and handled in a manner to prevent corrosion and loss of lubricant. Bolts which are installed without the same lubricant coating as tested under the verification test will be rejected, shall be removed from the joint, and shall be replaced with new lubricated bolts at no additional cost to the Contracting Agency.

Shop Assembly

Prior to galvanizing, the Contractor shall shop assemble the completed structure lying on its side in an undeflected position to ensure correct alignment, accuracy of holes, fit of joints, smooth camber profile, and the specified amount of camber. The joints shall be bolted with a sufficient number of bolts tightened snug tight to close the joints as they would be in the final field assembled position. The Contractor shall not disassemble the sign structure for galvanizing as specified until receiving the Engineer's approval of the shop assembled structure.

Zinc Coating and Painting

All galvanized surfaces exposed to view after erection shall be shop painted or shop powder coated in accordance with Section 6-07.3(11), except when the Plans or Special Provisions require field painting only in accordance with Sections 6-07.3(9)I and 6-07.3(11)A. Contact surfaces of the field bolted connections shall be left as galvanized without any overcoat.

The color of the finish coat shall match color No. 35237 Federal Standard 595 latest edition when dry.

All galvanized surfaces specified to be painted or powder coated shall be prepared for coating in accordance with the ASTM D 6386 and Section 6-07.3(11). The method of preparation shall be as agreed upon by the paint or powder coating manufacturer and the galvanizer. The Contractor shall not begin painting or powder coating the sign structure until receiving the Engineer’s approval of the prepared galvanized surface.

After completing erection, the Contractor shall repair all metal surfaces with damaged paint or powder coatings and exposed metal with a field repair coating in accordance with Section 6-07.3(9)I and Section 6-07.3(11)A (for paint) or Section 6-07.3(11)B (for powder coating). The color of the finish coat of the field repair coating, when dry, shall match the color specified above.

Field Assembling

The Contractor shall furnish and install the vibration damper as shown in the Plans. The damper shall be installed before the sign structure is erected.

Welding Inspector Qualification

The fabricator shop will provide a Certified Welding Inspector. The inspector shall be a AWS Certified Welding Inspector (CWI) qualified and certified in accordance with the provisions of AWS QCI Standard for Qualification and Certification.

Welding Inspection

Welds for monotube sign structures shall be inspected using the methods described below.

1. Visual Inspection
   All welds shall have 100 percent of their length visually inspected.

2. Magnetic Particle Inspection
   Fillet welds, and longitudinal butt joint welds in beams, shall have 30 percent of their length inspected using magnetic-particle testing techniques. If rejectable flaws are found in any test length of the weld, the full length of the weld or five feet on either side of the test length, whichever is less, shall be tested.

3. Ultrasonic Inspection
   Groove welds, except the post to beam connection weld and longitudinal butt joint welds in beams, shall have 100 percent of their length inspected using ultrasonic testing techniques. The testing procedure and acceptance criteria for tubular members shall conform to the latest edition of the AWS Structural Welding Code D1.1-Steel.

4. Dye-Penetrant or Magnetic Particle Inspection
   The post to beam connection weld shall have 100 percent of its length inspected using dye-penetrant or magnetic-particle testing techniques. The inspection shall be performed after the root pass and after completion of the weld.

8-21.3(9)A.OPT2.BSP.FB8

(BSP August 3, 2009)

Monotube Sign Structures

Bolted Connections

All bolted connections shall be made using the direct tension indicator method, except as otherwise specified.

The Contractor may use tension control bolts at all monotube splice locations, subject to the following conditions:

1. The tension control bolts shall incorporate a design feature intended to either indirectly indicate, or to automatically provide, the bolt tension as specified in Table 3 of Section 6-03.3(33).

2. The Contractor shall submit the tension control bolt system to the Engineer for approval, including but not limited to bolt capacities, type of bolt, nut, and washer lubricant, method of packaging and protection of the lubricated bolt, installation equipment, calibration equipment, and installation procedures.

3. Verification testing of the tension control bolt system shall be performed at the job site in a device capable of indicating the actual bolt tension. A representative sample of not less than three bolt and nut assemblies of each diameter, length, and grade, used for structure assembly shall be tested. The test assembly shall include the type of washers specified for the structure, and the bolt, nut, and washers shall be arranged in the device as specified in the Plans for the structure. The test assembly shall use the lubricated bolts as supplied by the manufacturer.

4. The verification testing shall demonstrate that each bolt develops a tension not less than the tension specified in Table 3 of Section 6-03.3(33).

5. The tension control bolt manufacturer's installation procedure shall be followed for installation of bolts in the verification testing device, in all calibration devices, and in all structure connections.

6. Upon receiving the Engineer's approval of the verification testing results, the Contractor shall assemble the bolts in the splice locations as follows:

    a. All bolts, nuts, and washers shall be lubricated as supplied by the manufacturer and as tested during verification testing.

    b. All bolts shall be initially tightened sufficiently to bring all plies of the splice joint into firm contact but without yielding or fracturing the tension control or tension indicator element of the bolts.

    c. All bolts shall be tightened further, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened bolts. In some cases, proper tensioning of the bolts may require more than one cycle of systematic partial tightening prior to final yield or fracture of the tension control or tension indicator element of each bolt.

d. If yield or fracture of the tension control or tension indicator element of a bolt occurs prior to the final tightening cycle, that bolt shall be replaced with a new one.

7. Additional field verification testing shall be performed as requested by the Engineer.

8. All bolts and connecting hardware shall be stored and handled in a manner to prevent corrosion and loss of lubricant. Bolts which are installed without the same lubricant coating as tested under the verification test will be rejected, shall be removed from the joint, and shall be replaced with new lubricated bolts at no additional cost to the Contracting Agency.

Shop Assembly

Prior to galvanizing, the Contractor shall shop assemble the completed structure lying on its side in an undeflected position to ensure correct alignment, accuracy of holes, fit of joints, smooth camber profile, and the specified amount of camber. The joints shall be bolted with a sufficient number of bolts tightened snug tight to close the joints as they would be in the final field assembled position. The Contractor shall not disassemble the sign structure for galvanizing as specified until receiving the Engineer's approval of the shop assembled structure.

Zinc Coating and Painting

All galvanized surfaces exposed to view after erection shall be shop painted or shop powder coated in accordance with Section 6-07.3(11), except when the Plans or Special Provisions require field painting only in accordance with Sections 6-07.3(9)I and 6-07.3(11)A. Contact surfaces of the field bolted connections shall be left as galvanized without any overcoat.

The color of the finish coat shall match *** $$1$$ *** when dry.

All galvanized surfaces specified to be painted or powder coated shall be prepared for coating in accordance with the ASTM D 6386 and Section 6-07.3(11). The method of preparation shall be as agreed upon by the paint or powder coating manufacturer and the galvanizer. The Contractor shall not begin painting or powder coating the sign structure until receiving the Engineer’s approval of the prepared galvanized surface.

After completing erection, the Contractor shall repair all metal surfaces with damaged paint or powder coatings and exposed metal with a field repair coating in accordance with Section 6-07.3(9)I and Section 6-07.3(11)A (for paint) or Section 6-07.3(11)B (for powder coating). The color of the finish coat of the field repair coating, when dry, shall match the color specified above.

Field Assembling

The Contractor shall furnish and install the vibration damper as shown in the Plans. The damper shall be installed before the sign structure is erected.

Welding Inspector Qualification

The fabricator shop will provide a Certified Welding Inspector. The inspector shall be a AWS Certified Welding Inspector (CWI) qualified and certified in accordance with the provisions of AWS QCI Standard for Qualification and Certification.

Welding Inspection

Welds for monotube sign structures shall be inspected using the methods described below.

1. Visual Inspection
   All welds shall have 100 percent of their length visually inspected.

2. Magnetic Particle Inspection
   Fillet welds, and longitudinal butt joint welds in beams, shall have 30 percent of their length inspected using magnetic-particle testing techniques. If rejectable flaws are found in any test length of the weld, the full length of the weld or five feet on either side of the test length, whichever is less, shall be tested.

3. Ultrasonic Inspection
   Groove welds, except the post to beam connection weld and longitudinal butt joint welds in beams, shall have 100 percent of their length inspected using ultrasonic testing techniques. The testing procedure and acceptance criteria for tubular members shall conform to the latest edition of the AWS Structural Welding Code D1.1-Steel.

4. Dye-Penetrant or Magnetic Particle Inspection
   The post to beam connection weld shall have 100 percent of its length inspected using dye-penetrant or magnetic-particle testing techniques. The inspection shall be performed after the root pass and after completion of the weld.

8-21.3(9)E.GR8

Bridge Mounted Sign Brackets

8-21.3(9)E.INST1.GR8

Section 8-21.3(9)E is supplemented with the following:

8-21.3(9)E.OPT1.BSP.FB8

(BSP December 14, 2000)

Bridge Mounted Sign Bracket No(s). *** $$1$$ *** include the following quantities of structural carbon steel:

*** $$2$$ ***

For bridge mounted sign brackets mounted with resin bonded anchors, the Contractor shall install resin bonded anchors in accordance with Section 6-02.3(18) as supplemented in these Special Provisions. For this type of mounting, Bridge Mounted Sign Bracket No(s). *** $$3$$ *** include the following quantities of drilled holes:

*** $$4$$ ***

8-21.3(9)F.GR8

Foundations

8-21.3(9)F.INST1.GR8

Section 8-21.3(9)F is supplemented with the following:

8-21.3(9)F.OPT1.BSP.GB8

(BSP July 12, 2000)

The Contractor shall not construct grout pads at the base of the monotube sign structures.

8-21.3(9)F.OPT2.BSP.FB8

(BSP August 1, 2011)

Shafts For Sign Structure Foundations

Shaft foundations for the sign structures at the following location(s) shall be constructed in accordance with the following requirements, except that temporary casing is not required by the Contracting Agency but is instead a Contractor option:

*** $$1$$ ***

Shaft foundations for the sign structures at the following location(s) shall be constructed in accordance with the following requirements, including required use of temporary casing:

*** $$2$$ ***

Submittals

Contractor Project Reference and Personnel Experience Submittal

Prior to the start of shaft construction, the Contractor shall electronically submit a project reference list to the Engineer for approval verifying the successful completion by the Contractor of at least three separate shaft foundation projects in the past five years with drilled shafts of diameters and depths similar to or larger than those shown in the Plans and ground conditions similar to those identified in the Contract. A brief description of each listed project shall be provided along with the name and current phone number of the project owner or the owner's Contractor.

Prior to the start of shaft construction, the Contractor shall electronically submit a list identifying the on-site supervisors, and drill rig operators potentially assigned to the project to the Engineer for approval. On-site supervisors shall have a minimum two years experience in supervising construction of shaft foundations, and drill rig operators shall have a minimum one year experience in construction of shaft foundations. The list shall contain a brief description of each individual's experience.

The Engineer will approve or reject the Contractor's qualifications and field personnel within 10 working days after receipt of the submission. Work shall not be started on any drilled shaft until the Contractor's qualifications and field personnel are approved by the Engineer. The Engineer may suspend the shaft construction if the Contractor substitutes unapproved personnel. The Contractor shall be fully liable for the additional costs resulting from the suspension of work and no adjustments in contract time resulting from the suspension of work will be allowed.

Shaft Installation Narrative Submittal

The Contractor shall electronically submit a shaft installation narrative for approval by the Engineer. The narrative shall reference available subsurface data provided in the contract test hole boring logs, and the geotechnical report(s) prepared for this project. This narrative shall provide the following information in a single complete submittal:

1. Proposed overall construction operation sequence.

2. Description, size, and capacities of specific equipment that will be available on site, including but not limited to cranes, drills, auger, bailing buckets, final cleaning equipment and drilling unit. The narrative shall describe why the equipment was selected, and describe equipment suitability to the anticipated site conditions and work methods. The narrative shall include a project history of the drilling equipment demonstrating the successful use of the equipment on shafts of equal or greater size in similar soil/rock conditions. The narrative shall also include details of shaft excavation and cleanout methods

3. Details of the method(s) to be used to ensure shaft stability (i.e., prevention of caving, bottom heave, etc. using temporary casing, slurry, and other means) during excavation (including pauses and stops during excavation) and concrete placement. Temporary casing dimensions and detailed procedures for temporary casing installation and removal, and methods of advancing temporary casing with the excavation in accordance with this Special Provision, shall be provided.

4. Detailed procedures for mixing, using, and maintaining the slurry shall be provided. A detailed mix design (including all additives and their specific purpose in the slurry mix), and a discussion of its suitability to the anticipated subsurface conditions, shall also be provided for the proposed slurry.

   The submittal shall include a detailed plan for quality control of the selected slurry, including tests to be performed, test methods to be used, and minimum and/or maximum property requirements which shall be met to ensure that the slurry functions as intended, considering the anticipated subsurface conditions and shaft construction methods, in accordance with the slurry manufacturer's recommendations and this Special Provision. As a minimum, the slurry quality control plan shall include the following tests:

Property	**Test Method**
Density	Mud Weight (Density), API 13B-1, Section 1
Viscosity	Marsh Funnel and Cup, API 13B-1, Section 2.2
PH	Glass Electrode, pH Meter, or pH Paper
Sand Content	Sand, API 13B-1, Section 5

5. Description of the method used to fill or eliminate all voids below the top of shaft between the plan shaft diameter and excavated shaft diameter.

6. Reinforcing steel shop drawings, details of reinforcement placement, including bracing, centering, and lifting methods, and the method to assure the reinforcing cage position is maintained during construction.

7. Details of concrete placement, including operational procedures for pumping methods, and a sample uniform yield form to be used by the Contractor for plotting the approximate volume of concrete placed versus the depth of shaft for all shaft concrete placement (except concrete placement in the dry).

8. Description of the material (either CDF or granular material) used to temporarily backfill a shaft excavation during a stoppage of the excavation operation, as well as the method used to place and remove the material.

9. Storage and disposal plan for excavated material and drilling slurry (if applicable).

The Engineer will evaluate the shaft installation narrative for conformance with the Plans, Specifications and Special Provisions within the review time specified in Section 6-01.9.

Synthetic Slurry Technical Representative Submittal
If synthetic slurry is used to construct the shafts, the Contractor shall provide or arrange for technical assistance in the use of the synthetic slurry as specified in the **Slurry** subsection of this Special Provision. As part of the shaft installation narrative submittal, the Contractor shall electronically submit one of the following to the Engineer for approval:

1. The name and current phone number of the synthetic slurry manufacturer's technical representative assigned to the project.

2. The name(s) of the Contractor's personnel assigned to the project and trained by the synthetic slurry manufacturer in the proper use of the synthetic slurry. The submittal shall include a signed training certification letter from the synthetic slurry manufacturer for each trained Contractor's employee listed, including the date of the training.

All submittals shall be in electronic pdf format, and all documents in each pdf shall be legible. All submittals shall be prepared jointly by the Contractor and any subcontractors that will be performing the work.

Work shall not begin until all the required submittals have been approved in writing by the Engineer. All procedural approvals given by the Engineer will be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work.

Quality Assurance
Shafts shall be constructed so that the center at the top of the shaft is within four inches of the Plan location. Shafts shall be within 1.5 percent of plumb. Shaft steel reinforcing bar placement tolerances shall conform to Section 6-02.3(24)C.

A shaft preconstruction conference shall be held at least five working days prior to the Contractor beginning any shaft construction work at the site to discuss construction procedures, personnel, and equipment to be used, and other elements of the approved shaft installation plan as specified elsewhere in this Special Provision. Those attending shall include:

1. (representing the Contractor) The superintendent, on site supervisors, and all foremen in charge of excavating the shaft, placing the casing and slurry as applicable, placing the steel reinforcing bars, and placing the concrete. If synthetic slurry is used to construct the shafts, the synthetic slurry manufacturer's

representative and/or approved Contractor's employees trained in the use of the synthetic slurry shall also attend.

2. (representing the Contracting Agency) The Project Engineer, key inspection personnel, and representatives from the WSDOT State Construction Office and Materials Laboratory Geotechnical Division.

If the Contractor proposes a significant revision of the approved shaft installation plan, as determined by the Engineer, the Engineer may require an additional conference be held before any additional shaft construction operations are performed.

Shaft Excavation

Shafts shall be excavated to the required depth as shown in the Plans. Shaft excavation operations shall conform to this Special Provision and the shaft installation narrative as approved by the Engineer. Once the excavation operation has been started, the excavation shall be conducted in a continuous operation until the excavation of the shaft is completed, except for pauses and stops as noted, using approved equipment capable of excavating through the type of material expected.

Pauses, defined as momentary interruptions of the excavation operation, will be allowed only for casing splicing, tooling changes, slurry maintenance, and removal of obstructions. Shaft excavation operation interruptions not conforming to this definition shall be considered stops. Stops for uncased or partial depth cased excavations shall not exceed 16 hours in duration. Stops for fully cased excavations shall not exceed 65 hours duration.

For stops exceeding the time durations specified above, the Contractor shall stabilize the excavation using one or both of the following methods:

1. Before the end of the work day, install casing in the hole to the depth of the excavation. The outside diameter of the casing shall not be smaller than six inches less than either the Plan diameter of the shaft or the actual excavated diameter of the hole, whichever is greater. Prior to removing the casing and resumption of shaft excavation, the annular space between the casing and the excavation shall be sounded. If the sounding operation indicates that caving has occurred, the casing shall not be removed and shaft excavation shall not resume until the Contractor has stabilized the excavation in accordance with item 3 of the shaft installation narrative as approved by the Engineer.

2. Backfill the hole with CDF or granular material as specified by the Contractor and approved by the Engineer in accordance with item 8 of the shaft installation narrative. The Contractor shall backfill the hole to the ground surface if the excavation is not cased, or to a minimum of five feet

above the bottom of casing if the excavation is cased. Backfilling of shafts with casing fully seated into rock, as determined by the Engineer, will not be required.

During stops, the Contractor shall stabilize the shaft excavation to prevent bottom heave, caving, head loss, and loss of ground. The Contractor bears full responsibility for selection and execution of the method(s) of stabilizing and maintaining the shaft excavation, in accordance with Section1-07.13. Shaft stabilization shall conform to item 3 of the shaft installation narrative.

If slurry is present in the shaft excavation, the Contractor shall conform to the requirements in the **Slurry** subsection of this Special Provision regarding the maintenance of the slurry and the minimum level of drilling slurry throughout the stop, and shall recondition the slurry to the required slurry properties prior to recommencing shaft excavation operations.

Temporary casing shall be advanced during excavation operations within the limits of temporary casing shown in the Plans for all sign structure shaft foundation locations specified at the beginning of this Special Provision as requiring temporary casing. Excavation in advance of the casing tip shall not exceed three feet, except that in no case shall shaft excavation and casing placement extend below the bottom of shaft excavation as shown in the Plans. Unless partial depth temporary casing is shown in the Plans, temporary casing shall be full depth of the sign bridge shaft.

The Contractor shall conduct casing installation operations and shaft excavation operations such that the adjacent soil outside the casing and shaft excavation for the full height of the shaft is not disturbed. Disturbed soil is defined as soil whose geotechnical properties have been changed from those of the original in-situ soil, and whose altered condition adversely affects the structural integrity of the shaft foundation.

The Contractor shall use appropriate means such as a cleanout bucket, smooth mouth grab, or air lift to clean the bottom of the excavation of all shafts. No more than two inches of loose or disturbed material shall be present at the bottom of the shaft just prior to placing concrete.

The excavated shaft shall be inspected and approved by the Engineer prior to proceeding with construction. The bottom of the excavated shaft shall be sounded with an airlift pipe, a tape with a heavy weight attached to the end of the tape, or other means acceptable to the Engineer to determine that the shaft bottom meets the requirements in the Contract.

When obstructions are encountered, the Contractor shall notify the Engineer promptly. An obstruction is defined as a specific object (including, but not limited to, boulders, logs, and man made objects) encountered during the shaft excavation operation which prevents or hinders the advance of the shaft excavation. When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of

advance of the shaft drilling equipment being significantly reduced relative to the rate of advance for the portion of the shaft excavation in the geological unit that contains the obstruction, then the Contractor shall remove, break-up, or push aside, the obstruction under the provisions of Section 8-21.5 as supplemented in these Special Provisions. The method of dealing with such obstructions, and the continuation of excavation shall be as proposed by the Contractor and approved by the Engineer.

The Contractor shall use slurry, as specified in the **Slurry** subsection of this Special Provision, to maintain a stable excavation during excavation and concrete placement operations once water begins to enter the shaft excavation and remain present.

Slurry

If synthetic slurry is used, either a manufacturer's representative or a Contractor's employee trained in the use of the synthetic slurry, as approved by the Engineer in accordance with the **Submittals** subsection of this Special Provision, shall provide technical assistance for the use of the synthetic slurry, shall be at the site prior to introduction of the synthetic slurry into the first drilled hole requiring slurry, and shall remain at the site during the construction of the first shaft excavated to adjust the slurry mix to the specific site conditions.

If the Contractor uses slurry in shafts installed below groundwater and in caving or sloughing soils, the slurry level in the excavation shall be maintained above the groundwater level the greater of the following dimensions, except as otherwise noted for the special requirements for all stops in shaft excavation operations:

1. Not less than ten feet,

2. Dimension as required to provide and maintain a stable hole.

The Contractor shall provide casing, or other means, as necessary to meet these requirements.

The slurry level shall be maintained above all unstable zones a sufficient distance to prevent bottom heave, caving or sloughing of those zones.

Throughout all stops in shaft excavation operations as defined in the **Shaft Excavation** subsection of this Special Provision, the Contractor shall monitor and maintain the slurry level in the excavation the greater of the following elevations:

1. No lower than the water level elevation outside the shaft.

2. Elevation as required to provide and maintain a stable hole.

Synthetic slurry shall be mixed and thoroughly hydrated in slurry tanks, ponds, or storage areas. The Contractor shall draw sample sets from the slurry storage facility and test the samples for the conformance with the

specified viscosity and pH properties before beginning slurry placement in the drilled hole. Synthetic slurry shall conform to the quality control plan included in the shaft installation plan as approved by the Engineer. A sample set shall be composed of samples taken at mid-height and within two feet of the bottom of the storage area.

When synthetic slurry is used, the Contractor shall keep a written record of all additives and concentrations of the additives in the synthetic slurry. These records shall be provided to the Engineer once the slurry system has been established in the first drilled shaft on the project. The Contractor shall provide revised data to the Engineer if changes are made to the type or concentration of additives during construction.

The Contractor shall sample and test all slurry in the presence of the Engineer, unless otherwise directed. The date, time, names of the persons sampling and testing the slurry, and the results of the tests shall be recorded. A copy of the recorded slurry test results shall be submitted to the Engineer at the completion of each shaft, and during construction of each shaft when requested by the Engineer.

Sample sets of all slurry, composed of samples taken at mid-height and within two feet of the bottom of the shaft and the storage area, shall be taken and tested once every four hours minimum at the beginning and during drilling shafts and prior to cleaning the bottom of the hole to verify the control of the viscosity and pH properties of the slurry. As a minimum, sample sets of all slurry shall be taken and tested at least once every two hours if the previous sample set did not have consistent viscosity and pH properties. All slurry shall be recirculated, or agitated with the drilling equipment, when tests show that the sample sets do not have consistent specified properties. Cleaning of the bottom of the hole shall not begin until tests show the samples taken at mid-height and within two feet of the bottom of the hole have consistent viscosity and pH properties.

Sample sets of all slurry, as specified, shall be taken and tested to verify control of the viscosity, pH, density, and sand content properties after final cleaning of the bottom of the hole just prior to placing concrete. Placement of the concrete shall not start until tests show that the samples taken at mid-height and within two feet of the bottom of the hole have consistent specified properties.

The Contractor shall clean, recirculate, de-sand, or replace the slurry to maintain the required slurry properties.

The Contractor shall demonstrate to the satisfaction of the Engineer that stable conditions are being maintained. If the Engineer determines that stable conditions are not being maintained, the Contractor shall immediately take action to stabilize the shaft. The Contractor shall submit a revised shaft installation narrative which addresses the problem and prevents future instability. The Contractor shall not continue with shaft construction until the damage which has already occurred is repaired in

accordance with the specifications, and until receiving the Engineer's approval of the revised shaft installation narrative.

The Contractor shall dispose of the slurry and slurry-contacted spoils as specified in the shaft installation plan as approved by the Engineer, and in accordance with the following requirements:

1. Water slurry with no additives may be infiltrated to uplands within the confines of the Contracting Agency Right Of Way for the project, provided that the groundline at the disposal site is at least five feet above the current water table, and that disposal operations conform to the temporary erosion and sedimentation control (TESC) requirements established for this project. For the purposes of water slurry disposal, upland is defined as an area that has no chance of discharging directly to waters of the State, including wetlands or conveyances that indirectly lead to wetlands or waters of the State.

   Spoils in contact with the slurry may be disposed of as clean fill.

2. Synthetic slurry and water slurry with polymer-based additives shall be contained and disposed of by the Contractor at an approved facility. Spoils in contact with synthetic slurry or water slurry with polymer-based additives shall be contained and disposed of by the Contractor at an approved waste facility. Prior to beginning shaft excavation operations, the Contractor shall coordinate with the waste facility operator and the Jurisdictional Health Department (JHD) to determine requirements for shaft spoils disposal at the facility. The Contractor shall submit the location of the waste facility requirements for disposal of shaft spoils (as approved by the waste facility operator and the JHD), copies of any permits required and obtained, and any associated test results to the Engineer prior to disposal. The Contractor shall stockpile spoils on 6-mil plastic and cover with 6-mil plastic to protect from runoff until approval from the waste facility operator.

Assembly And Placement Of Steel Reinforcing Bars

The steel reinforcing bar cage shall be rigidly braced to retain its configuration during handling and construction. Individual or loose bars will not be permitted. The Contractor shall show bracing and any extra reinforcing steel required for fabrication of the cage in the shop drawings.

The reinforcement shall be carefully positioned and securely fastened to provide the minimum clearances listed below, and to ensure that no displacement of the steel reinforcing bars occurs during placement of the concrete. The Contractor shall submit details of the proposed reinforcing cage centralizers along with the shop drawings required by item 6 of the shaft installation narrative. The reinforcing steel centralizers shall be placed at least at the quarter points around the circumference of the steel

reinforcing bar cage, and located vertically at least at the 1/4 and 3/4 points of the shaft length below the shaft cap.

The Contractor shall place bars as shown in the Plans with minimum concrete cover of three inches for shafts with diameters of three feet or less, and four inches for shafts with diameters greater than three feet.

Placing Concrete

Shaft concrete shall be Class 4000P. Concrete placement shall commence immediately after completion of excavation by the Contractor and inspection by the Engineer. Immediately prior to commencing concrete placement, the shaft excavation and the properties of the slurry (if used) shall conform to the excavation and slurry requirements specified elsewhere in this Special Provision. Concrete placement shall continue in one operation to the construction joint at the top of the shaft, as shown in the Plans.

During concrete placement, the Contractor shall monitor, and minimize, the difference in the level of concrete inside and outside of the steel reinforcing bar cage. The Contractor shall conduct concrete placement operations to maintain the differential concrete head as 1'-0" maximum.

When placing concrete in the dry, only the top five feet of concrete shall be vibrated. The amount and extent of vibration shall be sufficient to assure concrete flow to the outside of the shaft with full consolidation without causing segregation to occur. Temporary casing shall be removed before vibration. This requirement may be waived if the temporary casing is removed with a vibratory hammer during the concrete placement operation. Vibration of the top five feet of concrete does not affect the maximum slump allowed for the concrete class specified.

If water is not present, the concrete shall be deposited through the center of the reinforcement cage by a method which prevents segregation of aggregates and splashing of concrete on the reinforcement cage. The concrete shall be placed such that the free-fall is vertical down the center of the shaft without hitting the sides, the steel reinforcing bars, or the steel reinforcing bar cage bracing. The Section 6-02.3(6) restriction for 5’-0” maximum free-fall shall not apply to placement of Class 4000P concrete into a shaft.

When placing concrete underwater, including when water in a shaft excavation exceeds three inches in depth, the Contractor shall place the concrete by pressure feed using a concrete pump with a watertight tube having a minimum diameter of four inches. The discharge end of the tube on the concrete pump shall include a device to seal out water while the tube is first filled with concrete. Alternatively, the Contractor may use a plug that is inserted in the hopper of the concrete pump and travels through the tremie to keep the concrete separated from the water and slurry. Concrete placement by gravity feed is not allowed.

Throughout the underwater concrete placement operation, the discharge end of the tube shall remain submerged in the concrete at least five feet and the tube shall always contain enough concrete to prevent water from entering. The concrete placement shall be continuous until the work is completed, resulting in a seamless, uniform shaft.

Before placing any fresh concrete against concrete deposited in water or slurry, the Contractor shall remove all scum, laitance, loose gravel and sediment on the upper surface of the concrete deposited in water or slurry and chip off any high spots on the upper surface of the existing concrete that would prevent the steel reinforcing bar cage from being placed in the position required by the Plans.

The Contractor's construction operation in the vicinity of a drilled shaft excavation with freshly placed concrete and curing concrete shall conform to Section 6-02.3(6)D.

Except for shafts where the shaft concrete is placed in the dry, the Contractor shall complete a uniform yield form, consistent with the sample form submitted to the Engineer as part of the shaft installation plan, for each shaft and shall submit the completed form to the Engineer within 24 hours of completing the concrete placement in the shaft.

Casing Removal

As the temporary casing is withdrawn, the Contractor shall maintain the concrete and slurry inside the casing at a level sufficient to balance the hydrostatic pressure outside the casing. The Contractor shall completely remove all temporary casings.

8-21.4.GR8

Measurement

8-21.4.INST1.GR8

Section 8-21.4 is supplemented with the following:

8-21.4.OPT1.BSP.FB8

(BSP July 12, 2000)

*** $$1$$ *** contain(s) the following approximate quantities of material and work:

*** $$2$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the applicable sign structure lump sum contract price even though the actual quantities required may deviate from those listed.

8-21.5.GR8

Payment

8-21.5.INST1.GR8
Section 8-21.5 is supplemented with the following:

8-21.5.OPT1.BSP.GB8
(BSP August 4, 2008)
"Removing Sign Structure Shaft Obstructions", estimated.
Payment for removing obstructions, as defined in Section 8-21.3(9)F as supplemented in these Special Provisions, will be made for the changes in shaft construction methods necessary to remove the obstruction. The Contractor and the Engineer shall evaluate the effort made and reach agreement on the equipment and employees utilized, and the number of hours involved for each. Once these cost items and their duration have been agreed upon, the payment amount will be determined using the rate and markup methods specified in Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Removing Sign Structure Shaft Obstructions" in the bid proposal to become a part of the total bid by the Contractor.

If the shaft construction equipment is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then standby payment for the idled equipment will be added to the payment calculations. If labor is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then all labor costs resulting from Contractor labor agreements and established Contractor policies will be added to the payment calculations.

The Contractor shall perform the amount of obstruction work estimated by the Contracting Agency within the original time of the contract. The Engineer will consider a time adjustment and additional compensation for costs related to the extended duration of the shaft construction operations, provided:

1. the dollar amount estimated by the Contracting Agency has been exceeded, and

2. the Contractor shows that the obstruction removal work represents a delay to the completion of the project based on the current progress schedule provided in accordance with Section 1-08.3.

8-24.GR8
Rock and Gravity Block Wall and Gabion Cribbing

8-24.2.GR8
Materials

8-24.2.INST1.GR8
Section 8-24.2 is supplemented with the following:

8-24.2.OPT1.GR8
(January 7, 2002)
Gravity Block Wall
Gravity block wall blocks shall be rectangular prisms with dimensions 2'-5 1/2" by 2'-5 1/2" by 4'-11", except for special blocks which shall be as dimensioned in the Plans. All dimensions shall be ± 1/2".

Except as otherwise specified, gravity block wall blocks will be accepted by the Engineer based on visual inspection only, with no minimum compressive strength and no air content requirements for the concrete used in the block.

Gravity block wall blocks for permanent walls of heights greater than six feet and less than 15 feet shall be cast with Class 3000 concrete, conforming to the air content requirements of Section 6-02.3(2)A. Commercial concrete shall not be used. Gravity block wall blocks for permanent walls of these heights will be accepted based on visual inspection, and conformance to Section 6-02.3(27) and the specified concrete strength and air content requirements.

8-24.3.GR8

Construction Requirements

8-24.3(2).GR8

Gravity Block Wall

8-24.3(2).INST1.GR8

Section 8-24.3(2) is supplemented with the following:

8-24.3(2).OPT1.GR8

(January 7, 2002)

Definitions

Temporary Gravity Block Wall: A gravity block wall that is constructed and removed under the same contract. Temporary gravity block walls shall not exceed ten feet in height, measured from the bottom of the bottom row of blocks to the top of the highest block.

Permanent Gravity Block Wall: A gravity block wall that remains in place after the conclusion of the contract under which the gravity block wall was constructed. Permanent gravity block walls shall not exceed 15 feet in height, measured from the bottom of the bottom row of blocks to the top of the highest block.

Submittals

The Contractor shall submit working drawings of the gravity block wall to the Engineer for approval in accordance with Section 6-01.9. The working drawings shall include, but not be limited to, the following:

1. Plan, elevation, and section views of the wall, showing the layout, batter, and orientation of the blocks.

2. Dimensions and details of the blocks, including details and locations of block erection lifting loops and inserts, and the features designed to interlock blocks together if the blocks have such features.

3. Method and equipment used to erect the blocks.

4. Erection sequence.

The Contractor shall not begin fabricating gravity block wall blocks until receiving the Engineer's approval of the working drawing submittal.

Gravity Block Wall Erection

After excavating for the wall base, the Contractor shall grade the excavation for a width equal to or exceeding the width of the bottom row of blocks. The base shall be graded to the base elevation shown in the Plans and working drawings as approved by the Engineer, and shall accommodate the batter of the bottom row of blocks.

The Contractor shall erect the gravity block wall and place the backfill in accordance with the erection sequence as approved by the Engineer. The top of the gravity block wall shall be within two inches of the line and grade shown in the Plans. The backfill shall be compacted in accordance with Section 2-03.3(14)C, Method C.

The Contractor shall repair all large blemishes, honeycombed areas, and chipped surfaces, (25 square inches and larger) on the exposed face of the erected wall using methods and materials as approved by the Engineer.

8-25.GR8

Glare Screen

8-25.1.GR8

Description

8-25.1.INST1.GR8

Section 8-25.1 is supplemented with the following:

8-25.1.OPT1.GR8

(April 1, 2002)

This work shall consist of furnishing and constructing permanent and temporary barrier glare screen on concrete barrier in accordance with the Plans, these Specifications, and as directed by the Engineer.

8-25.2.GR8

Materials

8-25.2.INST1.GR8

Section 8-25.2 is supplemented with the following:

8-25.2.OPT1.GR8

(April 1, 2002)

Barrier Glare Screen

Barrier glare screen shall consist of modular units with vertical blades mounted on a horizontal base rail. Base rails and blades shall be made of non-warping, non metallic durable polymeric materials; shall be resistant to damage due to impacts, ultraviolet light, ozone, hydrocarbons, and other effects of atmosphere weathering; shall resist stiffening with age; and shall be designed for a minimum life equaling 60 months of outdoor service.

The color of blades shall be gray or green. Only one color shall be used throughout the project. The height of the blade shall be 24 inches. The blade width and spacing shall provide for a minimum 22 degree sight cutoff angle. The length of the unit shall be the same as the length of the concrete barrier that the unit is mounted on. The unit can be composed of smaller sub-units as long as the competed assembly is the same length as the concrete barrier. The unit shall not exceed 4.5 pounds per linear foot.

Brackets and mounting hardware may be metallic or non-metallic. Metallic brackets and anchor hardware shall be stainless steel or galvanized in accordance with ASTM A-153. Anchors shall be a stud mechanical system and shall include the necessary washers. The blade to rail base separation strength shall be a minimum of 1,500 pounds. Anchors shall have a minimum 3,000 pound pull-out and shear strength.

Barrier glare screen shall be selected from approved materials listed in the Qualified Products List.

Laboratory Tests

Three blades shall be cycled at 1000 hours in a weatherometer in accordance with ASTM G 53 (3 hr. 60C UV, 3 hr. 50C CON). The blades shall show no signs of delamination, distress, or discoloration. Physical properties of tensile strength and rigidity shall be maintained within 80 percent of the unconditioned values.

An impact test shall be performed on three partial sections of the modular unit consisting of the base rail and one blade. The temperature shall be 45 F. The modular unit shall be fastened in a similar fashion as to how the system would be used in the field. Each blade shall receive three impacts with a horizontal steel bar traveling at 50 MPH impacting at mid-height on the blade. After impact, the screening unit (blades and base) shall be inspected for the following criteria:

1. Any cracking, splitting, or delamination, other than surface cracking evident on only one face of the blade, is considered a failure.

2. If the blade leans more than 10 degrees from the vertical it is considered a failure.

3. Any separation of the blade from the base is considered a failure.

4. Any separation of the base from the attachment is considered a failure.

If an individual blade or base fails any of the above criteria, the product is unacceptable.

Pre-approval

In order for a particular model of temporary barrier glare screen to become pre-approved, the following conditions must be met:

1. The manufacturer must submit a written request for pre-approval along with samples for each model to be tested to: Materials Engineer, Department of Transportation Material Laboratory, P.O. Box 47365, Olympia, WA 98504-7365. Samples shall be complete with blades, base rail, and mounting hardware and shall be accompanied by the manufacture's written installation procedures.

2. The barrier screen will be field impact tested by the State Materials Laboratory to verify compliance with these specifications.

3. In lieu of State Materials Laboratory testing, the Lab will accept the results of pre-approved testing performed by the manufacturer or other agencies under the following conditions:

    a. The State Materials Laboratory is informed of the pre-approval testing sufficiently in advance in order to attend and observe. Attendance will be at the discretion of the Materials Laboratory.

    b. The results of the testing shall be reported in sufficient detail to enable the State Materials Laboratory to evaluate compliance with these specifications.

The Manufacturer must submit a certified test report, including test data developed by an approved testing laboratory, which demonstrates that the barrier screening complies with the requirements of the specifications. Certified test data supplied by the manufacturer shall be subject to verification by appropriate tests conducted by the State Materials Laboratory.

Frequency of field testing, evaluation, and pre-approval updating shall be at the sole discretion of the Materials Laboratory.

8-25.3.GR8

Construction Requirements

8-25.3.INST1.GR8

Section 8-25.3 is supplemented with the following:

8-25.3.OPT1.GR8

(April 1, 2002)

Barrier Glare Screen

The vertical blades shall be attached to the rail base in a positive mechanical manner to prevent unintentional blade rotation or dislocation. Barrier glare screen shall be attached to the top of the barrier using approved anchors and following the manufacturer's recommendations. Each modular unit of 10 feet or less shall be secured to the concrete barrier with anchors at a minimum of three points. Modular units greater than 10 feet in length shall be secured at a minimum of four points. Spanning the joint between concrete barrier sections will not be allowed.

When the temporary screening is no longer required, the Contractor shall remove the screening units. When noted in the contract that the screening will become the property of the Contracting Agency, the Contractor shall deliver and stockpile the screening units at the location noted in the contract.

8-25.4.GR8

Measurement

8-25.4.INST1.GR8
Section 8-25.4 is supplemented with the following:

8-25.4.OPT1.GR8
(April 1, 2002)
Barrier glare screen and temporary barrier glare screen will be measured by the linear foot along its completed line and slope.

8-25.5.GR8
Payment

8-25.5.INST1.GR8
Section 8-25.5 is supplemented with the following:

8-25.5.OPT1.GR8
(April 1, 2002)
“Barrier Glare Screen", per linear foot.
"Temporary Barrier Glare Screen", per linear foot.

8-29.GR8
Wire Mesh Slope Protection

8-29.1.GR8
Description

8-29.1.INST1.GR8
Section 8-29.1 is supplemented with the following:

8-29.1.OPT1.GR8
(April 5, 2010)
This work also consists of furnishing and installing cable net slope protection.

8-29.2.GR8
Materials

8-29.2.INST1.GR8
Section 8-29.2 is supplemented with the following:

8-29.2.OPT1.GR8
(April 2, 2012)
Cable Net Slope Protection Materials
Except where the Plans specify only one type of wire mesh backing material, wire mesh shall consist of either of the following:

1. 8x10 double-twisted, hexagonal wire mesh conforming to ASTM A 975

2. Chain link fabric conforming to Section 9-16.4(2) except that the chain link mesh grid shall be two inch square.

Unless otherwise specified, wire mesh shall be PVC coated. The color of the PVC coating shall be Federal Standard 595 color number 20045, unless otherwise specified in the Plans.

Wire rope for cable net panels specified in the Plans to be 5/16 inch nominal diameter shall be galvanized aircraft cable (GAC) construction, EIP steel, 7x7 or 7x19, having a nominal breaking strength of at least 9,200 pounds. 5/16 inch wire rope shall be fabricated and galvanized in accordance with Federal Specification RR-W-410E and ASTM A 1023.

Wire rope for cable anchors, and for other wire ropes specified in the Plans to be 3/4 inch nominal diameter or larger, shall be independent wire rope class (IWRC) construction, EIP steel, 6x19, and shall be galvanized in accordance with ASTM A 603 Class A.

Hardware shall conform to Section 9-16.4(4), with appropriate adjustments for the actual wire rope diameter used for the cable net slope protection. Jaw end swivels shall be galvanized after fabrication in accordance with Federal Specification RR-C-271D Type VII Class 3. Screw pin anchor shackles shall be galvanized after fabrication in accordance with Federal Specification RR-C-271D Type IVA Grade A Class 2.

Lacing wire for seaming the double-twisted wire mesh shall conform to Section 9-16.4(5).

Pressed ring fasteners for seaming the double-twisted wire mesh and fastening the mesh to the cable nets shall be made of high tensile steel.

Threaded bar ground anchors used for anchoring the top cable net support rope and steel post anchor assemblies to the ground surface as shown in the Plans shall be deformed continuously threaded steel reinforcement bars conforming to either Section 9-07.2 or Section 9-07.11 (Grade 60 or better). Threaded bar ground anchors shall be either epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3 or galvanized after fabrication in accordance with ASTM A 767 Class I.

Bearing plates shall conform to ASTM A 572 Grade 50 and shall be galvanized after fabrication in accordance with AASHTO M 111. Nuts shall conform to either ASTM A 563 Grade B, hexagonal, or Section 9-07.11. Washers shall conform to AASHTO M 293, except that plate washers shall conform to ASTM A 36. Nuts and washers shall be galvanized after fabrication in accordance with AASHTO M 111 for plate washers and AASHTO M 232 for all other hardware.

Steel posts shall conform to ASTM A 992 and shall be galvanized after fabrication in accordance with AASHTO M 111. Bars and plates welded to steel posts shall conform to ASTM A 572 Grade 50 and shall be galvanized after fabrication in accordance with AASHTO M 111.

Grout for soil anchors and ground anchors shall conform to Section 9-16.4(6).

Concrete for soil anchor deadmen shall be either commercial concrete conforming to Section 6-02.3(2)B or Class 3000 conforming to Section 6-02.

Steel reinforcing bars for soil anchor deadmen shall conform to Section 9-07.2, and shall be epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3.

8-29.3.GR8

Construction Requirements

8-29.3.INST1.GR8

Section 8-29.3 is supplemented with the following:

8-29.3.OPT1.GR8

(January 3, 2011)

Cable Net Slope Protection Construction Requirements

Submittals

The Contractor shall submit a cable net slope protection plan to the Engineer for approval in accordance with Section 6-01.9. The cable net slope protection plan shall include the following:

1. Identification of the supplier of the cable nets. The cable net supplier shall either be listed in the WSDOT Qualified Products List (QPL) or the WSDOT New Products List, or if not listed in the WSDOT QPL or WSDOT New Products List, the submittal shall include written documentation demonstrating satisfactory performance of cable nets furnished by this supplier in projects completed for other agencies in similar site conditions.

2. An inclusive list with catalogue cuts for the appurtenances to be used for the anchors, support system, seaming panels, wire mesh fasteners, anchor bars, grout, wire rope, clips, thimbles, ferrules, steel rings and other fastening hardware.

3. Mill certificates for the wire rope.

4. A 3'-0" square physical sample of the PVC coated wire mesh in the specified color.

5. The Contractor's plan for installing anchors for the cable net slope protection, and the equipment and process to be used to confirm the capacity of the constructed anchors. The calibration data for the stressing devices used to proof test the anchors, as completed by an independent testing laboratory within 60 calendar days of the submittal date of the cable net slope protection plan to the Engineer, shall be included.

6. Working drawings for the temporary yoke or load frame to be used for anchor proof testing.

7. The Contractor's plan for assembling the cable nets and wire mesh, and erecting the assembled nets on the slope.

The Contractor shall not begin cable net slope protection operations until receiving the Engineer's approval of the cable net slope protection plan.

Cable Net Slope Protection Assembly

The cable net panels shall conform to the following criteria:

Panel Size:	approximately 12 feet by 25 feet
Grid Size:	no larger than 12 inches by 12 inches
Interior and Perimeter Rope:	no smaller than 5/16 inch diameter

Cable nets shall be fabricated with a perimeter rope. Interior wire rope junctions shall be bound with either double knots of 1/8 inch diameter corrosion resistant wire, or high-strength, corrosion resistant clips with slotted bottoms made from 0.08 inch thick plate. All perimeter-interior wire rope junctions shall be bound with corrosion resistant ferrules.

Clips and ferrules shall be pressed on and tie wires knotted so as not to slip when manually stretched or during the placement of the nets. Clips and ferrules shall be secured in the manner intended by the manufacturer while not damaging the wire ropes. Cable net assemblies showing signs of slight damage as determined by the Engineer will be subject to rejection.

Cable Net Slope Protection Installation

Cable net slope protection shall be installed in accordance with the details shown in the Plans.

Anchors and the top horizontal support rope shall be located a minimum of 15 feet beyond the slope crest, at locations receiving the Engineer's approval.

Anchors shall achieve the specified anchor capacity in vertical pullout. If double anchors are used, they shall be installed to ensure equal load distribution to both anchors, and each anchor shall achieve 60 percent of the specified anchor capacity in vertical pullout. For vertical pullout proof testing, an anchor is acceptable if it sustains the specified capacity for 10 minutes with no loss of load. Anchors that fail this criterion shall be replaced and retested at no additional expense to the Contracting Agency. For Type 1 cable net slope protection, up to 25 percent of the support rope anchors shall be proof tested. For Type 2 cable net slope protection, all support rope anchors shall be proof tested. Up to 25 percent of the side and back anchors shall be proof tested at the discretion of the Engineer. If more than three anchors fail, the Contractor shall proof test all anchors.

Proof testing of anchors shall be performed against a temporary yoke or load frame. No part of the temporary yoke or load frame shall bear within three feet of the anchor being tested.

Unless otherwise specified in the Plans, the wire mesh shall be placed on the outside of the cable net panels, and lapped and fastened as detailed in the Plans. With the exception of vertical seaming of the net panels, the wire mesh shall be connected to the cable net panels as shown in the Plans prior to placement on the slope.

All galvanized steel with exposed steel or damaged galvanizing shall be repaired in place after erection of the cable net slope protection in accordance with Section 6-07.3(9)I with paint conforming to Section 9-08.1(2)B.

8-29.4.GR8

Measurement

8-29.4.INST1.GR8

Section 8-29.4 is supplemented with the following:

8-29.4.OPT1.GR8

(April 5, 2010)

Cable net slope protection will be measured by the square foot of cable net panels erected on the slope.

8-29.5.GR8

Payment

8-29.5.INST1.GR8

Section 8-29.5 is supplemented with the following:

8-29.5.OPT1.GR8

(January 3, 2011)

"Cable Net Slope Protection Type ___", per square foot.

The unit contract price per square foot for "Cable Net Slope Protection Type ___" shall be full pay for performing the work as specified, including fabrication and installation of all steel posts and anchors and all anchor proof testing.

8-SA1.GR8

(March 13, 1995)

FIELD OFFICE BUILDING

Description

This work shall consist of furnishing and setting-up a temporary office building for the sole use of the Contracting Agency.

Construction Requirements

The building shall be set-up, at the location designated by the Engineer, within the first 10 working days, unless the Engineer has approved a different schedule.

The building shall be weather-tight, installed plumb and level, and provided with the following as a minimum:

1. 240 square feet of floor space
2. Above ground floor
3. Heat
4. Electric lights
5. Telephone
6. Adequate windows
7. Six square feet of shelving
8. Plan table: 3 feet 6 inches deep by 6 feet wide by 3 feet 3 inches high
9. Drafting stool
10. Conference table: 4 foot by 8 foot
11. Four chairs

12. Cylinder door lock and six keys
13. Sanitary facilities (unless existing facilities are available)

The building shall remain the property of the Contractor and removed from the site upon physical completion of the contract, or when designated by the Engineer.

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid item:

"Field Office Building", lump sum.

The lump sum contract price for "Field Office Building" shall be full pay for furnishing, installing, maintaining, and removing the facility, including all costs associated with all required utility hook-ups and disconnects, and monthly utility charges for all utilities except telephone.

The monthly telephone costs will be paid by the Contracting Agency.

8-SA2.GR8

April 4, 2011

BOLLARDS

Description

This work shall consist of furnishing and installing steel bollards in accordance with the Plans, Standard Plans, and these Specifications, at the locations shown in the Plans or as staked by the Engineer.

Materials

Posts and Hardware

Type 1 and Type 2 bollard posts shall be ASTM A 53, NPS 3 (3” Nom.) schedule 80 steel pipe. Post sleeves shall be ASTM A 53, NPS 4 (4”Nom.) schedule 40 steel pipe.

Type 3 bollard posts shall be steel structural tubing per ASTM A 500 Gr B.

Steel plate shall be per ASTM A 36.

All steel parts shall be hot-dip galvanized after fabrication in accordance with AASHTO M 111.

Reflective Tape

Reflective tape shall be one of the following or an approved equal:

Scotchlite High Intensity Grade Series 2870
Reflexite AP-1000
Scotchlite Diamond Grade LDP Series 3970
T-6500 High Intensity (Type IV)

Concrete

Footings shall be constructed using concrete Class 3000.

Construction Requirements

Bollards shall be constructed in accordance with the Standard Plans.

Bollards shall not vary more than 1/2 inch in 30 inches from a vertical plane.

Bollard posts and the exposed parts of the base assembly shall be painted in accordance with Section 6-07.3(11) for galvanized surfaces. The top coat shall match Federal Standard 595, Color No. 33538 Traffic Signal Yellow.

Measurement

Measurement for bollards will be by the unit for each type of bollard furnished and installed.

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid items:

"Bollard Type ___", per each.

DIVISION9.GR9

Division 9
Materials

APPENDIX1.FR9

Appendices
(January 2, 2012)

The following appendix is attached and made a part of this contract:

*** $$1$$ ***

[Fill-in is the name, title, and if necessary the page numbers of the appendix, formatted as shown in the following sample:]

APPENDIX A:
Summary of Geotechnical Conditions, Page __ through Page __.

APPENDIX2.FR9

Appendices
(January 2, 2012)

The following appendices are attached and made a part of this contract:

*** $$1$$ ***

[Fill-in is the name, title, and if necessary the page numbers of the appendices, formatted as shown in the following sample:]

APPENDIX A:
Summary of Geotechnical Conditions, Page __ through Page __.

APPENDIX B:

(Name of Report or Document), Page __ through Page __.

STDPLANS.GR9

(April 2, 2012)

Standard Plans

The State of Washington Standard Plans for Road, Bridge and Municipal Construction M21-01 transmitted under Publications Transmittal No. PT 09-013, effective April 2, 2012 is made a part of this contract.

The Standard Plans are revised as follows:

B-10.20 and B10.40
Substitute “step” in lieu of “handhold” on plan

C-14a
SECTION B, callout – 1½” PVC CONDUIT (TYP.) is revised to read: 1¼” PVC CONDUIT (TYP.) callout (mark) 8 #9 ~ 36” (TYP.) is revised to read: callout (mark) 8 #8 ~ 36” (TYP.) EPOXY BAR EXPANSION JOINT DETAIL, callout (mark) W #9 (epoxy coated symbol) ~ 36” (TYP.) is revised to read: callout (mark) 8 #8 (epoxy coated symbol) ~ 36” (TYP.)

C-23.60
Note 4. For anchor post assembly details, see Standard Plan C-1b. Use detail on this plan for wood breakaway post. (No block on this post)

Is revised as follows:

Note 4. For anchor post assembly details, refer to standard plan C-1b for Sim. Installation, with the exception of using the wood breakaway post detail, this plan. (No block on this post). Typical for both steel or wood guardrail runs.

G-24.40
Existing callout - CORNER BOLT (TYP.)
New callout - CORNER BOLT OR SHOULDER BOLT (TYP.)

I-30.50
Deleted

J-1f
Note 2, reference to J-7d is revised to J-15.15
References to J-9a (3 instances) are revised to J-60.05

J-3b
Sheet 2 of 2, Plan View of Service Cabinet, Boxed Note, “SEE STANDARD PLAN J-6C…” is revised to read: “SEE STANDARD PLAN J-10.10…”
Sheet 2 of 2, Plan View of Service Cabinet Notes, references to Std. Plan J-9a are revised to J-60.05 (3 instances).

J-7c
Note 3, reference to J-7d is revised to J-15.15

J-16b
Key Note 1, reference to J-16a is revised to J-40.36

J-16c
Key Note 1, reference to J-16a is revised to J-40.36

J-20.10
Sheet 2, 2-Way Mounting Angle Detail,
Dimension 1.625” is revised to 1.8125”
Dimension 2.375” is revised to 2.1875”

J-75.40
Monotube Sign Structure, elevation, callout – EQUIPMENT GROUNDING CONDUCTOR ~ SIZE PER NEC. MINIMUM SIZE # 8
Is revised to read; EQUIPMENT GROUNDING CONDUCTOR ~ SIZE PER NEC minimum size # 4 AWG
Detail C, callout– EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL REINFORCING BAR, SIZE PER NEC MIN. SIZE # 8
Is revised to read; EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL REINFORCING BAR, SIZE PER NEC minimum size # 4 AWG

J-75.45
elevation, callout – EQUIPMENT GROUNDING CONDUCTOR ~ SIZE PER NEC. MINIMUM SIZE # 8

Is revised to read:

EQUIPMENT GROUNDING CONDUCTOR ~ SIZE PER NEC minimum size # 4 AWG

Detail D, callout– EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL REINFORCING BAR, SIZE PER NEC. MIN. SIZE # 8

Is revised to read:

EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL REINFORCING BAR, SIZE PER NEC minimum size # 4 AWG

K-80.30
In the NARROW BASE, END view, the reference to Std. Plan C-8e is revised to Std. Plan K-80.35

L-20.10, Sheet 1
Delete all references to tension cable and substitute tension wire. Add knuckled selvage is required on the top edge of the fence fabric.

L-20.10, Sheet 2
Delete all references to tension cable and substitute tension wire. All rope thimbles, wire rope clips and seizing are not required.

L-30.10, Sheet 1

Delete all references to tension cable and substitute tension wire.

L-30.10, Sheet 2

Delete all references to tension cable and substitute tension wire. All rope thimbles, wire rope clips and seizing are not required.

The following are the Standard Plan numbers applicable at the time this project was advertised. The date shown with each plan number is the publication approval date shown in the lower right-hand corner of that plan. Standard Plans showing different dates shall not be used in this contract.

A-10.10-00.....8/7/07
A-10.20-00.....10/5/07
A-10.30-00.....10/5/07
A-20.10-00.....8/31/07
A-30.10-00.....11/8/07
A-30.15-00.....11/8/07
A-30.30-01.....6/16/11
A-30.35-00.....10/12/07
A-40.00-00.....8/11/09
A-40.10-02.....6/2/11
A-40.15-00.....8/11/09
A-40.20-00.....9/20/07
A-40.50-01.....6/2/11
A-50.10-00…....11/17/08
A-50.20-01….....9/22/09
A-50.30-00….....11/17/08
A-50.40-00….....11/17/08
A-60.10-01.....10/14/09
A-60.20-02.....6/2/11
A-60.30-00.....11/8/07
A-60.40-00.....8/31/07

B-5.20-01.....6/16/11
B-5.40-01.....6/16/11
B-5.60-01.....6/16/11
B-10.20-00.....6/1/06
B-10.40-00.....6/1/06
B-10.60-00.....6/8/06
B-15.20-00.....6/1/06
B-15.40-00.....6/1/06
B-15.60-00.....6/1/06
B-20.20-01.....11/21/06
B-20.40-02.....6/10/08
B-20.60-02.....6/10/08
B-25.20-00.....6/8/06
B-25.60-00.....6/1/06
B-30.10-00.....6/8/06
B-30.20-01.....11/21/06
B-30.30-00.....6/1/06
B-30.40-00.....6/1/06
B-30.50-00.....6/01/06
B-30.70-02.....6/16/11
B-30.80-00.....6/8/06
B-30.90-01.....9/20/07
B-35.20-00.....6/8/06
B-35.40-00.....6/8/06
B-40.20-00.....6/1/06
B-40.40-01.....6/16/10
B-45.20-00.....6/1/06
B-45.40-00.....6/1/06
B-50.20-00.....6/1/06
B-55.20-00.....6/1/06
B-60.20-00.....6/8/06
B-60.40-00.....6/1/06
B-65.20-00.....6/1/06
B-65.40-00.....6/1/06
B-70.20-00.....6/1/06
B-70.60-00.....6/1/06
B-75.20-01.....6/10/08
B-75.50-01.....6/10/08
B-75.60-00.....6/8/06
B-80.20-00.....6/8/06
B-80.40-00.....6/1/06
B-82.20-00.....6/1/06
B-85.10-01.....6/10/08
B-85.20-00.....6/1/06
B-85.30-00.....6/1/06
B-85.40-00.....6/8/06
B-85.50-01.....6/10/08
B-90.10-00.....6/8/06
B-90.20-00.....6/8/06
B-90.30-00.....6/8/06
B-90.40-00.....6/8/06
B-90.50-00.....6/8/06
B-95.20-01.....2/3/09
B-95.40-00.....6/8/06

C-1.....6/16/11
C-1a.....10/14/09
C-1b.....6/16/11
C-1c.....5/30/97
C-1d.....10/31/03
C-2.....1/6/00
C-2a.....6/21/06
C-2b.....6/21/06
C-2c.....6/21/06
C-2d.....6/21/06
C-2e.....6/21/06
C-2f.....3/14/97
C-2g.....7/27/01
C-5.....6/16/11
C-6.....5/30/97
C-6a.....10/14/09
C-6c.....1/6/00
C-6d.....5/30/97
C-6f.....7/25/97
C-7.....6/16/11
C-7a.....6/16/11
C-8.....2/10/09
C-8a.....7/25/97
C-8b.....6/27/11
C-8e.....2/21/07
C-8f.....6/30/04
C-20.14-01.....10/14/09
C-20.15-00.....10/14/09
C-20.18-00.....10/14/09
C-20.19-00.....10/14/09
C-20.40-02.....6/16/11
C-20.42-02.....6/16/11
C-20.45.00.....6/16/11
C-22.14-02.....6/16/11
C-22.16-02.....6/16/11
C-22.40-02.....6/16/10
C-22.45.00.....6/16/11
C-23.60-01.....10/14/09
C-25.18-02.....6/16/11

C-2h.....3/28/97
C-2i.....3/28/97
C-2j.....6/12/98
C-2k.....7/27/01
C-2n.....7/27/01
C-2o.....7/13/01
C-2p.....10/31/03
C-3.....6/27/11
C-3a.....10/4/05
C-3b.....6/27/11
C-3c.....6/27/11
C-4b.....6/8/06
C-4e.....2/20/03
C-4f.....6/16/11
C-10.....6/3/10
C-13.....7/3/08
C-13a.....7/3/08
C-13b.....7/3/08
C-13c.....7/3/08
C-14a.....7/3/08
C-14b.....7/26/02
C-14c.....7/3/08
C-14d.....7/3/08
C-14e.....7/3/08
C-15a.....7/3/08
C-15b.....7/3/08
C-16a.....6/3/10
C-16b.....6/3/10
C-25.20-04.....10/14/09
C-25.22-03.....10/14/09
C-25.26-01.....10/14/09
C-25.80-01.....7/3/08
C-28.40-01.....6/16/11
C-40.14-01.....6/3/10
C-40.16-01.....6/3/10
C-40.18-01.....10/14/09
C-85.14-00.....6/16/11
C-85.15-00.....6/16/11
C-85.16-00.....6/16/11
C-85-18-00.....6/16/11
C-85.20-00.....6/16/11
C-90.10-00.....7/3/08

1

D-2.04-00.....11/10/05
D-2.06-01.....1/6/09
D-2.08-00.....11/10/05
D-2.14-00.....11/10/05
D-2.16-00.....11/10/05
D-2.18-00.....11/10/05
D-2.20-00.....11/10/05
D-2.32-00.....11/10/05
D-2.34-01.....1/6/09
D-2.36-02.....1/6/09
D-2.42-00.....11/10/05
D-2.44-00.....11/10/05
D-2.60-00.....11/10/05
D-2.62-00.....11/10/05
D-2.46-00.....11/10/05
D-2.48-00.....11/10/05
D-2.64-01.....1/6/09
D-2.66-00.....11/10/05
D-2.68-00.....11/10/05
D-2.80-00.....11/10/05
D-2.82-00.....11/10/05
D-2.84-00.....11/10/05
D-2.86-00.....11/10/05
D-2.88-00.....11/10/05
D-2.92-00.....11/10/05
D-3.....6/2/11
D-3.10-00……6/16/10
D-3.11-00……6/16/10
D-3.17-00……6/16/11
D-3.15-00……6/16/11
D-3.16-00……6/16/11
D-4.....12/11/98
D-6.....6/19/98
D-10.10-01.....12/2/08
D-10.15-01.....12/2/08
D-10.20-00.....7/8/08
D-10.25-00.....7/8/08
D-10.30-00.....7/8/08
D-10.35-00.....7/8/08
D-10.40-01.....12/2/08
D-10.45-01.....12/2/08
D-15.10-01.....12/2/08
D-15.20-02.....6/2/11
D-15.30-01.....12/02/08

2

E-1.....2/21/07
E-2.....5/29/98
E-4.....8/27/03
E-4a.....8/27/03

3

F-10.12-02.....6/16/11
F-10.16-00.....12/20/06
F-10.18-00.....6/27/11
F-10.40-01.....7/3/08
F-10.42-00.....1/23/07
F-10.62-01.....9/05/07
F-10.64-02.....7/3/08
F-30.10-01.....6/3/10
F-40.12-01.....6/3/10
F-40.14-01.....6/3/10
F-40.15-01.....6/3/10
F-40.16-01.....6/3/10
F-45.10-00.....6/3/10
F-80.10-01.....6/3/10

4

G-10.10-00.....9/20/07
G-20.10-00.....9/20/07
G-22.10-01.....7/3/08
G-24.10-00.....11/8/07
G-24.20-00.....11/8/07
G-24.30-00.....11/8/07
G-24.40-01.....12/2/08
G-24.50-00.....11/8/07
G-24.60-01.....6/16/11
G-25.10-02.....6/27/11
G-30.10-01.....6/16/11
G-50.10-00.....11/8/07
G-60.10-01.....6/27/11
G-60.20-01.....6/27/11
G-60.30-01.....6/27/11
G-70.10-01.....6/27/11
G-70.20-01....6/27/11
G-70.30-01.....6/27/11
G-90.10-01…..5/11/11
G-90.20-01…..6/27/11
G-90.30-01…..6/2/11
G-90.40-01…..10/14/09
G-95.10-01.....6/2/11
G-95.20-02.....6/2/11
G-95.30-02.....6/2/11

5

H-10.10-00.....7/3/08
H-32.10-00.....9/20/07
H-70.10-00.....9/5/07

H-10.15-00.....7/3/08
H-30.10-00.....10/12/07
H-60.10-01.....7/3/08
H-60.20-01.....7/3/08
H-70.20-00.....9/5/07
H-70.30-01.....11/17/08

1

I-10.10-01.....8/11/09
I-30.10-01.....8/11/09
I-30.15-00.....8/11/09
I-30.20-00.....9/20/07
I-30.30-00.....9/20/07
I-30.40-00.....10/12/07
I-40.10-00.....9/20/07
I-40.20-00.....9/20/07
I-50.10-00.....9/20/07
I-50.20-00.....8/31/07
I-60.10-00.....8/31/07
I-60.20-00.....8/31/07
I-80.10-01.....8/11/09

2

J-1f.....6/23/00
J-3.....8/1/97
J-3b.....3/4/05
J-3c.....6/24/02
J-3d.....11/5/03
J-7c.....6/19/98
J-10.....7/18/97
J-10.10-01……5/11/11
J-12.....2/10/09
J-15.15-00……6/16/10
J-16b.....2/10/09
J-16c.....2/10/09
J-20.10-00.....10/14/09
J-20.15-00.....10/14/09
J-20.16-00.....10/14/09
J-20.20-00.....10/14/09
J-20.26-00.....10/14/09
J-21.10-02.....6/27/11
J-21.15-00.....10/14/09
J-21.16-00.....10/14/09
J-21.17-00.....10/14/09
J-21.20-00.....10/14/09
J-22.15-00.....10/14/09
J-22.16-01.....6/3/10
J-26.10-01…..6/27/11
J-26.15-00…..6/16/10
J-28.10-01.....5/11/11
J-28.22-00.....8/07/07
J-28.24-00.....8/07/07
J-28.26-01.....12/02/08
J-28.30-02.....6/27/11
J-28.40-01.....10/14/09
J-28.42-00.....8/07/07
J-28.45-01.....6/27/11
J-28.50-02.....6/2/11
J-28.60-01.....6/2/11
J-28.70-01.....5/11/11
J-29.10-00.....6/27/11
J-29.15-00.....6/27/11
J-29.16-00.....6/27/11
J-40.10-02…...5/11/11
J-40.20-00…...5/11/11
J-40.30-02……5/11/11
J-40.36-00…….6/3/10
J-40.37-00…….6/3/10
J-40.38-00.....6/16/11
J-50.10-00…….6/3/11
J-50.11-00…….6/3/11
J-50.12-00…….6/3/11
J-50.15-00…….6/3/11
J-50.16-00…….6/3/11
J-50.20-00…….6/3/11
J-50.25-00…….6/3/11
J-50.30-00…….6/3/11
J-60.05-00…….6/16/11
J-60.13-00….....6/16/10
J-60.14-00……6/16/10
J-75.10-01……5/11/11
J-75.20-00……2/10/09
J-75.30-01…….5/11/11
J-75.40-00……10/14/09
J-75.45-00……10/14/09
J-90.10-01…….6/27/11
J-90.20-01…….6/27/11

3

K-10.20-01.....10/12/07
K-10.40-00.....2/15/07
K-20.20-01.....10/12/07
K-20.40-00.....2/15/07
K-20.60-00.....2/15/07
K-22.20-01.....10/12/07
K-24.20-00.....2/15/07
K-24.40-01.....10/12/07
K-24.60-00.....2/15/07
K-24.80-01.....10/12/07
K-26.20-00.....2/15/07
K-26.40-01.....10/12/07
K-30.20-00.....2/15/07
K-30.40-01.....10/12/07
K-32.20-00.....2/15/07
K-32.40-00.....2/15/07
K-32.60-00.....2/15/07
K-32.80-00.....2/15/07
K-34.20-00.....2/15/07
K-36.20-00.....2/15/07
K-40.20-00.....2/15/07
K-40.40-00.....2/15/07
K-40.60-00.....2/15/07
K-40.80-00.....2/15/07
K-55.20-00.....2/15/07
K-60.20-02.....7/3/08
K-60.40-00.....2/15/07
K-70.20-00.....2/15/07
K-80.10-00.....2/21/07
K-80.20-00.....12/20/06
K-80.30-00.....2/21/07
K-80.35-00.....2/21/07
K-80.37-00.....2/21/07

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L-10.10-01.....6/16/11
L-20.10-01.....6/16/11
L-30.10-01.....6/16/11
L-40.10-01.....6/16/11
L-40.15-01.....6/16/11
L-40.20-01.....6/16/11
L-70.10-01.....5/21/08
L-70.20-01.....5/21/08

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M-1.20-02.....6/3/11
M-1.40-02.....6/3/11
M-1.60-02.....6/3/11
M-9.60-00…….2/10/09
M-11.10-01.....1/30/07
M-15.10-01.....2/6/07
M-40.10-02.....5/11/11
M-40.20-00...10/12/07
M-40.30-00.....9/20/07

M-1.80-03.....6/3/11
M-2.20-02.....6/3/11
M-3.10-03.....6/3/11
M-3.20-02.....6/3/11
M-3.30-03.....6/3/11
M-3.40-03.....6/3/11
M-3.50-02.....6/3/11
M-5.10-02.....6/3/11
M-7.50-01.....1/30/07
M-9.50-01.....1/30/07
M-17.10-02.....7/3/08
M-20.10-02.....6/3/11
M-20.20-01.....1/30/07
M-20.30-02.....10/14/09
M-20.40-02.....6/3/11
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